Stantec Consulting Ltd.
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

July 12, 2017
File: 1609-60595

Attention: Mr. Sean Fairfield, Director Project Planning and Permitting
Algonquin Power Co.
354 Davis Road
Suite 100
Oakville, ON L6J 2X1

Dear Mr. Fairfield,

Reference: Amherst Island Wind Energy Project – Cataraqui Region Conservation Authority (CRCA) Culvert Sizing Design Brief – Phase 5

In response to the Government of Ontario's recent promotion of renewable energy development, Algonquin Power Co. (Algonquin), on behalf of Windlectric Inc., is proposing to construct and operate the Amherst Island Wind Energy Project located in Loyalist Township, Ontario. Development, operation and maintenance of the turbines requires the construction of access roads to all turbine locations within the project area. Fifteen (15) locations were identified requiring Cataraqui Region Conservation Authority (CRCA) regulated watercourse culvert crossings for access roads to maintain existing drainage and provide vehicular access to the proposed infrastructure. Four (4) of the watercourses were determined to be fish habitat and thus also fall under the jurisdiction of the Fisheries and Oceans Canada (DFO) and are identified as such. Culvert crossings not located on conservation authority regulated watercourses (i.e., access roads crossing roadside ditches) will be sized according to municipal standards.

This technical memorandum ("Brief") focuses on Phase 5 of the project (Eleven (11) culvert crossings) and documents the methodology and assumptions, as discussed with the CRCA, used in determining the appropriate design flows and dimensions of the proposed culverts. This Brief should be read as a component of the larger Permit Application Package which documents the existing environmental conditions at each crossing location and details the proposed strategy for mitigating potential impacts.

All proposed crossings are sized to accommodate runoff from storms with up to a 1:100-year return period, without causing any flood elevation increases to upstream landowners. Under large/infrequent events flows are permitted to passively flow overtop the access roads at locations coincident with, or immediately adjacent to, the structures. These culverts will help minimize the potential hydrologic effects on downstream features which could arise. Further, by minimizing the amount of flow over the road, the culverts ensure a reasonable level of dry access to the site and reduce potential erosion of granular material.

The location of each proposed culvert is identified on the appended Figures, with a summary of sizing details provided herein. Site-specific refinement to the location / design of individual

Reference: Amherst Island Wind Energy Project – Cataraqui Region Conservation Authority (CRCA) Culvert Sizing Design Brief – Phase 5

culverts may occur during the detailed design to ensure proper placement and sizing to convey flows, prevent pooling, and to maintain hydrology.

Design Criteria and Assumptions

Hydrologic Characterization

The hydrologic model SWMHYMO (Stormwater Management Hydrologic Model) was used to predict peak flows at each watercourse crossing and determine site specific culvert size requirements.

Inputs to the model included contributing drainage area, catchment slopes, land use, and soil types. Drainage areas, as illustrated in Figure Series 2, were delineated using GIS data and aerial imagery showing local drains and drainage patterns within the watersheds. Catchment slopes, land use and soil types were defined using GIS data, aerial photo interpretation, and observations made during in person site visits. Specific parameter considerations include:

- Surficial soil type information was obtained from GIS data provided by the Ontario Ministry of Natural Resources and Forestry (MNRF). The predominant surficial soil type in the project area is clay, corresponding to hydrologic soil group type 'CD' (Figure series 3)
- Active agriculture (cropland) was determined to be the dominant land use. Forest blocks and minimal impervious coverage in the forms of roads, structures, and driveways are also present. (Figure series 4). Land slope was assessed using Ontario Base Mapping (OBM) contour data.
- Reach lengths, necessary in the assessment of hydrograph time-to-peak, were estimated using OBM data, aerial photos, and direct measurement.

The storm file used in the hydrologic model employed a 1:5-, 1:10- and 1:100-year, 24-hour, Soil Conservation Service (SCS) Type II distribution and is based on data obtained using the Ministry of Transportation Ontario Intensity Duration Frequency (IDF) Curve Lookup tool for the site (44.154167 N, 76.712500 W). The SCS is mainly utilized in undeveloped rural watersheds and has been determined to be an appropriate method to use in Southern Ontario.

Design Flow Estimation

The SWMHYMO hydrologic model was used to determine 5-, 10- and 100-year runoff flow rates from each catchment using the parameters described previously. Summary tables of hydrologic model parameters as well as model input and output files are appended, while design flow rates are summarized in Table 1.

Reference: Amherst Island Wind Energy Project – Cataraqui Region Conservation Authority (CRCA) Culvert Sizing Design Brief – Phase 5

Table 1: Target Design Flows

Water Crossing ID	Catchment Area (ha)	SWMHYMO Peak 5-year Flow (m^3/s)	SWMHYMO Peak 10-year Flow (m^3/s)	SWMHYMO Peak 100-year Flow (m^3/s)
RA 4	2.4	0.21	0.26	0.44
RA 27	7.1	0.45	0.57	1.00
RA 31	10.1	0.45	0.56	0.93
RA 32	9.7	0.50	0.62	1.01
RA 33	16.5	0.66	0.82	1.39
RA 34	3.7	0.20	0.25	0.42
RA 35a	4.1	0.24	0.30	0.49
RA 35b	8.3	0.41	0.51	0.85
RA 42	67.5	2.42	3.02	5.02
DFO Culvert 3	124.8	2.27	2.83	4.67
DFO Culvert 4	259.3	3.14	3.93	6.57

HEC-RAS Hydraulic Analysis

At the request of the Cataraqui Region Conservation Authority, the hydraulic analysis was completed using HEC-RAS v4.1.0 to estimate water levels at the proposed access road culvert locations to verify that backwater effects as a result of culvert installation would be minimal.

Model Development

The hydraulic model HEC-RAS v4.1.0 was used to estimate water levels at each crossing. This model is widely used to calculate water surface elevations and flow velocities throughout a watercourse based on channel cross section details and flow rates. The following parameters were used in model development.

- Culverts have been designed to convey the peak predicted flows under the 1:5-, 1:10- and 1:100 year storm events without increasing flood elevations on the neighboring properties
- The cross sections were obtained from topographic surveys of the area completed in November 2015. Additional site specific topographic information was collected in May 2017 to augment the model.
- The stream bed at the crossings are primarily earth with some grass. The channel morphology is consistent both upstream and downstream.

Reference: Amherst Island Wind Energy Project – Cataraqui Region Conservation Authority (CRCA) Culvert Sizing Design Brief – Phase 5

- The Manning's roughness coefficient values used in this analysis were selected based on a visual inspection of the existing channel. The channels were considered minor streams, with a regular section. The banks and floodplain are characterized as short grass and cultivated areas.

- To determine an appropriate downstream boundary for the model, the normal depth method was utilized where the slope of the channel was entered providing a normal depth computation for all profiles. The downstream channel slope was based on the slope of the channel through the study area.

- For ease of handling and potential for re-use, corrugated metal pipe (CMP) was the preferred material for the majority of the crossings.

- Culvert lengths were derived from Access Road Plan and Profile Drawings

Table 2: Water Crossing Culvert Sizing

Water Crossing ID	Shape	Material	# of Culverts - Dimensions (mm)
RA 4	Circular	CMP	2 - 600
RA 27	Circular	CMP	3 – 600
RA 31	Circular	CMP	2 - 1000
RA 32	Circular	CMP	2 - 1000
RA 33	Box	Concrete	2 – 2440 x 1220
RA 34	Circular	CMP	3 - 1000
RA 35a	Circular	CMP	3 - 500
RA 35b	Arch	CMP	1 - 560 x 420
RA 42	Arch	CMP	3 - 1390 x 970
DFO Culvert 3	Circular	CMP	2 – 1800 x 1200
DFO Culvert 4	Circular	CMP	4 - 1000

Model Results

As shown in the attached model results, proposed water surface elevations remain equal to or below existing water surface elevations at the upstream end of the modeled channel under the 5-, 10-, and 100-year events. Velocities within the vicinity of the proposed culverts are low due to the broad flat nature of the floodplain. In addition, the following factors were considered in determining the level of service required for the proposed access road:

- No access to residential dwellings will be provided via the proposed access road.

Reference: Amherst Island Wind Energy Project – Cataraqui Region Conservation Authority (CRCA) Culvert Sizing Design Brief – Phase 5

- Flow depths during the 1:5-year storm event at all proposed crossings are less than 0.3 m at the deepest point. Vehicle access is typically accommodated in depths in the range 0.3 m to 0.4 m (MNRF Technical Guide – River and Stream Systems: Flood Hazard Limit, 2002).
- During the operation phase of the project, access roads will be gated and used solely for maintenance purposes.
- Maintenance activities are not anticipated to be coincident with the peak flow timing of storm events
- Access roads are proposed to be at or near grade. It can be expected that minor roadway overtopping will occur at several locations throughout the project.

Culvert Opening Erosion Protection

Culverts will be constructed with a rip-rap apron installed at both the entrance and exit of the structure. The apron will be constructed of R-50 rip rap (OPSS 1004) with a minimum depth of 450 mm. Rip rap apron sizes for each culvert are shown in the attached drawings.

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Conclusion

Based on the preceding design brief the following conclusions can be drawn:

- The proposed culvert configurations are sufficient to pass flows during the 5-, 10- and 100-year rainfall events without causing an increase in water levels on neighboring properties
- Flow velocities overtopping the road are minimal. The recommended rip-rap sizing should be applied to the detailed culvert configurations.

We trust the enclosed is sufficient to address the culvert sizing requirements for the Amherst Island Wind Energy Project.

Should you have any questions or comments relating to this design, please do not hesitate to contact the undersigned at your convenience.

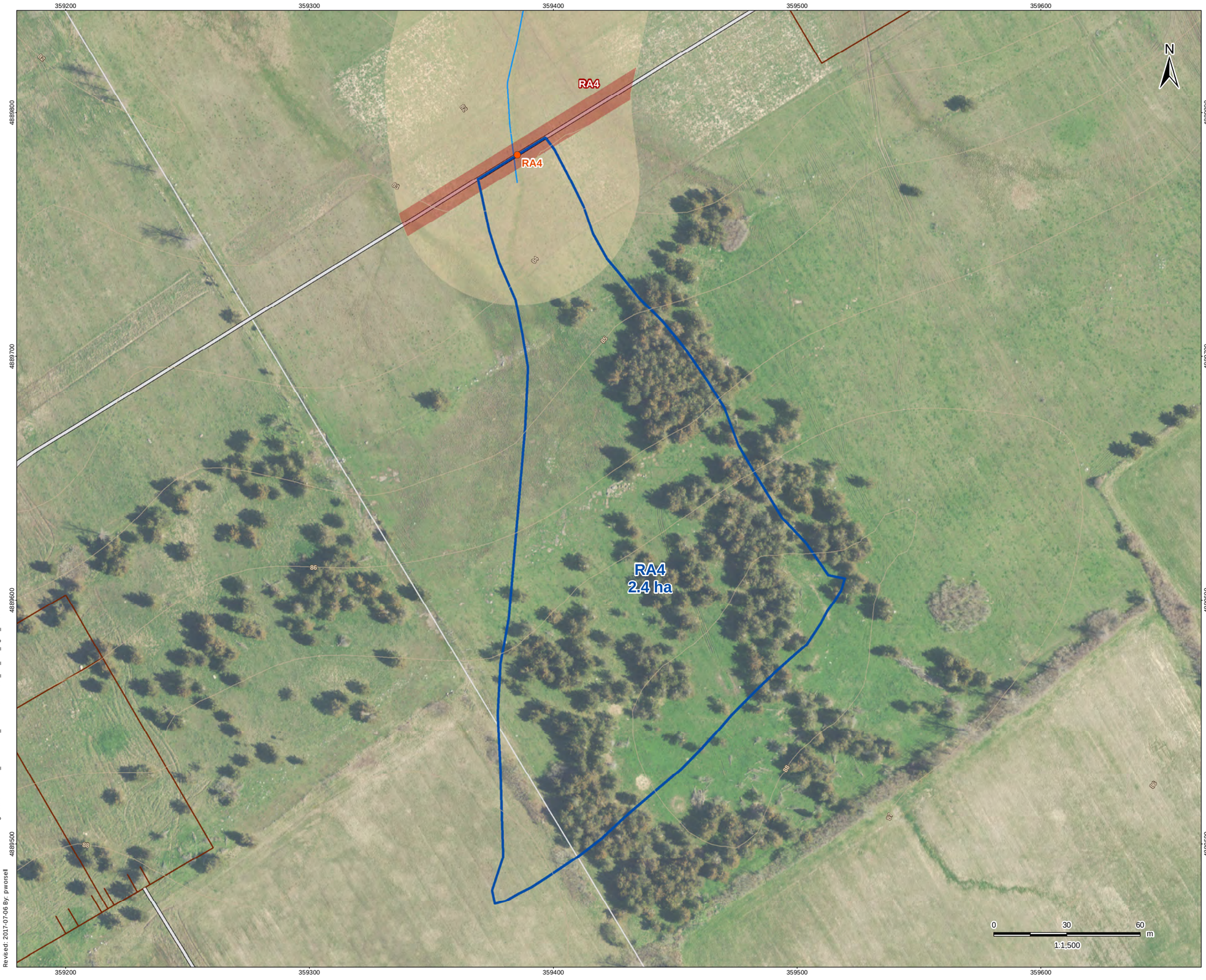
Regards,

STANTEC CONSULTING LTD.

Dave Williams, P.Eng.
Water Resources Engineer
Phone: (519) 585-7320
Fax: 519-579-6733
david.williams@stantec.com

Attachment: Figure Series 1 – Surface Water Catchment Areas
Figure Series 2 – Soils
Figure Series 3 – Woodlots
IDF Parameters – MTO IDF Curve Lookup for Amherst Island
Hydrologic Input Parameters
SWMHYMO Input and Summary Files
HEC-RAS Modeling Results

HYDROLOGIC ANALYSIS



Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

Notes

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Figure No.

1-1

Title

Surface Water Catchment Area - Culvert RA4

\\Cd1220-f02\01609\active\60960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
Revised: 2017-07-06 By: pworsell

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-2

Title

Surface Water Catchment Area - Culvert RA27

\\Cd1220-l02\01609\active\609605951\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
Revised: 2017-07-06 By: pworsell

366900 367000 367100 367200 367300 367400 367500 367600

4893700 4893600 4893500 4893400 4893300 4893200

Front Rd

Marshall 40 Foot Rd

RA31
10.1 ha

RA32
9.7 ha

RA31

RA32

N

0 60 120 m

1:2,500

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-3

Title

Surface Water Catchment Area - Culvert RA31

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Revised: 2017-07-06 By: pwoiser

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

Notes

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Figure No.

1-4

Title

Surface Water Catchment Area - Culvert RA32

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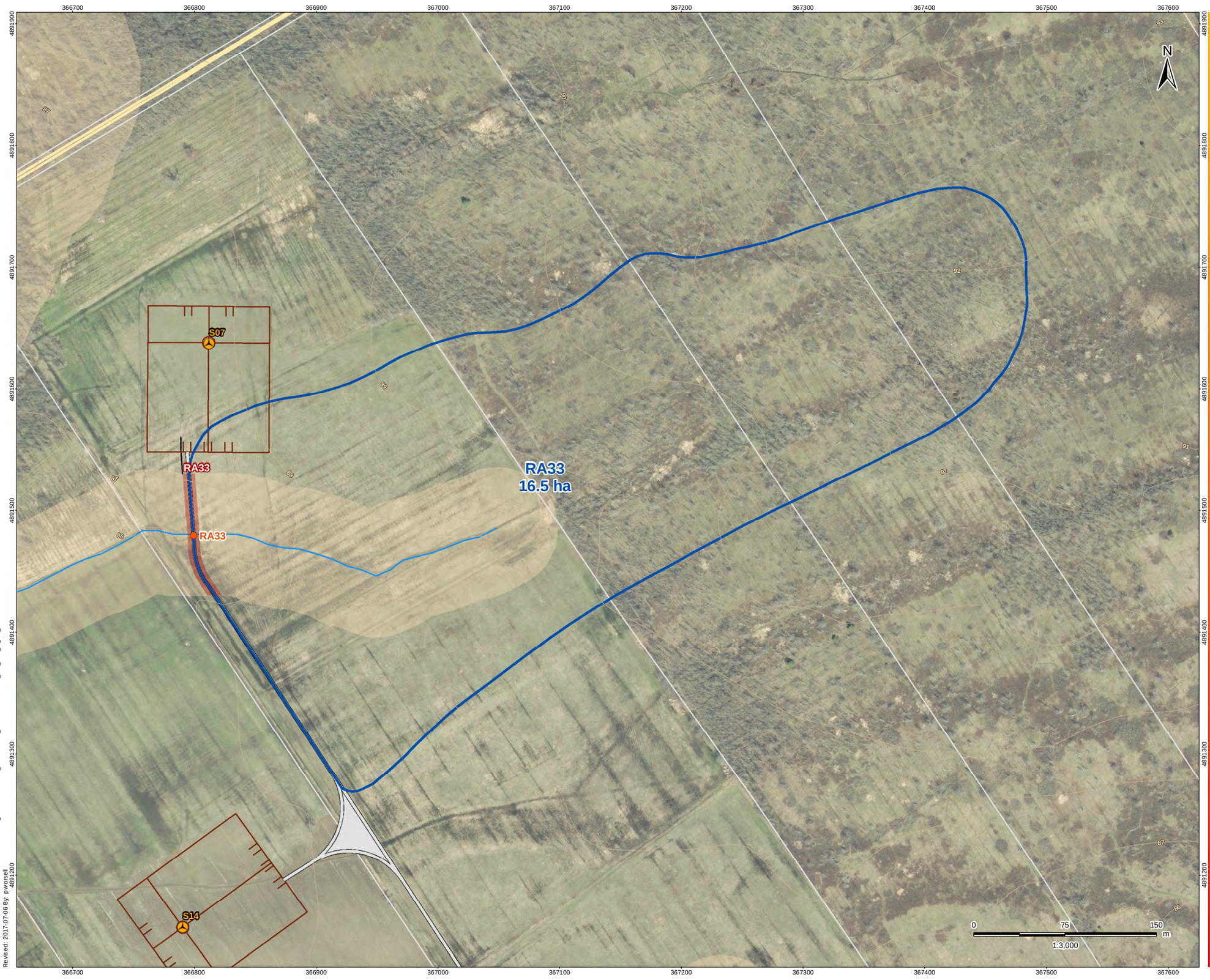

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-5

Title

Surface Water Catchment Area - Culvert RA33

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
Revised: 2017-07-06 By: pwoser#

366800 366900 367000 367100 367200

4891100 4891000 4890900 4890800

RA34
3.7 ha

RA35a
3.8 ha

RA35b
6.8 ha

RA34

RA34

RA35

N

0 30 60 m
1:1,500

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-6

Title

Surface Water Catchment Area - Culvert RA34

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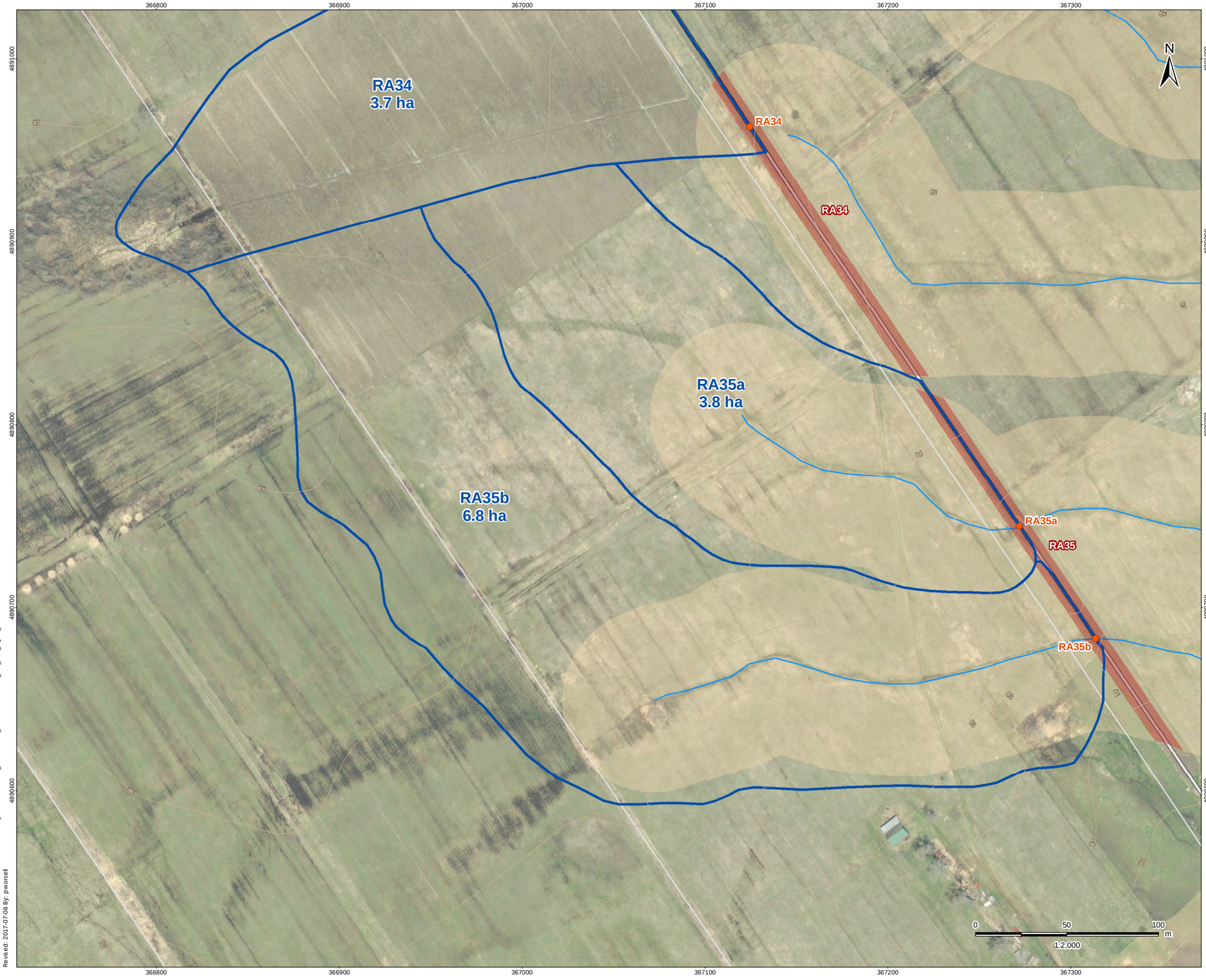

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

Notes

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Amherst Island Wind Energy Project

Figure No.

1-7

Title

Surface Water Catchment Area - Culvert RA35

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
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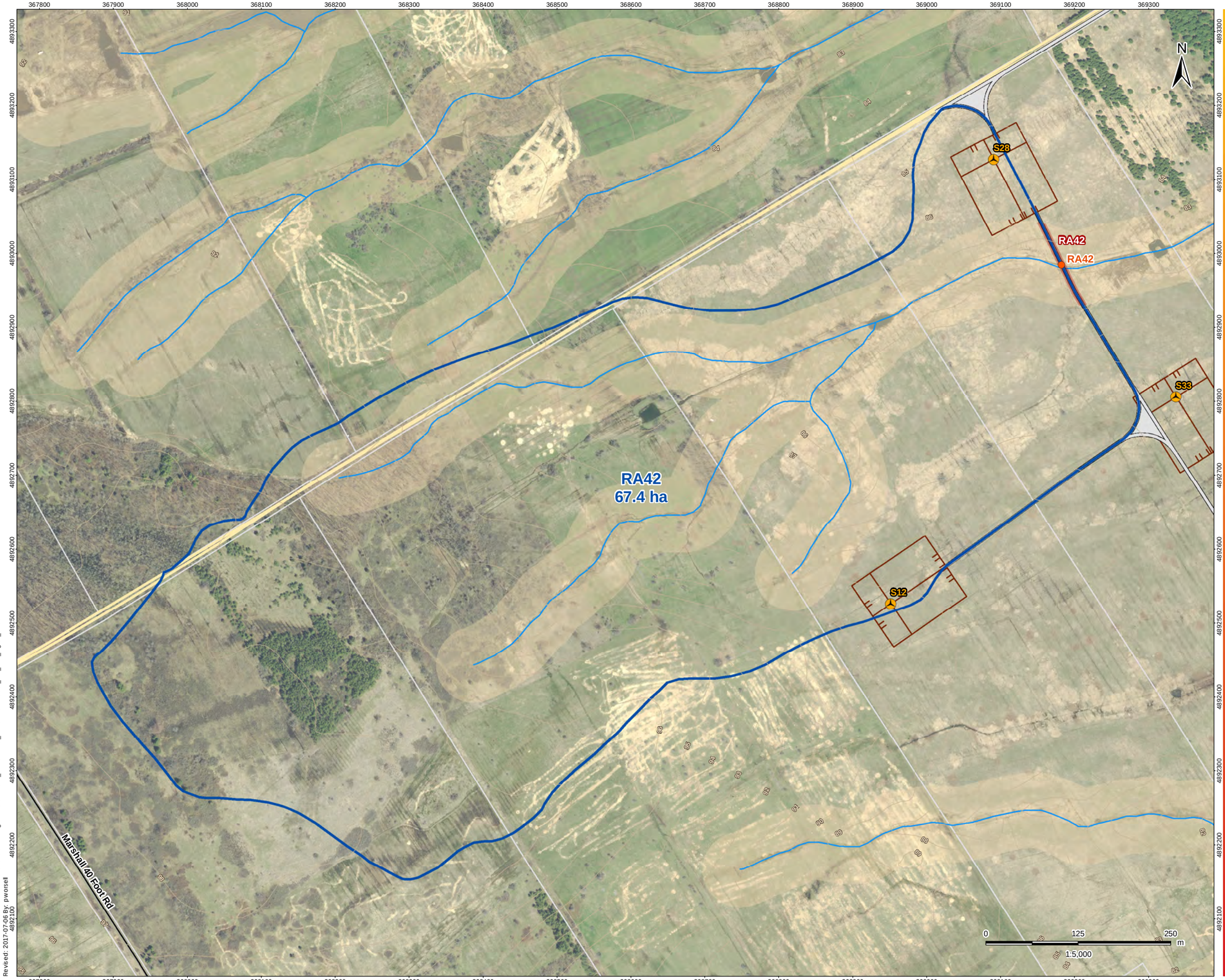

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Amherst Island Wind Energy Project

Figure No.

1-8

Title

Surface Water Catchment Area - Culvert RA42

\\Cd1220-f02\01609\active\609605951\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
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Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-9

Title

Surface Water Catchment Area - Culvert DFO Culvert 1

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
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Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-10

Title

Surface Water Catchment Area - Culvert DFO Culvert 2

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
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Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Figure No.

1-11

Title

Surface Water Catchment Area - Culvert DFO Culvert 3

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig01_SWCatchmentAreas.mxd
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Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment

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Amherst Island Wind Energy Project

Figure No.

1-12

Title

Surface Water Catchment Area - Culvert DFO Culvert 4

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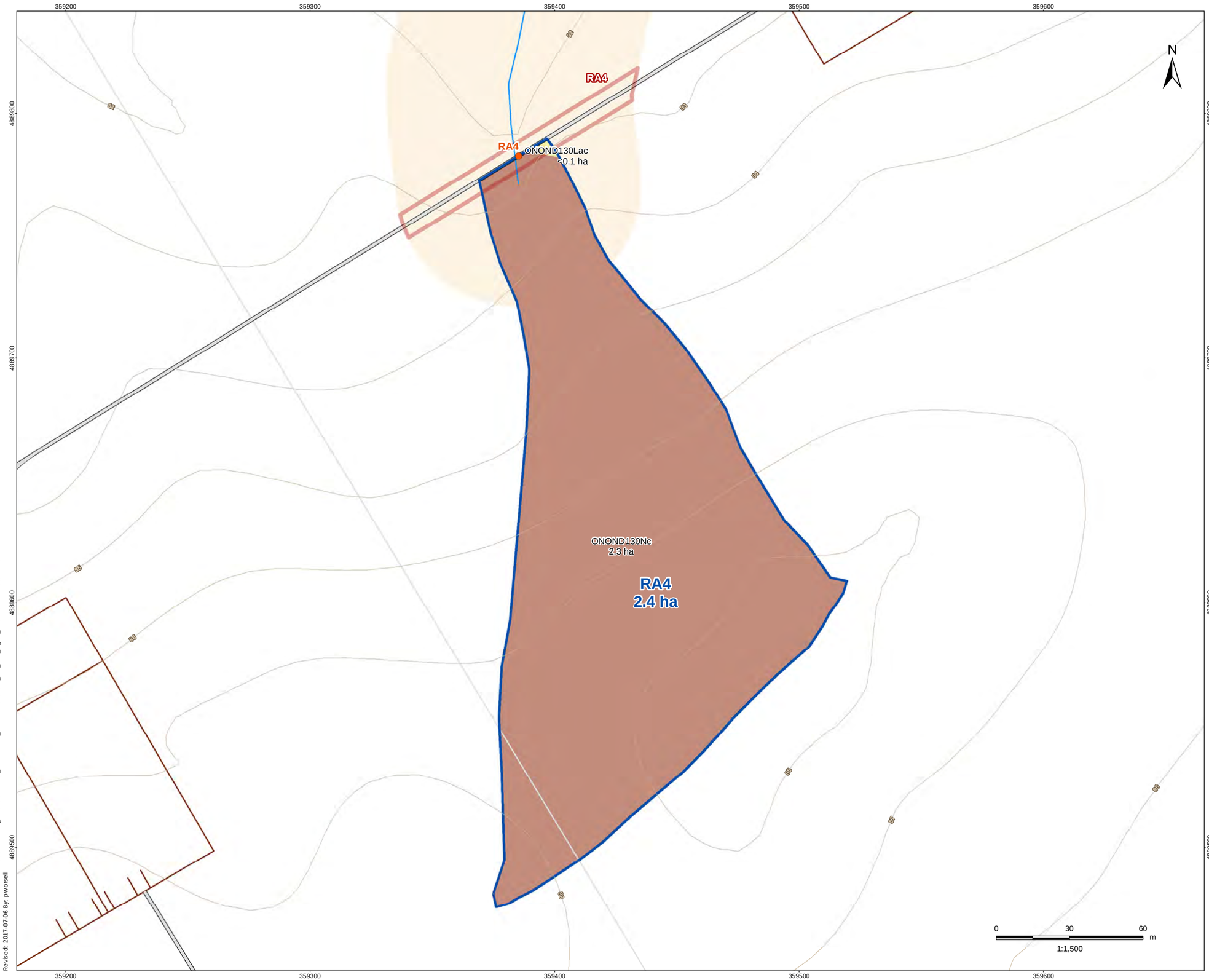

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Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

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Amherst Island Wind Energy Project

Figure No.

2-1

Title

Soils -
Culvert RA4

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
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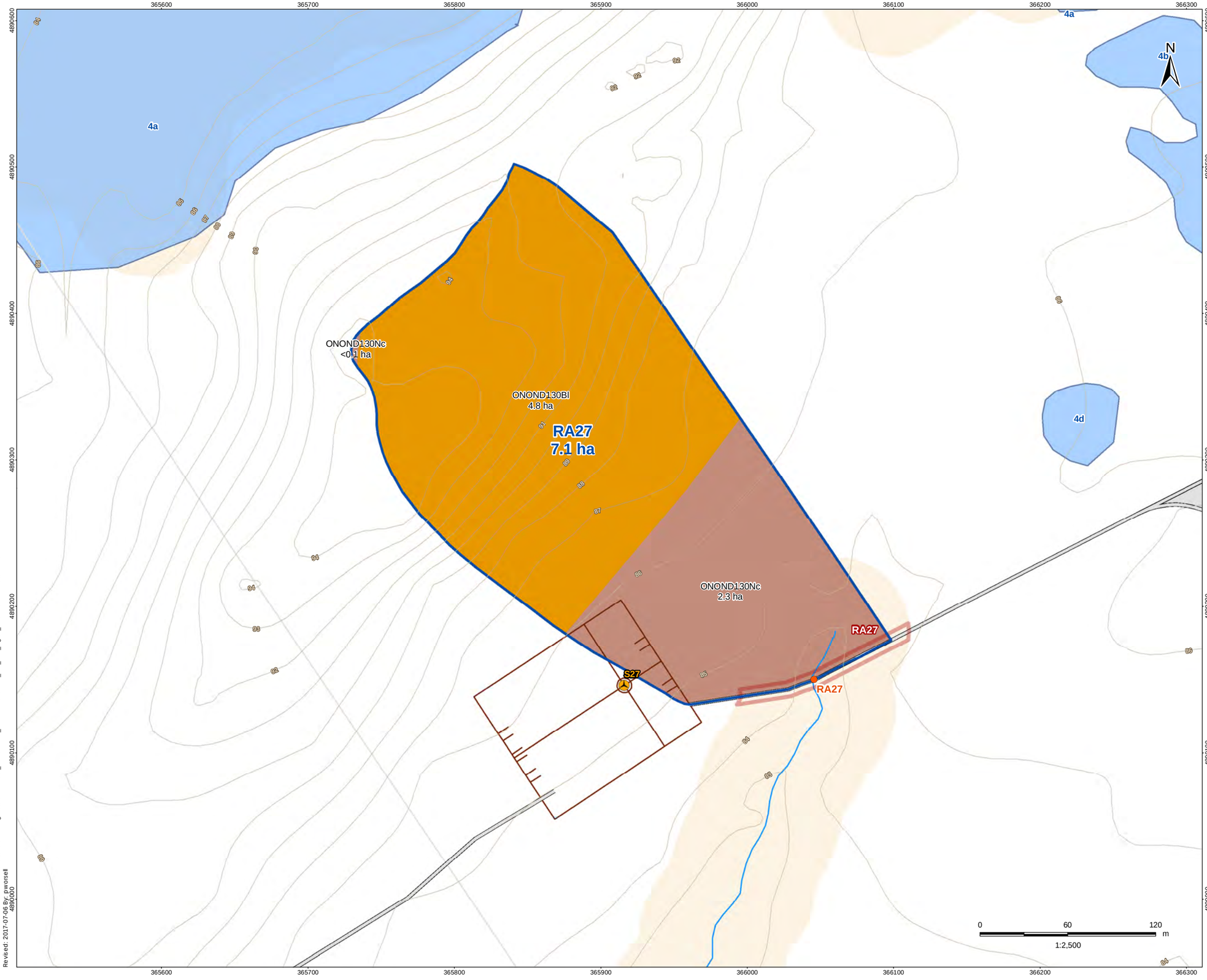

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Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Bonhead Loam
- Napanee Clay

Notes

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Client/Project

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Amherst Island Wind Energy Project

Figure No.

2-2

Title

Soils -
Culvert RA27

\\Cd1220-f02\01609\active\60960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
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366900 367000 367100 367200 367300 367400 367500 367600

4893700 4893600 4893500 4893400 4893300 4893200

Lake Ontario

Front Rd

Marshall 40 Foot Rd

ONOND130Fl
1.1 ha

RA31
10.1 ha

ONOND130Nc
9.1 ha

RA32
9.7 ha

RA31

RA32

5C

N

0 60 120 m

1:2,500

Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Farmington Loam
- Napanee Clay

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

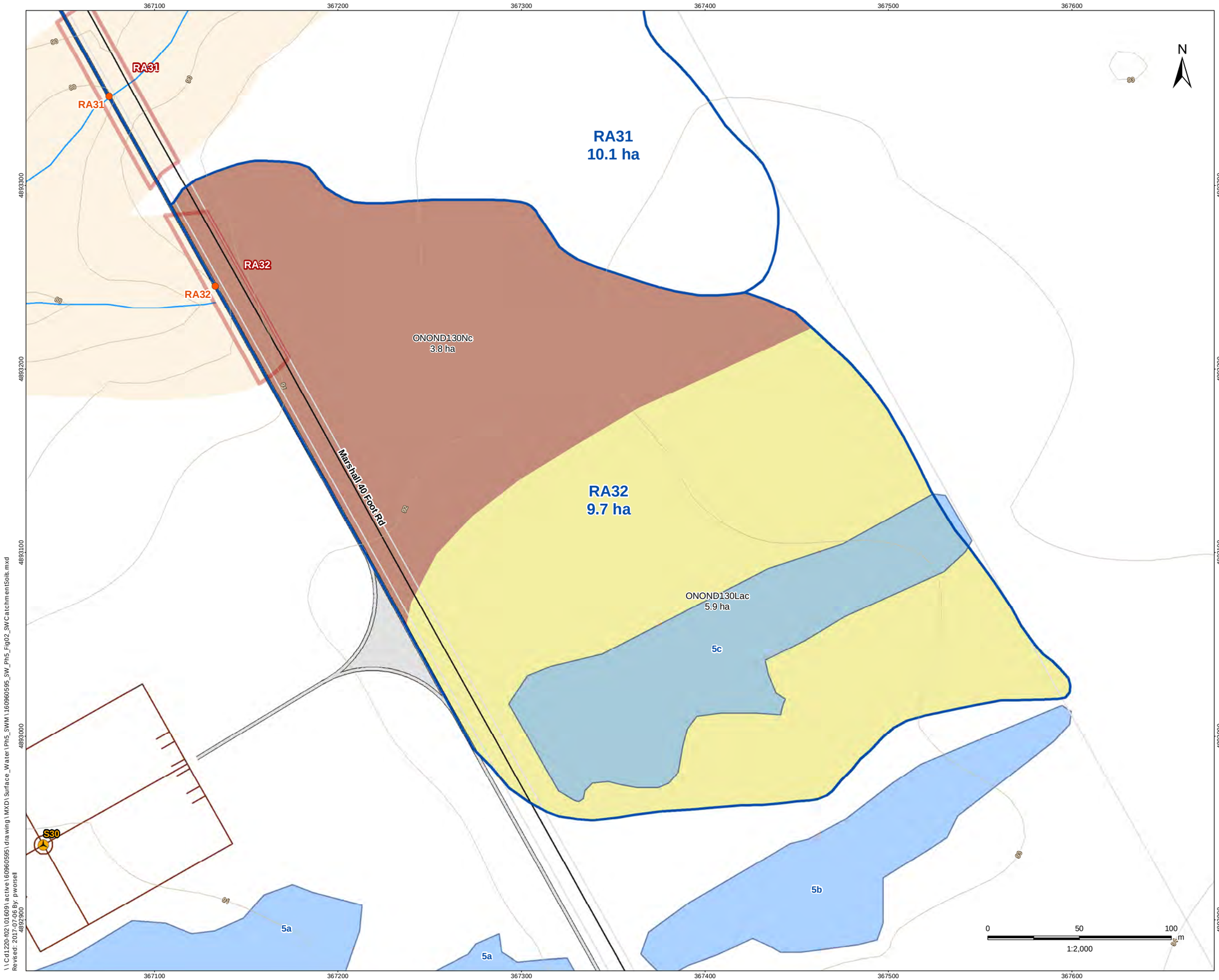
Figure No.

2-3

Title

Soils -
Culvert RA31

\\Cd1220-f02\01609\active\60960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
Revised: 2017-07-06 By: pworsell



Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

2-4

Title

Soils -
Culvert RA32

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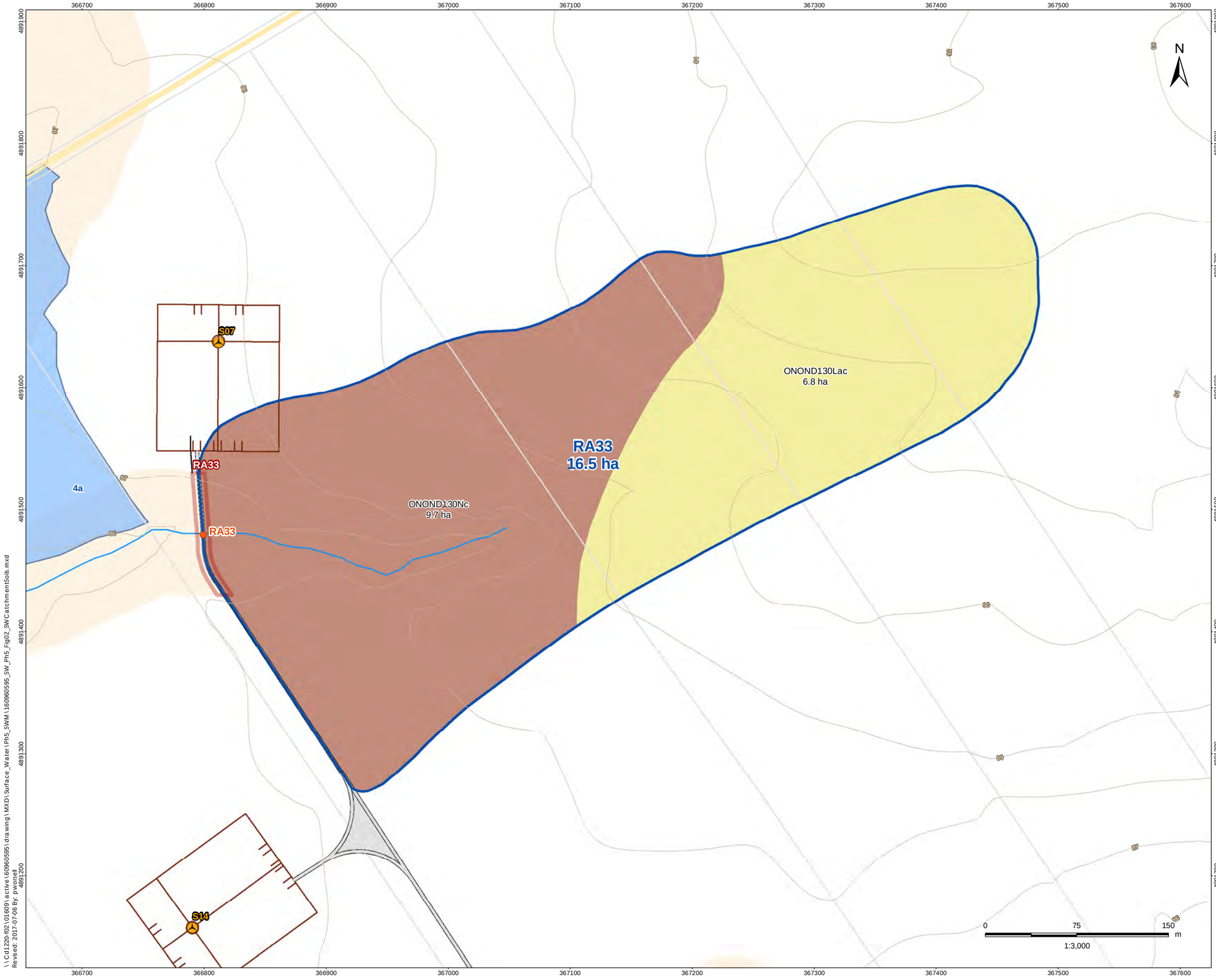

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Revised: 2017-07-06 By: pworsell

Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

2-5

Title

Soils -
Culvert RA33

366800 366900 367000 367100 367200

4891100 4891000 4890900 4890800

N

ONOND130Nc
3.7 ha

RA34
3.7 ha

RA34

RA34

RA35

RA35b
6.8 ha

RA35a
3.8 ha

0 30 60 m
1:1,500

Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Napanee Clay

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

2-6

Title

Soils -
Culvert RA34

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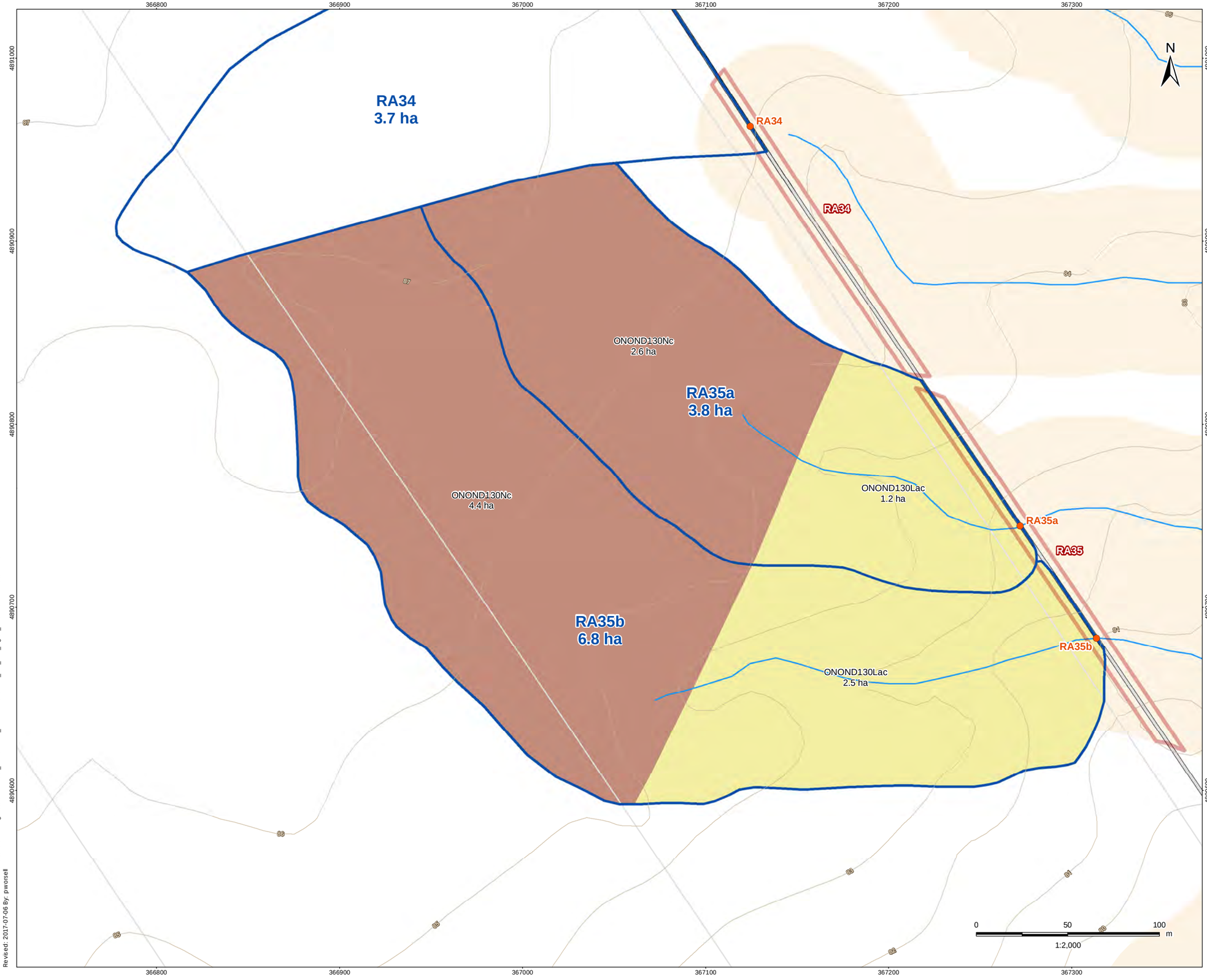
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

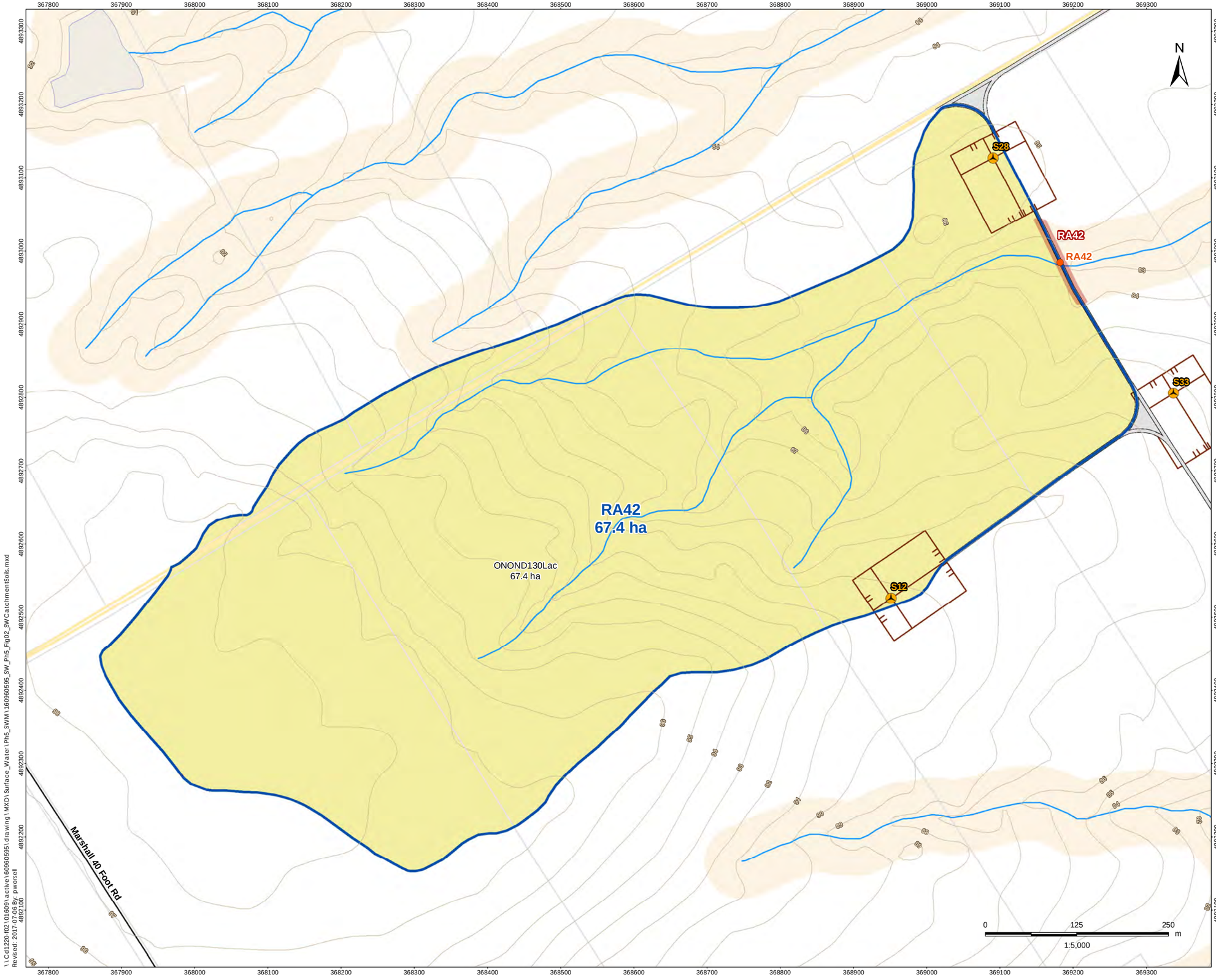
Figure No.

2-7

Title

Soils -
Culvert RA35

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay

Notes

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Client/Project

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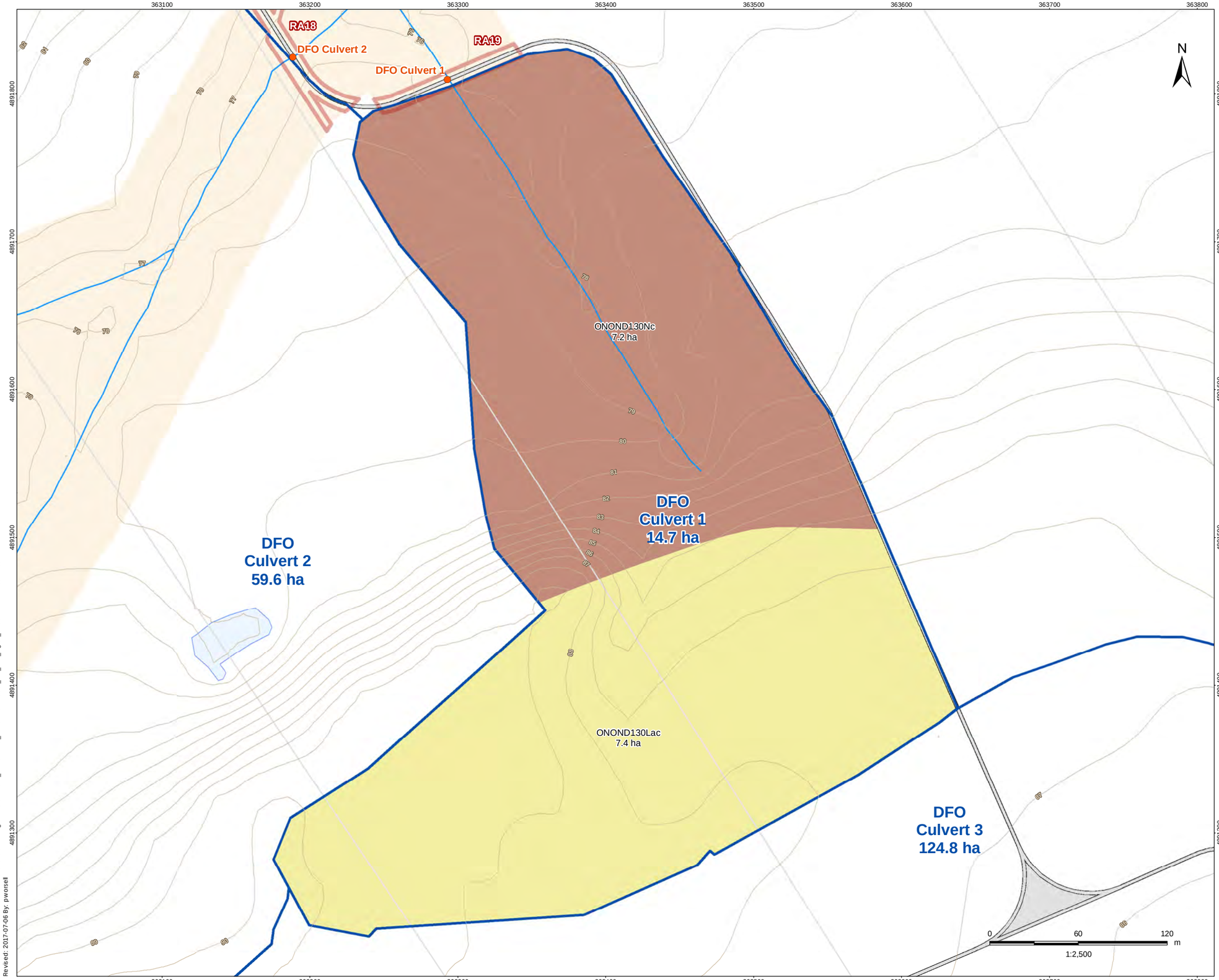
Amherst Island Wind Energy Project

Figure No.
2-8

Title

Soils -
Culvert RA42

\\Cd1220-f02\01609\active\609605951\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

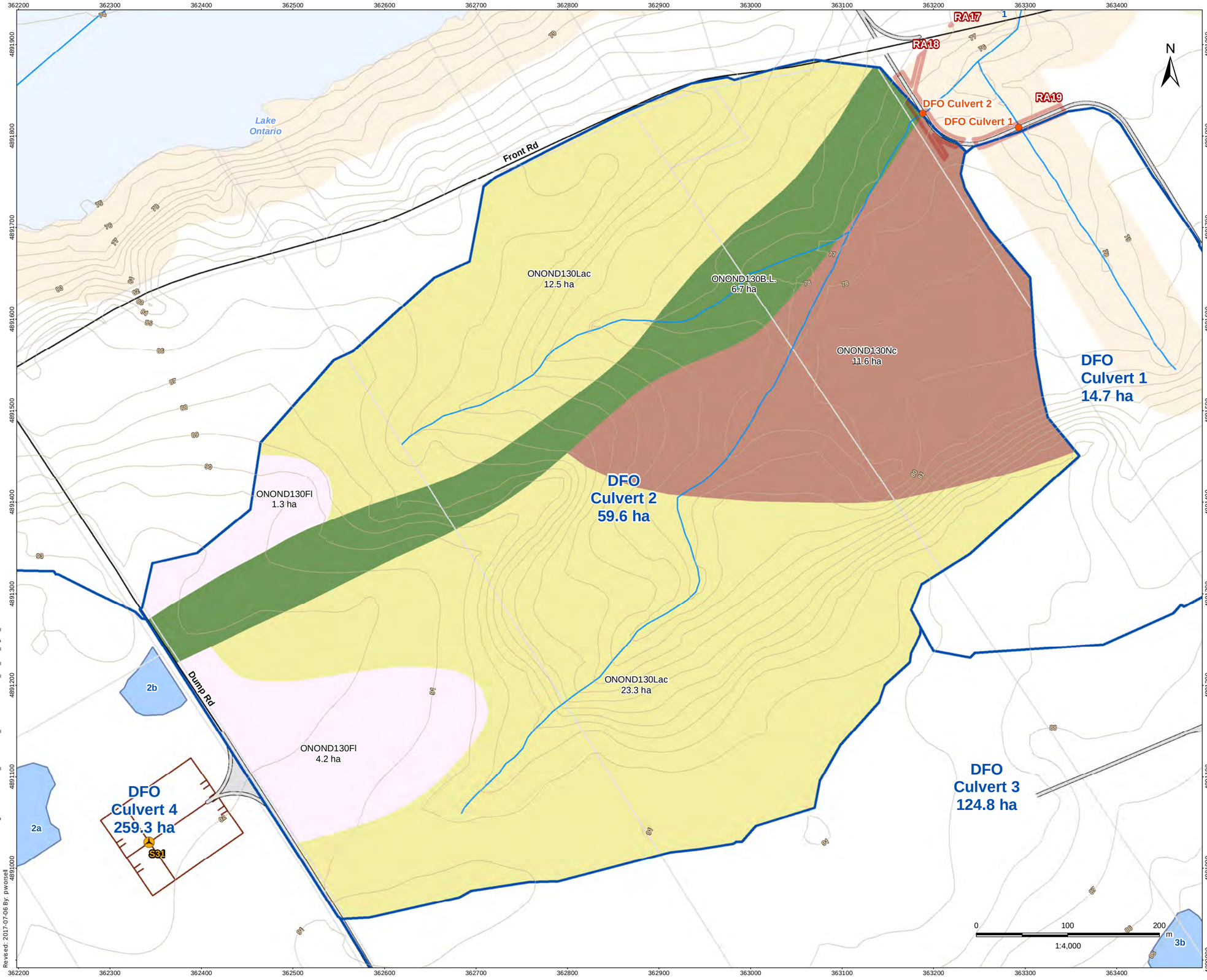
Figure No.

2-9

Title

Soils -
Culvert DFO Culvert 1

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Bottom Land
- Farmington Loam
- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

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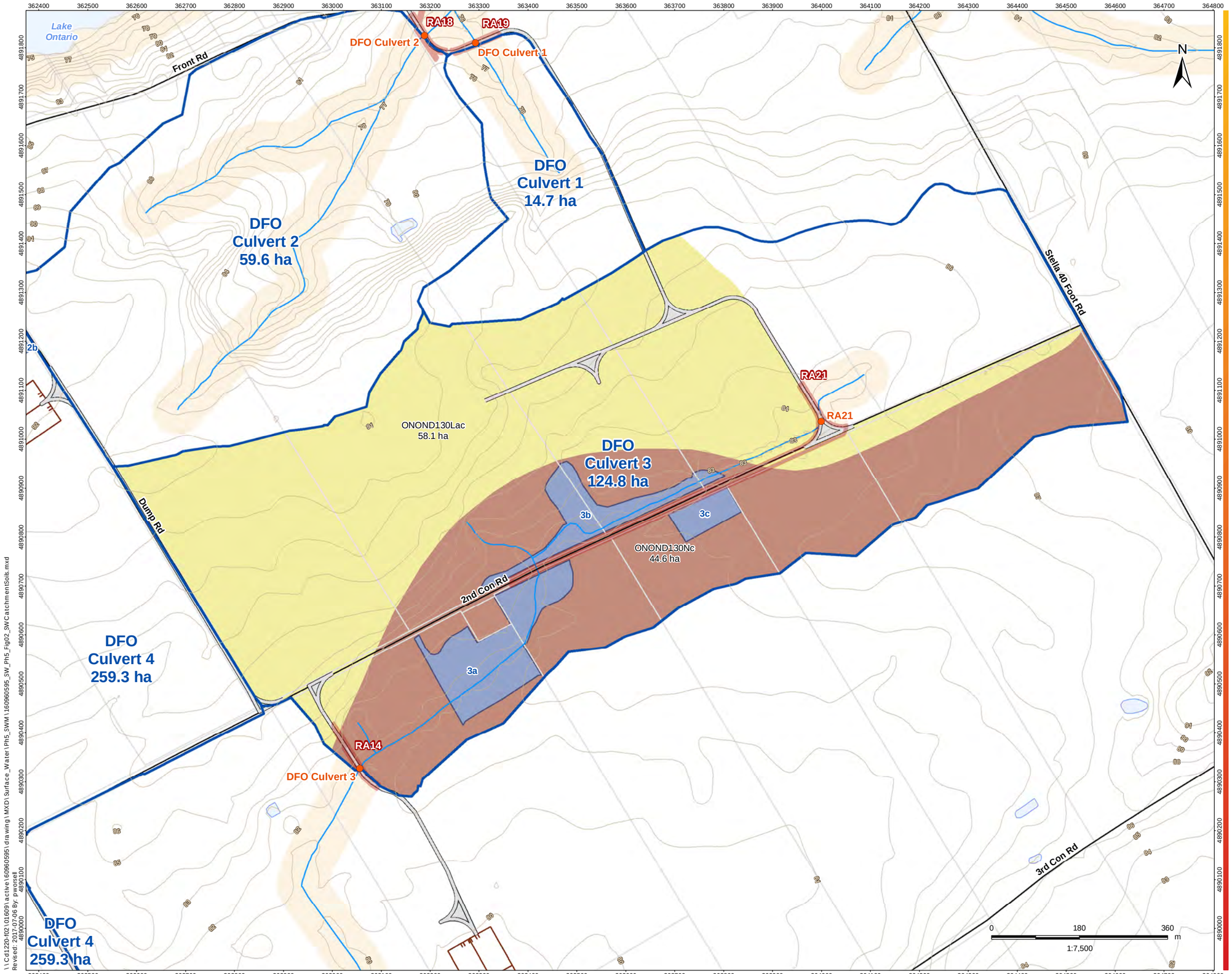
Figure No.

2-10

Title

Soils -
Culvert DFO Culvert 2

\\Cd1220-f02\01691\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Lansdowne Clay
- Napanee Clay

Notes

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Client/Project

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Amherst Island Wind Energy Project

Figure No.

2-11

Title

Soils -
Culvert DFO Culvert 3

\\C1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
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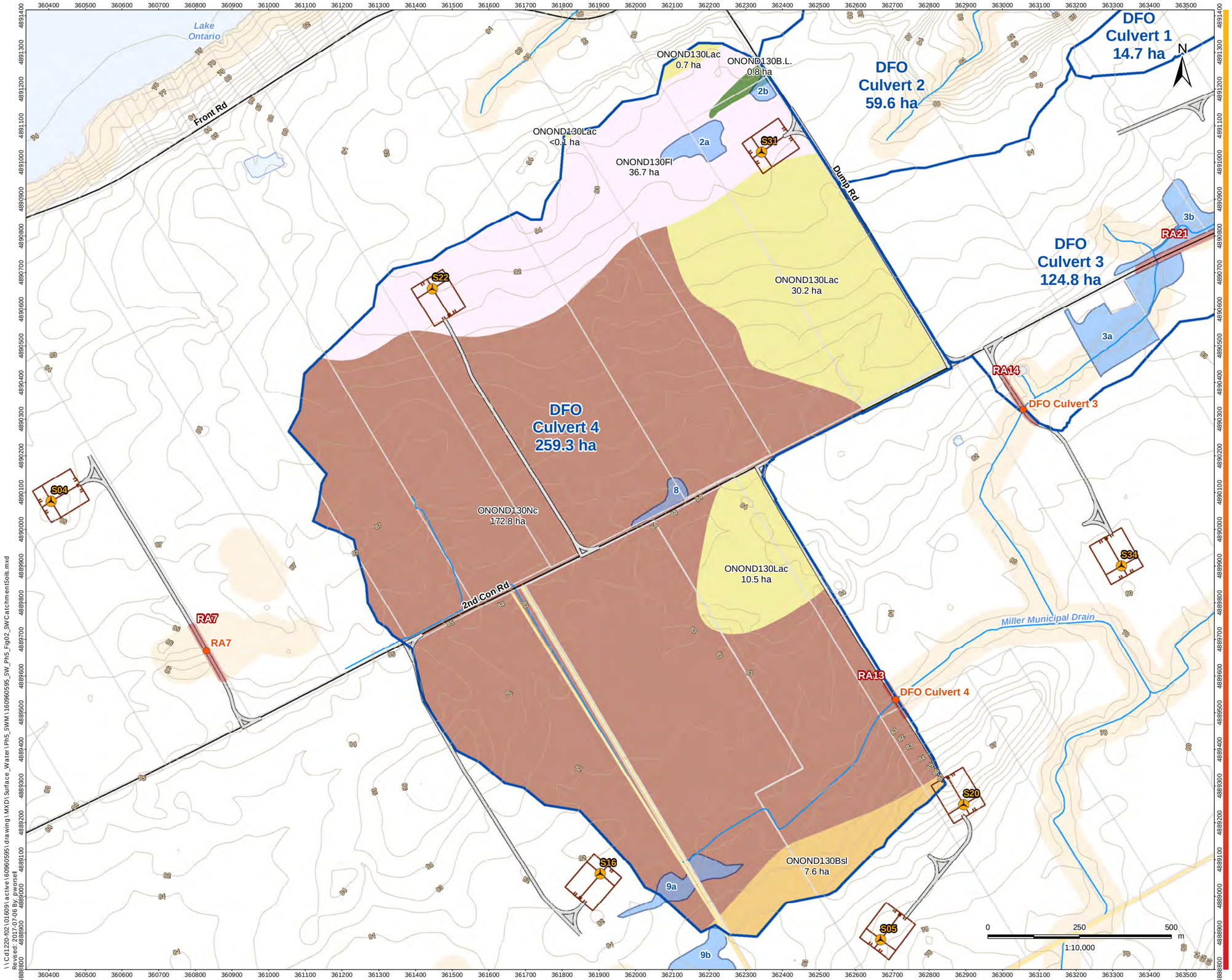

Stantec

Legend

- Turbine
- Culvert Location
- Access Road
- Laydown Area and Crane Path
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Waterbody

Soil Unit

- Bonhead Sandy Loam
- Bottom Land
- Farmington Loam
- Lansdowne Clay
- Napanee Clay

Notes

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Amherst Island Wind Energy Project

Figure No.

2-12

Title

Soils -
Culvert DFO Culvert 4

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig02_SWCatchmentSoils.mxd
Revised: 2017-07-06 By: pworsell

359200 359300 359400 359500 359600

4889800 4889700 4889600 4889500

RA4

RA4

RA4
2.4 ha

0.87 ha

N

0 30 60 m

1:1,500

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

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Amherst Island Wind Energy Project

Figure No.

3-1

Title

Woodlots -
Culvert RA4

\\Cd1220-f02\01609\active\60960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
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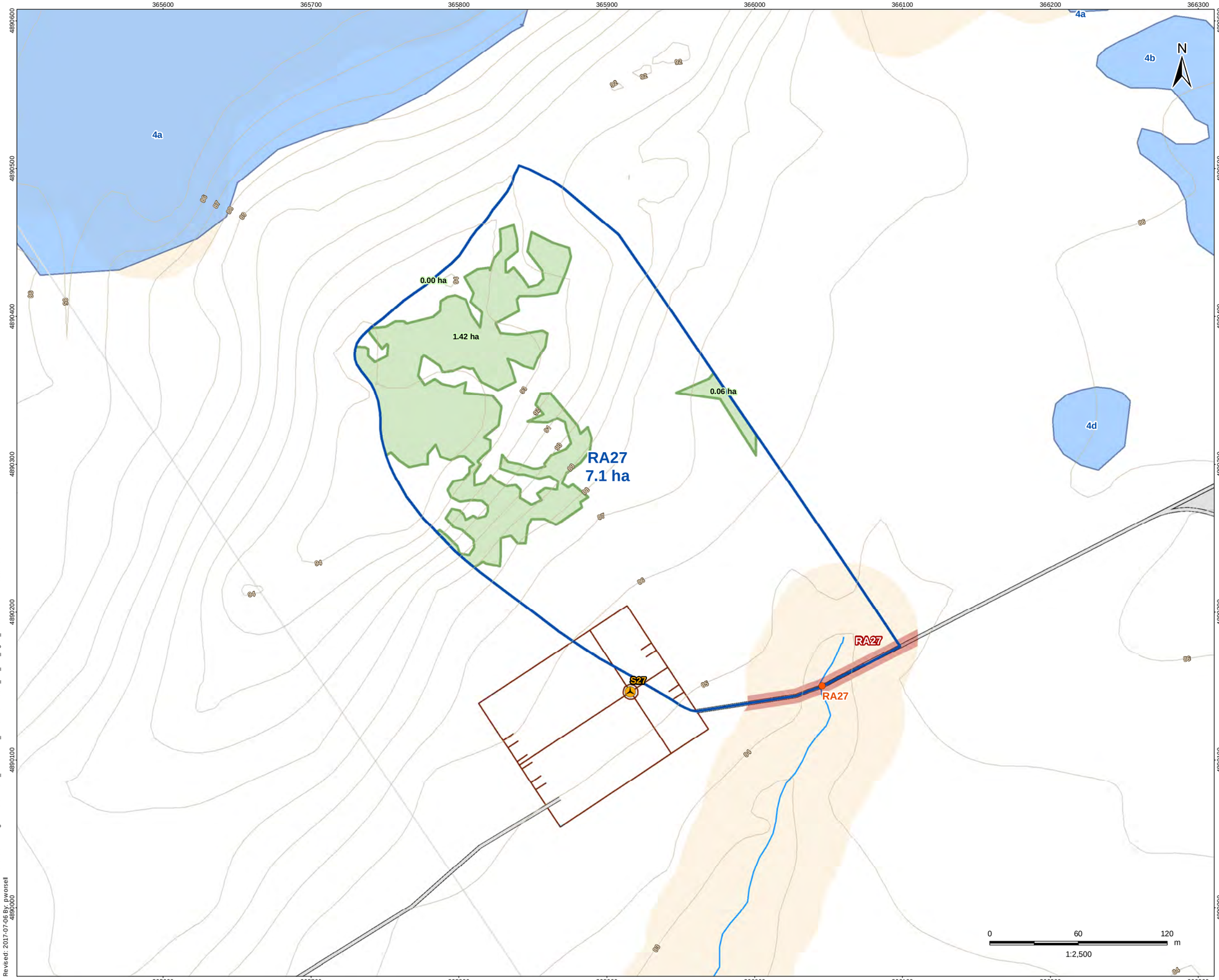

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

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Amherst Island Wind Energy Project

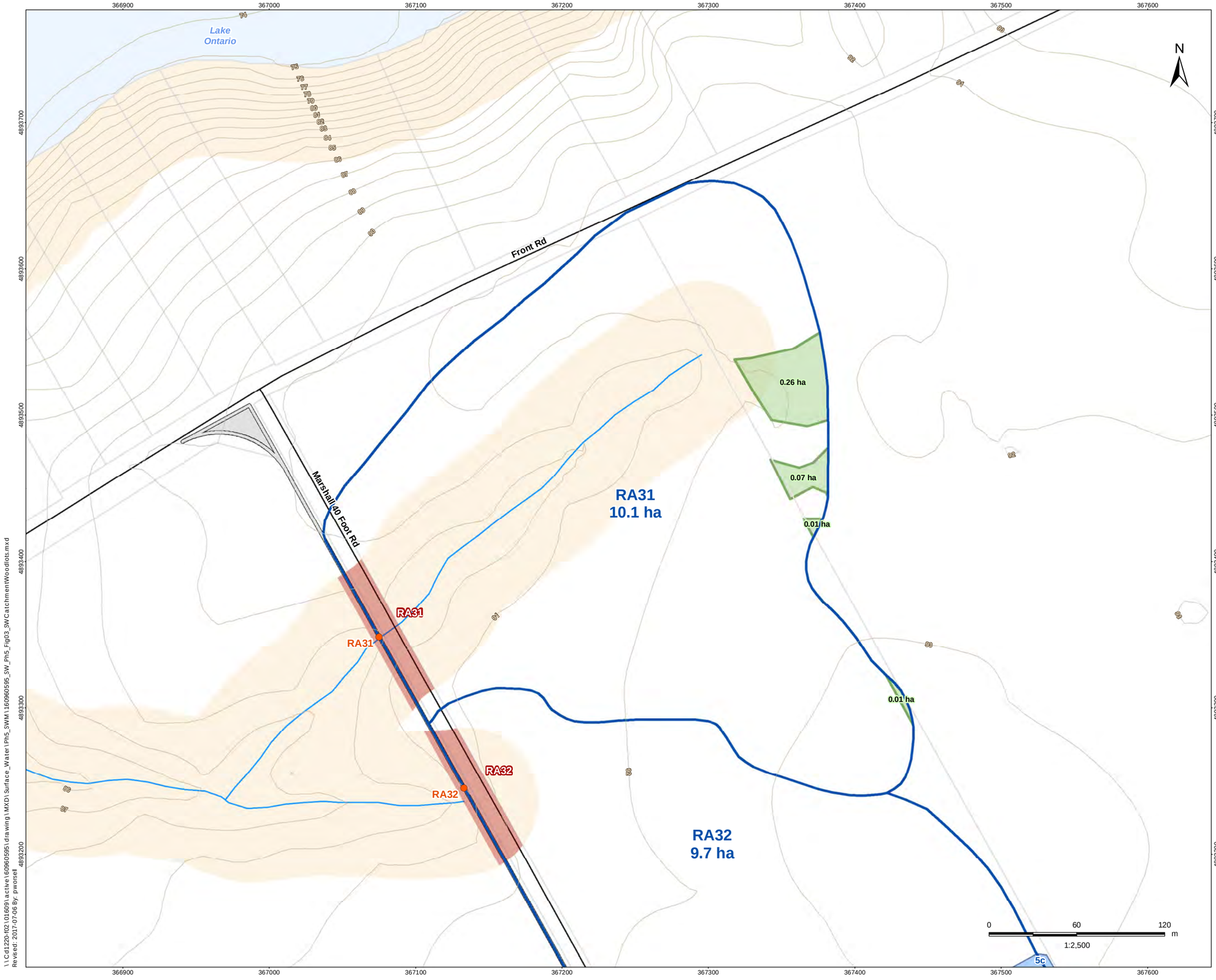
Figure No.

3-2

Title

Woodlots -
Culvert RA27

\\Cd1220-f02\01609\active\609605951\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

3-3

Title

Woodlots -
Culvert RA31

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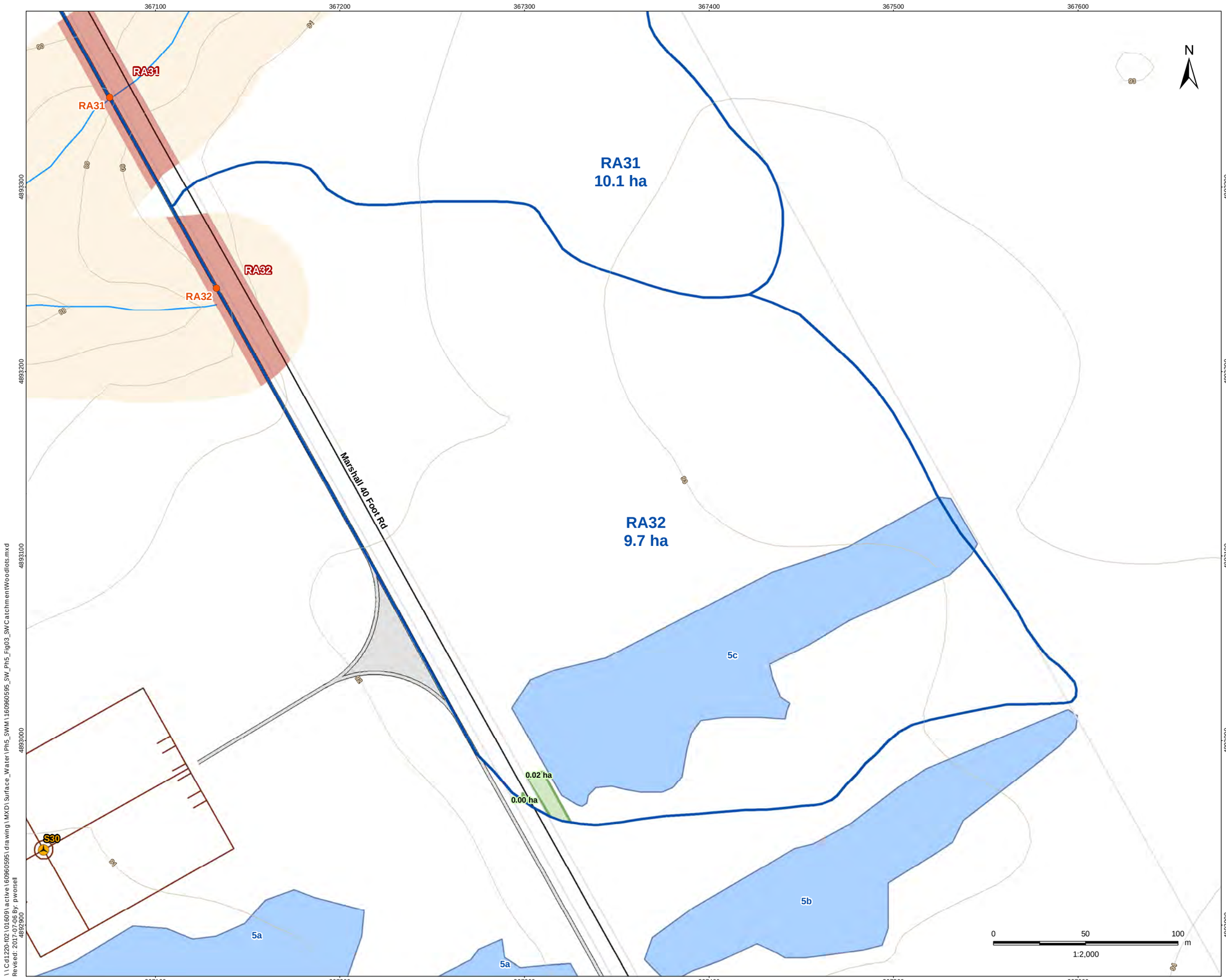
Revised: 2017-07-06 By: pworsell



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Revised: 2017-07-06 By: pworsell

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

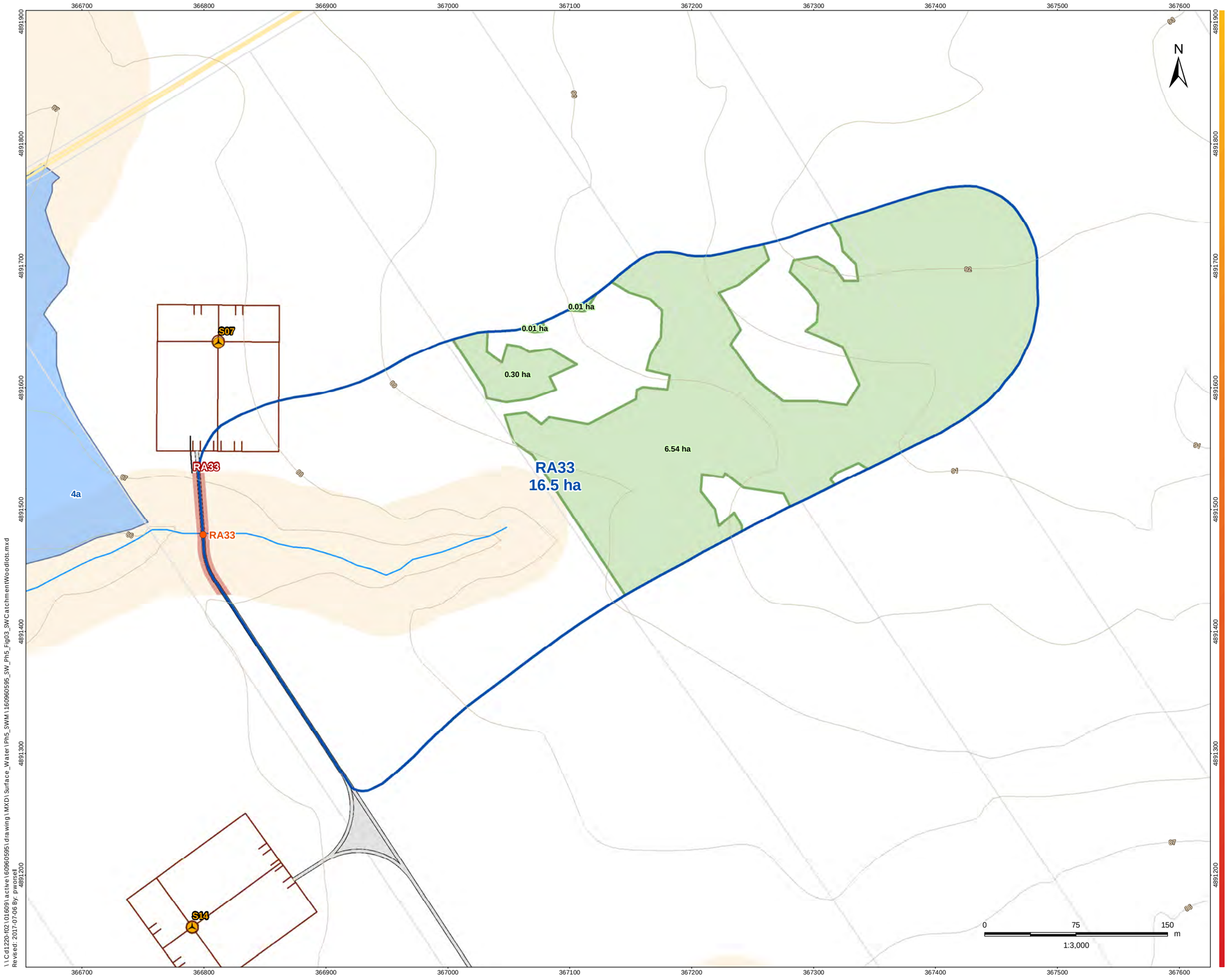
Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

3-4

Title

Woodlots - Culvert RA32



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Revised: 2017-07-06 By: pworsell

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

3-5

Title

Woodlots -
Culvert RA33

366800 366900 367000 367100 367200

4891100 4891000 4890900 4890800

N

RA34
3.7 ha

RA35b
6.8 ha

RA35a
3.8 ha

0.08 ha

0.09 ha

RA34

RA34

RA35

0 30 60 m
1:1,500

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

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Figure No.

3-6

Title

Woodlots -
Culvert RA34

\\Cd1220-f02\01609\active\609605951\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pwoiseil

RA34
3.7 ha

RA34

RA34

0.21 ha

RA35a
3.8 ha

RA35b
6.8 ha

RA35a

RA35

RA35b

N

0 50 100 m
1:2,000

366800 366900 367000 367100 367200 367300

4891000 4890900 4890800 4890700 4890600

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

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Client/Project

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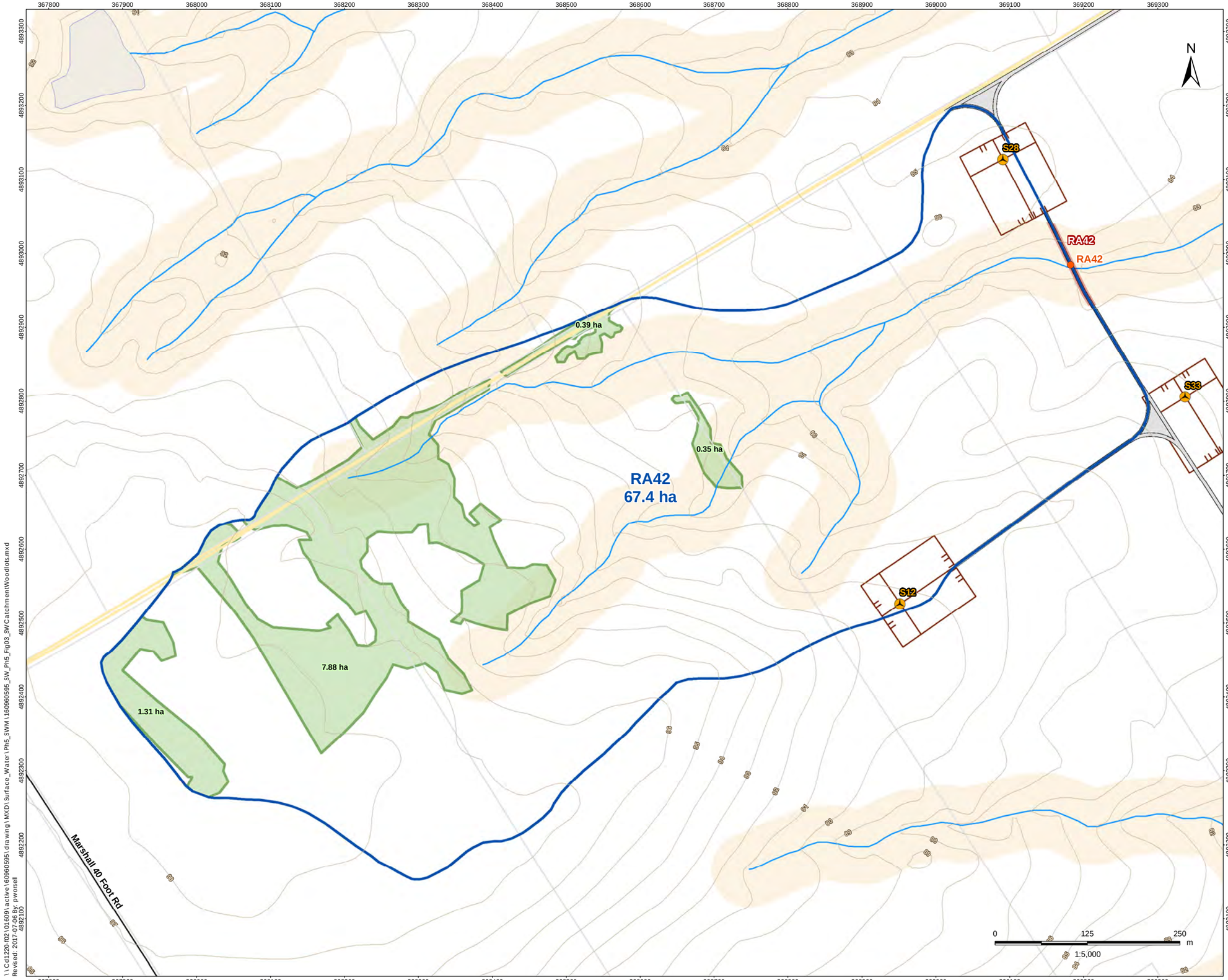
Figure No.

3-7

Title

Woodlots -
Culvert RA35

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell



Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

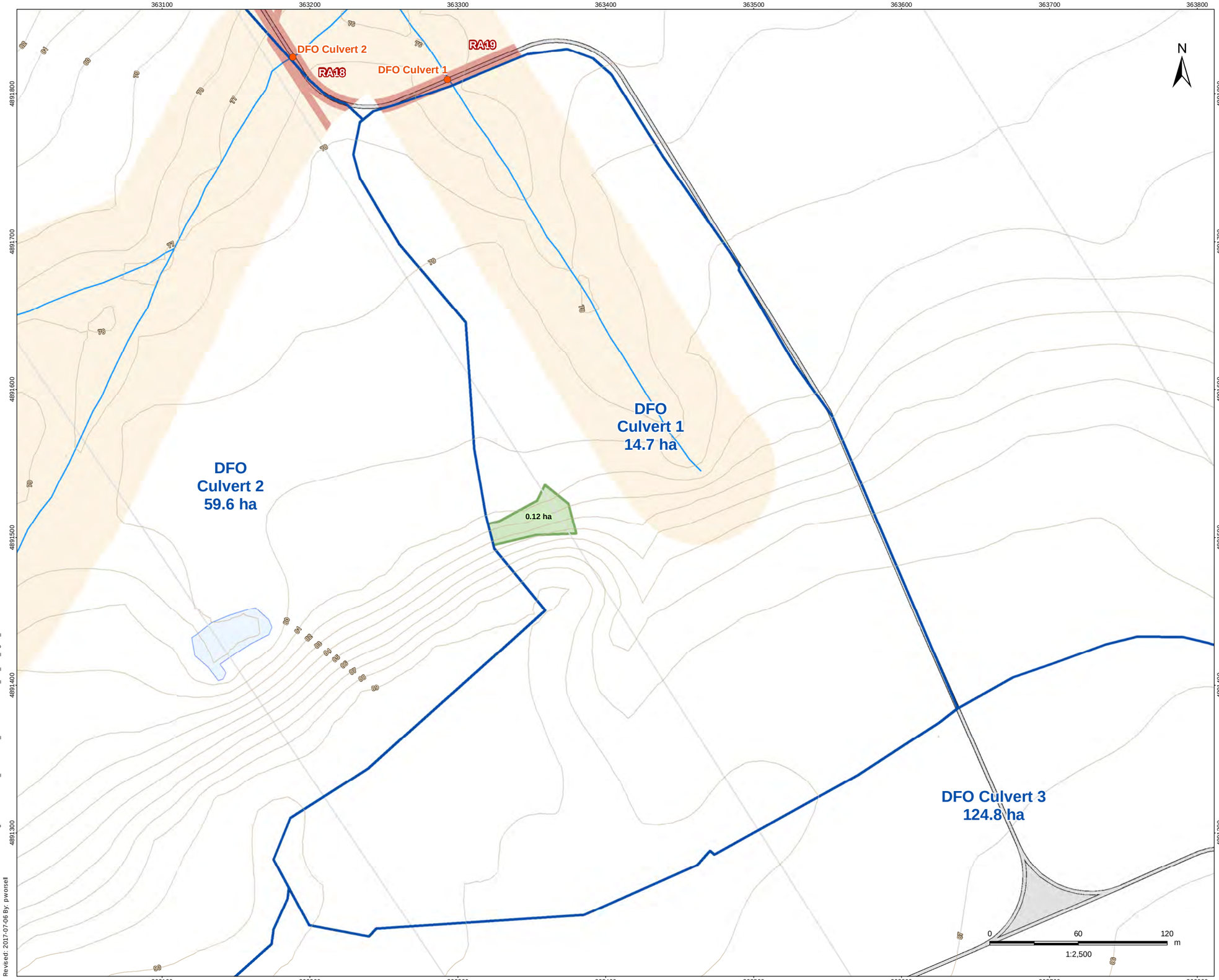
Figure No.

3-8

Title

Woodlots -
Culvert RA42

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell



Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

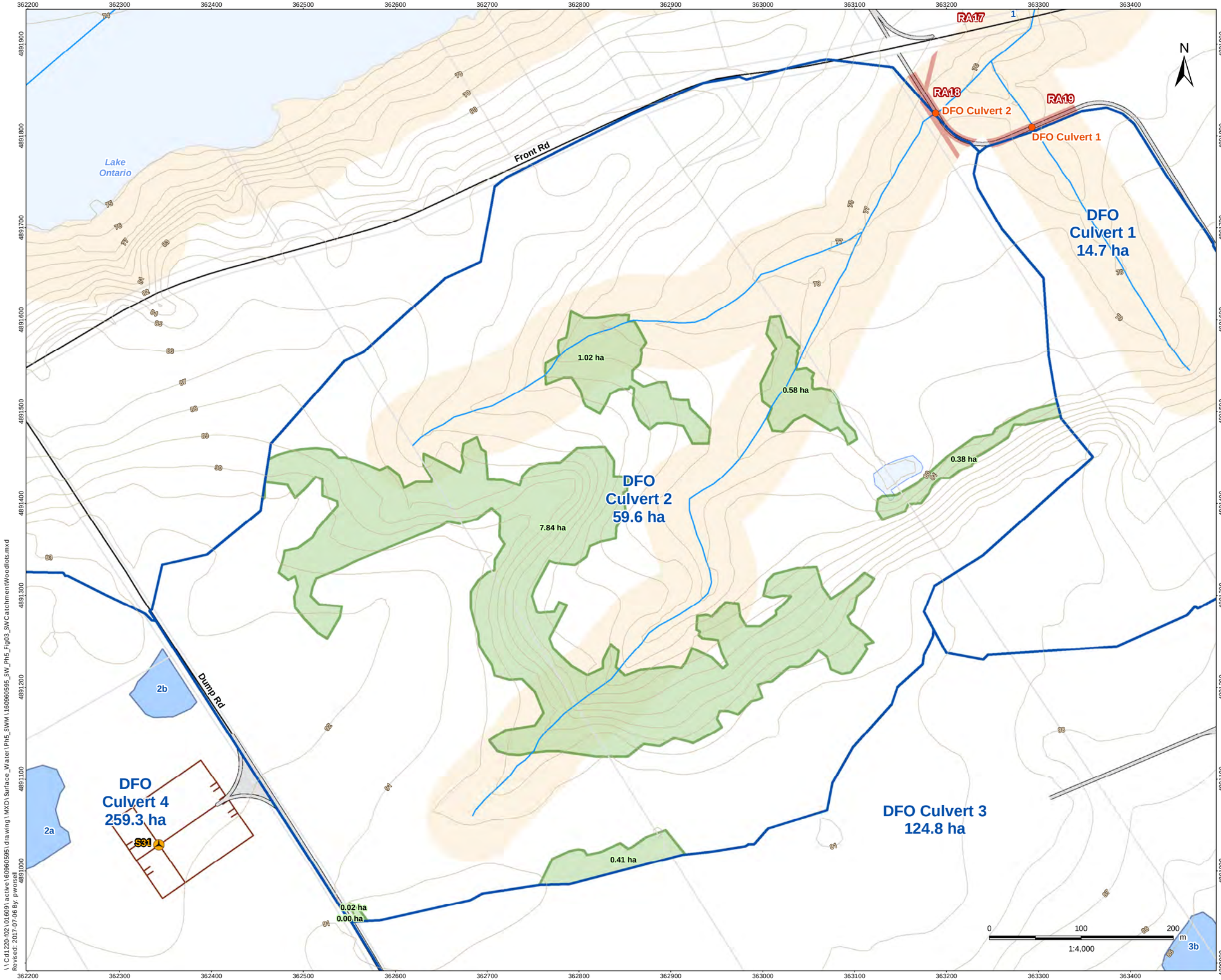
Figure No.

3-9

Title

Woodlots -
Culvert DFO Culvert 1

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell



Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

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Client/Project

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Amherst Island Wind Energy Project

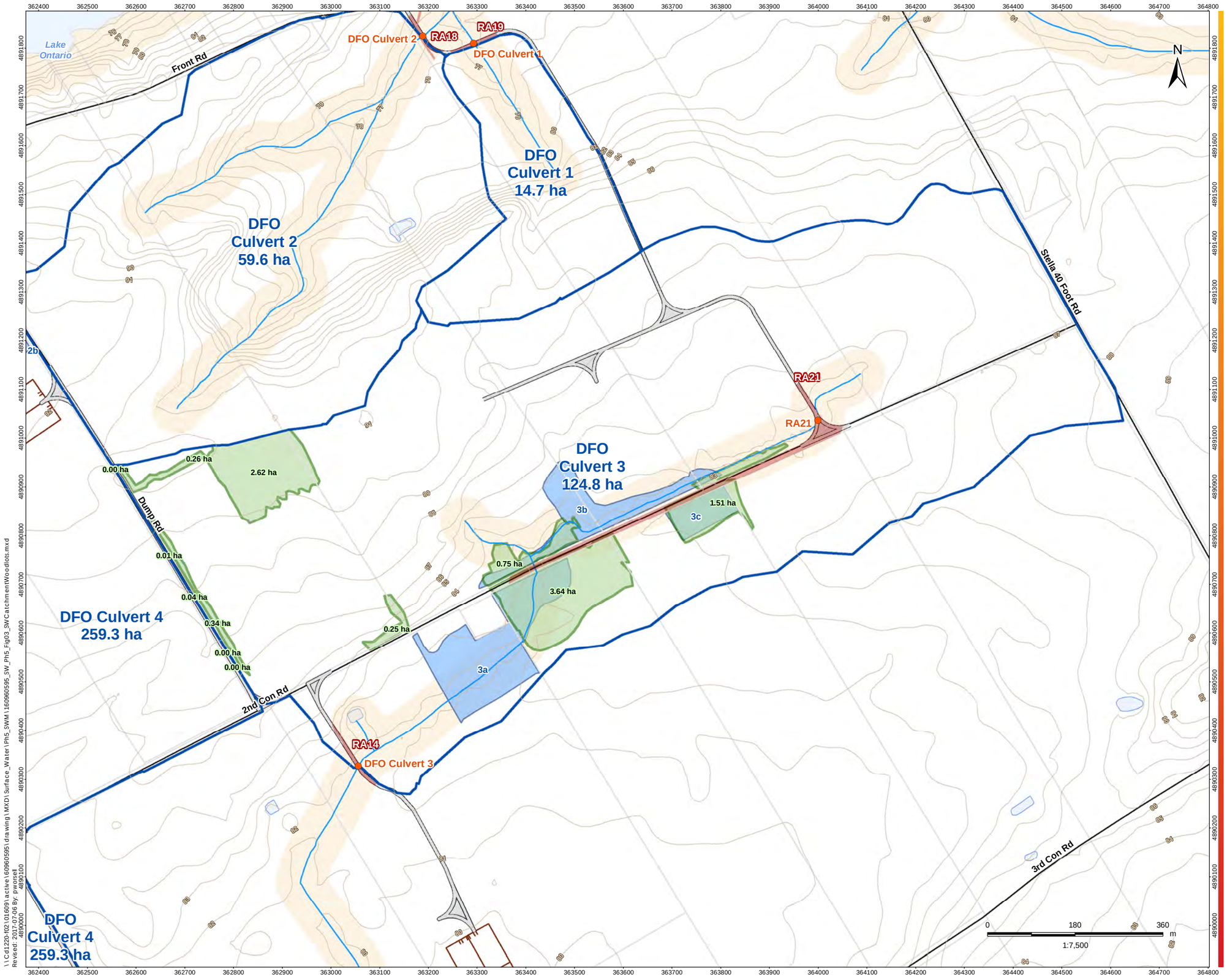
Figure No.

3-10

Title

Woodlots -
Culvert DFO Culvert 2

\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell



\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017; © Cataraqui Region Conservation Authority, 2017.

July 2017
160960595

Client/Project

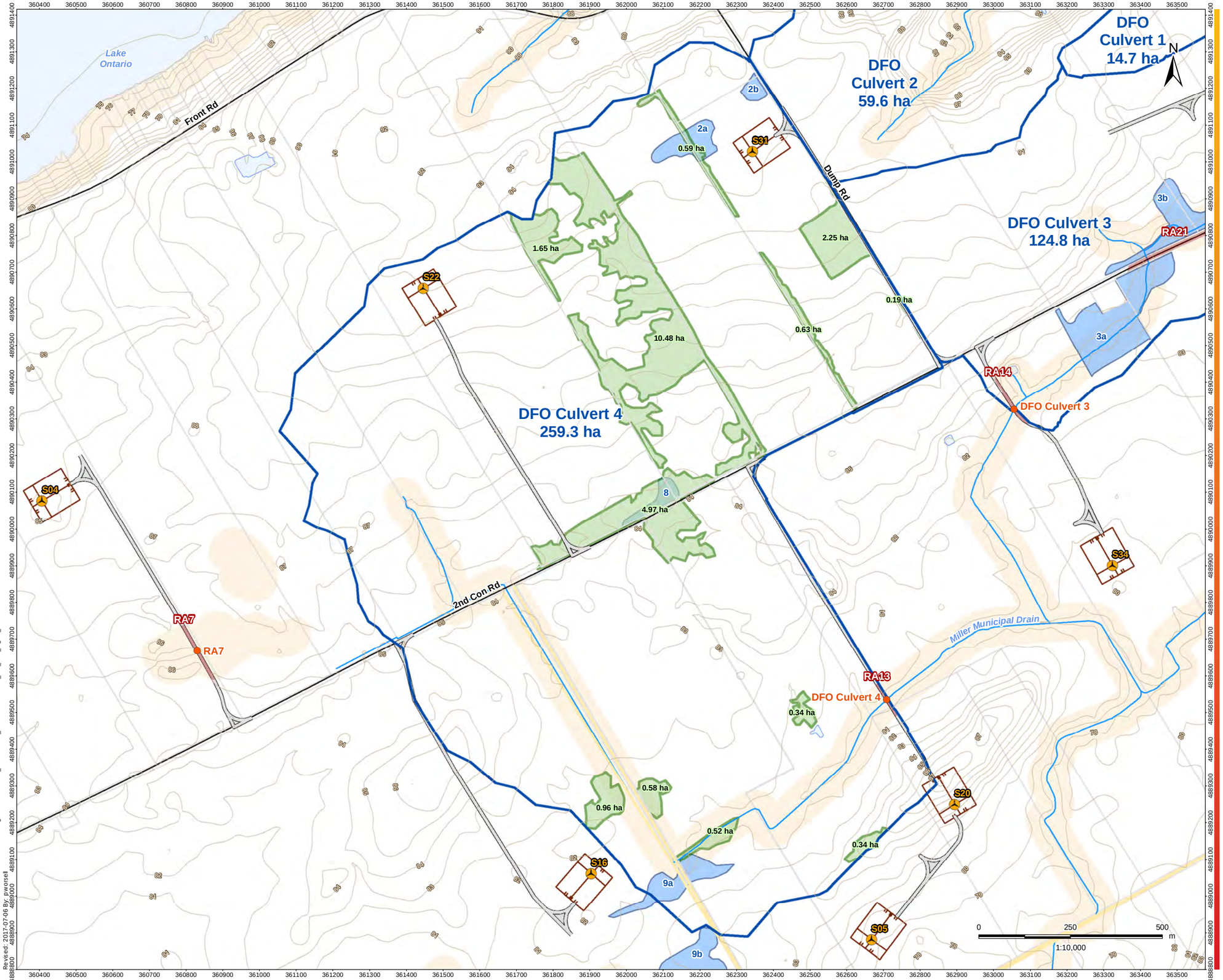
Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

3-11

Title

Woodlots -
Culvert DFO Culvert 3



\\Cd1220-f02\01609\active\160960595\drawing\MXD\Surface_Water\Ph5_SWM\160960595_SW_Ph5_Fig03_SWCatchmentWoodlots.mxd
Revised: 2017-07-06 By: pworsell

Stantec

Legend

- Turbine
- Access Road
- Laydown Area and Crane Path
- Culvert Location
- Surface Water Catchment Area

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Property Line
- Regulation Limit (CRCA)
- CA Regulation Limit Project Encroachment
- Wooded Area
- Waterbody

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2017; © Cataraqui Region Conservation Authority, 2017.

July 2017
160960595

Client/Project

Windlectric Inc.
Amherst Island Wind Energy Project

Figure No.

3-12

Title

Woodlots -
Culvert DFO Culvert 4

Ontario | Ontario.ca

IDF CURVE LOOKUP

Coordinate Selection | Terms of Use | About

Active coordinate

44° 9' 15" N, 76° 42' 45" W (44.154167,-76.712500) Modify selection

Retrieved: Thu, 04 Dec 2014 15:34:56 GMT

Map options: Modify selection | Show/hide gauging stations | Re-center selection

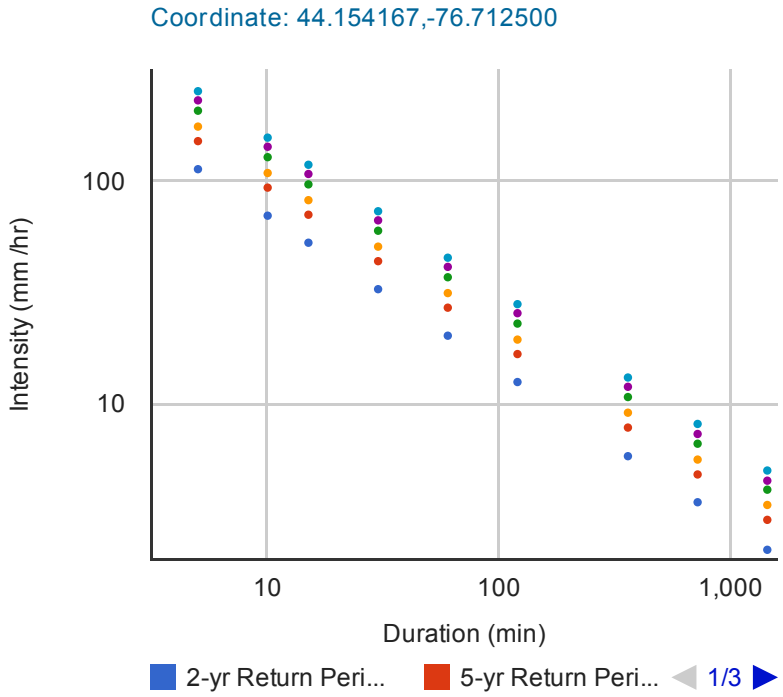
Coordinate summary

These are the coordinates in the selection.

IDF Curve: 44° 9' 15" N, 76° 42' 45" W (44.154167,-76.712500)

Results

An IDF curve was found for this set of coordinates.



Coefficient summary Notes

Click a return period in the table header for more detail.

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	20.2	27.0	31.4	37.0	41.2	45.3
B	-0.694	-0.694	-0.694	-0.694	-0.694	-0.694

Statistics

Rainfall intensity (mm hr^{-1})

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	113.3	70.0	52.9	32.7	20.2	12.5	5.8	3.6	2.2
5-yr	151.5	93.6	70.7	43.7	27.0	16.7	7.8	4.8	3.0
10-yr	176.1	108.9	82.2	50.8	31.4	19.4	9.1	5.6	3.5
25-yr	207.6	128.3	96.8	59.9	37.0	22.9	10.7	6.6	4.1
50-yr	231.1	142.9	107.8	66.7	41.2	25.5	11.9	7.3	4.5
100-yr	254.1	157.1	118.6	73.3	45.3	28.0	13.1	8.1	5.0

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Ontario

Last Modified: September 11, 2013

Amherst Island Wind Energy Project - 160960595
Culvert Sizing - NRCS (SCS) Curve Number Determination

Soil Type	Hydrologic Soil Group
Loam, Sandy Loam	B
Clay	CD

TABLE OF CURVE NUMBERS (CN's)									
Land Use		Hydrologic Soil Type							Source
		A	AB	B	BC	C	CD	D	
Meadow	"Good"	30	44	58	64.5	71	74.5	78	MTO
Woodlot	"Fair"	36	48	60	66.5	73	76	79	MTO
Lawns	"Good"	39	50	61	67.5	74	77	80	USDA
Pasture/Range		58	61.5	65	70.5	76	78.5	81	MTO
Crop		66	70	74	78	82	84	86	MTO
Bare Soil (Fallow)		77	82	86	89	91	93	94	MTO
Impervious		98	98	98	98	98	98	98	MTO

MTO - Ministry of Transportation Ontario Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
USDA - United States Department of Agriculture (2004), National Engineering Handbook, Part 630 Hydrology, Chapter 9 Hydrologic Soil Cover Compexes

HYDROLOGIC SOIL TYPE (%) - Existing Conditions								
Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
RA 4	0	0	0	0	0	100	0	100
RA 27	0	0	68	0	0	32	0	100
RA 31	0	0	11	0	0	89	0	100
RA 32	0	0	0	0	0	100	0	100
RA 33	0	0	0	0	0	100	0	100
RA 34	0	0	0	0	0	100	0	100
RA 35a	0	0	0	0	0	100	0	100
RA 35b	0	0	0	0	0	100	0	100
RA 42	0	0	0	0	0	100	0	100
DFO Culvert 3	0	0	0	0	0	100	0	100
DFO Culvert 4	0	0	17	0	0	83	0	100

LAND USE (%) - Existing Conditions									
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Bare Soil	Lakes and Wetlands	Impervious	Total
RA 4		36			62		0	2	100
RA 27		21			77		0	2	100
RA 31		3			95		0	2	100
RA 32		0			83		14	2	100
RA 33		41			57		0	2	100
RA 34		5			93		0	2	100
RA 35a		0			98		0	2	100
RA 35b		5			93		0	2	100
RA 42		15			83		0	2	100
DFO Culvert 3		8			90		0	2	100
DFO Culvert 4		9			89		0	2	100

CURVE NUMBER (CN) - Existing Conditions										
Catchment	Meadow	Woodlot	Lawns	Pasture Range	Crop	Bare Soil	Lakes and Wetlands	Impervious	Weighted CN w/ imp area	Weighted CN w/o imp area
RA 4		27			52			2	81	81
RA 27		14			59			2	75	75
RA 31		3			78			2	83	83
RA 32		0			70		13	2	86	85
RA 33		32			47			2	81	81
RA 34		4			78			2	84	84
RA 35a					82			2	84	84
RA 35b		3			78			2	84	84
RA 42		11			70			2	83	83
DFO Culvert 3		6			76			2	84	83
DFO Culvert 4		7			73			2	82	81

Notes:

AMC II assumed

Hydrological Soil Groups taken from MTO Drainage Manual

*1 Catchments with impervious greater than 20% - only pervious portions used for CN calculation

Amherst Island Wind Energy Project - 160960595
SWMHYMO Parameters

Existing Conditions Airport Method

Catchment Number	SWMHYMO Command	Area (ha)	CN	TIMP (%)	XIMP (%)	Rise (m)	Length (m)	Slope (%)	Tc (hrs)	Tp (hrs)
RA 4	DESIGN NASHYD	2.4	81			4	170	2.4	0.37	0.22
RA 27	DESIGN NASHYD	7.1	75			10	300	3.3	0.44	0.27
RA 31	DESIGN NASHYD	10.1	83			3	550	0.5	1.09	0.65
RA 32	DESIGN NASHYD	9.7	86			3	500	0.6	1.01	0.60
RA 33	DESIGN NASHYD	16.5	81			6	780	0.8	1.16	0.69
RA 34	DESIGN NASHYD	3.7	84			2	300	0.5	0.83	0.50
RA 35a	DESIGN NASHYD	4.1	84			4	400	1.0	0.76	0.46
RA 35b	DESIGN NASHYD	8.3	84			6	630	1.0	0.97	0.58
RA 42	DESIGN NASHYD	67.5	83			15	1480	1.0	1.46	0.87
DFO Culvert 3	DESIGN NASHYD	124.8	84			5	1800	0.3	3.66	2.19
DFO Culvert 4	DESIGN NASHYD	259.3	82			13	3500	0.4	5.75	3.45

SWMHYMO Parameter Notes:

Time of Concentration calculated using the Airport Method
(For areas less than 100 ha)

$Tc = [\ 3.26\ (1.1\text{-}C)\ L^{0.5}]\ /\ S^{0.33}$

Where: C = Runoff Coefficient = 0.4 for undeveloped areas
L = Length of Overland Flow (m)
S = Slope (%)

Time of Concentration calculated using the SCS Lag Equation
(For areas greater than 100 ha)

$Tc = [259L^{0.8}\ [(1000 / CN) - 9]^{0.7}] / [1900S^{0.5}]$

Where: L = Length of Overland Flow (m)
CN = SCS Curve Number
S = Slope (%)

```
00001> 2     Metric units
00002> *#*************************************************************************
00003> *#  Project Name: [Amherst Island Wind Energy Project]
00004> *#  Project Number:[1609-60595]
00005> *#  Date        : July 12, 2017
00006> *#                Hydrologic Modeling for Access Road Culvert Sizing
00007> *#                CA Permitting
00008> *#
00009> *#  Company     : Stantec Consulting Ltd. (Kitchener)
00010> *#  Modeller    : D. Williams
00011> *#  License #   :  4730904
00012> *#*************************************************************************
00013> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
00014> *%                  ["25mm.4hr"] <--storm filename, one per line for NSTORM time
00015> *%-----------------|-----------------------------------------------------|
00016> READ STORM          STORM_FILENAME=["STORM.001"]
00017> *#-----------------|-----------------------------------------------------|
00018> *#*************************************************************************
00019> *#  RA 4
00020> *#*************************************************************************
00021> DESIGN NASHYD       ID=[1], NHYD=["RA 4"], DT=[1]min, AREA=[2.4](ha),
00022>                     DWF=[0](cms), CN/C=[81], TP=[0.22]hrs,
00023>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00024> *#-----------------|-----------------------------------------------------|
00025> *#*************************************************************************
00026> *#  RA 27
00027> *#*************************************************************************
00028> DESIGN NASHYD       ID=[1], NHYD=["RA 27"], DT=[1]min, AREA=[7.1](ha),
00029>                     DWF=[0](cms), CN/C=[75], TP=[0.27]hrs,
00030>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00031> *#-----------------|-----------------------------------------------------|
00032> *#*************************************************************************
00033> *#  RA 31
00034> *#*************************************************************************
00035> DESIGN NASHYD       ID=[1], NHYD=["RA 31"], DT=[1]min, AREA=[10.1](ha),
00036>                     DWF=[0](cms), CN/C=[83], TP=[0.65]hrs,
00037>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00038> *#-----------------|-----------------------------------------------------|
00039> *#*************************************************************************
00040> *#  RA 32
00041> *#*************************************************************************
00042> DESIGN NASHYD       ID=[1], NHYD=["RA 32"], DT=[1]min, AREA=[9.7](ha),
00043>                     DWF=[0](cms), CN/C=[86], TP=[0.60]hrs,
00044>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00045> *#-----------------|-----------------------------------------------------|
00046> *#*************************************************************************
00047> *#  RA 33
00048> *#*************************************************************************
00049> DESIGN NASHYD       ID=[1], NHYD=["RA 33"], DT=[1]min, AREA=[16.5](ha),
00050>                     DWF=[0](cms), CN/C=[81], TP=[0.69]hrs,
00051>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00052> *#-----------------|-----------------------------------------------------|
00053> *#*************************************************************************
00054> *#  RA 34
00055> *#*************************************************************************
00056> DESIGN NASHYD       ID=[1], NHYD=["RA 34a"], DT=[1]min, AREA=[3.7](ha),
00057>                     DWF=[0](cms), CN/C=[84], TP=[0.5]hrs,
00058>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00059> *#-----------------|-----------------------------------------------------|
00060> *#*************************************************************************
00061> *#  RA 35a
00062> *#*************************************************************************
00063> DESIGN NASHYD       ID=[1], NHYD=["RA 35a"], DT=[1]min, AREA=[4.1](ha),
00064>                     DWF=[0](cms), CN/C=[84], TP=[0.46]hrs,
00065>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00066> *#-----------------|-----------------------------------------------------|
00067> *#*************************************************************************
00068> *#  RA 35b
00069> *#*************************************************************************
00070> DESIGN NASHYD       ID=[1], NHYD=["RA 35b"], DT=[1]min, AREA=[8.3](ha),
00071>                     DWF=[0](cms), CN/C=[84], TP=[0.58]hrs,
00072>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00073> *#-----------------|-----------------------------------------------------|
```

```
00074> *#*************************************************************************
00075> *#  RA 42
00076> *#*************************************************************************
00077> DESIGN NASHYD       ID=[1], NHYD=["RA 42"], DT=[1]min, AREA=[67.5](ha),
00078>                     DWF=[0](cms), CN/C=[83], TP=[0.87]hrs,
00079>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00080> *#-----------------|-------------------------------------------------------|
00081> *#*************************************************************************
00082> *#  DFO Culvert 3
00083> *#*************************************************************************
00084> DESIGN NASHYD       ID=[1], NHYD=["DFO_3"], DT=[1]min, AREA=[124.8](ha),
00085>                     DWF=[0](cms), CN/C=[84], TP=[2.19]hrs,
00086>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00087> *#-----------------|-------------------------------------------------------|
00088> *#*************************************************************************
00089> *#  DFO Culvert 4
00090> *#*************************************************************************
00091> DESIGN NASHYD       ID=[1], NHYD=["DFO_3"], DT=[1]min, AREA=[259.3](ha),
00092>                     DWF=[0](cms), CN/C=[82], TP=[3.45]hrs,
00093>                     RAINFALL=[ ,  ,  ,  , ](mm/hr), END=-1
00094> *#-----------------|-------------------------------------------------------|
00095> START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[5]
00096> *%                  ["AI5SCS.24h"] <--storm filename, one per line for NSTORM time
00097> *#-----------------|-------------------------------------------------------|
00098> START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[10]
00099> *                   ["AI10SCS.24h"] <--storm filename, one per line for NSTORM time
00100> *%-----------------|-------------------------------------------------------|
00101> START               TZERO=[0.0]hrs or date,  METOUT=[2],  NSTORM=[1],  NRUN=[100]
00102> *                   ["AI100SCS.24h"] <--storm filename, one per line for NSTORM time
00103> *%-----------------|-------------------------------------------------------|
00104>
00105> FINISH
00106>
00107>
00108>
00109>
00110>
00111>
00112>
00113>
00114>
00115>
00116>
00117>
00118>
00119>
```

```
00001> ================================================================================
00002>
00003>    SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
00004>    S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>    SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
00006>        S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
00007>    SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
00008>                                                          9   9  9   9   # 4730904
00009>          StormWater Management HYdrologic Model           999    999    =========
00010>
00011>  ********************************************************************************
00012>  ***************************** SWMHYMO Ver/4.05  ****************************
00013>  *********  A single event and continuous hydrologic simulation model  *********
00014>  *********     based on the principles of HYMO and its successors      *********
00015>  *********                OTTHYMO-83 and OTTHYMO-89.                   *********
00016>  ********************************************************************************
00017>  ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
00018>  *********                  Ottawa,  Ontario: (613) 836-3884           *********
00019>  *********                  Gatineau, Quebec: (819) 243-6858           *********
00020>  *********                  E-Mail: swmhymo@jfsa.com                   *********
00021>  ********************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++++ Licensed user: Stantec Consulting Ltd. (Kitchener)          +++++++++
00025>  +++++++++                Kitchener             SERIAL#:4730904        +++++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
00030>  *********           Maximum value for ID numbers  :     10             *********
00031>  *********           Max. number of rainfall points: 105408             *********
00032>  *********           Max. number of flow points    : 105408             *********
00033>  ********************************************************************************
00034>
00035>  ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
00036>  *****-------------------------------------------------------------------*****
00037>  *****    ID:  Hydrograph IDentification numbers, (1-10).                 *****
00038>  *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).    *****
00039>  *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
00040>  ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    *****
00041>  ***** TpeakDate_hh:mm is the date and time of the peak flow.             *****
00042>  *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       *****
00043>  *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       *****
00044>  *****     *:  see WARNING or NOTE message printed at end of run.         *****
00045>  *****    **:  see  ERROR  message printed at end of run.                 *****
00046>  ********************************************************************************
00047>  ********************************************************************************
00048>
00049> ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
00050>
00051>  ********************************************************************************
00052>
00053>  **********************   S U M M A R Y   O U T P U T   **********************
00054>  ********************************************************************************
00055>  *         DATE: 2017-07-12     TIME: 14:28:19     RUN COUNTER: 001525         *
00056>  ********************************************************************************
00057>  * Input   filename: C:\usr\_AIWEP\AI_ph5.dat                                   *
00058>  * Output  filename: C:\usr\_AIWEP\AI_ph5.out                                   *
00059>  * Summary filename: C:\usr\_AIWEP\AI_ph5.sum                                   *
00060>  * User comments:                                                              *
00061>  * 1:_____________________________________________________________________________*
00062>  * 2:_____________________________________________________________________________*
00063>  * 3:_____________________________________________________________________________*
00064>  ********************************************************************************
00065>
00066>
00067> #*******************************************************************************
00068> #  Project Name: [Amherst Island Wind Energy Project]
00069> #  Project Number:[1609-60595]
00070> #  Date        : July 12, 2017
00071> #                Hydrologic Modeling for Access Road Culvert Sizing
00072> #                CA Permitting
00073> #
```

```
00074> #  Company     : Stantec Consulting Ltd. (Kitchener)
00075> #  Modeller    : D. Williams
00076> #  License #   :  4730904
00077> #*******************************************************************************
00078>  RUN:COMMAND#
00079>  001:0001--------------------------------------------------------------------------
00080>      START
00081>       [TZERO =    .00 hrs on        0]
00082>       [METOUT=   2    (1=imperial, 2=metric output)]
00083>       [NSTORM=   1 ]
00084>       [NRUN  =   1 ]
00085>  001:0002--------------------------------------------------------------------------
00086>      READ STORM
00087>       Filename = STORM.001
00088>       Comment  =
00089>       [SDT= 5.00:SDUR=   4.00:PTOT=  25.00]
00090> #-----------------|-----------------------------------------------------------|
00091> #*******************************************************************************
00092> #  RA 4
00093> #*******************************************************************************
00094>  001:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00095>      DESIGN NASHYD      01:RA 4           2.40     .050 No_date    1:51    6.65 .266
00096>       [CN= 81.0: N= 3.00]
00097>       [Tp=  .22:DT= 1.00]
00098> #-----------------|-----------------------------------------------------------|
00099> #*******************************************************************************
00100> #  RA 27
00101> #*******************************************************************************
00102>  001:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00103>      DESIGN NASHYD      01:RA 27          7.10     .098 No_date    1:55    5.11 .204
00104>       [CN= 75.0: N= 3.00]
00105>       [Tp=  .27:DT= 1.00]
00106> #-----------------|-----------------------------------------------------------|
00107> #*******************************************************************************
00108> #  RA 31
00109> #*******************************************************************************
00110>  001:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00111>      DESIGN NASHYD      01:RA 31         10.10     .113 No_date    2:24    7.31 .292
00112>       [CN= 83.0: N= 3.00]
00113>       [Tp=  .65:DT= 1.00]
00114> #-----------------|-----------------------------------------------------------|
00115> #*******************************************************************************
00116> #  RA 32
00117> #*******************************************************************************
00118>  001:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00119>      DESIGN NASHYD      01:RA 32          9.70     .135 No_date    2:20    8.52 .341
00120>       [CN= 86.0: N= 3.00]
00121>       [Tp=  .60:DT= 1.00]
00122> #-----------------|-----------------------------------------------------------|
00123> #*******************************************************************************
00124> #  RA 33
00125> #*******************************************************************************
00126>  001:0007--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00127>      DESIGN NASHYD      01:RA 33         16.50     .160 No_date    2:28    6.65 .266
00128>       [CN= 81.0: N= 3.00]
00129>       [Tp=  .69:DT= 1.00]
00130> #-----------------|-----------------------------------------------------------|
00131> #*******************************************************************************
00132> #  RA 34
00133> #*******************************************************************************
00134>  001:0008--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00135>      DESIGN NASHYD      01:RA 34a         3.70     .053 No_date    2:13    7.68 .307
00136>       [CN= 84.0: N= 3.00]
00137>       [Tp=  .50:DT= 1.00]
00138> #-----------------|-----------------------------------------------------------|
00139> #*******************************************************************************
00140> #  RA 35a
00141> #*******************************************************************************
00142>  001:0009--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00143>      DESIGN NASHYD      01:RA 35a         4.10     .062 No_date    2:09    7.68 .307
00144>       [CN= 84.0: N= 3.00]
00145>       [Tp=  .46:DT= 1.00]
00146> #-----------------|-----------------------------------------------------------|
```

```
00147> #*******************************************************************************
00148> #  RA 35b
00149> #*******************************************************************************
00150>  001:0010--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00151>      DESIGN NASHYD      01:RA 35b         8.30     .106 No_date    2:19    7.68 .307
00152>       [CN= 84.0: N= 3.00]
00153>       [Tp=  .58:DT= 1.00]
00154> #-----------------|-------------------------------------------------------------|
00155> #*******************************************************************************
00156> #  RA 42
00157> #*******************************************************************************
00158>  001:0011--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00159>      DESIGN NASHYD      01:RA 42         67.50     .612 No_date    2:42    7.31 .292
00160>       [CN= 83.0: N= 3.00]
00161>       [Tp=  .87:DT= 1.00]
00162> #-----------------|-------------------------------------------------------------|
00163> #*******************************************************************************
00164> #  DFO Culvert 3
00165> #*******************************************************************************
00166>  001:0012--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00167>      DESIGN NASHYD      01:DFO_3        124.80     .598 No_date    4:20    7.68 .307
00168>       [CN= 84.0: N= 3.00]
00169>       [Tp= 2.19:DT= 1.00]
00170> #-----------------|-------------------------------------------------------------|
00171> #*******************************************************************************
00172> #  DFO Culvert 4
00173> #*******************************************************************************
00174>  001:0013--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00175>      DESIGN NASHYD      01:DFO_3        259.30     .766 No_date    5:35    6.97 .279
00176>       [CN= 82.0: N= 3.00]
00177>       [Tp= 3.45:DT= 1.00]
00178> #-----------------|-------------------------------------------------------------|
00179>   ** END OF RUN :   4
00180>
00181> *******************************************************************************
00182>
00183>
00184>
00185>
00186>
00187>  RUN:COMMAND#
00188>  005:0001--------------------------------------------------------------------------------
00189>      START
00190>       [TZERO =    .00 hrs on        0]
00191>       [METOUT=   2    (1=imperial, 2=metric output)]
00192>       [NSTORM=   1 ]
00193>       [NRUN  =   5 ]
00194> #*******************************************************************************
00195> #  Project Name: [Amherst Island Wind Energy Project]
00196> #  Project Number:[1609-60595]
00197> #  Date        : July 12, 2017
00198> #                Hydrologic Modeling for Access Road Culvert Sizing
00199> #                CA Permitting
00200> #
00201> #  Company     : Stantec Consulting Ltd. (Kitchener)
00202> #  Modeller    : D. Williams
00203> #  License #   :  4730904
00204> #*******************************************************************************
00205>  005:0002--------------------------------------------------------------------------------
00206>      READ STORM
00207>       Filename = STORM.001
00208>       Comment  =
00209>       [SDT=15.00:SDUR=  24.00:PTOT=  71.40]
00210> #-----------------|-------------------------------------------------------------|
00211> #*******************************************************************************
00212> #  RA 4
00213> #*******************************************************************************
00214>  005:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00215>      DESIGN NASHYD      01:RA 4           2.40     .209 No_date   12:06   37.74 .529
00216>       [CN= 81.0: N= 3.00]
00217>       [Tp=  .22:DT= 1.00]
00218> #-----------------|-------------------------------------------------------------|
00219> #*******************************************************************************
```

```
00220> #  RA 27
00221> #*******************************************************************************
00222>  005:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00223>      DESIGN NASHYD      01:RA 27          7.10     .449 No_date   12:09   31.61 .443
00224>       [CN= 75.0: N= 3.00]
00225>       [Tp=  .27:DT= 1.00]
00226> #-----------------|-------------------------------------------------------------|
00227> #*******************************************************************************
00228> #  RA 31
00229> #*******************************************************************************
00230>  005:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00231>      DESIGN NASHYD      01:RA 31         10.10     .448 No_date   12:34   40.07 .561
00232>       [CN= 83.0: N= 3.00]
00233>       [Tp=  .65:DT= 1.00]
00234> #-----------------|-------------------------------------------------------------|
00235> #*******************************************************************************
00236> #  RA 32
00237> #*******************************************************************************
00238>  005:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00239>      DESIGN NASHYD      01:RA 32          9.70     .503 No_date   12:31   43.92 .615
00240>       [CN= 86.0: N= 3.00]
00241>       [Tp=  .60:DT= 1.00]
00242> #-----------------|-------------------------------------------------------------|
00243> #*******************************************************************************
00244> #  RA 33
00245> #*******************************************************************************
00246>  005:0007--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00247>      DESIGN NASHYD      01:RA 33         16.50     .657 No_date   12:37   37.74 .529
00248>       [CN= 81.0: N= 3.00]
00249>       [Tp=  .69:DT= 1.00]
00250> #-----------------|-------------------------------------------------------------|
00251> #*******************************************************************************
00252> #  RA 34
00253> #*******************************************************************************
00254>  005:0008--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00255>      DESIGN NASHYD      01:RA 34a         3.70     .204 No_date   12:24   41.31 .579
00256>       [CN= 84.0: N= 3.00]
00257>       [Tp=  .50:DT= 1.00]
00258> #-----------------|-------------------------------------------------------------|
00259> #*******************************************************************************
00260> #  RA 35a
00261> #*******************************************************************************
00262>  005:0009--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00263>      DESIGN NASHYD      01:RA 35a         4.10     .240 No_date   12:21   41.31 .579
00264>       [CN= 84.0: N= 3.00]
00265>       [Tp=  .46:DT= 1.00]
00266> #-----------------|-------------------------------------------------------------|
00267> #*******************************************************************************
00268> #  RA 35b
00269> #*******************************************************************************
00270>  005:0010--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00271>      DESIGN NASHYD      01:RA 35b         8.30     .412 No_date   12:29   41.31 .579
00272>       [CN= 84.0: N= 3.00]
00273>       [Tp=  .58:DT= 1.00]
00274> #-----------------|-------------------------------------------------------------|
00275> #*******************************************************************************
00276> #  RA 42
00277> #*******************************************************************************
00278>  005:0011--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00279>      DESIGN NASHYD      01:RA 42         67.50    2.423 No_date   12:49   40.07 .561
00280>       [CN= 83.0: N= 3.00]
00281>       [Tp=  .87:DT= 1.00]
00282> #-----------------|-------------------------------------------------------------|
00283> #*******************************************************************************
00284> #  DFO Culvert 3
00285> #*******************************************************************************
00286>  005:0012--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00287>      DESIGN NASHYD      01:DFO_3        124.80    2.273 No_date   14:20   41.31 .579
00288>       [CN= 84.0: N= 3.00]
00289>       [Tp= 2.19:DT= 1.00]
00290> #-----------------|-------------------------------------------------------------|
00291> #*******************************************************************************
00292> #  DFO Culvert 4
```

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00293> #*******************************************************************************
00294>  005:0013--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00295>      DESIGN NASHYD      01:DFO_3        259.30    3.143 No_date   15:51   38.88 .545
00296>       [CN= 82.0: N= 3.00]
00297>       [Tp= 3.45:DT= 1.00]
00298> #-----------------|-------------------------------------------------------------|
00299> #-----------------|-------------------------------------------------------------|
00300>   ** END OF RUN :   9
00301>
00302> *******************************************************************************
00303>
00304>
00305>
00306>
00307>
00308>  RUN:COMMAND#
00309>  010:0001-------------------------------------------------------------------------------
00310>      START
00311>       [TZERO =    .00 hrs on        0]
00312>       [METOUT=   2    (1=imperial, 2=metric output)]
00313>       [NSTORM=   1 ]
00314>       [NRUN  =  10 ]
00315> #*******************************************************************************
00316> #  Project Name: [Amherst Island Wind Energy Project]
00317> #  Project Number:[1609-60595]
00318> #  Date        : July 12, 2017
00319> #                Hydrologic Modeling for Access Road Culvert Sizing
00320> #                CA Permitting
00321> #
00322> #  Company     : Stantec Consulting Ltd. (Kitchener)
00323> #  Modeller    : D. Williams
00324> #  License #   :  4730904
00325> #*******************************************************************************
00326>  010:0002-------------------------------------------------------------------------------
00327>      READ STORM
00328>       Filename = STORM.001
00329>       Comment  =
00330>       [SDT=15.00:SDUR=  24.00:PTOT=  83.00]
00331> #-----------------|-------------------------------------------------------------|
00332> #*******************************************************************************
00333> #  RA 4
00334> #*******************************************************************************
00335>  010:0003--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00336>      DESIGN NASHYD      01:RA 4           2.40     .262 No_date   12:06   47.08 .567
00337>       [CN= 81.0: N= 3.00]
00338>       [Tp=  .22:DT= 1.00]
00339> #-----------------|-------------------------------------------------------------|
00340> #*******************************************************************************
00341> #  RA 27
00342> #*******************************************************************************
00343>  010:0004--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00344>      DESIGN NASHYD      01:RA 27          7.10     .572 No_date   12:09   39.97 .482
00345>       [CN= 75.0: N= 3.00]
00346>       [Tp=  .27:DT= 1.00]
00347> #-----------------|-------------------------------------------------------------|
00348> #*******************************************************************************
00349> #  RA 31
00350> #*******************************************************************************
00351>  010:0005--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00352>      DESIGN NASHYD      01:RA 31         10.10     .558 No_date   12:34   49.75 .599
00353>       [CN= 83.0: N= 3.00]
00354>       [Tp=  .65:DT= 1.00]
00355> #-----------------|-------------------------------------------------------------|
00356> #*******************************************************************************
00357> #  RA 32
00358> #*******************************************************************************
00359>  010:0006--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00360>      DESIGN NASHYD      01:RA 32          9.70     .620 No_date   12:30   54.07 .651
00361>       [CN= 86.0: N= 3.00]
00362>       [Tp=  .60:DT= 1.00]
00363> #-----------------|-------------------------------------------------------------|
00364> #*******************************************************************************
00365> #  RA 33
```

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00366> #*******************************************************************************
00367>  010:0007--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00368>      DESIGN NASHYD      01:RA 33         16.50     .824 No_date   12:37   47.08 .567
00369>       [CN= 81.0: N= 3.00]
00370>       [Tp=  .69:DT= 1.00]
00371> #-----------------|-------------------------------------------------------------|
00372> #*******************************************************************************
00373> #  RA 34
00374> #*******************************************************************************
00375>  010:0008--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00376>      DESIGN NASHYD      01:RA 34a         3.70     .254 No_date   12:24   51.14 .616
00377>       [CN= 84.0: N= 3.00]
00378>       [Tp=  .50:DT= 1.00]
00379> #-----------------|-------------------------------------------------------------|
00380> #*******************************************************************************
00381> #  RA 35a
00382> #*******************************************************************************
00383>  010:0009--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00384>      DESIGN NASHYD      01:RA 35a         4.10     .298 No_date   12:21   51.14 .616
00385>       [CN= 84.0: N= 3.00]
00386>       [Tp=  .46:DT= 1.00]
00387> #-----------------|-------------------------------------------------------------|
00388> #*******************************************************************************
00389> #  RA 35b
00390> #*******************************************************************************
00391>  010:0010--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00392>      DESIGN NASHYD      01:RA 35b         8.30     .512 No_date   12:29   51.14 .616
00393>       [CN= 84.0: N= 3.00]
00394>       [Tp=  .58:DT= 1.00]
00395> #-----------------|-------------------------------------------------------------|
00396> #*******************************************************************************
00397> #  RA 42
00398> #*******************************************************************************
00399>  010:0011--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00400>      DESIGN NASHYD      01:RA 42         67.50    3.020 No_date   12:49   49.75 .599
00401>       [CN= 83.0: N= 3.00]
00402>       [Tp=  .87:DT= 1.00]
00403> #-----------------|-------------------------------------------------------------|
00404> #*******************************************************************************
00405> #  DFO Culvert 3
00406> #*******************************************************************************
00407>  010:0012--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00408>      DESIGN NASHYD      01:DFO_3        124.80    2.825 No_date   14:19   51.14 .616
00409>       [CN= 84.0: N= 3.00]
00410>       [Tp= 2.19:DT= 1.00]
00411> #-----------------|-------------------------------------------------------------|
00412> #*******************************************************************************
00413> #  DFO Culvert 4
00414> #*******************************************************************************
00415>  010:0013--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00416>      DESIGN NASHYD      01:DFO_3        259.30    3.927 No_date   15:49   48.39 .583
00417>       [CN= 82.0: N= 3.00]
00418>       [Tp= 3.45:DT= 1.00]
00419> #-----------------|-------------------------------------------------------------|
00420> #-----------------|-------------------------------------------------------------|
00421>   ** END OF RUN :  99
00422>
00423> *******************************************************************************
00424>
00425>
00426>
00427>
00428>
00429>  RUN:COMMAND#
00430>  100:0001--------------------------------------------------------------------------
00431>      START
00432>       [TZERO =    .00 hrs on        0]
00433>       [METOUT=   2    (1=imperial, 2=metric output)]
00434>       [NSTORM=   1 ]
00435>       [NRUN  = 100 ]
00436> #*******************************************************************************
00437> #  Project Name: [Amherst Island Wind Energy Project]
00438> #  Project Number:[1609-60595]
```

```
00439> #  Date        : July 12, 2017
00440> #                Hydrologic Modeling for Access Road Culvert Sizing
00441> #                CA Permitting
00442> #
00443> #  Company     : Stantec Consulting Ltd. (Kitchener)
00444> #  Modeller    : D. Williams
00445> #  License #   :  4730904
00446> #*******************************************************************************
00447>  100:0002-------------------------------------------------------------------------
00448>      READ STORM
00449>       Filename = STORM.001
00450>       Comment  =
00451>       [SDT=15.00:SDUR=  24.00:PTOT= 119.80]
00452> #-----------------|---------------------------------------------------------|
00453> #*******************************************************************************
00454> #  RA 4
00455> #*******************************************************************************
00456>  100:0003--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00457>      DESIGN NASHYD      01:RA 4           2.40     .440 No_date   12:06   78.68 .657
00458>       [CN= 81.0: N= 3.00]
00459>       [Tp=  .22:DT= 1.00]
00460> #-----------------|---------------------------------------------------------|
00461> #*******************************************************************************
00462> #  RA 27
00463> #*******************************************************************************
00464>  100:0004--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00465>      DESIGN NASHYD      01:RA 27          7.10     .997 No_date   12:09   68.95 .576
00466>       [CN= 75.0: N= 3.00]
00467>       [Tp=  .27:DT= 1.00]
00468> #-----------------|---------------------------------------------------------|
00469> #*******************************************************************************
00470> #  RA 31
00471> #*******************************************************************************
00472>  100:0005--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00473>      DESIGN NASHYD      01:RA 31         10.10     .927 No_date   12:33   82.17 .686
00474>       [CN= 83.0: N= 3.00]
00475>       [Tp=  .65:DT= 1.00]
00476> #-----------------|---------------------------------------------------------|
00477> #*******************************************************************************
00478> #  RA 32
00479> #*******************************************************************************
00480>  100:0006--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00481>      DESIGN NASHYD      01:RA 32          9.70    1.007 No_date   12:30   87.66 .732
00482>       [CN= 86.0: N= 3.00]
00483>       [Tp=  .60:DT= 1.00]
00484> #-----------------|---------------------------------------------------------|
00485> #*******************************************************************************
00486> #  RA 33
00487> #*******************************************************************************
00488>  100:0007--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00489>      DESIGN NASHYD      01:RA 33         16.50    1.387 No_date   12:36   78.68 .657
00490>       [CN= 81.0: N= 3.00]
00491>       [Tp=  .69:DT= 1.00]
00492> #-----------------|---------------------------------------------------------|
00493> #*******************************************************************************
00494> #  RA 34
00495> #*******************************************************************************
00496>  100:0008--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00497>      DESIGN NASHYD      01:RA 34a         3.70     .418 No_date   12:23   83.96 .701
00498>       [CN= 84.0: N= 3.00]
00499>       [Tp=  .50:DT= 1.00]
00500> #-----------------|---------------------------------------------------------|
00501> #*******************************************************************************
00502> #  RA 35a
00503> #*******************************************************************************
00504>  100:0009--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
00505>      DESIGN NASHYD      01:RA 35a         4.10     .492 No_date   12:20   83.96 .701
00506>       [CN= 84.0: N= 3.00]
00507>       [Tp=  .46:DT= 1.00]
00508> #-----------------|---------------------------------------------------------|
00509> #*******************************************************************************
00510> #  RA 35b
00511> #*******************************************************************************
```

```
 100:0010--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
      DESIGN NASHYD      01:RA 35b         8.30     .845 No_date   12:29   83.96 .701
       [CN= 84.0: N= 3.00]
       [Tp=  .58:DT= 1.00]
#-----------------|-------------------------------------------------------------|
#*****************************************************************************
#  RA 42
#*****************************************************************************
 100:0011--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
      DESIGN NASHYD      01:RA 42         67.50    5.018 No_date   12:48   82.17 .686
       [CN= 83.0: N= 3.00]
       [Tp=  .87:DT= 1.00]
#-----------------|-------------------------------------------------------------|
#*****************************************************************************
#  DFO Culvert 3
#*****************************************************************************
 100:0012--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
      DESIGN NASHYD      01:DFO_3        124.80    4.668 No_date   14:16   83.96 .701
       [CN= 84.0: N= 3.00]
       [Tp= 2.19:DT= 1.00]
#-----------------|-------------------------------------------------------------|
#*****************************************************************************
#  DFO Culvert 4
#*****************************************************************************
 100:0013--------------ID:NHYD----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
      DESIGN NASHYD      01:DFO_3        259.30    6.571 No_date   15:45   80.41 .671
       [CN= 82.0: N= 3.00]
       [Tp= 3.45:DT= 1.00]
#-----------------|-------------------------------------------------------------|
#-----------------|-------------------------------------------------------------|
 100:0002-------------------------------------------------------------------------
       FINISH
 -------------------------------------------------------------------------------
 *******************************************************************************
      WARNINGS / ERRORS / NOTES
      ------------------------
    Simulation ended on 2017-07-12     at 14:28:20
 ===============================================================================
```

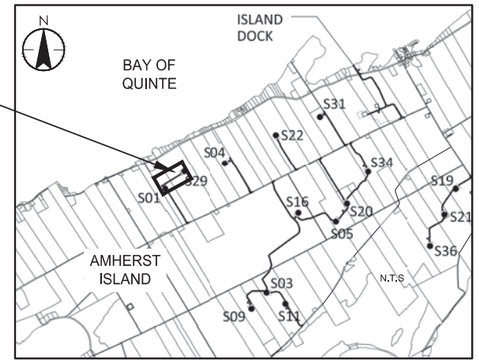
RA4 – HYDRAULIC MODELING

LOCATION OF ERECTION BUMP–OUTS AND PADS TO BE FIELD DETERMINED WITHIN REA LIMITS. PROVIDE ADDITIONAL BUMP–OUTS, AS REQUIRED. BUMP–OUTS AND PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIALS, AS DETERMINED IN FIELD.

SEE STRUCTURAL DRAWINGS FOR FOUNDATION DETAILS AND BACKFILL REQUIREMENTS

CONTRACTOR TO MAINTAIN EXISTING DRAINAGE FLOWS AS REQUIRED

PLAN LOCATION



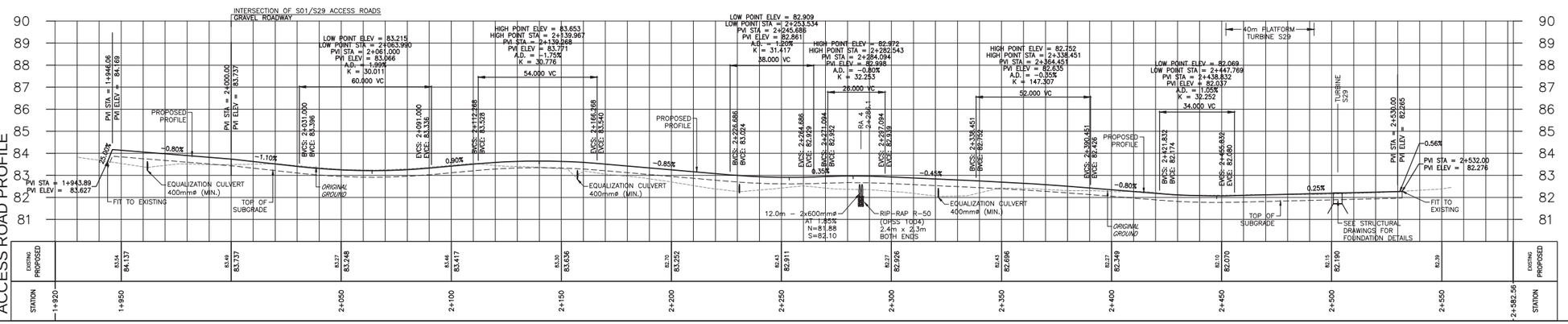
KEY PLAN

(SEE DWG. NO. C202–SHEET 2)

SEE DRAWING C302 FOR ADDITIONAL ACCESS ROAD DETAILS

CRANE PAD REQUIREMENTS:

- CRANE PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIAL AS FOLLOWS:
  - 500mm GRANULAR 'B' TYPE II, PLACED IN 2 LIFTS, COMPACTED TO 100% SPMDD. WITH REINFORCEMENT LAYER (NAUE COMBIGRID 40/40 Q1 151 GRK3 OR APPROVED EQUIVALENT).
- SEPARATION LAYER (TERRAFIX 200R GEOTEXTILE).
- SUBGRADE TO BE INSPECTED, PROOF ROLLED, AND COMPACTED TO 100% SPMDD.
- CRANE PAD MUST BE EXTENDED 1.5m (MIN.) BEYOND OUTRIGGER MATS.



Stantec

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Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****	
Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations	
☐ Reviewed - No comments	
☐ Reviewed - Incorporate comments and resubmit	
☐ Reviewed - Not accepted	
Reviewed By	Date [dd-mmm-yyyy]
Project Manager - PHCL	Date [dd-mmm-yyyy]
Project Manager - Windlectric	Date [dd-mmm-yyyy]
Owner:	

Revision	By	Appd.	YY.MM.DD
B ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A ISSUED FOR CLIENT REVIEW	RCL	MPG	16.02.02

File Name: C202_133560100-Turbine S01-S29.dwg	Dwn.	Chkd.	Dsgn.	YY.MM.DD
	RCL	MPG	RCL	15.12.03

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

ACCESS ROAD
TURBINE S01 AND S29
PLAN AND PROFILE

Project No.	Scale	Drawing No.	Sheet	Revision
133560100	1:1000H 1:100V	C202	3 of 3	B


0.5
1
2
2.1667*
2.3333*
2.5000*
2.6667*
2.8333*
3
4
RA4
4.2000*
4.4000*
4.6000*
4.8000*
5
5.3333*
5.6667*
6
6.1429*
6.2857*
6.4286*
6.5714*
6.7143*
6.8571*
7

HEC-RAS Plan: Plan 06 River: RA4 Reach: RA4

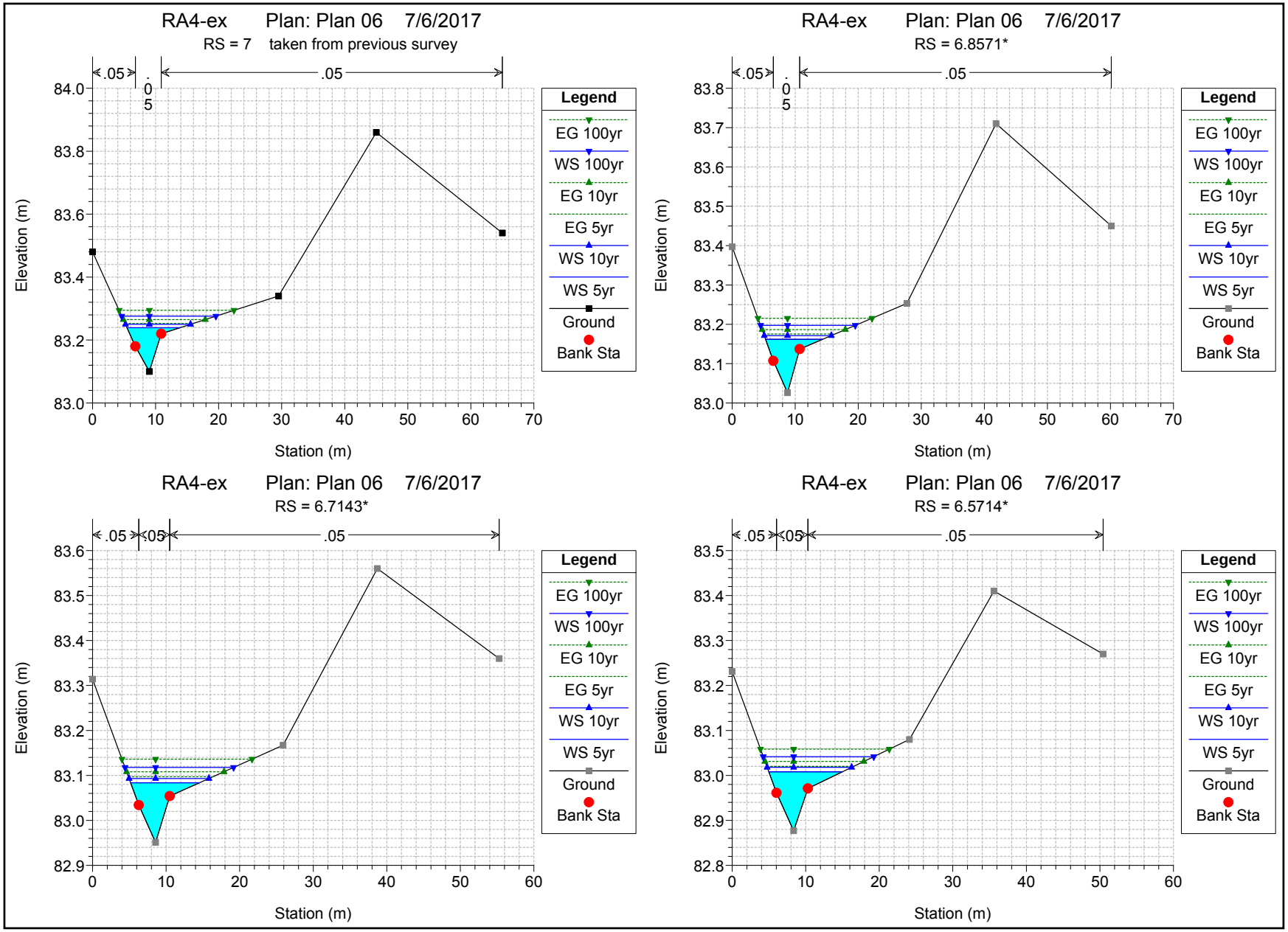
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA4	7	5yr	0.21	83.10	83.24		83.25	0.017444	0.53	0.44	8.44	0.56	0.48	0.25	0.12
RA4	7	10yr	0.26	83.10	83.25		83.27	0.017362	0.57	0.54	10.34	0.57	0.49	0.28	0.16
RA4	7	100yr	0.44	83.10	83.28		83.29	0.017307	0.66	0.87	14.96	0.59	0.51	0.35	0.24
RA4	6.8571*	5yr	0.21	83.03	83.16		83.18	0.017643	0.53	0.45	9.06	0.57	0.47	0.24	0.14
RA4	6.8571*	10yr	0.26	83.03	83.17		83.19	0.018357	0.57	0.54	10.63	0.59	0.49	0.27	0.18
RA4	6.8571*	100yr	0.44	83.03	83.20		83.22	0.017748	0.66	0.87	15.02	0.60	0.50	0.34	0.26
RA4	6.7143*	5yr	0.21	82.95	83.08		83.10	0.018253	0.53	0.45	9.36	0.57	0.46	0.23	0.16
RA4	6.7143*	10yr	0.26	82.95	83.09		83.11	0.018586	0.57	0.55	10.86	0.59	0.48	0.26	0.20
RA4	6.7143*	100yr	0.44	82.95	83.12		83.14	0.018632	0.67	0.86	14.76	0.61	0.51	0.33	0.27
RA4	6.5714*	5yr	0.21	82.88	83.01		83.02	0.016809	0.51	0.48	10.00	0.55	0.43	0.21	0.18
RA4	6.5714*	10yr	0.26	82.88	83.02		83.03	0.016627	0.54	0.59	11.48	0.56	0.45	0.24	0.21
RA4	6.5714*	100yr	0.44	82.88	83.04		83.06	0.017168	0.64	0.90	15.02	0.59	0.49	0.31	0.28
RA4	6.4286*	5yr	0.21	82.80	82.93		82.94	0.020087	0.53	0.46	9.69	0.60	0.46	0.20	0.20
RA4	6.4286*	10yr	0.26	82.80	82.94		82.95	0.020881	0.58	0.54	10.86	0.62	0.48	0.24	0.24
RA4	6.4286*	100yr	0.44	82.80	82.96		82.98	0.019715	0.66	0.86	14.35	0.62	0.51	0.31	0.31
RA4	6.2857*	5yr	0.21	82.73	82.86	82.83	82.87	0.012825	0.45	0.56	10.96	0.48	0.37	0.18	0.20
RA4	6.2857*	10yr	0.26	82.73	82.87	82.84	82.88	0.013455	0.49	0.66	12.08	0.50	0.40	0.20	0.23
RA4	6.2857*	100yr	0.44	82.73	82.89		82.90	0.015397	0.60	0.95	14.85	0.56	0.46	0.27	0.30
RA4	6.1429*	5yr	0.21	82.65	82.76	82.76	82.78	0.031680	0.60	0.39	8.70	0.73	0.53	0.17	0.27
RA4	6.1429*	10yr	0.26	82.65	82.77	82.77	82.79	0.029976	0.64	0.48	9.78	0.72	0.55	0.21	0.30
RA4	6.1429*	100yr	0.44	82.65	82.80		82.82	0.025523	0.71	0.77	12.75	0.70	0.57	0.29	0.36
RA4	6	5yr	0.21	82.58	82.72		82.72	0.006391	0.35	0.74	11.92	0.35	0.28	0.14	0.19
RA4	6	10yr	0.26	82.58	82.73		82.74	0.006315	0.37	0.88	13.10	0.35	0.30	0.16	0.20
RA4	6	100yr	0.44	82.58	82.76		82.77	0.006033	0.43	1.34	16.27	0.36	0.33	0.20	0.24
RA4	5.6667*	5yr	0.21	82.56	82.69		82.70	0.005965	0.34	0.75	11.54	0.34	0.28	0.16	0.19
RA4	5.6667*	10yr	0.26	82.56	82.71		82.71	0.005890	0.36	0.89	12.59	0.34	0.29	0.18	0.20
RA4	5.6667*	100yr	0.44	82.56	82.74		82.75	0.005579	0.42	1.36	15.90	0.35	0.32	0.20	0.24
RA4	5.3333*	5yr	0.21	82.55	82.67		82.67	0.006033	0.34	0.73	10.50	0.34	0.29	0.18	0.20
RA4	5.3333*	10yr	0.26	82.55	82.68		82.69	0.005933	0.37	0.86	11.38	0.34	0.30	0.20	0.21
RA4	5.3333*	100yr	0.44	82.55	82.71		82.72	0.005955	0.43	1.30	15.40	0.36	0.34	0.20	0.26
RA4	5	5yr	0.21	82.53	82.62		82.63	0.015873	0.48	0.49	7.62	0.53	0.43	0.28	0.28
RA4	5	10yr	0.26	82.53	82.63		82.64	0.015195	0.51	0.58	8.11	0.53	0.45	0.30	0.30
RA4	5	100yr	0.44	82.53	82.66		82.68	0.016297	0.63	0.85	12.50	0.58	0.51	0.25	0.38
RA4	4.8000*	5yr	0.21	82.46	82.56		82.57	0.015615	0.46	0.51	8.54	0.52	0.41	0.26	0.24
RA4	4.8000*	10yr	0.26	82.46	82.57		82.58	0.016053	0.51	0.59	9.13	0.54	0.45	0.29	0.26
RA4	4.8000*	100yr	0.44	82.46	82.60		82.61	0.015760	0.61	0.91	14.17	0.56	0.48	0.25	0.32

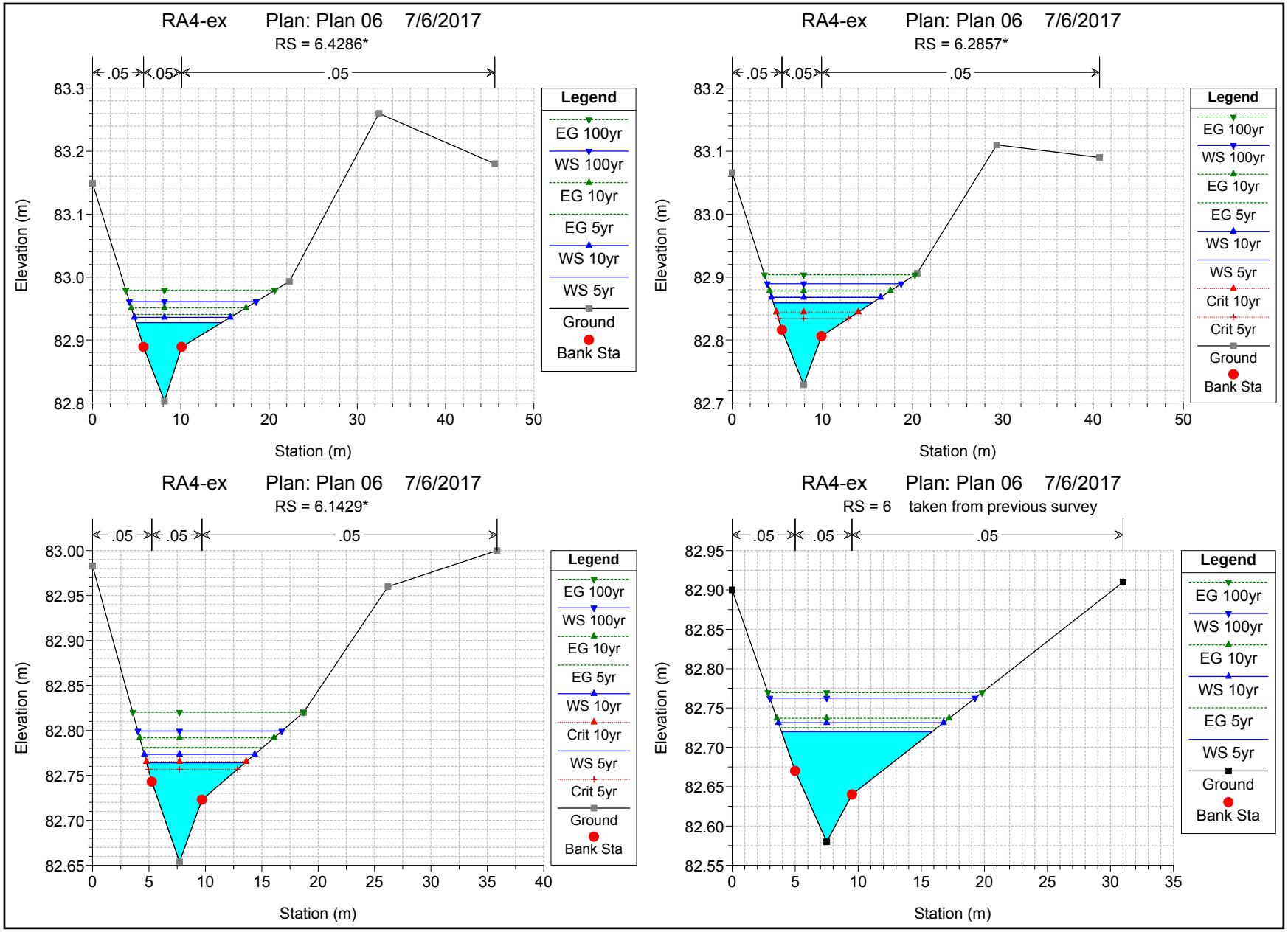
HEC-RAS Plan: Plan 06 River: RA4 Reach: RA4 (Continued)

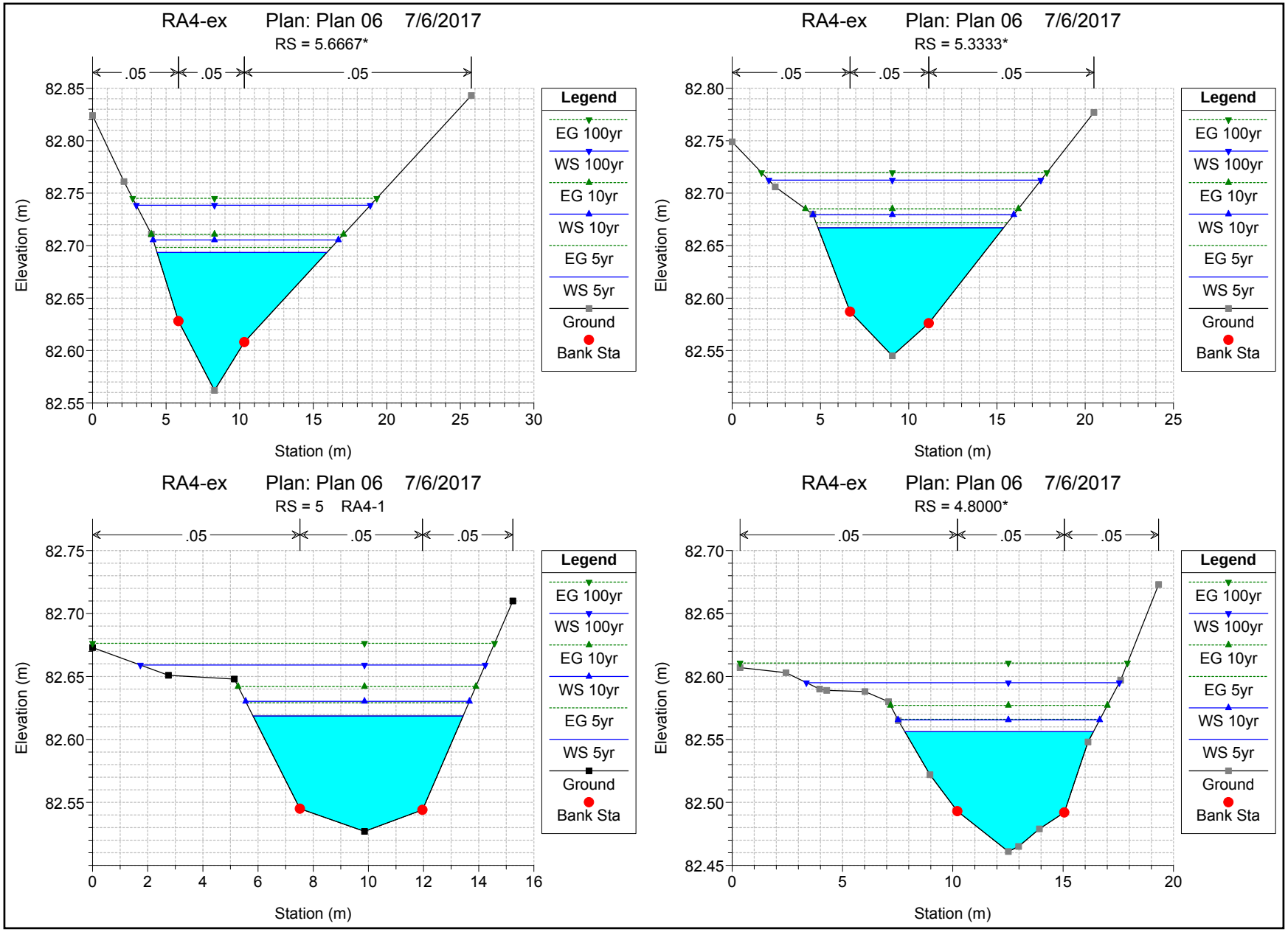
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA4	4.6000*	5yr	0.21	82.40	82.49		82.50	0.015563	0.45	0.53	9.50	0.52	0.40	0.24	0.22
RA4	4.6000*	10yr	0.26	82.40	82.50		82.51	0.014873	0.48	0.63	10.09	0.52	0.42	0.27	0.24
RA4	4.6000*	100yr	0.44	82.40	82.53		82.54	0.017578	0.61	0.90	15.04	0.59	0.49	0.27	0.29
RA4	4.4000*	5yr	0.21	82.33	82.43		82.44	0.016000	0.44	0.54	10.53	0.52	0.39	0.23	0.19
RA4	4.4000*	10yr	0.26	82.33	82.44		82.45	0.016135	0.47	0.63	11.06	0.53	0.41	0.27	0.22
RA4	4.4000*	100yr	0.44	82.33	82.46		82.48	0.016113	0.56	0.92	13.17	0.56	0.48	0.32	0.28
RA4	4.2000*	5yr	0.21	82.26	82.37	82.35	82.38	0.014848	0.41	0.58	11.78	0.50	0.36	0.22	0.16
RA4	4.2000*	10yr	0.26	82.26	82.38	82.36	82.39	0.014667	0.44	0.68	12.42	0.51	0.39	0.25	0.18
RA4	4.2000*	100yr	0.44	82.26	82.40	82.38	82.41	0.015388	0.54	0.97	14.21	0.54	0.45	0.32	0.25
RA4	4	5yr	0.21	82.20	82.30	82.29	82.31	0.018485	0.43	0.56	12.77	0.55	0.38	0.23	0.12
RA4	4	10yr	0.26	82.20	82.31	82.30	82.32	0.018768	0.47	0.65	13.31	0.56	0.40	0.26	0.15
RA4	4	100yr	0.44	82.20	82.33	82.31	82.35	0.018285	0.55	0.94	14.89	0.58	0.47	0.34	0.22
RA4	3	5yr	0.21	81.91	82.02	82.01	82.03	0.017772	0.43	0.56	12.82	0.54	0.37	0.23	0.12
RA4	3	10yr	0.26	81.91	82.03	82.01	82.03	0.017103	0.45	0.67	13.44	0.54	0.39	0.26	0.15
RA4	3	100yr	0.44	81.91	82.05	82.02	82.06	0.017752	0.54	0.95	14.95	0.57	0.46	0.34	0.22
RA4	2.8333*	5yr	0.21	81.82	81.94	81.92	81.95	0.018290	0.44	0.54	11.89	0.55	0.39	0.22	0.05
RA4	2.8333*	10yr	0.26	81.82	81.95	81.93	81.96	0.017547	0.47	0.64	12.57	0.55	0.41	0.25	0.09
RA4	2.8333*	100yr	0.44	81.82	81.97	81.95	81.98	0.017587	0.56	0.93	14.27	0.57	0.47	0.33	0.18
RA4	2.6667*	5yr	0.21	81.74	81.86	81.84	81.87	0.018608	0.47	0.51	10.78	0.56	0.41	0.21	
RA4	2.6667*	10yr	0.26	81.74	81.87	81.85	81.88	0.019037	0.50	0.60	11.43	0.57	0.43	0.26	
RA4	2.6667*	100yr	0.44	81.74	81.89	81.87	81.91	0.017784	0.57	0.90	13.50	0.58	0.49	0.33	0.13
RA4	2.5000*	5yr	0.21	81.65	81.78	81.75	81.79	0.017894	0.48	0.49	9.86	0.56	0.43	0.20	
RA4	2.5000*	10yr	0.26	81.65	81.79	81.77	81.80	0.016568	0.50	0.60	10.66	0.54	0.43	0.24	
RA4	2.5000*	100yr	0.44	81.65	81.82	81.80	81.83	0.017249	0.58	0.89	12.75	0.58	0.50	0.33	0.07
RA4	2.3333*	5yr	0.21	81.56	81.70	81.67	81.71	0.018673	0.51	0.45	8.92	0.57	0.46	0.18	
RA4	2.3333*	10yr	0.26	81.56	81.71	81.68	81.72	0.022064	0.58	0.51	9.35	0.63	0.51	0.23	
RA4	2.3333*	100yr	0.44	81.56	81.74	81.72	81.76	0.018105	0.62	0.84	11.81	0.59	0.52	0.32	
RA4	2.1667*	5yr	0.21	81.48	81.62	81.59	81.64	0.017543	0.52	0.44	8.19	0.56	0.47	0.16	
RA4	2.1667*	10yr	0.26	81.48	81.65	81.60	81.66	0.010759	0.46	0.65	9.70	0.46	0.40	0.21	
RA4	2.1667*	100yr	0.44	81.48	81.67	81.64	81.68	0.016162	0.62	0.85	11.51	0.57	0.52	0.30	
RA4	2	5yr	0.21	81.39	81.54	81.51	81.56	0.017526	0.55	0.38	7.45	0.57	0.55		
RA4	2	10yr	0.26	81.39	81.52	81.52	81.56	0.054278	0.88	0.30	4.55	0.98	0.88		
RA4	2	100yr	0.44	81.39	81.58	81.56	81.60	0.019898	0.69	0.75	10.11	0.63	0.59	0.31	
RA4	1	5yr	0.21	81.03	81.12	81.10	81.13	0.013325	0.33	0.65	18.99	0.45	0.32	0.07	
RA4	1	10yr	0.26	81.03	81.14	81.10	81.15	0.006557	0.28	1.07	23.12	0.33	0.24	0.12	0.11
RA4	1	100yr	0.44	81.03	81.15	81.13	81.16	0.012913	0.41	1.23	23.96	0.47	0.36	0.20	0.19

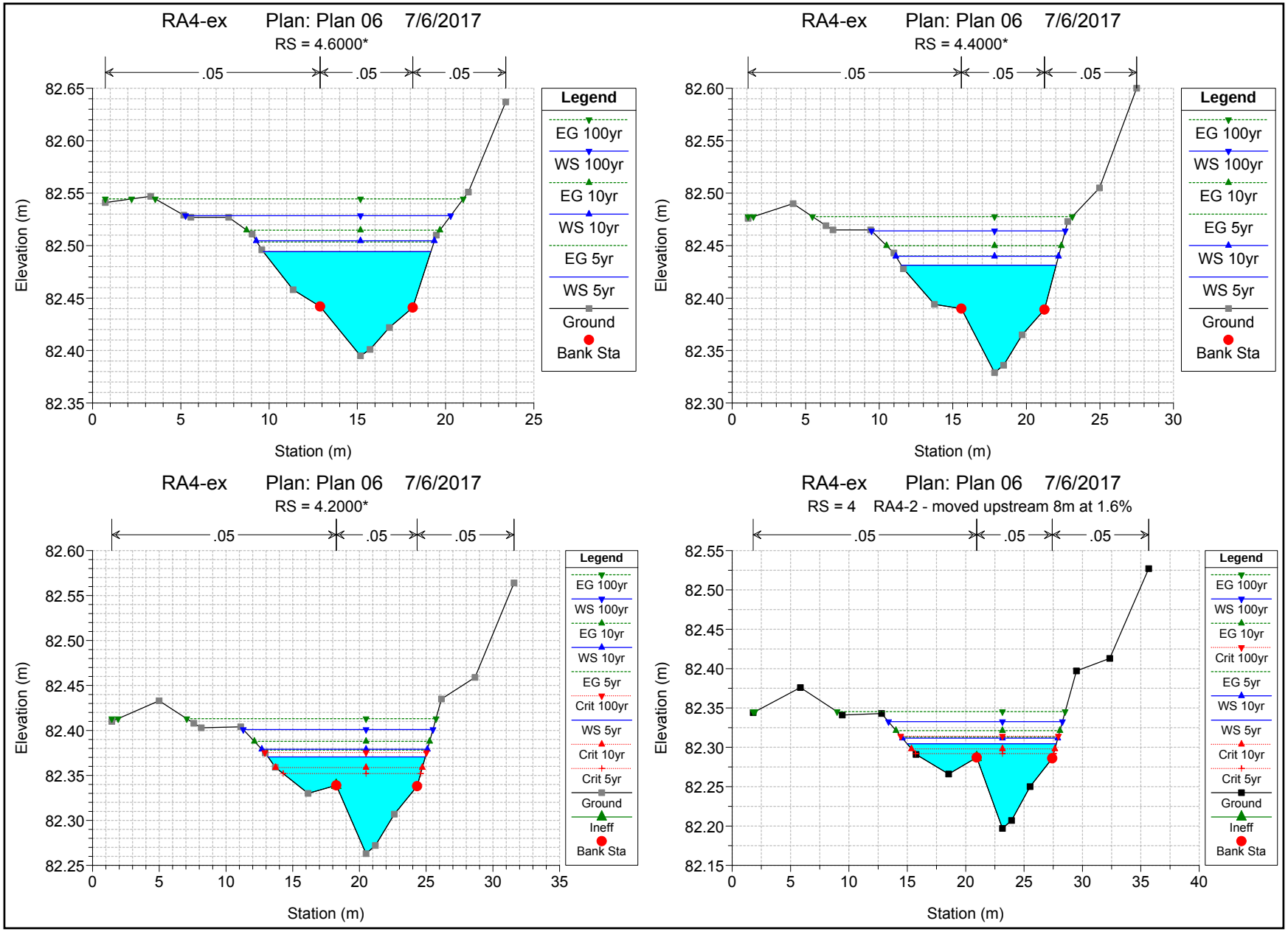
HEC-RAS Plan: Plan 06 River: RA4 Reach: RA4 (Continued)

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA4	0.5	5yr	0.21	80.90	80.99	80.97	81.00	0.013006	0.33	0.66	19.09	0.45	0.32	0.07	
RA4	0.5	10yr	0.26	80.90	80.98	80.98	80.99	0.065143	0.62	0.42	9.80	0.96	0.62		
RA4	0.5	100yr	0.44	80.90	81.02	81.00	81.03	0.013005	0.41	1.22	23.94	0.48	0.36	0.20	0.19


RA4-ex Plan: Plan 06 7/6/2017
RS = 7 taken from previous survey
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.8571*
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.7143*
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.5714*
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)


RA4-ex Plan: Plan 06 7/6/2017
RS = 6.4286*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.2857*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.1429*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
Crit 10yr
WS 5yr
Crit 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 6 taken from previous survey
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 5.6667*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 5.3333*
RA4-ex Plan: Plan 06 7/6/2017
RS = 5 RA4-1
RA4-ex Plan: Plan 06 7/6/2017
RS = 4.8000*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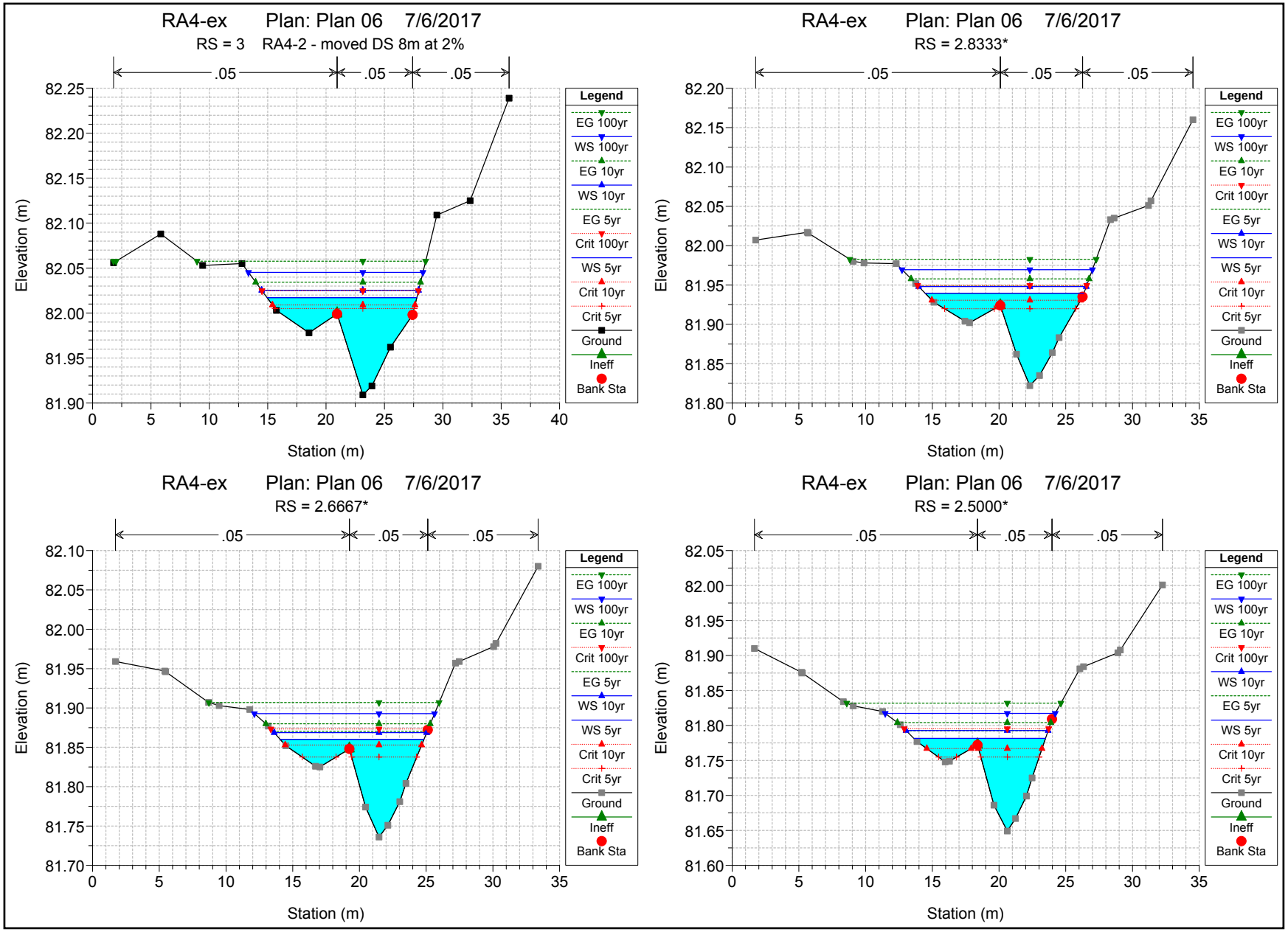
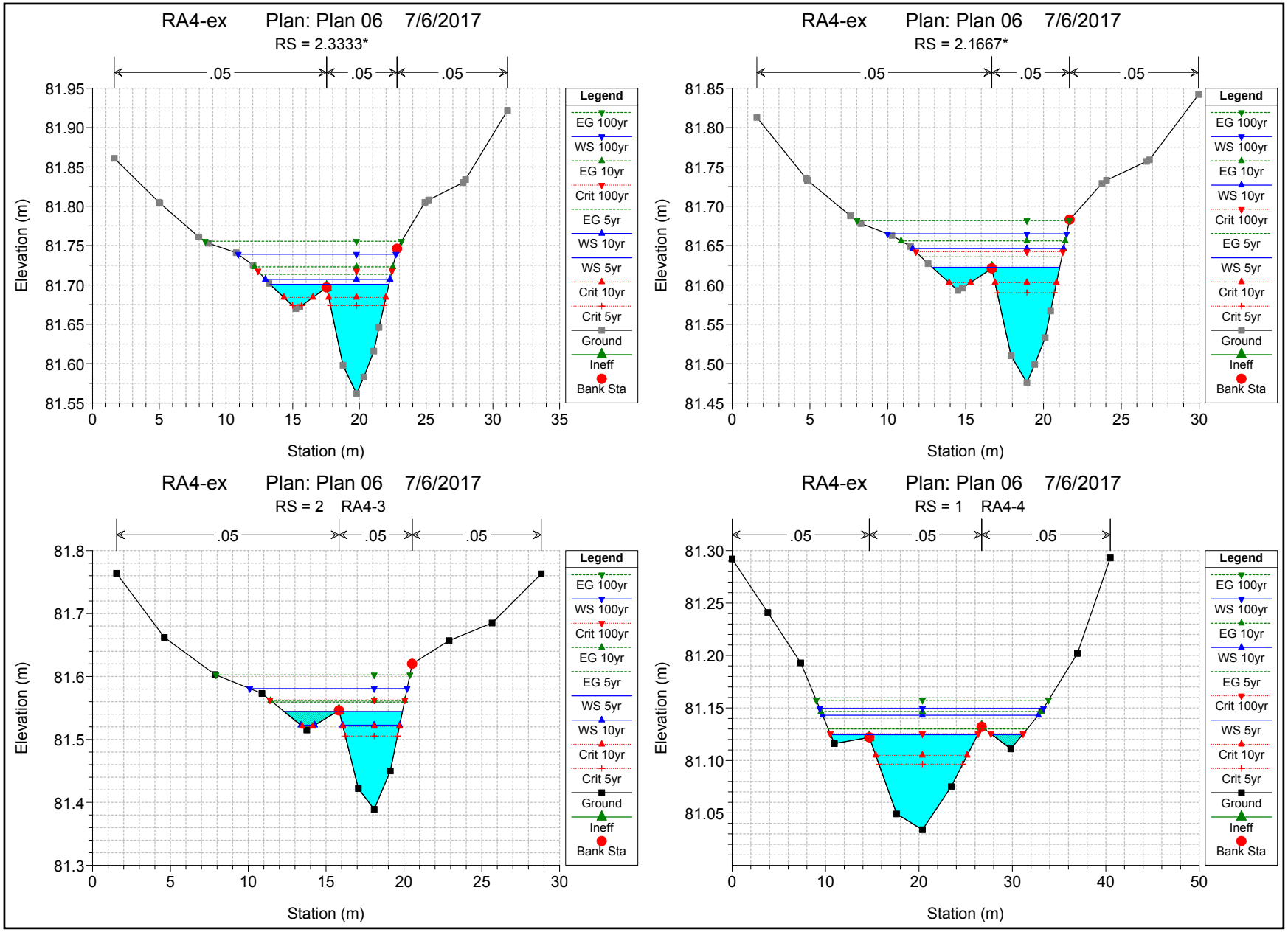
RS = 4.6000*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4.4000*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4.2000*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4 RA4-2 - moved upstream 8m at 1.6%
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
Crit 100yr
EG 5yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 3 RA4-2 - moved DS 8m at 2%
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.8333*
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.6667*
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.5000*


RA4-ex Plan: Plan 06 7/6/2017
RS = 2.3333*
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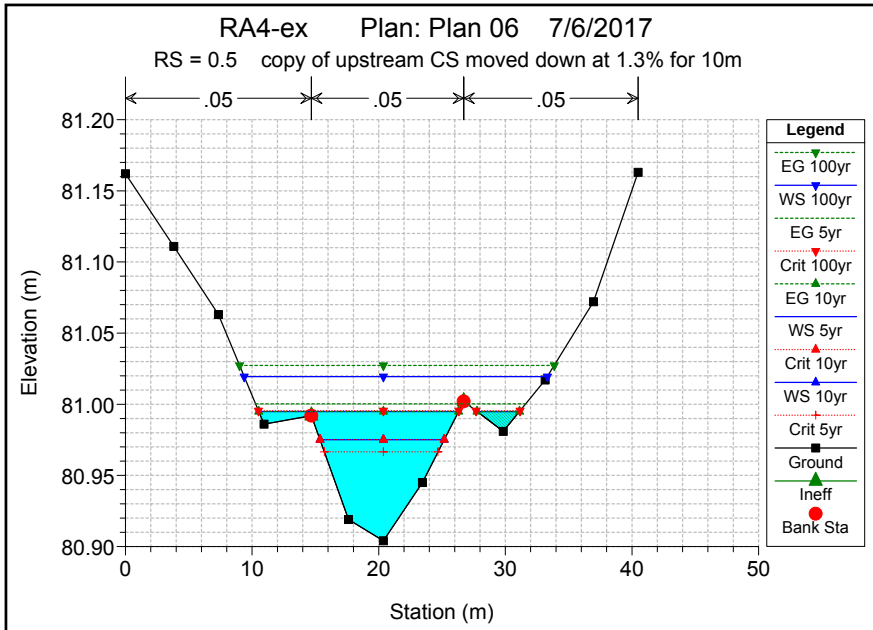
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
Crit 100yr
EG 5yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.1667*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
Crit 100yr
EG 5yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2 RA4-3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
Crit 100yr
EG 10yr
EG 5yr
WS 5yr
WS 10yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 1 RA4-4
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 0.5 copy of upstream CS moved down at 1.3% for 10m
.05
.05
.05
Elevation (m)
81.20
81.15
81.10
81.05
81.00
80.95
80.90
0
10
20
30
40
50
Station (m)
Legend
EG 100yr
WS 100yr
EG 5yr
Crit 100yr
EG 10yr
WS 5yr
Crit 10yr
WS 10yr
Crit 5yr
Ground
Ineff
Bank Sta


0.5
1
2
2.1667*
2.3333*
2.5000*
2.6667*
2.8333*
3
3.5
4
RA4
4.2000*
4.4000*
4.6000*
4.8000*
5
5.3333*
5.6667*
6
6.1429*
6.2857*
6.4286*
6.5714*
6.7143*
6.8571*
7

HEC-RAS Plan: Plan 06 River: RA4 Reach: RA4

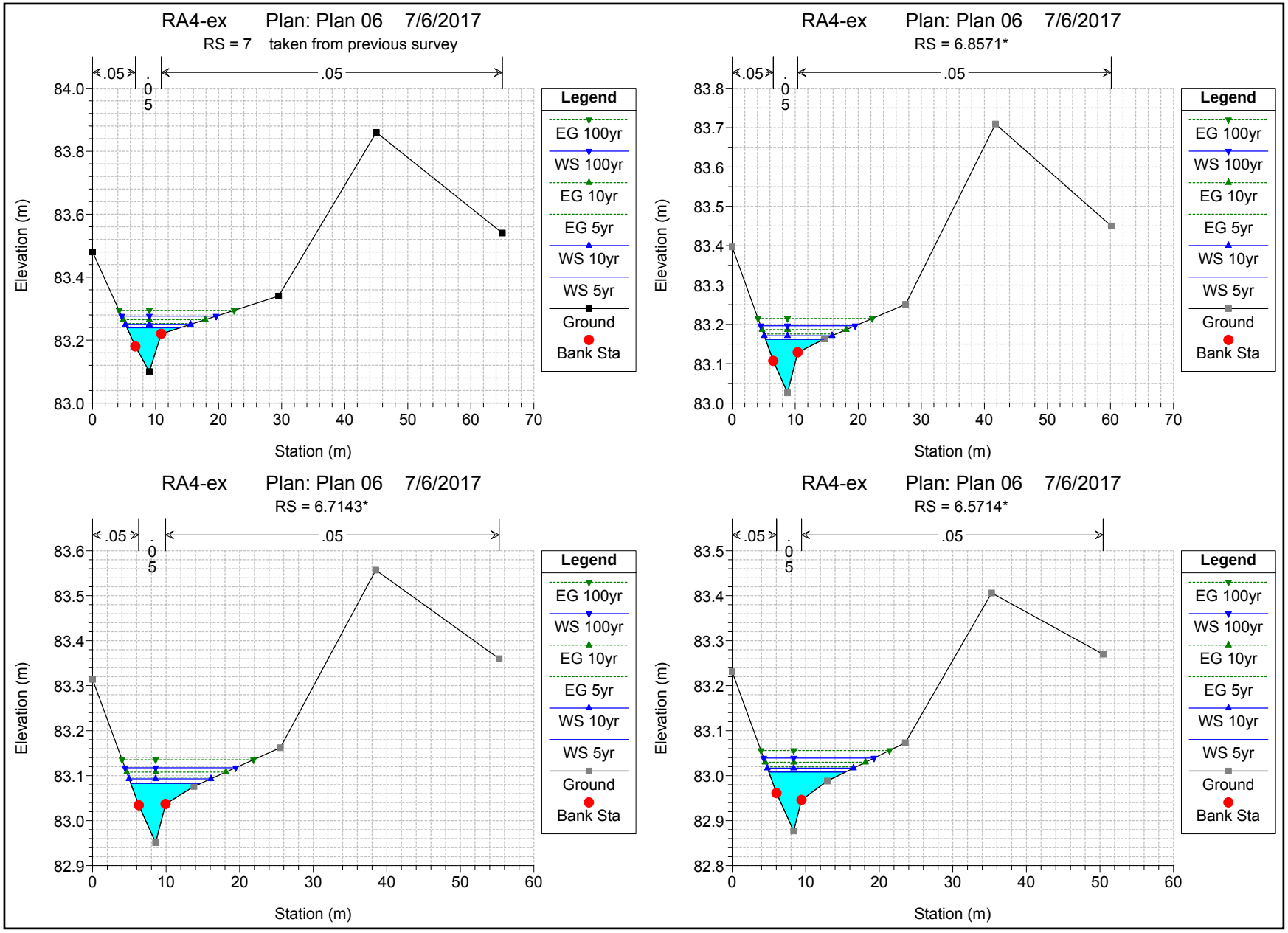
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA4	7	5yr	0.21	83.10	83.24		83.25	0.017508	0.53	0.44	8.43	0.57	0.48	0.25	0.12
RA4	7	10yr	0.26	83.10	83.25		83.27	0.017355	0.57	0.54	10.34	0.57	0.49	0.28	0.16
RA4	7	100yr	0.44	83.10	83.28		83.29	0.017204	0.66	0.87	14.99	0.59	0.51	0.35	0.24
RA4	6.8571*	5yr	0.21	83.03	83.16		83.18	0.017559	0.54	0.46	9.27	0.57	0.46	0.24	0.17
RA4	6.8571*	10yr	0.26	83.03	83.17		83.19	0.018364	0.58	0.55	10.79	0.59	0.48	0.27	0.20
RA4	6.8571*	100yr	0.44	83.03	83.20		83.21	0.018373	0.68	0.87	15.00	0.61	0.51	0.34	0.28
RA4	6.7143*	5yr	0.21	82.95	83.08		83.10	0.018842	0.55	0.46	9.55	0.59	0.45	0.23	0.21
RA4	6.7143*	10yr	0.26	82.95	83.09		83.11	0.018600	0.59	0.56	11.14	0.59	0.47	0.26	0.24
RA4	6.7143*	100yr	0.44	82.95	83.12		83.14	0.018465	0.68	0.89	15.06	0.61	0.50	0.33	0.30
RA4	6.5714*	5yr	0.21	82.88	83.01		83.02	0.016731	0.52	0.50	10.46	0.55	0.41	0.21	0.24
RA4	6.5714*	10yr	0.26	82.88	83.02		83.03	0.017484	0.57	0.60	11.72	0.57	0.44	0.24	0.27
RA4	6.5714*	100yr	0.44	82.88	83.04		83.06	0.018808	0.68	0.90	15.00	0.62	0.49	0.31	0.33
RA4	6.4286*	5yr	0.21	82.80	82.93		82.94	0.021144	0.56	0.47	10.01	0.62	0.44	0.20	0.29
RA4	6.4286*	10yr	0.26	82.80	82.94		82.95	0.019932	0.59	0.58	11.41	0.61	0.45	0.23	0.31
RA4	6.4286*	100yr	0.44	82.80	82.96		82.98	0.019528	0.68	0.90	14.69	0.63	0.49	0.30	0.36
RA4	6.2857*	5yr	0.21	82.73	82.86		82.86	0.015235	0.49	0.55	10.90	0.53	0.38	0.18	0.28
RA4	6.2857*	10yr	0.26	82.73	82.86		82.87	0.015839	0.53	0.65	11.98	0.54	0.40	0.21	0.31
RA4	6.2857*	100yr	0.44	82.73	82.89		82.90	0.016934	0.63	0.96	14.81	0.58	0.46	0.28	0.37
RA4	6.1429*	5yr	0.21	82.65	82.77		82.78	0.028562	0.59	0.44	9.36	0.70	0.47	0.18	0.39
RA4	6.1429*	10yr	0.26	82.65	82.78		82.79	0.027173	0.62	0.53	10.44	0.69	0.49	0.22	0.40
RA4	6.1429*	100yr	0.44	82.65	82.80		82.82	0.023562	0.69	0.84	13.39	0.68	0.52	0.29	0.44
RA4	6	5yr	0.21	82.58	82.72		82.73	0.007116	0.35	0.75	12.04	0.36	0.28	0.15	0.25
RA4	6	10yr	0.26	82.58	82.73		82.74	0.007010	0.38	0.89	13.20	0.37	0.29	0.17	0.26
RA4	6	100yr	0.44	82.58	82.76		82.77	0.006426	0.43	1.37	16.46	0.37	0.32	0.21	0.29
RA4	5.6667*	5yr	0.21	82.56	82.69		82.70	0.006303	0.36	0.75	11.44	0.35	0.28	0.16	0.23
RA4	5.6667*	10yr	0.26	82.56	82.71		82.71	0.006240	0.38	0.89	12.51	0.35	0.29	0.18	0.24
RA4	5.6667*	100yr	0.44	82.56	82.74		82.75	0.005875	0.43	1.36	15.88	0.36	0.32	0.21	0.27
RA4	5.3333*	5yr	0.21	82.55	82.67		82.67	0.005905	0.35	0.73	10.46	0.34	0.29	0.18	0.21
RA4	5.3333*	10yr	0.26	82.55	82.68		82.69	0.006040	0.38	0.86	11.29	0.35	0.30	0.20	0.23
RA4	5.3333*	100yr	0.44	82.55	82.71		82.72	0.006083	0.45	1.30	15.38	0.36	0.34	0.20	0.27
RA4	5	5yr	0.21	82.53	82.62		82.63	0.016370	0.48	0.48	7.59	0.54	0.44	0.28	0.28
RA4	5	10yr	0.26	82.53	82.63		82.64	0.014559	0.50	0.59	8.16	0.52	0.45	0.30	0.30
RA4	5	100yr	0.44	82.53	82.66		82.68	0.016868	0.64	0.84	12.35	0.58	0.52	0.25	0.38
RA4	4.8000*	5yr	0.21	82.46	82.56		82.57	0.014246	0.45	0.52	8.67	0.50	0.40	0.25	0.23
RA4	4.8000*	10yr	0.26	82.46	82.56		82.58	0.018110	0.53	0.56	8.96	0.57	0.46	0.30	0.27
RA4	4.8000*	100yr	0.44	82.46	82.64		82.65	0.002937	0.33	1.75	18.31	0.26	0.25	0.18	0.19

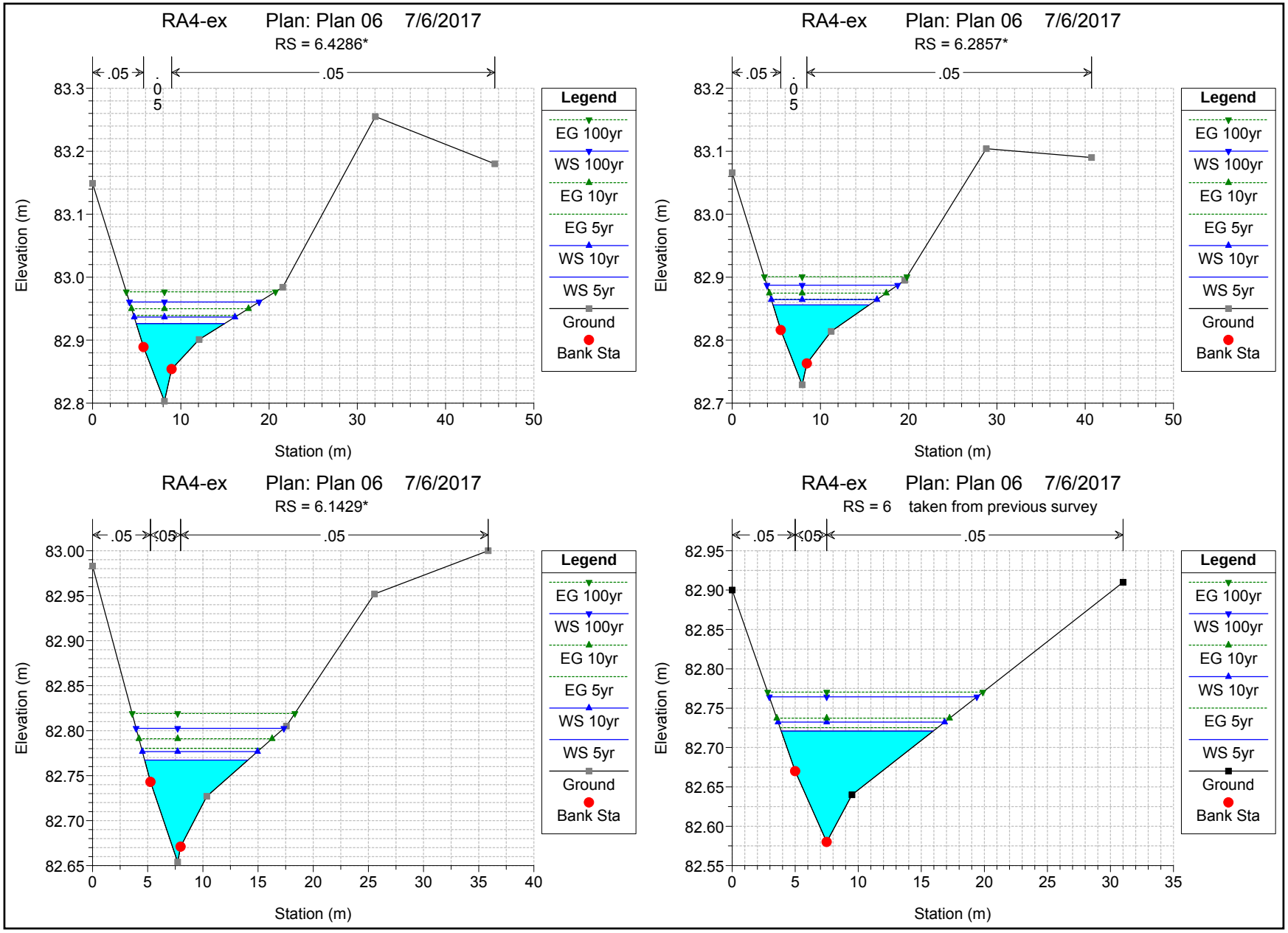
HEC-RAS Plan: Plan 06 River: RA4 Reach: RA4 (Continued)

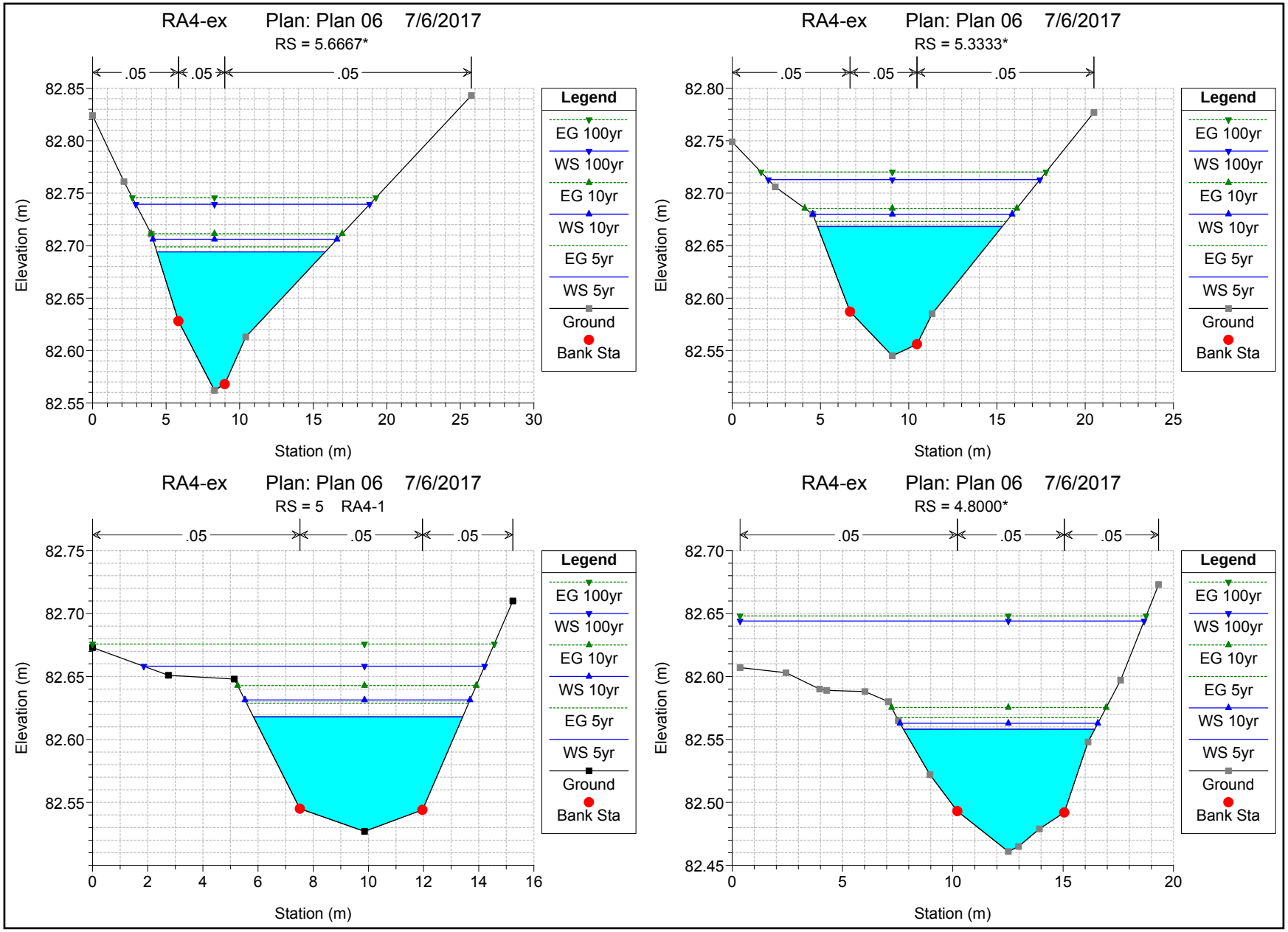
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA4	4.6000*	5yr	0.21	82.40	82.49		82.50	0.019661	0.48	0.48	9.20	0.58	0.43	0.26	0.24
RA4	4.6000*	10yr	0.26	82.40	82.52		82.52	0.008943	0.40	0.76	11.23	0.41	0.35	0.23	0.20
RA4	4.6000*	100yr	0.44	82.40	82.64		82.64	0.000547	0.17	3.26	22.69	0.12	0.13	0.12	0.10
RA4	4.4000*	5yr	0.21	82.33	82.47		82.47	0.003327	0.26	0.99	16.25	0.25	0.21	0.12	0.13
RA4	4.4000*	10yr	0.26	82.33	82.51		82.51	0.001072	0.19	1.90	24.06	0.15	0.14	0.10	0.08
RA4	4.4000*	100yr	0.44	82.33	82.64		82.64	0.000145	0.10	5.23	26.42	0.06	0.08	0.08	0.07
RA4	4.2000*	5yr	0.21	82.26	82.47	82.35	82.47	0.000342	0.11	2.51	27.43	0.09	0.08	0.07	0.05
RA4	4.2000*	10yr	0.26	82.26	82.51	82.36	82.51	0.000164	0.09	3.74	28.66	0.06	0.07	0.06	0.04
RA4	4.2000*	100yr	0.44	82.26	82.64	82.38	82.64	0.000050	0.07	7.63	30.14	0.04	0.06	0.06	0.05
RA4	4	5yr	0.21	82.20	82.46	82.29	82.46	0.000760	0.21	0.99	31.99	0.14	0.21		
RA4	4	10yr	0.26	82.20	82.51	82.30	82.51	0.000675	0.22	1.18	33.27	0.13	0.22		
RA4	4	100yr	0.44	82.20	82.64	82.33	82.64	0.000535	0.26	1.72	33.87	0.13	0.26		
RA4	3.5		Culvert												
RA4	3	5yr	0.21	81.91	82.03	82.00	82.04	0.020341	0.56	0.37	13.52	0.61	0.56		
RA4	3	10yr	0.26	81.91	82.04	82.01	82.06	0.021334	0.63	0.42	14.38	0.63	0.63		
RA4	3	100yr	0.44	81.91	82.07	82.04	82.10	0.023342	0.79	0.56	22.93	0.70	0.79		
RA4	2.8333*	5yr	0.21	81.82	81.95	81.92	81.96	0.018228	0.48	0.44	12.39	0.56	0.48		0.08
RA4	2.8333*	10yr	0.26	81.82	81.96	81.93	81.97	0.017666	0.52	0.51	13.30	0.56	0.51		0.13
RA4	2.8333*	100yr	0.44	81.82	81.99	81.95	82.01	0.017008	0.63	0.72	19.19	0.58	0.61		0.23
RA4	2.6667*	5yr	0.21	81.74	81.87	81.84	81.88	0.018425	0.49	0.42	11.25	0.57	0.49		
RA4	2.6667*	10yr	0.26	81.74	81.88	81.85	81.89	0.018658	0.54	0.49	12.14	0.58	0.53		0.06
RA4	2.6667*	100yr	0.44	81.74	81.91	81.88	81.93	0.017075	0.64	0.70	17.80	0.59	0.63		0.19
RA4	2.5000*	5yr	0.21	81.65	81.78	81.76	81.80	0.018652	0.51	0.41	10.10	0.57	0.51		
RA4	2.5000*	10yr	0.26	81.65	81.80	81.77	81.82	0.017291	0.54	0.49	11.20	0.56	0.54		
RA4	2.5000*	100yr	0.44	81.65	81.83	81.80	81.86	0.017319	0.65	0.68	16.43	0.59	0.65		0.14
RA4	2.3333*	5yr	0.21	81.56	81.70	81.67	81.72	0.018255	0.53	0.40	9.16	0.57	0.53		
RA4	2.3333*	10yr	0.26	81.56	81.72	81.68	81.73	0.019288	0.58	0.45	9.94	0.60	0.58		
RA4	2.3333*	100yr	0.44	81.56	81.76	81.72	81.78	0.016559	0.66	0.67	15.16	0.58	0.65		0.09
RA4	2.1667*	5yr	0.21	81.48	81.62	81.59	81.64	0.018868	0.55	0.38	8.20	0.59	0.55		
RA4	2.1667*	10yr	0.26	81.48	81.65	81.60	81.66	0.012318	0.51	0.51	10.12	0.49	0.51		
RA4	2.1667*	100yr	0.44	81.48	81.67	81.64	81.70	0.022677	0.75	0.59	11.98	0.68	0.75		
RA4	2	5yr	0.21	81.39	81.54	81.51	81.56	0.017526	0.55	0.38	7.45	0.57	0.55		
RA4	2	10yr	0.26	81.39	81.52	81.52	81.56	0.054278	0.88	0.30	4.55	0.98	0.88		
RA4	2	100yr	0.44	81.39	81.58	81.56	81.60	0.019898	0.69	0.75	10.11	0.63	0.59	0.31	
RA4	1	5yr	0.21	81.03	81.12	81.10	81.13	0.013325	0.33	0.65	18.99	0.45	0.32	0.07	
RA4	1	10yr	0.26	81.03	81.14	81.10	81.15	0.006557	0.28	1.07	23.12	0.33	0.24	0.12	0.11

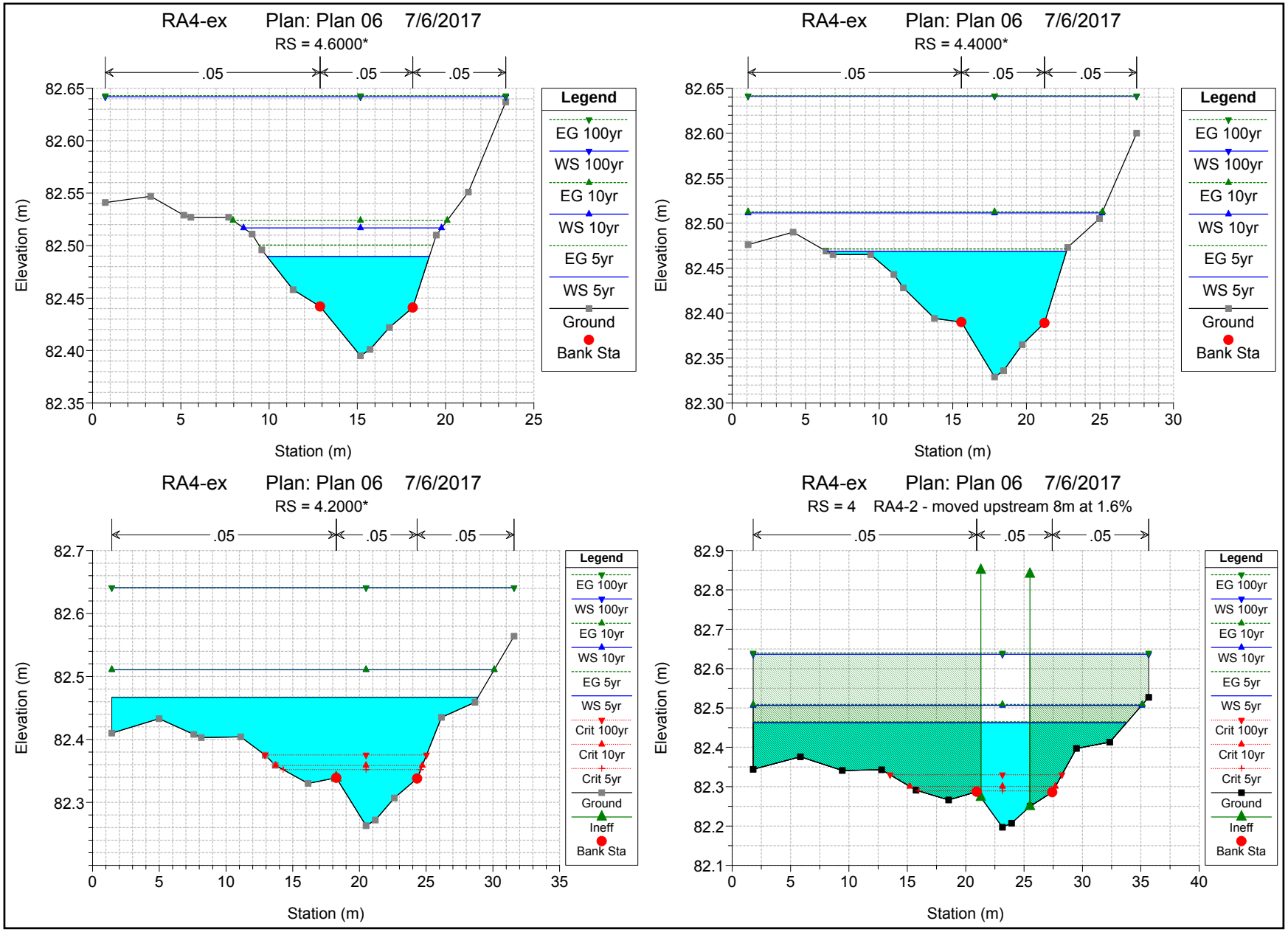
HEC-RAS Plan: Plan 06 River: RA4 Reach: RA4 (Continued)

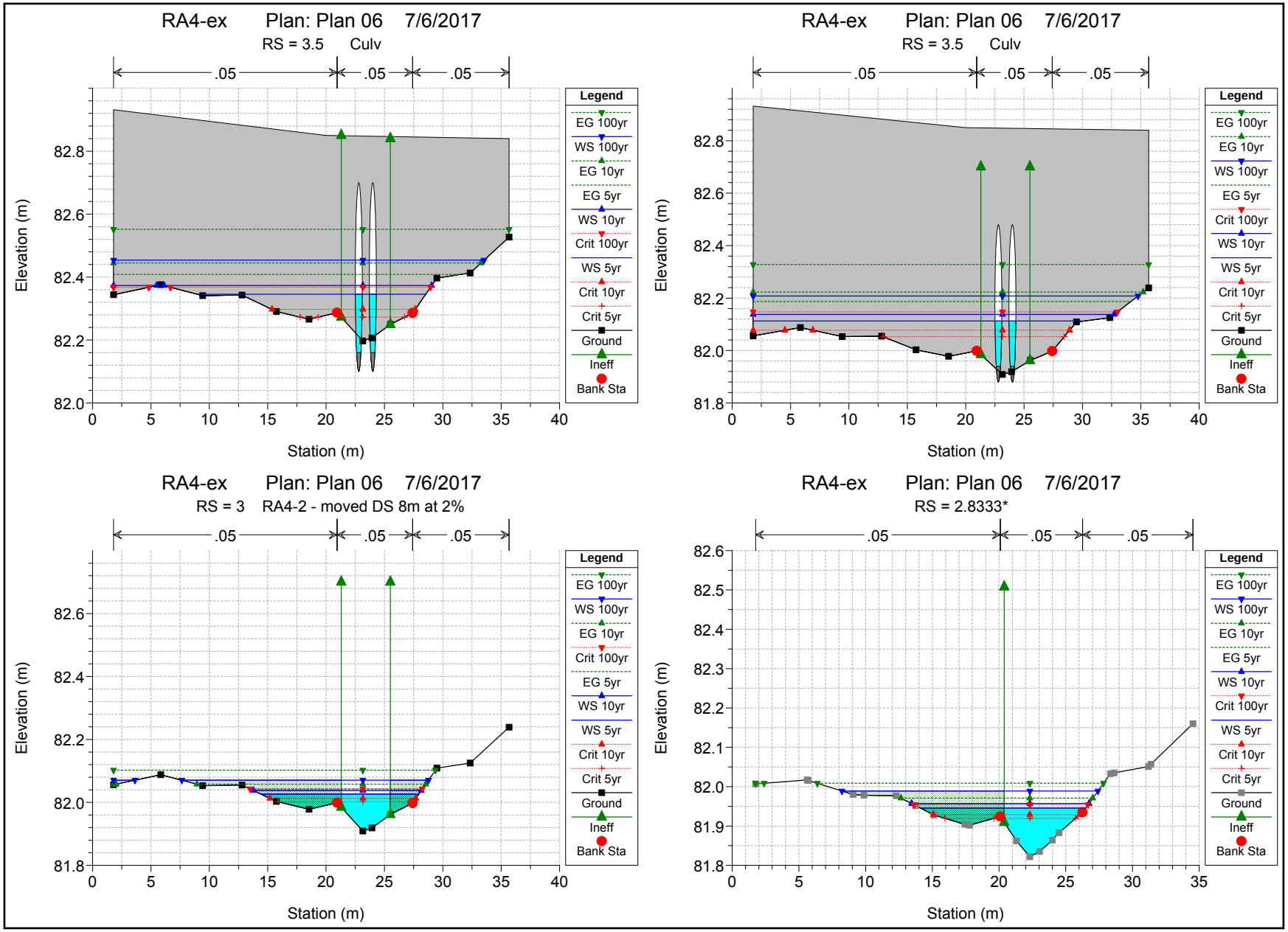
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA4	1	100yr	0.44	81.03	81.15	81.13	81.16	0.012913	0.41	1.23	23.96	0.47	0.36	0.20	0.19
RA4	0.5	5yr	0.21	80.90	80.99	80.97	81.00	0.013006	0.33	0.66	19.09	0.45	0.32	0.07	
RA4	0.5	10yr	0.26	80.90	80.98	80.98	80.99	0.065143	0.62	0.42	9.80	0.96	0.62		
RA4	0.5	100yr	0.44	80.90	81.02	81.00	81.03	0.013005	0.41	1.22	23.94	0.48	0.36	0.20	0.19

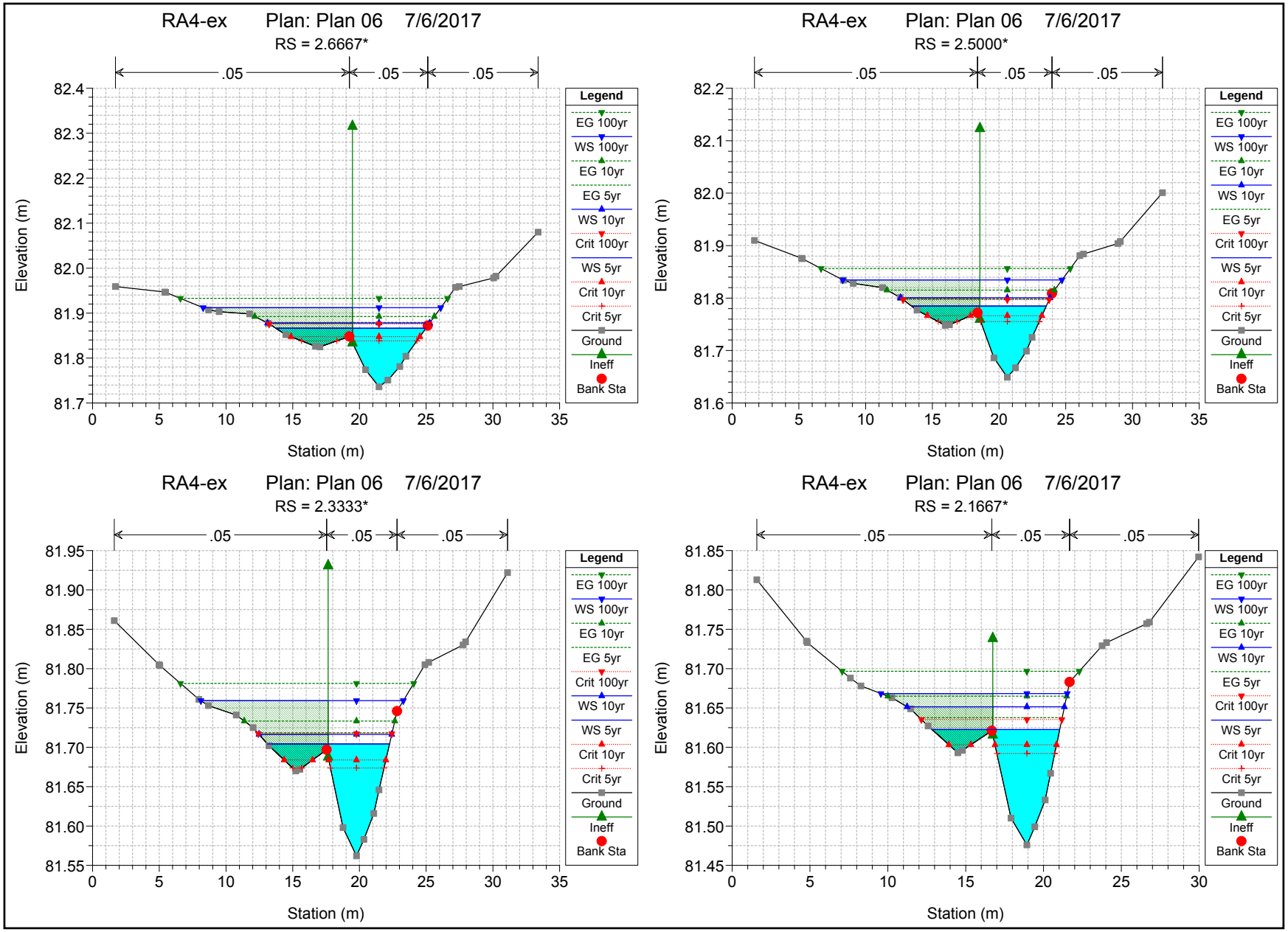

RA4-ex Plan: Plan 06 7/6/2017
RS = 7 taken from previous survey
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.8571*
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.7143*
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.5714*

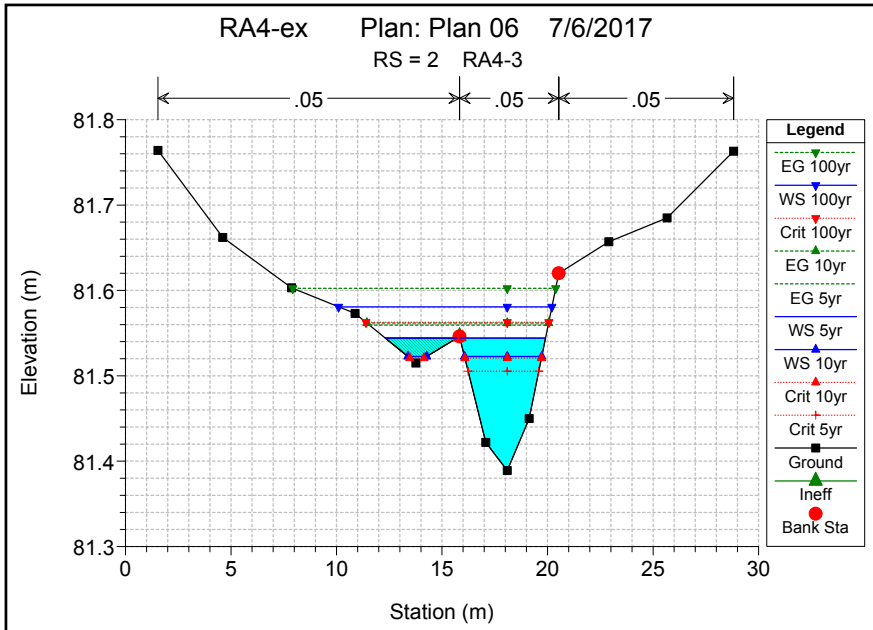

RA4-ex Plan: Plan 06 7/6/2017
RS = 6.4286*
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.2857*
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 6.1429*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 6 taken from previous survey
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Ground
Bank Sta

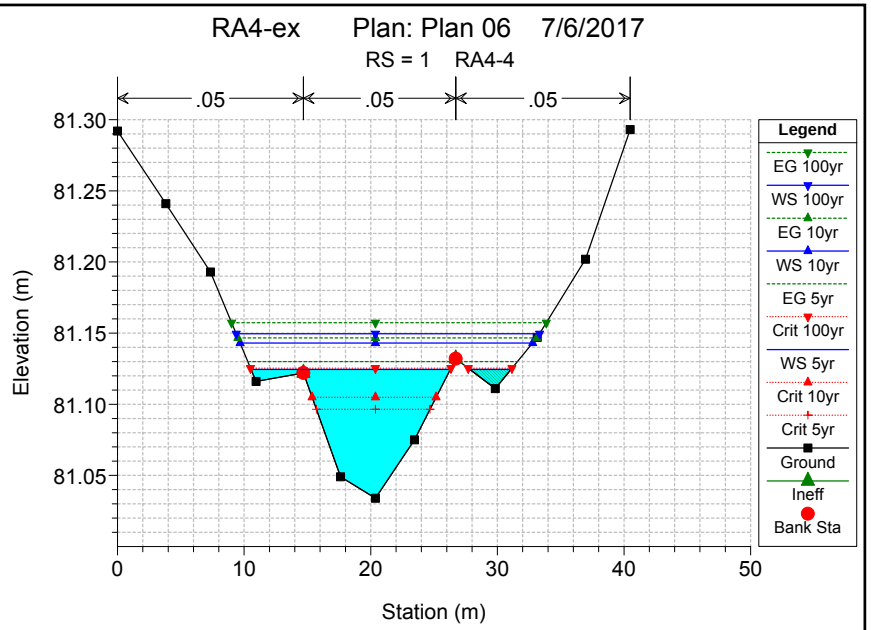

RA4-ex Plan: Plan 06 7/6/2017
RS = 5.6667*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 5.3333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 5 RA4-1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4.8000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

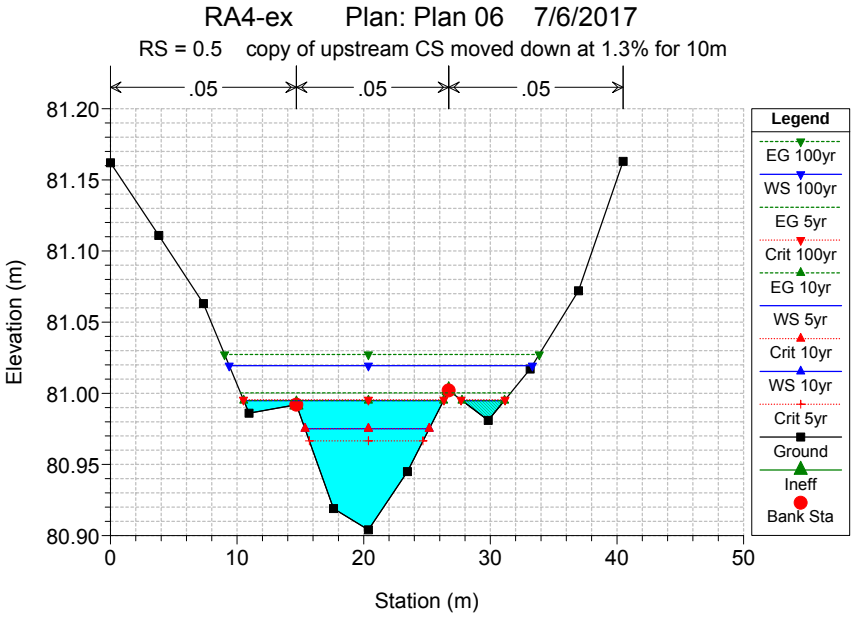

RA4-ex Plan: Plan 06 7/6/2017
RS = 4.6000*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4.4000*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4.2000*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 4 RA4-2 - moved upstream 8m at 1.6%
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 3.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 3.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
EG 5yr
Crit 100yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 3 RA4-2 - moved DS 8m at 2%
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
Crit 100yr
EG 5yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.8333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 2.6667*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.3333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
Crit 100yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA4-ex Plan: Plan 06 7/6/2017
RS = 2.1667*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 2 RA4-3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
Crit 100yr
EG 10yr
EG 5yr
WS 5yr
WS 10yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 1 RA4-4
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA4-ex Plan: Plan 06 7/6/2017
RS = 0.5 copy of upstream CS moved down at 1.3% for 10m
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 5yr
Crit 100yr
EG 10yr
WS 5yr
Crit 10yr
WS 10yr
Crit 5yr
Ground
Ineff
Bank Sta

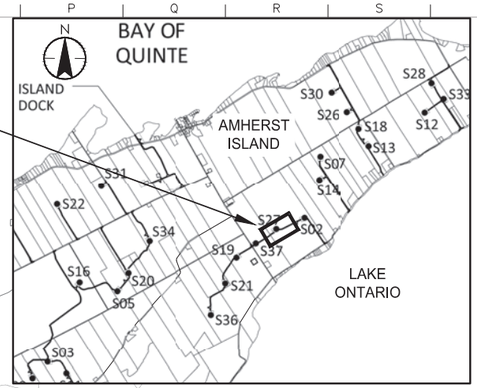
RA27 – HYDRAULIC MODELING

LOCATION OF ERECTION BUMP-OUTS AND PADS TO BE FIELD DETERMINED WITHIN REA LIMITS. PROVIDE ADDITIONAL BUMP-OUTS, AS REQUIRED. BUMP-OUTS AND PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIALS, AS DETERMINED IN FIELD.

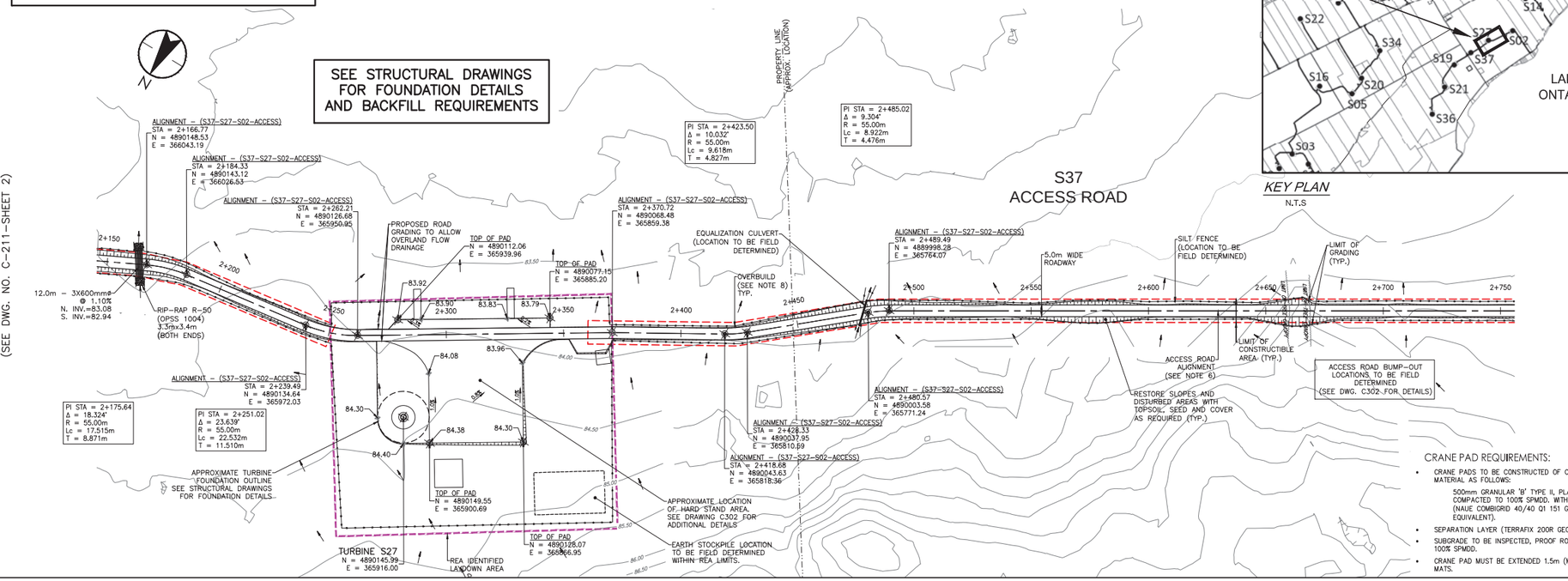
CONTRACTOR TO MAINTAIN EXISTING DRAINAGE FLOWS AS REQUIRED

SEE STRUCTURAL DRAWINGS FOR FOUNDATION DETAILS AND BACKFILL REQUIREMENTS

PLAN LOCATION



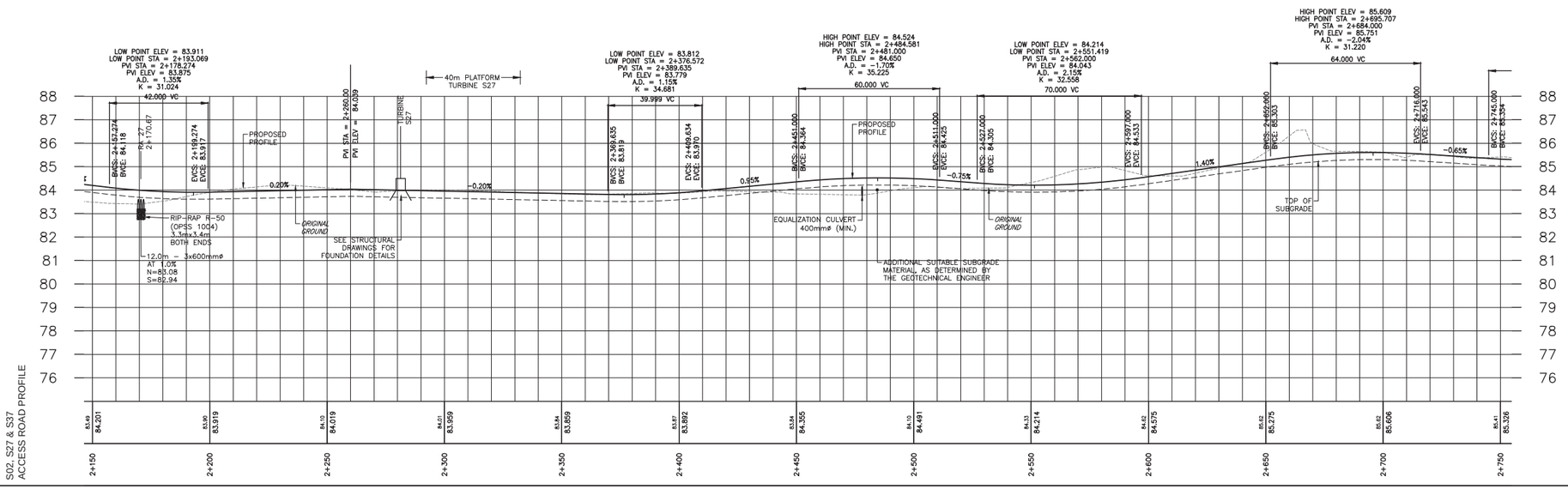
KEY PLAN
N.T.S



CRANE PAD REQUIREMENTS:

- CRANE PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIAL AS FOLLOWS:
  500mm GRANULAR 'B' TYPE II, PLACED IN 2 LIFTS, COMPACTED TO 100% SPMDD. WITH REINFORCEMENT LAYER (NAUE COMBIGRID 40/40 Q1 151 GRK3 OR APPROVED EQUIVALENT).
- SEPARATION LAYER (TERRAFIX 200R GEOTEXTILE).
- SUBGRADE TO BE INSPECTED, PROOF ROLLED, AND COMPACTED TO 100% SPMDD.
- CRANE PAD MUST BE EXTENDED 1.5m (MIN.) BEYOND OUTRIGGER MATS.

SEE DRAWING C302 FOR ADDITIONAL ACCESS ROAD DETAILS



Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016-09-23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****	
Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations	
☐ Reviewed - No comments	
☐ Reviewed - Incorporate comments and resubmit	
☐ Reviewed - Not accepted	
Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.16
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	17.01.17
Revision		By	Appd.	YY.MM.DD

File Name: C211_133560100-turbine S02-S37.DWG		RCL/DH	MPG	RCL 15.12.03
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

ACCESS ROAD
TURBINE S02, S27 AND S37
PLAN AND PROFILE

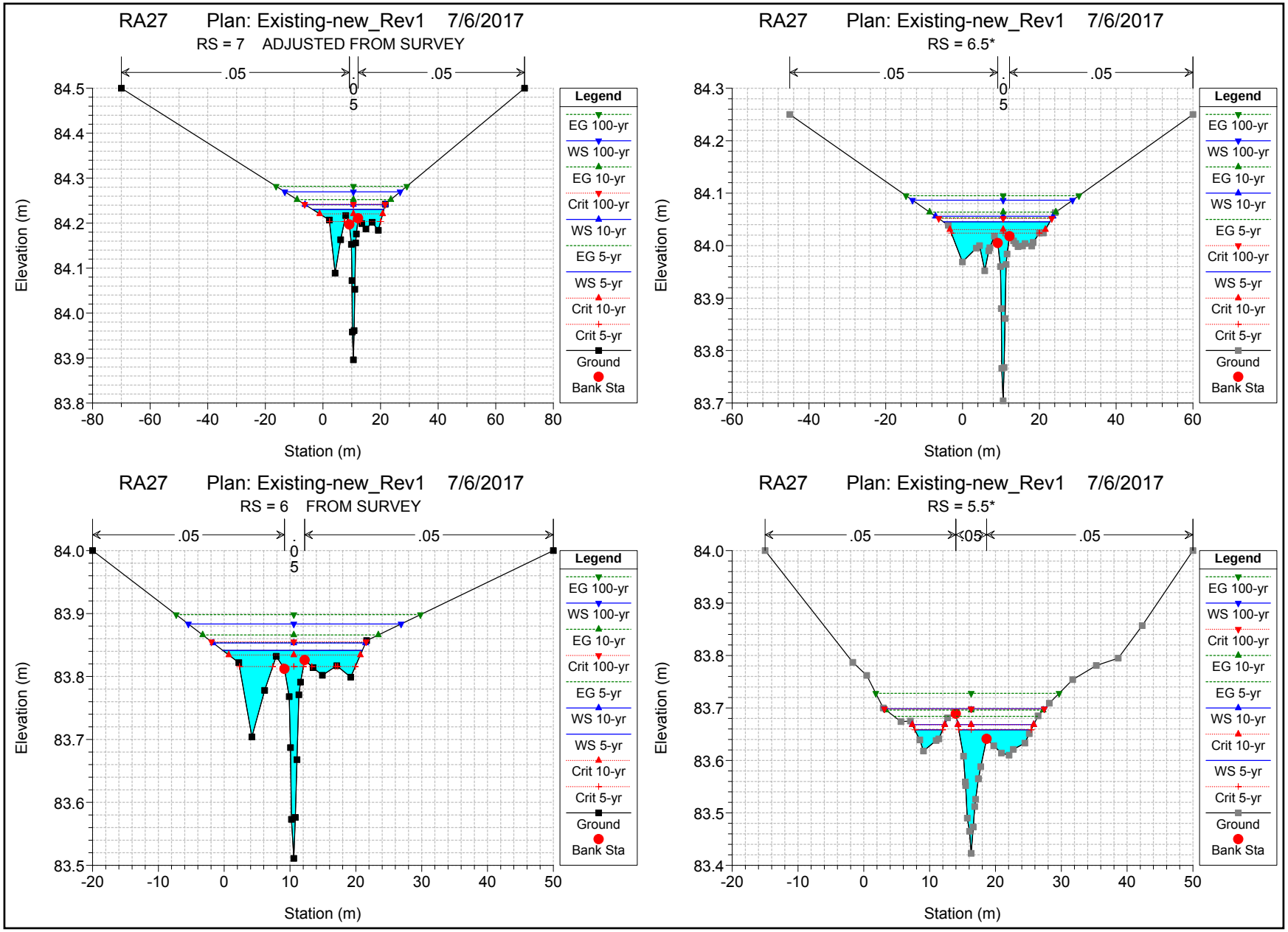
Project No.	Scale
133560100	1:1000H 0 10 30 50m; 1:100V 0 1 3 5m
Drawing No.	Sheet / Revision
C211	3 of 4 / B

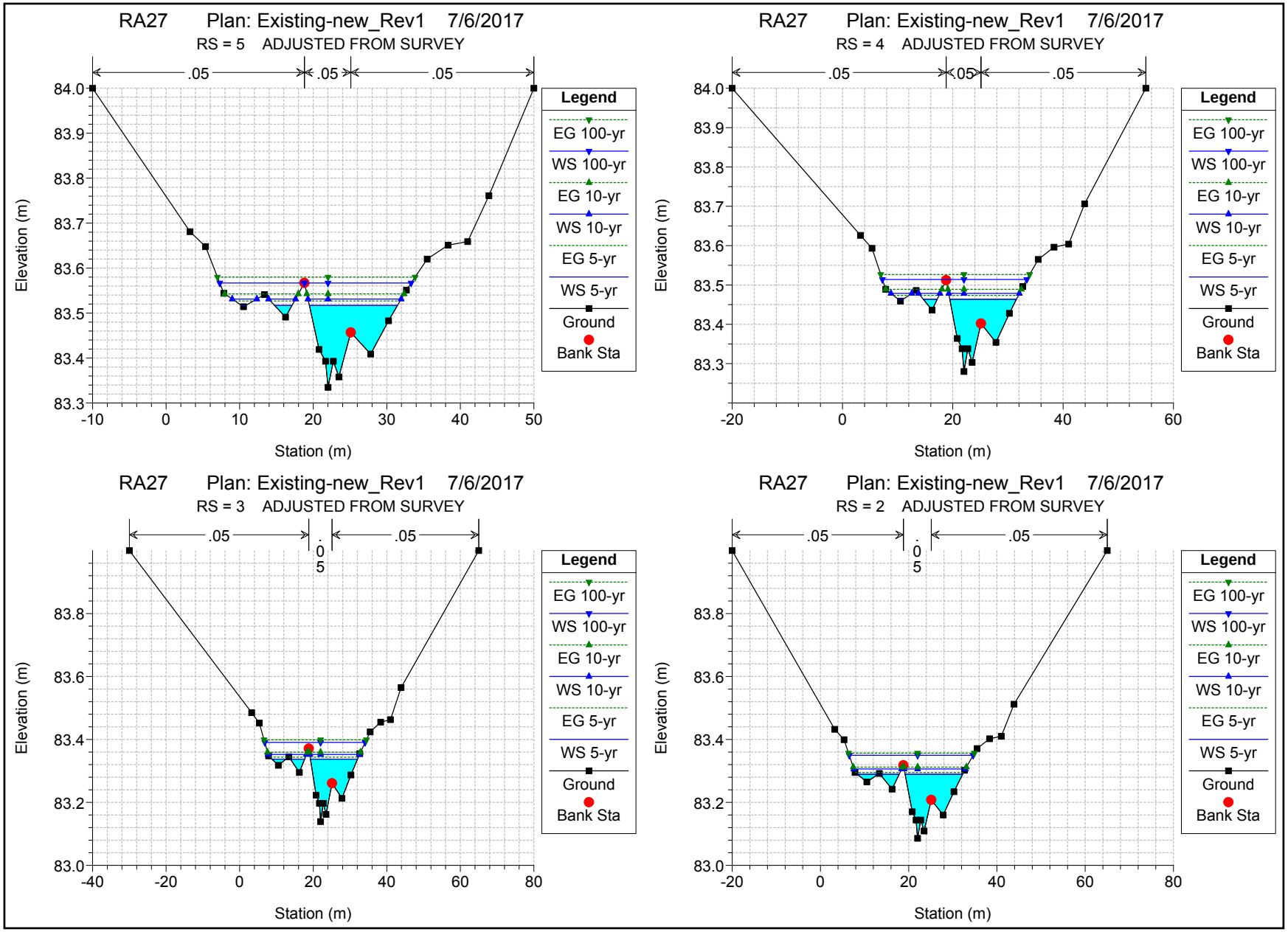
ORIGINAL SHEET - ARCH D

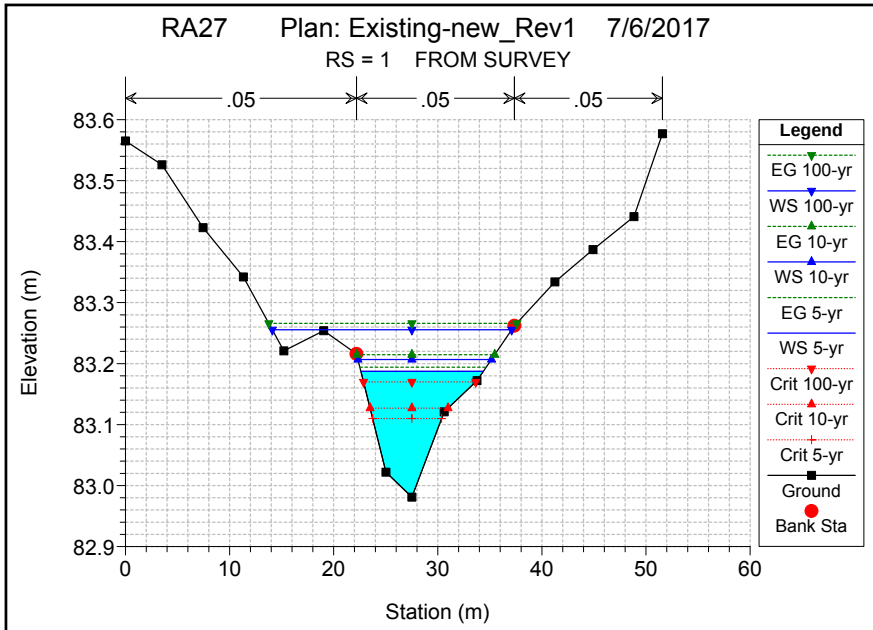

7
6.5*
RA27
RA27
6
5.5*
5
4
3
2
1

HEC-RAS Plan: Existing-New_1 River: RA27 Reach: RA27

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA27	7	5-yr	0.45	83.90	84.23	84.20	84.24	0.012996	0.58	1.23	24.71	0.51	0.37	0.28	0.23
RA27	7	10-yr	0.57	83.90	84.24	84.22	84.25	0.013114	0.61	1.51	27.81	0.52	0.38	0.29	0.27
RA27	7	100-yr	1.00	83.90	84.27	84.24	84.28	0.013284	0.70	2.47	40.04	0.54	0.40	0.33	0.31
RA27	6.5*	5-yr	0.45	83.70	84.05	84.02	84.05	0.008714	0.49	1.47	27.72	0.42	0.31	0.25	0.19
RA27	6.5*	10-yr	0.57	83.70	84.06	84.03	84.06	0.009058	0.53	1.77	30.59	0.43	0.32	0.27	0.23
RA27	6.5*	100-yr	1.00	83.70	84.09	84.05	84.10	0.008890	0.59	2.87	41.64	0.44	0.35	0.30	0.27
RA27	6	5-yr	0.45	83.51	83.84	83.82	83.85	0.014966	0.61	1.11	21.16	0.54	0.41	0.33	0.23
RA27	6	10-yr	0.57	83.51	83.85	83.83	83.87	0.014496	0.64	1.37	23.16	0.54	0.42	0.34	0.28
RA27	6	100-yr	1.00	83.51	83.88	83.86	83.90	0.014856	0.73	2.20	32.30	0.57	0.45	0.40	0.32
RA27	5.5*	5-yr	0.45	83.42	83.66	83.66	83.68	0.032774	0.79	0.75	15.25	0.79	0.60	0.29	0.37
RA27	5.5*	10-yr	0.57	83.42	83.67	83.67	83.70	0.034185	0.84	0.90	16.50	0.81	0.63	0.34	0.43
RA27	5.5*	100-yr	1.00	83.42	83.70	83.70	83.73	0.031587	0.91	1.53	24.33	0.81	0.65	0.39	0.54
RA27	5	5-yr	0.45	83.34	83.52		83.53	0.011676	0.49	1.06	14.90	0.48	0.42	0.12	0.35
RA27	5	10-yr	0.57	83.34	83.53		83.54	0.011704	0.52	1.31	19.72	0.48	0.44	0.14	0.38
RA27	5	100-yr	1.00	83.34	83.57		83.58	0.011520	0.59	2.15	26.01	0.50	0.46	0.25	0.45
RA27	4	5-yr	0.45	83.28	83.46		83.47	0.011020	0.48	1.08	15.46	0.46	0.41	0.12	0.35
RA27	4	10-yr	0.57	83.28	83.48		83.49	0.010889	0.51	1.35	20.47	0.47	0.42	0.14	0.38
RA27	4	100-yr	1.00	83.28	83.51		83.53	0.010731	0.57	2.21	26.17	0.48	0.45	0.25	0.44
RA27	3	5-yr	0.45	83.14	83.34		83.34	0.006770	0.40	1.35	20.36	0.37	0.33	0.11	0.30
RA27	3	10-yr	0.57	83.14	83.35		83.36	0.006735	0.42	1.69	23.96	0.37	0.34	0.14	0.32
RA27	3	100-yr	1.00	83.14	83.39		83.40	0.006397	0.48	2.67	27.30	0.38	0.37	0.24	0.36
RA27	2	5-yr	0.45	83.09	83.29		83.30	0.005713	0.37	1.46	22.07	0.34	0.31	0.11	0.28
RA27	2	10-yr	0.57	83.09	83.31		83.31	0.005366	0.39	1.86	24.72	0.33	0.31	0.14	0.29
RA27	2	100-yr	1.00	83.09	83.35		83.36	0.004609	0.42	3.01	28.08	0.32	0.33	0.23	0.32
RA27	1	5-yr	0.45	82.98	83.19	83.11	83.19	0.007014	0.37	1.22	11.76	0.37	0.37		
RA27	1	10-yr	0.57	82.98	83.21	83.13	83.21	0.007007	0.39	1.46	12.83	0.37	0.39		
RA27	1	100-yr	1.00	82.98	83.26	83.17	83.27	0.007004	0.46	2.29	23.00	0.39	0.44	0.12	


RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 7 ADJUSTED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
Crit 100-yr
WS 10-yr
EG 5-yr
WS 5-yr
Crit 10-yr
Crit 5-yr
Ground
Bank Sta
RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 6.5*
RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 6 FROM SURVEY
RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 5.5*

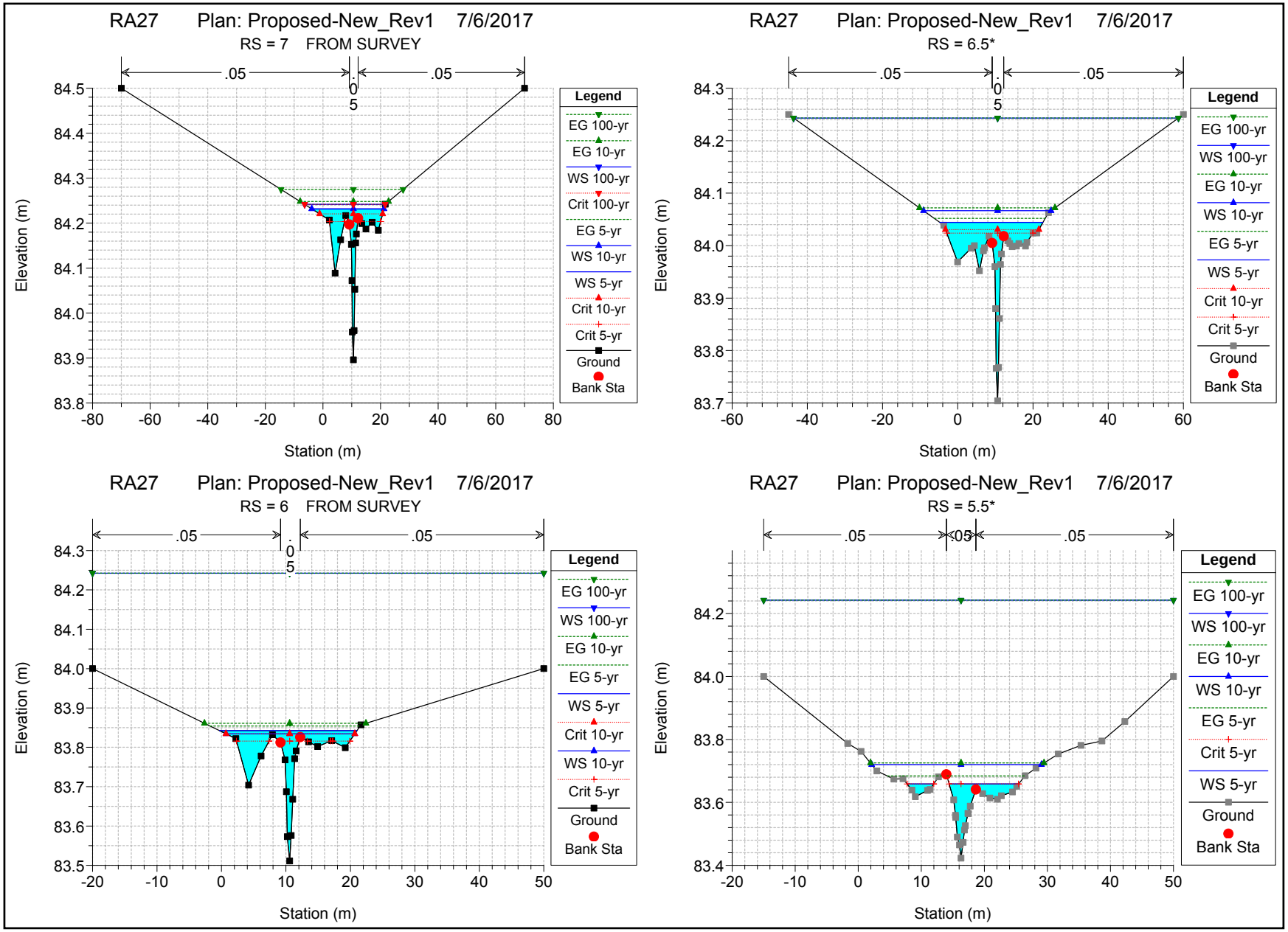

RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 5 ADJUSTED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 4 ADJUSTED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 3 ADJUSTED FROM SURVEY
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 2 ADJUSTED FROM SURVEY
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta

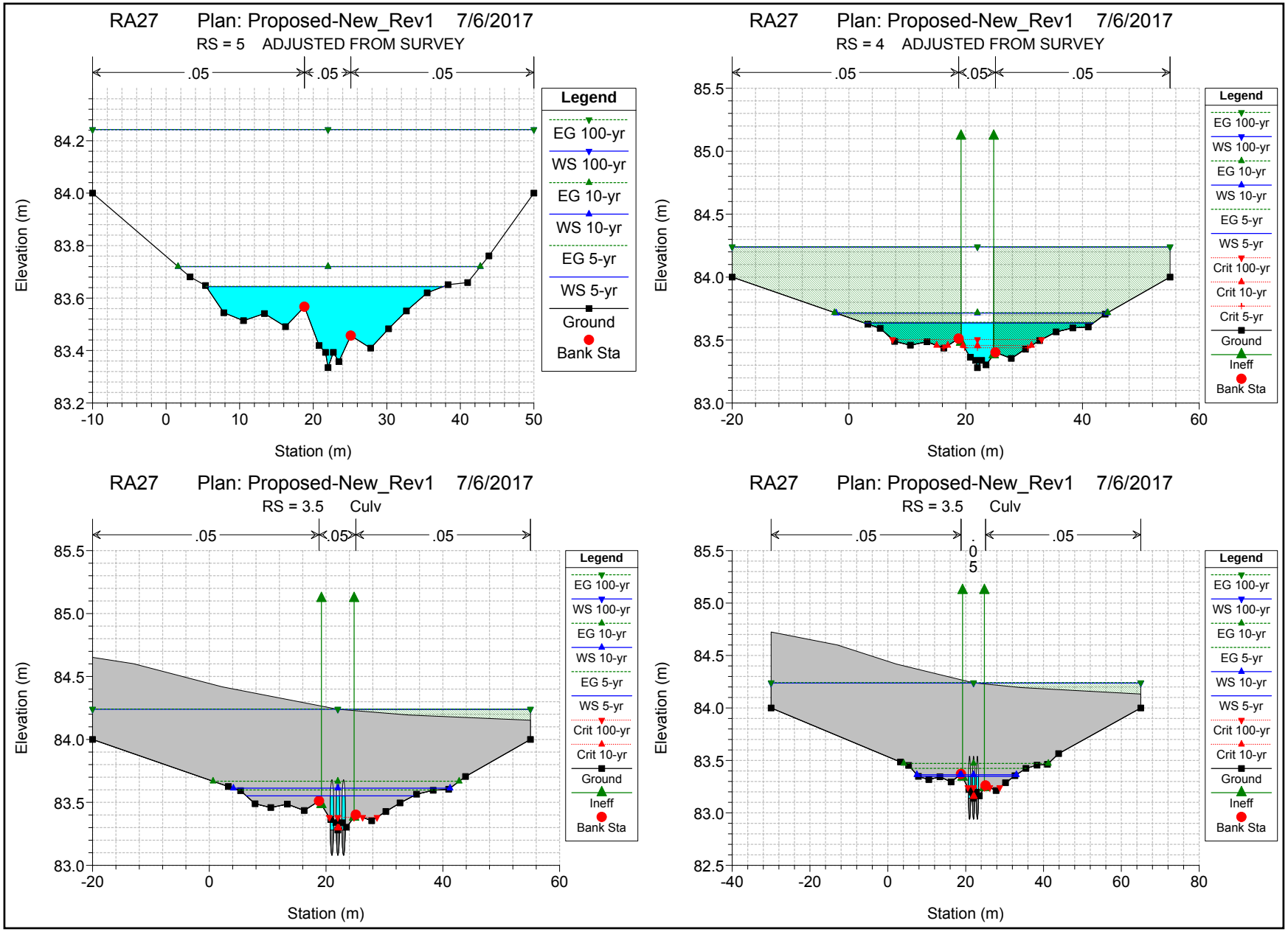

RA27 Plan: Existing-new_Rev1 7/6/2017
RS = 1 FROM SURVEY
.05
.05
.05
Elevation (m)
83.6
83.5
83.4
83.3
83.2
83.1
83.0
82.9
0
10
20
30
40
50
60
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Crit 100-yr
Crit 10-yr
Crit 5-yr
Ground
Bank Sta

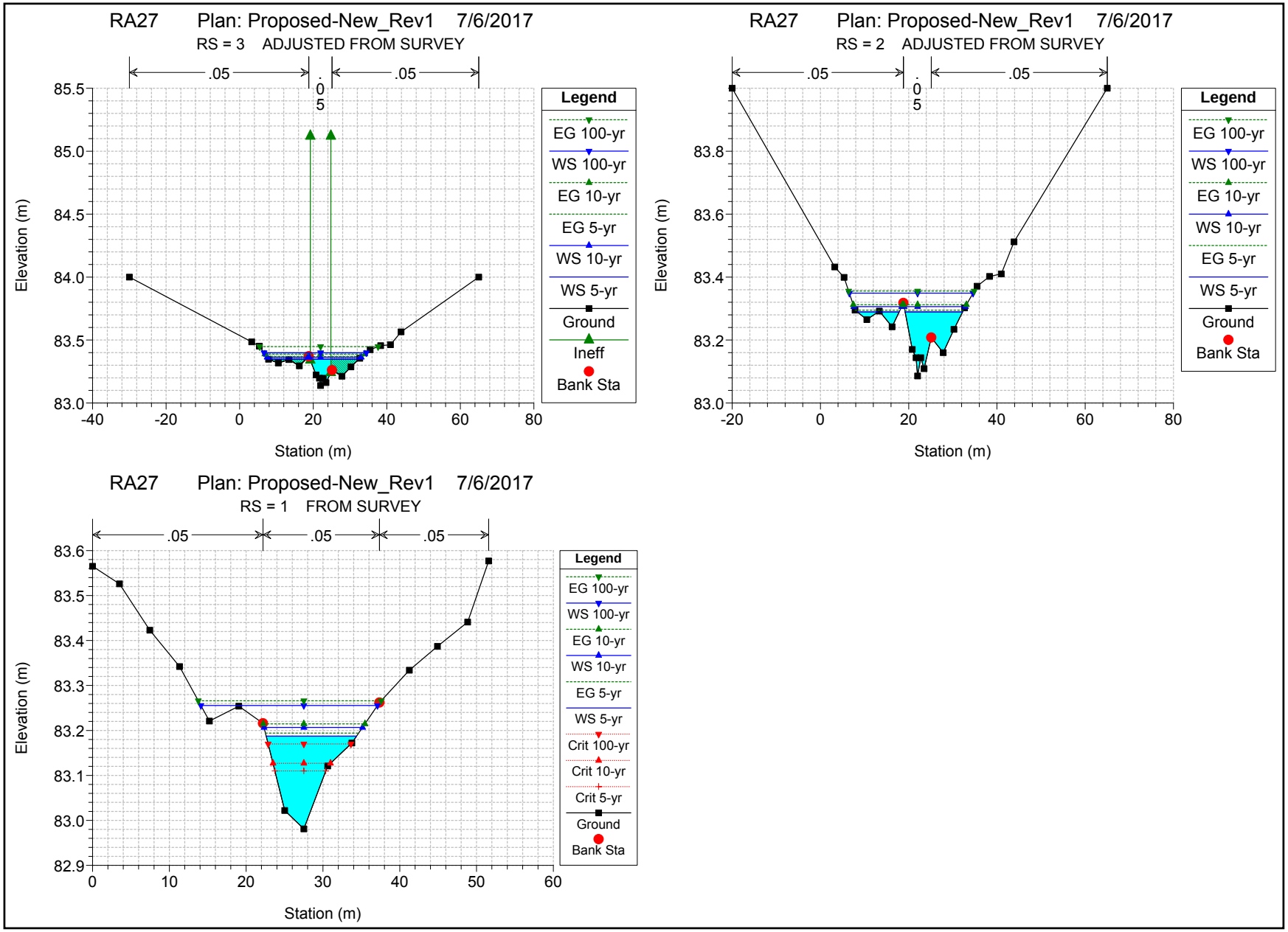

7
6.5*
RA27
RA27
6
5.5*
5
4
3.5
3
2
1

HEC-RAS Plan: Proposed-New River: RA27 Reach: RA27

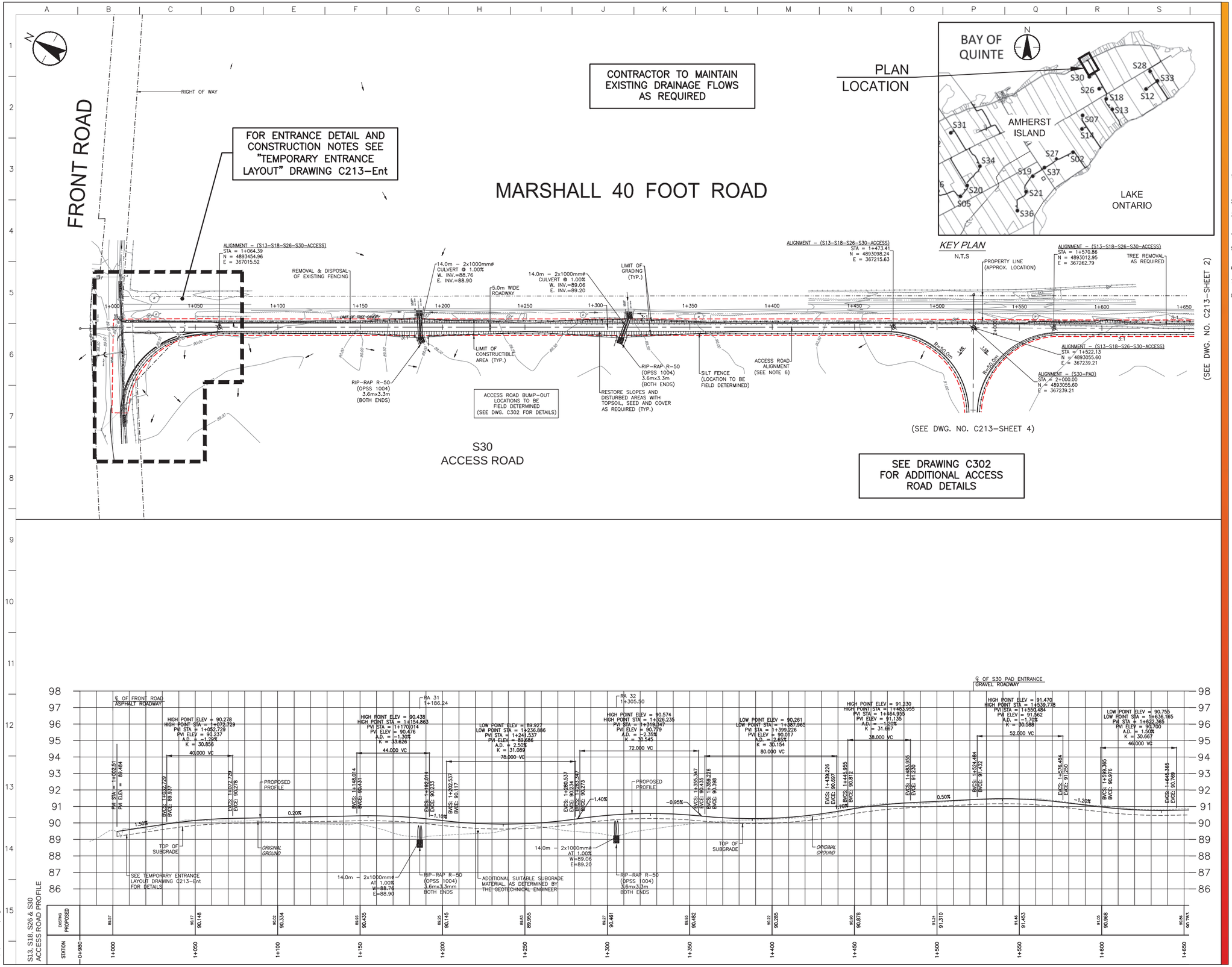
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA27	7	5-yr	0.45	83.90	84.23	84.20	84.24	0.012594	0.57	1.25	24.91	0.50	0.36	0.27	0.23
RA27	7	10-yr	0.57	83.90	84.23	84.22	84.25	0.019866	0.72	1.26	25.10	0.63	0.45	0.34	0.29
RA27	7	100-yr	1.00	83.90	84.24	84.24	84.28	0.039098	1.06	1.52	27.94	0.89	0.65	0.50	0.48
RA27	6.5*	5-yr	0.45	83.70	84.04	84.02	84.05	0.009141	0.50	1.44	27.42	0.43	0.31	0.25	0.19
RA27	6.5*	10-yr	0.57	83.70	84.07	84.03	84.07	0.005967	0.45	2.11	33.91	0.36	0.27	0.23	0.20
RA27	6.5*	100-yr	1.00	83.70	84.24		84.24	0.000164	0.12	14.13	102.28	0.07	0.07	0.07	0.06
RA27	6	5-yr	0.45	83.51	83.84	83.82	83.85	0.014345	0.60	1.13	21.32	0.53	0.40	0.32	0.23
RA27	6	10-yr	0.57	83.51	83.83	83.83	83.86	0.033711	0.88	0.96	19.97	0.81	0.60	0.48	0.29
RA27	6	100-yr	1.00	83.51	84.24		84.24	0.000015	0.05	25.14	70.00	0.02	0.04	0.04	0.04
RA27	5.5*	5-yr	0.45	83.42	83.66	83.66	83.68	0.032774	0.79	0.75	15.25	0.79	0.60	0.29	0.37
RA27	5.5*	10-yr	0.57	83.42	83.72		83.73	0.004650	0.39	2.09	26.93	0.32	0.27	0.19	0.23
RA27	5.5*	100-yr	1.00	83.42	84.24		84.24	0.000007	0.04	31.14	65.00	0.02	0.03	0.03	0.03
RA27	5	5-yr	0.45	83.34	83.64		83.64	0.000343	0.14	4.37	32.25	0.09	0.10	0.08	0.09
RA27	5	10-yr	0.57	83.34	83.72		83.72	0.000145	0.11	7.24	41.09	0.06	0.08	0.07	0.07
RA27	5	100-yr	1.00	83.34	84.24		84.24	0.000004	0.03	35.96	60.00	0.01	0.03	0.03	0.03
RA27	4	5-yr	0.45	83.28	83.64	83.44	83.64	0.001140	0.29	1.56	39.31	0.17	0.29		
RA27	4	10-yr	0.57	83.28	83.71	83.46	83.72	0.000821	0.29	1.99	46.35	0.15	0.29		
RA27	4	100-yr	1.00	83.28	84.24	83.50	84.24	0.000121	0.20	4.94	75.00	0.07	0.20		
RA27	3.5		Culvert												
RA27	3	5-yr	0.45	83.14	83.35		83.37	0.013747	0.61	0.74	23.59	0.53	0.61		
RA27	3	10-yr	0.57	83.14	83.36		83.39	0.015508	0.69	0.82	25.26	0.58	0.69		
RA27	3	100-yr	1.00	83.14	83.40		83.45	0.023279	0.98	1.02	27.83	0.73	0.98		
RA27	2	5-yr	0.45	83.09	83.29		83.30	0.005713	0.37	1.46	22.07	0.34	0.31	0.11	0.28
RA27	2	10-yr	0.57	83.09	83.31		83.31	0.005371	0.39	1.86	24.72	0.33	0.31	0.14	0.29
RA27	2	100-yr	1.00	83.09	83.35		83.36	0.004692	0.43	2.99	28.04	0.33	0.33	0.23	0.32
RA27	1	5-yr	0.45	82.98	83.19	83.11	83.19	0.007014	0.37	1.22	11.76	0.37	0.37		
RA27	1	10-yr	0.57	82.98	83.21	83.13	83.21	0.007007	0.39	1.46	12.83	0.37	0.39		
RA27	1	100-yr	1.00	82.98	83.26	83.17	83.27	0.007004	0.46	2.29	23.00	0.39	0.44	0.12	


RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 7 FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
EG 10-yr
WS 100-yr
Crit 100-yr
EG 5-yr
WS 10-yr
WS 5-yr
Crit 10-yr
Crit 5-yr
Ground
Bank Sta
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 6.5*
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 6 FROM SURVEY
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 5.5*


RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 5 ADJUSTED FROM SURVEY
.05
.05
.05
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 4 ADJUSTED FROM SURVEY
.05
.05
.05
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Crit 100-yr
Crit 10-yr
Crit 5-yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 3.5 Culv
.05
.05
.05
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Crit 100-yr
Crit 10-yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 3.5 Culv
.05
.05
.05
Legend
EG 100-yr
WS 100-yr
EG 10-yr
EG 5-yr
WS 10-yr
WS 5-yr
Crit 100-yr
Crit 10-yr
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)


RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 3 ADJUSTED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
EG 5-yr
WS 10-yr
WS 5-yr
Ground
Ineff
Bank Sta
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 2 ADJUSTED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA27 Plan: Proposed-New_Rev1 7/6/2017
RS = 1 FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Crit 100-yr
Crit 10-yr
Crit 5-yr
Ground
Bank Sta

RA31 & RA32 – HYDRAULIC MODELING



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****		
Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations		
☐ Reviewed - No comments		
☐ Reviewed - Incorporate comments and resubmit		
☐ Reviewed - Not accepted		
Reviewed By	Date [dd-mmm-yyyy]	
Project Manager - PHCL	Date [dd-mmm-yyyy]	
Project Manager - Windlectric	Date [dd-mmm-yyyy]	
Owner:		

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	17.01.20
Revision		By	Appd.	YY.MM.DD

File Name: C213_133560100-Turbine S13-S30.DWG		RCL	MPG	15.12.03
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

ACCESS ROAD
TURBINE S30, S26, S18 AND S13
PLAN AND PROFILE

Project No.	Scale
133560100	1:1000H 0 10 30 50m; 1:100V 0 1 3 5m
Drawing No.	Sheet / Revision
C213	1 of 4 / B


317
316
315.82*
315.64*
315.36*
315.09*
314.9
314
313
RA31
312
RA31
311
RA31+32
RA31+32
RA31+32
31321.2*
31321.6*
31322
321
RA32
322
RA32
323
324
324.5
325
325.17*
325.33*
325.50*
325.67*
325.83*
326
327

HEC-RAS Plan: RA3132-exV4

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA32	RA32	327	5yr	0.50	90.85	90.91	90.91	90.92	0.059731	0.48	1.05	34.57	0.87	0.48		
RA32	RA32	327	10yr	0.62	90.85	90.91	90.91	90.93	0.076827	0.55	1.12	35.67	0.99	0.55		
RA32	RA32	327	100yr	1.01	90.85	90.93	90.93	90.95	0.078278	0.63	1.60	42.63	1.03	0.63		
RA32	RA32	326	5yr	0.50	89.97	90.07		90.07	0.002215	0.18	3.05	46.68	0.20	0.16	0.10	0.10
RA32	RA32	326	10yr	0.62	89.97	90.08		90.08	0.002269	0.20	3.50	49.07	0.20	0.18	0.11	0.11
RA32	RA32	326	100yr	1.01	89.97	90.10		90.11	0.002416	0.24	4.82	55.52	0.22	0.21	0.14	0.14
RA32	RA32	325.83*	5yr	0.50	89.94	90.06		90.06	0.002551	0.20	2.86	46.45	0.21	0.18	0.10	0.10
RA32	RA32	325.83*	10yr	0.62	89.94	90.07		90.07	0.002637	0.22	3.29	49.05	0.22	0.19	0.11	0.11
RA32	RA32	325.83*	100yr	1.01	89.94	90.09		90.09	0.002831	0.26	4.56	55.84	0.24	0.22	0.14	0.15
RA32	RA32	325.67*	5yr	0.50	89.92	90.04		90.05	0.003103	0.22	2.69	47.41	0.24	0.19	0.09	0.12
RA32	RA32	325.67*	10yr	0.62	89.92	90.05		90.05	0.003206	0.24	3.10	49.99	0.24	0.20	0.11	0.13
RA32	RA32	325.67*	100yr	1.01	89.92	90.08		90.08	0.003397	0.28	4.34	57.07	0.26	0.23	0.14	0.17
RA32	RA32	325.50*	5yr	0.50	89.89	90.03		90.03	0.003789	0.23	2.57	48.28	0.26	0.20	0.08	0.14
RA32	RA32	325.50*	10yr	0.62	89.89	90.03		90.04	0.003922	0.25	2.96	50.89	0.27	0.21	0.09	0.16
RA32	RA32	325.50*	100yr	1.01	89.89	90.06		90.06	0.004036	0.30	4.18	58.35	0.28	0.24	0.13	0.20
RA32	RA32	325.33*	5yr	0.50	89.87	90.01		90.01	0.004587	0.24	2.49	48.51	0.28	0.20	0.05	0.17
RA32	RA32	325.33*	10yr	0.62	89.87	90.01		90.02	0.004877	0.27	2.83	51.50	0.29	0.22	0.06	0.19
RA32	RA32	325.33*	100yr	1.01	89.87	90.04		90.04	0.004566	0.30	4.11	59.91	0.30	0.25	0.11	0.22
RA32	RA32	325.17*	5yr	0.50	89.84	89.98		89.99	0.004269	0.22	2.67	49.57	0.27	0.19		0.18
RA32	RA32	325.17*	10yr	0.62	89.84	89.99		89.99	0.005012	0.25	2.91	50.85	0.29	0.21		0.20
RA32	RA32	325.17*	100yr	1.01	89.84	90.01		90.02	0.004121	0.27	4.38	62.86	0.28	0.23	0.07	0.22
RA32	RA32	325	5yr	0.50	89.82	89.97		89.97	0.001861	0.15	3.65	57.44	0.18	0.14		0.14
RA32	RA32	325	10yr	0.62	89.82	89.97		89.97	0.002925	0.18	3.61	57.24	0.22	0.17		0.17
RA32	RA32	325	100yr	1.01	89.82	90.00		90.00	0.002344	0.20	5.46	69.59	0.21	0.18	0.04	0.18
RA32	RA32	324.9	5yr	0.50	89.46	89.97	89.70	89.97	0.000281	0.15	5.81	75.58	0.09	0.09		0.06
RA32	RA32	324.9	10yr	0.62	89.46	89.97	89.72	89.97	0.000454	0.19	5.67	74.74	0.11	0.11		0.08
RA32	RA32	324.9	100yr	1.01	89.46	90.00	89.79	90.00	0.000608	0.24	7.37	82.11	0.13	0.14		0.11
RA32	RA32	324.8		Culvert												
RA32	RA32	324.5	5yr	0.50	89.35	89.52	89.52	89.60	0.045764	1.28	0.39	35.76	1.01	1.28		
RA32	RA32	324.5	10yr	0.62	89.35	89.54	89.54	89.64	0.043670	1.37	0.45	39.46	1.01	1.37		
RA32	RA32	324.5	100yr	1.01	89.35	89.61	89.61	89.74	0.038106	1.60	0.63	51.26	1.00	1.60		
RA32	RA32	324	5yr	0.50	89.29	89.40		89.41	0.012037	0.45	1.42	22.61	0.47	0.35	0.34	0.33
RA32	RA32	324	10yr	0.62	89.29	89.41		89.42	0.011554	0.48	1.66	23.51	0.47	0.37	0.35	0.35
RA32	RA32	324	100yr	1.01	89.29	89.44		89.45	0.011096	0.55	2.49	30.89	0.48	0.40	0.41	0.36
RA32	RA32	323	5yr	0.50	89.13	89.25		89.25	0.007852	0.39	1.64	23.45	0.39	0.31	0.29	0.28
RA32	RA32	323	10yr	0.62	89.13	89.26		89.27	0.008158	0.42	1.87	24.28	0.40	0.33	0.31	0.31
RA32	RA32	323	100yr	1.01	89.13	89.29		89.30	0.008460	0.50	2.73	31.69	0.42	0.37	0.37	0.33

HEC-RAS Plan: RA3132-exV4 (Continued)

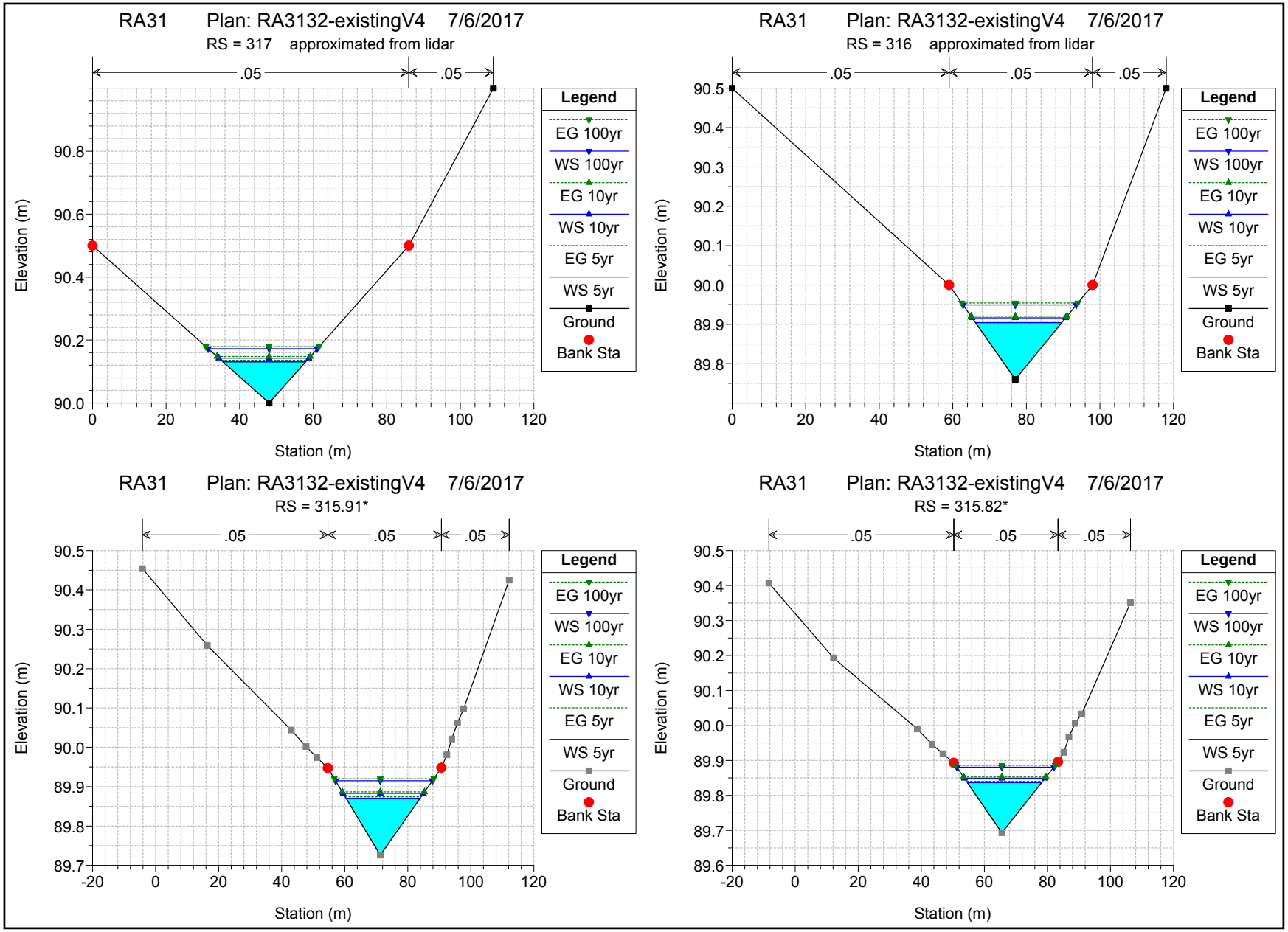
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA32	RA32	322.89*	5yr	0.50	89.08	89.21		89.22	0.006683	0.39	1.80	27.36	0.36	0.28	0.27	0.24
RA32	RA32	322.89*	10yr	0.62	89.08	89.23		89.23	0.006408	0.40	2.11	28.53	0.36	0.29	0.28	0.26
RA32	RA32	322.89*	100yr	1.01	89.08	89.26		89.26	0.006068	0.45	3.01	31.55	0.37	0.33	0.32	0.30
RA32	RA32	322	5yr	0.50	88.68	88.84		88.85	0.013501	0.54	1.05	14.78	0.52	0.48	0.14	0.34
RA32	RA32	322	10yr	0.62	88.68	88.85		88.86	0.014099	0.59	1.22	16.06	0.53	0.51	0.18	0.37
RA32	RA32	322	100yr	1.01	88.68	88.88	88.85	88.90	0.015214	0.70	1.73	18.50	0.58	0.58	0.30	0.45
RA32	RA32	321	5yr	0.50	87.84	87.98		87.99	0.008273	0.44	1.25	15.50	0.41	0.40	0.17	0.17
RA32	RA32	321	10yr	0.62	87.84	88.00		88.01	0.007974	0.47	1.51	17.92	0.41	0.41	0.18	0.20
RA32	RA32	321	100yr	1.01	87.84	88.04		88.05	0.007394	0.53	2.28	22.13	0.41	0.44	0.25	0.26
RA31+32	RA31+32	31322	5yr	0.95	87.26	87.51		87.53	0.009969	0.60	1.74	15.65	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31322	10yr	1.18	87.26	87.53		87.55	0.009982	0.65	2.07	18.02	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31322	100yr	1.93	87.26	87.58		87.60	0.010002	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.8*	5yr	0.95	87.16	87.41		87.42	0.010026	0.60	1.74	15.61	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.8*	10yr	1.18	87.16	87.43		87.45	0.010014	0.65	2.07	17.99	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.8*	100yr	1.93	87.16	87.48		87.50	0.009997	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.6*	5yr	0.95	87.06	87.31		87.33	0.009975	0.60	1.74	15.64	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.6*	10yr	1.18	87.06	87.33		87.35	0.009984	0.65	2.07	18.01	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.6*	100yr	1.93	87.06	87.38		87.40	0.009997	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.4*	5yr	0.95	86.96	87.21		87.23	0.010017	0.60	1.74	15.62	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.4*	10yr	1.18	86.96	87.23		87.25	0.010012	0.65	2.07	17.99	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.4*	100yr	1.93	86.96	87.28		87.30	0.010001	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.2*	5yr	0.95	86.86	87.11		87.13	0.009982	0.60	1.74	15.63	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.2*	10yr	1.18	86.86	87.13		87.15	0.009986	0.65	2.07	18.01	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.2*	100yr	1.93	86.86	87.18		87.20	0.009996	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321	5yr	0.95	86.76	87.01	86.95	87.03	0.010009	0.60	1.74	15.62	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321	10yr	1.18	86.76	87.03	86.96	87.05	0.010010	0.65	2.07	17.99	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321	100yr	1.93	86.76	87.08	87.01	87.10	0.010001	0.76	3.04	21.40	0.50	0.64	0.39	0.31
RA31	RA31	317	5yr	0.45	90.00	90.13		90.14	0.008822	0.30	1.47	22.49	0.38	0.30		
RA31	RA31	317	10yr	0.56	90.00	90.14		90.15	0.008742	0.32	1.74	24.46	0.38	0.32		
RA31	RA31	317	100yr	0.93	90.00	90.17		90.18	0.008707	0.36	2.55	29.61	0.40	0.36		
RA31	RA31	316	5yr	0.45	89.76	89.90		89.91	0.005838	0.26	1.69	23.44	0.31	0.26		
RA31	RA31	316	10yr	0.56	89.76	89.92		89.92	0.005847	0.28	1.99	25.44	0.32	0.28		
RA31	RA31	316	100yr	0.93	89.76	89.95		89.95	0.005896	0.32	2.91	30.73	0.33	0.32		
RA31	RA31	315.91*	5yr	0.45	89.73	89.87		89.87	0.005785	0.26	1.70	23.50	0.31	0.26		
RA31	RA31	315.91*	10yr	0.56	89.73	89.88		89.89	0.005816	0.28	2.00	25.50	0.32	0.28		
RA31	RA31	315.91*	100yr	0.93	89.73	89.91		89.92	0.005940	0.32	2.90	30.72	0.33	0.32		

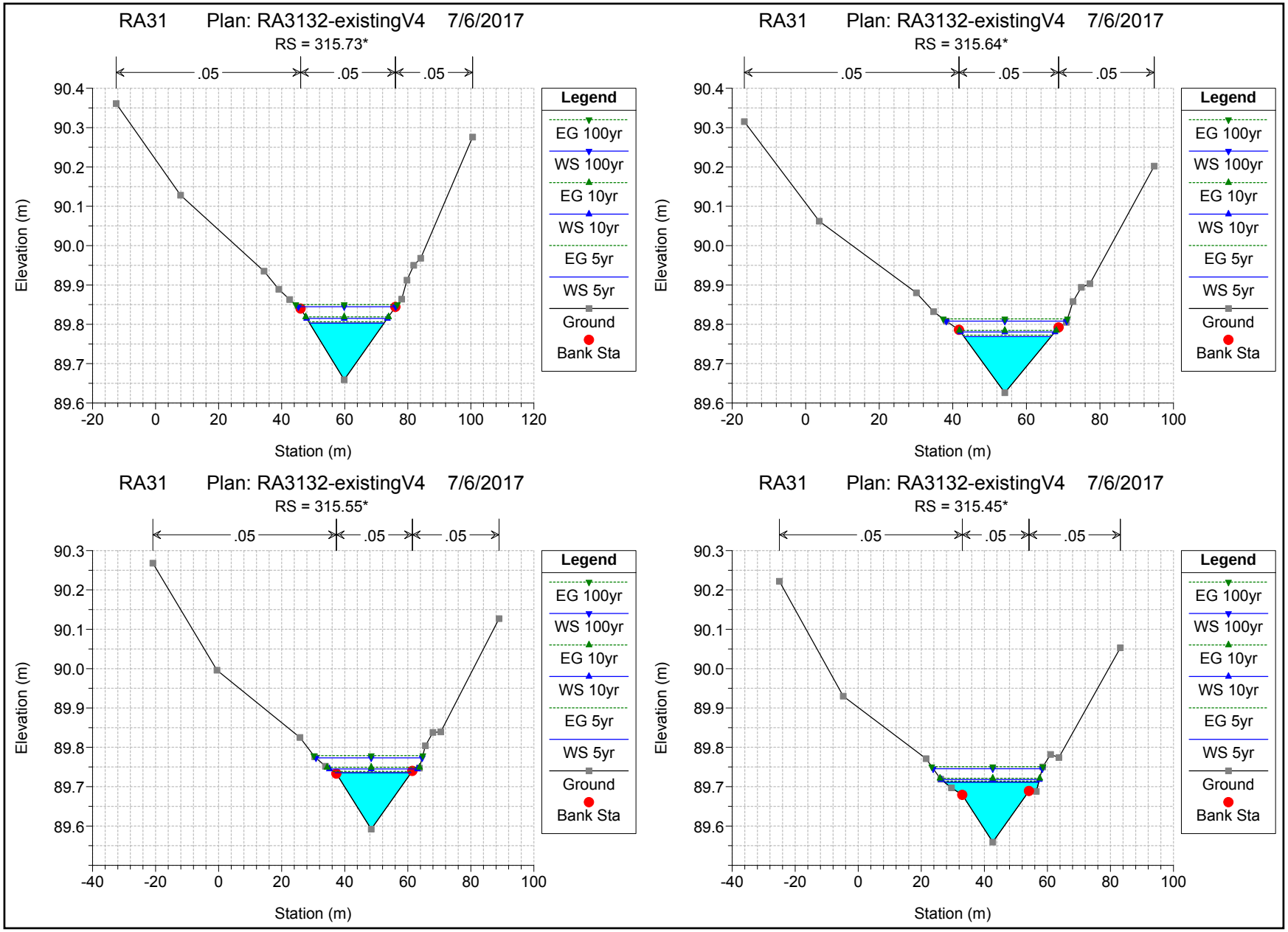
HEC-RAS Plan: RA3132-exV4 (Continued)

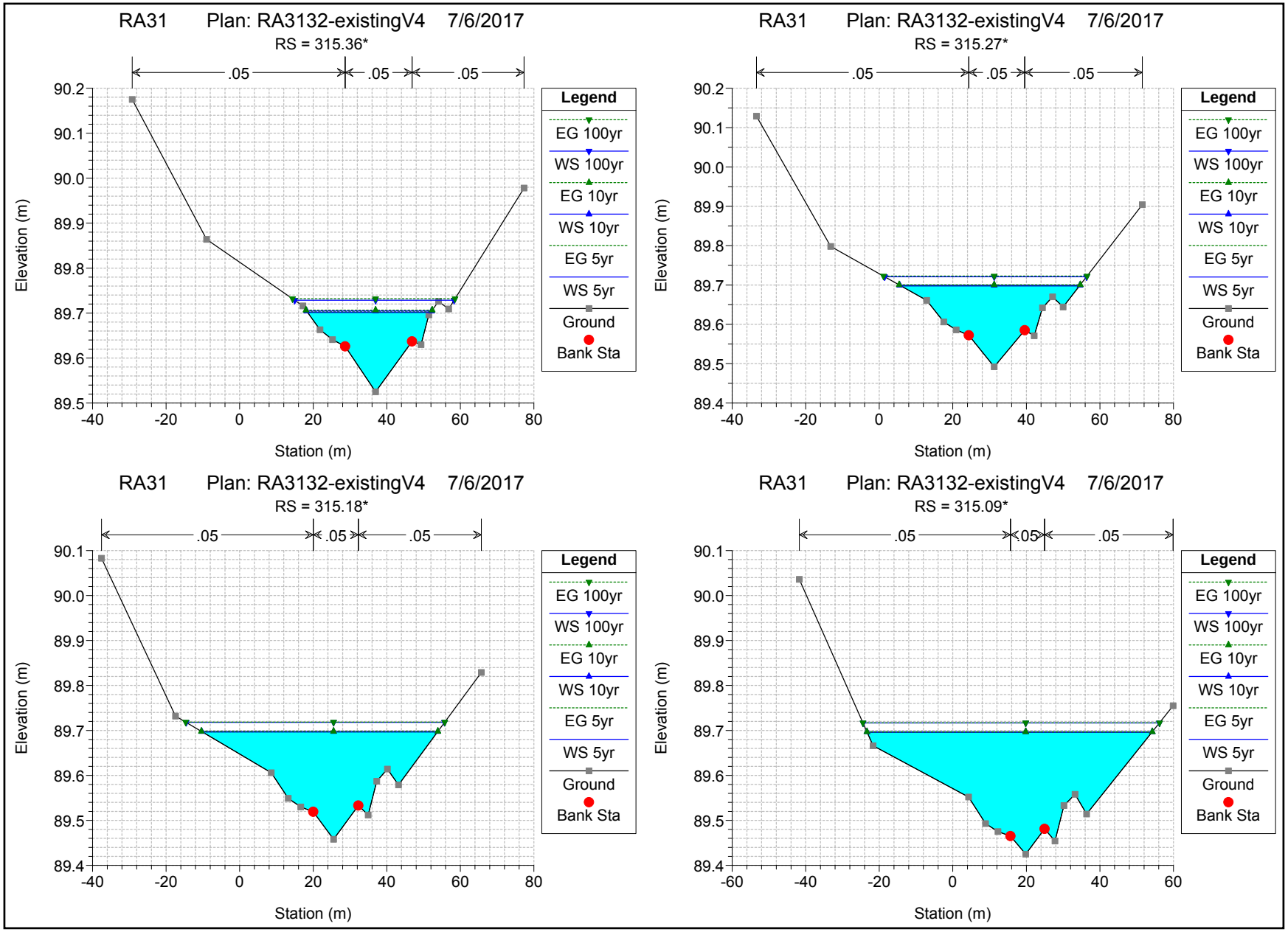
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA31	RA31	315.82*	5yr	0.45	89.69	89.84		89.84	0.005863	0.26	1.69	23.55	0.32	0.26		
RA31	RA31	315.82*	10yr	0.56	89.69	89.85		89.85	0.005890	0.28	1.99	25.55	0.32	0.28		
RA31	RA31	315.82*	100yr	0.93	89.69	89.88		89.89	0.006037	0.32	2.89	30.77	0.33	0.32		
RA31	RA31	315.73*	5yr	0.45	89.66	89.80		89.81	0.005771	0.26	1.70	23.66	0.31	0.26		
RA31	RA31	315.73*	10yr	0.56	89.66	89.82		89.82	0.005847	0.28	2.00	25.62	0.32	0.28		
RA31	RA31	315.73*	100yr	0.93	89.66	89.84		89.85	0.006301	0.33	2.83	30.81	0.34	0.33	0.03	
RA31	RA31	315.64*	5yr	0.45	89.63	89.77		89.77	0.005938	0.26	1.69	23.72	0.32	0.26		
RA31	RA31	315.64*	10yr	0.56	89.63	89.78		89.78	0.006029	0.28	1.98	25.68	0.32	0.28		
RA31	RA31	315.64*	100yr	0.93	89.63	89.81		89.81	0.006171	0.34	2.78	32.73	0.34	0.33	0.08	0.07
RA31	RA31	315.55*	5yr	0.45	89.59	89.74		89.74	0.005714	0.26	1.71	24.10	0.31	0.26	0.02	
RA31	RA31	315.55*	10yr	0.56	89.59	89.75		89.75	0.005887	0.29	1.96	27.87	0.32	0.28	0.05	0.03
RA31	RA31	315.55*	100yr	0.93	89.59	89.77		89.78	0.005712	0.34	2.83	33.65	0.33	0.33	0.12	0.13
RA31	RA31	315.45*	5yr	0.45	89.56	89.71		89.71	0.003278	0.23	2.06	29.92	0.24	0.22	0.08	0.08
RA31	RA31	315.45*	10yr	0.56	89.56	89.72		89.72	0.003933	0.26	2.26	31.14	0.27	0.25	0.09	0.11
RA31	RA31	315.45*	100yr	0.93	89.56	89.75		89.75	0.004177	0.32	3.17	34.62	0.29	0.29	0.15	0.16
RA31	RA31	315.36*	5yr	0.45	89.52	89.70		89.70	0.001205	0.17	2.95	33.44	0.16	0.15	0.09	0.09
RA31	RA31	315.36*	10yr	0.56	89.52	89.70		89.71	0.001695	0.21	3.06	33.99	0.19	0.18	0.11	0.11
RA31	RA31	315.36*	100yr	0.93	89.52	89.73		89.73	0.002420	0.28	3.98	43.34	0.23	0.23	0.15	0.12
RA31	RA31	315.27*	5yr	0.45	89.49	89.70		89.70	0.000452	0.13	4.52	48.59	0.10	0.10	0.07	0.06
RA31	RA31	315.27*	10yr	0.56	89.49	89.70		89.70	0.000672	0.16	4.59	49.01	0.12	0.12	0.08	0.08
RA31	RA31	315.27*	100yr	0.93	89.49	89.72		89.72	0.001064	0.21	5.71	54.89	0.16	0.16	0.11	0.11
RA31	RA31	315.18*	5yr	0.45	89.46	89.70		89.70	0.000161	0.09	7.04	63.94	0.06	0.06	0.05	0.05
RA31	RA31	315.18*	10yr	0.56	89.46	89.70		89.70	0.000245	0.11	7.10	64.21	0.08	0.08	0.06	0.06
RA31	RA31	315.18*	100yr	0.93	89.46	89.72		89.72	0.000428	0.15	8.46	70.24	0.10	0.11	0.08	0.09
RA31	RA31	315.09*	5yr	0.45	89.42	89.70		89.70	0.000058	0.06	10.59	77.48	0.04	0.04	0.04	0.04
RA31	RA31	315.09*	10yr	0.56	89.42	89.70		89.70	0.000089	0.07	10.64	77.58	0.05	0.05	0.05	0.05
RA31	RA31	315.09*	100yr	0.93	89.42	89.72		89.72	0.000165	0.11	12.20	80.58	0.07	0.08	0.07	0.07
RA31	RA31	315	5yr	0.45	89.39	89.70		89.70	0.000022	0.04	14.89	84.93	0.02	0.03	0.03	0.03
RA31	RA31	315	10yr	0.56	89.39	89.70		89.70	0.000034	0.05	14.94	84.96	0.03	0.04	0.04	0.04
RA31	RA31	315	100yr	0.93	89.39	89.72		89.72	0.000068	0.08	16.61	85.96	0.04	0.06	0.05	0.05
RA31	RA31	314.9	5yr	0.45	89.18	89.70	89.39	89.70	0.000019	0.05	15.44	84.92	0.02	0.03	0.03	0.03
RA31	RA31	314.9	10yr	0.56	89.18	89.70	89.41	89.70	0.000028	0.06	15.49	84.95	0.03	0.04	0.03	0.03
RA31	RA31	314.9	100yr	0.93	89.18	89.72	89.48	89.72	0.000058	0.08	17.15	85.95	0.04	0.05	0.05	0.05
RA31	RA31	314.8		Culvert												
RA31	RA31	314.5	5yr	0.45	89.24	89.41	89.41	89.49	0.047409	1.22	0.37	72.35	1.01	1.22		
RA31	RA31	314.5	10yr	0.56	89.24	89.44	89.44	89.53	0.043507	1.30	0.43	75.83	1.00	1.30		
RA31	RA31	314.5	100yr	0.93	89.24	89.51	89.51	89.63	0.039907	1.56	0.60	85.20	1.01	1.56		

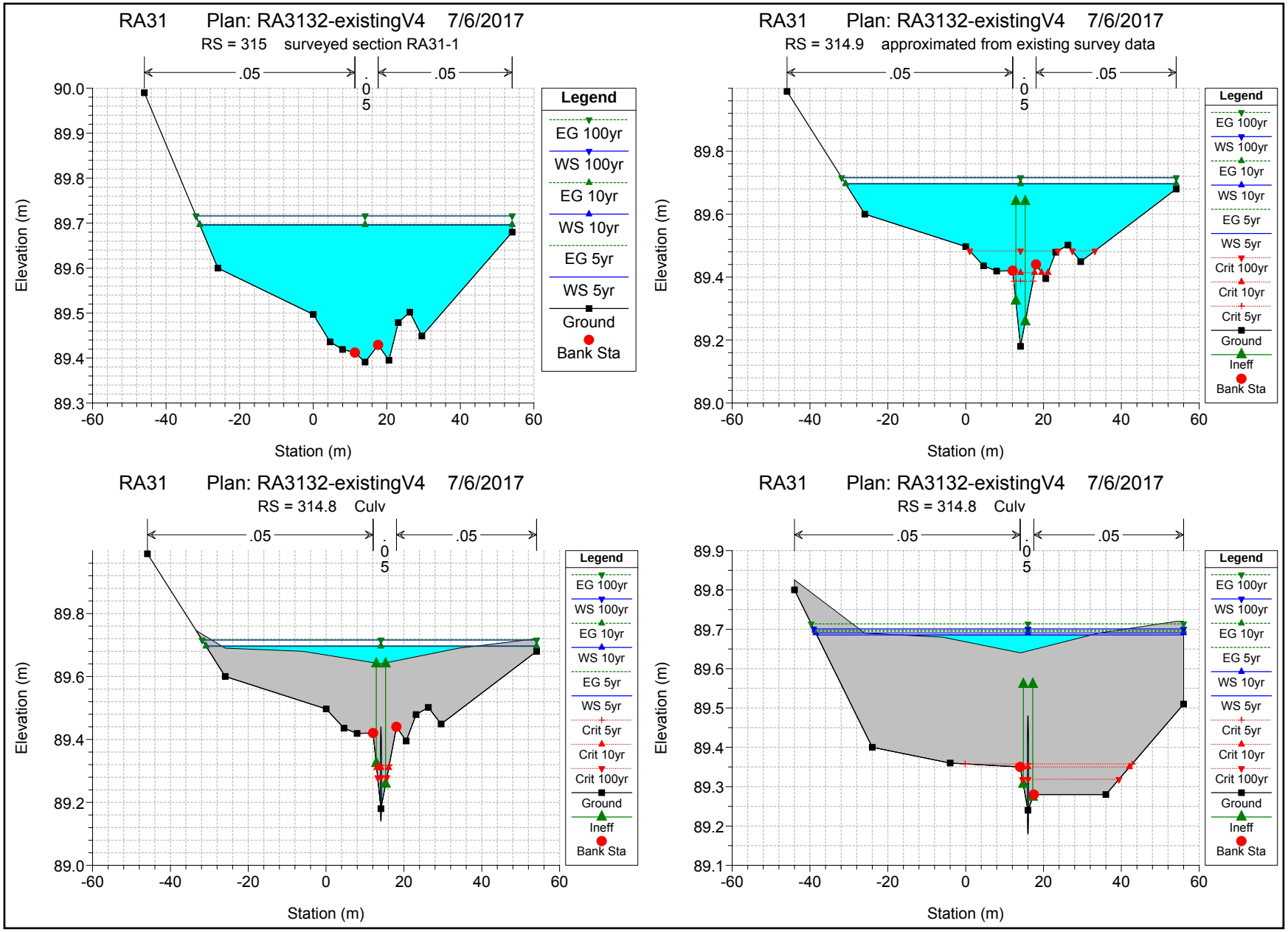
HEC-RAS Plan: RA3132-exV4 (Continued)

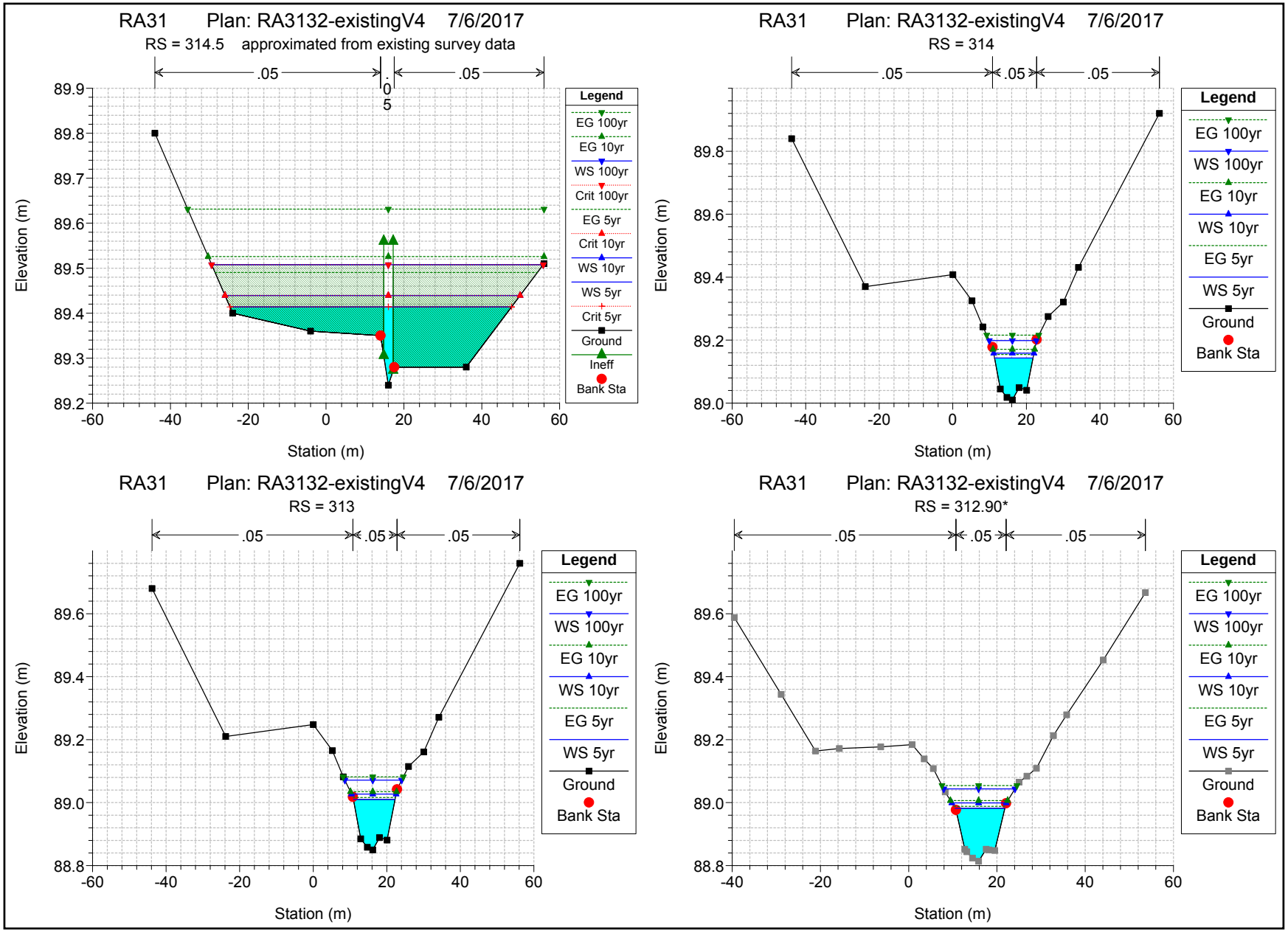
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA31	RA31	314	5yr	0.45	89.01	89.14		89.15	0.012805	0.46	0.97	10.45	0.49	0.46		
RA31	RA31	314	10yr	0.56	89.01	89.16		89.17	0.012640	0.49	1.13	10.94	0.49	0.49		
RA31	RA31	314	100yr	0.93	89.01	89.20		89.22	0.012351	0.58	1.60	12.79	0.51	0.58	0.11	
RA31	RA31	313	5yr	0.45	88.85	89.01		89.02	0.005954	0.36	1.26	11.32	0.34	0.36		
RA31	RA31	313	10yr	0.56	88.85	89.03		89.03	0.005945	0.38	1.46	12.11	0.35	0.38	0.04	
RA31	RA31	313	100yr	0.93	88.85	89.07		89.08	0.005901	0.46	2.06	15.42	0.36	0.45	0.14	0.09
RA31	RA31	312.90*	5yr	0.45	88.81	88.98		88.99	0.005474	0.35	1.28	11.29	0.33	0.35	0.03	
RA31	RA31	312.90*	10yr	0.56	88.81	89.00		89.01	0.005475	0.38	1.48	12.35	0.34	0.38	0.07	0.01
RA31	RA31	312.90*	100yr	0.93	88.81	89.04		89.05	0.005433	0.46	2.12	16.13	0.35	0.44	0.15	0.12
RA31	RA31	312	5yr	0.45	88.48	88.66		88.67	0.008971	0.48	1.13	13.79	0.43	0.40	0.29	0.24
RA31	RA31	312	10yr	0.56	88.48	88.68		88.69	0.008995	0.51	1.32	14.58	0.44	0.42	0.32	0.27
RA31	RA31	312	100yr	0.93	88.48	88.71		88.73	0.009398	0.62	1.97	21.18	0.46	0.47	0.40	0.26
RA31	RA31	311	5yr	0.45	87.81	88.00	87.97	88.03	0.015357	0.73	0.74	8.14	0.58	0.60	0.32	0.30
RA31	RA31	311	10yr	0.56	87.81	88.02	87.99	88.04	0.014998	0.77	0.93	11.12	0.58	0.60	0.37	0.24
RA31	RA31	311	100yr	0.93	87.81	88.06	88.04	88.09	0.014033	0.86	1.44	12.99	0.59	0.64	0.47	0.38

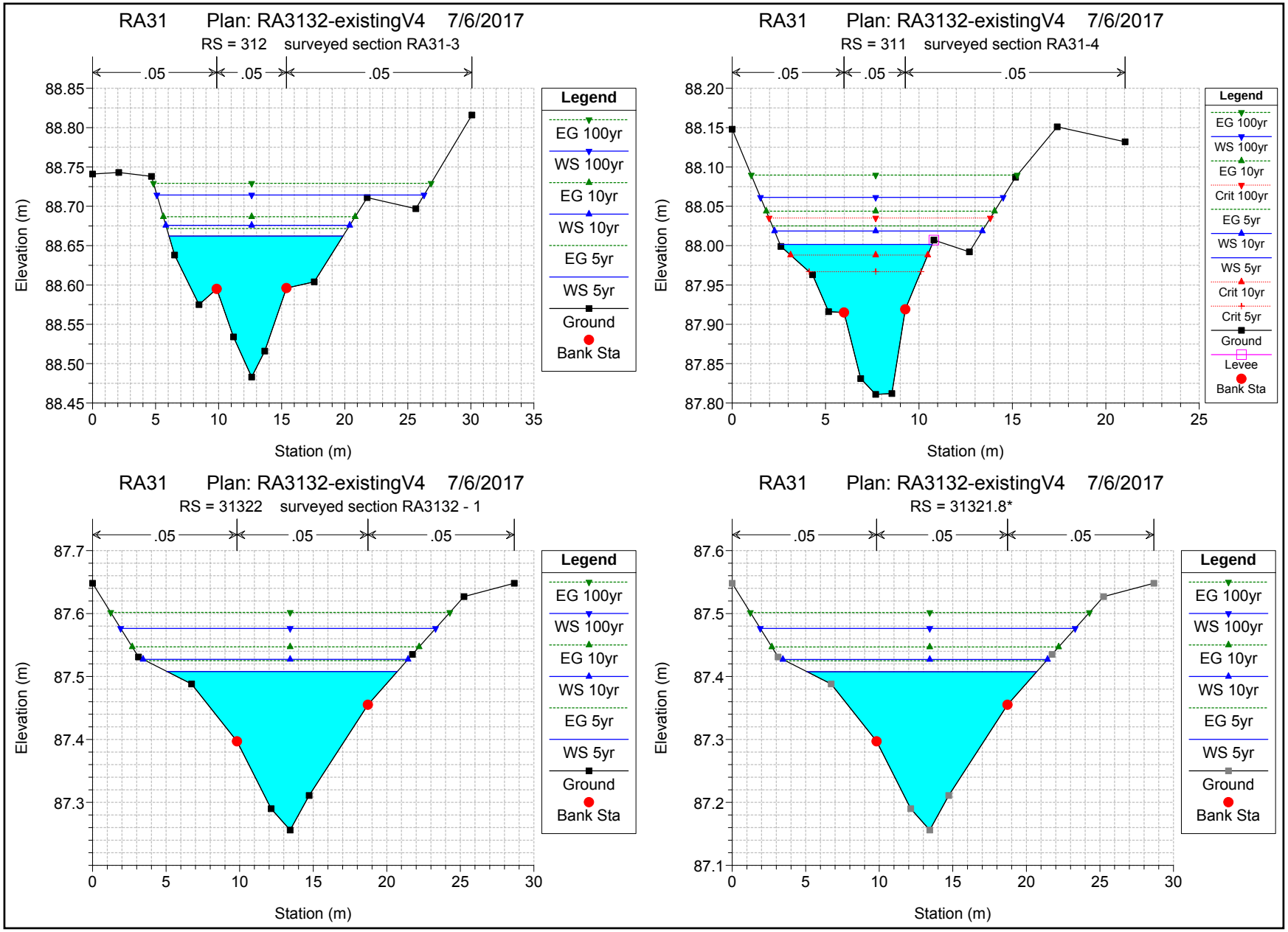

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 317 approximated from lidar
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 316 approximated from lidar
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.91*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.82*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

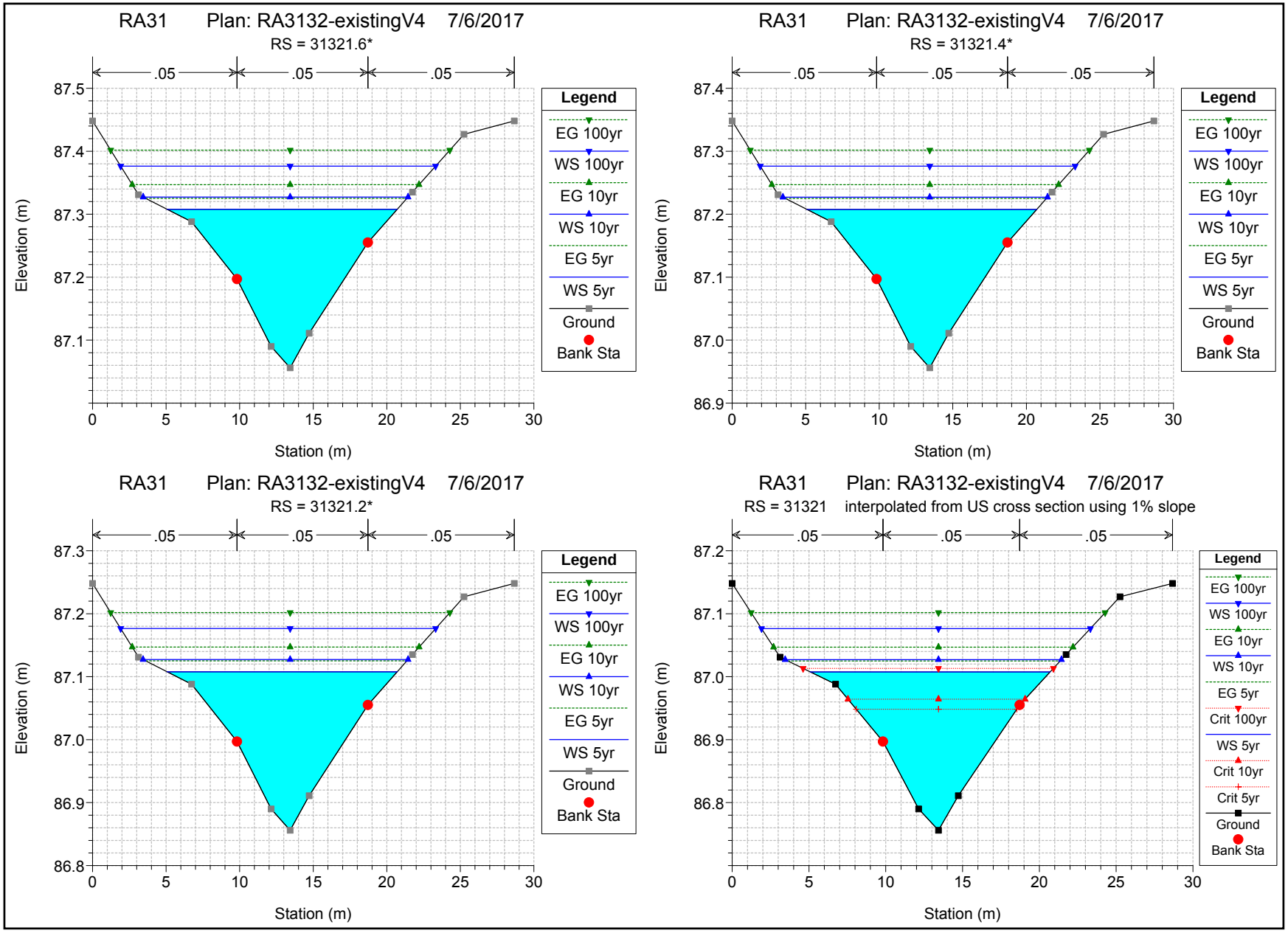

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.73*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.64*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.55*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.45*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

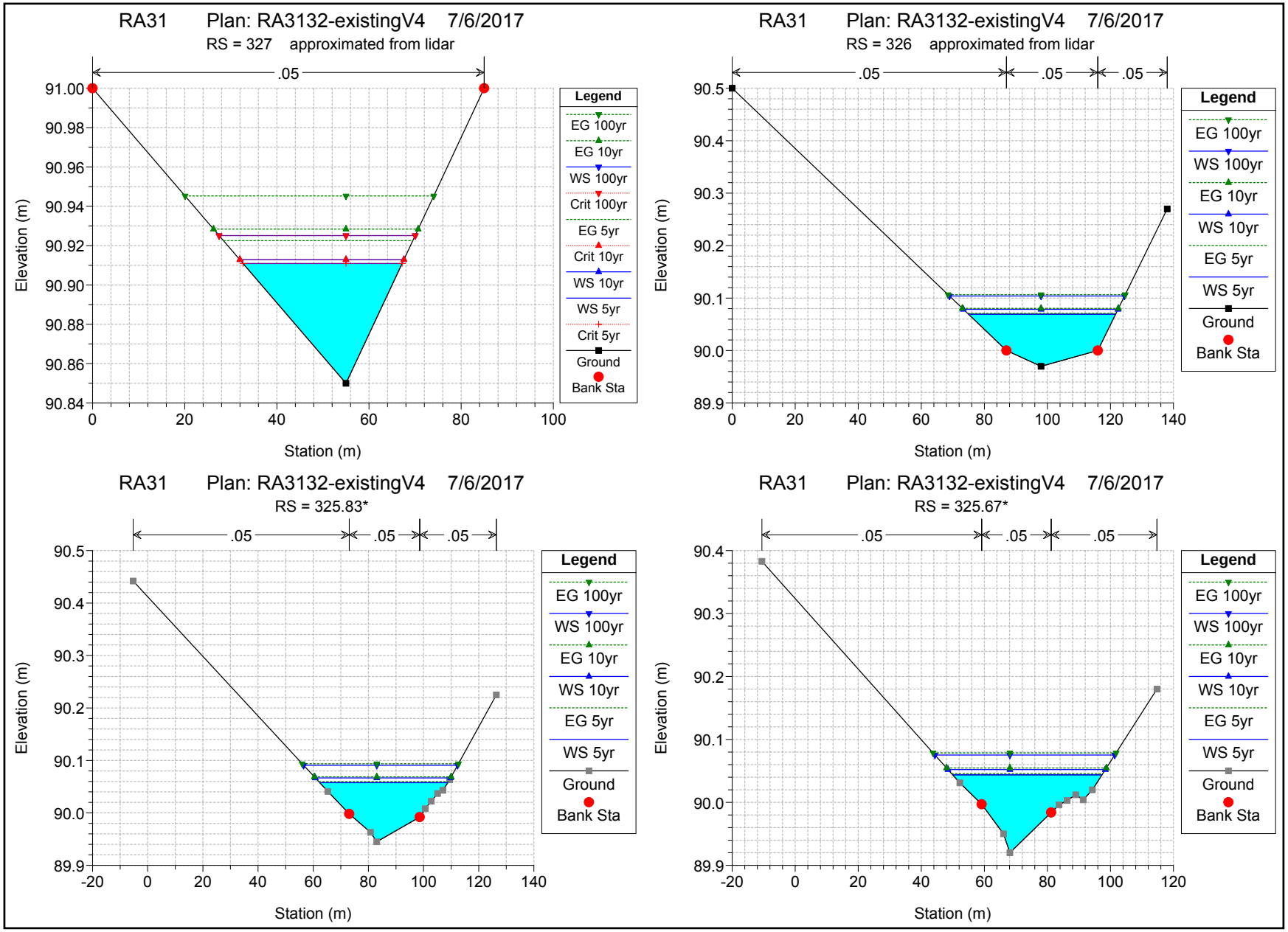

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.36*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.27*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.18*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315.09*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

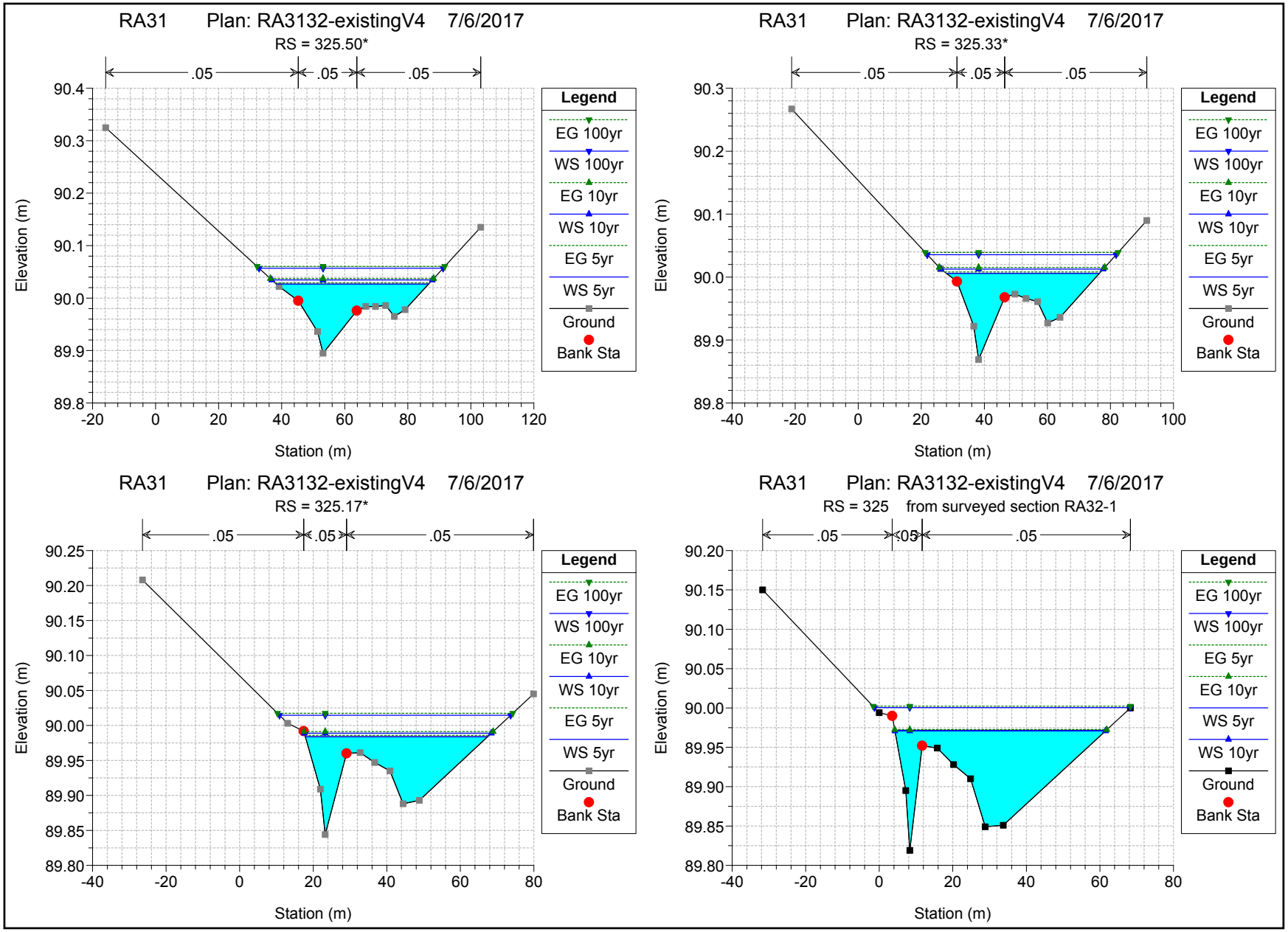

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 315 surveyed section RA31-1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 314.9 approximated from existing survey data
Crit 100yr
Crit 10yr
Crit 5yr
Ineff
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 314.8 Culv
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 314.8 Culv

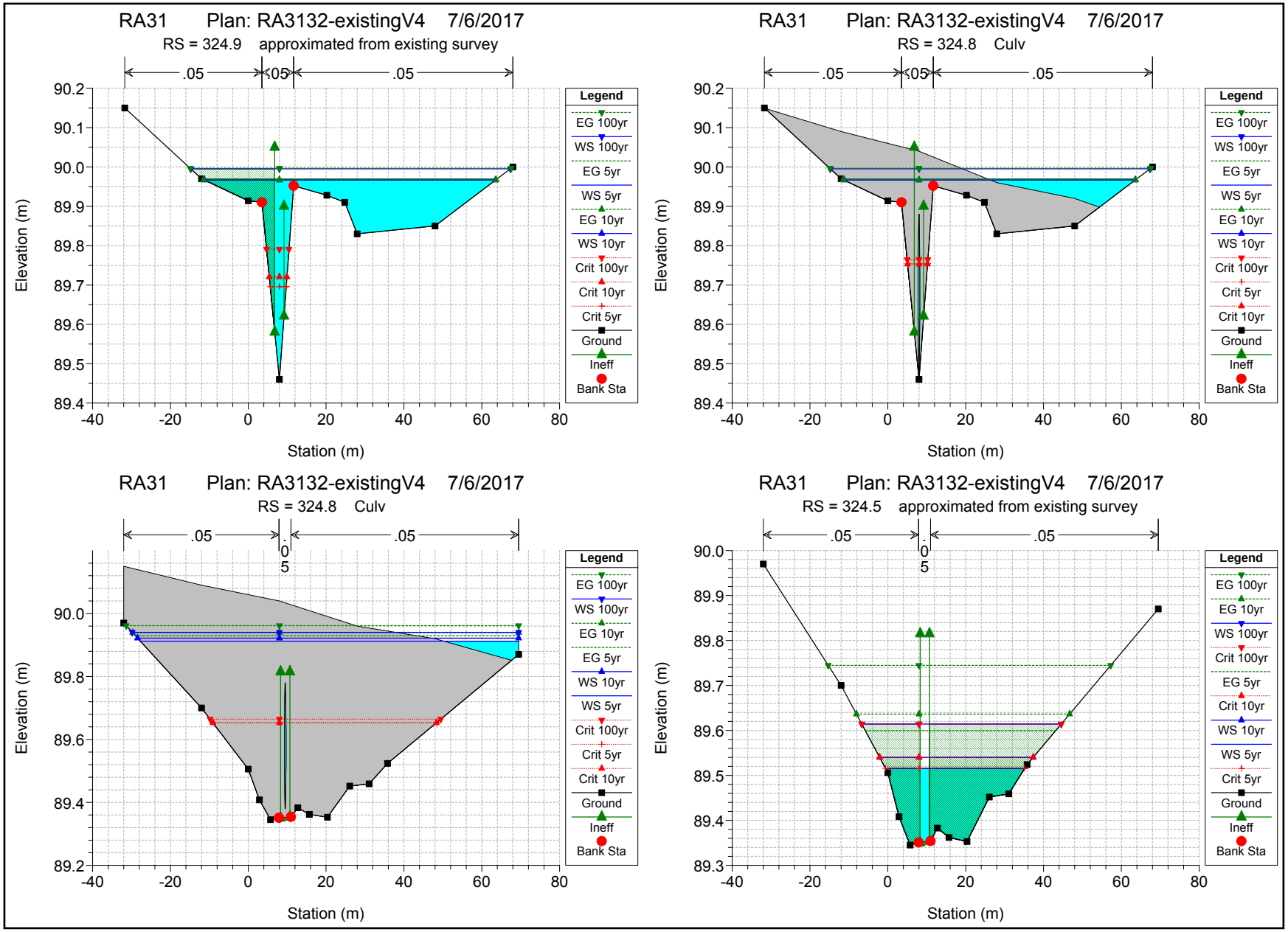

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 314.5 approximated from existing survey data
.05
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
Crit 100yr
EG 5yr
Crit 10yr
WS 10yr
WS 5yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 314
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 313
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 312.90*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

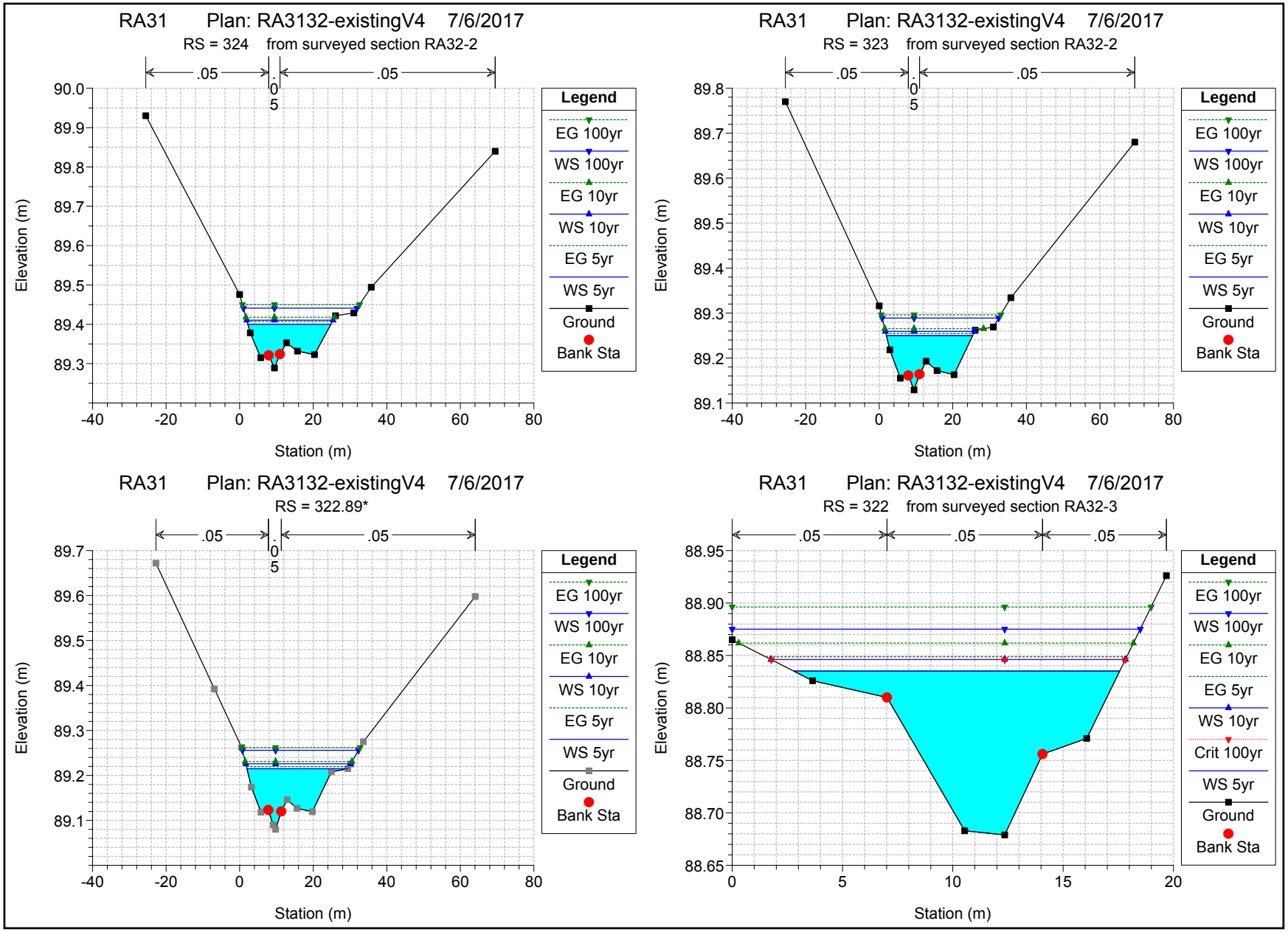

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 312 surveyed section RA31-3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 311 surveyed section RA31-4
Legend
EG 100yr
WS 100yr
EG 10yr
Crit 100yr
EG 5yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Levee
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 31322 surveyed section RA3132 - 1
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 31321.8*

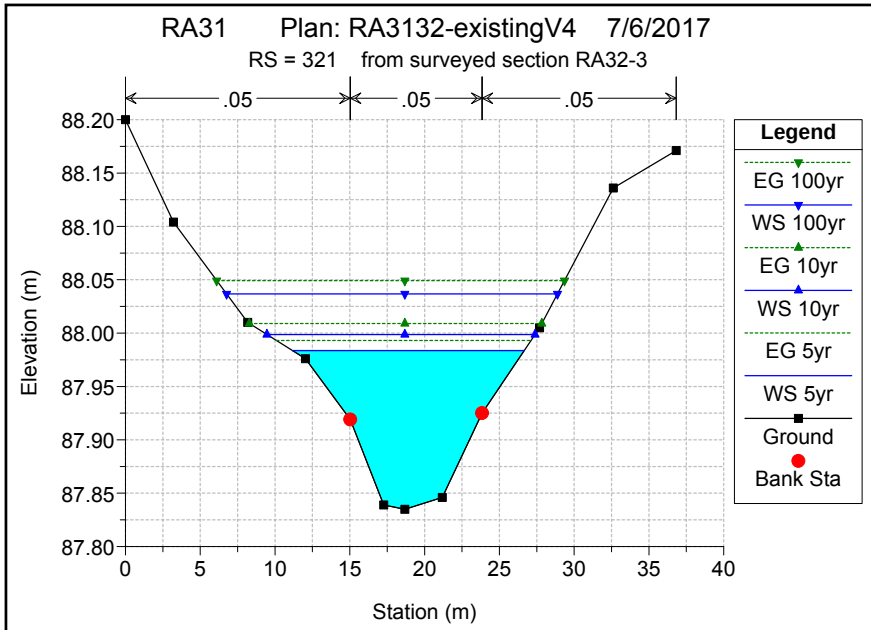

RA31 Plan: RA3132-existingV4 7/6/2017
RS = 31321.6*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 31321.4*
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 31321.2*
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 31321 interpolated from US cross section using 1% slope
Crit 100yr
Crit 10yr
Crit 5yr


RA31 Plan: RA3132-existingV4 7/6/2017
RS = 327 approximated from lidar
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
Crit 100yr
EG 5yr
Crit 10yr
WS 10yr
WS 5yr
Crit 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 326 approximated from lidar
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 325.83*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 325.67*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta


RA31 Plan: RA3132-existingV4 7/6/2017
RS = 325.50*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 325.33*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 325.17*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 325 from surveyed section RA32-1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 5yr
EG 10yr
WS 5yr
WS 10yr
Ground
Bank Sta


RA31 Plan: RA3132-existingV4 7/6/2017
RS = 324.9 approximated from existing survey
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 5yr
WS 5yr
EG 10yr
WS 10yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 324.8 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 5yr
WS 5yr
EG 10yr
WS 10yr
Crit 100yr
Crit 5yr
Crit 10yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 324.8 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Crit 100yr
Crit 5yr
Crit 10yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 324.5 approximated from existing survey
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
Crit 100yr
EG 5yr
Crit 10yr
WS 10yr
WS 5yr
Crit 5yr
Ground
Ineff
Bank Sta


RA31 Plan: RA3132-existingV4 7/6/2017
RS = 324 from surveyed section RA32-2
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 323 from surveyed section RA32-2
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 322.89*
RA31 Plan: RA3132-existingV4 7/6/2017
RS = 322 from surveyed section RA32-3
Crit 100yr


RA31 Plan: RA3132-existingV4 7/6/2017
RS = 321 from surveyed section RA32-3
.05
.05
.05
88.20
88.15
88.10
88.05
88.00
87.95
87.90
87.85
87.80
Elevation (m)
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta


317
316
315.82*
315.64*
315.36*
315.09*
314.9
314
313
RA31
312
RA31
311
RA31+32
RA31+32
RA31+32
31321.2*
31321.6*
31322
321
RA32
322
RA32
323
324
324.5
325
325.17*
325.33*
325.50*
325.67*
325.83*
326
327

HEC-RAS Plan: Proposed V4

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA32	RA32	327	5yr	0.50	90.85	90.91	90.91	90.92	0.059731	0.48	1.05	34.57	0.87	0.48		
RA32	RA32	327	10yr	0.62	90.85	90.91	90.91	90.93	0.076827	0.55	1.12	35.67	0.99	0.55		
RA32	RA32	327	100yr	1.01	90.85	90.93	90.93	90.95	0.078278	0.63	1.60	42.63	1.03	0.63		
RA32	RA32	326	5yr	0.50	89.97	90.07		90.07	0.002217	0.18	3.05	46.67	0.20	0.16	0.10	0.10
RA32	RA32	326	10yr	0.62	89.97	90.08		90.08	0.002262	0.20	3.51	49.09	0.20	0.18	0.11	0.11
RA32	RA32	326	100yr	1.01	89.97	90.10		90.11	0.002414	0.24	4.82	55.53	0.22	0.21	0.14	0.14
RA32	RA32	325.83*	5yr	0.50	89.94	90.06		90.06	0.002554	0.20	2.86	46.44	0.21	0.18	0.10	0.10
RA32	RA32	325.83*	10yr	0.62	89.94	90.07		90.07	0.002623	0.21	3.29	49.09	0.22	0.19	0.11	0.11
RA32	RA32	325.83*	100yr	1.01	89.94	90.09		90.09	0.002827	0.26	4.56	55.85	0.24	0.22	0.14	0.15
RA32	RA32	325.67*	5yr	0.50	89.92	90.04		90.05	0.003111	0.22	2.69	47.39	0.24	0.19	0.09	0.12
RA32	RA32	325.67*	10yr	0.62	89.92	90.05		90.05	0.003166	0.23	3.12	50.08	0.24	0.20	0.11	0.13
RA32	RA32	325.67*	100yr	1.01	89.92	90.08		90.08	0.003389	0.28	4.34	57.09	0.26	0.23	0.14	0.17
RA32	RA32	325.50*	5yr	0.50	89.89	90.03		90.03	0.003820	0.24	2.56	48.23	0.26	0.20	0.08	0.14
RA32	RA32	325.50*	10yr	0.62	89.89	90.04		90.04	0.003777	0.25	3.00	51.16	0.26	0.21	0.09	0.16
RA32	RA32	325.50*	100yr	1.01	89.89	90.06		90.06	0.004015	0.30	4.18	58.40	0.28	0.24	0.13	0.20
RA32	RA32	325.33*	5yr	0.50	89.87	90.01		90.01	0.004803	0.25	2.45	48.15	0.29	0.21	0.05	0.17
RA32	RA32	325.33*	10yr	0.62	89.87	90.02		90.02	0.004167	0.25	2.99	52.67	0.27	0.21	0.07	0.18
RA32	RA32	325.33*	100yr	1.01	89.87	90.04		90.04	0.004494	0.30	4.13	60.05	0.29	0.24	0.11	0.22
RA32	RA32	325.17*	5yr	0.50	89.84	89.98		89.98	0.005259	0.24	2.48	48.60	0.29	0.20		0.19
RA32	RA32	325.17*	10yr	0.62	89.84	90.00		90.00	0.003092	0.21	3.44	55.74	0.23	0.18	0.03	0.17
RA32	RA32	325.17*	100yr	1.01	89.84	90.02		90.02	0.003944	0.27	4.45	63.30	0.27	0.23	0.07	0.22
RA32	RA32	325	5yr	0.50	89.82	89.96		89.96	0.003233	0.18	3.03	54.41	0.23	0.17		0.16
RA32	RA32	325	10yr	0.62	89.82	89.99		89.99	0.001334	0.14	4.73	62.31	0.15	0.13		0.13
RA32	RA32	325	100yr	1.01	89.82	90.00		90.00	0.002155	0.19	5.60	70.02	0.20	0.18	0.04	0.18
RA32	RA32	324.9	5yr	0.50	89.46	89.96	89.70	89.96	0.000388	0.17	5.11	71.25	0.10	0.10		0.07
RA32	RA32	324.9	10yr	0.62	89.46	89.99	89.72	89.99	0.000276	0.16	6.88	80.13	0.09	0.09		0.07
RA32	RA32	324.9	100yr	1.01	89.46	90.00	89.79	90.00	0.000576	0.23	7.51	82.70	0.13	0.13		0.11
RA32	RA32	324.8		Culvert												
RA32	RA32	324.5	5yr	0.50	89.35	89.69	89.52	89.71	0.004279	0.63	0.80	62.57	0.35	0.63		
RA32	RA32	324.5	10yr	0.62	89.35	89.74	89.54	89.76	0.004060	0.67	0.92	71.06	0.35	0.67		
RA32	RA32	324.5	100yr	1.01	89.35	89.90	89.61	89.90	0.000014	0.05	29.55	96.29	0.02	0.03	0.03	0.03
RA32	RA32	324	5yr	0.50	89.29	89.69	89.43	89.69	0.000830	0.30	1.68	66.61	0.16	0.30	0.30	0.29
RA32	RA32	324	10yr	0.62	89.29	89.74	89.44	89.75	0.000818	0.33	1.91	74.57	0.16	0.32	0.32	0.31
RA32	RA32	324	100yr	1.01	89.29	89.89	89.49	89.90	0.000790	0.39	2.59	92.75	0.16	0.39	0.39	0.38
RA32	RA32	323.5		Culvert												
RA32	RA32	323	5yr	0.50	89.13	89.26	89.26	89.32	0.050118	1.07	0.49	25.46	1.00	1.03	0.98	0.89

HEC-RAS Plan: Proposed V4 (Continued)

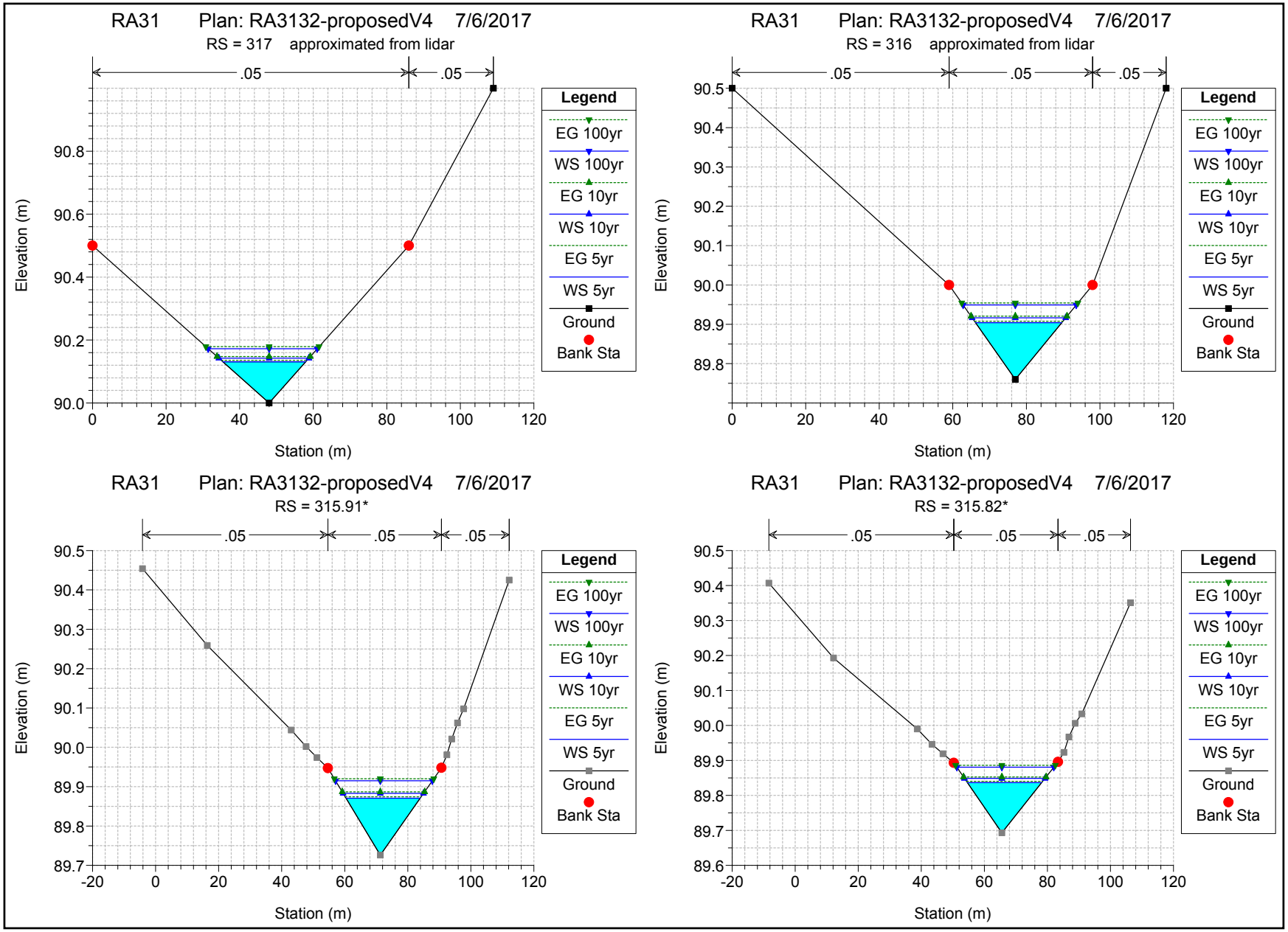
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA32	RA32	323	10yr	0.62	89.13	89.28	89.28	89.34	0.048383	1.15	0.56	30.71	1.00	1.10	1.06	0.98
RA32	RA32	323	100yr	1.01	89.13	89.33	89.33	89.41	0.043860	1.34	0.77	35.83	1.01	1.30	1.26	1.19
RA32	RA32	322.89*	5yr	0.50	89.08	89.21		89.22	0.006683	0.39	1.80	27.36	0.36	0.28	0.27	0.24
RA32	RA32	322.89*	10yr	0.62	89.08	89.23		89.23	0.006408	0.40	2.11	28.53	0.36	0.29	0.28	0.26
RA32	RA32	322.89*	100yr	1.01	89.08	89.26		89.26	0.006068	0.45	3.01	31.55	0.37	0.33	0.32	0.30
RA32	RA32	322	5yr	0.50	88.68	88.84		88.85	0.013501	0.54	1.05	14.78	0.52	0.48	0.14	0.34
RA32	RA32	322	10yr	0.62	88.68	88.85		88.86	0.014099	0.59	1.22	16.06	0.53	0.51	0.18	0.37
RA32	RA32	322	100yr	1.01	88.68	88.88	88.85	88.90	0.015214	0.70	1.73	18.50	0.58	0.58	0.30	0.45
RA32	RA32	321	5yr	0.50	87.84	87.98		87.99	0.008273	0.44	1.25	15.50	0.41	0.40	0.17	0.17
RA32	RA32	321	10yr	0.62	87.84	88.00		88.01	0.007974	0.47	1.51	17.92	0.41	0.41	0.18	0.20
RA32	RA32	321	100yr	1.01	87.84	88.04		88.05	0.007394	0.53	2.28	22.13	0.41	0.44	0.25	0.26
RA31+32	RA31+32	31322	5yr	0.95	87.26	87.51		87.53	0.009969	0.60	1.74	15.65	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31322	10yr	1.18	87.26	87.53		87.55	0.009982	0.65	2.07	18.02	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31322	100yr	1.93	87.26	87.58		87.60	0.010002	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.8*	5yr	0.95	87.16	87.41		87.42	0.010026	0.60	1.74	15.61	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.8*	10yr	1.18	87.16	87.43		87.45	0.010014	0.65	2.07	17.99	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.8*	100yr	1.93	87.16	87.48		87.50	0.009997	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.6*	5yr	0.95	87.06	87.31		87.33	0.009975	0.60	1.74	15.64	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.6*	10yr	1.18	87.06	87.33		87.35	0.009984	0.65	2.07	18.01	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.6*	100yr	1.93	87.06	87.38		87.40	0.009997	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.4*	5yr	0.95	86.96	87.21		87.23	0.010017	0.60	1.74	15.62	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.4*	10yr	1.18	86.96	87.23		87.25	0.010012	0.65	2.07	17.99	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.4*	100yr	1.93	86.96	87.28		87.30	0.010001	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321.2*	5yr	0.95	86.86	87.11		87.13	0.009982	0.60	1.74	15.63	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321.2*	10yr	1.18	86.86	87.13		87.15	0.009986	0.65	2.07	18.01	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321.2*	100yr	1.93	86.86	87.18		87.20	0.009996	0.76	3.04	21.41	0.50	0.64	0.39	0.31
RA31+32	RA31+32	31321	5yr	0.95	86.76	87.01	86.95	87.03	0.010009	0.60	1.74	15.62	0.47	0.55	0.26	0.18
RA31+32	RA31+32	31321	10yr	1.18	86.76	87.03	86.96	87.05	0.010010	0.65	2.07	17.99	0.48	0.57	0.28	0.22
RA31+32	RA31+32	31321	100yr	1.93	86.76	87.08	87.01	87.10	0.010001	0.76	3.04	21.40	0.50	0.64	0.39	0.31
RA31	RA31	317	5yr	0.45	90.00	90.13		90.14	0.008825	0.30	1.47	22.49	0.38	0.30		
RA31	RA31	317	10yr	0.56	90.00	90.14		90.15	0.008742	0.32	1.74	24.46	0.38	0.32		
RA31	RA31	317	100yr	0.93	90.00	90.17		90.18	0.008707	0.36	2.55	29.61	0.40	0.36		
RA31	RA31	316	5yr	0.45	89.76	89.90		89.91	0.005840	0.26	1.69	23.44	0.31	0.26		
RA31	RA31	316	10yr	0.56	89.76	89.92		89.92	0.005847	0.28	1.99	25.44	0.32	0.28		
RA31	RA31	316	100yr	0.93	89.76	89.95		89.95	0.005896	0.32	2.91	30.73	0.33	0.32		
RA31	RA31	315.91*	5yr	0.45	89.73	89.87		89.87	0.005783	0.26	1.70	23.51	0.31	0.26		
RA31	RA31	315.91*	10yr	0.56	89.73	89.88		89.89	0.005801	0.28	2.00	25.51	0.32	0.28		

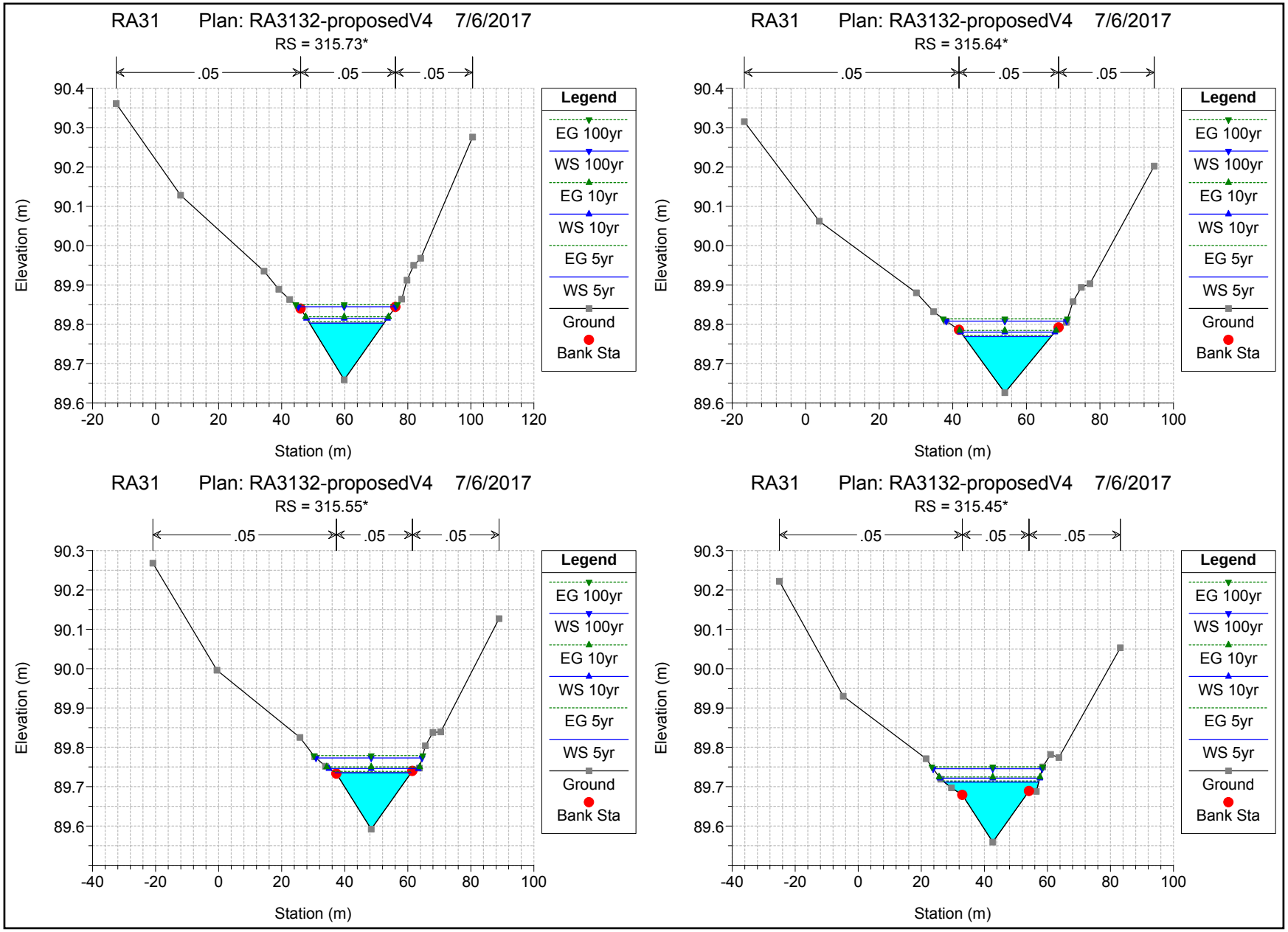
HEC-RAS Plan: Proposed V4 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA31	RA31	315.91*	100yr	0.93	89.73	89.91		89.92	0.005940	0.32	2.90	30.72	0.33	0.32		
RA31	RA31	315.82*	5yr	0.45	89.69	89.84		89.84	0.005865	0.26	1.69	23.55	0.32	0.26		
RA31	RA31	315.82*	10yr	0.56	89.69	89.85		89.85	0.005899	0.28	1.99	25.54	0.32	0.28		
RA31	RA31	315.82*	100yr	0.93	89.69	89.88		89.89	0.006037	0.32	2.89	30.77	0.33	0.32		
RA31	RA31	315.73*	5yr	0.45	89.66	89.80		89.81	0.005765	0.26	1.70	23.66	0.31	0.26		
RA31	RA31	315.73*	10yr	0.56	89.66	89.82		89.82	0.005789	0.28	2.01	25.67	0.32	0.28		
RA31	RA31	315.73*	100yr	0.93	89.66	89.84		89.85	0.006299	0.33	2.83	30.82	0.34	0.33	0.03	
RA31	RA31	315.64*	5yr	0.45	89.63	89.77		89.77	0.005946	0.27	1.69	23.72	0.32	0.27		
RA31	RA31	315.64*	10yr	0.56	89.63	89.78		89.78	0.006089	0.28	1.97	25.64	0.33	0.28		
RA31	RA31	315.64*	100yr	0.93	89.63	89.81		89.81	0.006169	0.34	2.78	32.73	0.34	0.33	0.08	0.07
RA31	RA31	315.55*	5yr	0.45	89.59	89.74		89.74	0.005695	0.26	1.71	24.12	0.31	0.26	0.02	
RA31	RA31	315.55*	10yr	0.56	89.59	89.75		89.75	0.005680	0.28	1.99	28.30	0.32	0.28	0.05	0.03
RA31	RA31	315.55*	100yr	0.93	89.59	89.77		89.78	0.005719	0.34	2.83	33.64	0.33	0.33	0.12	0.13
RA31	RA31	315.45*	5yr	0.45	89.56	89.71		89.71	0.003235	0.23	2.07	29.98	0.24	0.22	0.08	0.08
RA31	RA31	315.45*	10yr	0.56	89.56	89.72		89.72	0.003423	0.25	2.37	31.66	0.25	0.24	0.09	0.11
RA31	RA31	315.45*	100yr	0.93	89.56	89.75		89.75	0.004191	0.32	3.17	34.61	0.29	0.29	0.15	0.16
RA31	RA31	315.36*	5yr	0.45	89.52	89.70		89.70	0.001187	0.17	2.97	33.52	0.16	0.15	0.09	0.09
RA31	RA31	315.36*	10yr	0.56	89.52	89.71		89.71	0.001427	0.20	3.25	35.29	0.17	0.17	0.10	0.10
RA31	RA31	315.36*	100yr	0.93	89.52	89.73		89.73	0.002434	0.28	3.97	43.29	0.23	0.23	0.15	0.12
RA31	RA31	315.27*	5yr	0.45	89.49	89.70		89.70	0.000445	0.13	4.54	48.73	0.10	0.10	0.07	0.06
RA31	RA31	315.27*	10yr	0.56	89.49	89.71		89.71	0.000563	0.15	4.92	50.81	0.11	0.11	0.08	0.08
RA31	RA31	315.27*	100yr	0.93	89.49	89.72		89.72	0.001071	0.21	5.70	54.82	0.16	0.16	0.11	0.11
RA31	RA31	315.18*	5yr	0.45	89.46	89.70		89.70	0.000159	0.09	7.07	64.10	0.06	0.06	0.05	0.05
RA31	RA31	315.18*	10yr	0.56	89.46	89.70		89.70	0.000209	0.10	7.55	66.26	0.07	0.07	0.06	0.06
RA31	RA31	315.18*	100yr	0.93	89.46	89.72		89.72	0.000431	0.15	8.44	70.15	0.10	0.11	0.08	0.09
RA31	RA31	315.09*	5yr	0.45	89.42	89.70		89.70	0.000057	0.06	10.63	77.56	0.04	0.04	0.04	0.04
RA31	RA31	315.09*	10yr	0.56	89.42	89.70		89.70	0.000077	0.07	11.18	78.64	0.04	0.05	0.04	0.05
RA31	RA31	315.09*	100yr	0.93	89.42	89.72		89.72	0.000166	0.11	12.18	80.54	0.07	0.08	0.07	0.07
RA31	RA31	315	5yr	0.45	89.39	89.70		89.70	0.000022	0.04	14.94	84.96	0.02	0.03	0.03	0.03
RA31	RA31	315	10yr	0.56	89.39	89.70		89.70	0.000030	0.05	15.54	85.32	0.03	0.04	0.03	0.03
RA31	RA31	315	100yr	0.93	89.39	89.72		89.72	0.000068	0.08	16.59	85.95	0.04	0.06	0.05	0.05
RA31	RA31	314.9	5yr	0.45	89.18	89.70	89.39	89.70	0.000018	0.05	15.49	84.95	0.02	0.03	0.03	0.03
RA31	RA31	314.9	10yr	0.56	89.18	89.70	89.41	89.70	0.000025	0.05	16.09	85.31	0.03	0.03	0.03	0.03
RA31	RA31	314.9	100yr	0.93	89.18	89.72	89.48	89.72	0.000058	0.08	17.12	85.93	0.04	0.05	0.05	0.05
RA31	RA31	314.8		Culvert												
RA31	RA31	314.5	5yr	0.45	89.24	89.42	89.42	89.49	0.044704	1.21	0.37	72.95	0.99	1.21		

HEC-RAS Plan: Proposed V4 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA31	RA31	314.5	10yr	0.56	89.24	89.44	89.44	89.53	0.044264	1.32	0.42	75.98	1.01	1.32		
RA31	RA31	314.5	100yr	0.93	89.24	89.57	89.51	89.57	0.000051	0.06	18.32	88.53	0.04	0.05	0.05	0.05
RA31	RA31	314	5yr	0.45	89.01	89.36	89.12	89.37	0.000926	0.29	1.52	28.71	0.16	0.29		
RA31	RA31	314	10yr	0.56	89.01	89.41	89.14	89.42	0.000901	0.32	1.75	59.11	0.16	0.32		
RA31	RA31	314	100yr	0.93	89.01	89.56	89.19	89.57	0.000849	0.38	2.41	71.91	0.17	0.38		
RA31	RA31	313.5		Culvert												
RA31	RA31	313	5yr	0.45	88.85	89.01	88.96	89.04	0.013742	0.66	0.68	11.48	0.55	0.66		
RA31	RA31	313	10yr	0.56	88.85	89.03	88.98	89.06	0.015125	0.74	0.75	12.34	0.58	0.74		
RA31	RA31	313	100yr	0.93	88.85	89.07	89.03	89.12	0.020552	1.00	0.93	15.37	0.70	1.00		
RA31	RA31	312.90*	5yr	0.45	88.81	88.98		88.99	0.005474	0.35	1.28	11.29	0.33	0.35	0.03	
RA31	RA31	312.90*	10yr	0.56	88.81	89.00		89.01	0.005475	0.38	1.48	12.35	0.34	0.38	0.07	0.01
RA31	RA31	312.90*	100yr	0.93	88.81	89.04		89.05	0.005433	0.46	2.12	16.13	0.35	0.44	0.15	0.12
RA31	RA31	312	5yr	0.45	88.48	88.66		88.67	0.008971	0.48	1.13	13.79	0.43	0.40	0.29	0.24
RA31	RA31	312	10yr	0.56	88.48	88.68		88.69	0.008995	0.51	1.32	14.58	0.44	0.42	0.32	0.27
RA31	RA31	312	100yr	0.93	88.48	88.71		88.73	0.009398	0.62	1.97	21.18	0.46	0.47	0.40	0.26
RA31	RA31	311	5yr	0.45	87.81	88.00	87.97	88.03	0.015357	0.73	0.74	8.14	0.58	0.60	0.32	0.30
RA31	RA31	311	10yr	0.56	87.81	88.02	87.99	88.04	0.014998	0.77	0.93	11.12	0.58	0.60	0.37	0.24
RA31	RA31	311	100yr	0.93	87.81	88.06	88.04	88.09	0.014033	0.86	1.44	12.99	0.59	0.64	0.47	0.38


RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 317 approximated from lidar
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 316 approximated from lidar
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.91*
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.82*
.05
.05
.05
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
Elevation (m)
Station (m)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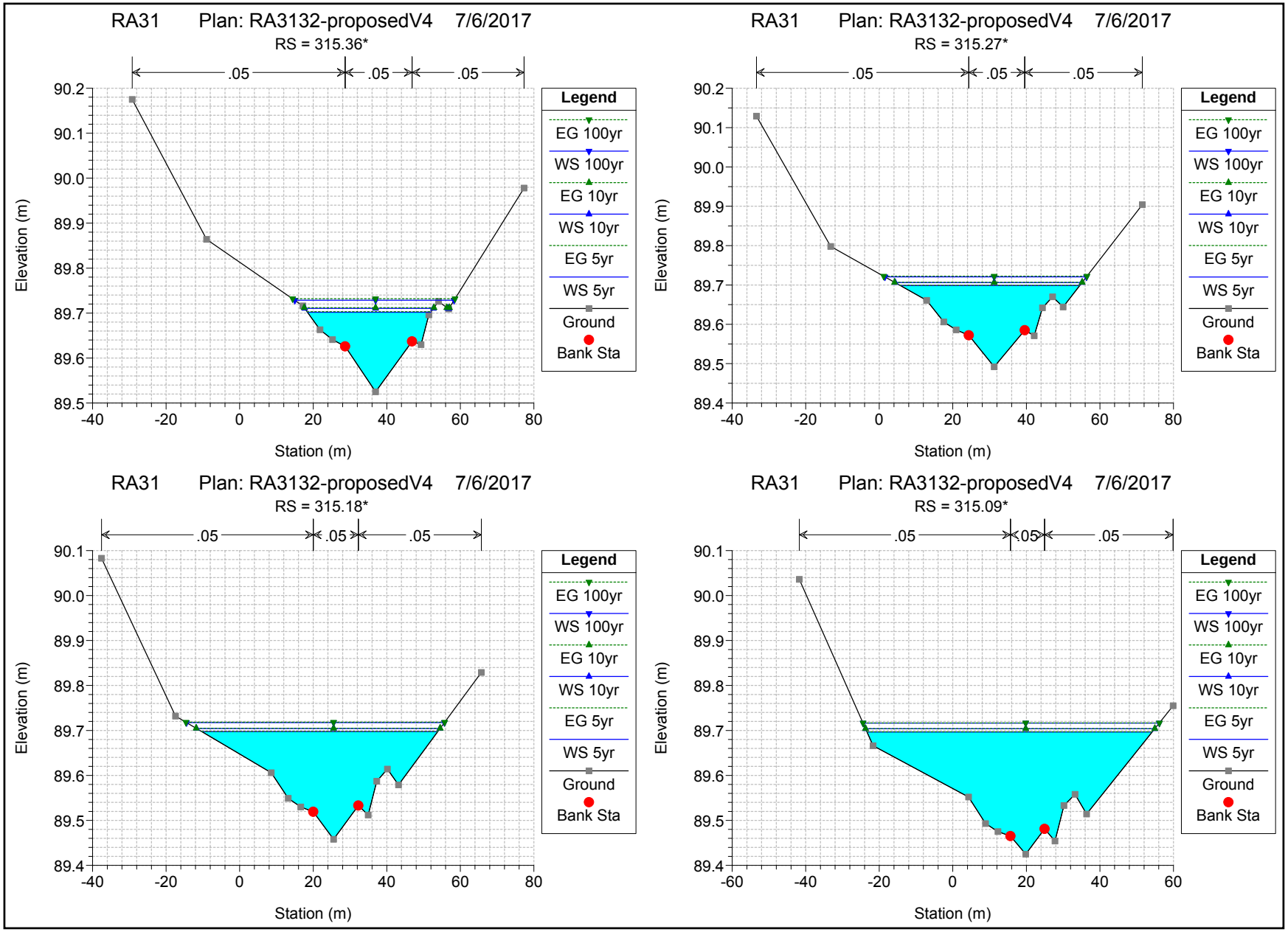
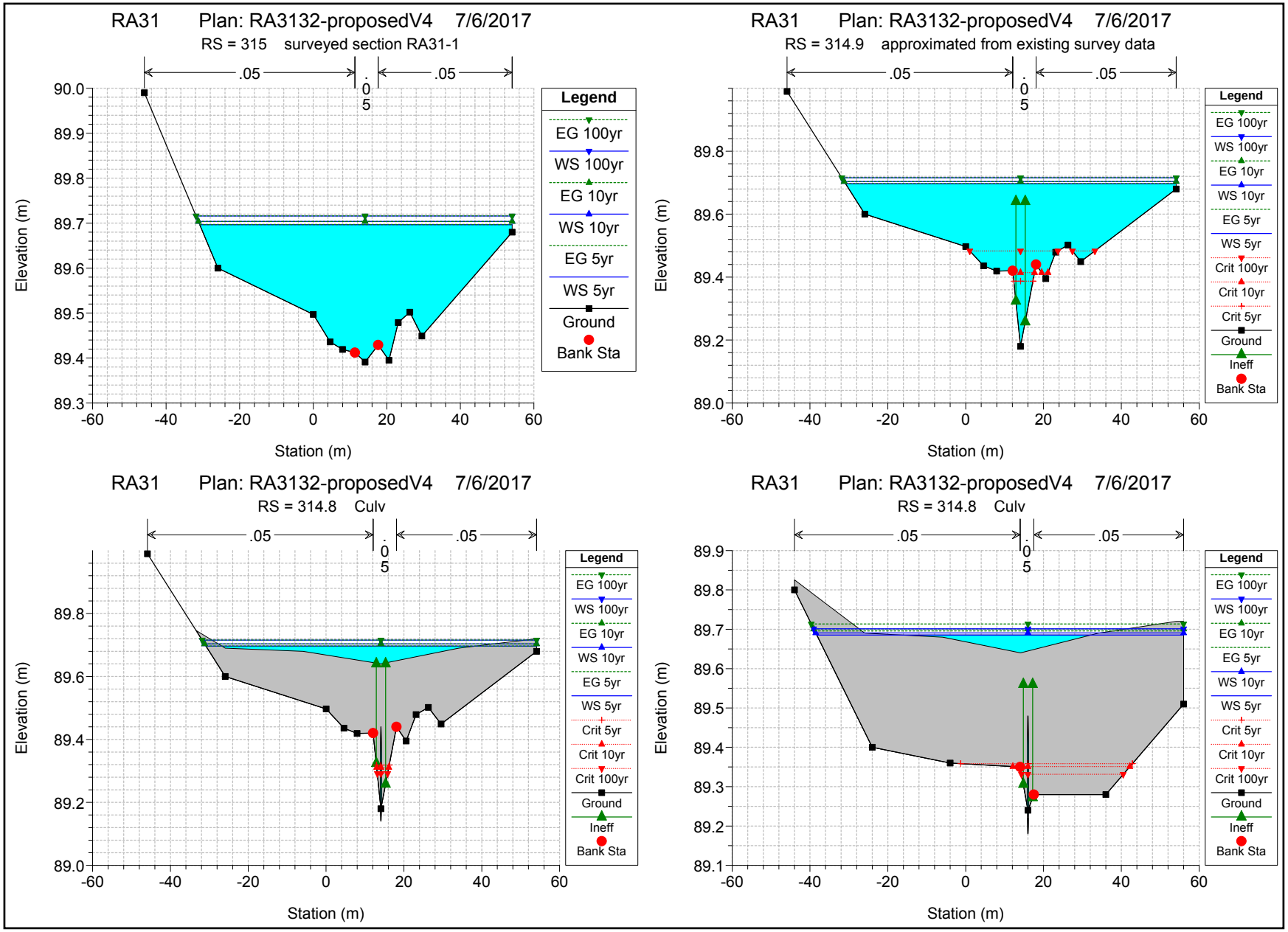
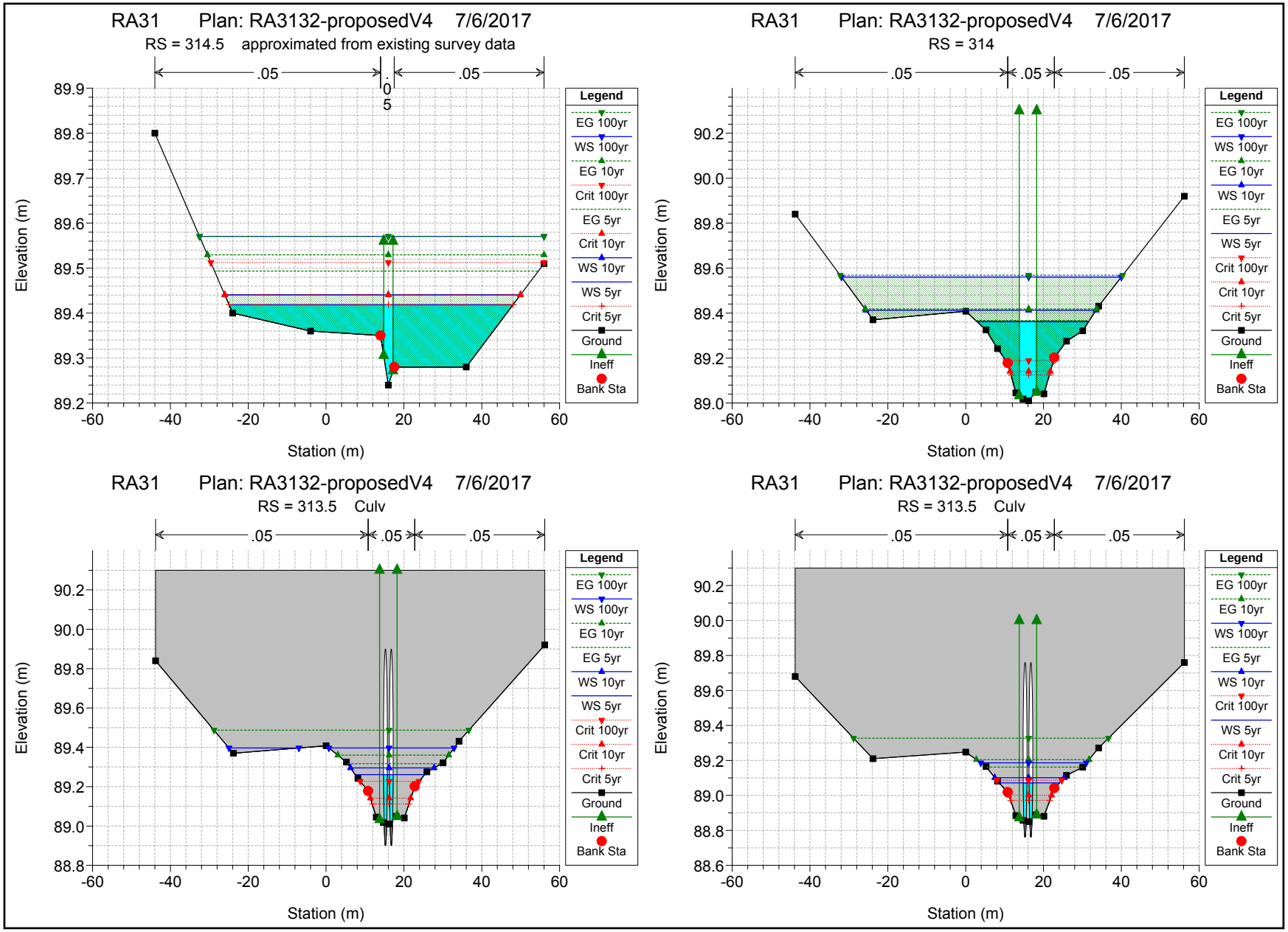
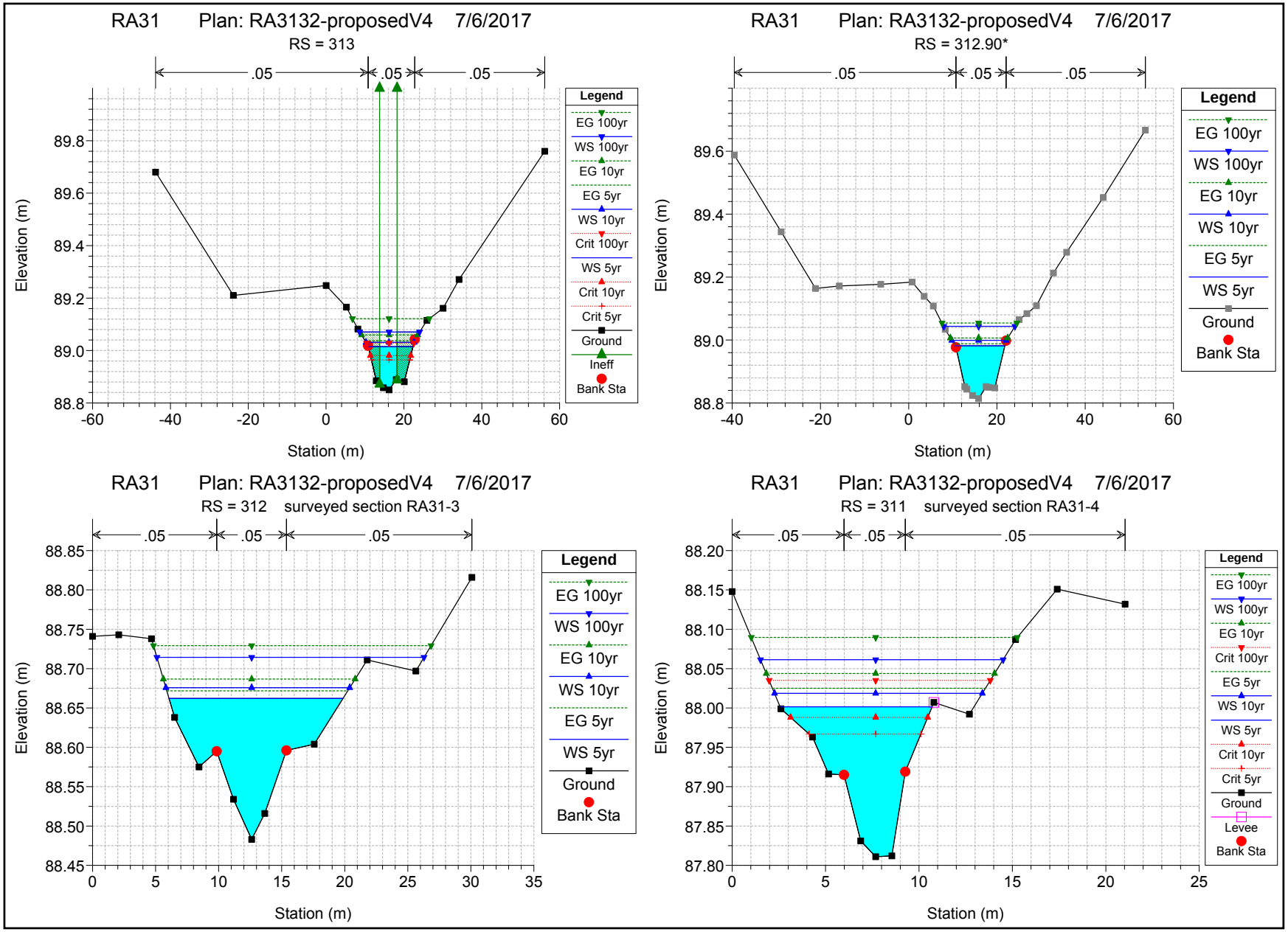
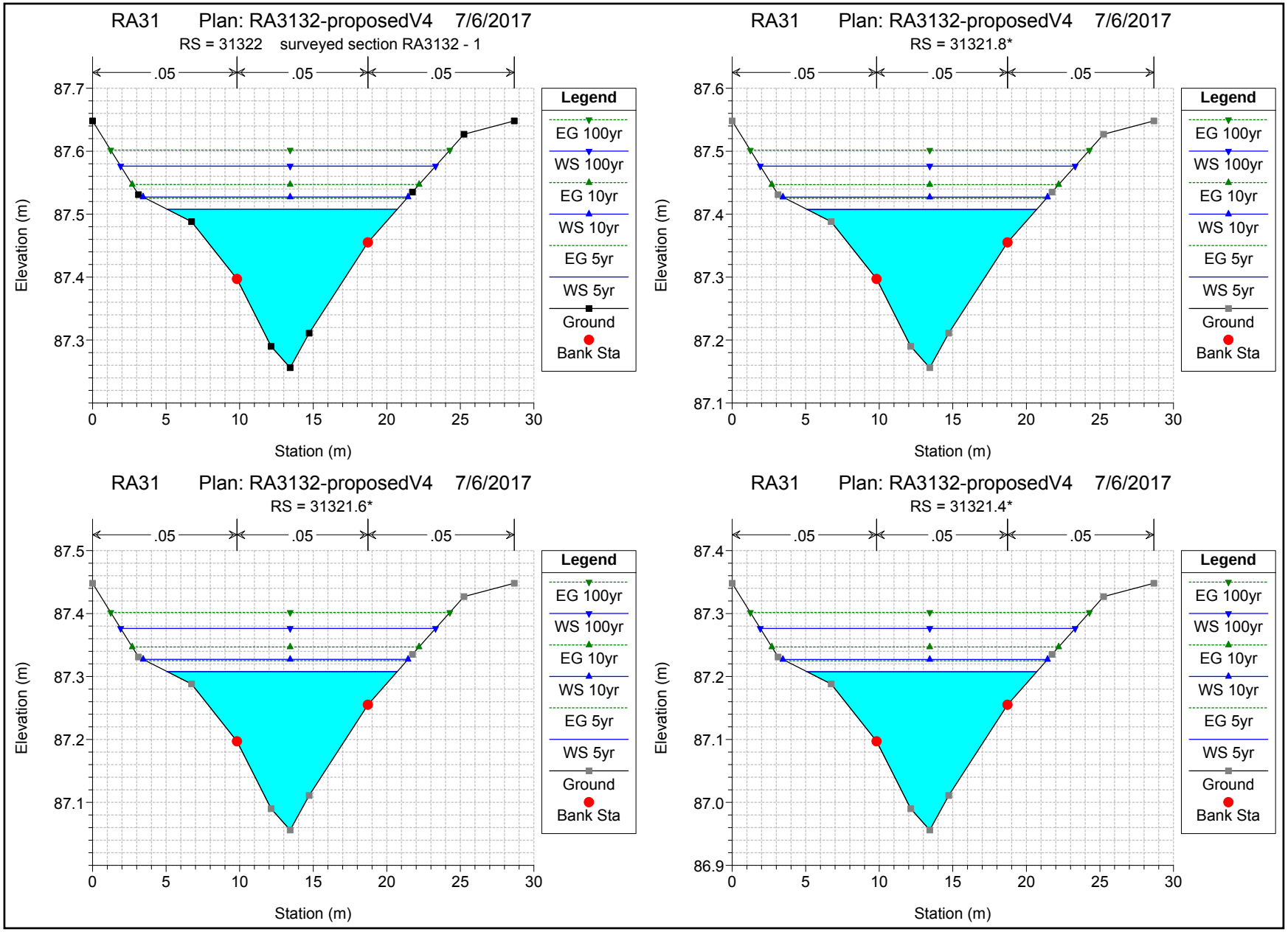
RS = 315.73*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.64*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.55*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.45*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

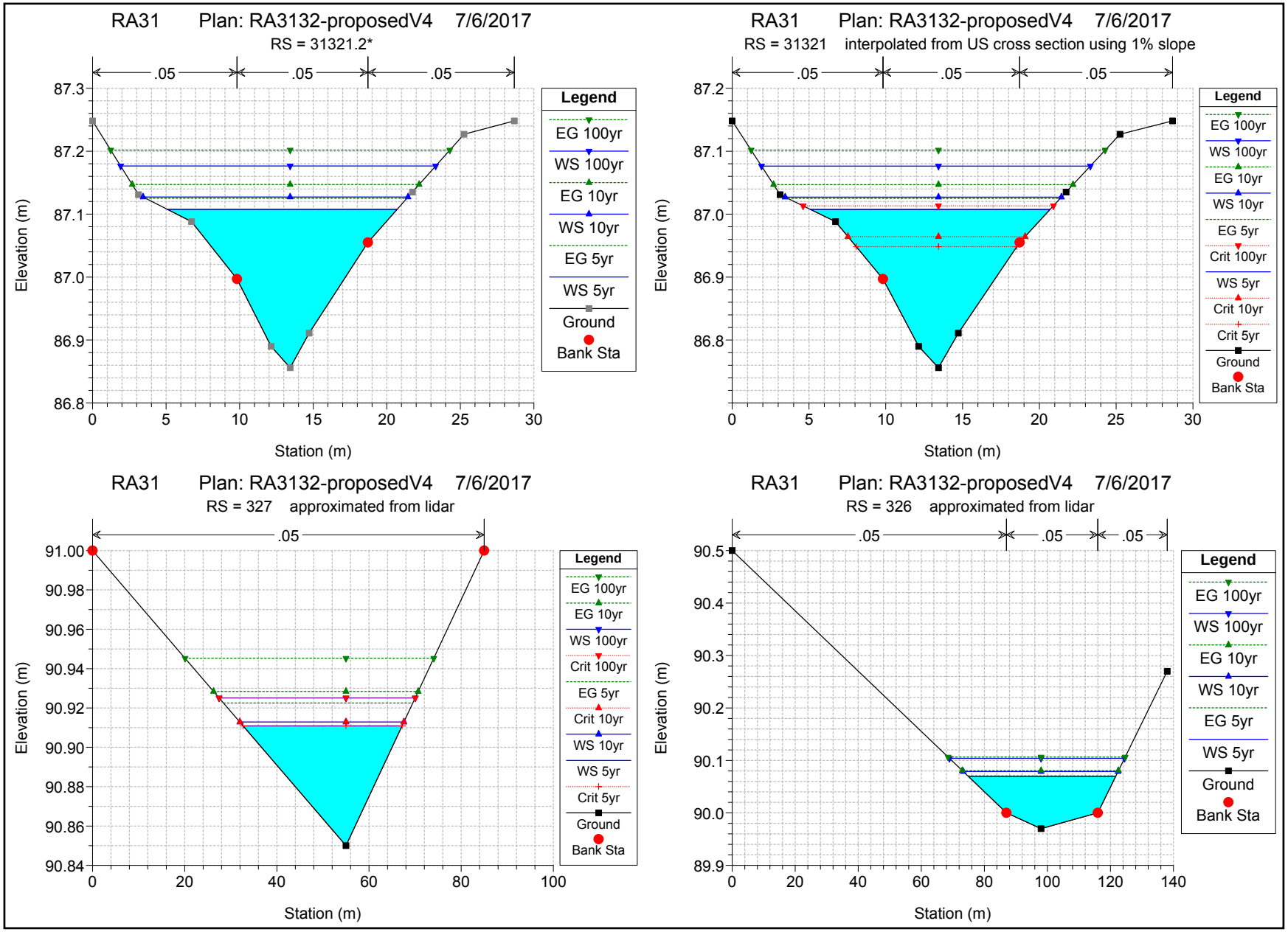

RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.36*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.27*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.18*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315.09*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

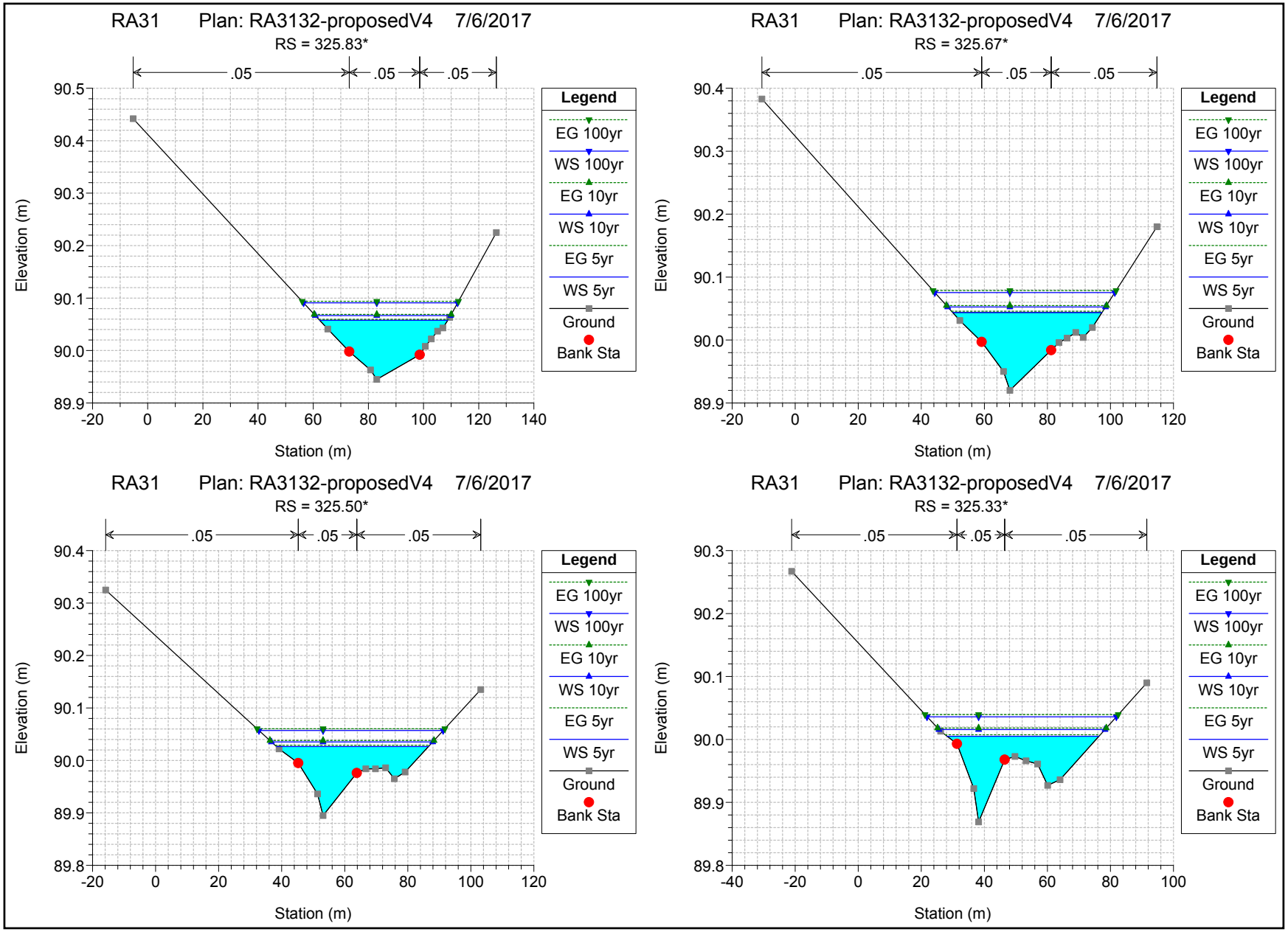

RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 315 surveyed section RA31-1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 314.9 approximated from existing survey data
Crit 100yr
Crit 10yr
Crit 5yr
Ineff
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 314.8 Culv
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 314.8 Culv

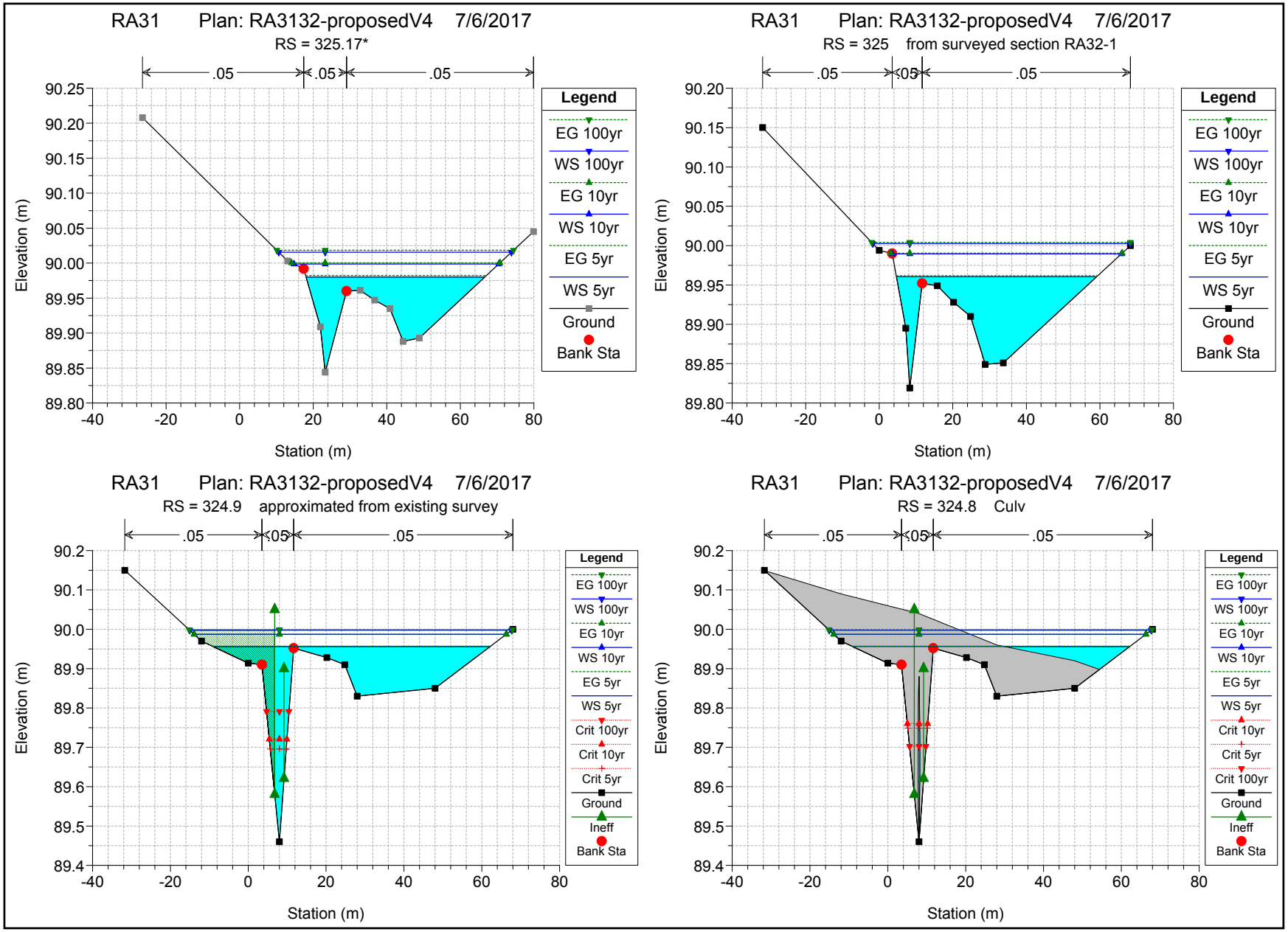

RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 314.5 approximated from existing survey data
.05
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
Crit 100yr
EG 5yr
Crit 10yr
WS 10yr
WS 5yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 314
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 313.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 313.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
EG 5yr
WS 10yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta

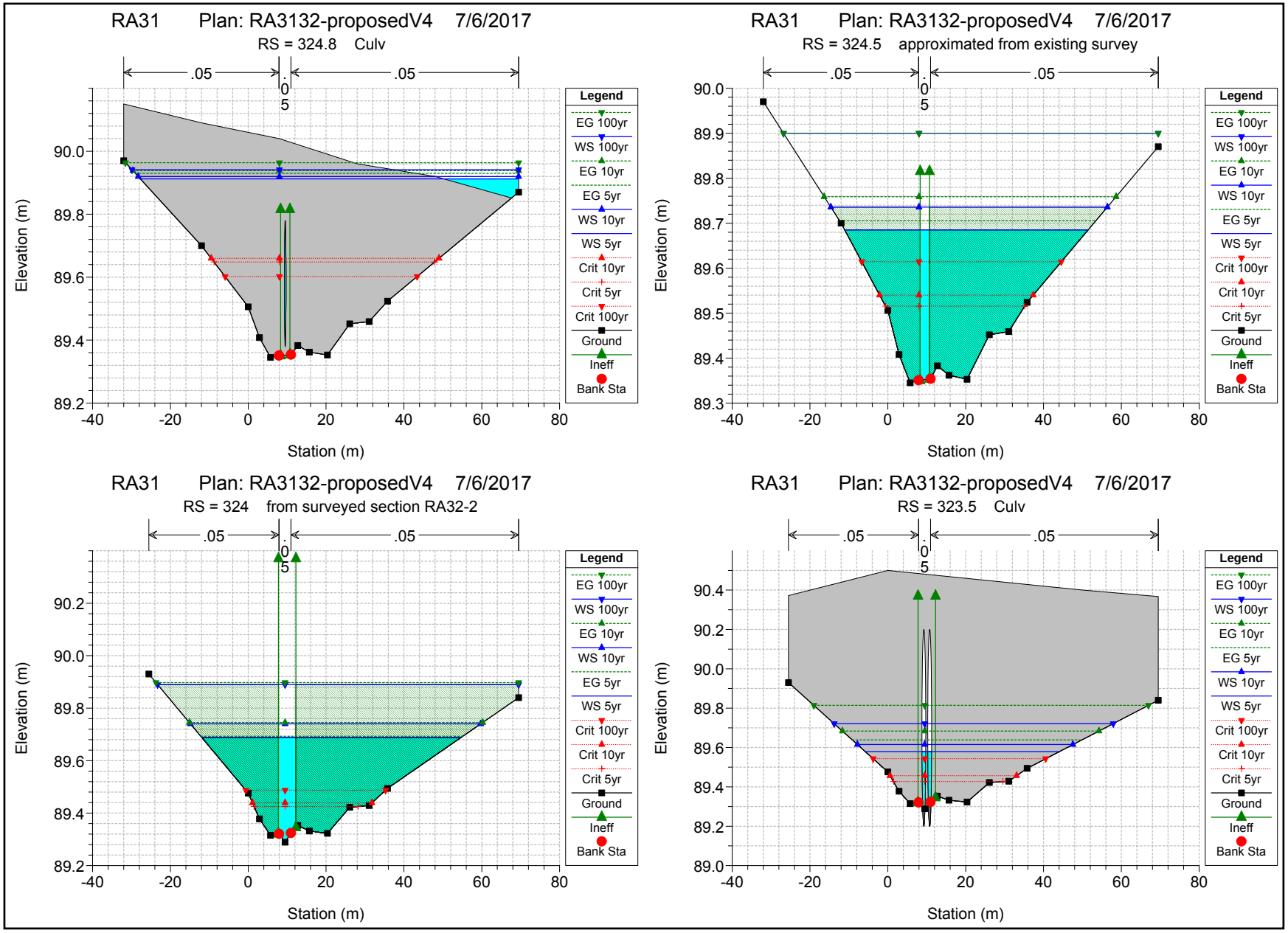

RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 313
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 312.90*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 312 surveyed section RA31-3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 311 surveyed section RA31-4
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
Crit 100yr
EG 5yr
WS 10yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Levee
Bank Sta

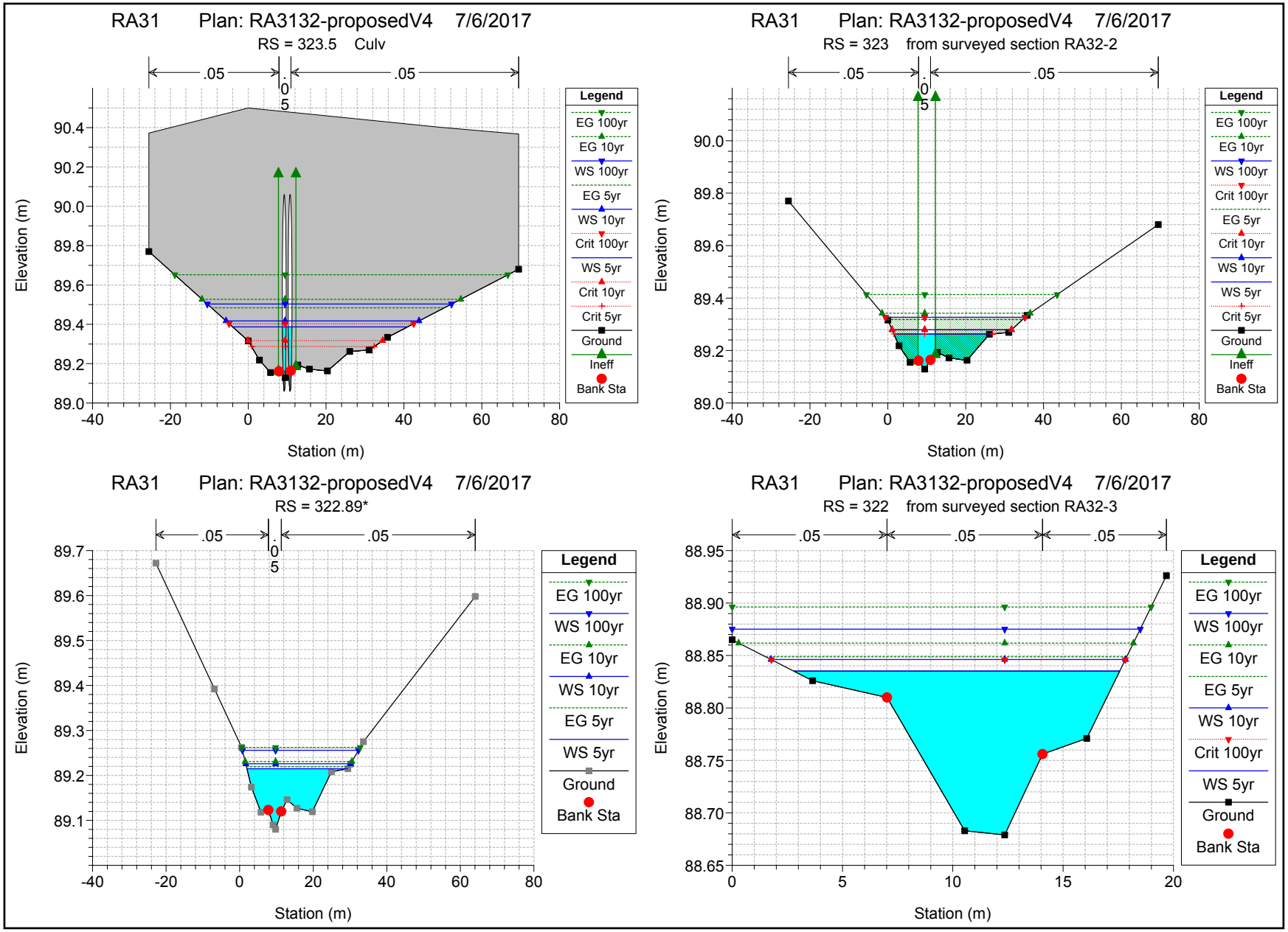

RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 31322 surveyed section RA3132 - 1
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 31321.8*
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 31321.6*
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 31321.4*

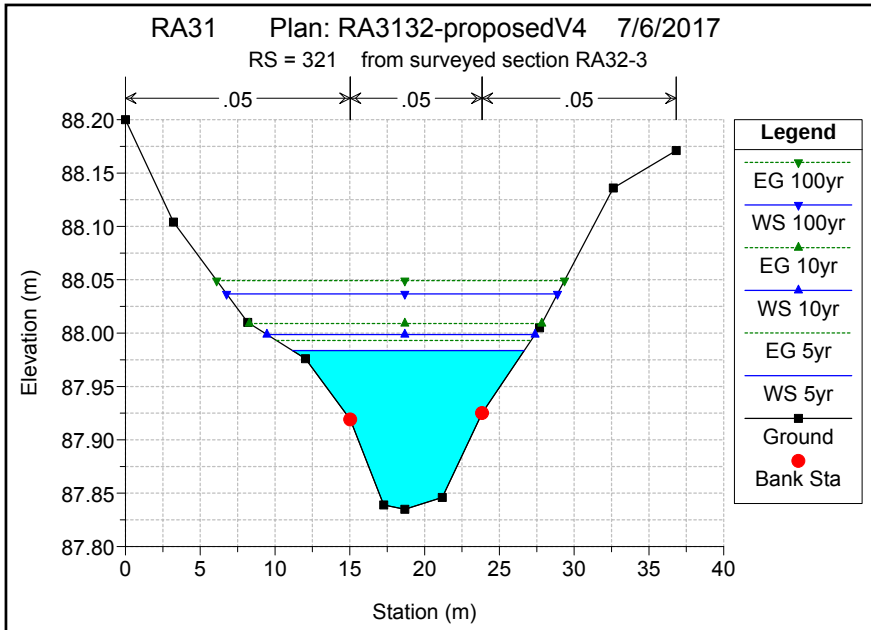

RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 31321.2*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 31321 interpolated from US cross section using 1% slope
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 327 approximated from lidar
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
Crit 100yr
EG 5yr
Crit 10yr
WS 10yr
WS 5yr
Crit 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 326 approximated from lidar
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta


RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 325.83*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 325.67*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 325.50*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 325.33*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta


RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 325.17*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 325 from surveyed section RA32-1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 324.9 approximated from existing survey
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 324.8 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Crit 10yr
Crit 5yr
Crit 100yr
Ground
Ineff
Bank Sta


RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 324.8 Culv
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 324.5 approximated from existing survey
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 324 from surveyed section RA32-2
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 323.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
EG 5yr
WS 10yr
WS 5yr
Crit 100yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta


RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 323.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100yr
EG 10yr
WS 100yr
EG 5yr
WS 10yr
Crit 100yr
WS 5yr
Crit 10yr
Crit 5yr
Ground
Ineff
Bank Sta
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 323 from surveyed section RA32-2
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 322.89*
RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 322 from surveyed section RA32-3


RA31 Plan: RA3132-proposedV4 7/6/2017
RS = 321 from surveyed section RA32-3
.05
.05
.05
88.20
88.15
88.10
88.05
88.00
87.95
87.90
87.85
87.80
Elevation (m)
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG 100yr
WS 100yr
EG 10yr
WS 10yr
EG 5yr
WS 5yr
Ground
Bank Sta

RA33 – HYDRAULIC MODELING

CONTRACTOR TO MAINTAIN EXISTING DRAINAGE FLOWS AS REQUIRED

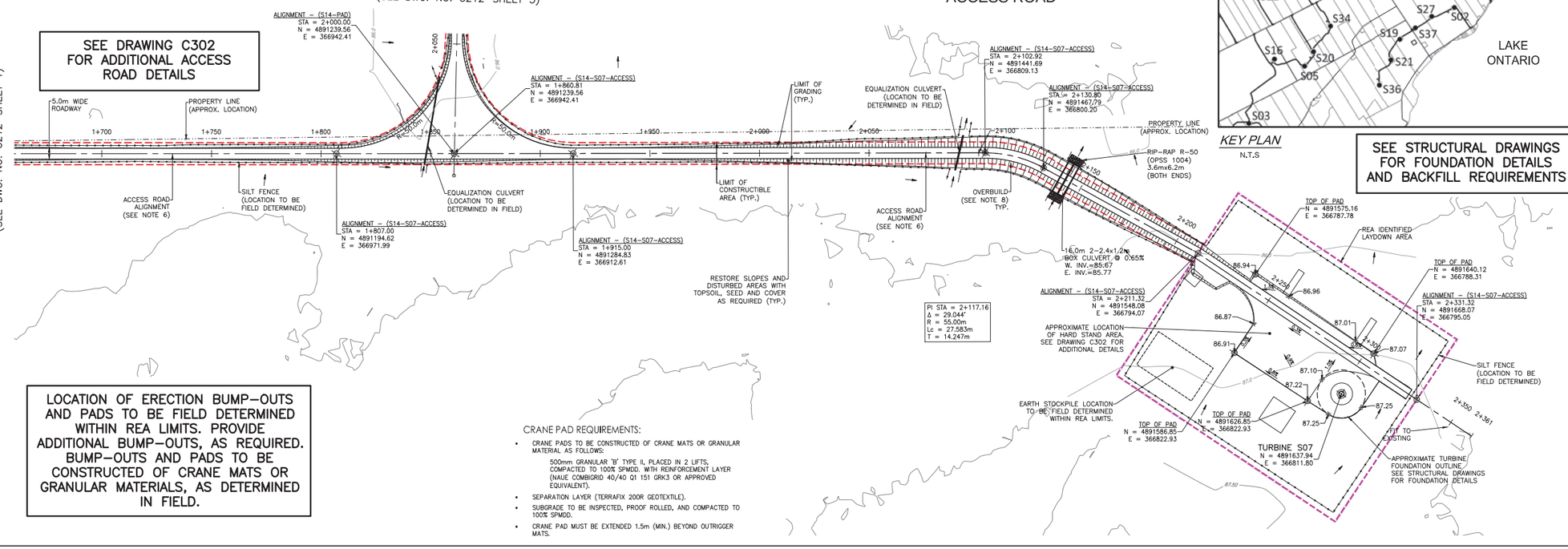
S14
ACCESS ROAD

(SEE DWG. NO. C212–SHEET 3)

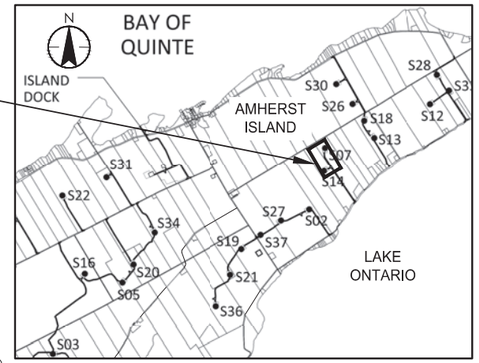
S07
ACCESS ROAD

SEE DRAWING C302 FOR ADDITIONAL ACCESS ROAD DETAILS

LOCATION OF ERECTION BUMP–OUTS AND PADS TO BE FIELD DETERMINED WITHIN REA LIMITS. PROVIDE ADDITIONAL BUMP–OUTS, AS REQUIRED. BUMP–OUTS AND PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIALS, AS DETERMINED IN FIELD.



PLAN
LOCATION

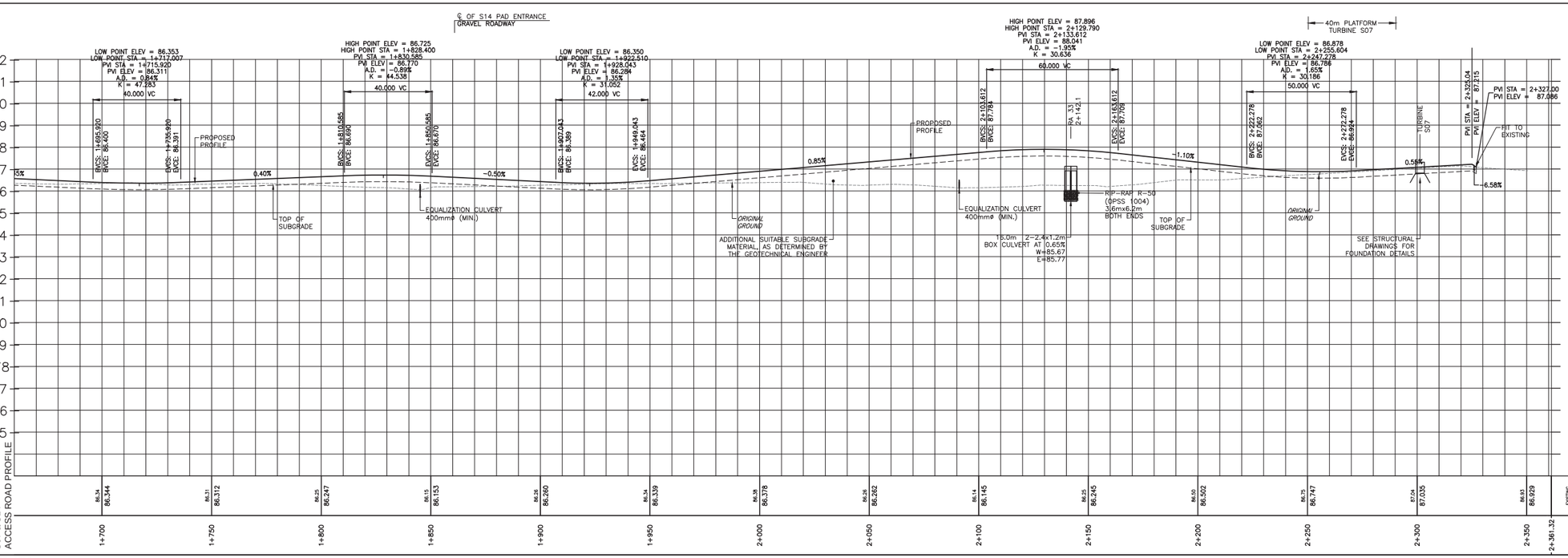


KEY PLAN
N.T.S

SEE STRUCTURAL DRAWINGS FOR FOUNDATION DETAILS AND BACKFILL REQUIREMENTS

CRANE PAD REQUIREMENTS:

- CRANE PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIAL AS FOLLOWS:
  500mm GRANULAR 'B' TYPE II, PLACED IN 2 LIFTS, COMPACTED TO 100% SPMDD. WITH REINFORCEMENT LAYER (NAUE COMBIGRID 40/40 Q1 151 GRK3 OR APPROVED EQUIVALENT).
- SEPARATION LAYER (TERRAFIX 200R GEOTEXTILE).
- SUBGRADE TO BE INSPECTED, PROOF ROLLED, AND COMPACTED TO 100% SPMDD.
- CRANE PAD MUST BE EXTENDED 1.5m (MIN.) BEYOND OUTRIGGER MATS.



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

☐ Reviewed - No comments
☐ Reviewed - Incorporate comments and resubmit
☐ Reviewed - Not accepted

Reviewed By	Date [dd-mmm-yyyy]
Project Manager - PHCL	Date [dd-mmm-yyyy]
Project Manager - Windlectric	Date [dd-mmm-yyyy]
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL/DH	MPG	16.02.02
Revision		By	Appd.	YY.MM.DD

File Name: C212_133560100-turbine-S07-S14.DWG		RCL/DH	MPG	RCL 15.12.03
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

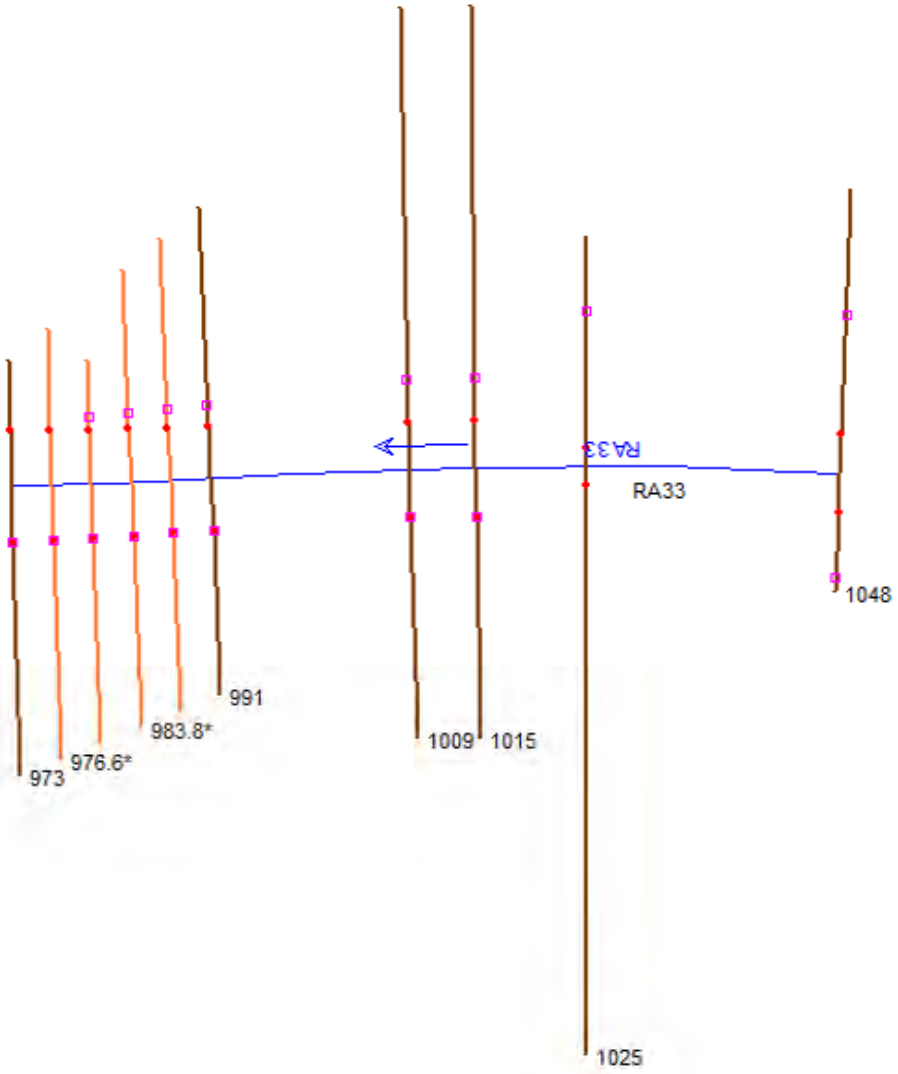
ACCESS ROAD
TURBINE S07 AND S14
PLAN AND PROFILE

Project No.	Scale	Sheet	Revision
133560100	1:1000H 1:100V	2 of 3	B

Drawing No. C212

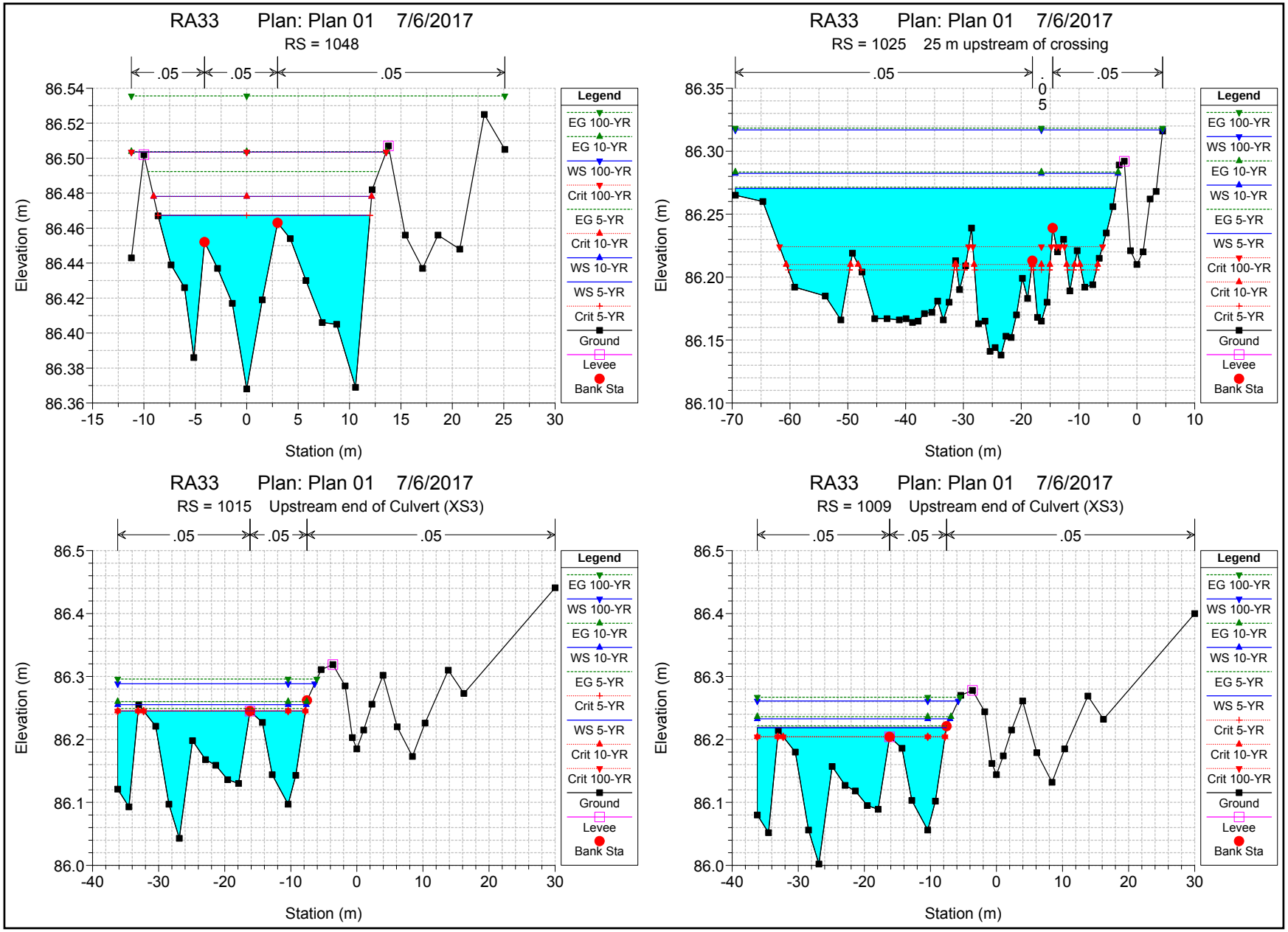
V:\01450\active\133560100\10_drawings\10.4_sheet_files\05_arvw\C212_133560100-turbine S07-S14.dwg
2017.06.22 6:17 PM By: laguerrie, Bob

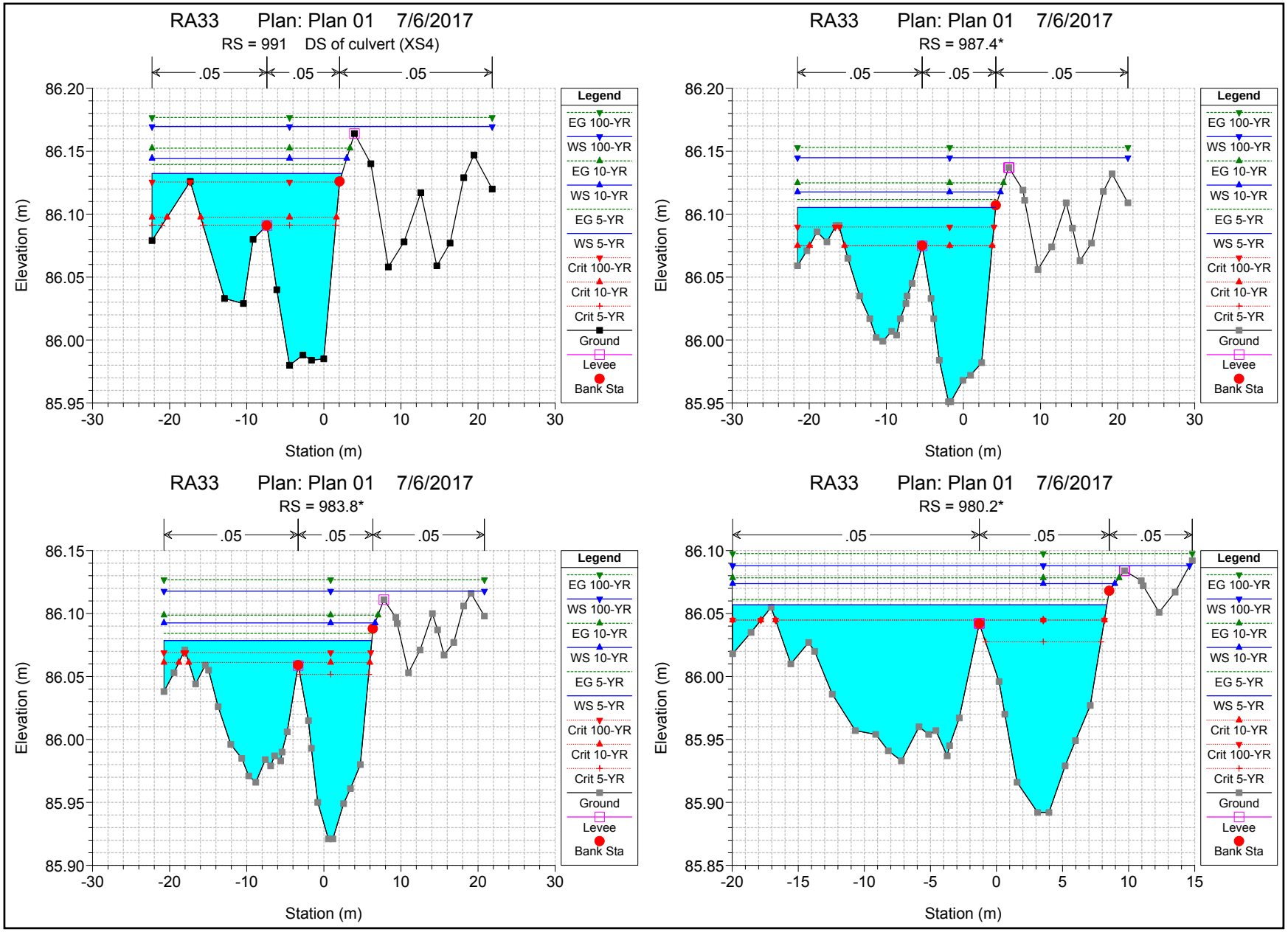
ORIGINAL SHEET - ARCH D

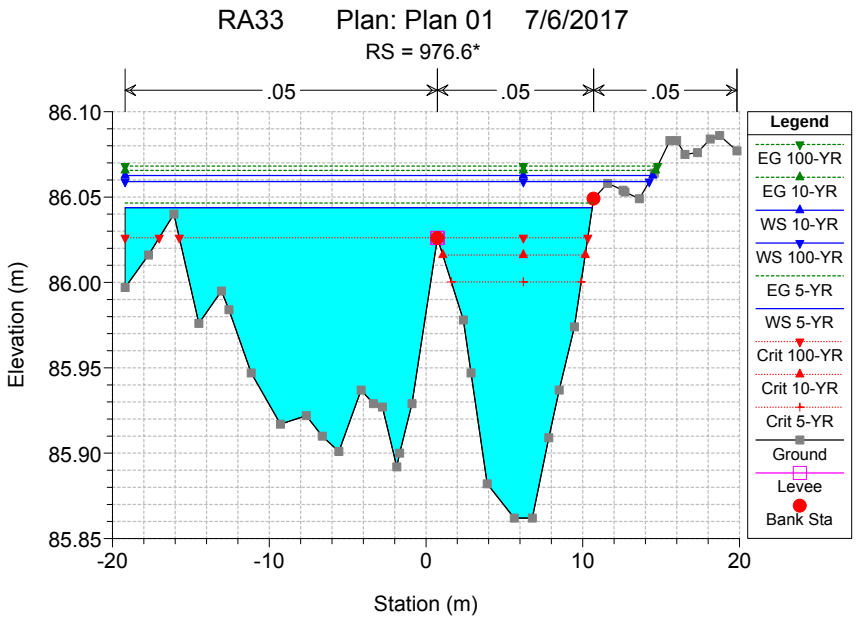

RA33
RA33
1048
991
983.8*
976.6*
973
1009
1015
1025

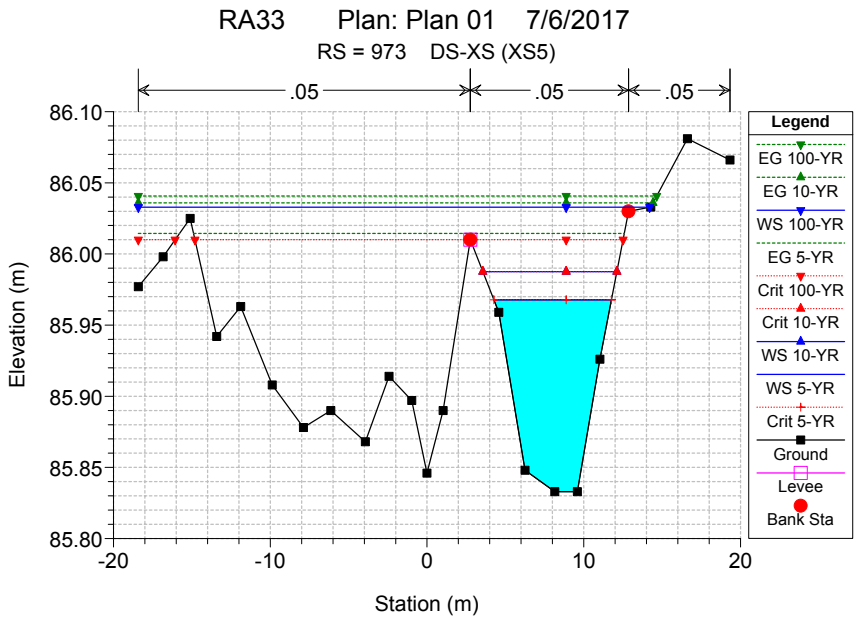
HEC-RAS Plan: Existing River: RA33 Reach: RA33

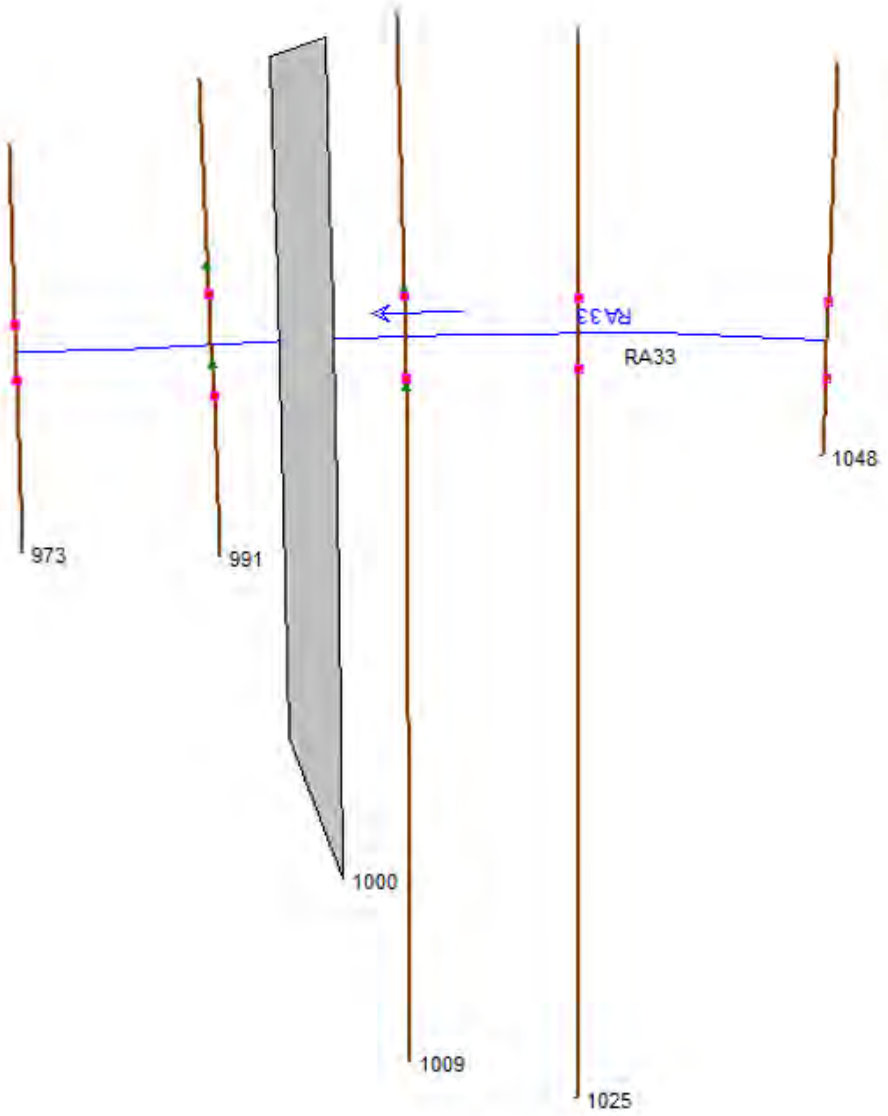
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA33	1048	5-YR	0.66	86.37	86.47	86.47	86.49	0.073872	0.72	0.94	20.63	1.05	0.70	0.61	0.72
RA33	1048	10-YR	0.82	86.37	86.48	86.48	86.50	0.058363	0.73	1.17	21.21	0.96	0.70	0.61	0.72
RA33	1048	100-YR	1.39	86.37	86.50	86.50	86.54	0.050226	0.86	1.77	24.78	0.95	0.78	0.65	0.79
RA33	1025	5-YR	0.66	86.17	86.27	86.21	86.27	0.001373	0.14	4.94	65.78	0.16	0.13	0.14	0.11
RA33	1025	10-YR	0.82	86.17	86.28	86.21	86.28	0.001334	0.15	5.72	66.17	0.16	0.14	0.15	0.12
RA33	1025	100-YR	1.39	86.17	86.32	86.22	86.32	0.001157	0.18	8.50	73.90	0.15	0.16	0.17	0.13
RA33	1015	5-YR	0.66	86.10	86.25	86.25	86.25	0.004849	0.25	2.40	27.57	0.29	0.27	0.28	
RA33	1015	10-YR	0.82	86.10	86.26	86.25	86.26	0.005561	0.28	2.68	28.55	0.31	0.31	0.32	
RA33	1015	100-YR	1.39	86.10	86.29	86.25	86.30	0.005753	0.36	3.65	29.81	0.34	0.38	0.39	0.08
RA33	1009	5-YR	0.66	86.06	86.22	86.20	86.22	0.003044	0.22	2.80	28.62	0.23	0.23	0.24	
RA33	1009	10-YR	0.82	86.06	86.23	86.20	86.24	0.003062	0.24	3.21	29.17	0.24	0.26	0.26	0.04
RA33	1009	100-YR	1.39	86.06	86.26	86.20	86.27	0.004086	0.33	4.06	30.41	0.29	0.34	0.35	0.09
RA33	991	5-YR	0.66	85.98	86.13	86.09	86.14	0.007519	0.41	1.91	24.64	0.39	0.34	0.25	0.04
RA33	991	10-YR	0.82	85.98	86.14	86.10	86.15	0.007608	0.44	2.21	25.27	0.40	0.37	0.29	0.08
RA33	991	100-YR	1.39	85.98	86.17	86.13	86.18	0.006246	0.45	4.01	44.13	0.37	0.35	0.32	0.24
RA33	987.4*	5-YR	0.66	85.95	86.11	86.07	86.11	0.007715	0.40	1.97	25.70	0.39	0.33	0.26	
RA33	987.4*	10-YR	0.82	85.95	86.12	86.07	86.12	0.007592	0.42	2.29	26.31	0.39	0.36	0.30	0.05
RA33	987.4*	100-YR	1.39	85.95	86.14	86.09	86.15	0.007059	0.47	3.77	42.85	0.39	0.37	0.35	0.21
RA33	983.8*	5-YR	0.66	85.92	86.08	86.05	86.08	0.007420	0.38	2.05	26.97	0.38	0.32	0.27	
RA33	983.8*	10-YR	0.82	85.92	86.09	86.06	86.10	0.006849	0.39	2.43	27.39	0.37	0.34	0.29	0.03
RA33	983.8*	100-YR	1.39	85.92	86.12	86.07	86.13	0.007806	0.48	3.53	41.58	0.41	0.39	0.38	0.17
RA33	980.2*	5-YR	0.66	85.89	86.06	86.03	86.06	0.005516	0.33	2.31	28.33	0.32	0.28	0.25	
RA33	980.2*	10-YR	0.82	85.89	86.07	86.04	86.08	0.004726	0.33	2.79	28.92	0.31	0.30	0.27	0.03
RA33	980.2*	100-YR	1.39	85.89	86.09	86.04	86.10	0.008412	0.48	3.30	34.58	0.42	0.42	0.40	0.12
RA33	976.6*	5-YR	0.66	85.86	86.04	86.00	86.05	0.002959	0.25	2.86	29.80	0.24	0.23	0.21	
RA33	976.6*	10-YR	0.82	85.86	86.06	86.02	86.07	0.002574	0.26	3.46	33.67	0.23	0.24	0.23	0.04
RA33	976.6*	100-YR	1.39	85.86	86.06	86.03	86.07	0.008117	0.46	3.34	33.44	0.41	0.42	0.39	0.06
RA33	973	5-YR	0.66	85.83	85.97	85.97	86.01	0.055314	0.96	0.69	7.50	1.01	0.96		
RA33	973	10-YR	0.82	85.83	85.99	85.99	86.04	0.051920	0.97	0.85	8.55	0.99	0.97		
RA33	973	100-YR	1.39	85.83	86.03	86.01	86.04	0.007004	0.42	3.54	32.69	0.38	0.39	0.38	0.02


RA33 Plan: Plan 01 7/6/2017
RS = 1048
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
EG 10-YR
WS 100-YR
Crit 100-YR
EG 5-YR
Crit 10-YR
WS 10-YR
WS 5-YR
Crit 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 01 7/6/2017
RS = 1025 25 m upstream of crossing
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 100-YR
Crit 10-YR
Crit 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 01 7/6/2017
RS = 1015 Upstream end of Culvert (XS3)
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
Crit 5-YR
WS 5-YR
Crit 10-YR
Crit 100-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 01 7/6/2017
RS = 1009 Upstream end of Culvert (XS3)
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 5-YR
Crit 10-YR
Crit 100-YR
Ground
Levee
Bank Sta


RA33 Plan: Plan 01 7/6/2017
RS = 991 DS of culvert (XS4)
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 100-YR
Crit 10-YR
Crit 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 01 7/6/2017
RS = 987.4*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 100-YR
Crit 10-YR
Crit 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 01 7/6/2017
RS = 983.8*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 100-YR
Crit 10-YR
Crit 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 01 7/6/2017
RS = 980.2*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 10-YR
Crit 100-YR
Crit 5-YR
Ground
Levee
Bank Sta


RA33 Plan: Plan 01 7/6/2017
RS = 976.6*
.05
.05
.05
86.10
86.05
86.00
85.95
85.90
85.85
Elevation (m)
-20
-10
0
10
20
Station (m)
Legend
EG 100-YR
EG 10-YR
WS 10-YR
WS 100-YR
EG 5-YR
WS 5-YR
Crit 100-YR
Crit 10-YR
Crit 5-YR
Ground
Levee
Bank Sta

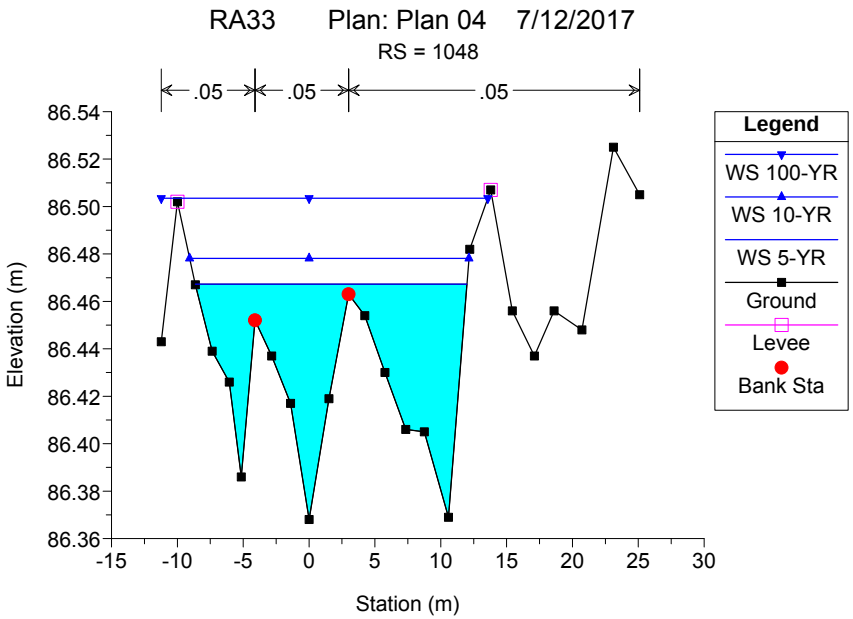

RA33 Plan: Plan 01 7/6/2017
RS = 973 DS-XS (XS5)
.05
.05
.05
86.10
86.05
86.00
85.95
85.90
85.85
85.80
Elevation (m)
-20
-10
0
10
20
Station (m)
Legend
EG 100-YR
EG 10-YR
WS 100-YR
EG 5-YR
Crit 100-YR
Crit 10-YR
WS 10-YR
WS 5-YR
Crit 5-YR
Ground
Levee
Bank Sta

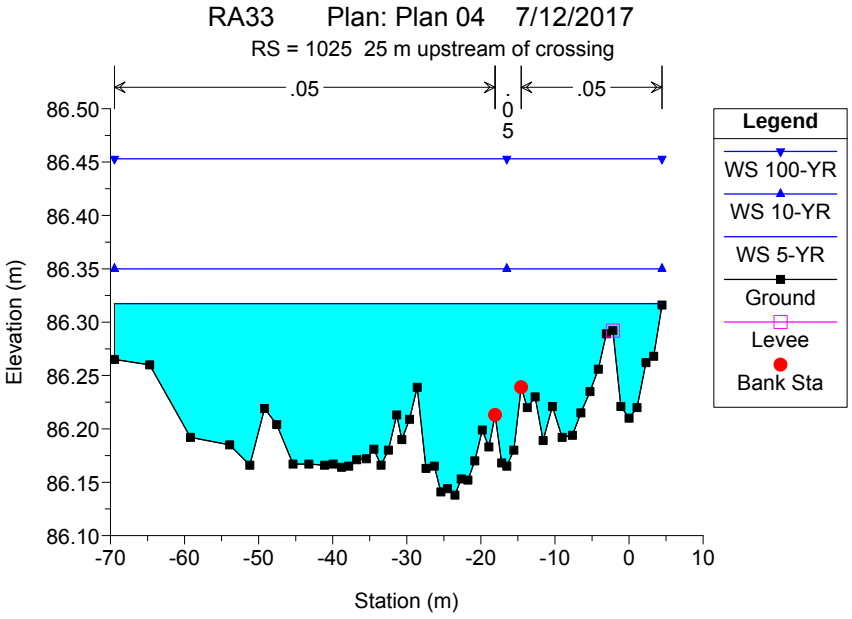

RA33
RA33
973
991
1000
1009
1025
1048

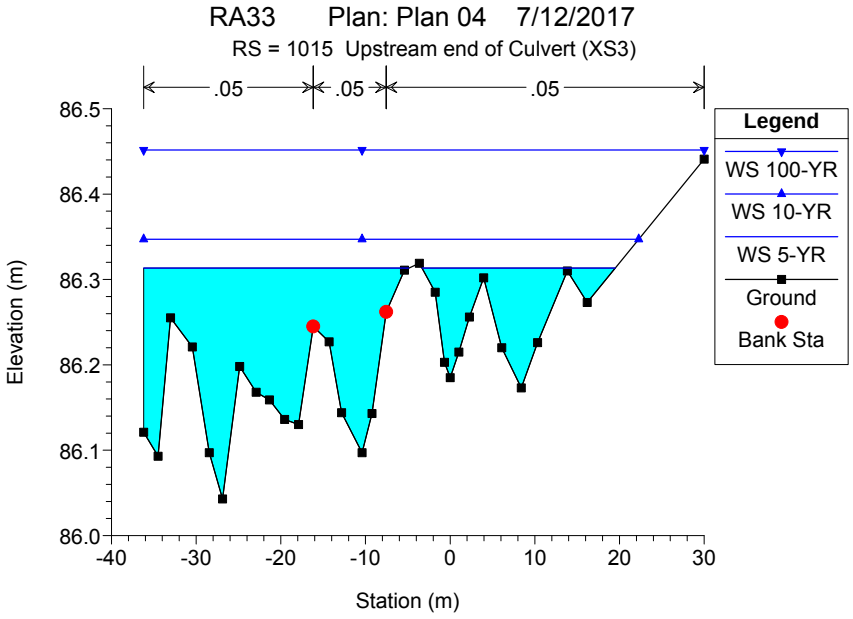
HEC-RAS Plan: Plan4_DBL River: RA33 Reach: RA33

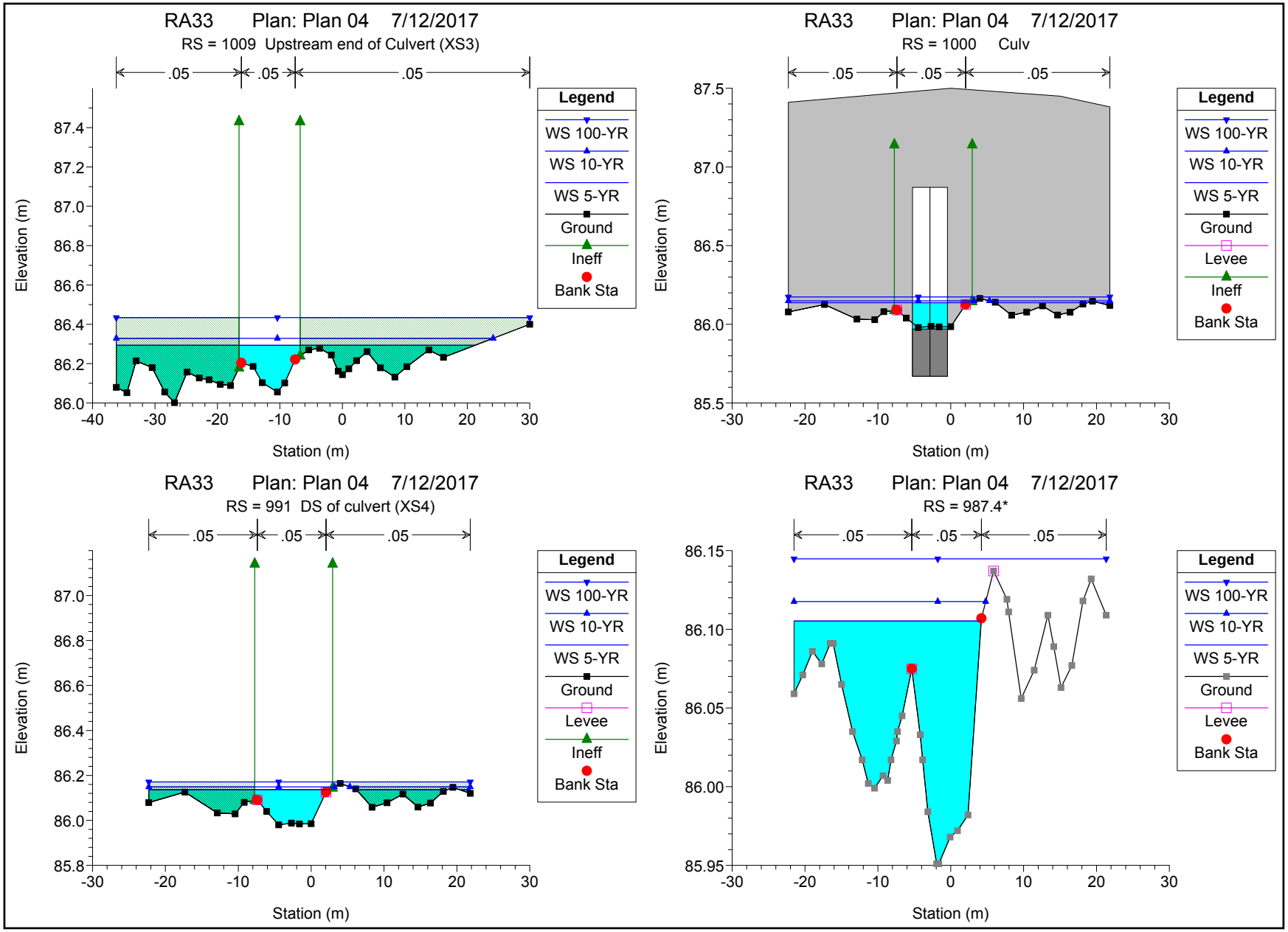
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA33	1048	5-YR	0.66	86.37	86.47	86.47	86.49	0.073872	0.72	0.94	20.63	1.05	0.70	0.61	0.72
RA33	1048	10-YR	0.82	86.37	86.48	86.48	86.50	0.058363	0.73	1.17	21.21	0.96	0.70	0.61	0.72
RA33	1048	100-YR	1.39	86.37	86.50	86.50	86.54	0.050226	0.86	1.77	24.78	0.95	0.78	0.65	0.79
RA33	1025	5-YR	0.66	86.17	86.32	86.21	86.32	0.000256	0.08	8.54	73.90	0.07	0.08	0.08	0.06
RA33	1025	10-YR	0.82	86.17	86.35	86.21	86.35	0.000178	0.08	10.94	73.90	0.06	0.08	0.08	0.06
RA33	1025	100-YR	1.39	86.17	86.45	86.22	86.45	0.000088	0.08	18.56	73.90	0.05	0.07	0.08	0.07
RA33	1015	5-YR	0.66	86.10	86.31		86.31	0.000526	0.12	5.73	54.09	0.11	0.11	0.13	0.07
RA33	1015	10-YR	0.82	86.10	86.35		86.35	0.000369	0.12	7.65	58.48	0.09	0.11	0.13	0.07
RA33	1015	100-YR	1.39	86.10	86.45		86.45	0.000170	0.11	14.21	66.20	0.07	0.10	0.11	0.08
RA33	1009	5-YR	0.66	86.06	86.29	86.22	86.30	0.005830	0.45	1.48	57.44	0.36	0.44	0.33	0.24
RA33	1009	10-YR	0.82	86.06	86.33	86.23	86.34	0.004623	0.46	1.83	60.35	0.33	0.45	0.36	0.29
RA33	1009	100-YR	1.39	86.06	86.43	86.27	86.45	0.003008	0.49	2.86	66.20	0.29	0.48	0.43	0.38
RA33	1000		Culvert												
RA33	991	5-YR	0.66	85.98	86.14	86.09	86.15	0.013468	0.57	1.17	38.92	0.52	0.56	0.30	0.07
RA33	991	10-YR	0.82	85.98	86.15	86.11	86.17	0.015417	0.65	1.29	42.01	0.57	0.64	0.38	0.14
RA33	991	100-YR	1.39	85.98	86.17	86.15	86.21	0.025669	0.93	1.53	44.13	0.75	0.91	0.60	0.35
RA33	987.4*	5-YR	0.66	85.95	86.11	86.07	86.11	0.007715	0.40	1.97	25.70	0.39	0.33	0.26	
RA33	987.4*	10-YR	0.82	85.95	86.12	86.07	86.12	0.007592	0.42	2.29	26.31	0.39	0.36	0.30	0.05
RA33	987.4*	100-YR	1.39	85.95	86.14	86.09	86.15	0.007059	0.47	3.77	42.85	0.39	0.37	0.35	0.21
RA33	983.8*	5-YR	0.66	85.92	86.08	86.05	86.08	0.007420	0.38	2.05	26.97	0.38	0.32	0.27	
RA33	983.8*	10-YR	0.82	85.92	86.09	86.06	86.10	0.006849	0.39	2.43	27.39	0.37	0.34	0.29	0.03
RA33	983.8*	100-YR	1.39	85.92	86.12	86.07	86.13	0.007806	0.48	3.53	41.58	0.41	0.39	0.38	0.17
RA33	980.2*	5-YR	0.66	85.89	86.06	86.03	86.06	0.005516	0.33	2.31	28.33	0.32	0.28	0.25	
RA33	980.2*	10-YR	0.82	85.89	86.07	86.04	86.08	0.004726	0.33	2.79	28.92	0.31	0.30	0.27	0.03
RA33	980.2*	100-YR	1.39	85.89	86.09	86.04	86.10	0.008412	0.48	3.30	34.58	0.42	0.42	0.40	0.12
RA33	976.6*	5-YR	0.66	85.86	86.04	86.00	86.05	0.002959	0.25	2.86	29.80	0.24	0.23	0.21	
RA33	976.6*	10-YR	0.82	85.86	86.06	86.02	86.07	0.002574	0.26	3.46	33.67	0.23	0.24	0.23	0.04
RA33	976.6*	100-YR	1.39	85.86	86.06	86.03	86.07	0.008117	0.46	3.34	33.44	0.41	0.42	0.39	0.06
RA33	973	5-YR	0.66	85.83	85.97	85.97	86.01	0.055314	0.96	0.69	7.50	1.01	0.96		
RA33	973	10-YR	0.82	85.83	85.99	85.99	86.04	0.051920	0.97	0.85	8.55	0.99	0.97		
RA33	973	100-YR	1.39	85.83	86.03	86.01	86.04	0.007004	0.42	3.54	32.69	0.38	0.39	0.38	0.02

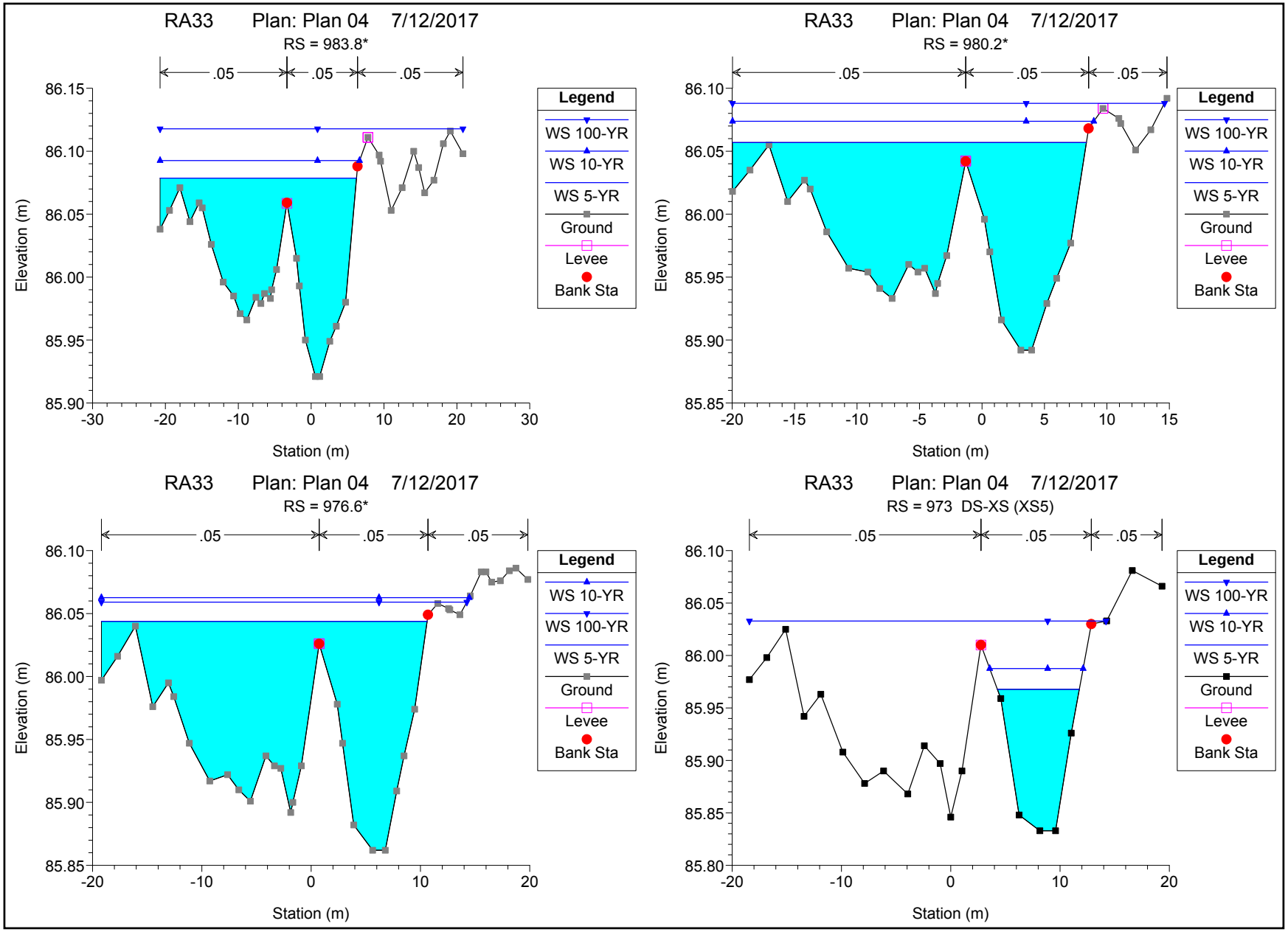
No Data for Plot








RA33 Plan: Plan 04 7/12/2017
RS = 1009 Upstream end of Culvert (XS3)
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Ineff
Bank Sta
RA33 Plan: Plan 04 7/12/2017
RS = 1000 Culv
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Levee
Ineff
Bank Sta
RA33 Plan: Plan 04 7/12/2017
RS = 991 DS of culvert (XS4)
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Levee
Ineff
Bank Sta
RA33 Plan: Plan 04 7/12/2017
RS = 987.4*
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Levee
Bank Sta


RA33 Plan: Plan 04 7/12/2017
RS = 983.8*
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 04 7/12/2017
RS = 980.2*
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 04 7/12/2017
RS = 976.6*
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 10-YR
WS 100-YR
WS 5-YR
Ground
Levee
Bank Sta
RA33 Plan: Plan 04 7/12/2017
RS = 973 DS-XS (XS5)
.05 .05 .05
Elevation (m)
Station (m)
Legend
WS 100-YR
WS 10-YR
WS 5-YR
Ground
Levee
Bank Sta

RA34 – HYDRAULIC MODELING

SEE DRAWING C302
FOR ADDITIONAL ACCESS
ROAD DETAILS

CONTRACTOR TO MAINTAIN
EXISTING DRAINAGE FLOWS
AS REQUIRED

FOR ENTRANCE DETAIL AND
CONSTRUCTION NOTES SEE
"TEMPORARY ENTRANCE
LAYOUT" DRAWING C212–Ent

SOUTH SHORE ROAD

LAKE ONTARIO

S14
ACCESS ROAD

ACCESS ROAD BUMP–OUT
LOCATIONS TO BE
FIELD DETERMINED
(SEE DWG. C302 FOR DETAILS)

RIGHT OF WAY

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+072.95
N = 4890585.02
E = 367380.84

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+080.35
N = 4890590.85
E = 367376.27

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+000.00
N = 4890533.44
E = 367402.36

ALIGNMENT / – (S14–S07–ACCESS)
STA = 1+053.23
N = 4890570.35
E = 367394.01

PI STA = 1+076.66
Δ = 7.715°
R = 55.00m
Lc = 7.400m
T = 3.708m

REMOVAL & REPLACEMENT
OF EXISTING FENCING

OVERBUILD
(SEE NOTE, 8)
TYP.

ACCESS ROAD
ALIGNMENT
(SEE NOTE 6)

RIP–RAP R–50
(OPSS 1004)
2.4mx3.1m
(BOTH ENDS)

14.0m – 560x420mmø
PIPE ARCH @ 1.60%
W. INV.=81.14
E. INV.=80.92

RIP–RAP R–50
(OPSS 1004)
2.4mx3.1m
(BOTH ENDS)

LIMIT OF
GRADING
(TYP.)

5.0m WIDE
ROADWAY

14.0m – 3x500mmø
CULVERT @ 1.00%
W. INV.=82.37
E. INV.=82.23

SILT FENCE
(LOCATION TO BE
FIELD DETERMINED)

RESTORE SLOPES AND
DISTURBED AREAS WITH
TOPSOIL, SEED AND COVER
AS REQUIRED (TYP.)

SILT FENCE
(LOCATION TO BE
FIELD DETERMINED)

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+486.49
N = 4890926.77
E = 367148.00

RIP–RAP R–50
(OPSS 1004)
2.4mx4.6m
(BOTH ENDS)

LIMIT OF
CONSTRUCTIBLE
AREA (TYP.)

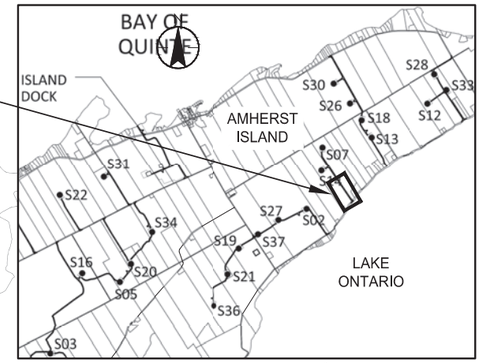
EQUALIZATION CULVERT
(LOCATION TO BE
FIELD DETERMINED)

14.0m – 3X1000mmø
CULVERT @ 1.05%
W. INV.=85.20
E. INV.=85.05

PROPERTY LINE
(APPROX. LOCATION)

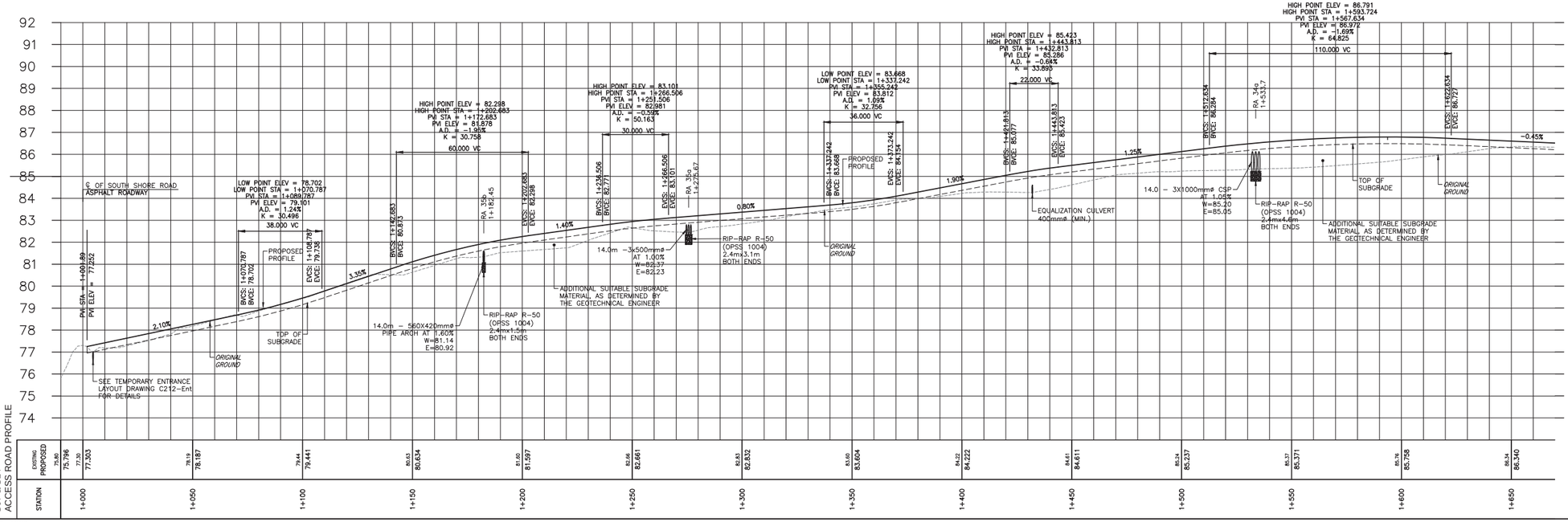
(SEE DWG. NO. C212–SHEET 2)

PLAN
LOCATION



KEY PLAN
N.T.S

S07 & S14
ACCESS ROAD PROFILE



STATION	1+000	1+050	1+100	1+150	1+200	1+250	1+300	1+350	1+400	1+450	1+500	1+550	1+600	1+650
EXISTING	75.80		78.19		79.44		80.61	81.60	82.46		84.22		85.57		86.34
PROPOSED	75.796	77.303	78.187	79.441	80.634	81.597	82.661	82.832	83.604	84.222	84.611	85.237	85.371	85.758	86.340

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 — EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 — PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

☐ Reviewed - No comments
☐ Reviewed - Incorporate comments and resubmit
☐ Reviewed - Not accepted

Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	16.02.02
Revision		By	Appd.	YY.MM.DD

File Name: C212_133560100-turbine S07-S14.DWG	RCL/DH	MPG	RCL	15.12.03
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

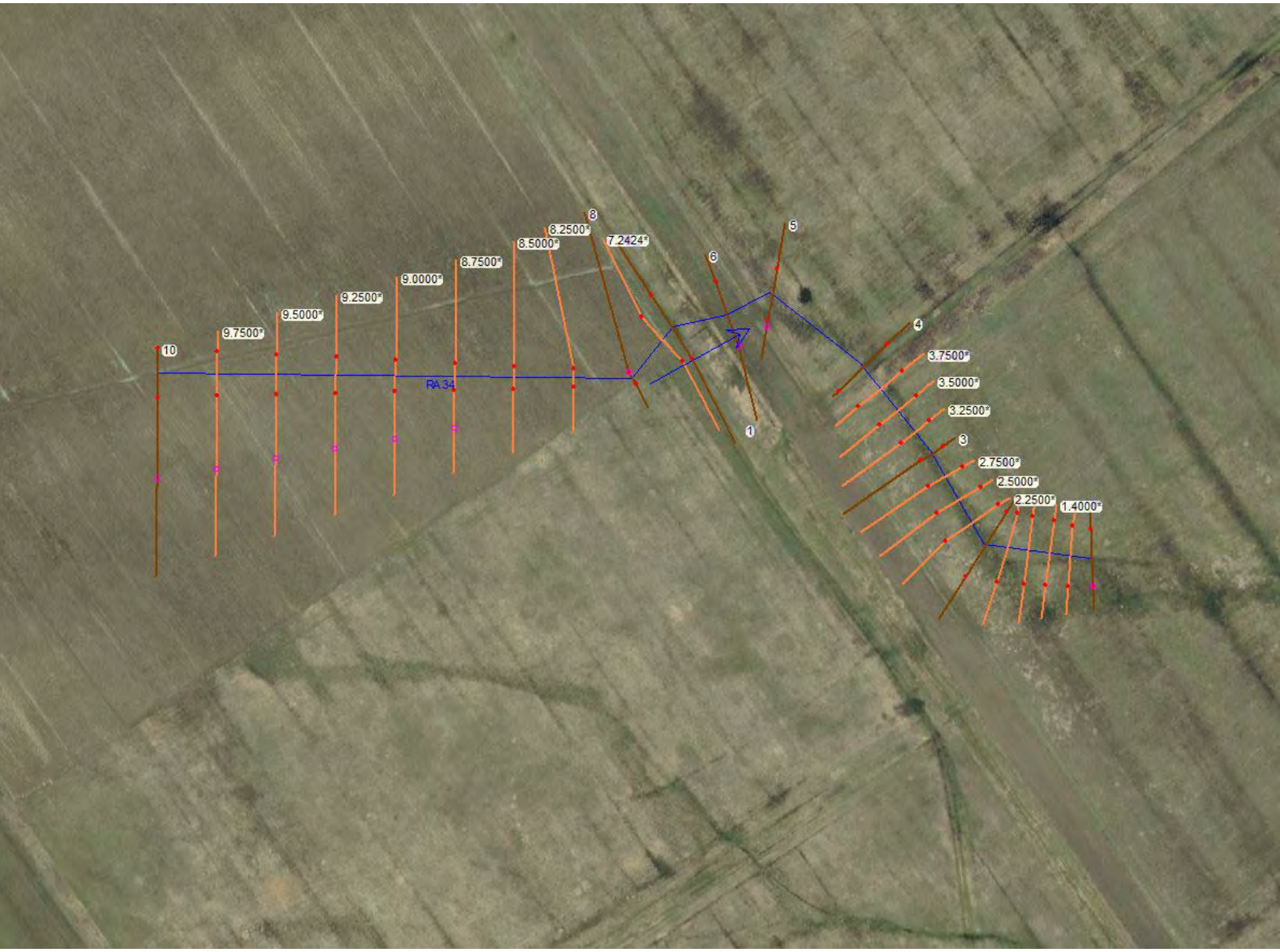
PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

ACCESS ROAD
TURBINE S07 AND S14
PLAN AND PROFILE

Project No.	Scale	Drawing No.	Sheet	Revision
133560100	1:1000H 1:100V	C212	1 of 3	B

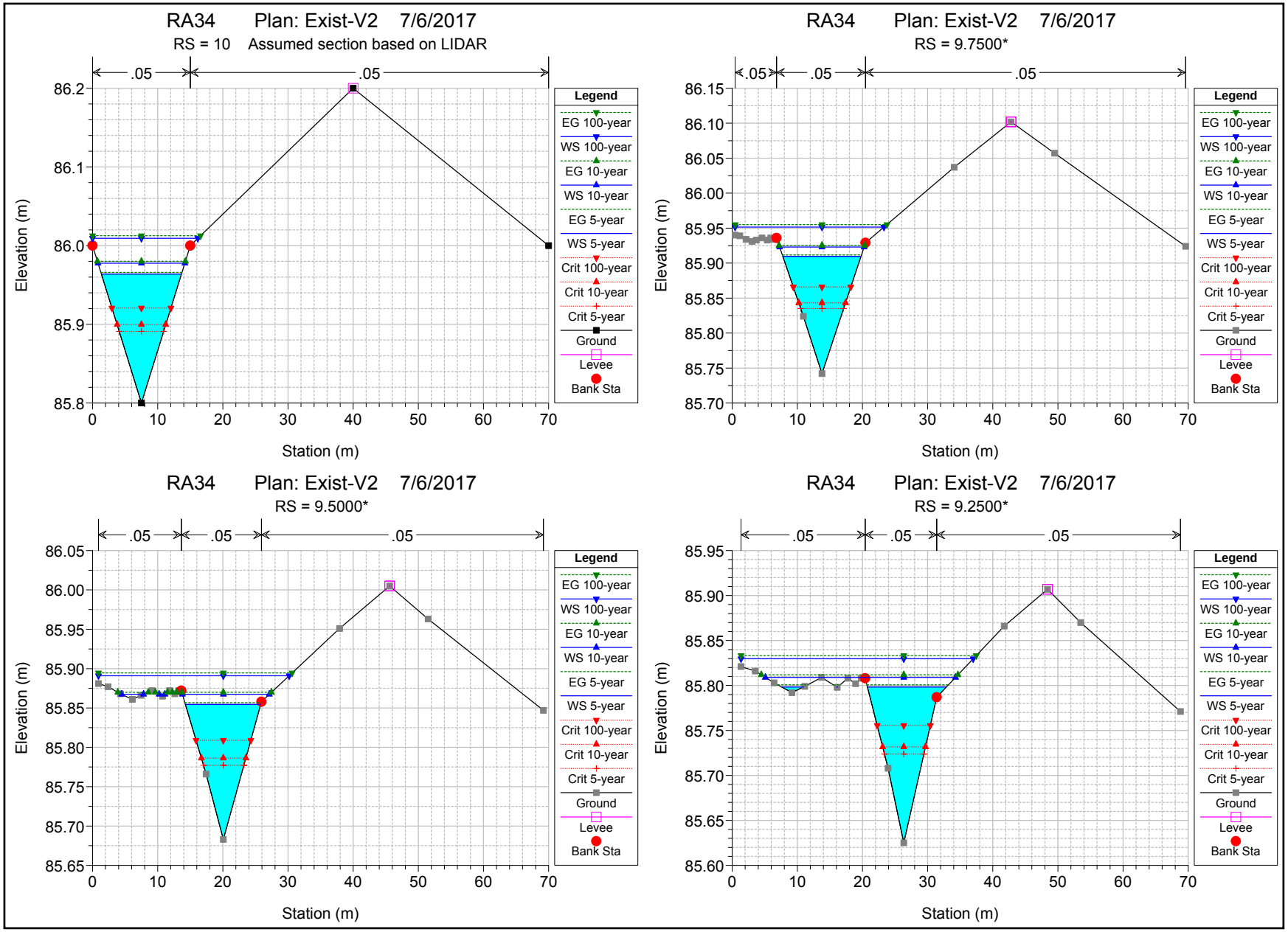

10
9.7500°
9.5000°
9.2500°
9.0000°
8.7500°
8.5000°
8.2500°
8
7.2424°
6
5
4
3.7500°
3.5000°
3.2500°
3
2.7500°
2.5000°
2.2500°
1.4000°
RA 34
1

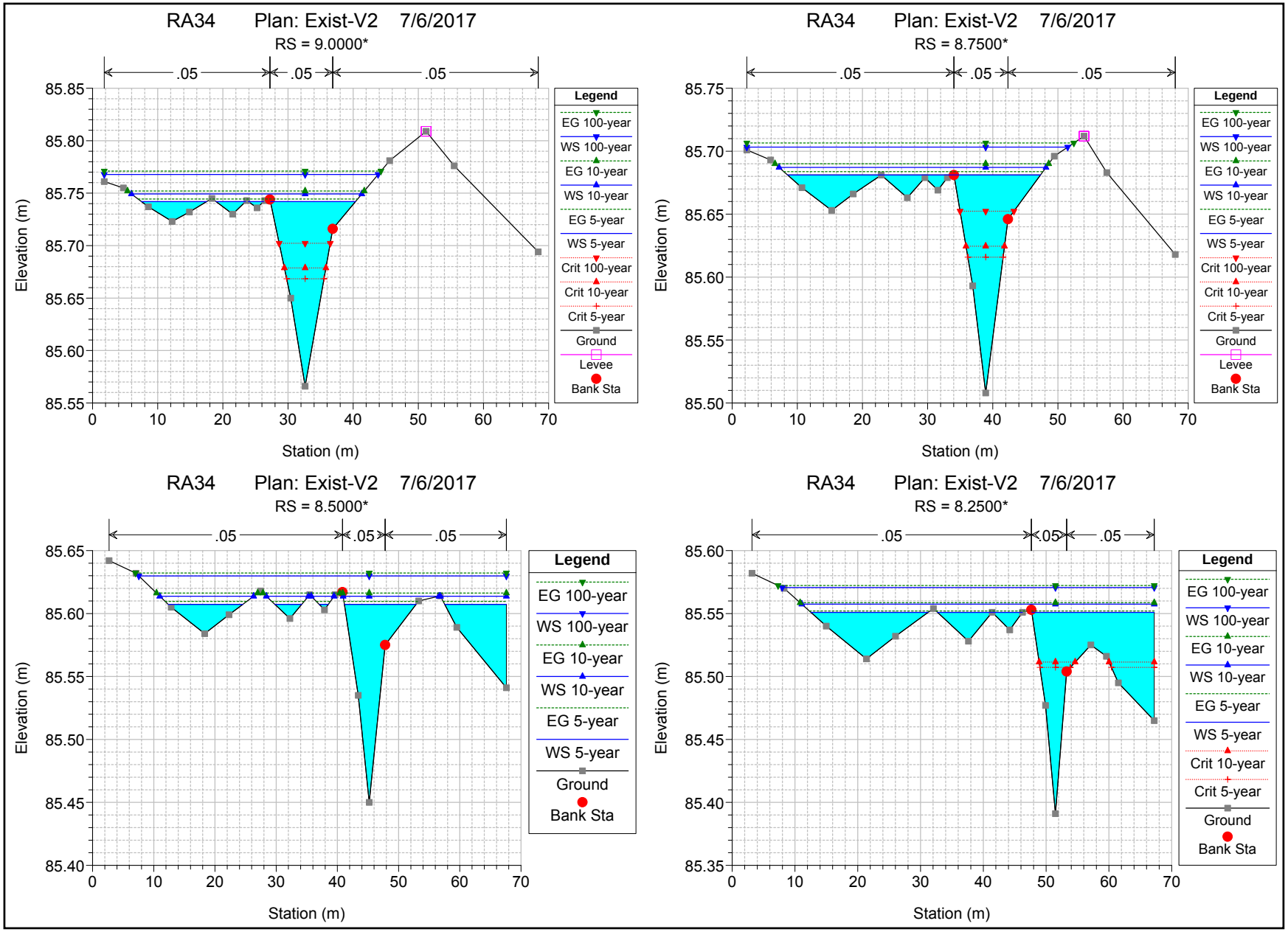
HEC-RAS Plan: Ex-V2 River: RA34 Reach: 1

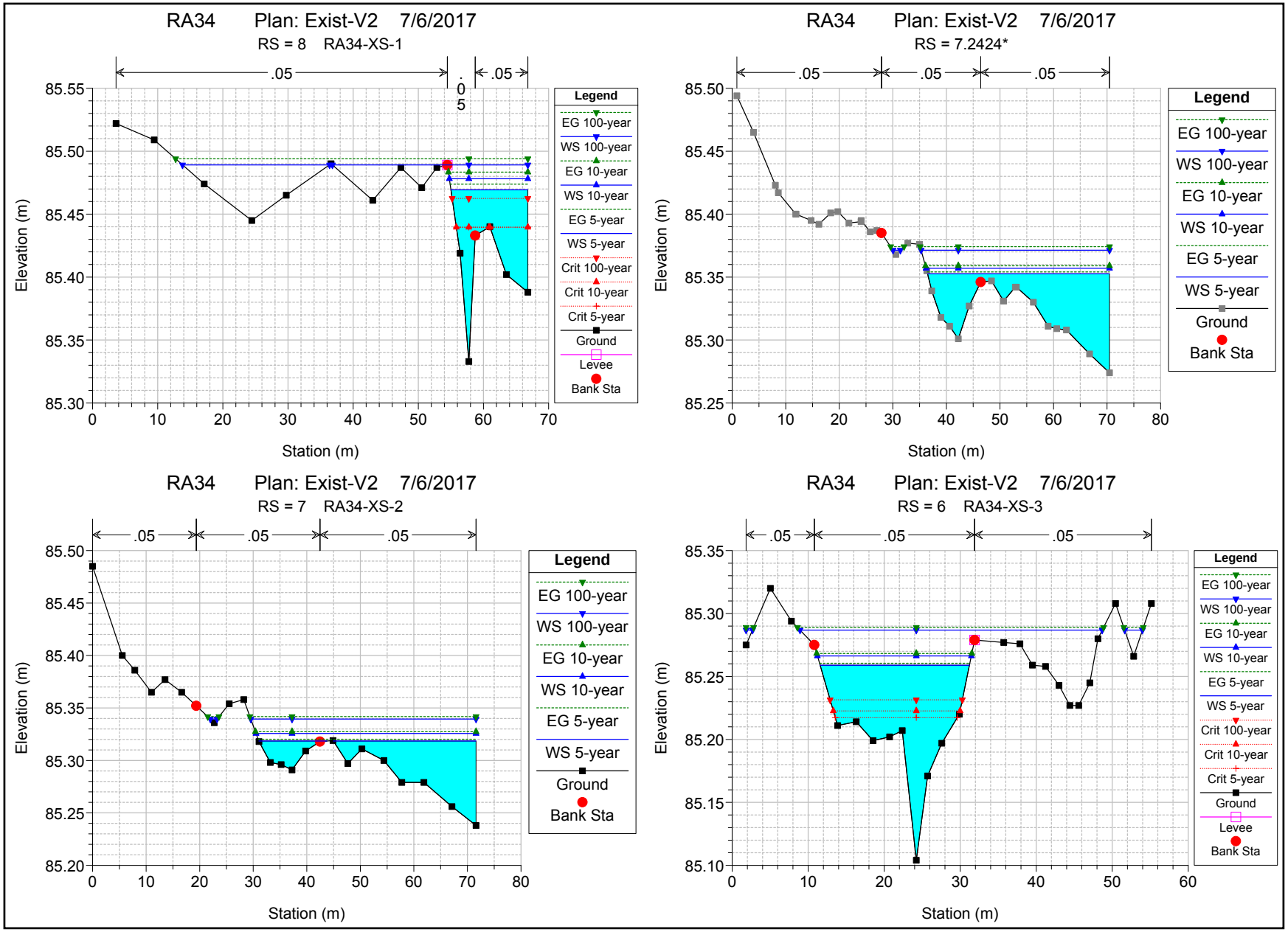
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	10	5-year	0.20	85.80	85.96	85.89	85.97	0.002877	0.20	1.01	12.30	0.23	0.20		
1	10	10-year	0.25	85.80	85.98	85.90	85.98	0.002904	0.21	1.18	13.33	0.23	0.21		
1	10	100-year	0.42	85.80	86.01	85.92	86.01	0.003104	0.25	1.65	16.18	0.25	0.25		0.03
1	9.7500*	5-year	0.20	85.74	85.91	85.84	85.91	0.002879	0.20	1.00	12.00	0.23	0.20		
1	9.7500*	10-year	0.25	85.74	85.92	85.84	85.93	0.002959	0.22	1.16	12.97	0.23	0.22		
1	9.7500*	100-year	0.42	85.74	85.95	85.87	85.96	0.003152	0.26	1.69	22.86	0.25	0.25	0.07	0.06
1	9.5000*	5-year	0.20	85.68	85.85	85.78	85.86	0.002943	0.21	0.98	11.58	0.23	0.21		
1	9.5000*	10-year	0.25	85.68	85.87	85.79	85.87	0.002990	0.22	1.15	17.66	0.23	0.22	0.02	0.03
1	9.5000*	100-year	0.42	85.68	85.89	85.81	85.89	0.003337	0.27	1.76	29.29	0.26	0.24	0.09	0.07
1	9.2500*	5-year	0.20	85.63	85.80	85.72	85.80	0.003096	0.22	0.95	15.54	0.24	0.22	0.02	0.04
1	9.2500*	10-year	0.25	85.63	85.81	85.73	85.81	0.003228	0.24	1.18	29.14	0.25	0.21	0.04	0.06
1	9.2500*	100-year	0.42	85.63	85.83	85.76	85.83	0.003535	0.28	1.86	35.64	0.27	0.22	0.10	0.09
1	9.0000*	5-year	0.20	85.57	85.74	85.67	85.74	0.003107	0.22	1.04	29.87	0.24	0.20	0.05	0.06
1	9.0000*	10-year	0.25	85.57	85.75	85.68	85.75	0.003376	0.25	1.29	35.40	0.25	0.20	0.06	0.08
1	9.0000*	100-year	0.42	85.57	85.77	85.70	85.77	0.003608	0.29	2.02	42.02	0.27	0.21	0.11	0.11
1	8.7500*	5-year	0.20	85.51	85.68	85.62	85.68	0.003611	0.24	1.12	38.83	0.26	0.18	0.06	0.08
1	8.7500*	10-year	0.25	85.51	85.69	85.62	85.69	0.003874	0.26	1.36	40.98	0.27	0.19	0.08	0.09
1	8.7500*	100-year	0.42	85.51	85.70	85.65	85.71	0.004203	0.30	2.08	49.26	0.29	0.20	0.12	0.11
1	8.5000*	5-year	0.20	85.45	85.61		85.61	0.004547	0.25	1.14	39.77	0.28	0.18	0.06	0.13
1	8.5000*	10-year	0.25	85.45	85.61		85.62	0.004723	0.26	1.44	52.35	0.29	0.18	0.08	0.14
1	8.5000*	100-year	0.42	85.45	85.63		85.63	0.004181	0.28	2.37	60.05	0.28	0.18	0.11	0.16
1	8.2500*	5-year	0.20	85.39	85.55	85.51	85.55	0.002348	0.18	1.63	51.62	0.20	0.13	0.06	0.13
1	8.2500*	10-year	0.25	85.39	85.56	85.51	85.56	0.002312	0.19	1.99	56.15	0.20	0.13	0.07	0.14
1	8.2500*	100-year	0.42	85.39	85.57		85.57	0.002652	0.22	2.76	59.30	0.22	0.15	0.10	0.17
1	8	5-year	0.20	85.33	85.47	85.44	85.47	0.009773	0.32	0.69	11.81	0.40	0.30		0.28
1	8	10-year	0.25	85.33	85.48	85.44	85.48	0.009750	0.34	0.79	12.05	0.40	0.32		0.31
1	8	100-year	0.42	85.33	85.49	85.46	85.49	0.009481	0.35	1.64	52.57	0.40	0.25	0.14	0.34
1	7.2424*	5-year	0.20	85.30	85.35		85.35	0.006891	0.16	1.16	33.96	0.30	0.18		0.18
1	7.2424*	10-year	0.25	85.30	85.36		85.36	0.007159	0.18	1.32	34.23	0.31	0.19		0.20
1	7.2424*	100-year	0.42	85.30	85.37		85.37	0.007113	0.20	1.82	36.52	0.31	0.23		0.24
1	7	5-year	0.20	85.29	85.32		85.32	0.007568	0.11	1.15	39.21	0.28	0.18		0.19
1	7	10-year	0.25	85.29	85.33		85.33	0.006345	0.12	1.44	41.08	0.27	0.18		0.19
1	7	100-year	0.42	85.29	85.34		85.34	0.006077	0.15	2.01	43.29	0.28	0.21		0.22
1	6	5-year	0.20	85.10	85.26	85.22	85.26	0.003397	0.18	1.16	19.64	0.23	0.18		
1	6	10-year	0.25	85.10	85.27	85.22	85.27	0.003668	0.19	1.30	20.25	0.24	0.19		
1	6	100-year	0.42	85.10	85.29	85.23	85.29	0.003208	0.21	2.22	42.94	0.24	0.19	0.04	0.10
1	5	5-year	0.20	85.13	85.21	85.17	85.21	0.002888	0.17	1.32	28.02	0.22	0.15	0.04	0.09
1	5	10-year	0.25	85.13	85.22	85.17	85.22	0.002924	0.19	1.53	29.27	0.22	0.17	0.06	0.11
1	5	100-year	0.42	85.13	85.24	85.19	85.24	0.003045	0.22	2.13	32.45	0.24	0.20	0.07	0.14
1	4	5-year	0.20	84.92	85.00		85.00	0.017712	0.30	0.68	18.23	0.49	0.30		
1	4	10-year	0.25	84.92	85.00		85.01	0.018114	0.32	0.78	18.76	0.51	0.32		
1	4	100-year	0.42	84.92	85.02		85.02	0.018408	0.39	1.08	20.17	0.53	0.39	0.06	
1	3.7500*	5-year	0.20	84.75	84.84		84.84	0.019905	0.34	0.61	14.70	0.53	0.34		
1	3.7500*	10-year	0.25	84.75	84.84		84.85	0.018547	0.35	0.72	15.36	0.52	0.35		
1	3.7500*	100-year	0.42	84.75	84.86		84.87	0.018149	0.41	1.01	16.84	0.54	0.41	0.03	
1	3.5000*	5-year	0.20	84.58	84.68		84.69	0.017058	0.35	0.58	11.74	0.51	0.35		
1	3.5000*	10-year	0.25	84.58	84.69		84.70	0.017271	0.38	0.67	12.34	0.52	0.38		
1	3.5000*	100-year	0.42	84.58	84.71		84.72	0.017837	0.45	0.94	13.66	0.55	0.45		
1	3.2500*	5-year	0.20	84.41	84.52		84.53	0.020079	0.42	0.48	8.45	0.56	0.42		
1	3.2500*	10-year	0.25	84.41	84.53		84.54	0.019127	0.44	0.58	9.29	0.56	0.44		
1	3.2500*	100-year	0.42	84.41	84.56		84.57	0.017113	0.49	0.86	10.63	0.55	0.49		
1	3	5-year	0.20	84.25	84.38		84.39	0.014244	0.42	0.48	6.52	0.49	0.42		
1	3	10-year	0.25	84.25	84.39		84.40	0.014562	0.45	0.56	6.90	0.51	0.45		
1	3	100-year	0.42	84.25	84.42		84.43	0.015424	0.54	0.78	8.21	0.54	0.54	0.06	
1	2.7500*	5-year	0.20	84.15	84.27		84.27	0.012978	0.36	0.56	8.87	0.46	0.36		
1	2.7500*	10-year	0.25	84.15	84.28		84.29	0.013156	0.38	0.66	9.68	0.47	0.38		
1	2.7500*	100-year	0.42	84.15	84.30		84.31	0.013295	0.45	0.93	10.83	0.49	0.45		
1	2.5000*	5-year	0.20	84.05	84.17		84.17	0.012044	0.32	0.63	11.18	0.43	0.32		
1	2.5000*	10-year	0.25	84.05	84.18		84.18	0.012052	0.34	0.75	12.44	0.44	0.34		
1	2.5000*	100-year	0.42	84.05	84.20		84.21	0.012552	0.40	1.05	13.91	0.46	0.40		
1	2.2500*	5-year	0.20	83.95	84.06		84.07	0.013132	0.31	0.65	12.98	0.44	0.31		
1	2.2500*	10-year	0.25	83.95	84.07		84.08	0.013227	0.33	0.77	14.07	0.45	0.33		
1	2.2500*	100-year	0.42	83.95	84.09		84.10	0.013049	0.37	1.12	16.94	0.46	0.37		
1	2	5-year	0.20	83.85	83.97		83.97	0.010490	0.27	0.75	15.27	0.40	0.27		
1	2	10-year	0.25	83.85	83.98		83.98	0.010455	0.29	0.87	16.04	0.40	0.29		
1	2	100-year	0.42	83.85	84.00		84.00	0.010633	0.33	1.28	20.39	0.42	0.33		
1	1.8000*	5-year	0.20	83.78	83.90		83.90	0.011019	0.27	0.74	15.71	0.40	0.27		
1	1.8000*	10-year	0.25	83.78	83.91		83.91	0.011268	0.28	0.89	18.17	0.41	0.28		

HEC-RAS Plan: Ex-V2 River: RA34 Reach: 1 (Continued)

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	1.8000*	100-year	0.42	83.78	83.93		83.93	0.010932	0.33	1.27	20.19	0.42	0.33		
1	1.6000*	5-year	0.20	83.72	83.83		83.83	0.011155	0.27	0.76	17.04	0.40	0.27		
1	1.6000*	10-year	0.25	83.72	83.84		83.84	0.011146	0.29	0.89	17.93	0.41	0.29		
1	1.6000*	100-year	0.42	83.72	83.86		83.86	0.011148	0.33	1.26	20.21	0.42	0.33		
1	1.4000*	5-year	0.20	83.65	83.76		83.76	0.010835	0.26	0.77	17.10	0.40	0.26		
1	1.4000*	10-year	0.25	83.65	83.77		83.77	0.010759	0.28	0.90	18.12	0.40	0.28		
1	1.4000*	100-year	0.42	83.65	83.78		83.79	0.010904	0.33	1.26	20.24	0.42	0.33		0.06
1	1.2000*	5-year	0.20	83.58	83.69		83.69	0.011694	0.27	0.76	17.24	0.41	0.27		
1	1.2000*	10-year	0.25	83.58	83.69		83.70	0.012015	0.29	0.87	18.26	0.42	0.29		0.03
1	1.2000*	100-year	0.42	83.58	83.71		83.72	0.011899	0.35	1.22	22.02	0.44	0.34		0.09
1	1	5-year	0.20	83.51	83.61	83.59	83.61	0.011501	0.27	0.77	19.44	0.41	0.27		0.09
1	1	10-year	0.25	83.51	83.62	83.59	83.62	0.011515	0.29	0.89	20.20	0.42	0.28		0.12
1	1	100-year	0.42	83.51	83.63	83.61	83.64	0.011513	0.35	1.26	21.90	0.43	0.33		0.19


RA34 Plan: Exist-V2 7/6/2017
RS = 10 Assumed section based on LIDAR
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 9.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 9.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 9.2500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta


RA34 Plan: Exist-V2 7/6/2017
RS = 9.0000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 8.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 8.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 8.2500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 10-year
Crit 5-year
Ground
Bank Sta


RA34 Plan: Exist-V2 7/6/2017
RS = 8 RA34-XS-1
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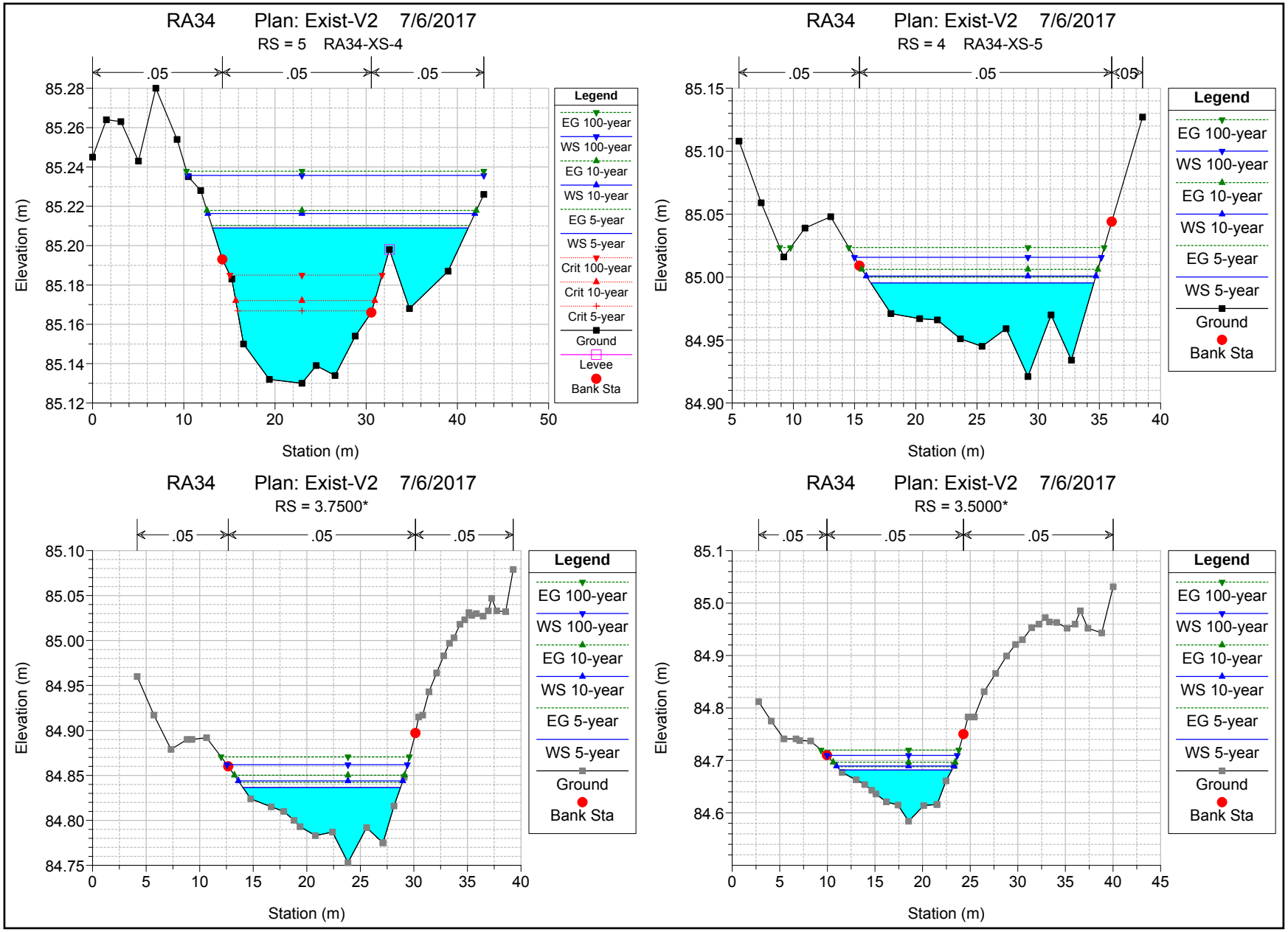
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 7.2424*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 7 RA34-XS-2
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 6 RA34-XS-3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta


RA34 Plan: Exist-V2 7/6/2017
RS = 5 RA34-XS-4
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Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 4 RA34-XS-5
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 3.7500*
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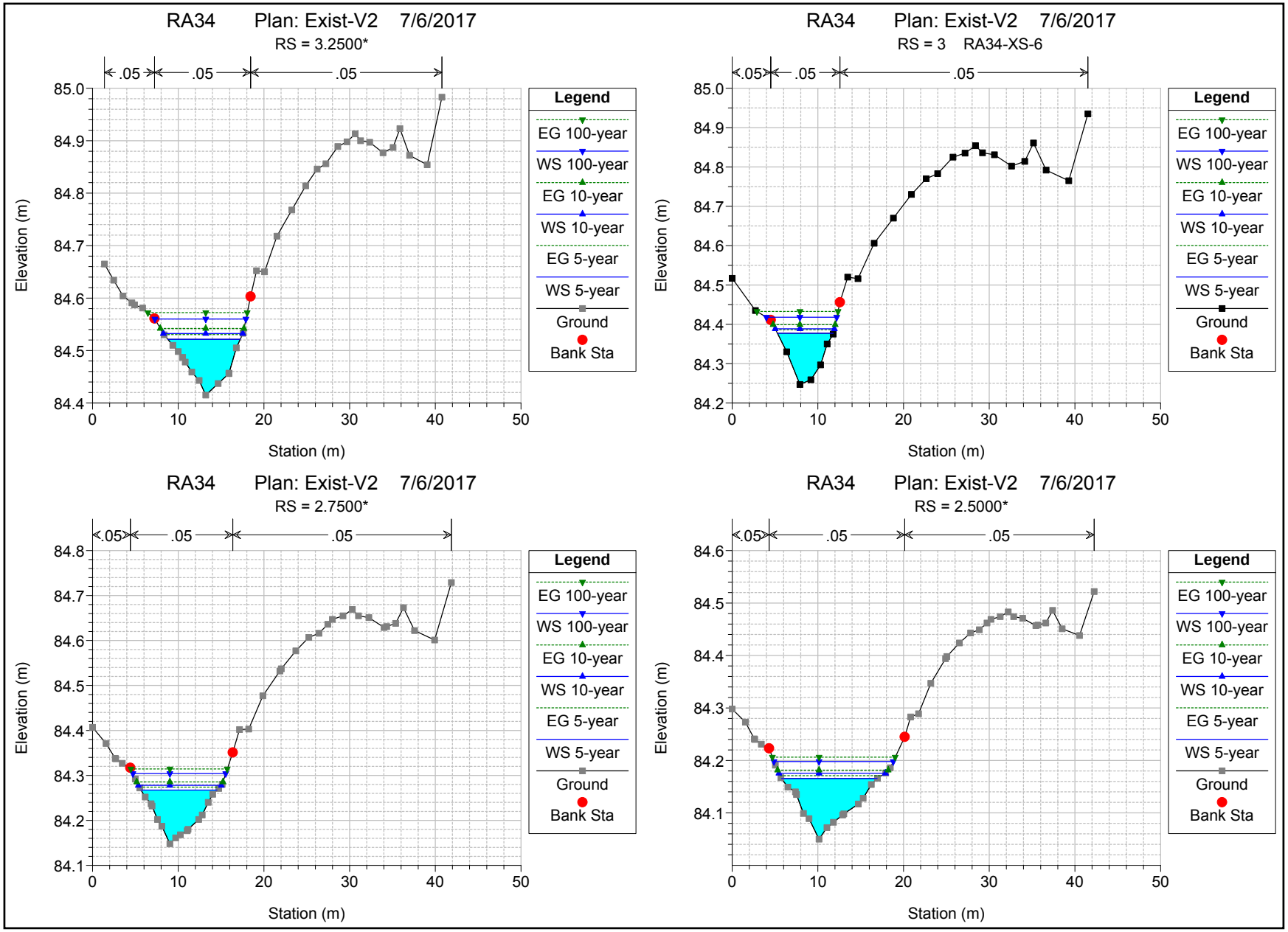
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 3.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta


RA34 Plan: Exist-V2 7/6/2017
RS = 3.2500*
.05
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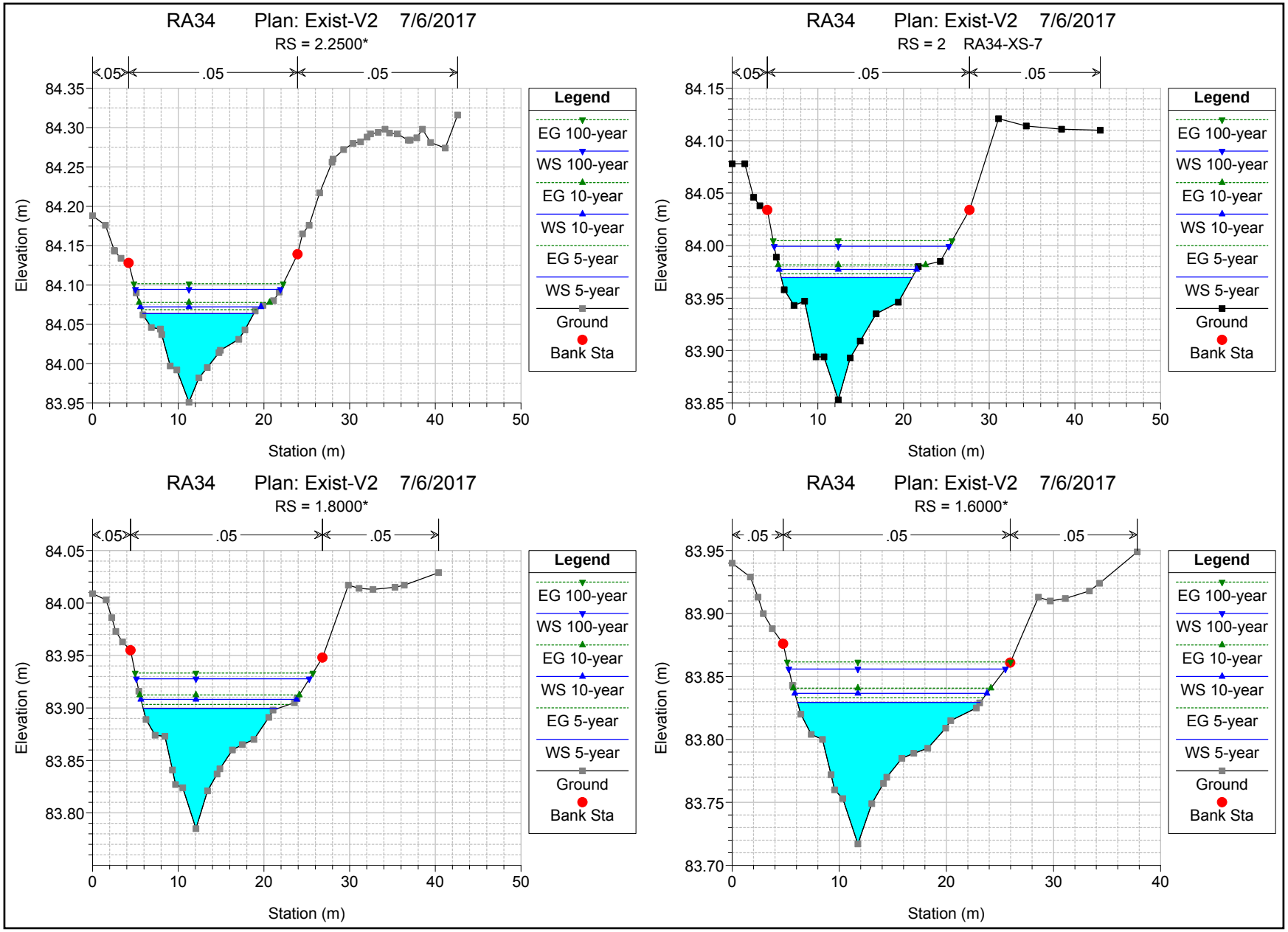
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 3 RA34-XS-6
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 2.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 2.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta


RA34 Plan: Exist-V2 7/6/2017
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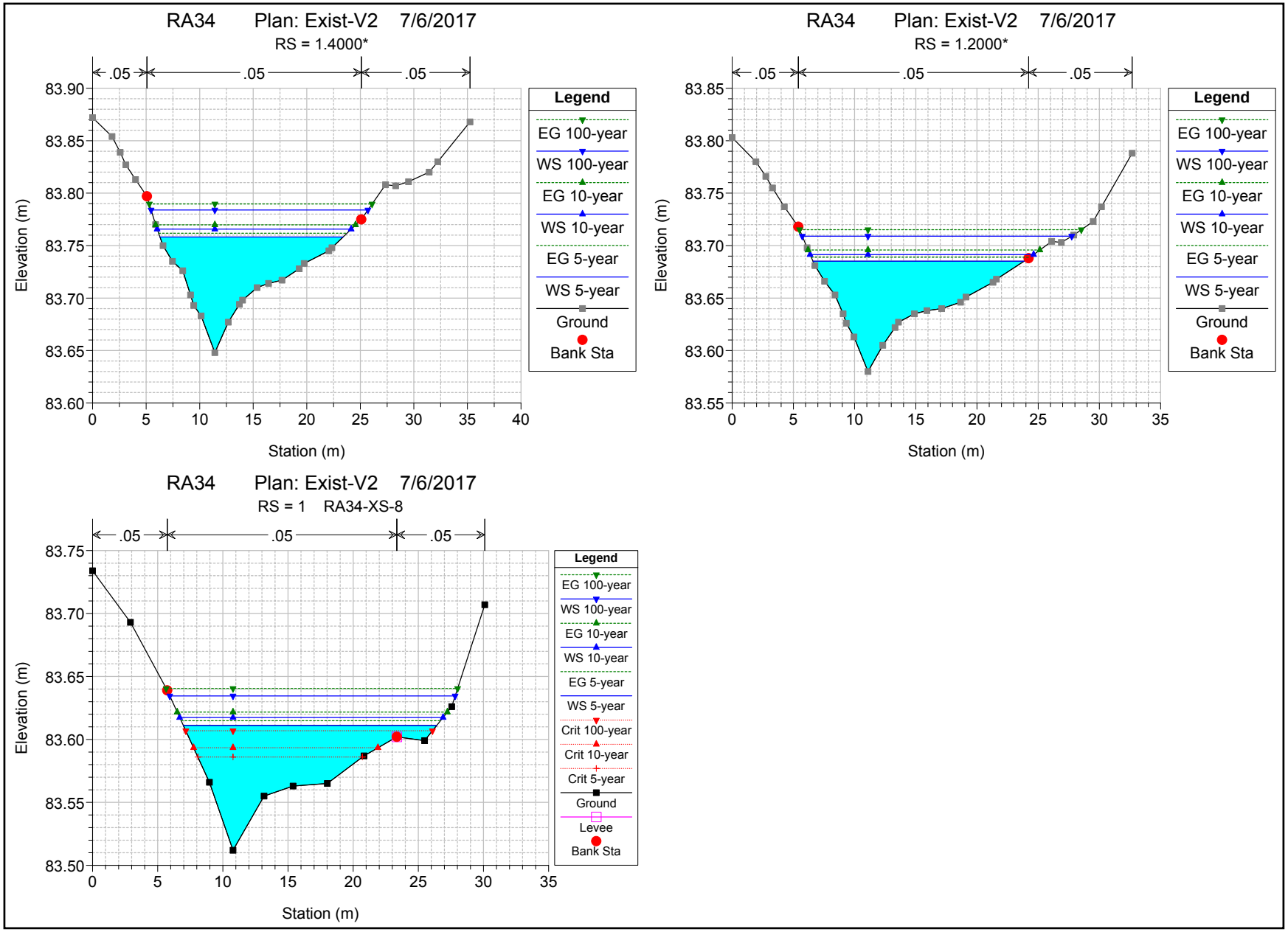
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 2 RA34-XS-7
RA34 Plan: Exist-V2 7/6/2017
RS = 1.8000*
RA34 Plan: Exist-V2 7/6/2017
RS = 1.6000*


RA34 Plan: Exist-V2 7/6/2017
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Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 1.2000*
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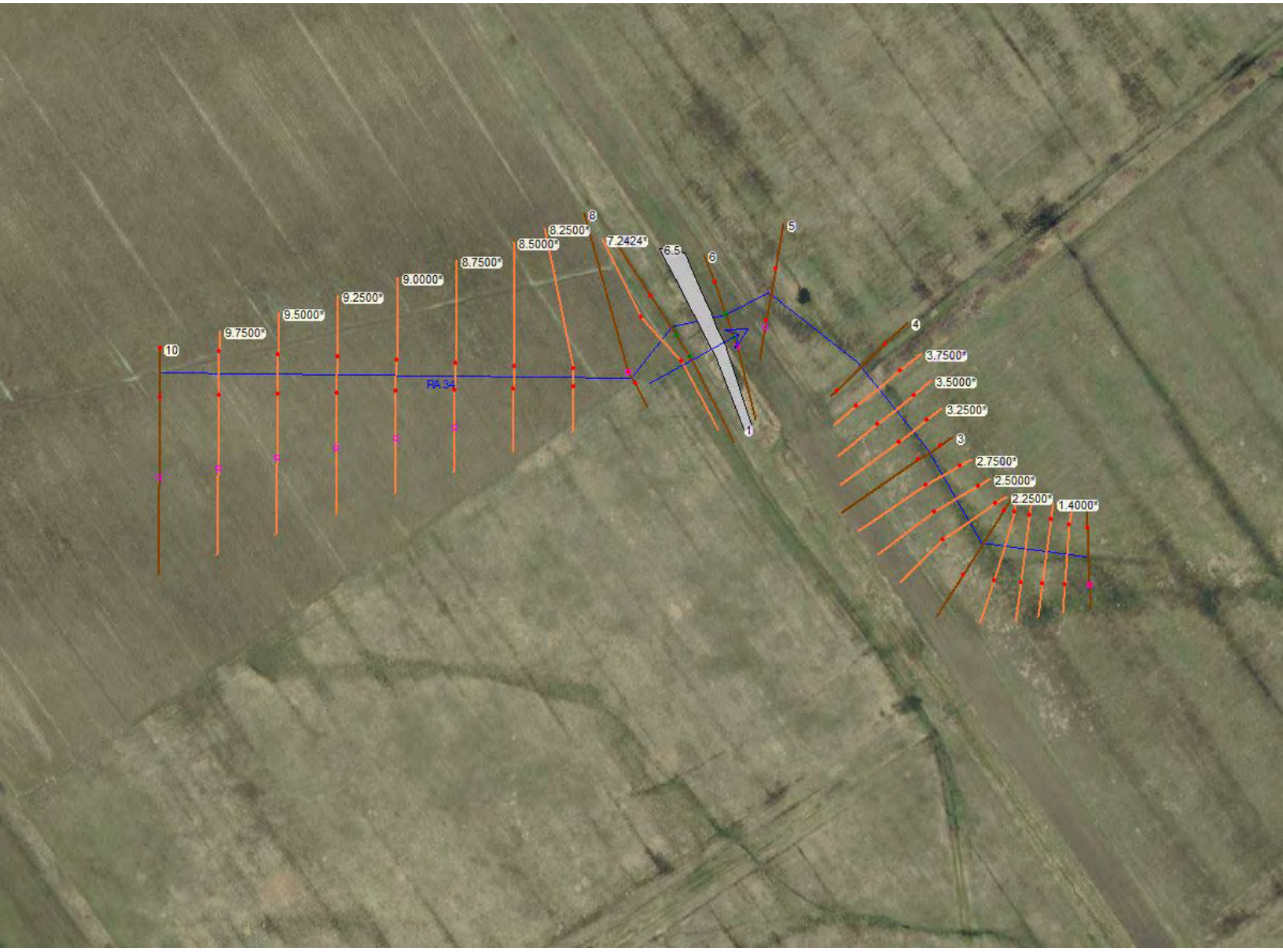
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Exist-V2 7/6/2017
RS = 1 RA34-XS-8
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta

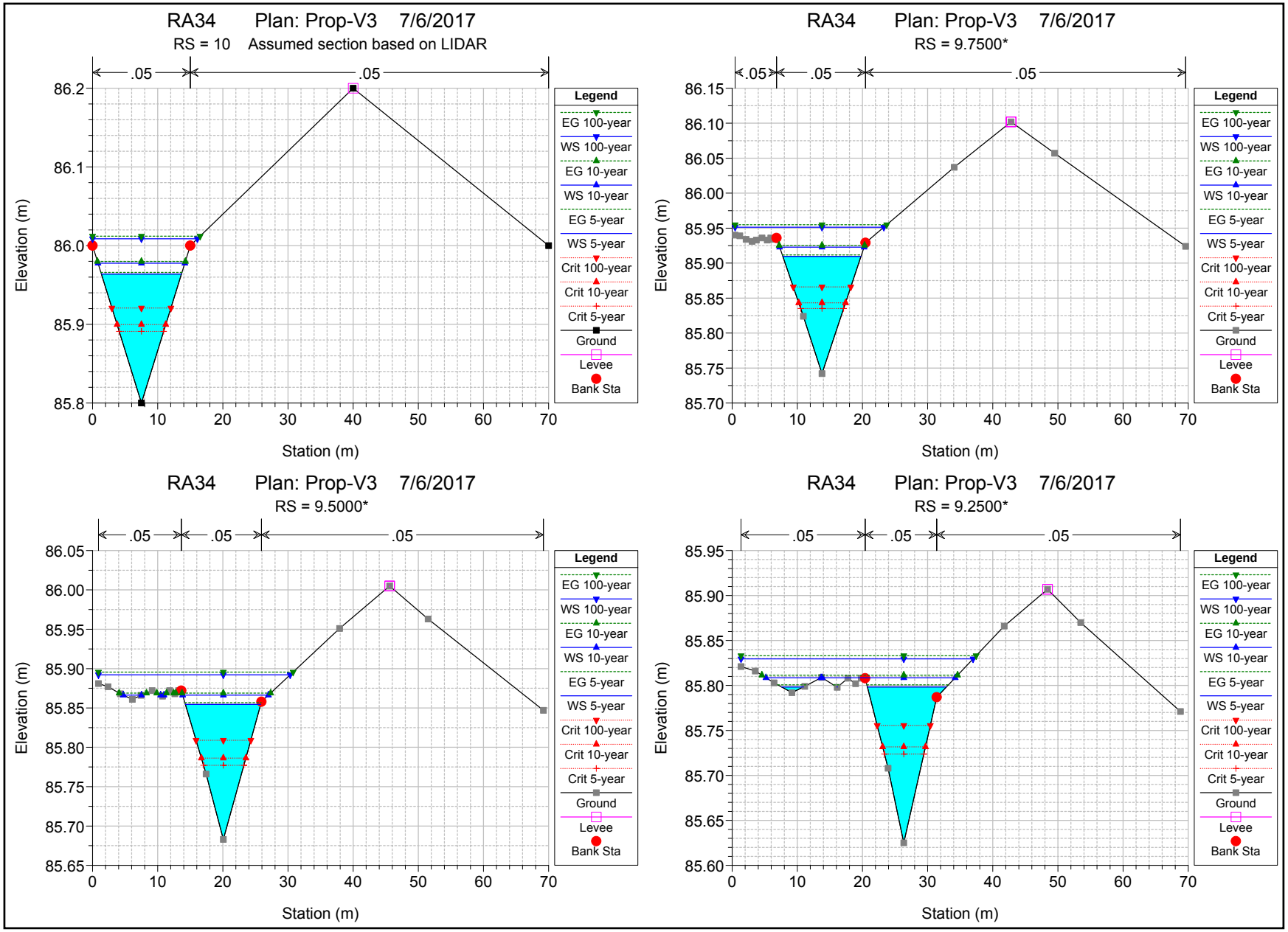

10
9.7500°
9.5000°
9.2500°
9.0000°
8.7500°
8.5000°
8.2500°
8
7.2424°
6.5
6
5
4
3.7500°
3.5000°
3.2500°
3
2.7500°
2.5000°
2.2500°
1.4000°
1
RA 34

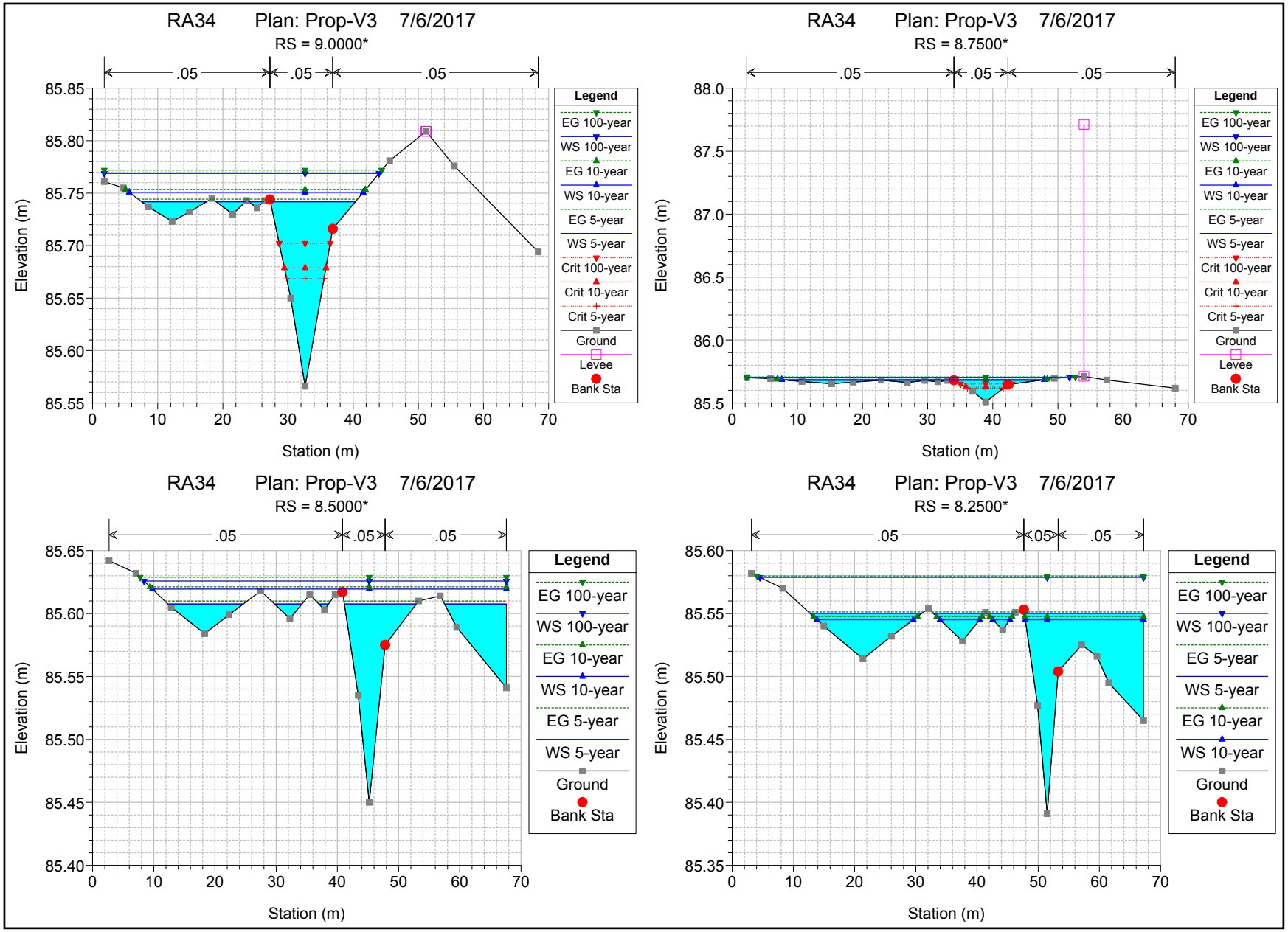
HEC-RAS Plan: Pr-V3 River: RA34 Reach: 1

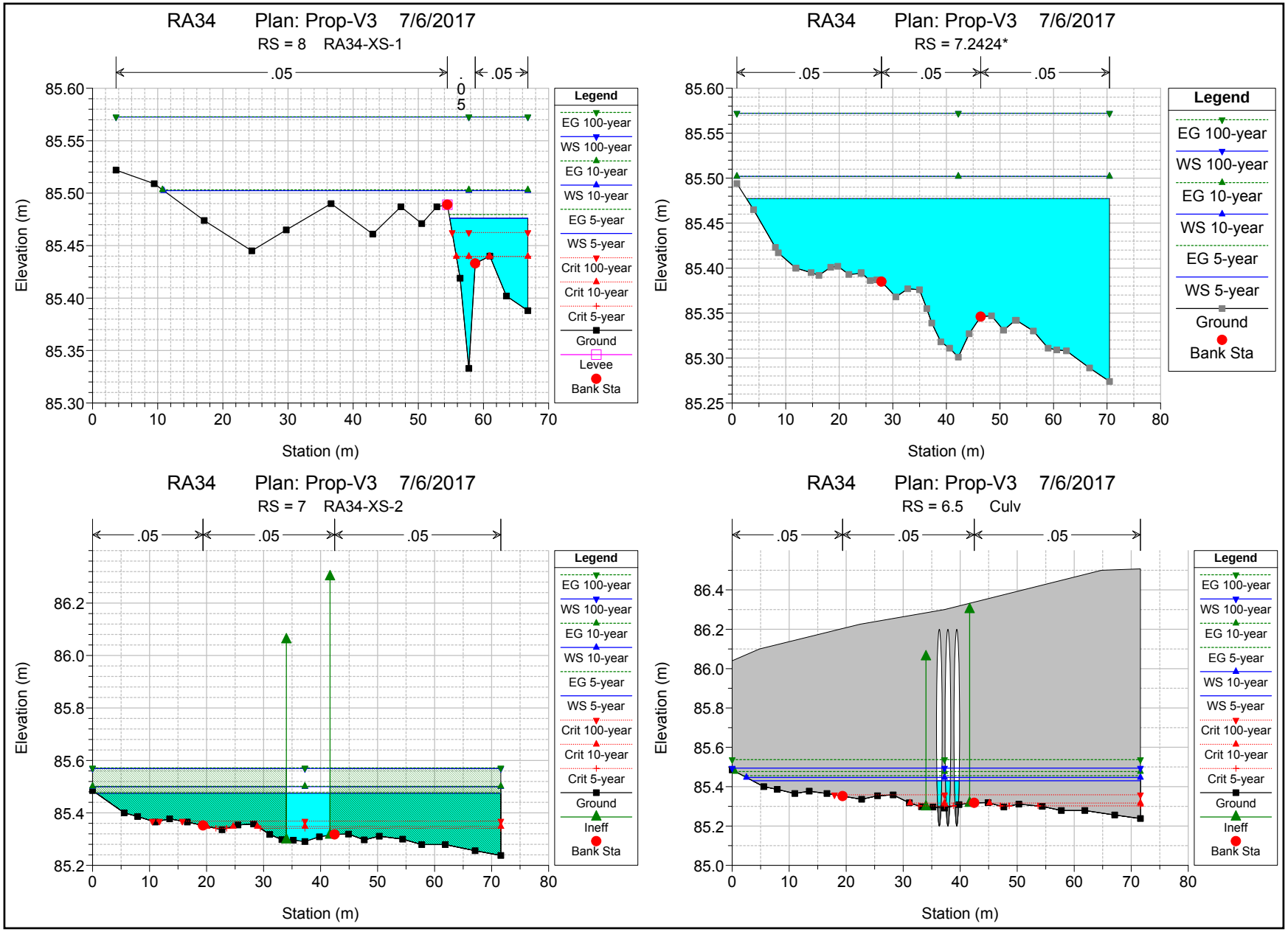
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	10	5-year	0.20	85.80	85.96	85.89	85.97	0.002877	0.20	1.01	12.30	0.23	0.20		
1	10	10-year	0.25	85.80	85.98	85.90	85.98	0.002907	0.21	1.18	13.33	0.23	0.21		
1	10	100-year	0.42	85.80	86.01	85.92	86.01	0.003168	0.26	1.64	16.09	0.25	0.26		0.03
1	9.7500*	5-year	0.20	85.74	85.91	85.84	85.91	0.002879	0.20	1.00	12.00	0.23	0.20		
1	9.7500*	10-year	0.25	85.74	85.92	85.84	85.93	0.002969	0.22	1.16	12.96	0.23	0.22		
1	9.7500*	100-year	0.42	85.74	85.95	85.87	85.95	0.003172	0.26	1.69	22.84	0.25	0.25	0.07	0.06
1	9.5000*	5-year	0.20	85.68	85.85	85.78	85.86	0.002943	0.21	0.98	11.58	0.23	0.21		
1	9.5000*	10-year	0.25	85.68	85.87	85.79	85.87	0.003095	0.23	1.13	16.50	0.24	0.22	0.02	0.03
1	9.5000*	100-year	0.42	85.68	85.89	85.81	85.90	0.003185	0.27	1.80	29.45	0.25	0.23	0.09	0.08
1	9.2500*	5-year	0.20	85.63	85.80	85.72	85.80	0.003095	0.22	0.95	15.55	0.24	0.22	0.02	0.04
1	9.2500*	10-year	0.25	85.63	85.81	85.73	85.81	0.003287	0.24	1.17	28.80	0.25	0.22	0.04	0.06
1	9.2500*	100-year	0.42	85.63	85.83	85.76	85.83	0.003556	0.28	1.86	35.62	0.27	0.22	0.10	0.09
1	9.0000*	5-year	0.20	85.57	85.74	85.67	85.74	0.003111	0.22	1.04	29.83	0.24	0.20	0.05	0.06
1	9.0000*	10-year	0.25	85.57	85.75	85.68	85.75	0.003113	0.24	1.35	35.94	0.24	0.19	0.07	0.08
1	9.0000*	100-year	0.42	85.57	85.77	85.70	85.77	0.003427	0.28	2.06	42.16	0.26	0.20	0.11	0.10
1	8.7500*	5-year	0.20	85.51	85.68	85.62	85.68	0.003622	0.24	1.12	38.65	0.26	0.18	0.06	0.08
1	8.7500*	10-year	0.25	85.51	85.69	85.63	85.69	0.004378	0.27	1.28	40.26	0.28	0.20	0.08	0.10
1	8.7500*	100-year	0.42	85.51	85.70	85.65	85.71	0.003978	0.29	2.13	49.54	0.28	0.20	0.12	0.11
1	8.5000*	5-year	0.20	85.45	85.61		85.61	0.004476	0.25	1.15	40.15	0.28	0.18	0.06	0.13
1	8.5000*	10-year	0.25	85.45	85.62		85.62	0.003310	0.23	1.76	57.86	0.25	0.14	0.07	0.12
1	8.5000*	100-year	0.42	85.45	85.63		85.63	0.005534	0.31	2.13	59.20	0.32	0.20	0.11	0.17
1	8.2500*	5-year	0.20	85.39	85.55		85.55	0.002464	0.18	1.60	50.73	0.21	0.13	0.06	0.13
1	8.2500*	10-year	0.25	85.39	85.55		85.55	0.005419	0.27	1.35	44.38	0.31	0.19	0.08	0.19
1	8.2500*	100-year	0.42	85.39	85.58		85.58	0.001713	0.19	3.25	62.68	0.18	0.13	0.09	0.15
1	8	5-year	0.20	85.33	85.48	85.44	85.48	0.006937	0.28	0.77	12.00	0.34	0.27		0.26
1	8	10-year	0.25	85.33	85.50	85.44	85.50	0.001435	0.15	2.36	55.93	0.16	0.11	0.07	0.15
1	8	100-year	0.42	85.33	85.57	85.46	85.57	0.000182	0.08	6.72	63.22	0.06	0.06	0.06	0.08
1	7.2424*	5-year	0.20	85.30	85.48		85.48	0.000025	0.03	8.01	67.78	0.02	0.03	0.02	0.03
1	7.2424*	10-year	0.25	85.30	85.50		85.50	0.000021	0.03	9.72	69.58	0.02	0.03	0.02	0.03
1	7.2424*	100-year	0.42	85.30	85.57		85.57	0.000016	0.03	14.61	69.58	0.02	0.03	0.02	0.03
1	7	5-year	0.20	85.29	85.48	85.34	85.48	0.000596	0.15	1.34	70.98	0.12	0.15		
1	7	10-year	0.25	85.29	85.50	85.35	85.50	0.000596	0.17	1.52	71.61	0.12	0.17		
1	7	100-year	0.42	85.29	85.57	85.37	85.57	0.000597	0.20	2.06	71.61	0.13	0.20		
1	6.5		Culvert												
1	6	5-year	0.20	85.10	85.27	85.22	85.27	0.004960	0.29	0.71	20.29	0.30	0.29		
1	6	10-year	0.25	85.10	85.28	85.22	85.28	0.005429	0.32	0.79	21.47	0.32	0.32		
1	6	100-year	0.42	85.10	85.30	85.24	85.31	0.006736	0.42	1.00	49.67	0.37	0.42		
1	5	5-year	0.20	85.13	85.21	85.17	85.21	0.002888	0.17	1.32	28.02	0.22	0.15	0.04	0.09
1	5	10-year	0.25	85.13	85.22	85.17	85.22	0.002924	0.19	1.53	29.27	0.22	0.17	0.06	0.11
1	5	100-year	0.42	85.13	85.24	85.19	85.24	0.003045	0.22	2.13	32.45	0.24	0.20	0.07	0.14
1	4	5-year	0.20	84.92	85.00		85.00	0.017712	0.30	0.68	18.23	0.49	0.30		
1	4	10-year	0.25	84.92	85.00		85.01	0.018114	0.32	0.78	18.76	0.51	0.32		
1	4	100-year	0.42	84.92	85.02		85.02	0.018408	0.39	1.08	20.17	0.53	0.39	0.06	
1	3.7500*	5-year	0.20	84.75	84.84		84.84	0.019905	0.34	0.61	14.70	0.53	0.34		
1	3.7500*	10-year	0.25	84.75	84.84		84.85	0.018547	0.35	0.72	15.36	0.52	0.35		
1	3.7500*	100-year	0.42	84.75	84.86		84.87	0.018149	0.41	1.01	16.84	0.54	0.41	0.03	
1	3.5000*	5-year	0.20	84.58	84.68		84.69	0.017058	0.35	0.58	11.74	0.51	0.35		
1	3.5000*	10-year	0.25	84.58	84.69		84.70	0.017271	0.38	0.67	12.34	0.52	0.38		
1	3.5000*	100-year	0.42	84.58	84.71		84.72	0.017837	0.45	0.94	13.66	0.55	0.45		
1	3.2500*	5-year	0.20	84.41	84.52		84.53	0.020079	0.42	0.48	8.45	0.56	0.42		
1	3.2500*	10-year	0.25	84.41	84.53		84.54	0.019127	0.44	0.58	9.29	0.56	0.44		
1	3.2500*	100-year	0.42	84.41	84.56		84.57	0.017113	0.49	0.86	10.63	0.55	0.49		
1	3	5-year	0.20	84.25	84.38		84.39	0.014244	0.42	0.48	6.52	0.49	0.42		
1	3	10-year	0.25	84.25	84.39		84.40	0.014562	0.45	0.56	6.90	0.51	0.45		
1	3	100-year	0.42	84.25	84.42		84.43	0.015424	0.54	0.78	8.21	0.54	0.54	0.06	
1	2.7500*	5-year	0.20	84.15	84.27		84.27	0.012978	0.36	0.56	8.87	0.46	0.36		
1	2.7500*	10-year	0.25	84.15	84.28		84.29	0.013156	0.38	0.66	9.68	0.47	0.38		
1	2.7500*	100-year	0.42	84.15	84.30		84.31	0.013295	0.45	0.93	10.83	0.49	0.45		
1	2.5000*	5-year	0.20	84.05	84.17		84.17	0.012044	0.32	0.63	11.18	0.43	0.32		
1	2.5000*	10-year	0.25	84.05	84.18		84.18	0.012052	0.34	0.75	12.44	0.44	0.34		
1	2.5000*	100-year	0.42	84.05	84.20		84.21	0.012552	0.40	1.05	13.91	0.46	0.40		
1	2.2500*	5-year	0.20	83.95	84.06		84.07	0.013132	0.31	0.65	12.98	0.44	0.31		
1	2.2500*	10-year	0.25	83.95	84.07		84.08	0.013227	0.33	0.77	14.07	0.45	0.33		
1	2.2500*	100-year	0.42	83.95	84.09		84.10	0.013049	0.37	1.12	16.94	0.46	0.37		
1	2	5-year	0.20	83.85	83.97		83.97	0.010490	0.27	0.75	15.27	0.40	0.27		
1	2	10-year	0.25	83.85	83.98		83.98	0.010455	0.29	0.87	16.04	0.40	0.29		
1	2	100-year	0.42	83.85	84.00		84.00	0.010633	0.33	1.28	20.39	0.42	0.33		

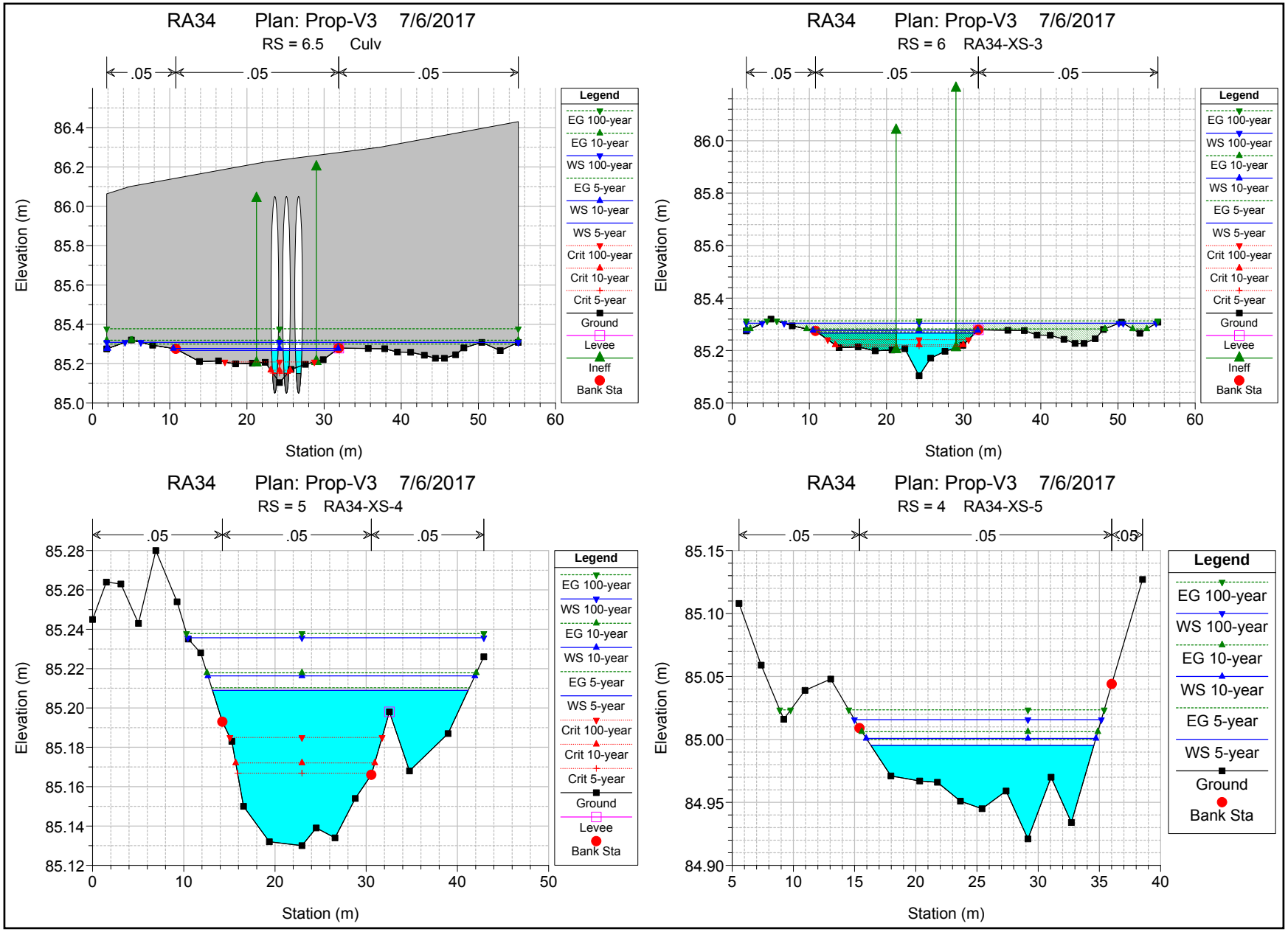
HEC-RAS Plan: Pr-V3 River: RA34 Reach: 1 (Continued)

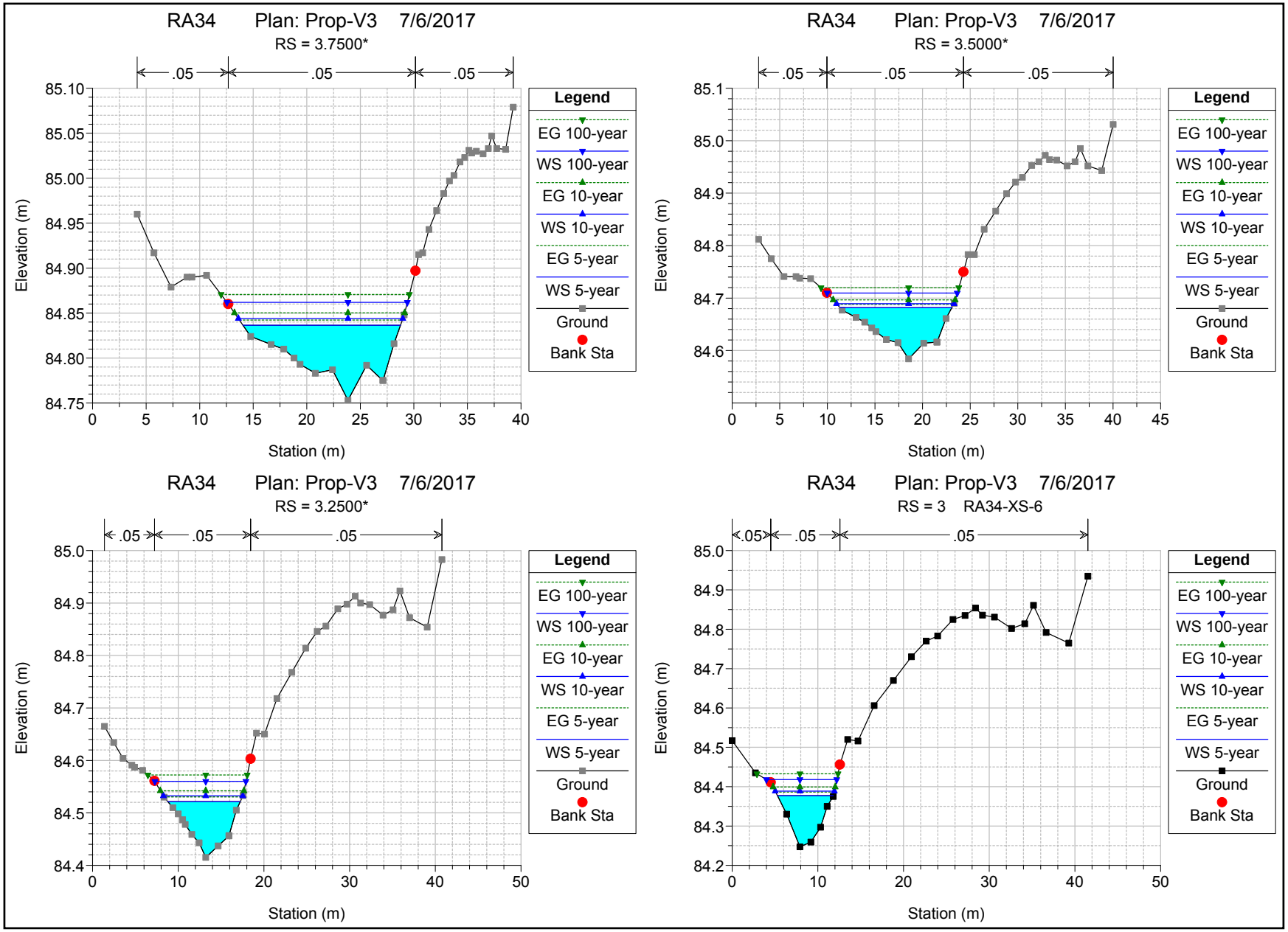
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	1.8000*	5-year	0.20	83.78	83.90		83.90	0.011019	0.27	0.74	15.71	0.40	0.27		
1	1.8000*	10-year	0.25	83.78	83.91		83.91	0.011268	0.28	0.89	18.17	0.41	0.28		
1	1.8000*	100-year	0.42	83.78	83.93		83.93	0.010932	0.33	1.27	20.19	0.42	0.33		
1	1.6000*	5-year	0.20	83.72	83.83		83.83	0.011155	0.27	0.76	17.04	0.40	0.27		
1	1.6000*	10-year	0.25	83.72	83.84		83.84	0.011146	0.29	0.89	17.93	0.41	0.29		
1	1.6000*	100-year	0.42	83.72	83.86		83.86	0.011148	0.33	1.26	20.21	0.42	0.33		
1	1.4000*	5-year	0.20	83.65	83.76		83.76	0.010835	0.26	0.77	17.10	0.40	0.26		
1	1.4000*	10-year	0.25	83.65	83.77		83.77	0.010759	0.28	0.90	18.12	0.40	0.28		
1	1.4000*	100-year	0.42	83.65	83.78		83.79	0.010904	0.33	1.26	20.24	0.42	0.33		0.06
1	1.2000*	5-year	0.20	83.58	83.69		83.69	0.011694	0.27	0.76	17.24	0.41	0.27		
1	1.2000*	10-year	0.25	83.58	83.69		83.70	0.012015	0.29	0.87	18.26	0.42	0.29		0.03
1	1.2000*	100-year	0.42	83.58	83.71		83.72	0.011899	0.35	1.22	22.02	0.44	0.34		0.09
1	1	5-year	0.20	83.51	83.61	83.59	83.61	0.011501	0.27	0.77	19.44	0.41	0.27		0.09
1	1	10-year	0.25	83.51	83.62	83.59	83.62	0.011515	0.29	0.89	20.20	0.42	0.28		0.12
1	1	100-year	0.42	83.51	83.63	83.61	83.64	0.011513	0.35	1.26	21.90	0.43	0.33		0.19

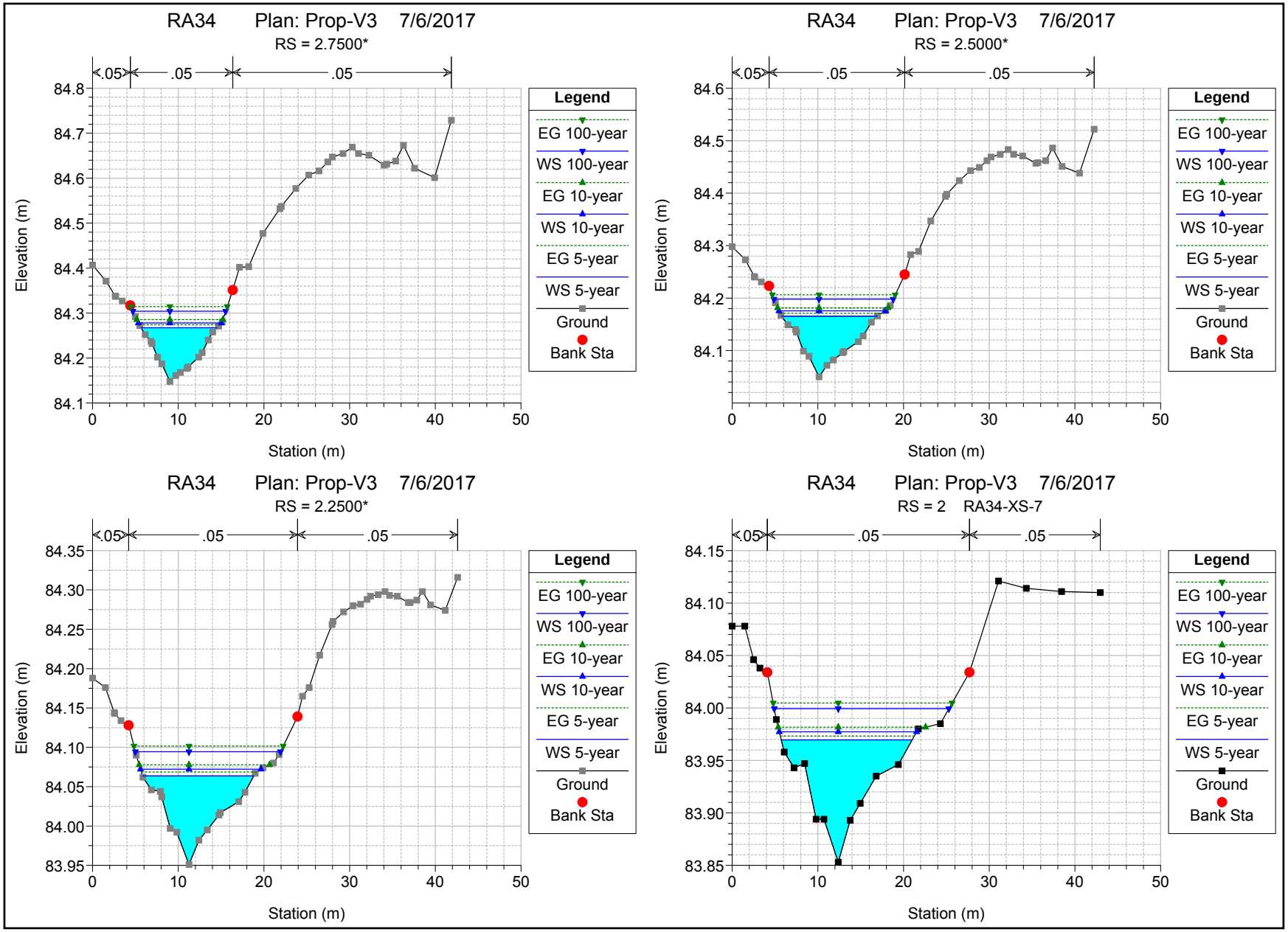

RA34 Plan: Prop-V3 7/6/2017
RS = 10 Assumed section based on LIDAR
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 9.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 9.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 9.2500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta

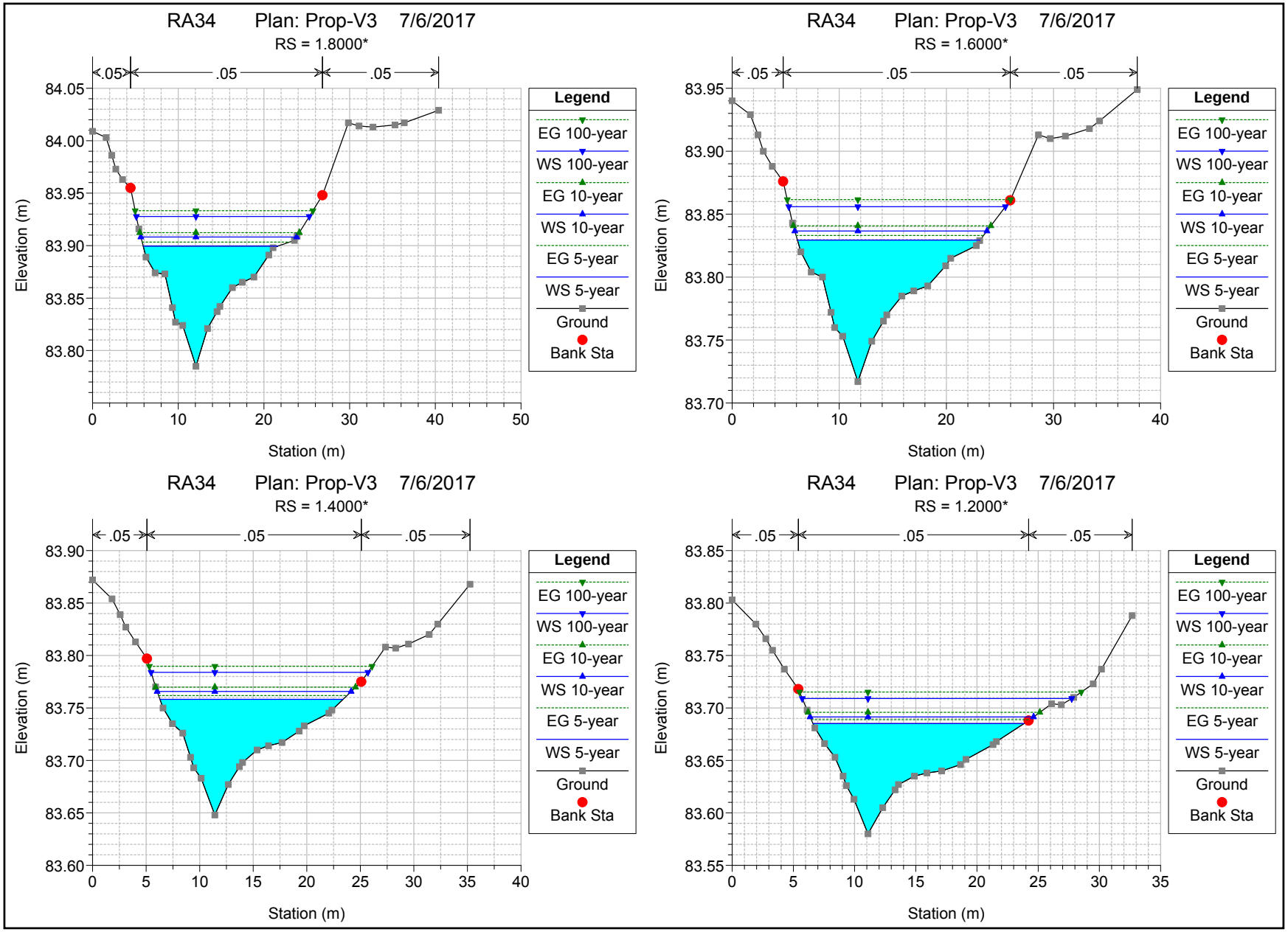

RA34 Plan: Prop-V3 7/6/2017
RS = 9.0000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 8.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 8.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 8.2500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 5-year
WS 5-year
EG 10-year
WS 10-year
Ground
Bank Sta

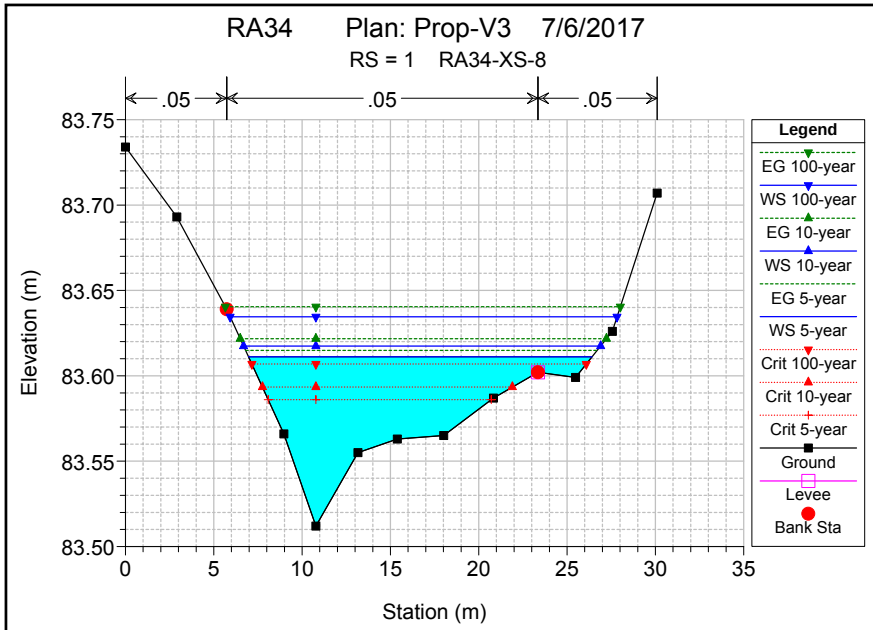

RA34 Plan: Prop-V3 7/6/2017
RS = 8 RA34-XS-1
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 7.2424*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 7 RA34-XS-2
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Ineff
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 6.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
EG 5-year
WS 10-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Ineff
Bank Sta


RA34 Plan: Prop-V3 7/6/2017
RS = 6.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
EG 10-year
WS 100-year
EG 5-year
WS 10-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Ineff
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 6 RA34-XS-3
RA34 Plan: Prop-V3 7/6/2017
RS = 5 RA34-XS-4
RA34 Plan: Prop-V3 7/6/2017
RS = 4 RA34-XS-5


RA34 Plan: Prop-V3 7/6/2017
RS = 3.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 3.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 3.2500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 3 RA34-XS-6
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta


RA34 Plan: Prop-V3 7/6/2017
RS = 2.7500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 2.5000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 2.2500*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 2 RA34-XS-7
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta


RA34 Plan: Prop-V3 7/6/2017
RS = 1.8000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 1.6000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 1.4000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA34 Plan: Prop-V3 7/6/2017
RS = 1.2000*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta


RA34 Plan: Prop-V3 7/6/2017
RS = 1 RA34-XS-8
.05
.05
.05
Elevation (m)
83.75
83.70
83.65
83.60
83.55
83.50
0
5
10
15
20
25
30
35
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Crit 100-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta

RA35A – HYDRAULIC MODELING

SEE DRAWING C302
FOR ADDITIONAL ACCESS
ROAD DETAILS

CONTRACTOR TO MAINTAIN
EXISTING DRAINAGE FLOWS
AS REQUIRED

FOR ENTRANCE DETAIL AND
CONSTRUCTION NOTES SEE
"TEMPORARY ENTRANCE
LAYOUT" DRAWING C212–Ent

SOUTH SHORE ROAD

LAKE ONTARIO

S14
ACCESS ROAD

ACCESS ROAD BUMP–OUT
LOCATIONS TO BE
FIELD DETERMINED
(SEE DWG. C302 FOR DETAILS)

RIGHT OF WAY

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+072.95
N = 4890585.02
E = 367380.84

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+080.35
N = 4890590.85
E = 367376.27

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+000.00
N = 4890533.44
E = 367402.36

ALIGNMENT / – (S14–S07–ACCESS)
STA = 1+053.23
N = 4890570.35
E = 367394.01

PI STA = 1+076.66
Δ = 7.715°
R = 55.00m
Lc = 7.400m
T = 3.708m

REMOVAL & REPLACEMENT
OF EXISTING FENCING

OVERBUILD
(SEE NOTE, 8)
TYP.

ACCESS ROAD
ALIGNMENT
(SEE NOTE 6)

RIP–RAP R–50
(OPSS 1004)
2.4mx3.1m
(BOTH ENDS)

14.0m – 560x420mmø
PIPE ARCH @ 1.60%
W. INV.=81.14
E. INV.=80.92

RIP–RAP R–50
(OPSS 1004)
2.4mx3.1m
(BOTH ENDS)

LIMIT OF
GRADING
(TYP.)

5.0m WIDE
ROADWAY

14.0m – 3x500mmø
CULVERT @ 1.00%
W. INV.=82.37
E. INV.=82.23

SILT FENCE
(LOCATION TO BE
FIELD DETERMINED)

RESTORE SLOPES AND
DISTURBED AREAS WITH
TOPSOIL, SEED AND COVER
AS REQUIRED (TYP.)

SILT FENCE
(LOCATION TO BE
FIELD DETERMINED)

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+486.49
N = 4890926.77
E = 367148.00

RIP–RAP R–50
(OPSS 1004)
2.4mx4.6m
(BOTH ENDS)

LIMIT OF
CONSTRUCTIBLE
AREA (TYP.)

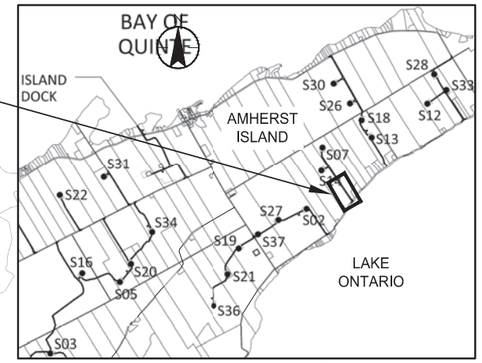
EQUALIZATION CULVERT
(LOCATION TO BE
FIELD DETERMINED)

14.0m – 3X1000mmø
CULVERT @ 1.05%
W. INV.=85.20
E. INV.=85.05

PROPERTY LINE
(APPROX. LOCATION)

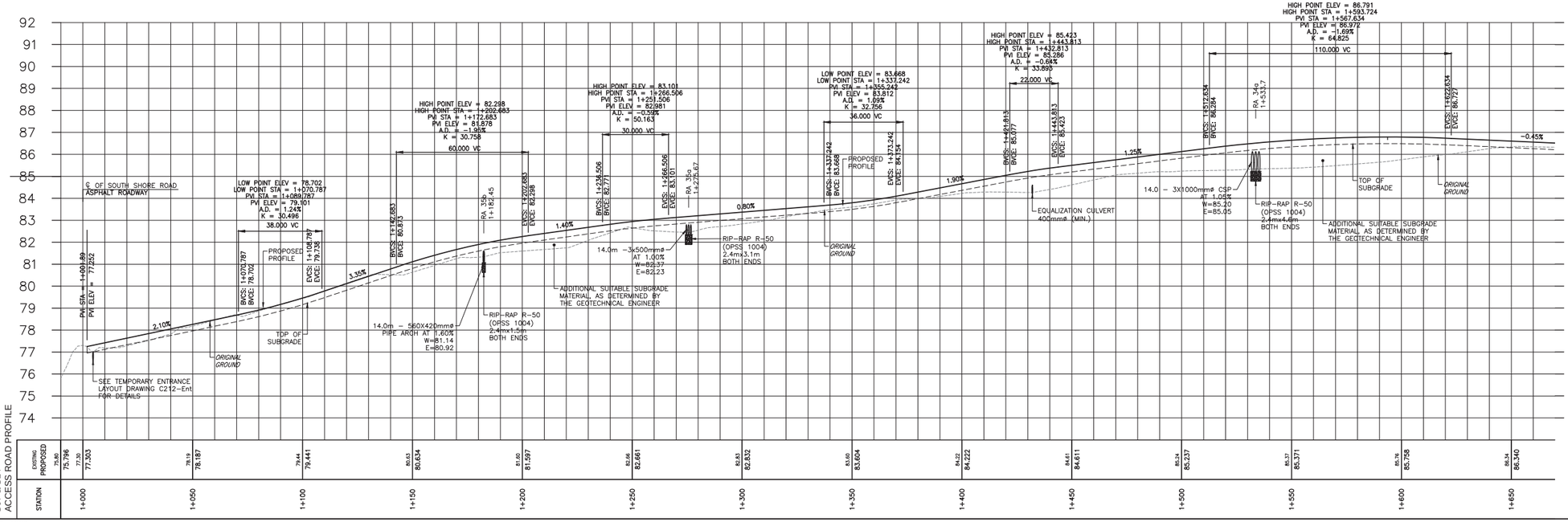
(SEE DWG. NO. C212–SHEET 2)

PLAN
LOCATION



KEY PLAN
N.T.S

S07 & S14
ACCESS ROAD PROFILE



STATION	1+000	1+050	1+100	1+150	1+200	1+250	1+300	1+350	1+400	1+450	1+500	1+550	1+600	1+650
EXISTING	75.80		78.19		79.44		80.61	81.60	82.46		84.22		85.57		86.34
PROPOSED	75.796	77.303	78.187	79.441	80.634	81.597	82.661	82.832	83.604	84.222	84.611	85.237	85.371	85.758	86.340

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 — EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 — PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

☐ Reviewed - No comments
☐ Reviewed - Incorporate comments and resubmit
☐ Reviewed - Not accepted

Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	16.02.02
Revision		By	Appd.	YY.MM.DD

File Name: C212_133560100-turbine S07-S14.DWG	RCL/DH	MPG	RCL	15.12.03
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

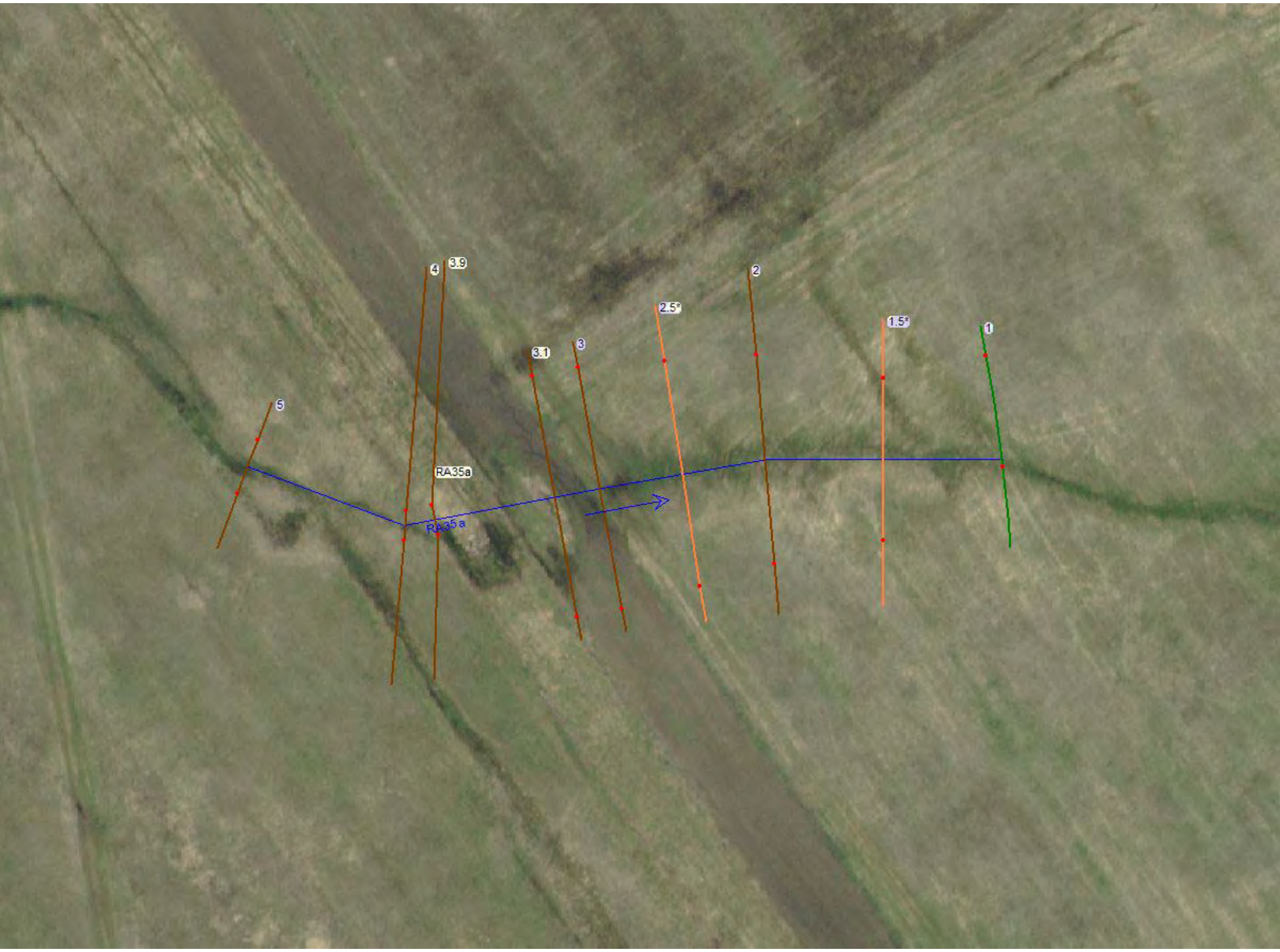
PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

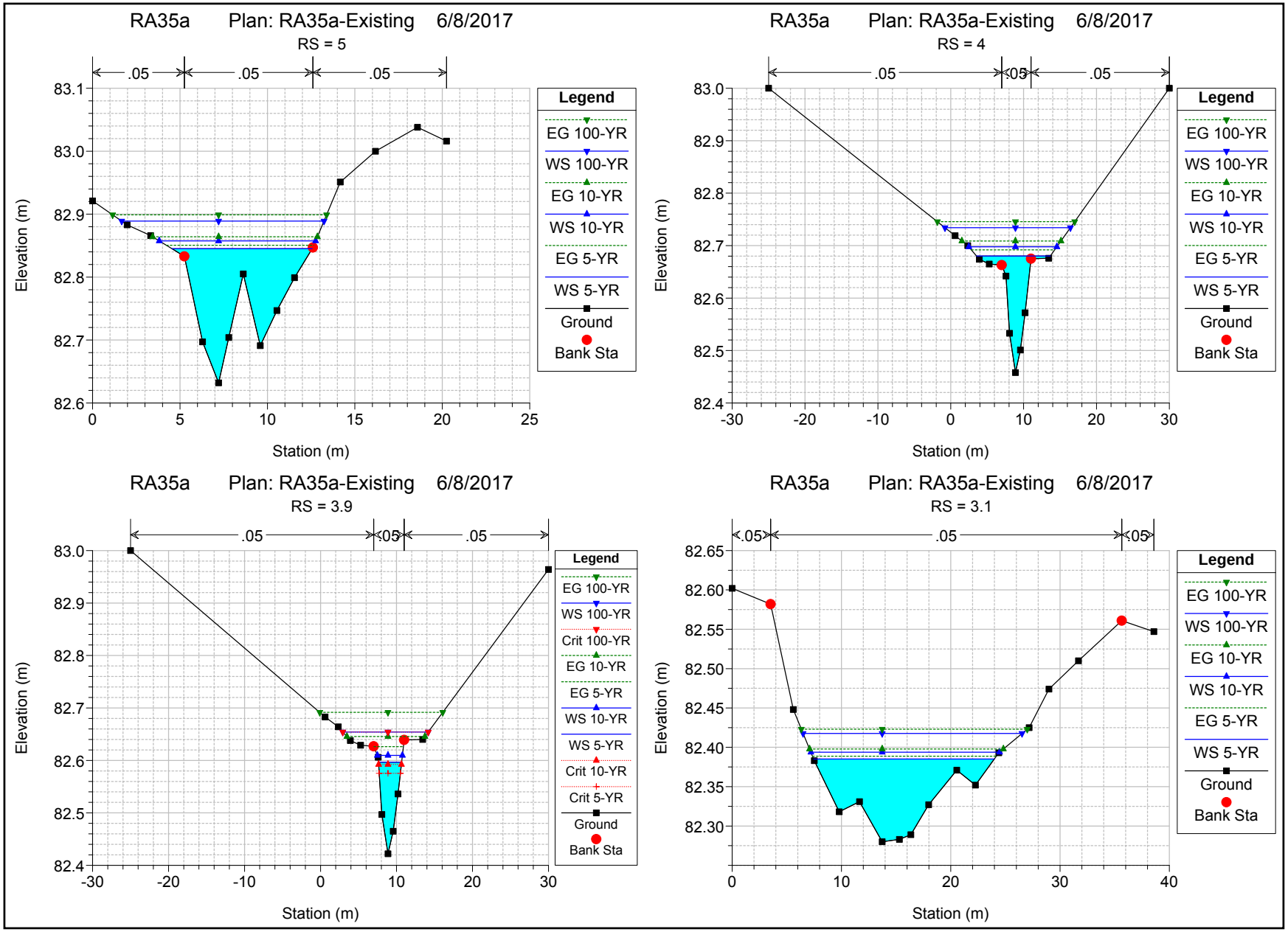
ACCESS ROAD
TURBINE S07 AND S14
PLAN AND PROFILE

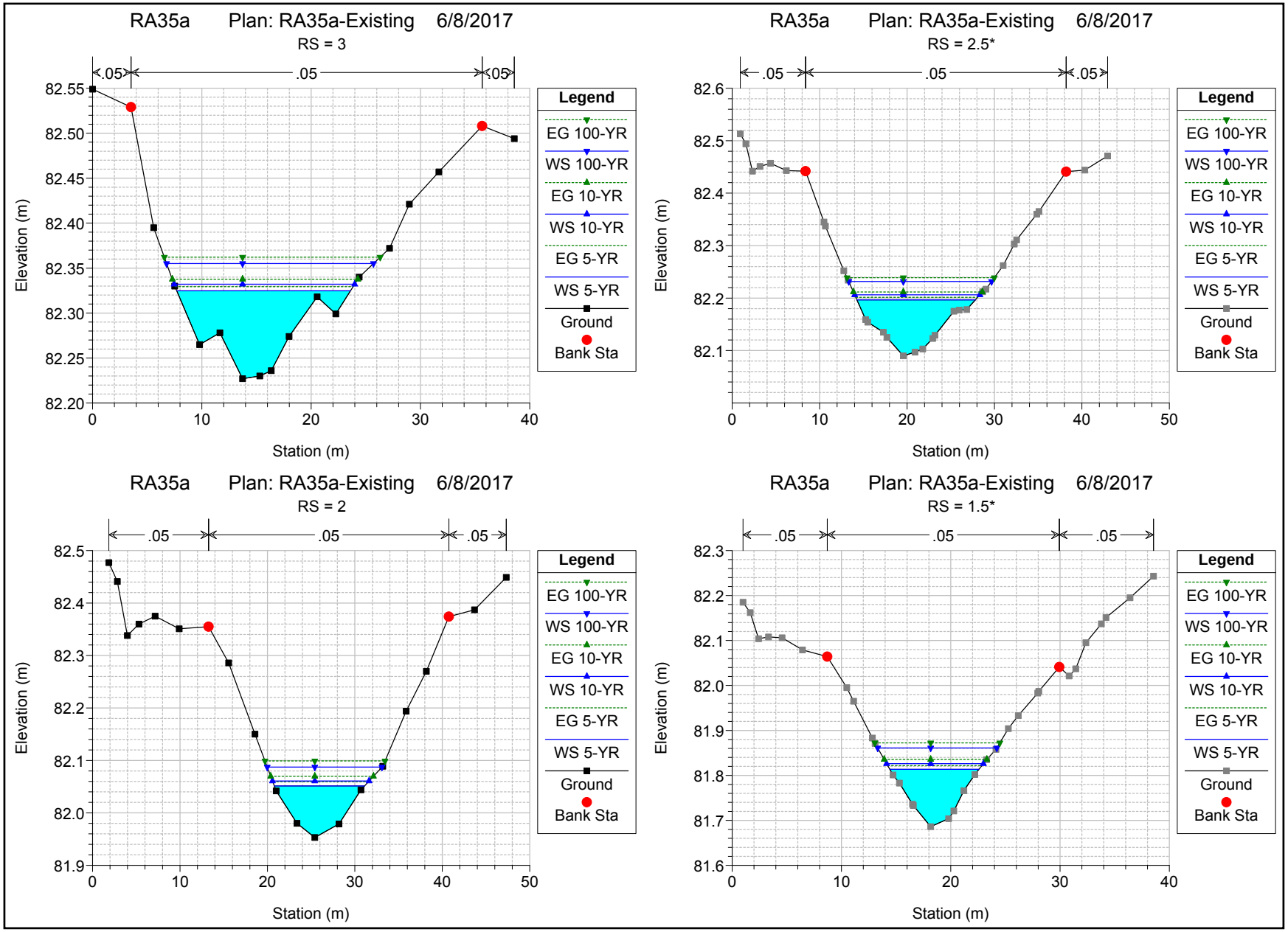
Project No.	Scale	Drawing No.	Sheet	Revision
133560100	1:1000H 1:100V	C212	1 of 3	B

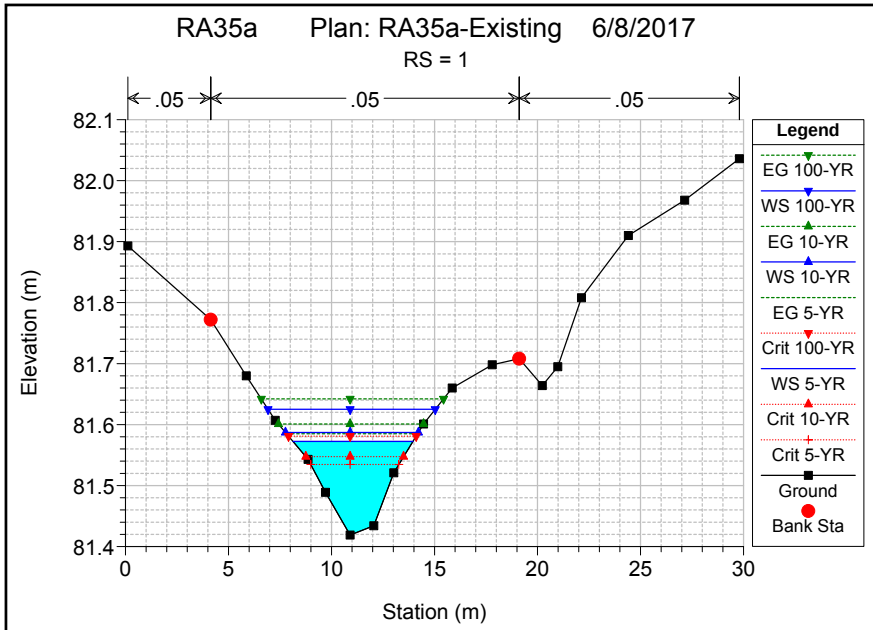

4
3.9
3.1
3
2.5°
2
1.5°
1
5
RA35a
RA35a

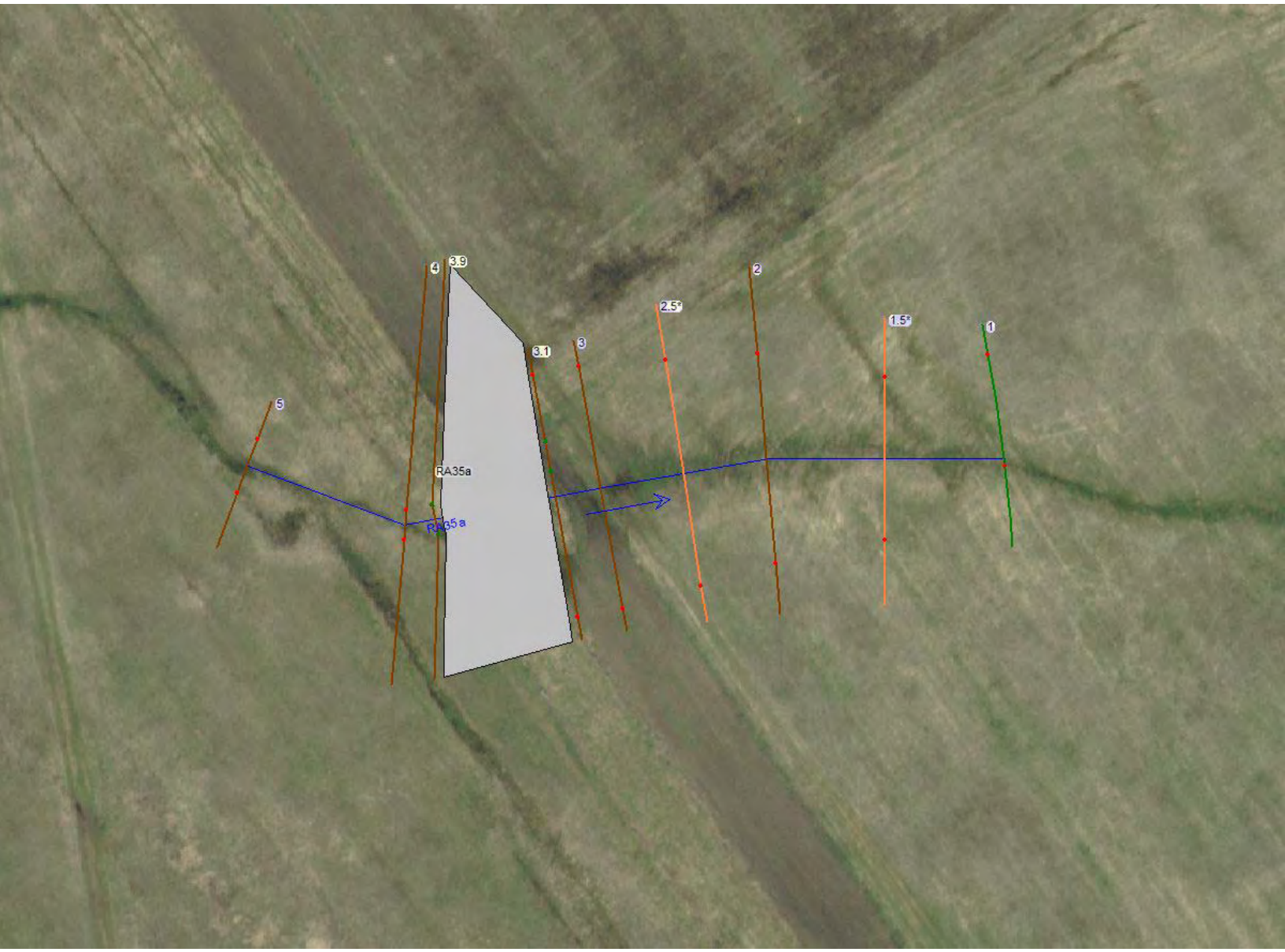
HEC-RAS Plan: Existing River: RA35a Reach: RA35a

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA35a	5	5-YR	0.24	82.63	82.85		82.85	0.005660	0.33	0.74	8.02	0.33	0.32	0.05	
RA35a	5	10-YR	0.30	82.63	82.86		82.86	0.005909	0.36	0.85	8.95	0.34	0.35	0.08	0.05
RA35a	5	100-YR	0.49	82.63	82.89		82.90	0.006711	0.45	1.17	11.56	0.38	0.42	0.15	0.12
RA35a	4	5-YR	0.24	82.46	82.68		82.69	0.009818	0.48	0.54	10.13	0.44	0.44	0.11	0.05
RA35a	4	10-YR	0.30	82.46	82.70		82.71	0.008418	0.49	0.73	12.08	0.42	0.41	0.16	0.13
RA35a	4	100-YR	0.49	82.46	82.73		82.75	0.007269	0.53	1.27	17.21	0.41	0.39	0.21	0.21
RA35a	3.9	5-YR	0.24	82.42	82.60	82.58	82.63	0.030724	0.76	0.31	3.05	0.76	0.76		
RA35a	3.9	10-YR	0.30	82.42	82.61	82.59	82.65	0.034876	0.84	0.35	3.30	0.82	0.84		
RA35a	3.9	100-YR	0.49	82.42	82.65	82.65	82.69	0.029376	0.88	0.65	11.24	0.78	0.76	0.25	0.19
RA35a	3.1	5-YR	0.24	82.28	82.39		82.39	0.008292	0.26	0.91	16.54	0.36	0.26		
RA35a	3.1	10-YR	0.30	82.28	82.39		82.40	0.008240	0.28	1.06	17.28	0.36	0.28		
RA35a	3.1	100-YR	0.49	82.28	82.42		82.42	0.008516	0.33	1.50	20.04	0.38	0.33		
RA35a	3	5-YR	0.24	82.23	82.32		82.33	0.012592	0.30	0.79	15.89	0.43	0.30		
RA35a	3	10-YR	0.30	82.23	82.33		82.34	0.012777	0.33	0.91	16.53	0.45	0.33		
RA35a	3	100-YR	0.49	82.23	82.36		82.36	0.012242	0.37	1.32	18.93	0.45	0.37		
RA35a	2.5*	5-YR	0.24	82.09	82.20		82.20	0.010315	0.30	0.79	13.55	0.40	0.30		
RA35a	2.5*	10-YR	0.30	82.09	82.21		82.21	0.010128	0.32	0.92	14.33	0.41	0.32		
RA35a	2.5*	100-YR	0.49	82.09	82.23		82.24	0.010124	0.37	1.31	16.33	0.42	0.37		
RA35a	2	5-YR	0.24	81.95	82.05		82.06	0.016986	0.39	0.61	10.32	0.52	0.39		
RA35a	2	10-YR	0.30	81.95	82.06		82.07	0.017350	0.42	0.71	11.04	0.53	0.42		
RA35a	2	100-YR	0.49	81.95	82.09		82.10	0.017090	0.48	1.03	13.12	0.55	0.48		
RA35a	1.5*	5-YR	0.24	81.69	81.81		81.82	0.013848	0.41	0.59	8.15	0.48	0.41		
RA35a	1.5*	10-YR	0.30	81.69	81.83		81.84	0.013560	0.43	0.70	8.86	0.49	0.43		
RA35a	1.5*	100-YR	0.49	81.69	81.86		81.87	0.012784	0.47	1.04	10.89	0.49	0.47		
RA35a	1	5-YR	0.24	81.42	81.57	81.53	81.59	0.017008	0.50	0.48	5.82	0.55	0.50		
RA35a	1	10-YR	0.30	81.42	81.59	81.55	81.60	0.017019	0.52	0.57	6.45	0.56	0.52		
RA35a	1	100-YR	0.49	81.42	81.63	81.58	81.64	0.017001	0.58	0.85	8.11	0.57	0.58		


RA35a Plan: RA35a-Existing 6/8/2017
RS = 5
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Existing 6/8/2017
RS = 4
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Existing 6/8/2017
RS = 3.9
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
Crit 100-YR
EG 10-YR
EG 5-YR
WS 10-YR
WS 5-YR
Crit 10-YR
Crit 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Existing 6/8/2017
RS = 3.1
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta

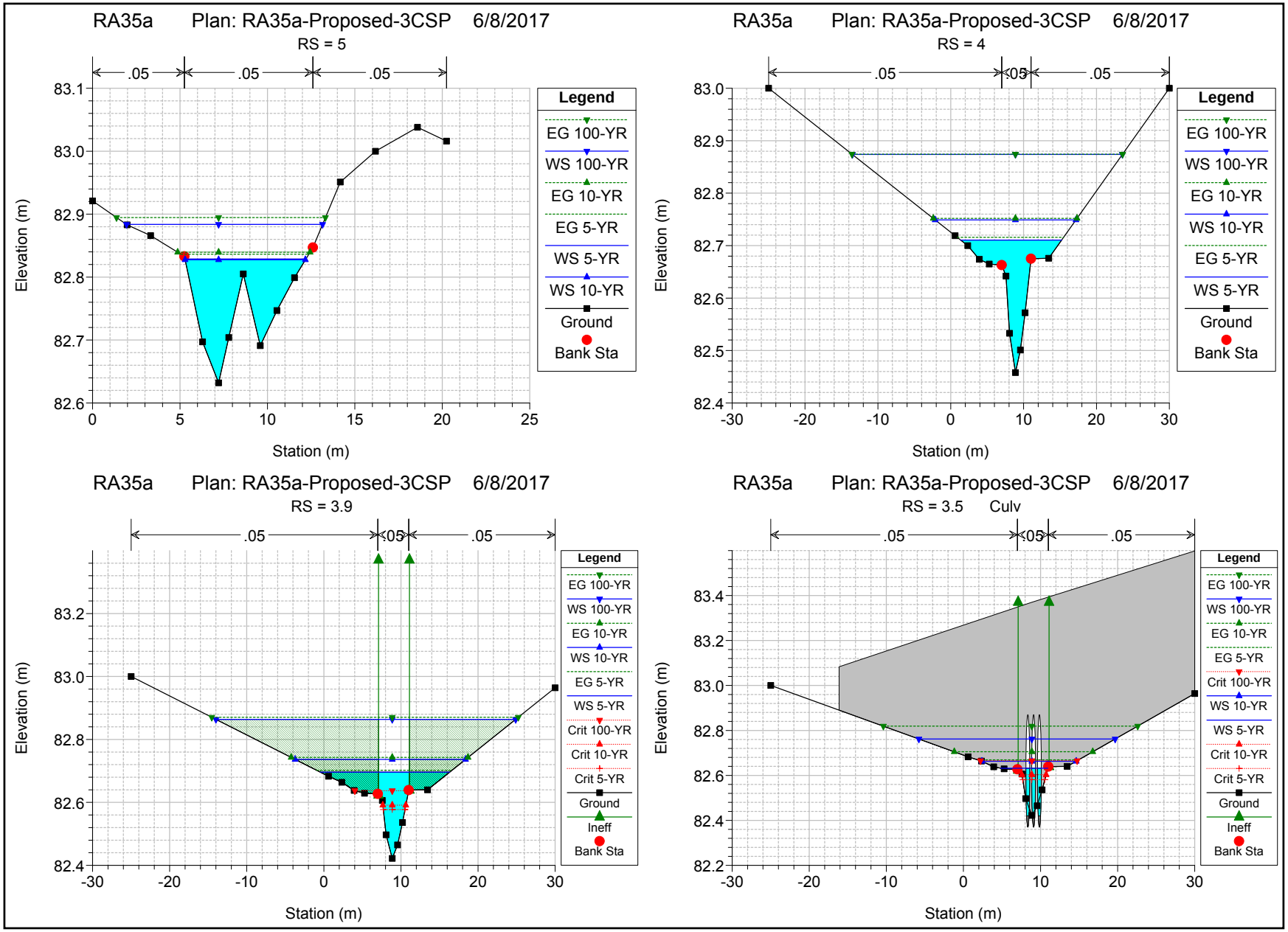

RA35a Plan: RA35a-Existing 6/8/2017
RS = 3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Existing 6/8/2017
RS = 2.5*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Existing 6/8/2017
RS = 2
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Existing 6/8/2017
RS = 1.5*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta

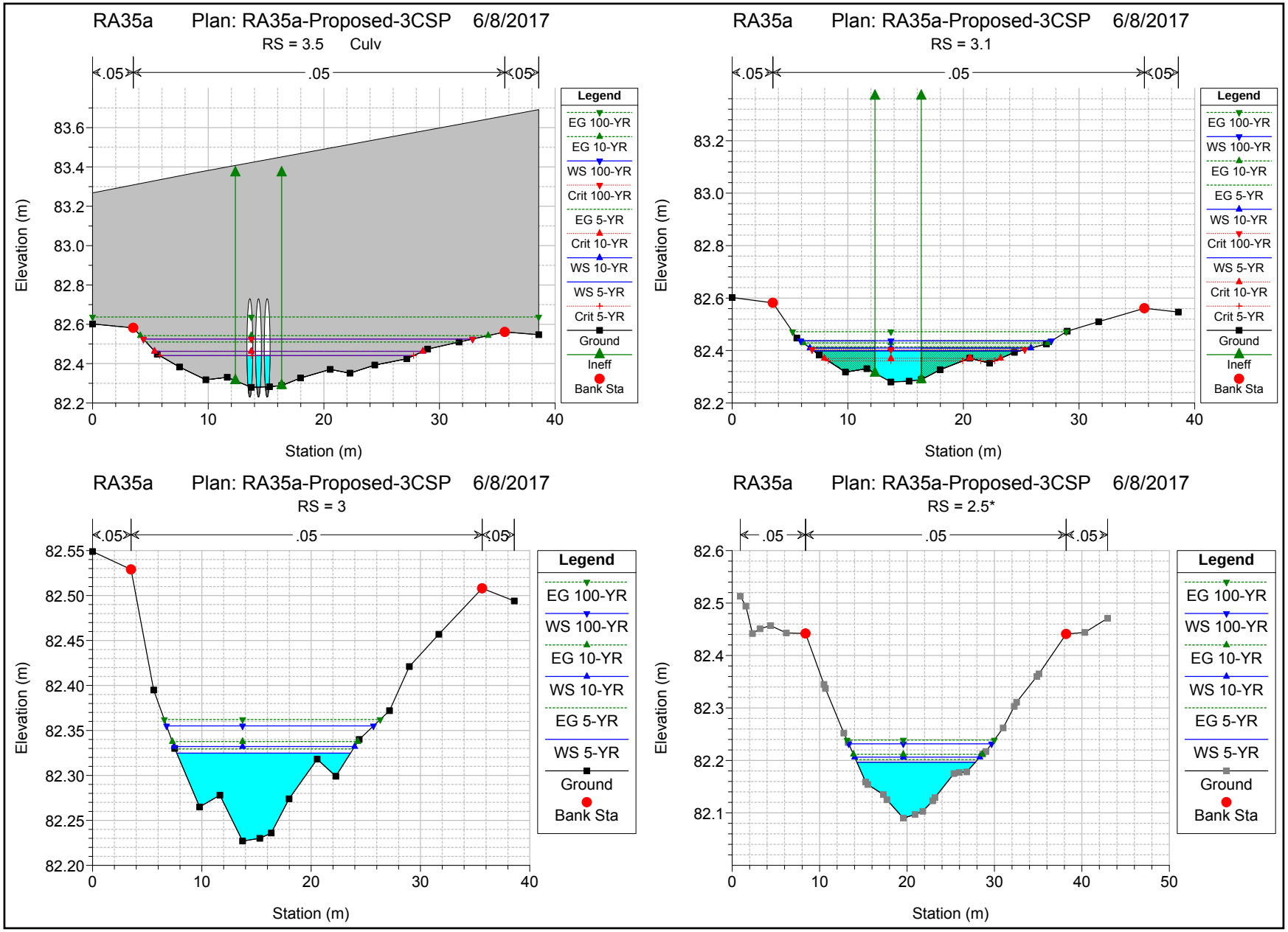

RA35a Plan: RA35a-Existing 6/8/2017
RS = 1
.05
.05
.05
Elevation (m)
82.1
82.0
81.9
81.8
81.7
81.6
81.5
81.4
0
5
10
15
20
25
30
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
Crit 100-YR
WS 5-YR
Crit 10-YR
Crit 5-YR
Ground
Bank Sta

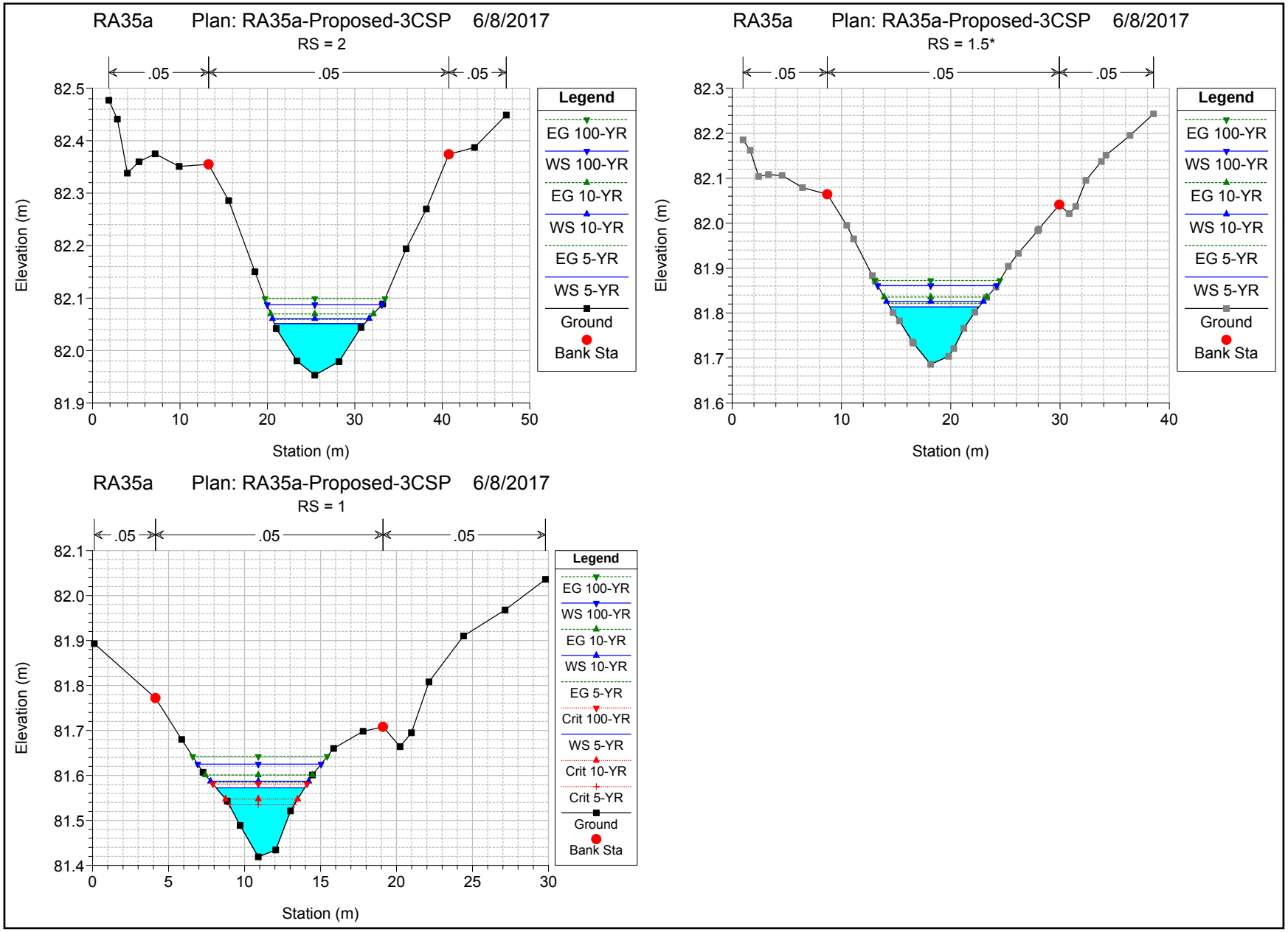

4
3.9
3.1
3
2.5°
2
1.5°
1
5
RA35a
RA35a

HEC-RAS Plan: Proposed-3CSP River: RA35a Reach: RA35a

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA35a	5	5-YR	0.24	82.63	82.83		82.84	0.009383	0.39	0.62	6.92	0.41	0.39		
RA35a	5	10-YR	0.30	82.63	82.83		82.84	0.015038	0.49	0.61	6.88	0.52	0.49		
RA35a	5	100-YR	0.49	82.63	82.88		82.89	0.007719	0.47	1.11	11.20	0.40	0.44	0.14	0.12
RA35a	4	5-YR	0.24	82.46	82.71		82.72	0.003583	0.34	0.90	13.85	0.28	0.27	0.12	0.11
RA35a	4	10-YR	0.30	82.46	82.75		82.75	0.001739	0.27	1.54	19.31	0.20	0.19	0.11	0.11
RA35a	4	100-YR	0.49	82.46	82.87		82.87	0.000278	0.15	5.05	37.04	0.09	0.10	0.08	0.08
RA35a	3.9	5-YR	0.24	82.42	82.70	82.58	82.70	0.003116	0.35	0.69	16.74	0.27	0.35		0.17
RA35a	3.9	10-YR	0.30	82.42	82.74	82.59	82.74	0.002385	0.35	0.85	22.10	0.24	0.35		0.21
RA35a	3.9	100-YR	0.49	82.42	82.86	82.64	82.87	0.001377	0.36	1.36	38.87	0.20	0.36		0.27
RA35a	3.5		Culvert												
RA35a	3.1	5-YR	0.24	82.28	82.40	82.36	82.41	0.013855	0.54	0.44	17.84	0.52	0.54		
RA35a	3.1	10-YR	0.30	82.28	82.41	82.37	82.43	0.015607	0.61	0.49	19.11	0.56	0.61		
RA35a	3.1	100-YR	0.49	82.28	82.44	82.40	82.47	0.021650	0.83	0.60	21.69	0.68	0.83		
RA35a	3	5-YR	0.24	82.23	82.32		82.33	0.012592	0.30	0.79	15.89	0.43	0.30		
RA35a	3	10-YR	0.30	82.23	82.33		82.34	0.012777	0.33	0.91	16.53	0.45	0.33		
RA35a	3	100-YR	0.49	82.23	82.36		82.36	0.012242	0.37	1.32	18.93	0.45	0.37		
RA35a	2.5*	5-YR	0.24	82.09	82.20		82.20	0.010315	0.30	0.79	13.55	0.40	0.30		
RA35a	2.5*	10-YR	0.30	82.09	82.21		82.21	0.010128	0.32	0.92	14.33	0.41	0.32		
RA35a	2.5*	100-YR	0.49	82.09	82.23		82.24	0.010124	0.37	1.31	16.33	0.42	0.37		
RA35a	2	5-YR	0.24	81.95	82.05		82.06	0.016986	0.39	0.61	10.32	0.52	0.39		
RA35a	2	10-YR	0.30	81.95	82.06		82.07	0.017350	0.42	0.71	11.04	0.53	0.42		
RA35a	2	100-YR	0.49	81.95	82.09		82.10	0.017090	0.48	1.03	13.12	0.55	0.48		
RA35a	1.5*	5-YR	0.24	81.69	81.81		81.82	0.013848	0.41	0.59	8.15	0.48	0.41		
RA35a	1.5*	10-YR	0.30	81.69	81.83		81.84	0.013560	0.43	0.70	8.86	0.49	0.43		
RA35a	1.5*	100-YR	0.49	81.69	81.86		81.87	0.012784	0.47	1.04	10.89	0.49	0.47		
RA35a	1	5-YR	0.24	81.42	81.57	81.53	81.59	0.017008	0.50	0.48	5.82	0.55	0.50		
RA35a	1	10-YR	0.30	81.42	81.59	81.55	81.60	0.017019	0.52	0.57	6.45	0.56	0.52		
RA35a	1	100-YR	0.49	81.42	81.63	81.58	81.64	0.017001	0.58	0.85	8.11	0.57	0.58		


RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 5
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
EG 5-YR
WS 5-YR
WS 10-YR
Ground
Bank Sta
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 4
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 3.9
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Crit 100-YR
Crit 10-YR
Crit 5-YR
Ground
Ineff
Bank Sta
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 3.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
EG 5-YR
Crit 100-YR
WS 10-YR
WS 5-YR
Crit 10-YR
Crit 5-YR
Ground
Ineff
Bank Sta


RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 3.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
EG 10-YR
WS 100-YR
Crit 100-YR
EG 5-YR
Crit 10-YR
WS 10-YR
WS 5-YR
Crit 5-YR
Ground
Ineff
Bank Sta
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 3.1
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 3
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 2.5*


RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 2
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 1.5*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
WS 5-YR
Ground
Bank Sta
RA35a Plan: RA35a-Proposed-3CSP 6/8/2017
RS = 1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-YR
WS 100-YR
EG 10-YR
WS 10-YR
EG 5-YR
Crit 100-YR
WS 5-YR
Crit 10-YR
Crit 5-YR
Ground
Bank Sta

RA35B – HYDRAULIC MODELING

SEE DRAWING C302
FOR ADDITIONAL ACCESS
ROAD DETAILS

CONTRACTOR TO MAINTAIN
EXISTING DRAINAGE FLOWS
AS REQUIRED

FOR ENTRANCE DETAIL AND
CONSTRUCTION NOTES SEE
"TEMPORARY ENTRANCE
LAYOUT" DRAWING C212–Ent

SOUTH SHORE ROAD

LAKE ONTARIO

S14
ACCESS ROAD

ACCESS ROAD BUMP–OUT
LOCATIONS TO BE
FIELD DETERMINED
(SEE DWG. C302 FOR DETAILS)

RIGHT OF WAY

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+072.95
N = 4890585.02
E = 367380.84

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+080.35
N = 4890590.85
E = 367376.27

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+000.00
N = 4890533.44
E = 367402.36

ALIGNMENT / – (S14–S07–ACCESS)
STA = 1+053.23
N = 4890570.35
E = 367394.01

PI STA = 1+076.66
Δ = 7.715°
R = 55.00m
Lc = 7.400m
T = 3.708m

REMOVAL & REPLACEMENT
OF EXISTING FENCING

OVERBUILD
(SEE NOTE, 8)
TYP.

ACCESS ROAD
ALIGNMENT
(SEE NOTE 6)

RIP–RAP R–50
(OPSS 1004)
2.4mx3.1m
(BOTH ENDS)

14.0m – 560x420mmø
PIPE ARCH @ 1.60%
W. INV.=81.14
E. INV.=80.92

RIP–RAP R–50
(OPSS 1004)
2.4mx3.1m
(BOTH ENDS)

LIMIT OF
GRADING
(TYP.)

5.0m WIDE
ROADWAY

14.0m – 3x500mmø
CULVERT @ 1.00%
W. INV.=82.37
E. INV.=82.23

SILT FENCE
(LOCATION TO BE
FIELD DETERMINED)

RESTORE SLOPES AND
DISTURBED AREAS WITH
TOPSOIL, SEED AND COVER
AS REQUIRED (TYP.)

SILT FENCE
(LOCATION TO BE
FIELD DETERMINED)

ALIGNMENT – (S14–S07–ACCESS)
STA = 1+486.49
N = 4890926.77
E = 367148.00

RIP–RAP R–50
(OPSS 1004)
2.4mx4.6m
(BOTH ENDS)

LIMIT OF
CONSTRUCTIBLE
AREA (TYP.)

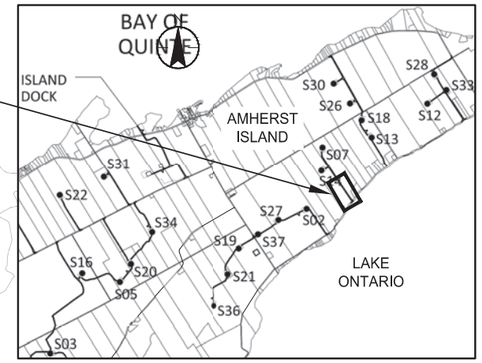
EQUALIZATION CULVERT
(LOCATION TO BE
FIELD DETERMINED)

14.0m – 3X1000mmø
CULVERT @ 1.05%
W. INV.=85.20
E. INV.=85.05

PROPERTY LINE
(APPROX. LOCATION)

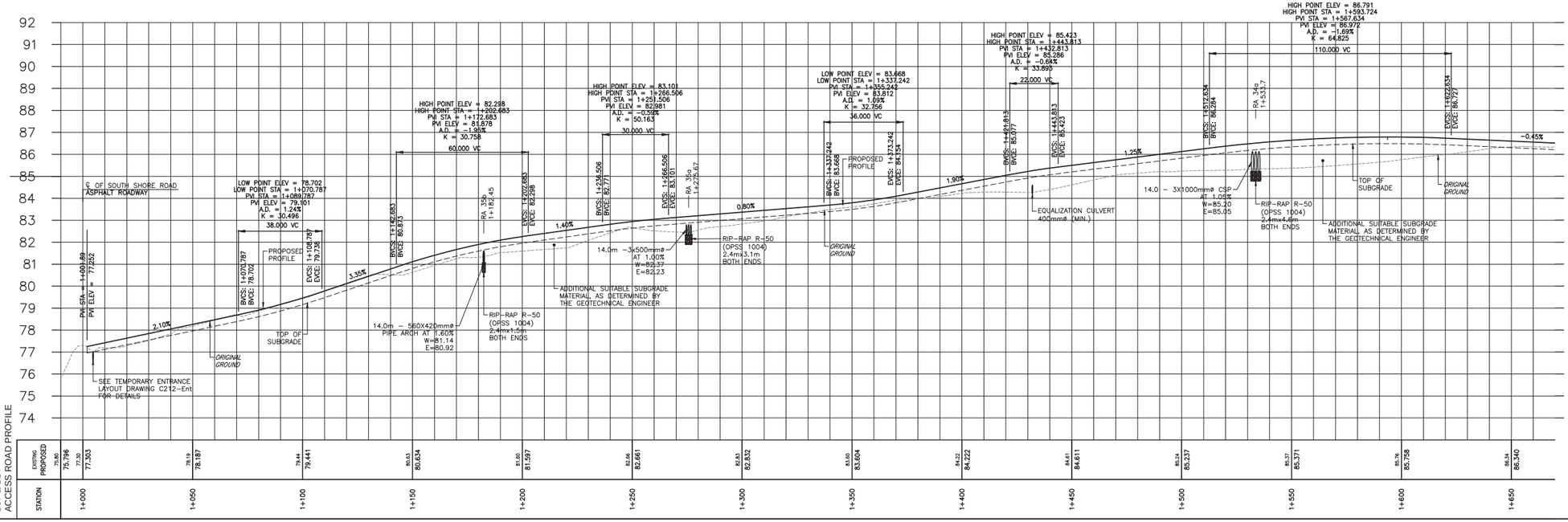
(SEE DWG. NO. C212–SHEET 2)

PLAN
LOCATION



KEY PLAN
N.T.S

S07 & S14
ACCESS ROAD PROFILE



STATION	1+000	1+050	1+100	1+150	1+200	1+250	1+300	1+350	1+400	1+450	1+500	1+550	1+600	1+650
EXISTING	75.80		78.19		79.44		80.61	81.60	82.46		84.22		85.57		86.34
PROPOSED	75.796	77.303	78.187	79.441	80.634	81.597	82.661	82.832	83.604	84.222	84.611	85.237	85.371	85.758	86.340

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 — EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 — PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****

Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations

☐ Reviewed - No comments
☐ Reviewed - Incorporate comments and resubmit
☐ Reviewed - Not accepted

Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	16.02.02
Revision		By	Appd.	YY.MM.DD

File Name: C212_133560100-turbine S07-S14.DWG	RCL/DH	MPG	RCL	15.12.03
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

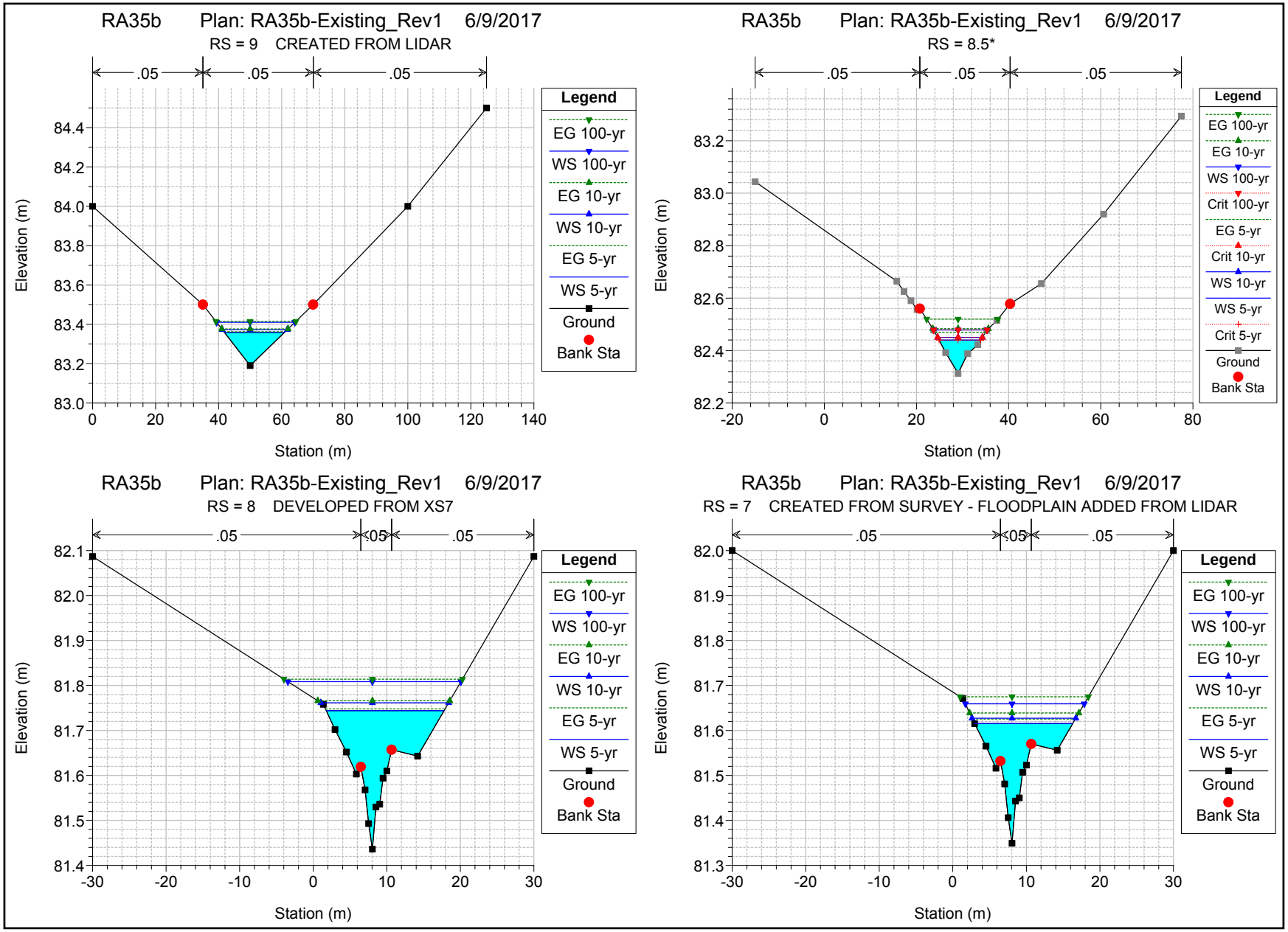
ACCESS ROAD
TURBINE S07 AND S14
PLAN AND PROFILE

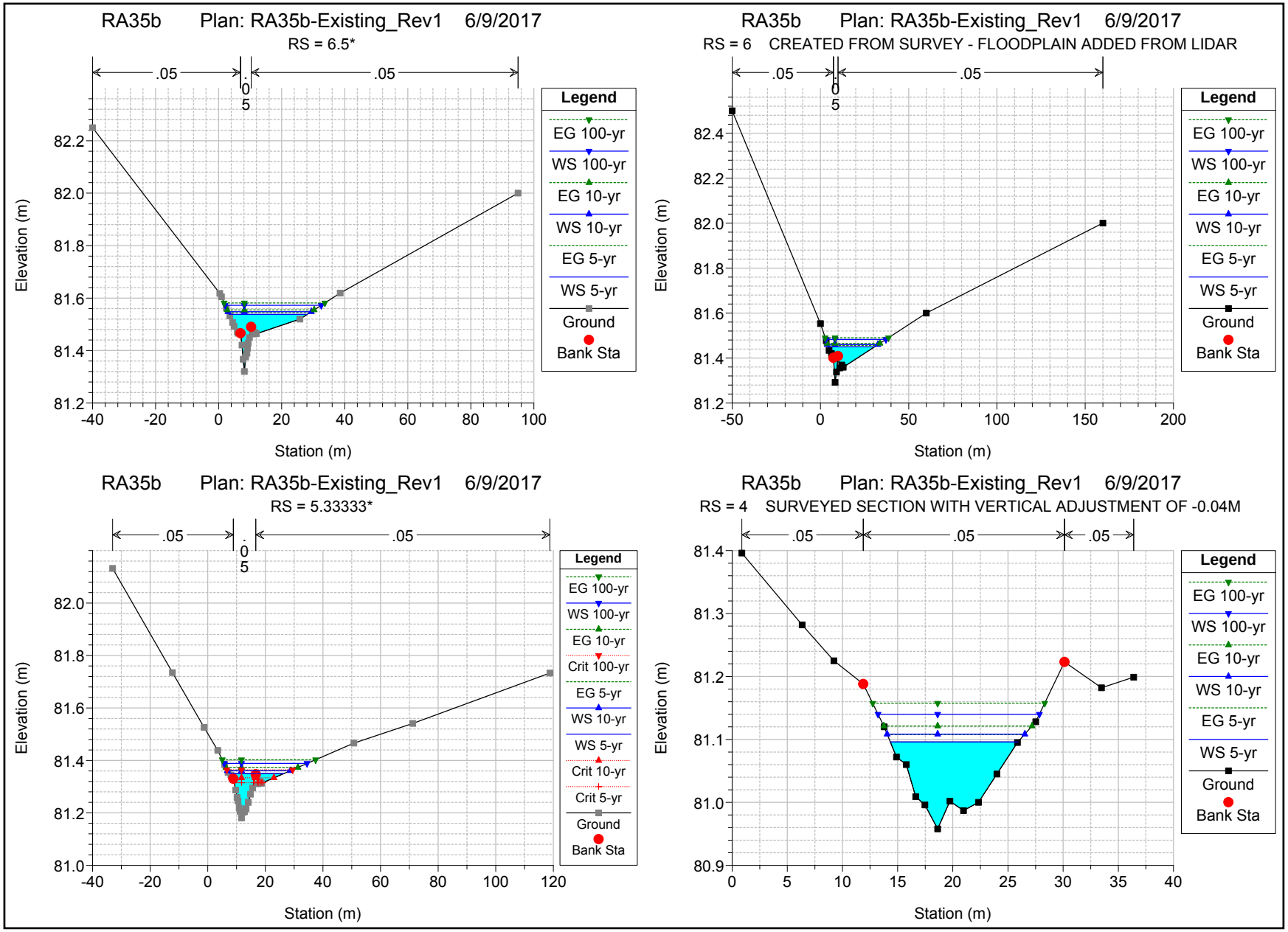
Project No.	Scale	Drawing No.	Sheet	Revision
133560100	1:1000H 1:100V	C212	1 of 3	B

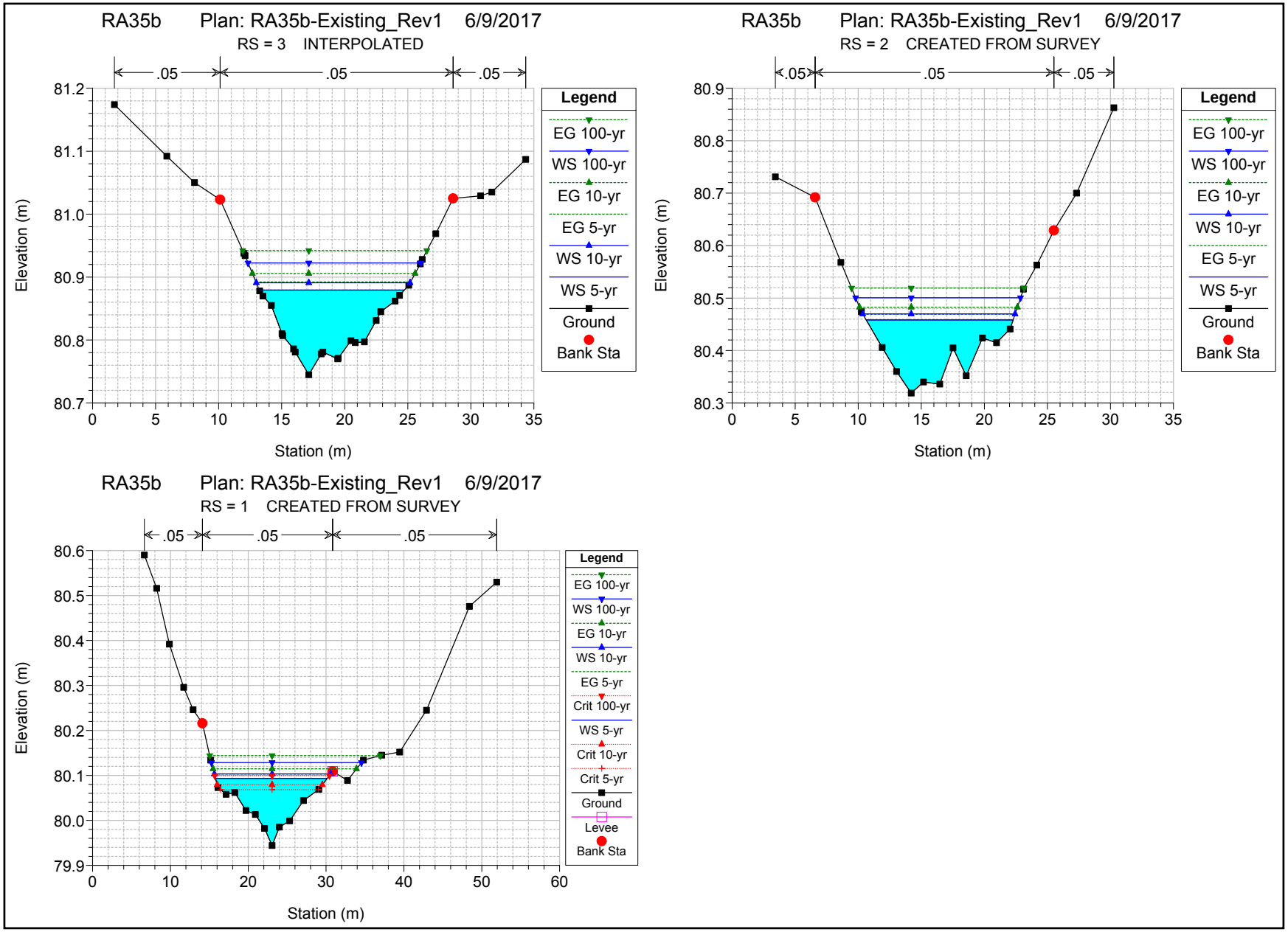

9
8.5°
8
7
6
6.5°
5.33333°
4
3
2
1
RA35b
RA35b

HEC-RAS Plan: Existing_Rev1 River: RA35b Reach: RA35b

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA35b	9	5-yr	0.41	83.19	83.36		83.36	0.004445	0.26	1.61	19.05	0.28	0.26		
RA35b	9	10-yr	0.51	83.19	83.37		83.38	0.004475	0.27	1.89	20.64	0.29	0.27		
RA35b	9	100-yr	0.84	83.19	83.41		83.41	0.004546	0.31	2.73	24.83	0.30	0.31		
RA35b	8.5*	5-yr	0.41	82.31	82.44	82.44	82.47	0.063547	0.77	0.54	9.06	1.00	0.77		
RA35b	8.5*	10-yr	0.51	82.31	82.45	82.45	82.48	0.062174	0.81	0.63	9.72	1.01	0.81		
RA35b	8.5*	100-yr	0.84	82.31	82.48	82.48	82.52	0.058170	0.90	0.94	11.60	1.01	0.90		
RA35b	8	5-yr	0.41	81.44	81.74		81.75	0.002444	0.32	1.68	16.03	0.24	0.25	0.18	0.17
RA35b	8	10-yr	0.51	81.44	81.76		81.77	0.002504	0.35	1.97	17.38	0.24	0.26	0.19	0.19
RA35b	8	100-yr	0.84	81.44	81.81		81.81	0.002652	0.41	2.93	23.53	0.26	0.29	0.19	0.24
RA35b	7	5-yr	0.41	81.35	81.62		81.63	0.007919	0.50	1.06	13.36	0.41	0.39	0.26	0.22
RA35b	7	10-yr	0.51	81.35	81.63		81.64	0.008507	0.54	1.23	14.12	0.43	0.42	0.29	0.26
RA35b	7	100-yr	0.84	81.35	81.66		81.68	0.009769	0.65	1.71	16.16	0.48	0.49	0.36	0.35
RA35b	6.5*	5-yr	0.41	81.32	81.54		81.54	0.008139	0.46	1.37	24.75	0.41	0.30	0.23	0.22
RA35b	6.5*	10-yr	0.51	81.32	81.55		81.56	0.007988	0.48	1.64	26.47	0.41	0.31	0.25	0.24
RA35b	6.5*	100-yr	0.84	81.32	81.57		81.58	0.008622	0.56	2.33	30.51	0.44	0.36	0.30	0.30
RA35b	6	5-yr	0.41	81.29	81.45		81.46	0.009792	0.44	1.39	26.39	0.43	0.30	0.18	0.27
RA35b	6	10-yr	0.51	81.29	81.46		81.47	0.009567	0.46	1.66	28.64	0.43	0.31	0.20	0.28
RA35b	6	100-yr	0.84	81.29	81.48		81.49	0.009943	0.53	2.39	34.12	0.46	0.35	0.26	0.33
RA35b	5.33333*	5-yr	0.41	81.18	81.35	81.31	81.36	0.014021	0.50	0.97	18.98	0.51	0.43	0.10	0.18
RA35b	5.33333*	10-yr	0.51	81.18	81.36	81.33	81.37	0.013684	0.53	1.19	21.88	0.51	0.43	0.15	0.21
RA35b	5.33333*	100-yr	0.84	81.18	81.39	81.36	81.40	0.012737	0.59	1.89	28.79	0.52	0.45	0.23	0.27
RA35b	4	5-yr	0.41	80.96	81.10		81.11	0.017922	0.48	0.87	11.58	0.55	0.48		
RA35b	4	10-yr	0.51	80.96	81.11		81.12	0.018083	0.50	1.01	12.48	0.56	0.50		
RA35b	4	100-yr	0.84	80.96	81.14		81.16	0.018700	0.58	1.45	14.62	0.59	0.58		
RA35b	3	5-yr	0.41	80.74	80.88		80.89	0.021810	0.51	0.81	11.50	0.61	0.51		
RA35b	3	10-yr	0.51	80.74	80.89		80.91	0.021524	0.54	0.95	12.20	0.61	0.54		
RA35b	3	100-yr	0.84	80.74	80.92		80.94	0.020954	0.62	1.36	13.70	0.63	0.62		
RA35b	2	5-yr	0.41	80.32	80.46		80.47	0.017058	0.47	0.88	11.65	0.54	0.47		
RA35b	2	10-yr	0.51	80.32	80.47		80.48	0.017149	0.50	1.02	12.09	0.55	0.50		
RA35b	2	100-yr	0.84	80.32	80.50		80.52	0.017668	0.60	1.41	13.09	0.58	0.60		
RA35b	1	5-yr	0.41	79.94	80.09	80.07	80.10	0.018105	0.44	0.94	14.95	0.55	0.44		0.05
RA35b	1	10-yr	0.51	79.94	80.10	80.08	80.11	0.018103	0.47	1.10	16.96	0.55	0.46		0.10
RA35b	1	100-yr	0.84	79.94	80.13	80.10	80.14	0.018103	0.56	1.57	19.28	0.58	0.54		0.23


RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 9 CREATED FROM LIDAR
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 8.5*
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-yr
EG 10-yr
WS 100-yr
Crit 100-yr
EG 5-yr
Crit 10-yr
WS 10-yr
WS 5-yr
Crit 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 8 DEVELOPED FROM XS7
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 7 CREATED FROM SURVEY - FLOODPLAIN ADDED FROM LIDAR
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta


RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 6.5*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 6 CREATED FROM SURVEY - FLOODPLAIN ADDED FROM LIDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 5.33333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
Crit 100-yr
EG 5-yr
WS 10-yr
WS 5-yr
Crit 10-yr
Crit 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 4 SURVEYED SECTION WITH VERTICAL ADJUSTMENT OF -0.04M
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta


RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 3 INTERPOLATED
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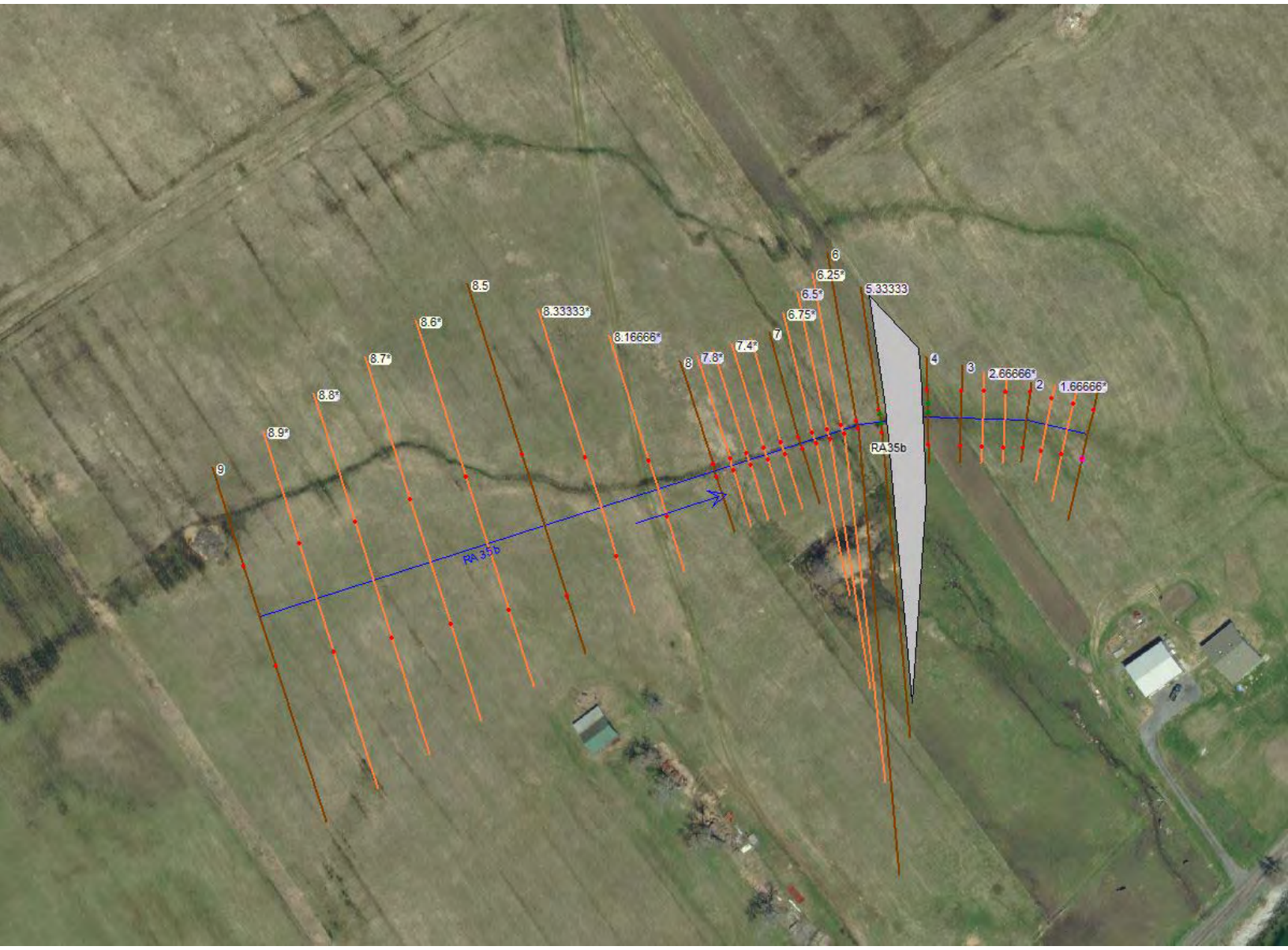
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 2 CREATED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Existing_Rev1 6/9/2017
RS = 1 CREATED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
Crit 100-yr
WS 5-yr
Crit 10-yr
Crit 5-yr
Ground
Levee
Bank Sta

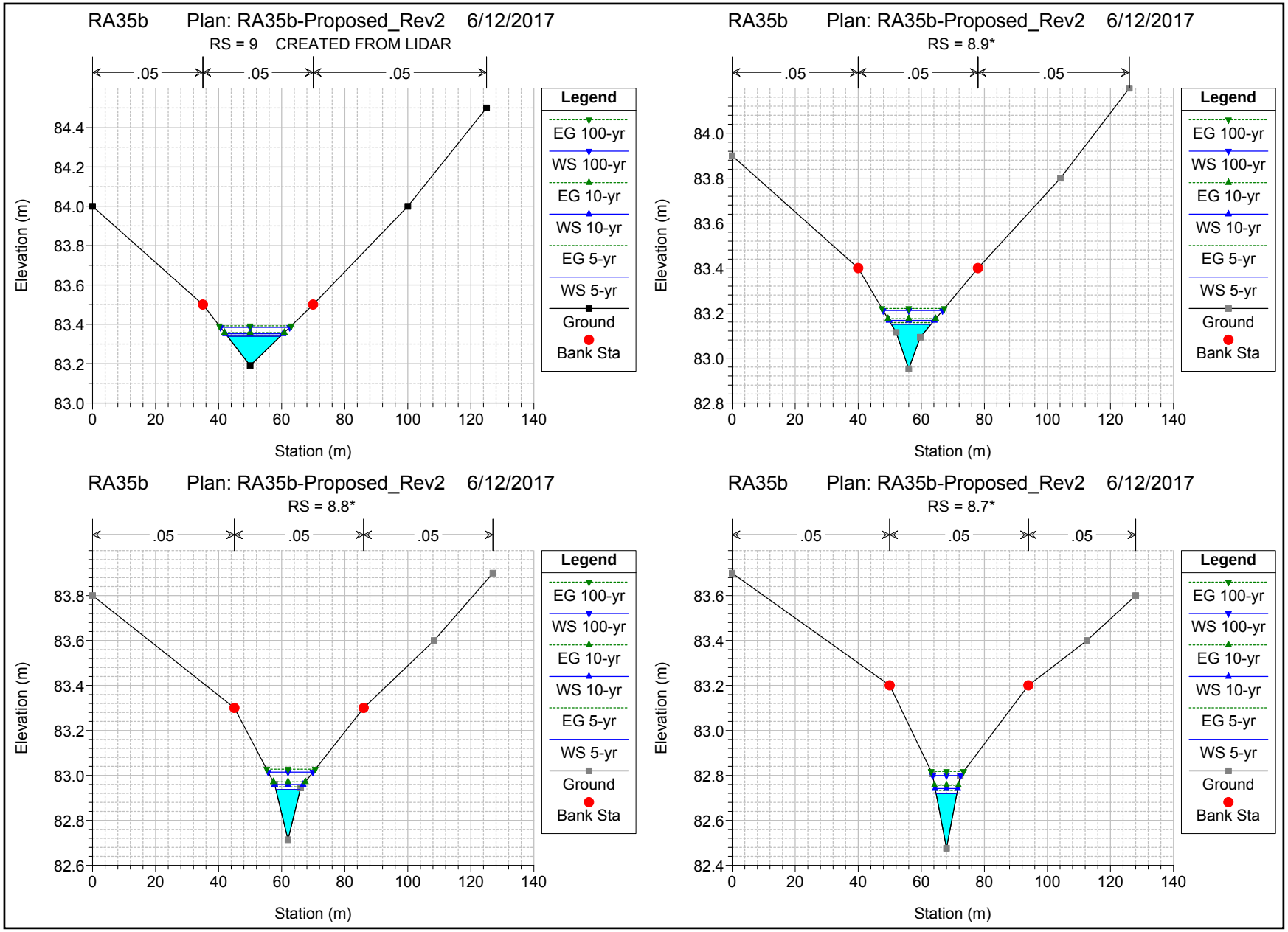

9
8.9°
8.8°
8.7°
8.6°
8.5
8.33333°
8.16666°
8
7.8°
7.4°
7
6.75°
6.5°
6.25°
6
5.33333
4
3
2.66666°
2
1.66666°
RA35b
RA35b

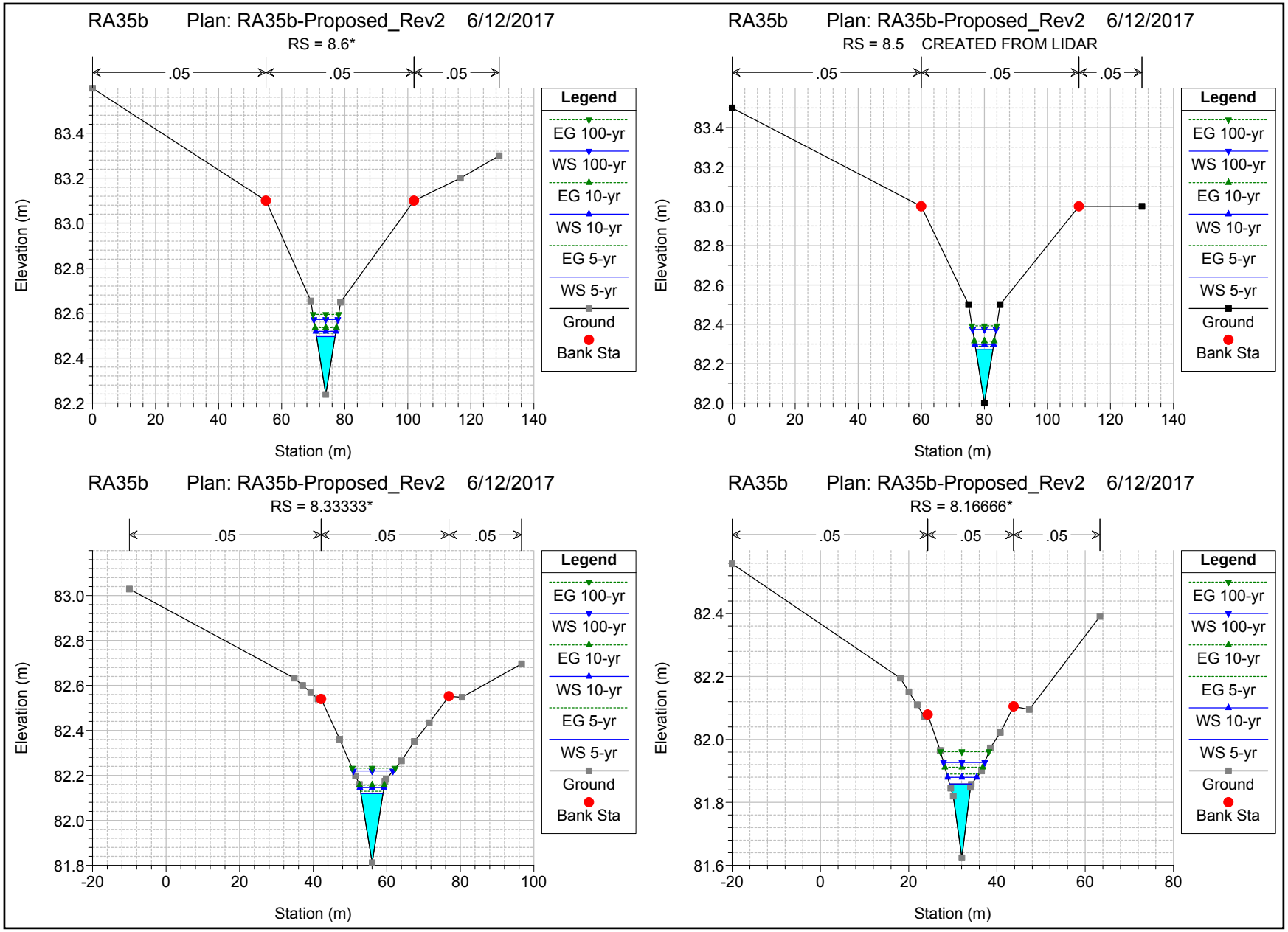
HEC-RAS Plan: ProposedRev2 River: RA35b Reach: RA35b

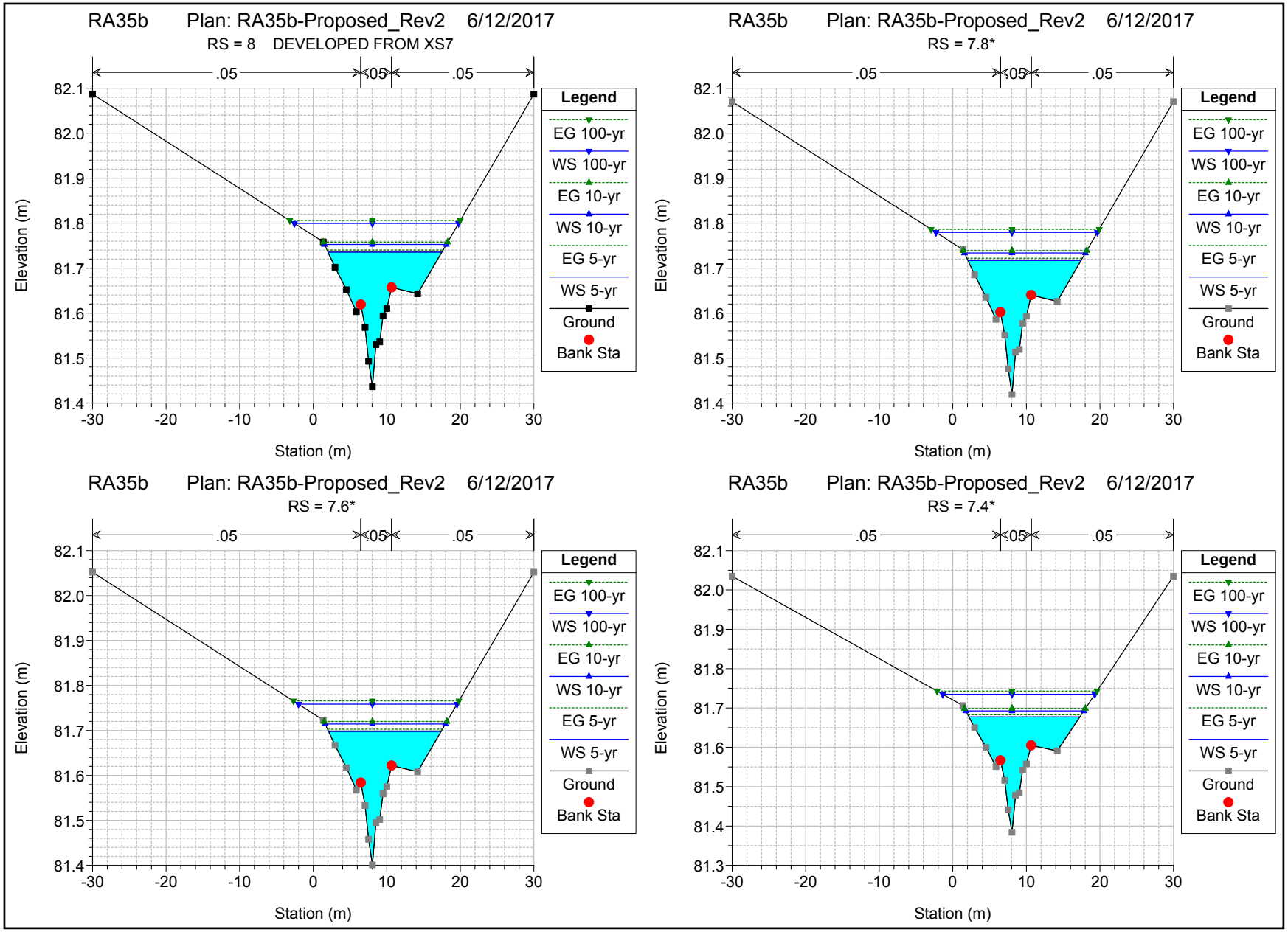
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA35b	9	5-yr	0.41	83.19	83.34		83.34	0.008560	0.33	1.26	16.85	0.38	0.33		
RA35b	9	10-yr	0.51	83.19	83.35		83.36	0.008589	0.35	1.48	18.26	0.39	0.35		
RA35b	9	100-yr	0.84	83.19	83.38		83.39	0.008822	0.40	2.13	21.93	0.41	0.40		
RA35b	8.9*	5-yr	0.41	82.95	83.15		83.16	0.010317	0.39	1.06	12.55	0.43	0.39		
RA35b	8.9*	10-yr	0.51	82.95	83.17		83.18	0.009777	0.40	1.29	14.31	0.42	0.40		
RA35b	8.9*	100-yr	0.84	82.95	83.21		83.22	0.008539	0.42	2.02	18.82	0.41	0.42		
RA35b	8.8*	5-yr	0.41	82.71	82.94		82.95	0.010731	0.48	0.86	7.70	0.46	0.48		
RA35b	8.8*	10-yr	0.51	82.71	82.96		82.97	0.010733	0.49	1.04	9.03	0.46	0.49		
RA35b	8.8*	100-yr	0.84	82.71	83.01		83.03	0.010802	0.50	1.68	14.19	0.46	0.50		
RA35b	8.7*	5-yr	0.41	82.48	82.72		82.73	0.010898	0.51	0.80	6.60	0.47	0.51		
RA35b	8.7*	10-yr	0.51	82.48	82.74		82.76	0.010632	0.54	0.96	7.20	0.47	0.54		
RA35b	8.7*	100-yr	0.84	82.48	82.80		82.82	0.010305	0.60	1.41	8.84	0.48	0.60		
RA35b	8.6*	5-yr	0.41	82.24	82.50		82.51	0.011488	0.55	0.76	5.87	0.48	0.55		
RA35b	8.6*	10-yr	0.51	82.24	82.52		82.54	0.011248	0.57	0.90	6.39	0.49	0.57		
RA35b	8.6*	100-yr	0.84	82.24	82.57		82.59	0.012157	0.67	1.27	7.60	0.52	0.67		
RA35b	8.5	5-yr	0.41	82.00	82.27		82.29	0.010825	0.55	0.75	5.47	0.48	0.55		
RA35b	8.5	10-yr	0.51	82.00	82.30		82.31	0.010601	0.58	0.89	5.96	0.48	0.58		
RA35b	8.5	100-yr	0.84	82.00	82.37		82.39	0.008673	0.61	1.39	7.47	0.45	0.61		
RA35b	8.33333*	5-yr	0.41	81.81	82.12		82.13	0.006079	0.45	0.92	6.01	0.36	0.45		
RA35b	8.33333*	10-yr	0.51	81.81	82.15		82.16	0.006051	0.47	1.09	6.53	0.37	0.47		
RA35b	8.33333*	100-yr	0.84	81.81	82.22		82.23	0.007343	0.50	1.69	10.76	0.40	0.50		
RA35b	8.16666*	5-yr	0.41	81.62	81.86		81.89	0.032063	0.79	0.52	5.00	0.78	0.79		
RA35b	8.16666*	10-yr	0.51	81.62	81.88		81.91	0.035257	0.80	0.64	6.57	0.81	0.80		
RA35b	8.16666*	100-yr	0.84	81.62	81.93		81.96	0.032408	0.82	1.03	9.35	0.79	0.82		
RA35b	8	5-yr	0.41	81.44	81.74		81.74	0.003030	0.35	1.54	15.49	0.26	0.27	0.19	0.18
RA35b	8	10-yr	0.51	81.44	81.75		81.76	0.003057	0.37	1.82	16.58	0.27	0.28	0.21	0.20
RA35b	8	100-yr	0.84	81.44	81.80		81.81	0.003176	0.44	2.71	22.32	0.28	0.31	0.21	0.25
RA35b	7.8*	5-yr	0.41	81.42	81.72		81.72	0.003166	0.36	1.52	15.39	0.27	0.27	0.20	0.18
RA35b	7.8*	10-yr	0.51	81.42	81.73		81.74	0.003199	0.38	1.78	16.46	0.27	0.29	0.21	0.20
RA35b	7.8*	100-yr	0.84	81.42	81.78		81.79	0.003360	0.45	2.65	21.95	0.29	0.32	0.22	0.26
RA35b	7.6*	5-yr	0.41	81.40	81.70		81.70	0.003279	0.36	1.50	15.30	0.27	0.28	0.20	0.18
RA35b	7.6*	10-yr	0.51	81.40	81.71		81.72	0.003326	0.39	1.76	16.36	0.28	0.29	0.22	0.21
RA35b	7.6*	100-yr	0.84	81.40	81.76		81.77	0.003568	0.46	2.59	21.56	0.30	0.33	0.22	0.26
RA35b	7.4*	5-yr	0.41	81.38	81.68		81.68	0.003604	0.37	1.44	15.07	0.29	0.29	0.20	0.19
RA35b	7.4*	10-yr	0.51	81.38	81.69		81.70	0.003718	0.40	1.68	16.07	0.29	0.30	0.22	0.21
RA35b	7.4*	100-yr	0.84	81.38	81.73		81.74	0.004074	0.48	2.45	20.69	0.32	0.35	0.24	0.27
RA35b	7.2*	5-yr	0.41	81.37	81.65		81.66	0.004236	0.40	1.36	14.70	0.31	0.30	0.22	0.20
RA35b	7.2*	10-yr	0.51	81.37	81.67		81.67	0.004431	0.43	1.58	15.63	0.32	0.32	0.24	0.22
RA35b	7.2*	100-yr	0.84	81.37	81.71		81.72	0.005018	0.52	2.24	19.36	0.35	0.38	0.26	0.29
RA35b	7	5-yr	0.41	81.35	81.61		81.63	0.008032	0.50	1.06	13.33	0.41	0.39	0.26	0.22
RA35b	7	10-yr	0.51	81.35	81.63		81.64	0.008779	0.55	1.21	14.05	0.44	0.42	0.29	0.26
RA35b	7	100-yr	0.84	81.35	81.66		81.67	0.010076	0.66	1.69	16.08	0.48	0.50	0.37	0.35
RA35b	6.75*	5-yr	0.41	81.33	81.58		81.58	0.007747	0.47	1.26	20.32	0.40	0.33	0.24	0.21
RA35b	6.75*	10-yr	0.51	81.33	81.59		81.60	0.007821	0.50	1.50	21.66	0.41	0.34	0.26	0.24
RA35b	6.75*	100-yr	0.84	81.33	81.61		81.63	0.008790	0.59	2.11	24.80	0.45	0.40	0.32	0.31
RA35b	6.5*	5-yr	0.41	81.32	81.54		81.54	0.008297	0.47	1.36	24.68	0.41	0.30	0.23	0.22
RA35b	6.5*	10-yr	0.51	81.32	81.55		81.55	0.008385	0.49	1.61	26.28	0.42	0.32	0.25	0.25
RA35b	6.5*	100-yr	0.84	81.32	81.57		81.58	0.008377	0.55	2.36	30.65	0.43	0.36	0.29	0.30
RA35b	6.25*	5-yr	0.41	81.31	81.50		81.50	0.008603	0.45	1.43	26.64	0.41	0.29	0.21	0.24
RA35b	6.25*	10-yr	0.51	81.31	81.51		81.52	0.007125	0.44	1.81	29.69	0.38	0.28	0.22	0.24
RA35b	6.25*	100-yr	0.84	81.31	81.54		81.54	0.006378	0.47	2.76	35.63	0.38	0.31	0.25	0.27
RA35b	6	5-yr	0.41	81.29	81.47		81.48	0.003493	0.30	2.06	31.75	0.27	0.20	0.14	0.19
RA35b	6	10-yr	0.51	81.29	81.49		81.49	0.002700	0.29	2.68	36.09	0.24	0.19	0.14	0.18
RA35b	6	100-yr	0.84	81.29	81.52		81.52	0.002927	0.34	3.80	42.86	0.26	0.22	0.18	0.21
RA35b	5.33333	5-yr	0.41	81.18	81.33	81.33	81.39	0.050960	1.09	0.38	12.75	1.01	1.09		
RA35b	5.33333	10-yr	0.51	81.18	81.35	81.35	81.42	0.048441	1.17	0.44	18.66	1.01	1.17		
RA35b	5.33333	100-yr	0.84	81.18	81.49	81.45	81.50	0.004075	0.36	3.62	57.02	0.30	0.23	0.17	0.17
RA35b	4.5		Culvert												
RA35b	4	5-yr	0.41	80.96	81.13	81.11	81.17	0.028526	0.91	0.45	13.92	0.78	0.91		
RA35b	4	10-yr	0.51	80.96	81.14	81.12	81.20	0.030699	1.02	0.50	14.82	0.82	1.02		
RA35b	4	100-yr	0.84	80.96	81.18	81.18	81.28	0.038399	1.33	0.63	17.85	0.95	1.33		
RA35b	3	5-yr	0.41	80.74	80.88		80.89	0.019994	0.49	0.84	11.65	0.58	0.49		
RA35b	3	10-yr	0.51	80.74	80.89		80.91	0.020022	0.52	0.98	12.30	0.59	0.52		
RA35b	3	100-yr	0.84	80.74	80.92		80.94	0.019786	0.61	1.39	13.78	0.61	0.61		
RA35b	2.66666*	5-yr	0.41	80.60	80.74		80.75	0.018910	0.48	0.86	11.79	0.57	0.48		
RA35b	2.66666*	10-yr	0.51	80.60	80.75		80.77	0.018813	0.51	1.00	12.27	0.58	0.51		
RA35b	2.66666*	100-yr	0.84	80.60	80.78		80.80	0.018813	0.60	1.40	13.51	0.60	0.60		

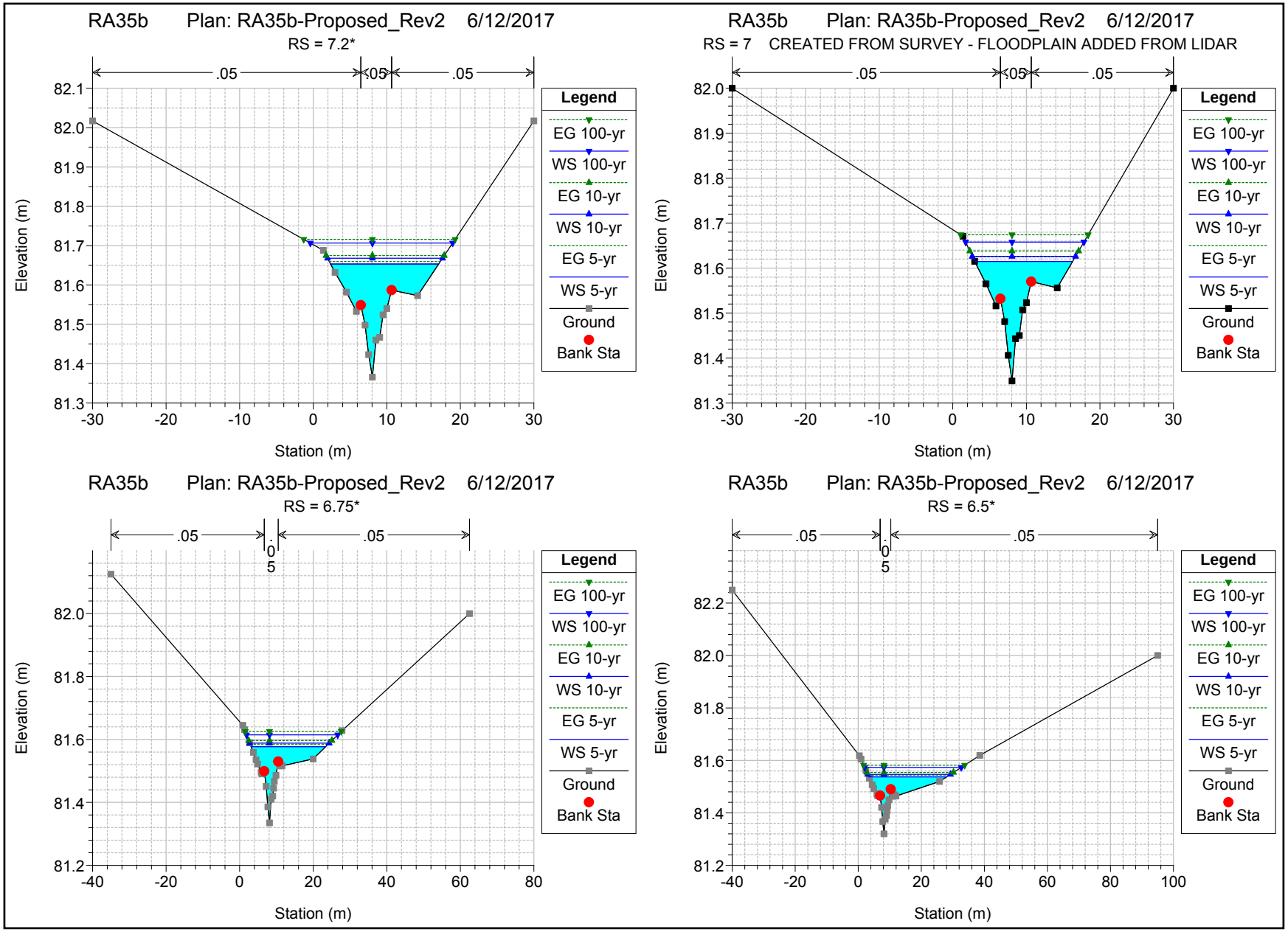
HEC-RAS Plan: ProposedRev2 River: RA35b Reach: RA35b (Continued)

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
RA35b	2.33333*	5-yr	0.41	80.46	80.60		80.61	0.020885	0.50	0.83	11.53	0.59	0.50		
RA35b	2.33333*	10-yr	0.51	80.46	80.61		80.62	0.020844	0.53	0.96	12.03	0.60	0.53		
RA35b	2.33333*	100-yr	0.84	80.46	80.64		80.66	0.020664	0.63	1.34	13.12	0.63	0.63		
RA35b	2	5-yr	0.41	80.32	80.46		80.47	0.017584	0.47	0.87	11.62	0.55	0.47		
RA35b	2	10-yr	0.51	80.32	80.47		80.48	0.017428	0.51	1.01	12.07	0.56	0.51		
RA35b	2	100-yr	0.84	80.32	80.50		80.52	0.017245	0.60	1.42	13.11	0.58	0.60		
RA35b	1.66666*	5-yr	0.41	80.19	80.34		80.35	0.017123	0.47	0.88	11.69	0.54	0.47		
RA35b	1.66666*	10-yr	0.51	80.19	80.35		80.36	0.017118	0.50	1.02	12.19	0.55	0.50		
RA35b	1.66666*	100-yr	0.84	80.19	80.38		80.40	0.016972	0.58	1.46	13.82	0.57	0.58		
RA35b	1.33333*	5-yr	0.41	80.07	80.22		80.23	0.018008	0.46	0.89	12.59	0.55	0.46		
RA35b	1.33333*	10-yr	0.51	80.07	80.23		80.24	0.017629	0.49	1.05	13.41	0.55	0.49		
RA35b	1.33333*	100-yr	0.84	80.07	80.26		80.27	0.019130	0.58	1.45	15.04	0.60	0.58		
RA35b	1	5-yr	0.41	79.94	80.09	80.07	80.10	0.018102	0.44	0.94	14.35	0.55	0.44		
RA35b	1	10-yr	0.51	79.94	80.10	80.08	80.11	0.018117	0.47	1.09	14.95	0.56	0.47		
RA35b	1	100-yr	0.84	79.94	80.13	80.10	80.14	0.018103	0.56	1.57	19.28	0.58	0.54		0.23


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 9 CREATED FROM LIDAR
.05 .05 .05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.9*
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.8*
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.7*


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.6*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.5 CREATED FROM LIDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.33333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8.16666*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
EG 5-yr
WS 10-yr
WS 5-yr
Ground
Bank Sta


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 8 DEVELOPED FROM XS7
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 7.8*
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 7.6*
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 7.4*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta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.05
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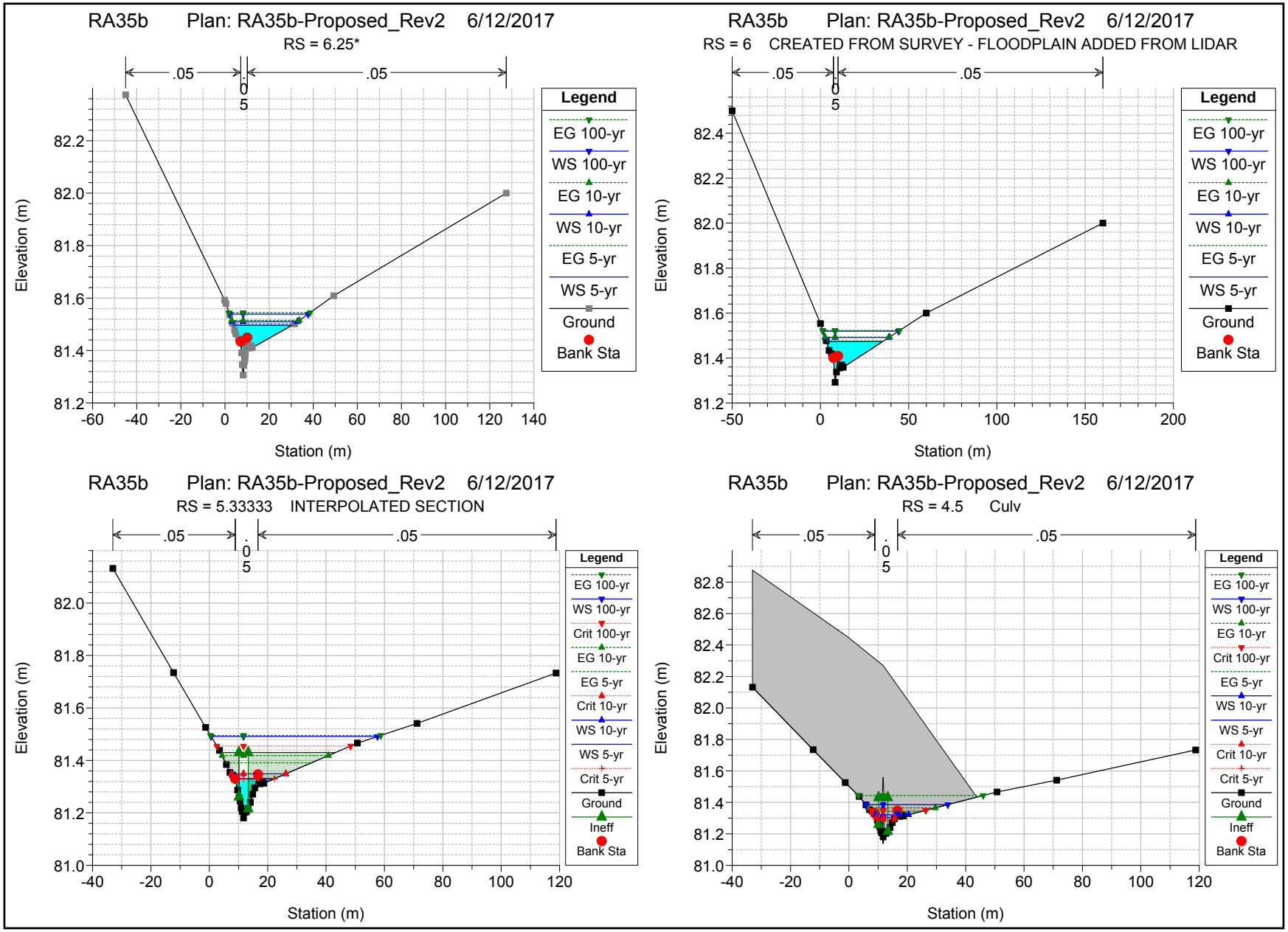
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 7 CREATED FROM SURVEY - FLOODPLAIN ADDED FROM LIDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 6.75*
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 6.5*
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 6.25*
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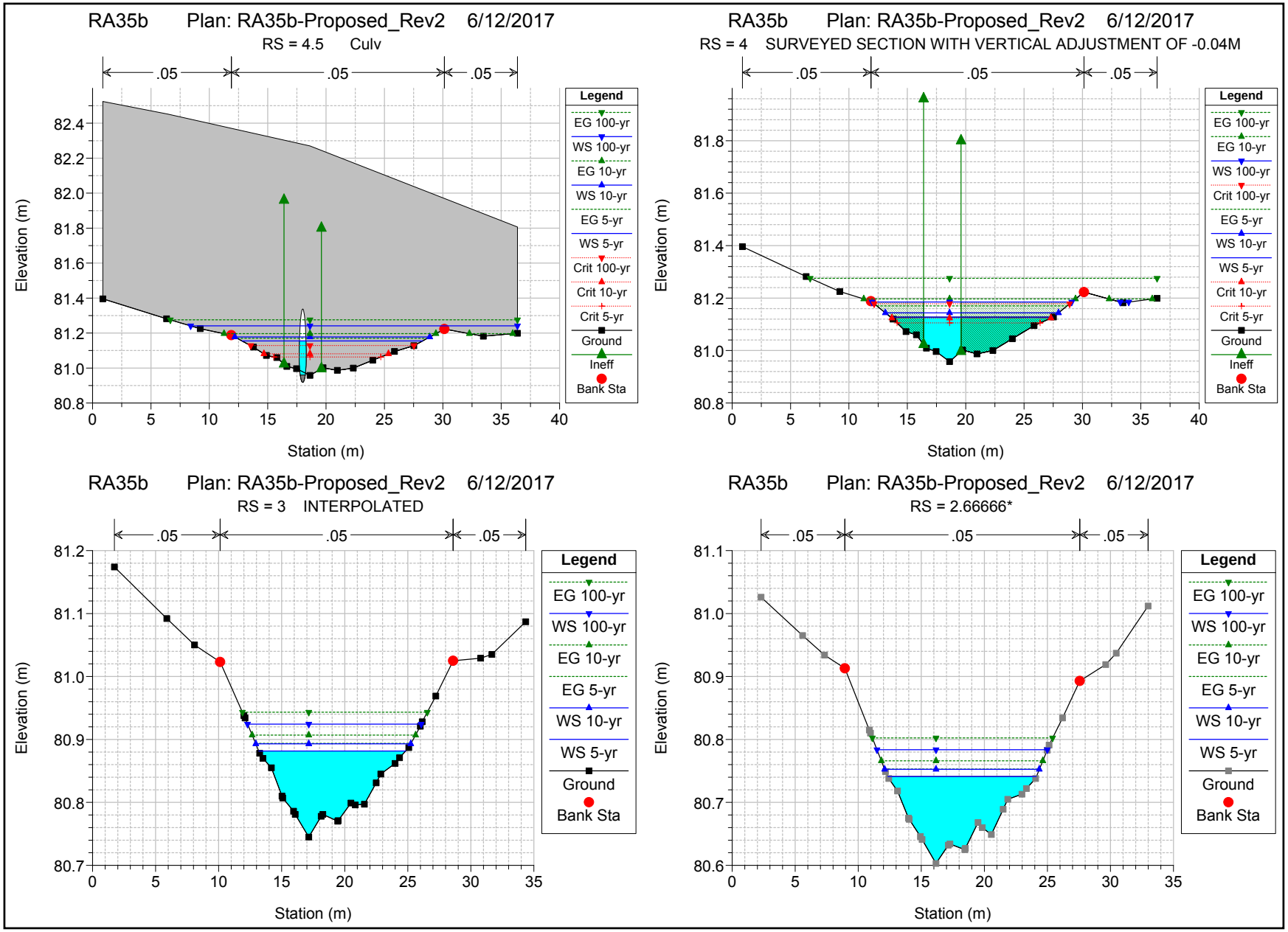
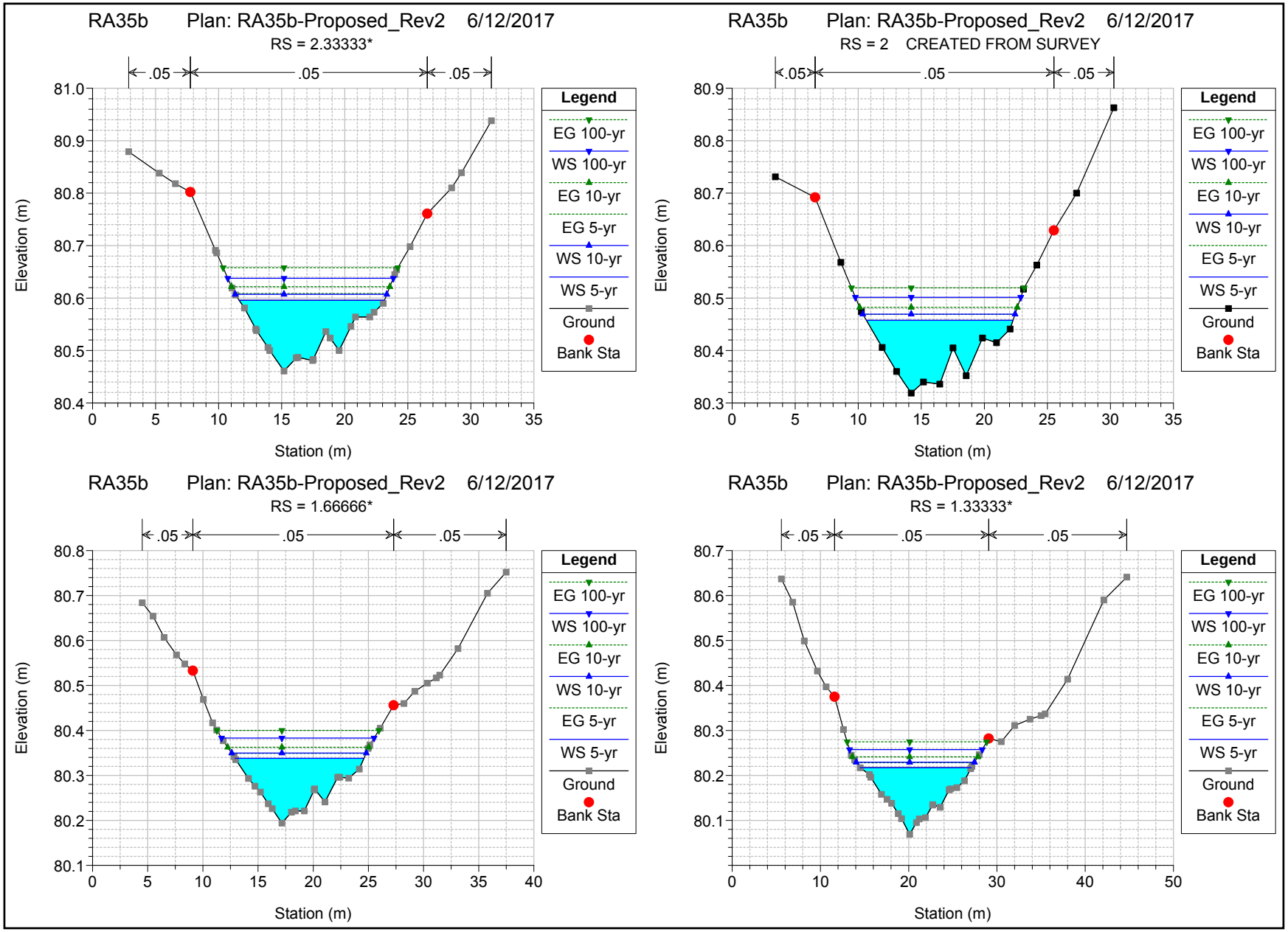
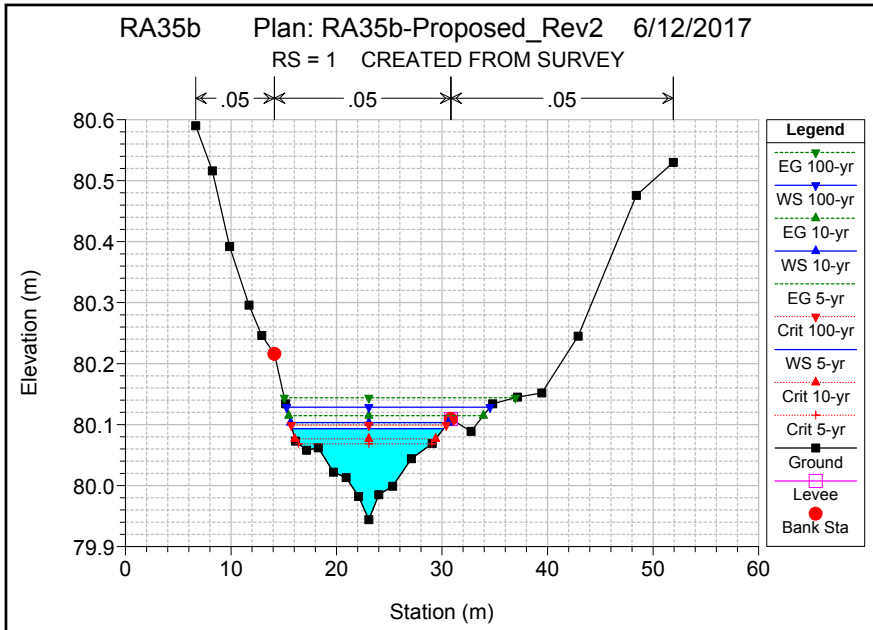
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 6 CREATED FROM SURVEY - FLOODPLAIN ADDED FROM LIDAR
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 5.33333 INTERPOLATED SECTION
Crit 100-yr
Crit 10-yr
Crit 5-yr
Ineff
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 4.5 Culv


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 4.5 Culv
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Crit 100-yr
Crit 10-yr
Crit 5-yr
Ground
Ineff
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 4 SURVEYED SECTION WITH VERTICAL ADJUSTMENT OF -0.04M
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 3 INTERPOLATED
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 2.66666*


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 2.33333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 2 CREATED FROM SURVEY
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 1.66666*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta
RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 1.33333*
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
WS 5-yr
Ground
Bank Sta


RA35b Plan: RA35b-Proposed_Rev2 6/12/2017
RS = 1 CREATED FROM SURVEY
.05
.05
.05
Elevation (m)
80.6
80.5
80.4
80.3
80.2
80.1
80.0
79.9
0
10
20
30
40
50
60
Station (m)
Legend
EG 100-yr
WS 100-yr
EG 10-yr
WS 10-yr
EG 5-yr
Crit 100-yr
WS 5-yr
Crit 10-yr
Crit 5-yr
Ground
Levee
Bank Sta

RA42 – HYDRAULIC MODELING

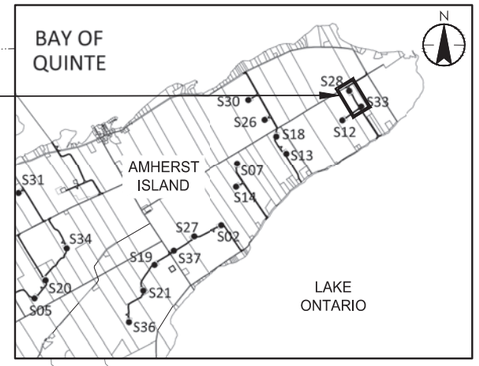
LOCATION OF ERECTION BUMP-OUTS AND PADS TO BE FIELD DETERMINED WITHIN REA LIMITS. PROVIDE ADDITIONAL BUMP-OUTS, AS REQUIRED. BUMP-OUTS AND PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIALS, AS DETERMINED IN FIELD.

CONTRACTOR TO MAINTAIN EXISTING DRAINAGE FLOWS AS REQUIRED

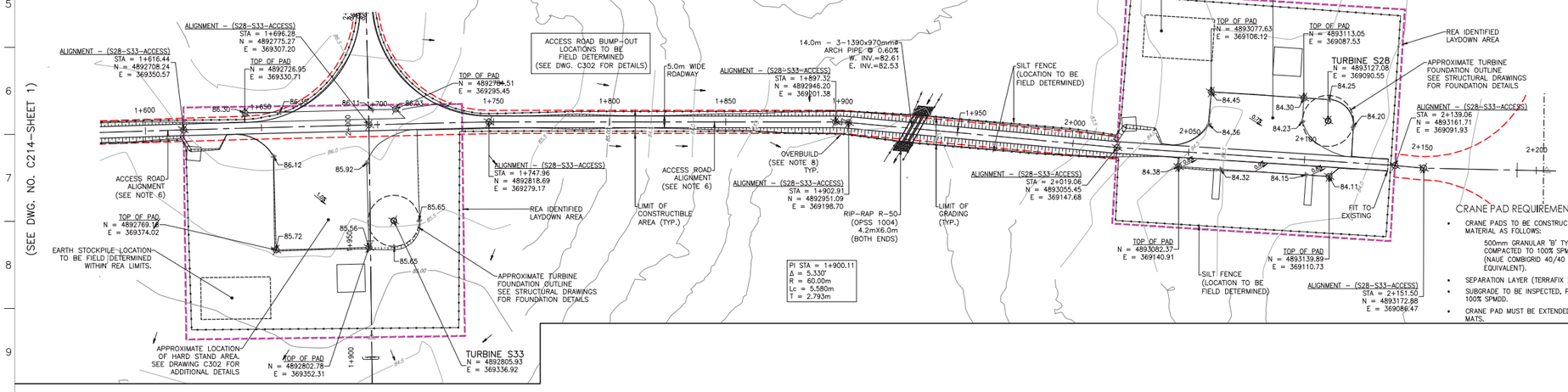
SEE STRUCTURAL DRAWINGS FOR FOUNDATION DETAILS AND BACKFILL REQUIREMENTS

SEE DRAWING C302 FOR ADDITIONAL ACCESS ROAD DETAILS

PLAN LOCATION

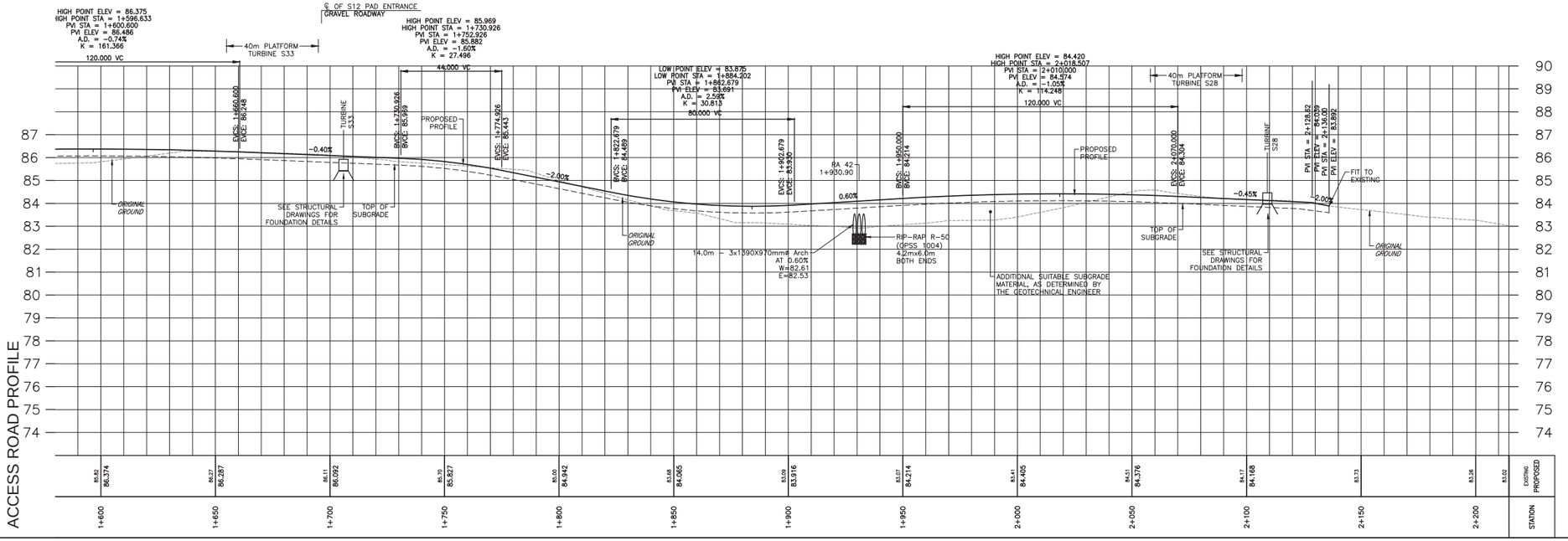


KEY PLAN
N.T.S



CRANE PAD REQUIREMENTS:

- CRANE PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIAL AS FOLLOWS:
  500mm GRANULAR 'B' TYPE II, PLACED IN 2 LIFTS, COMPACTED TO 100% SPMDD, WITH REINFORCEMENT LAYER (NAUE COMBIGRID 40/40 Q1 151 GRK3 OR APPROVED EQUIVALENT).
- SEPARATION LAYER (TERRAFIX 200R GEOTEXTILE).
- SUBGRADE TO BE INSPECTED, PROOF ROLLED, AND COMPACTED TO 100% SPMDD.
- CRANE PAD MUST BE EXTENDED 1.5m (MIN.) BEYOND OUTRIGGER MATS.



Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016-09-23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****	
Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations	
☐ Reviewed - No comments	
☐ Reviewed - Incorporate comments and resubmit	
☐ Reviewed - Not accepted	
Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	17.01.30
Revision		By	Appd.	YY.MM.DD

File Name: C214_133560100-Turbine S28-S33.DWG		RCL	MPG	15.12.03
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

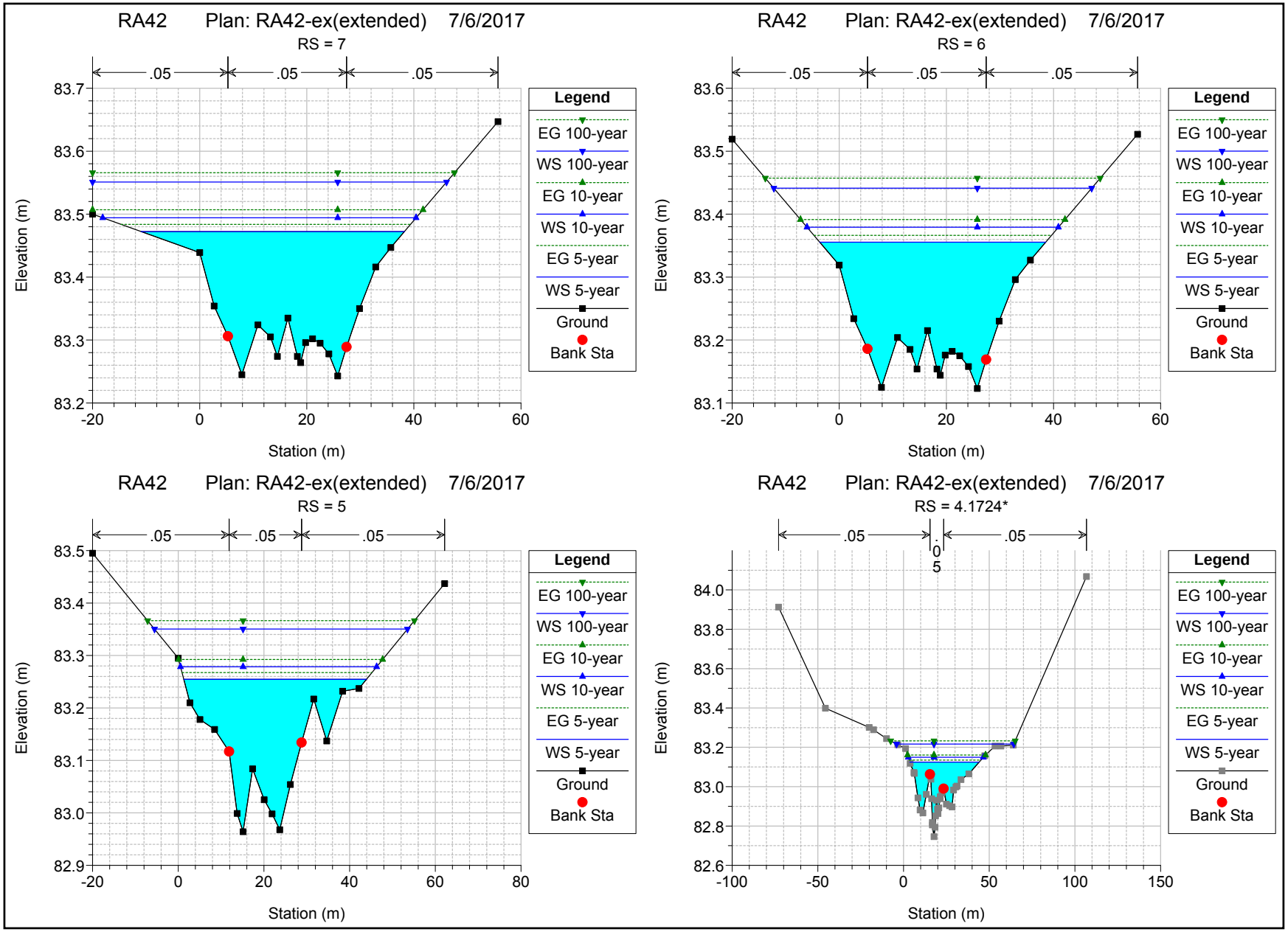
ACCESS ROAD
TURBINE S28, S33 AND S12
PLAN AND PROFILE

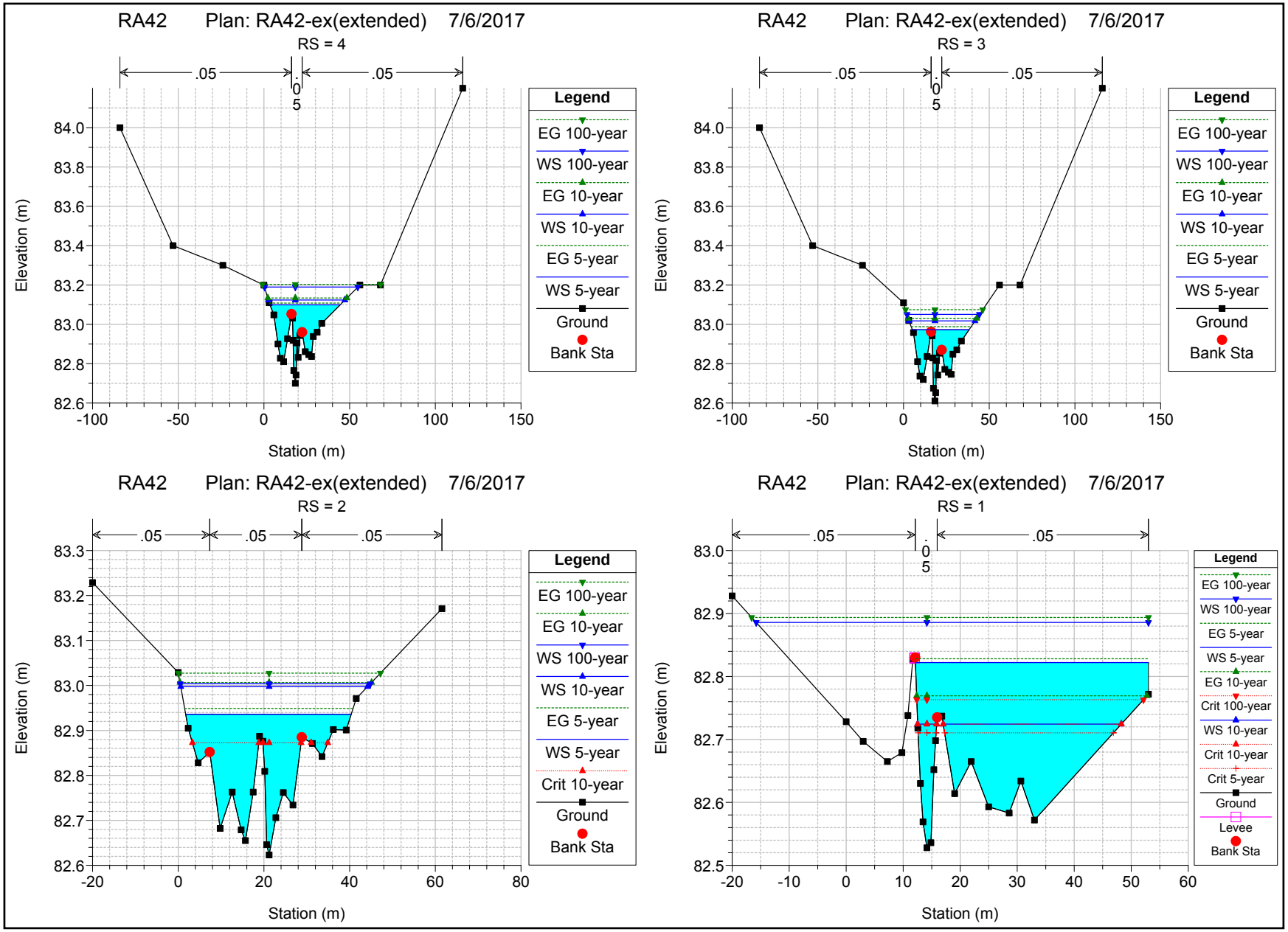
Project No.	Scale	Sheet	Revision
133560100	1:1000H 0 10 30 50m; 1:100V 0 1 3 5m		
Drawing No.			
C214		2 of 3	B


4
3
4.1724°
7
6
5
2
1
RA42
1

HEC-RAS Plan: RA42-ex(exte River: RA42 Reach: 1

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	7	5-year	2.42	83.24	83.47		83.48	0.006107	0.51	5.61	49.15	0.38	0.43	0.20	0.27
1	7	10-year	3.02	83.24	83.49		83.51	0.006023	0.54	6.79	58.53	0.38	0.44	0.21	0.29
1	7	100-year	5.02	83.24	83.55		83.57	0.005482	0.61	10.37	66.10	0.38	0.48	0.33	0.33
1	6	5-year	2.42	83.12	83.36		83.37	0.005634	0.49	5.62	42.19	0.36	0.43	0.26	0.26
1	6	10-year	3.02	83.12	83.38		83.39	0.005532	0.53	6.68	46.94	0.37	0.45	0.27	0.28
1	6	100-year	5.02	83.12	83.44		83.46	0.005374	0.62	9.98	59.36	0.38	0.50	0.32	0.33
1	5	5-year	2.42	82.96	83.25		83.27	0.005348	0.54	5.43	42.64	0.36	0.45	0.27	0.21
1	5	10-year	3.02	82.96	83.28		83.29	0.005287	0.57	6.49	45.79	0.37	0.47	0.31	0.24
1	5	100-year	5.02	82.96	83.35		83.37	0.004714	0.64	10.23	59.05	0.36	0.49	0.34	0.32
1	4.1724*	5-year	2.42	82.75	83.12		83.14	0.005784	0.55	5.64	40.43	0.38	0.43	0.41	0.34
1	4.1724*	10-year	3.02	82.75	83.15		83.16	0.005707	0.59	6.67	43.79	0.38	0.45	0.44	0.36
1	4.1724*	100-year	5.02	82.75	83.22		83.23	0.006646	0.75	10.09	68.36	0.43	0.50	0.46	0.38
1	4	5-year	2.42	82.70	83.10		83.11	0.004926	0.51	6.01	40.92	0.35	0.40	0.41	0.34
1	4	10-year	3.02	82.70	83.12		83.13	0.005018	0.55	7.06	44.65	0.36	0.43	0.44	0.36
1	4	100-year	5.02	82.70	83.19		83.20	0.005070	0.65	10.32	54.44	0.37	0.49	0.50	0.41
1	3	5-year	2.42	82.61	82.97		82.99	0.009521	0.63	4.57	33.08	0.47	0.53	0.53	0.46
1	3	10-year	3.02	82.61	83.02		83.03	0.006620	0.61	6.17	38.54	0.40	0.49	0.48	0.43
1	3	100-year	5.02	82.61	83.05		83.07	0.010767	0.85	7.49	42.25	0.53	0.67	0.66	0.59
1	2	5-year	2.42	82.62	82.94		82.95	0.006268	0.53	5.16	38.63	0.38	0.47	0.29	0.22
1	2	10-year	3.02	82.62	83.00	82.87	83.01	0.003233	0.45	7.66	43.59	0.29	0.39	0.28	0.23
1	2	100-year	5.02	82.62	83.00		83.03	0.008079	0.73	7.94	44.36	0.46	0.63	0.45	0.37
1	1	5-year	2.42	82.53	82.82	82.71	82.83	0.003003	0.38	7.10	40.88	0.27	0.34		0.34
1	1	10-year	3.02	82.53	82.72	82.72	82.77	0.050183	1.12	3.25	34.59	1.01	0.93		0.90
1	1	100-year	5.02	82.53	82.89	82.76	82.89	0.003001	0.45	13.18	68.83	0.28	0.38	0.27	0.42

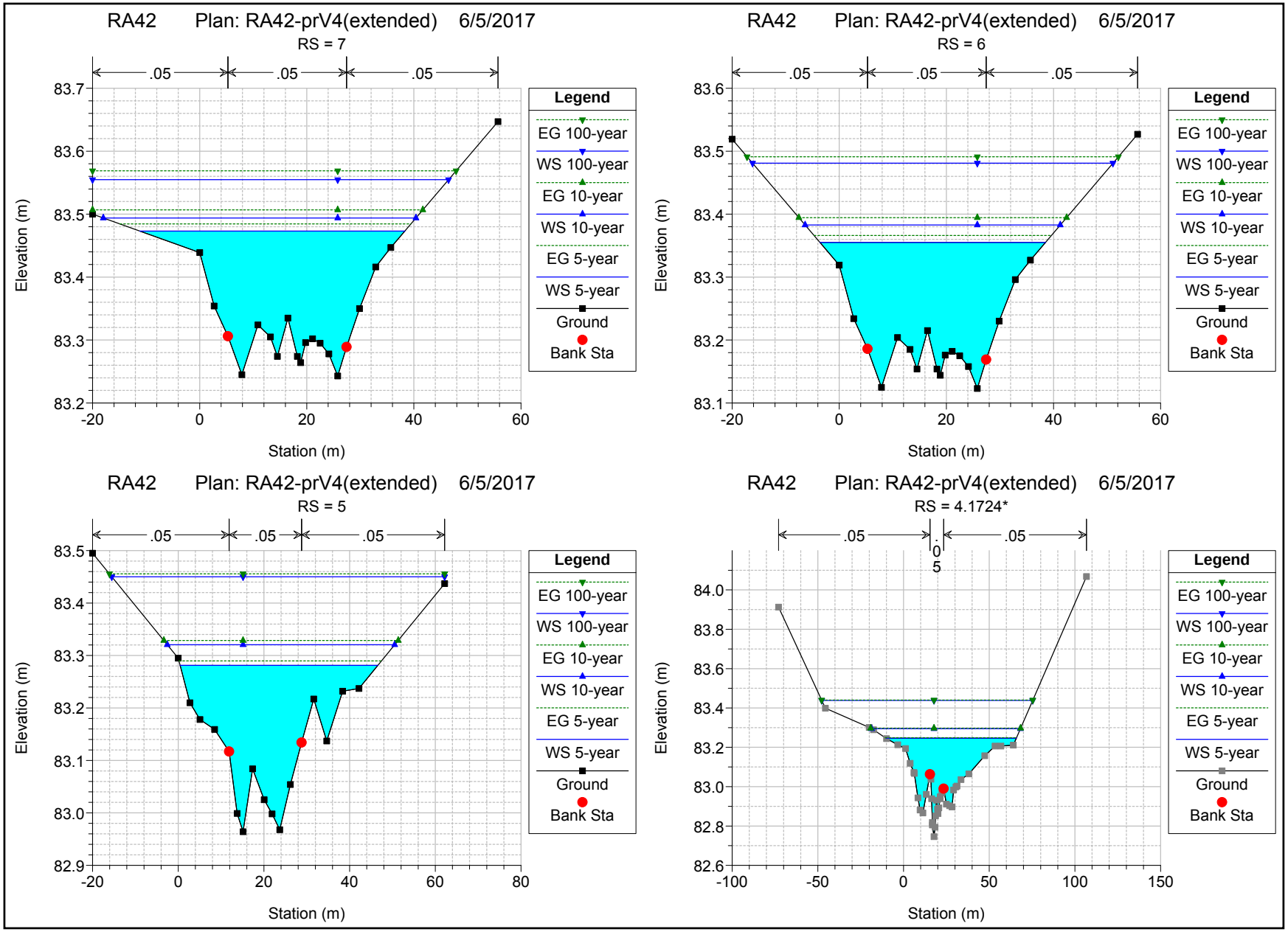

RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 7
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 6
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 5
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 4.1724*
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta


RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 4
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 2
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
EG 10-year
WS 100-year
WS 10-year
EG 5-year
WS 5-year
Crit 10-year
Ground
Bank Sta
RA42 Plan: RA42-ex(extended) 7/6/2017
RS = 1
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 5-year
WS 5-year
EG 10-year
Crit 100-year
WS 10-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta


4
3.5
3
4.1724*
7
6
5
2
1
RA42
1

HEC-RAS Plan: RA42-prV4(ex River: RA42 Reach: 1

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	7	5-year	2.42	83.24	83.47		83.48	0.006003	0.50	5.65	49.50	0.37	0.43	0.20	0.27
1	7	10-year	3.02	83.24	83.49		83.51	0.006064	0.54	6.77	58.39	0.38	0.45	0.21	0.29
1	7	100-year	5.02	83.24	83.55		83.57	0.005132	0.59	10.62	66.48	0.37	0.47	0.32	0.32
1	6	5-year	2.42	83.12	83.36		83.37	0.005673	0.49	5.60	42.12	0.36	0.43	0.26	0.27
1	6	10-year	3.02	83.12	83.38		83.39	0.005184	0.52	6.85	47.65	0.36	0.44	0.27	0.28
1	6	100-year	5.02	83.12	83.48		83.49	0.003018	0.51	12.49	67.29	0.29	0.40	0.27	0.28
1	5	5-year	2.42	82.96	83.28		83.29	0.003248	0.45	6.61	46.14	0.29	0.37	0.25	0.19
1	5	10-year	3.02	82.96	83.32		83.33	0.002654	0.45	8.55	53.07	0.27	0.35	0.24	0.21
1	5	100-year	5.02	82.96	83.45		83.46	0.001298	0.40	17.09	77.66	0.20	0.29	0.21	0.22
1	4.1724*	5-year	2.42	82.75	83.25		83.25	0.000957	0.30	12.29	76.16	0.16	0.20	0.17	0.17
1	4.1724*	10-year	3.02	82.75	83.29		83.30	0.000720	0.29	16.19	86.87	0.15	0.19	0.15	0.17
1	4.1724*	100-year	5.02	82.75	83.44		83.44	0.000342	0.24	31.71	123.08	0.11	0.16	0.13	0.16
1	4	5-year	2.42	82.70	83.11	83.11	83.21	0.036332	1.43	1.80	42.55	0.95	1.34	0.89	1.16
1	4	10-year	3.02	82.70	83.14	83.14	83.25	0.035668	1.54	2.08	47.14	0.96	1.45	1.04	1.29
1	4	100-year	5.02	82.70	83.23	83.23	83.39	0.033336	1.82	2.90	77.21	0.97	1.73	1.39	1.60
1	3.5		Culvert												
1	3	5-year	2.42	82.61	83.02	83.02	83.12	0.036227	1.43	1.80	38.81	0.95	1.34	0.89	1.16
1	3	10-year	3.02	82.61	83.05	83.05	83.16	0.035598	1.54	2.08	42.28	0.96	1.45	1.04	1.28
1	3	100-year	5.02	82.61	83.14	83.14	83.30	0.033593	1.82	2.90	55.35	0.98	1.73	1.39	1.60
1	2	5-year	2.42	82.62	82.94		82.95	0.006268	0.53	5.16	38.63	0.38	0.47	0.29	0.22
1	2	10-year	3.02	82.62	83.00	82.87	83.01	0.003232	0.45	7.66	43.59	0.29	0.39	0.28	0.23
1	2	100-year	5.02	82.62	83.00		83.03	0.008078	0.73	7.94	44.36	0.46	0.63	0.45	0.37
1	1	5-year	2.42	82.53	82.82	82.71	82.83	0.003003	0.38	7.10	40.88	0.27	0.34		0.34
1	1	10-year	3.02	82.53	82.72	82.72	82.77	0.050183	1.12	3.25	34.59	1.01	0.93		0.90
1	1	100-year	5.02	82.53	82.89	82.76	82.89	0.003001	0.45	13.18	68.83	0.28	0.38	0.27	0.42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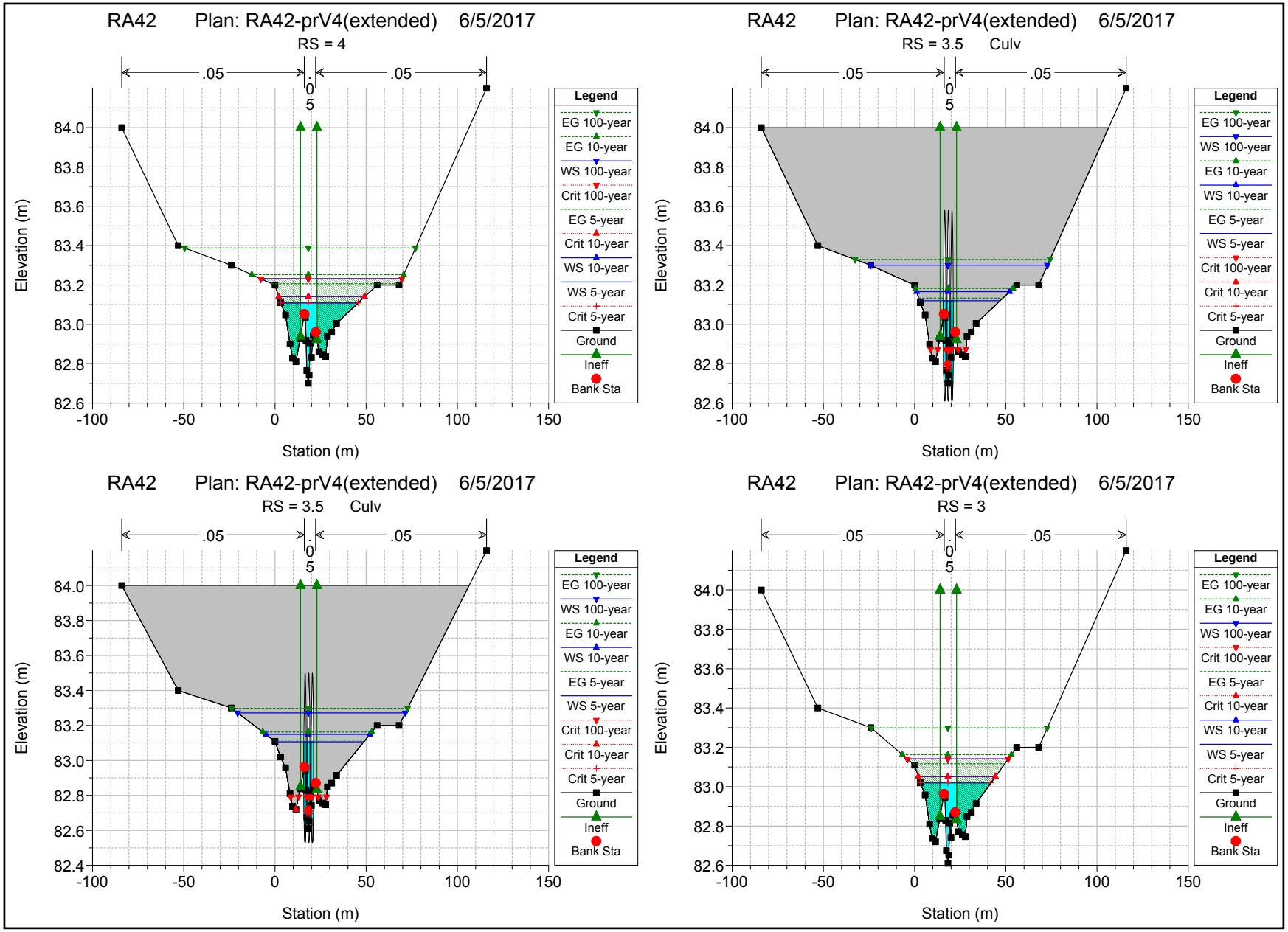
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-prV4(extended) 6/5/2017
RS = 6
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-prV4(extended) 6/5/2017
RS = 5
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta
RA42 Plan: RA42-prV4(extended) 6/5/2017
RS = 4.1724*
.05
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 10-year
WS 10-year
EG 5-year
WS 5-year
Ground
Bank Sta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0.5
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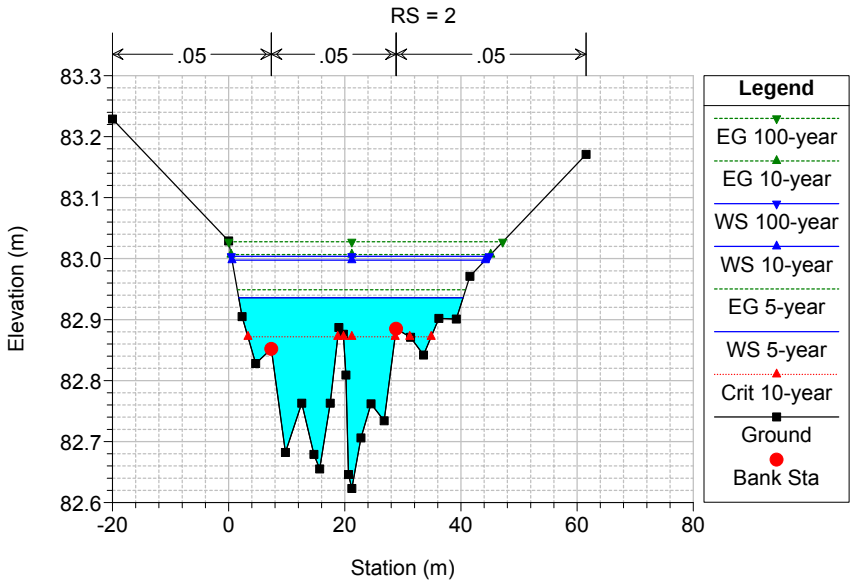
Station (m)
Legend
EG 100-year
EG 10-year
WS 100-year
Crit 100-year
EG 5-year
Crit 10-year
WS 10-year
WS 5-year
Crit 5-year
Ground
Ineff
Bank Sta
RA42 Plan: RA42-prV4(extended) 6/5/2017
RS = 3.5 Culv
RA42 Plan: RA42-prV4(extended) 6/5/2017
RS = 3.5 Culv
RA42 Plan: RA42-prV4(extended) 6/5/2017
RS = 3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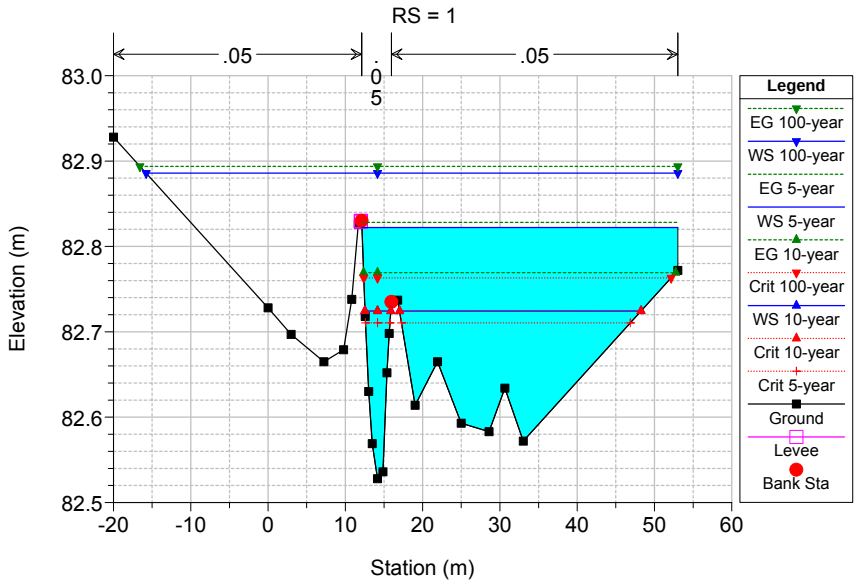
.05
Elevation (m)
Station (m)
Legend
EG 100-year
EG 10-year
WS 100-year
WS 10-year
EG 5-year
WS 5-year
Crit 10-year
Ground
Bank Sta


RA42 Plan: RA42-prV4(extended) 6/5/2017
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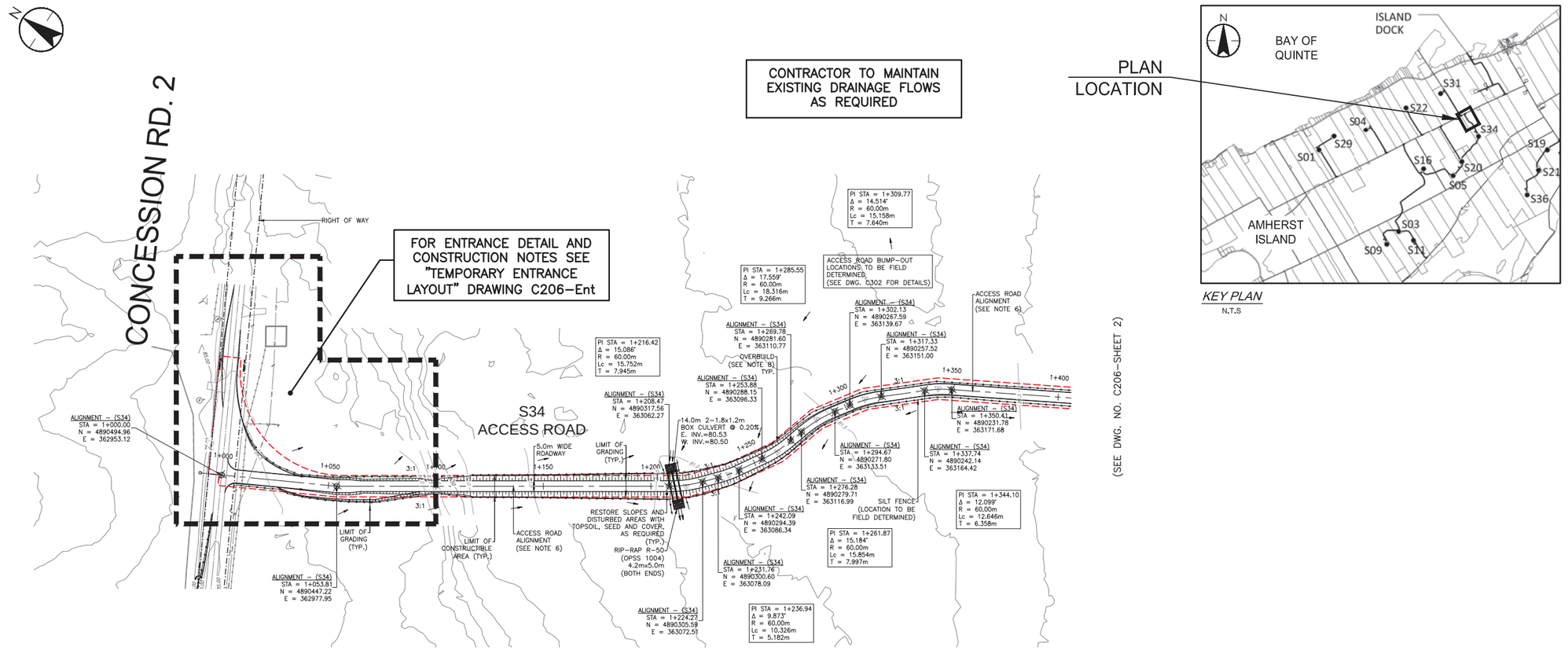
.05
Elevation (m)
Station (m)
Legend
EG 100-year
WS 100-year
EG 5-year
WS 5-year
EG 10-year
Crit 100-year
WS 10-year
Crit 10-year
Crit 5-year
Ground
Levee
Bank Sta

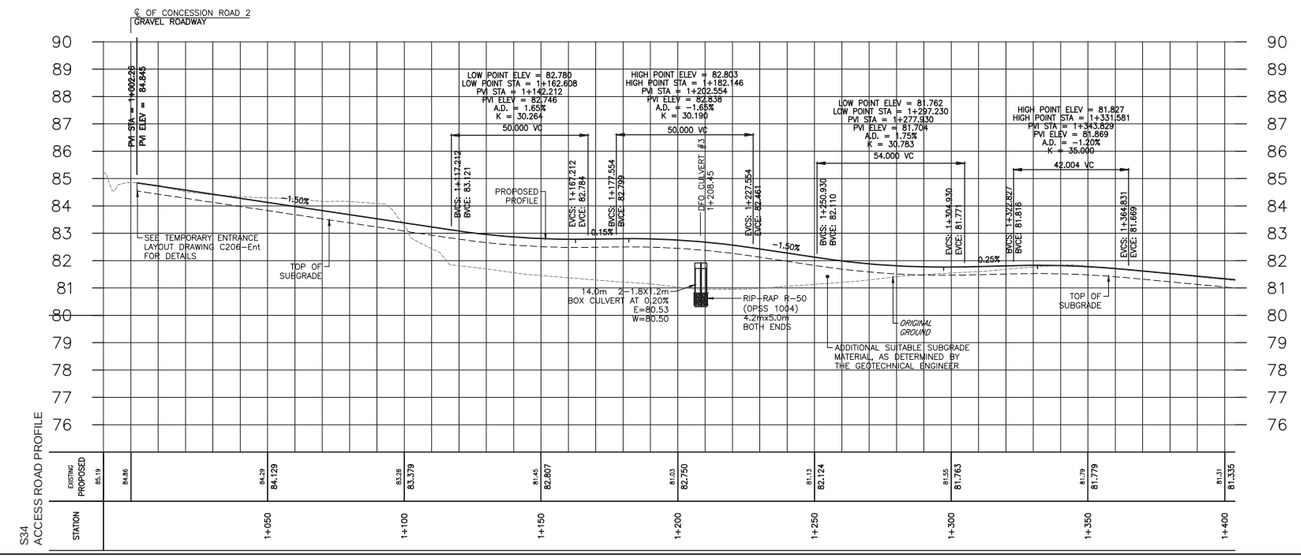
DFO3 – HYDRAULIC MODELING



PLAN LOCATION

KEY PLAN
N.T.S

SEE DRAWING C302 FOR ADDITIONAL ACCESS ROAD DETAILS



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016–09–23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 — EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 — PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****	
Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations	
☐ Reviewed - No comments	
☐ Reviewed - Incorporate comments and resubmit	
☐ Reviewed - Not accepted	
Reviewed By	Date (dd-mmm-yyyy)
Project Manager - PHCL	Date (dd-mmm-yyyy)
Project Manager - Windlectric	Date (dd-mmm-yyyy)
Owner:	

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	17.01.27
Revision		By	Appd.	YY.MM.DD

File Name: C206_133560100-Turbine S34.dwg	RCL/DWH	MPG	RCL	15.12.03
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

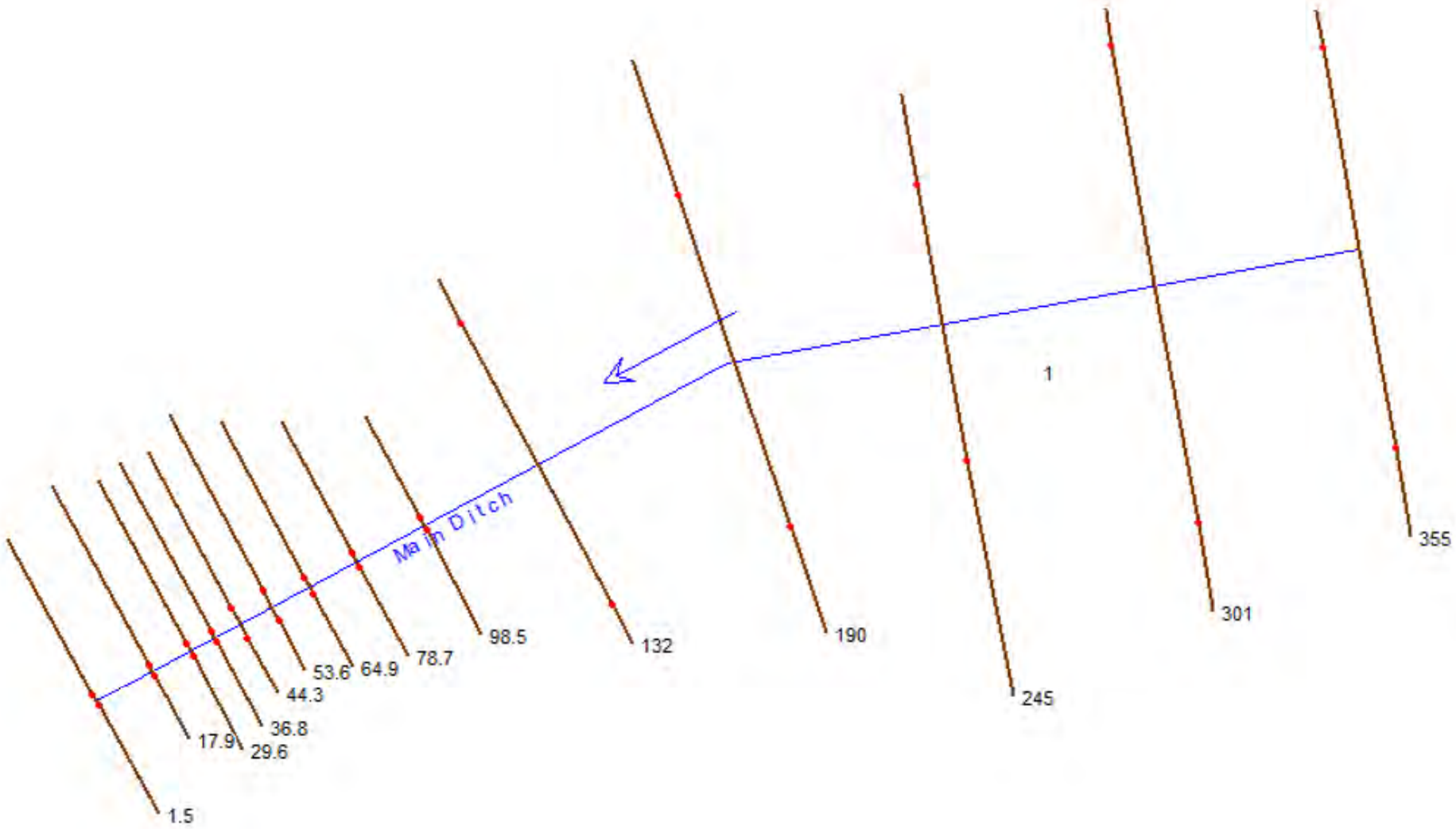
PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

ACCESS ROAD
TURBINE S34
PLAN AND PROFILE

Project No.	Scale
133560100	1:1000H 0 10 30 50m; 1:100V 0 1 3 5m
Drawing No.	Sheet / Revision
C206	1 of 2 / B

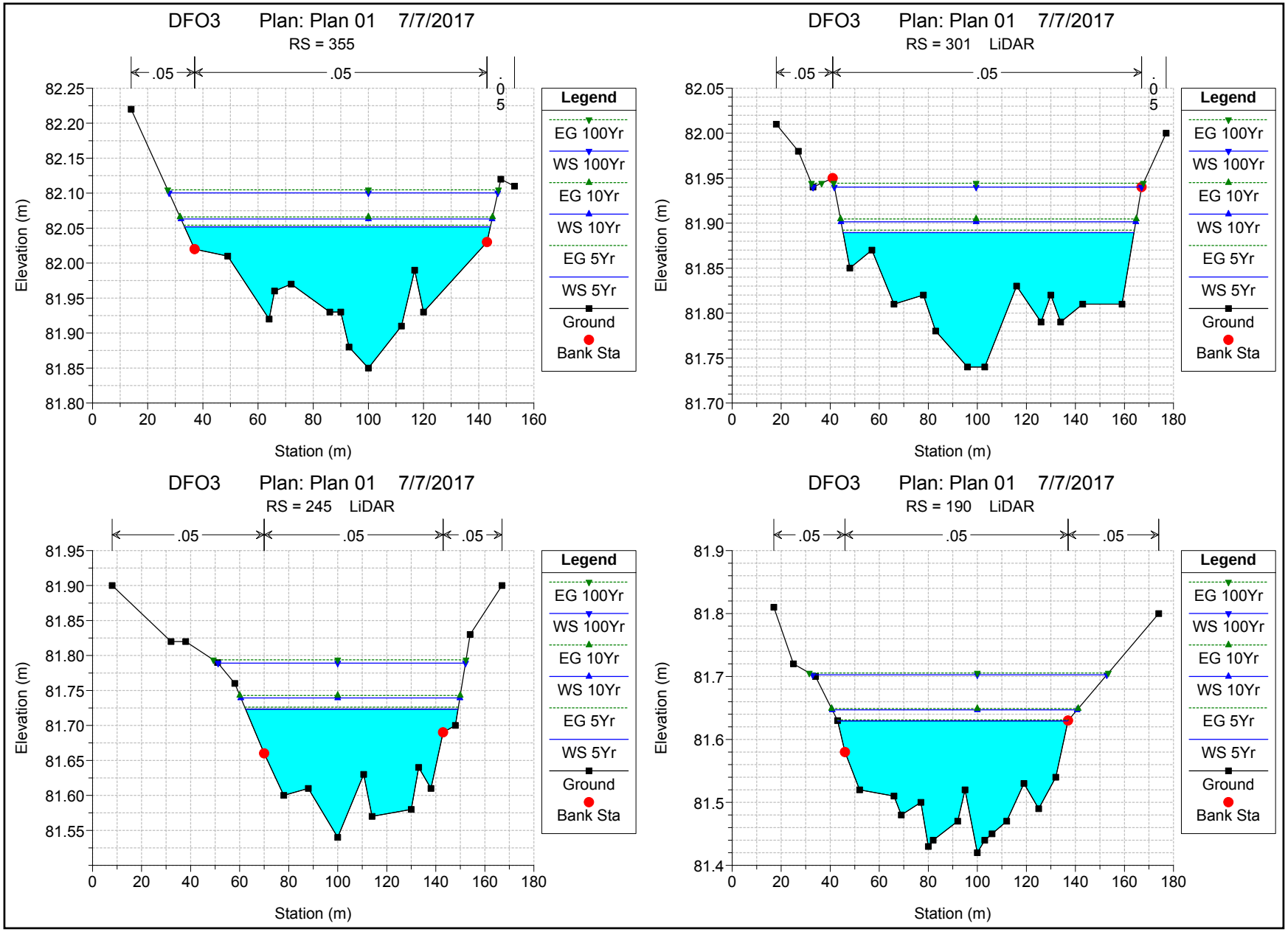

Main Ditch
1
1.5
17.9
29.6
36.8
44.3
53.6
64.9
78.7
98.5
132
190
245
301
355

HEC-RAS Plan: Plan 01 River: Main Ditch Reach: 1

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	355	5Yr	2.31	81.85	82.05		82.05	0.002499	0.22	10.73	110.90	0.22	0.22	0.06	0.05
1	355	10Yr	2.83	81.85	82.06		82.07	0.002618	0.24	11.99	112.82	0.23	0.24	0.08	0.07
1	355	100Yr	4.67	81.85	82.10		82.10	0.002690	0.29	16.31	119.16	0.24	0.29	0.12	0.11
1	301	5Yr	2.31	81.74	81.89		81.89	0.003698	0.23	9.92	118.63	0.26	0.23		
1	301	10Yr	2.83	81.74	81.90		81.90	0.003579	0.25	11.37	120.23	0.26	0.25		
1	301	100Yr	4.67	81.74	81.94		81.94	0.003241	0.29	16.10	125.36	0.26	0.29		
1	245	5Yr	2.31	81.54	81.72		81.73	0.002451	0.25	9.55	86.66	0.22	0.24	0.10	0.09
1	245	10Yr	2.83	81.54	81.74		81.74	0.002403	0.27	10.97	89.35	0.23	0.26	0.11	0.11
1	245	100Yr	4.67	81.54	81.79		81.79	0.002269	0.32	15.66	100.87	0.23	0.30	0.14	0.16
1	190	5Yr	2.31	81.42	81.63		81.63	0.001287	0.19	12.30	93.92	0.16	0.19	0.06	
1	190	10Yr	2.83	81.42	81.65		81.65	0.001275	0.20	14.01	99.88	0.17	0.20	0.07	0.03
1	190	100Yr	4.67	81.42	81.70		81.71	0.001187	0.24	20.10	119.93	0.17	0.23	0.09	0.08
1	132	5Yr	2.31	81.28	81.50		81.50	0.004506	0.33	6.95	56.60	0.30	0.33		
1	132	10Yr	2.83	81.28	81.52		81.53	0.004214	0.35	8.18	59.60	0.30	0.35		
1	132	100Yr	4.67	81.28	81.58		81.59	0.003905	0.38	12.45	77.18	0.30	0.37		0.04
1	98.5	5Yr	2.31	81.02	81.42		81.42	0.001592	0.33	8.82	55.25	0.20	0.26	0.14	0.28
1	98.5	10Yr	2.83	81.02	81.43		81.44	0.001730	0.36	9.86	55.99	0.21	0.29	0.16	0.31
1	98.5	100Yr	4.67	81.02	81.49		81.50	0.002138	0.45	12.90	58.12	0.24	0.36	0.24	0.40
1	78.7	5Yr	2.31	81.01	81.38		81.38	0.002119	0.36	8.82	65.89	0.23	0.26	0.15	0.27
1	78.7	10Yr	2.83	81.01	81.40		81.40	0.002273	0.39	9.88	66.86	0.24	0.29	0.18	0.30
1	78.7	100Yr	4.67	81.01	81.44		81.45	0.002754	0.47	12.92	69.00	0.27	0.36	0.25	0.38
1	64.9	5Yr	2.31	80.99	81.27	81.27	81.31	0.029819	1.15	3.31	44.35	0.83	0.70		0.54
1	64.9	10Yr	2.83	80.99	81.28	81.28	81.32	0.029343	1.19	3.88	46.26	0.83	0.73		0.59
1	64.9	100Yr	4.67	80.99	81.33		81.36	0.023358	1.19	6.00	50.52	0.76	0.78		0.69
1	53.6	5Yr	2.31	80.88	81.18		81.19	0.003492	0.47	6.90	53.98	0.30	0.33	0.13	0.28
1	53.6	10Yr	2.83	80.88	81.21		81.21	0.003314	0.48	8.22	58.50	0.30	0.34	0.15	0.29
1	53.6	100Yr	4.67	80.88	81.28		81.28	0.002838	0.52	12.68	69.26	0.28	0.37	0.22	0.33
1	44.3	5Yr	2.31	80.88	81.15		81.16	0.002929	0.41	7.04	44.62	0.27	0.33	0.26	0.30
1	44.3	10Yr	2.83	80.88	81.18		81.18	0.002861	0.44	8.14	46.40	0.27	0.35	0.28	0.32
1	44.3	100Yr	4.67	80.88	81.25		81.26	0.003228	0.54	12.22	68.32	0.30	0.38	0.36	0.32
1	36.8	5Yr	2.31	80.80	81.13		81.14	0.002984	0.43	6.87	43.19	0.27	0.34	0.22	0.35
1	36.8	10Yr	2.83	80.80	81.16		81.16	0.002930	0.45	7.97	45.80	0.28	0.35	0.24	0.37
1	36.8	100Yr	4.67	80.80	81.22		81.23	0.004136	0.62	11.47	67.50	0.34	0.41	0.33	0.40
1	29.6	5Yr	2.31	80.80	81.12		81.12	0.001512	0.31	9.57	59.89	0.20	0.24	0.14	0.25
1	29.6	10Yr	2.83	80.80	81.14		81.15	0.001462	0.32	11.13	62.52	0.20	0.25	0.15	0.26
1	29.6	100Yr	4.67	80.80	81.20		81.21	0.001651	0.39	15.10	68.77	0.22	0.31	0.20	0.32

HEC-RAS Plan: Plan 01 River: Main Ditch Reach: 1 (Continued)

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	17.9	5Yr	2.31	80.77	81.10		81.10	0.001672	0.33	9.32	58.93	0.21	0.25	0.15	0.25
1	17.9	10Yr	2.83	80.77	81.13		81.13	0.001603	0.34	10.87	61.99	0.21	0.26	0.16	0.26
1	17.9	100Yr	4.67	80.77	81.18		81.19	0.001855	0.41	14.68	68.91	0.23	0.32	0.21	0.33
1	1.5	5Yr	2.31	80.73	81.06	80.95	81.07	0.002904	0.48	7.50	54.48	0.28	0.31	0.25	0.29
1	1.5	10Yr	2.83	80.73	81.09	80.97	81.09	0.002901	0.51	9.11	62.74	0.28	0.31	0.27	0.29
1	1.5	100Yr	4.67	80.73	81.14	81.01	81.15	0.002900	0.56	12.65	65.92	0.29	0.37	0.30	0.36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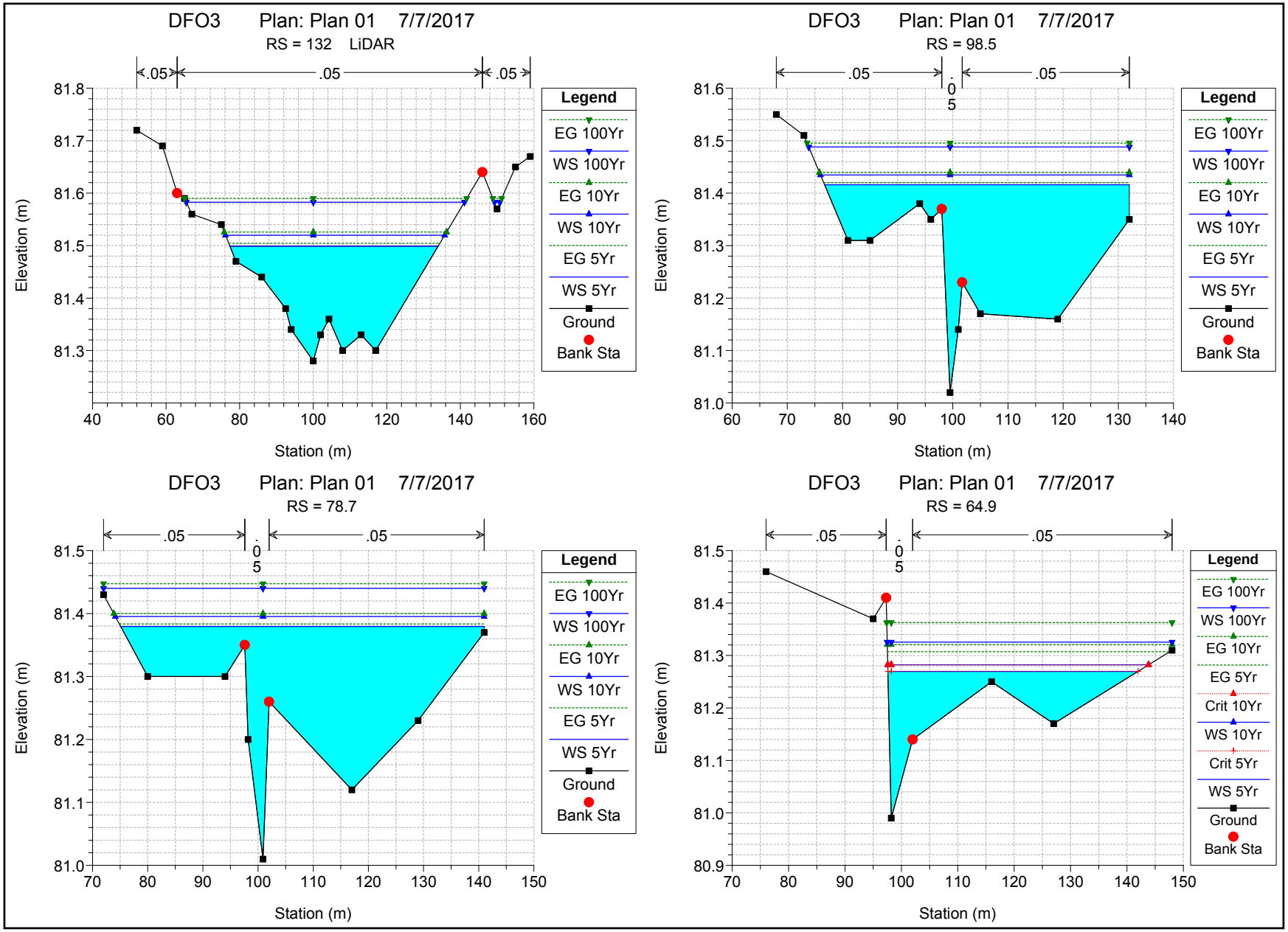
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 301 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 245 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 190 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta


DFO3 Plan: Plan 01 7/7/2017
RS = 132 LiDAR
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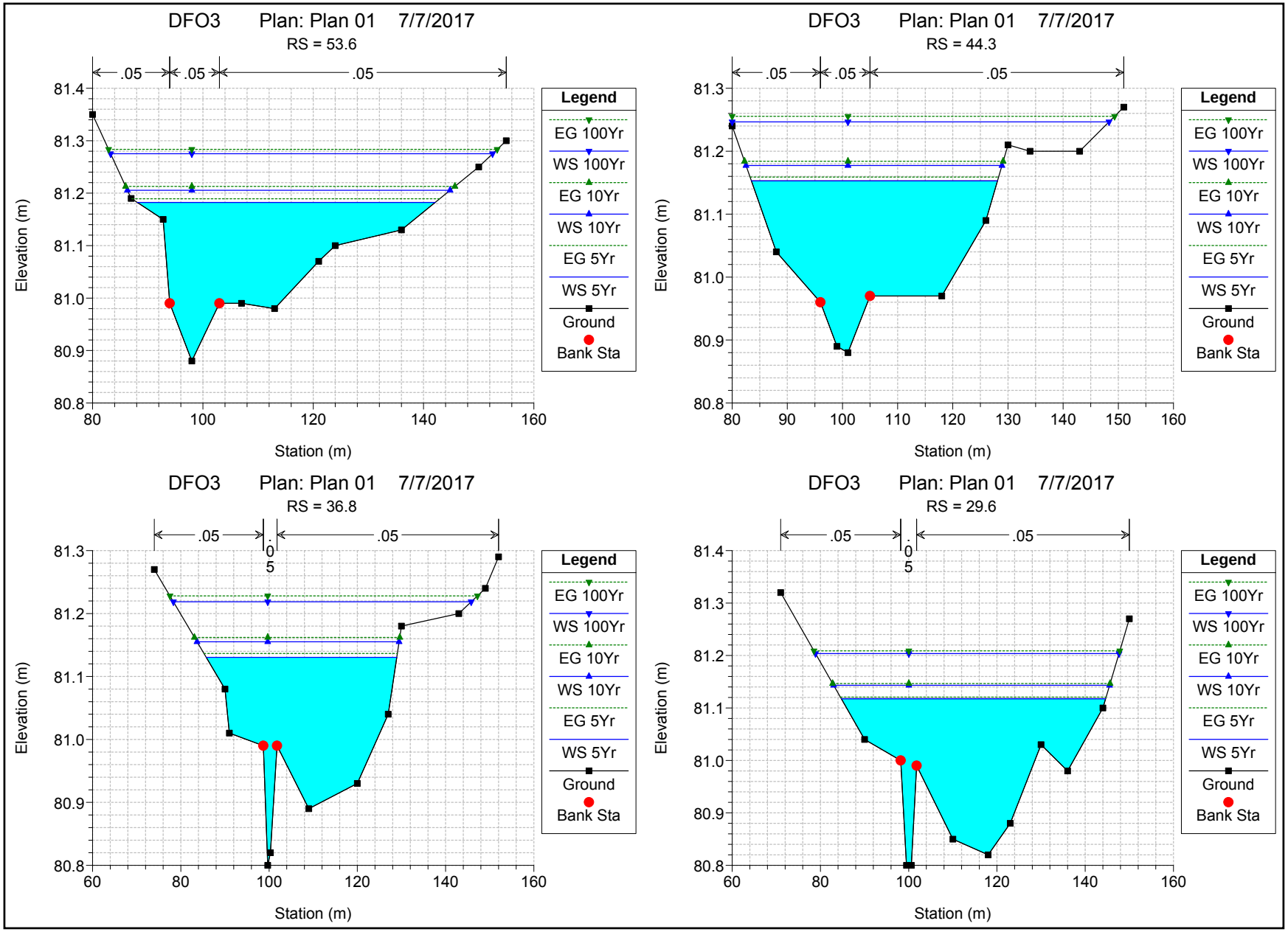
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 98.5
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 78.7
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 64.9
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
EG 5Yr
Crit 10Yr
WS 10Yr
Crit 5Yr
WS 5Yr
Ground
Bank Sta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.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 44.3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 36.8
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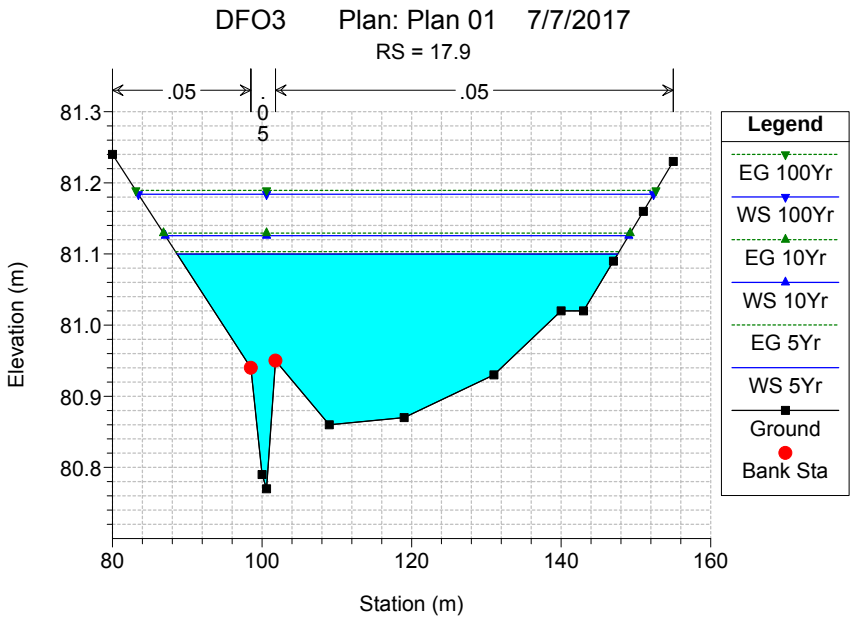
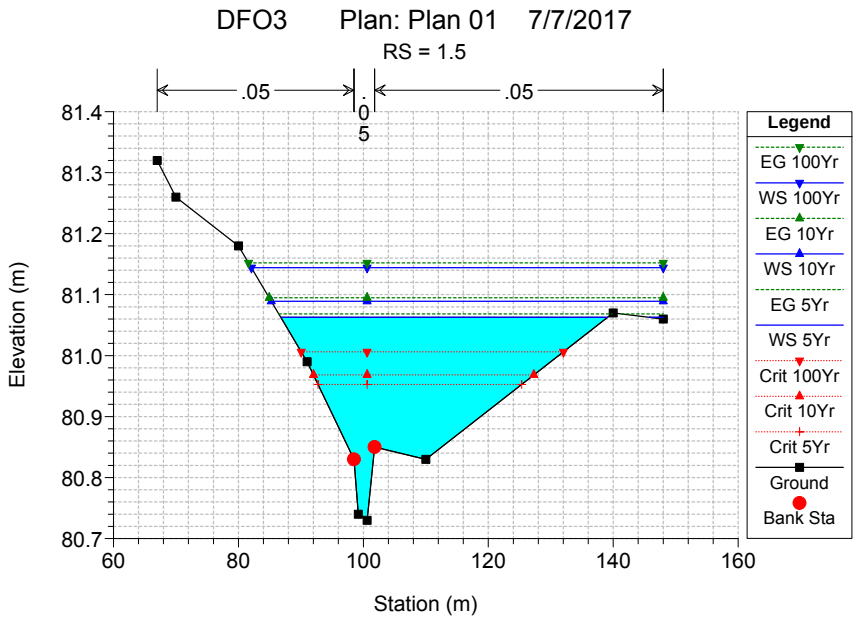
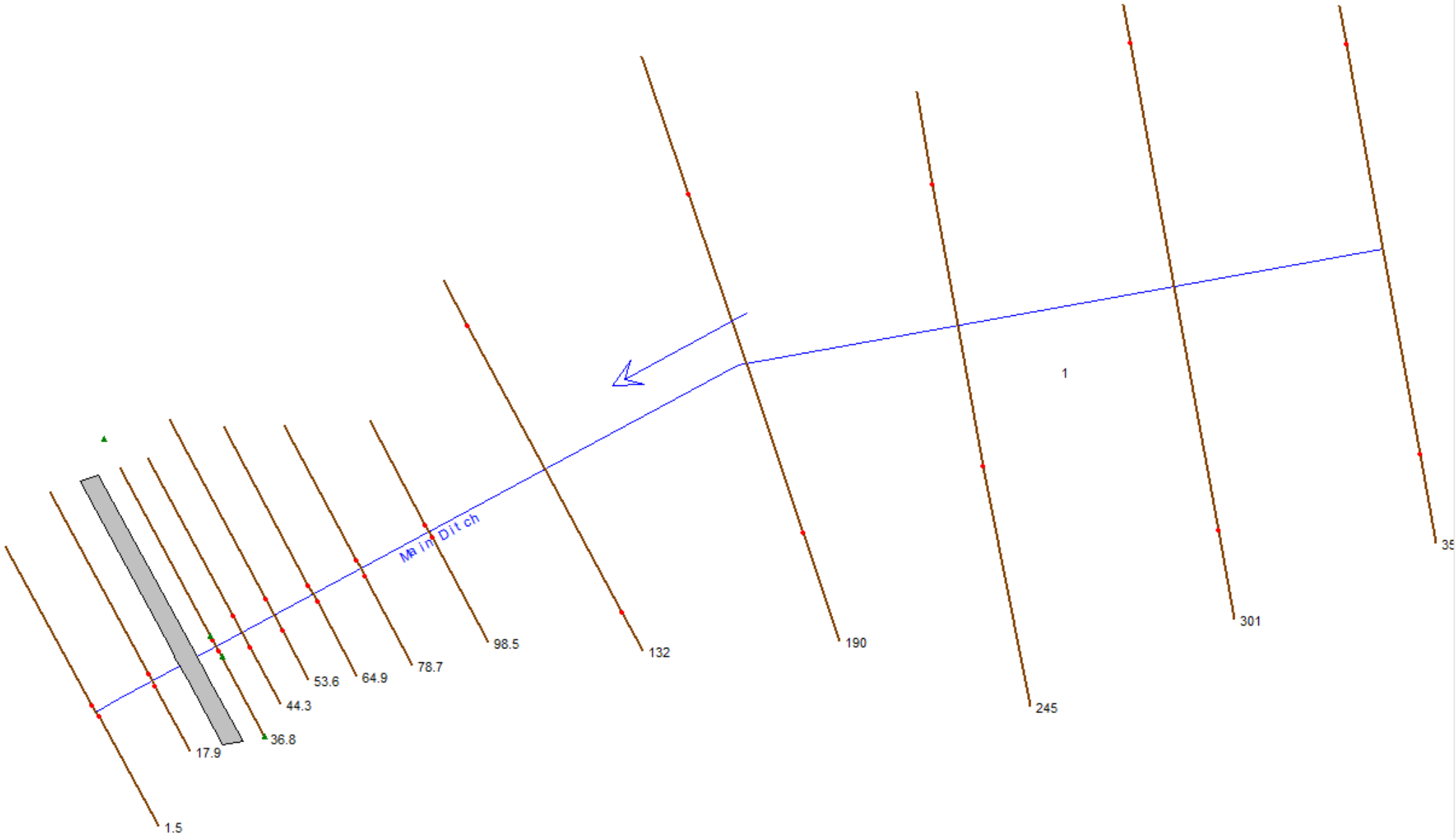
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3 Plan: Plan 01 7/7/2017
RS = 29.6
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta


DFO3 Plan: Plan 01 7/7/2017
RS = 17.9
.05
.05
.05
Elevation (m)
81.3
81.2
81.1
81.0
80.9
80.8
80
100
120
140
160
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta


DFO3 Plan: Plan 01 7/7/2017
RS = 1.5
.05
.05
.05
Elevation (m)
81.4
81.3
81.2
81.1
81.0
80.9
80.8
80.7
60
80
100
120
140
160
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Crit 100Yr
Crit 10Yr
Crit 5Yr
Ground
Bank Sta

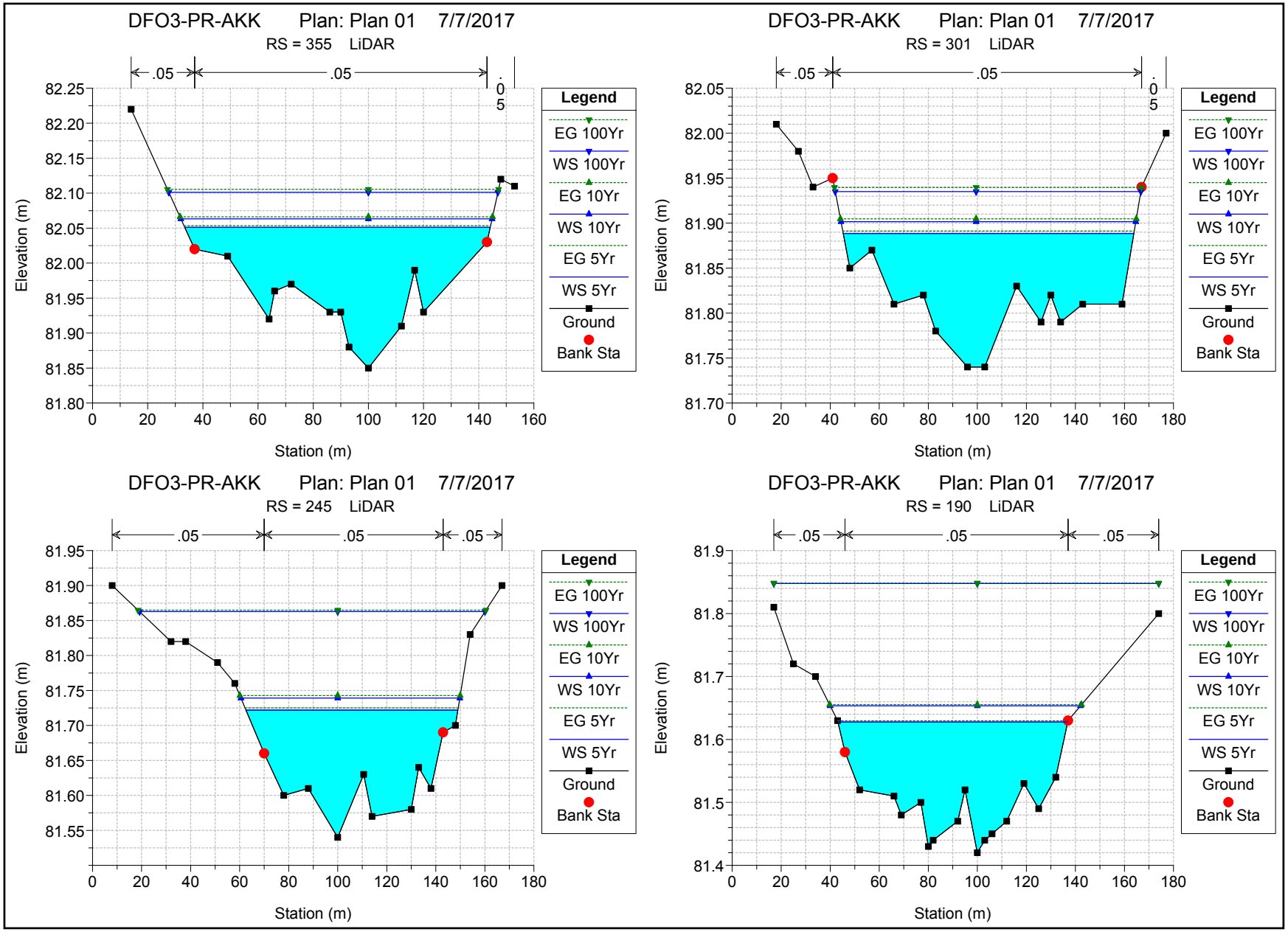

Main Ditch
1
1.5
17.9
36.8
44.3
53.6
64.9
78.7
98.5
132
190
245
301

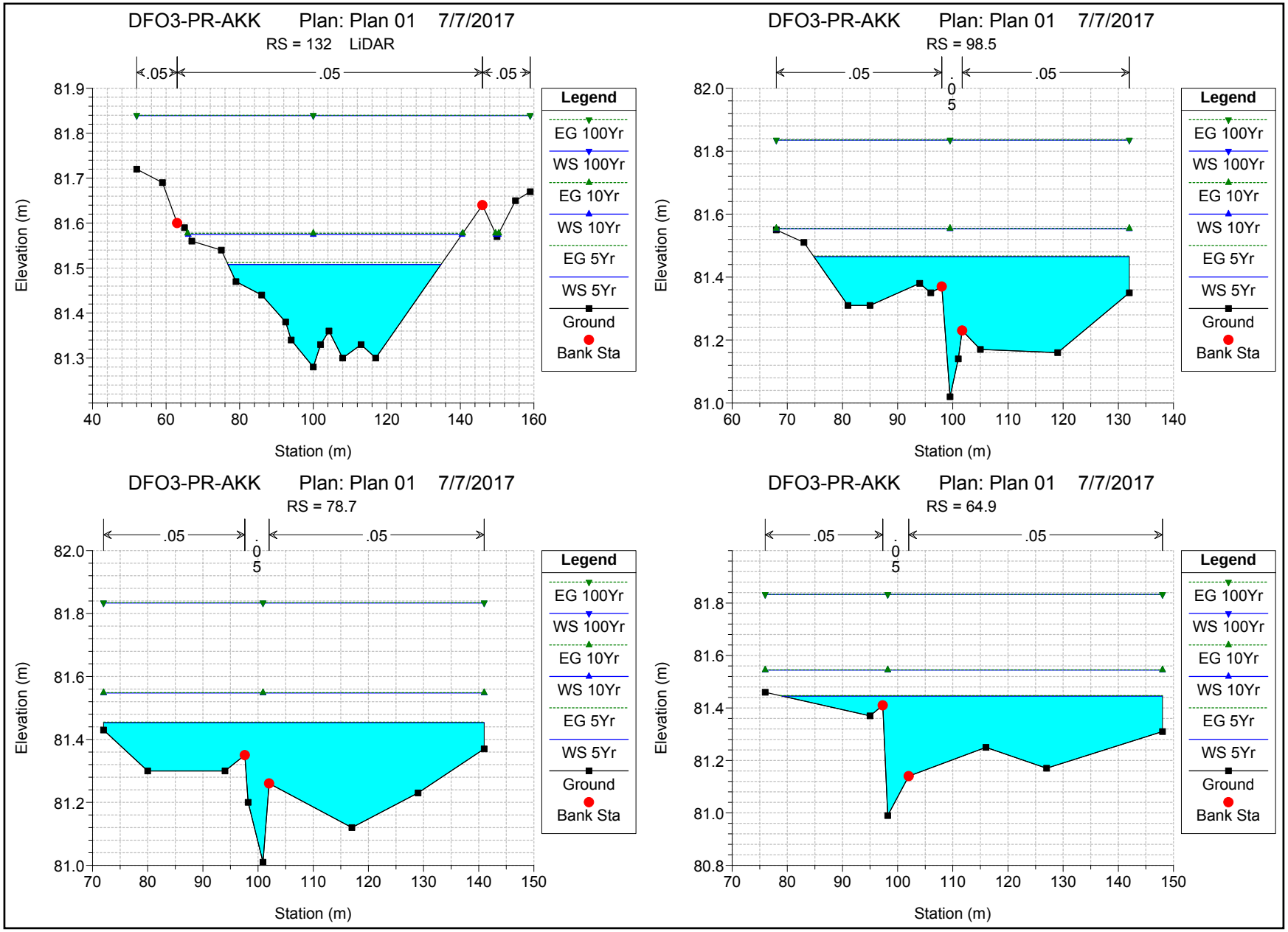
HEC-RAS Plan: Plan 01 River: Main Ditch Reach: 1

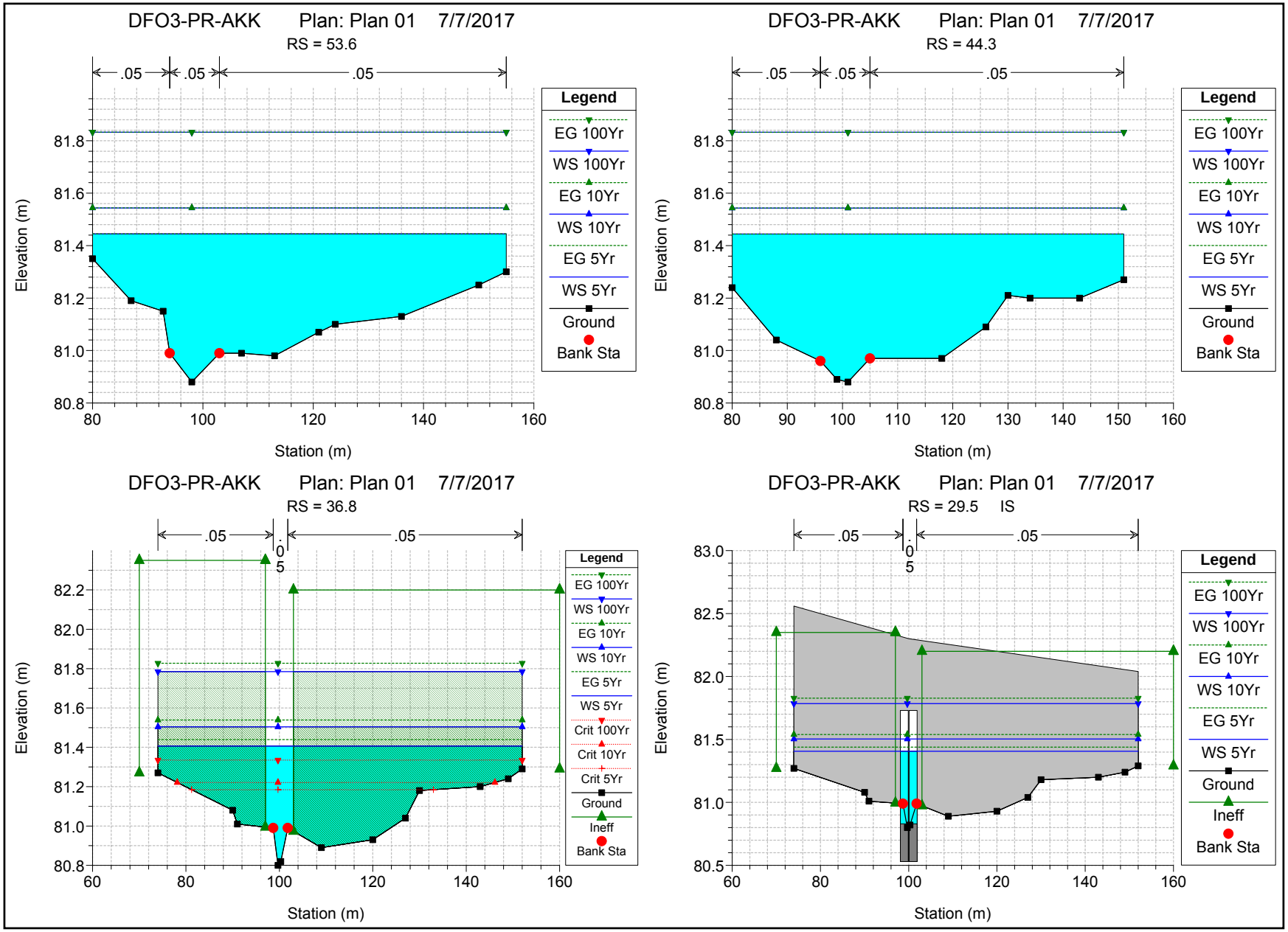
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	355	5Yr	2.27	81.85	82.05		82.05	0.002491	0.21	10.64	110.76	0.22	0.21	0.06	0.05
1	355	10Yr	2.83	81.85	82.06		82.07	0.002612	0.24	12.00	112.83	0.23	0.24	0.08	0.07
1	355	100Yr	4.67	81.85	82.10		82.11	0.002636	0.29	16.42	119.31	0.24	0.28	0.12	0.11
1	301	5Yr	2.27	81.74	81.89		81.89	0.003707	0.23	9.82	118.52	0.26	0.23		
1	301	10Yr	2.83	81.74	81.90		81.90	0.003568	0.25	11.38	120.25	0.26	0.25		
1	301	100Yr	4.67	81.74	81.94		81.94	0.003674	0.30	15.47	124.64	0.27	0.30		
1	245	5Yr	2.27	81.54	81.72		81.73	0.002455	0.25	9.45	86.47	0.22	0.24	0.10	0.08
1	245	10Yr	2.83	81.54	81.74		81.74	0.002416	0.27	10.95	89.32	0.23	0.26	0.11	0.11
1	245	100Yr	4.67	81.54	81.86		81.86	0.000682	0.22	24.60	140.89	0.13	0.19	0.09	0.10
1	190	5Yr	2.27	81.42	81.63		81.63	0.001300	0.19	12.15	93.73	0.16	0.19	0.06	
1	190	10Yr	2.83	81.42	81.65		81.66	0.001110	0.20	14.65	102.06	0.16	0.19	0.06	0.03
1	190	100Yr	4.67	81.42	81.85		81.85	0.000159	0.13	41.29	157.00	0.07	0.11	0.07	0.07
1	132	5Yr	2.27	81.28	81.51		81.51	0.003533	0.30	7.48	57.91	0.27	0.30		
1	132	10Yr	2.83	81.28	81.57		81.58	0.001654	0.24	11.83	74.98	0.19	0.24		0.01
1	132	100Yr	4.67	81.28	81.84		81.84	0.000139	0.13	38.05	107.00	0.06	0.12	0.07	0.08
1	98.5	5Yr	2.27	81.02	81.46		81.47	0.000701	0.24	11.57	57.20	0.14	0.20	0.12	0.21
1	98.5	10Yr	2.83	81.02	81.55		81.55	0.000364	0.21	16.84	64.00	0.10	0.17	0.11	0.19
1	98.5	100Yr	4.67	81.02	81.84		81.84	0.000099	0.15	34.89	64.00	0.06	0.13	0.12	0.14
1	78.7	5Yr	2.27	81.01	81.45		81.45	0.000525	0.21	13.85	69.00	0.12	0.16	0.12	0.17
1	78.7	10Yr	2.83	81.01	81.55		81.55	0.000237	0.17	20.36	69.00	0.08	0.14	0.11	0.15
1	78.7	100Yr	4.67	81.01	81.83		81.83	0.000070	0.13	40.08	69.00	0.05	0.12	0.11	0.12
1	64.9	5Yr	2.27	80.99	81.45		81.45	0.000567	0.24	12.82	68.96	0.13	0.18	0.06	0.18
1	64.9	10Yr	2.83	80.99	81.54		81.55	0.000245	0.18	19.90	72.00	0.09	0.14	0.08	0.15
1	64.9	100Yr	4.67	80.99	81.83		81.83	0.000069	0.13	40.66	72.00	0.05	0.11	0.09	0.12
1	53.6	5Yr	2.27	80.88	81.44		81.44	0.000083	0.12	25.23	75.00	0.05	0.09	0.07	0.09
1	53.6	10Yr	2.83	80.88	81.54		81.54	0.000055	0.11	32.66	75.00	0.04	0.09	0.07	0.08
1	53.6	100Yr	4.67	80.88	81.83		81.83	0.000029	0.10	54.31	75.00	0.03	0.09	0.08	0.09
1	44.3	5Yr	2.27	80.88	81.44		81.44	0.000069	0.11	26.20	71.00	0.05	0.09	0.09	0.08
1	44.3	10Yr	2.83	80.88	81.54		81.54	0.000049	0.10	33.25	71.00	0.04	0.08	0.08	0.08
1	44.3	100Yr	4.67	80.88	81.83		81.83	0.000028	0.10	53.76	71.00	0.03	0.09	0.09	0.08
1	36.8	5Yr	2.27	80.80	81.41	81.18	81.44	0.004346	0.85	2.83	78.00	0.38	0.80	0.73	0.74
1	36.8	10Yr	2.83	80.80	81.50	81.22	81.54	0.003602	0.87	3.42	78.00	0.35	0.83	0.77	0.78
1	36.8	100Yr	4.67	80.80	81.78	81.33	81.83	0.002599	0.95	5.11	78.00	0.32	0.91	0.87	0.88
1	29.5		Inl Struct												
1	17.9	5Yr	2.27	80.77	81.10		81.10	0.001672	0.32	9.22	58.74	0.21	0.25	0.15	0.25
1	17.9	10Yr	2.83	80.77	81.13		81.13	0.001603	0.34	10.87	61.99	0.21	0.26	0.16	0.26

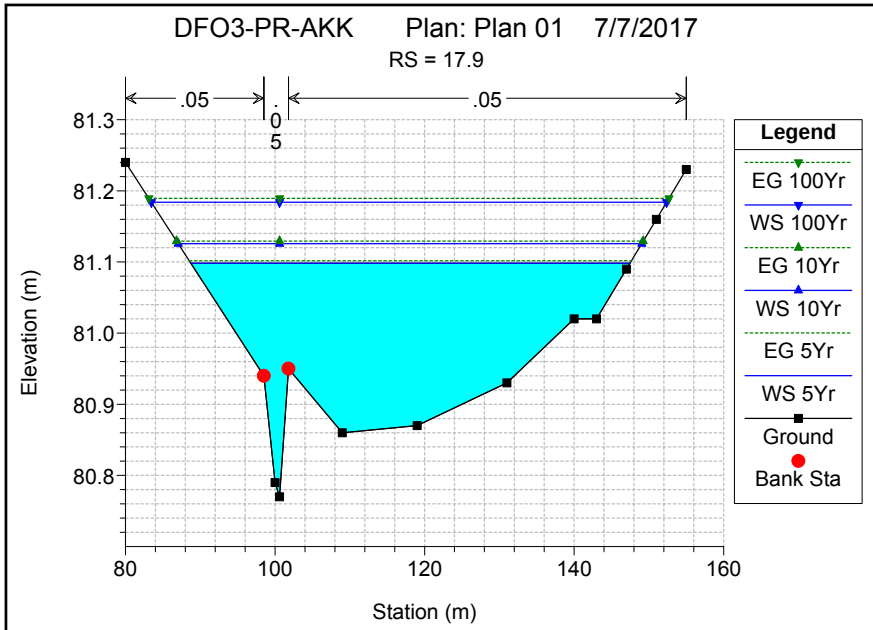
HEC-RAS Plan: Plan 01 River: Main Ditch Reach: 1 (Continued)

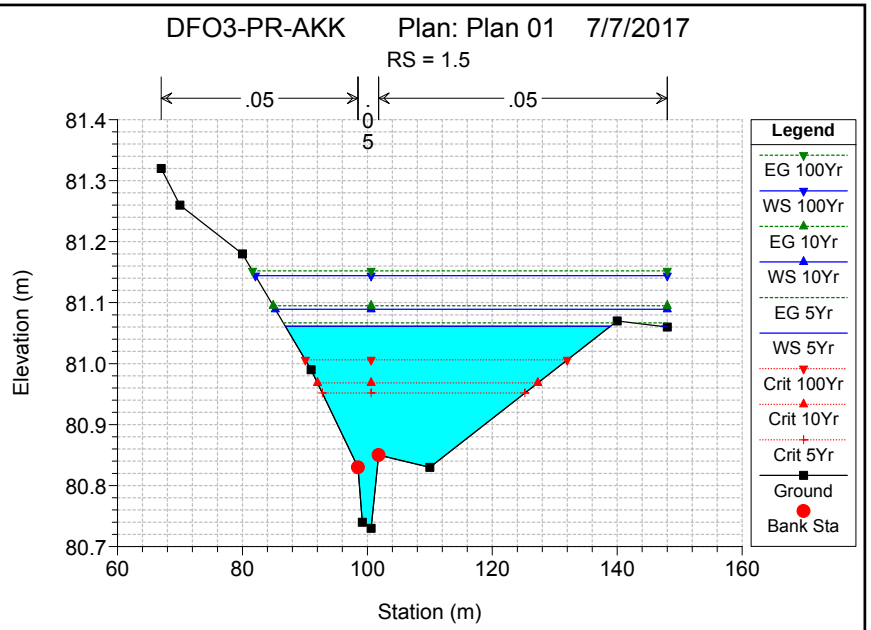
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
1	17.9	100Yr	4.67	80.77	81.18		81.19	0.001854	0.41	14.68	68.91	0.23	0.32	0.21	0.33
1	1.5	5Yr	2.27	80.73	81.06	80.95	81.07	0.002904	0.48	7.41	52.91	0.28	0.31	0.25	0.29
1	1.5	10Yr	2.83	80.73	81.09	80.97	81.09	0.002901	0.51	9.11	62.74	0.28	0.31	0.27	0.29
1	1.5	100Yr	4.67	80.73	81.14	81.01	81.15	0.002900	0.56	12.65	65.92	0.29	0.37	0.30	0.36


DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 355 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 301 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 245 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 190 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta


DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 132 LiDAR
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 98.5
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 78.7
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 64.9
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta


DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 53.6
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 44.3
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 36.8
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Crit 100Yr
Crit 10Yr
Crit 5Yr
Ground
Ineff
Bank Sta
DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 29.5 IS
.05
.05
.05
Elevation (m)
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Ineff
Bank Sta


DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 17.9
.05
.05
.05
Elevation (m)
81.3
81.2
81.1
81.0
80.9
80.8
80
100
120
140
160
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Ground
Bank Sta

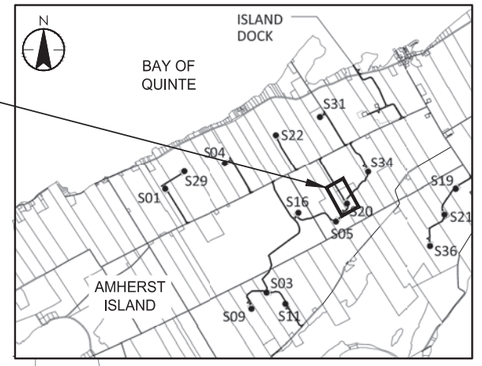

DFO3-PR-AKK Plan: Plan 01 7/7/2017
RS = 1.5
.05
.05
.05
Elevation (m)
81.4
81.3
81.2
81.1
81.0
80.9
80.8
80.7
60
80
100
120
140
160
Station (m)
Legend
EG 100Yr
WS 100Yr
EG 10Yr
WS 10Yr
EG 5Yr
WS 5Yr
Crit 100Yr
Crit 10Yr
Crit 5Yr
Ground
Bank Sta

DFO4 – HYDRAULIC MODELING

SEE DRAWING C302 FOR ADDITIONAL ACCESS ROAD DETAILS

LOCATION OF ERECTION BUMP-OUTS AND PADS TO BE FIELD DETERMINED WITHIN REA LIMITS. PROVIDE ADDITIONAL BUMP-OUTS, AS REQUIRED. BUMP-OUTS AND PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIALS, AS DETERMINED IN FIELD.

PLAN LOCATION



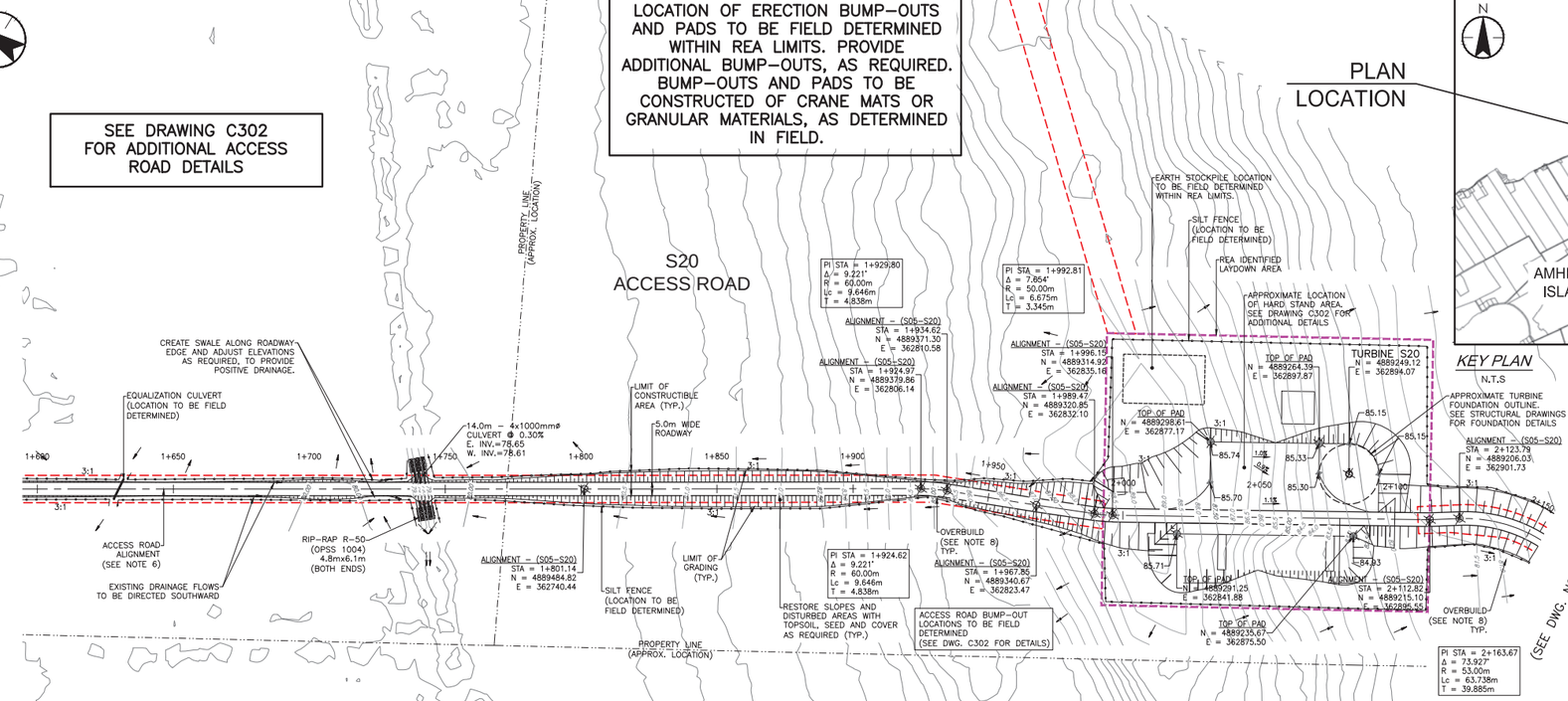
KEY PLAN N.T.S

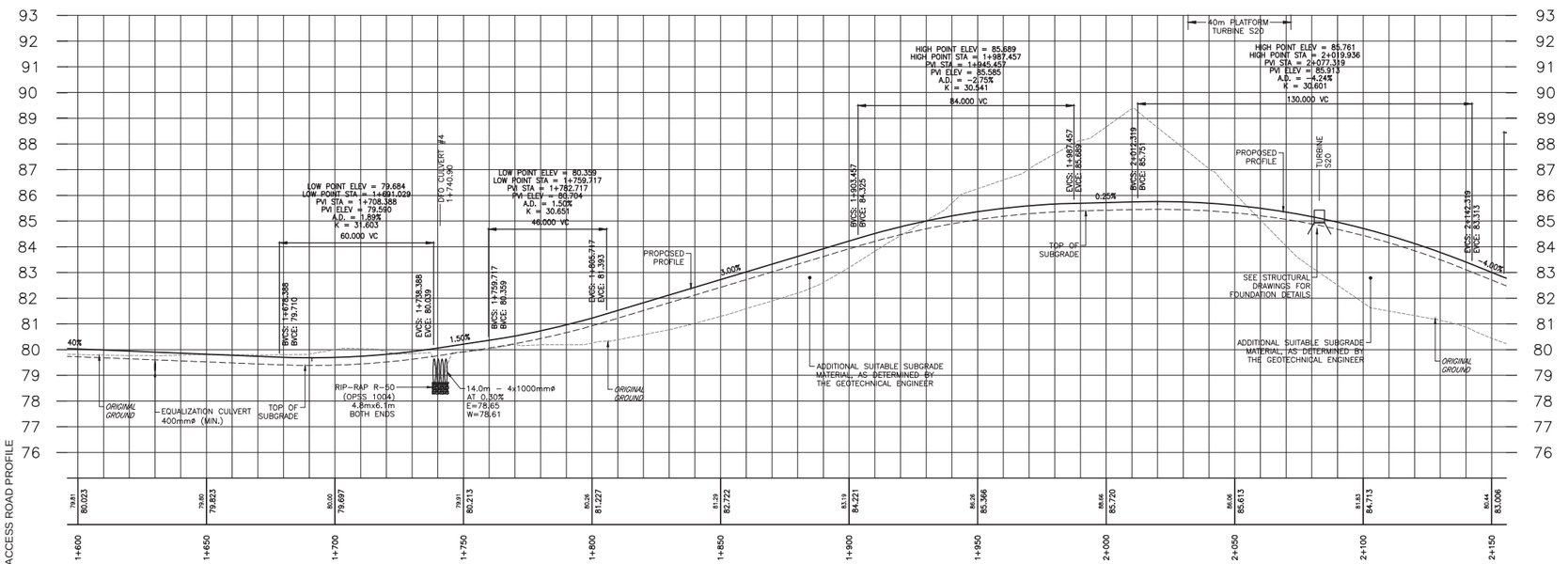
CONTRACTOR TO MAINTAIN EXISTING DRAINAGE FLOWS AS REQUIRED

SEE STRUCTURAL DRAWINGS FOR FOUNDATION DETAILS AND BACKFILL REQUIREMENTS

CRANE PAD REQUIREMENTS:

- CRANE PADS TO BE CONSTRUCTED OF CRANE MATS OR GRANULAR MATERIAL AS FOLLOWS:
  500mm GRANULAR 'B' TYPE II, PLACED IN 2 LIFTS, COMPACTED TO 100% SPMDD. WITH REINFORCEMENT LAYER (NAUE COMBIGRID 40/40 Q1 151 GRK3 OR APPROVED EQUIVALENT).
- SEPARATION LAYER (TERRAFIX 200R GEOTEXTILE).
- SUBGRADE TO BE INSPECTED, PROOF ROLLED, AND COMPACTED TO 100% SPMDD.
- CRANE PAD MUST BE EXTENDED 1.5m (MIN.) BEYOND OUTRIGGER MATS.





Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON Canada
Tel. 519.579.4410
www.stantec.com

General Notes

1. UNDER GROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE DRAWINGS AND WHERE SHOWN, THE ACCURACY OF POSITION IS NOT GUARANTEED. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL UTILITY PLANTS PRIOR TO STARTING WORK.
2. SEE DRAWING "CIVIL ACCESS ROAD DETAILS" (DRAWING C302) FOR ADDITIONAL CONSTRUCTION AND CULVERT NOTES.
3. UTILITY AND OTHER CONFLICTS HAVE NOT BEEN ADDRESSED IN THESE DRAWINGS, AND WILL BE RESOLVED IN THE FIELD USING VERIFIED UTILITY LOCATIONS AND OTHER SITE INFORMATION.
4. TOPOGRAPHICAL SURVEY COMPLETED BY McINTOSH PERRY CONSULTING ENGINEERS, DATED 2015. (UTM ZONE 18 NAD83 (CRSR) 1997.0)
5. SEE DRAWING "CIVIL ACCESS ROAD – EROSION AND SEDIMENT CONTROL" (DRAWING C301) FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. ACCESS ROAD ALIGNMENTS MAY REQUIRE FIELD MODIFICATIONS TO ACCOMODATE EXISTING CONDITIONS.
7. CONTRACTOR TO ADHERE TO ALL CONSERVATION AUTHORITY PERMITS AND CONDITIONS OF APPROVAL.
8. CONTRACTOR TO CONSTRUCT OVERBUILD (ADDITIONAL COMPACTED AREA) AT ALL BENDS AND CURVES IN ACCORDANCE WITH SIEMENS SPECIFICATIONS "GENERAL SITE REQUIREMENTS, AMHERST ISLAND, EQUIPMENT ONLY AM" REV 6.31, DATED 2016-09-23.

Legend

- SILT FENCE
- LIMIT OF CONSTRUCTIBLE AREA
- EXISTING OVERLAND FLOW/DITCH DIRECTION
- PROPOSED DITCH FLOW
- 218.5 EXISTING GROUND CONTOURS (AS PER NOTE 4 ABOVE)
- EXISTING GROUND CONTOURS (FROM LIDAR MAPPING)
- 84.86 PROPOSED PAD ELEVATION

*****For PHCL and Windlectric Use Only*****		
Review with no comments does not constitute approval of design details, calculations or methods. It is the responsibility of the consultant to ensure all information contained within the drawings are in full compliance with contractual obligations		
☐ Reviewed - No comments		
☐ Reviewed - Incorporate comments and resubmit		
☐ Reviewed - Not accepted		
Reviewed By	Date (dd-mmm-yyyy)	
Project Manager - PHCL	Date (dd-mmm-yyyy)	
Project Manager - Windlectric	Date (dd-mmm-yyyy)	
Owner:		

B	ISSUED FOR CRCA PERMITTING	RCL	MPG	17.06.22
A	ISSUED FOR CLIENT REVIEW	RCL	MPG	17.01.27
Revision		By	Appd.	YY.MM.DD

File Name: C207_133560100-turbine S05-S20.DWG	RCL/DH	MPG	RCL	15.12.03
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

NOT FOR CONSTRUCTION

Client/Project

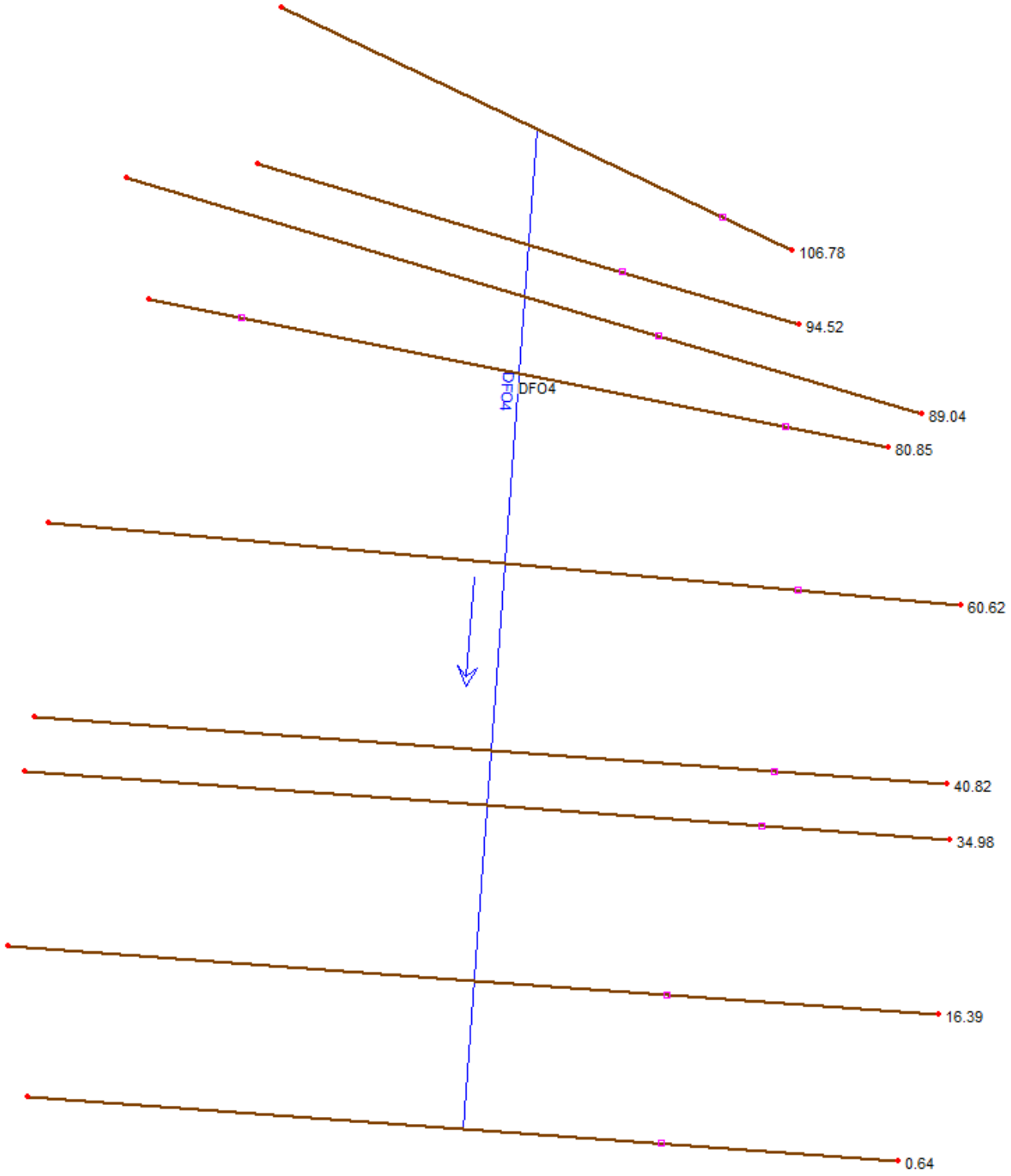
PENNECON HEAVY CIVIL

AMHERST ISLAND WIND PROJECT
75MW WIND FARM
Amherst Island, Loyalist Township, Ontario

Title

ACCESS ROAD
TURBINE S05 AND S20
PLAN AND PROFILE

Project No.	Scale	
133560100	1:1000H 0 10 30 50m 1:100V 0 1 3 5m	
Drawing No.	Sheet	Revision
C207	2 of 3	B


106.78
94.52
89.04
80.85
DFO4
60.62
40.82
34.98
16.39
0.64

HEC-RAS Plan: Existing River: DFO4 Reach: DFO4

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
DFO4	106.78	5	3.16	78.57	80.12	79.18	80.12	0.000745	0.26	12.24	36.70	0.14	0.26		
DFO4	106.78	10	3.93	78.57	80.16	79.25	80.16	0.000837	0.29	13.71	38.33	0.15	0.29		
DFO4	106.78	100	6.57	78.57	80.26	79.44	80.27	0.001212	0.36	18.28	48.17	0.19	0.36		
DFO4	94.52	5	3.16	78.43	80.11	79.01	80.11	0.000786	0.26	12.02	36.36	0.15	0.26		
DFO4	94.52	10	3.93	78.43	80.15	79.08	80.15	0.000867	0.29	13.41	37.09	0.16	0.29		
DFO4	94.52	100	6.57	78.43	80.25	79.28	80.26	0.001105	0.38	17.34	39.09	0.18	0.38		
DFO4	89.04	5	3.16	78.87	80.10	79.35	80.11	0.001389	0.27	11.76	53.78	0.18	0.27		
DFO4	89.04	10	3.93	78.87	80.14	79.41	80.14	0.001278	0.28	13.82	54.58	0.18	0.28		
DFO4	89.04	100	6.57	78.87	80.24	79.59	80.25	0.001181	0.34	19.59	56.75	0.18	0.34		
DFO4	80.85	5	3.16	78.89	80.08	79.39	80.09	0.002208	0.38	8.22	31.02	0.24	0.38		
DFO4	80.85	10	3.93	78.89	80.12	79.44	80.13	0.002549	0.42	9.46	35.48	0.26	0.42		
DFO4	80.85	100	6.57	78.89	80.22	79.61	80.23	0.003088	0.43	15.30	63.15	0.28	0.43		
DFO4	60.62	5	3.16	78.77	80.04	79.30	80.05	0.001978	0.29	11.05	60.13	0.21	0.29		
DFO4	60.62	10	3.93	78.77	80.08	79.36	80.09	0.001734	0.29	13.39	63.48	0.20	0.29		
DFO4	60.62	100	6.57	78.77	80.19	79.53	80.19	0.001433	0.29	22.88	97.12	0.19	0.29		
DFO4	40.82	5	3.16	78.81	80.01	79.32	80.02	0.001222	0.25	12.62	58.39	0.17	0.25		
DFO4	40.82	10	3.93	78.81	80.05	79.38	80.06	0.001136	0.26	15.06	62.10	0.17	0.26		
DFO4	40.82	100	6.57	78.81	80.16	79.55	80.17	0.001041	0.29	22.39	72.38	0.17	0.29		
DFO4	34.98	5	3.16	78.78	80.01	79.29	80.01	0.001004	0.24	13.37	58.24	0.16	0.24		
DFO4	34.98	10	3.93	78.78	80.05	79.34	80.05	0.000961	0.25	15.84	62.09	0.16	0.25		
DFO4	34.98	100	6.57	78.78	80.16	79.52	80.16	0.000938	0.28	23.16	72.75	0.16	0.28		
DFO4	16.39	5	3.16	78.77	79.99	79.29	80.00	0.000535	0.19	16.30	59.59	0.12	0.19		
DFO4	16.39	10	3.93	78.77	80.04	79.36	80.04	0.000545	0.21	18.80	62.25	0.12	0.21		
DFO4	16.39	100	6.57	78.77	80.14	79.54	80.15	0.000591	0.25	25.85	67.67	0.13	0.25		
DFO4	0.64	5	3.16	78.75	79.98	79.24	79.99	0.000700	0.21	15.09	60.15	0.13	0.21		
DFO4	0.64	10	3.93	78.75	80.03	79.30	80.03	0.000700	0.22	17.64	64.11	0.14	0.22		
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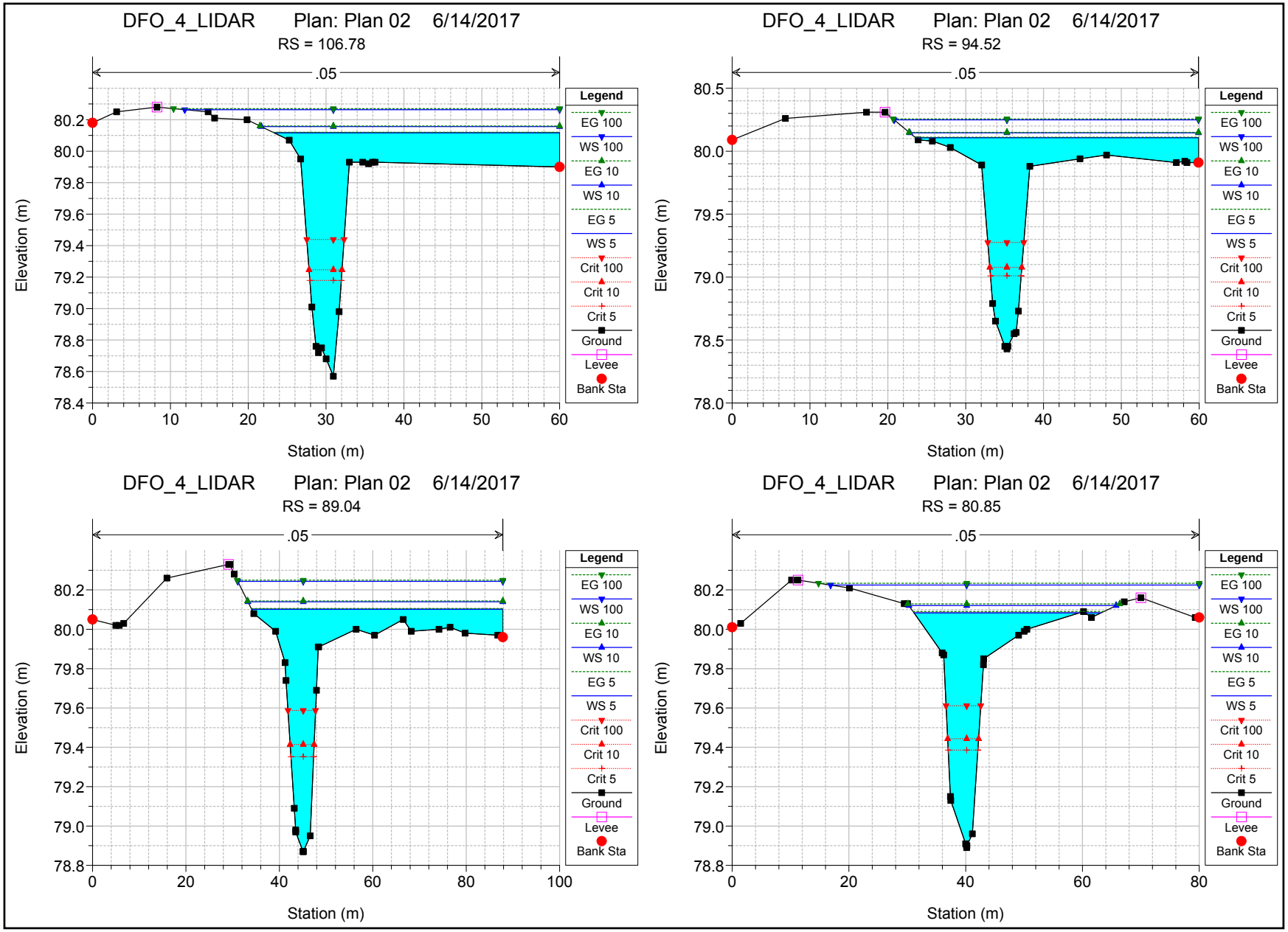
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Elevation (m)
Station (m)
Legend
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WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 02 6/14/2017
RS = 94.52
.05
Elevation (m)
Station (m)
Legend
EG 100
WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 02 6/14/2017
RS = 89.04
.05
Elevation (m)
Station (m)
Legend
EG 100
WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 02 6/14/2017
RS = 80.85
.05
Elevation (m)
Station (m)
Legend
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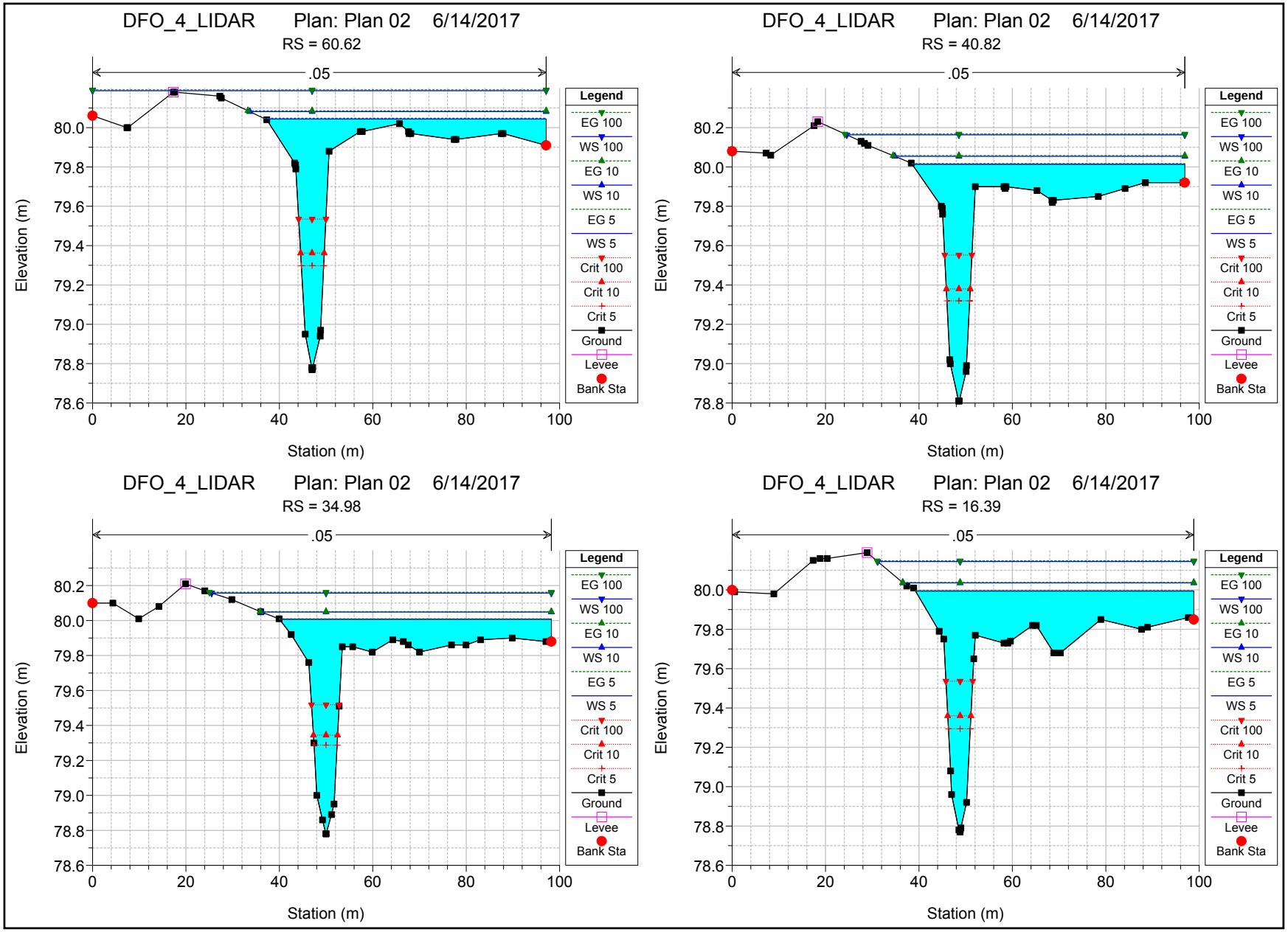
WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta


DFO_4_LIDAR Plan: Plan 02 6/14/2017
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Elevation (m)
Station (m)
Legend
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WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 02 6/14/2017
RS = 40.82
.05
Elevation (m)
Station (m)
Legend
EG 100
WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 02 6/14/2017
RS = 34.98
.05
Elevation (m)
Station (m)
Legend
EG 100
WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 02 6/14/2017
RS = 16.39
.05
Elevation (m)
Station (m)
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WS 100
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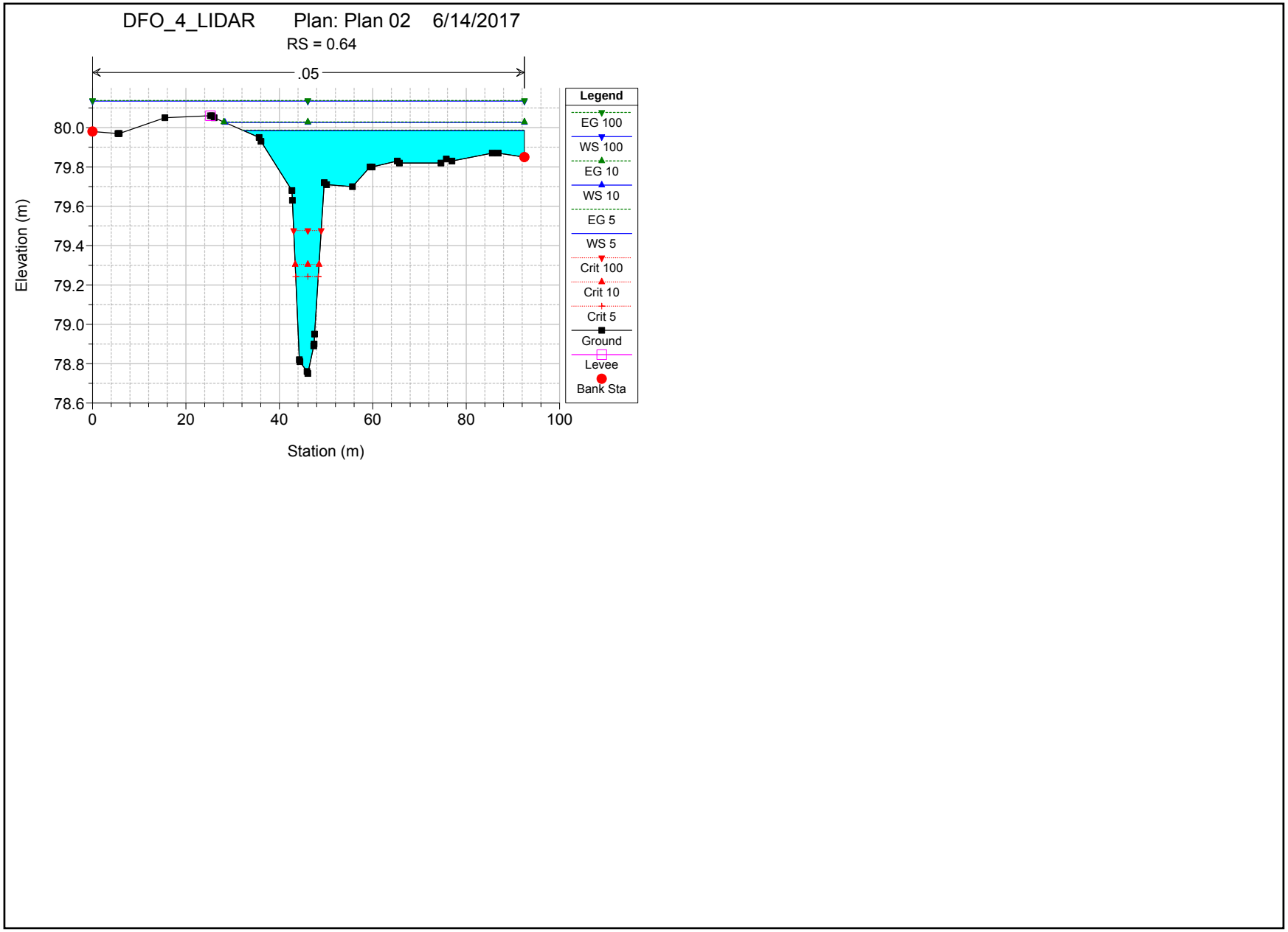
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta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Elevation (m)
80.0
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79.6
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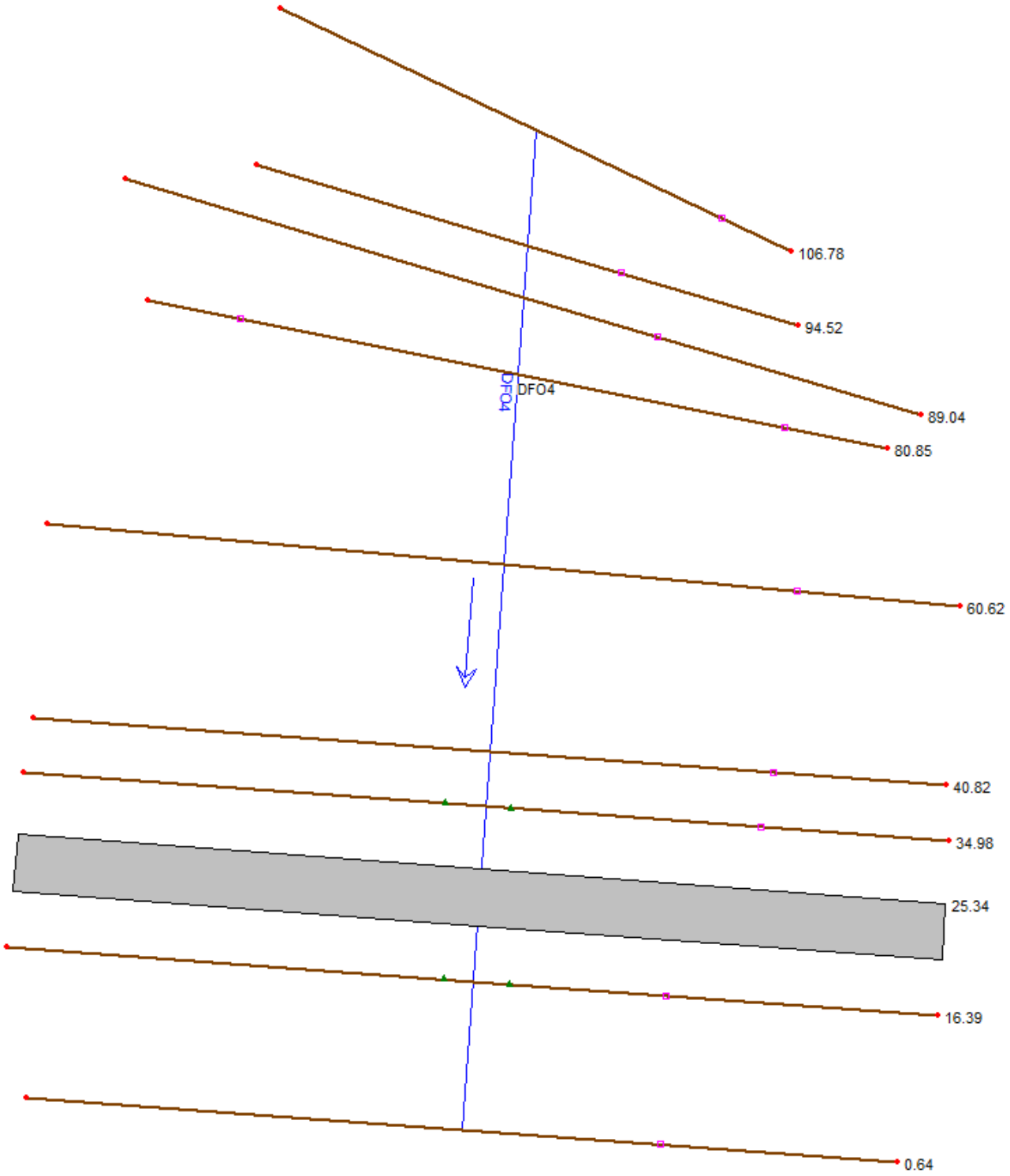
79.2
79.0
78.8
78.6
0
20
40
60
80
100
Station (m)
Legend
EG 100
WS 100
EG 10
WS 10
EG 5
WS 5
Crit 100
Crit 10
Crit 5
Ground
Levee
Bank Sta


106.78
94.52
89.04
80.85
DFO4
DFO4
60.62
40.82
34.98
25.34
16.39
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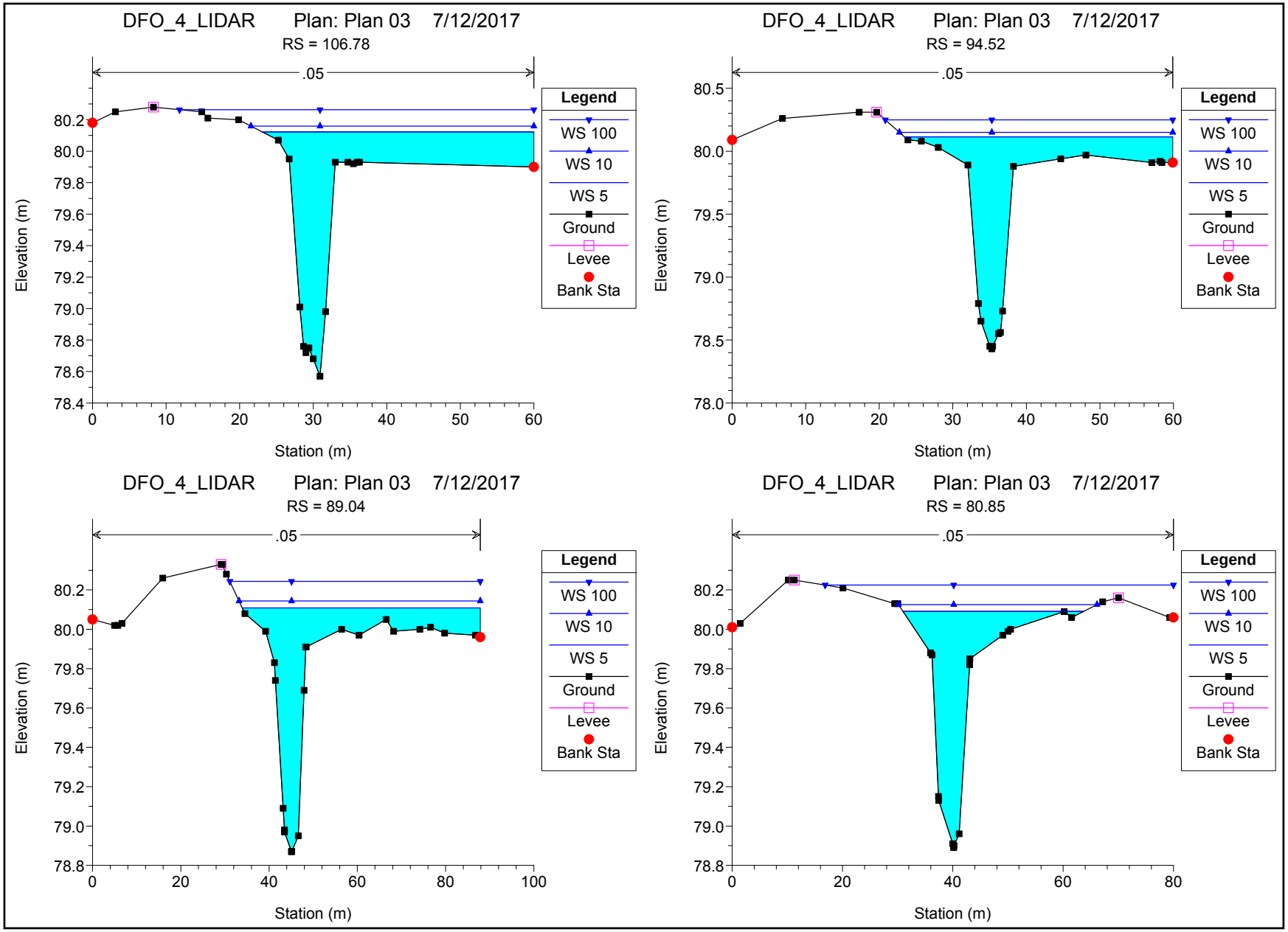
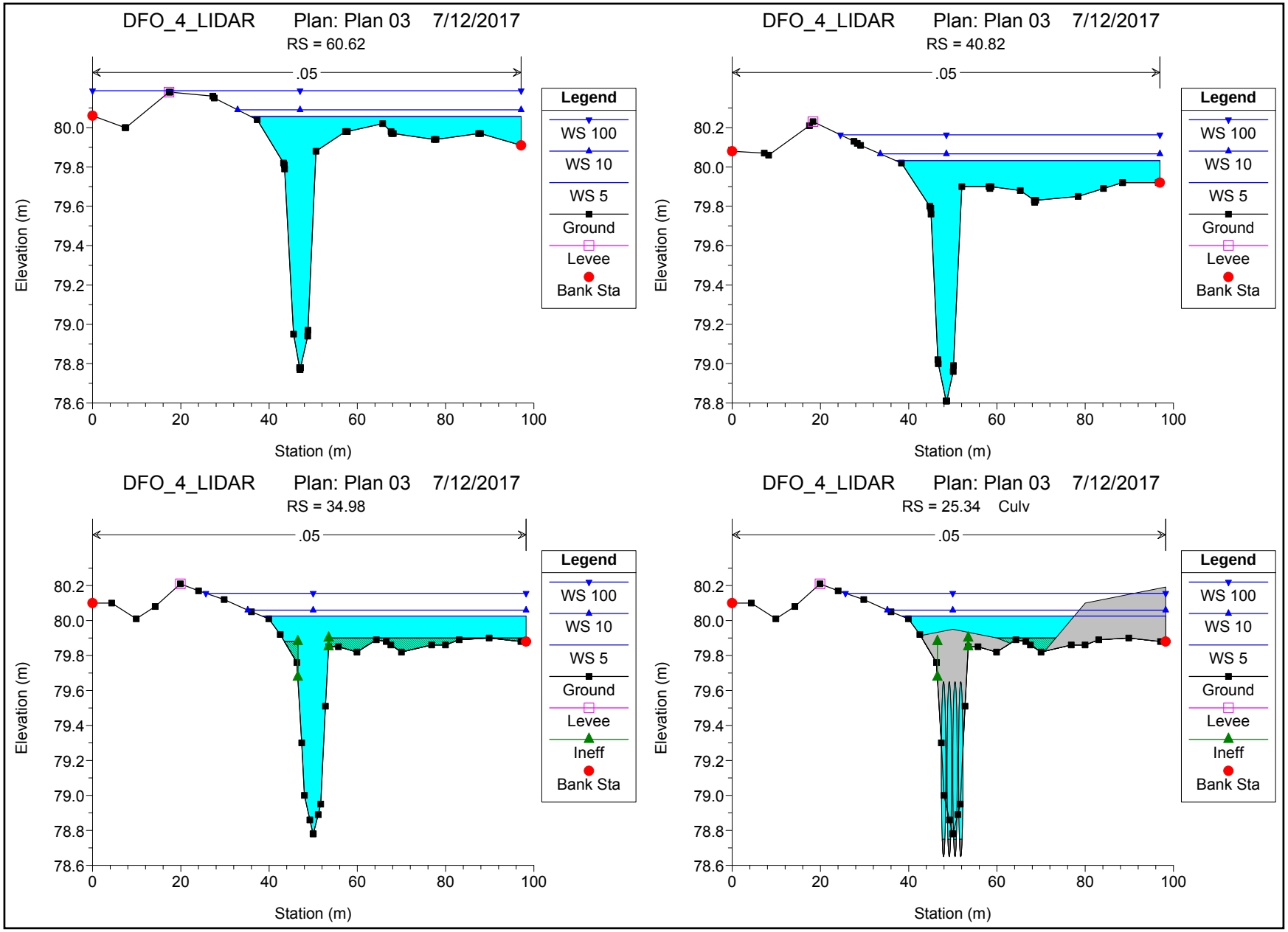
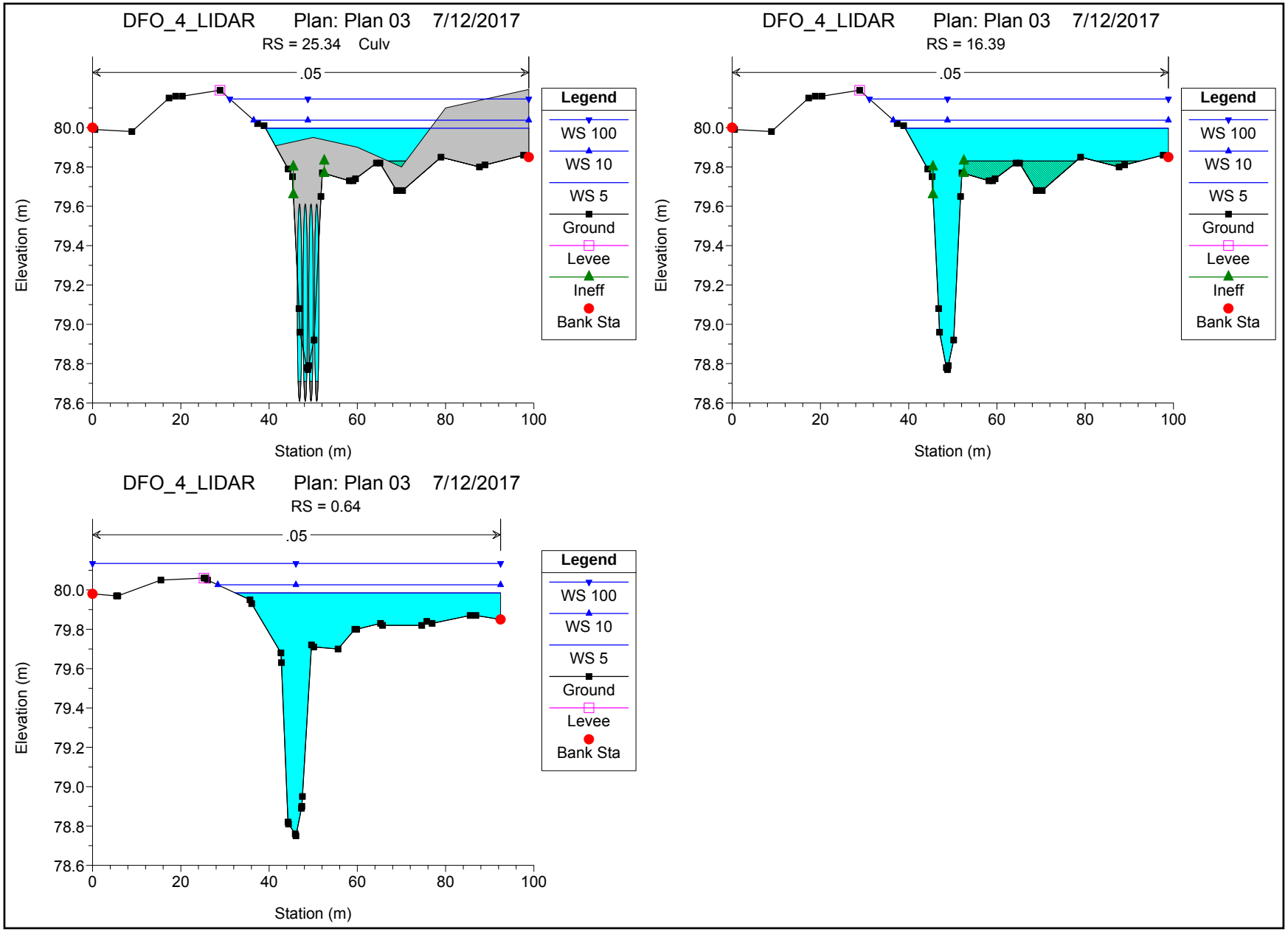

DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 106.78
.05
Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 94.52
.05
Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 89.04
.05
Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 80.85
.05
Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta


DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 60.62
.05
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 40.82
.05
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 34.98
.05
Legend
WS 100
WS 10
WS 5
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 25.34 Culv
.05
Legend
WS 100
WS 10
WS 5
Ground
Levee
Ineff
Bank Sta
Elevation (m)
Station (m)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RS = 25.34 Culv
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Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Ineff
Bank Sta
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 16.39
.05
Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Ineff
Bank Sta
DFO_4_LIDAR Plan: Plan 03 7/12/2017
RS = 0.64
.05
Elevation (m)
Station (m)
Legend
WS 100
WS 10
WS 5
Ground
Levee
Bank Sta

HEC-RAS Plan: Propo_Box River: DFO4 Reach: DFO4

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	Vel Total	Vel Left	Vel Right
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)		(m/s)	(m/s)	(m/s)
DFO4	106.78	5	3.16	78.57	80.12	79.18	80.13	0.000709	0.25	12.46	36.95	0.14	0.25		
DFO4	106.78	10	3.93	78.57	80.16	79.25	80.16	0.000814	0.28	13.84	38.47	0.15	0.28		
DFO4	106.78	100	6.57	78.57	80.26	79.44	80.27	0.001212	0.36	18.28	48.18	0.19	0.36		
DFO4	94.52	5	3.16	78.43	80.11	79.01	80.12	0.000741	0.26	12.25	36.49	0.14	0.26		
DFO4	94.52	10	3.93	78.43	80.15	79.08	80.15	0.000839	0.29	13.55	37.17	0.15	0.29		
DFO4	94.52	100	6.57	78.43	80.25	79.28	80.26	0.001105	0.38	17.34	39.09	0.18	0.38		
DFO4	89.04	5	3.16	78.87	80.11	79.35	80.11	0.001257	0.26	12.13	53.92	0.18	0.26		
DFO4	89.04	10	3.93	78.87	80.14	79.41	80.15	0.001214	0.28	14.05	54.66	0.18	0.28		
DFO4	89.04	100	6.57	78.87	80.24	79.59	80.25	0.001181	0.34	19.59	56.75	0.18	0.34		
DFO4	80.85	5	3.16	78.89	80.09	79.39	80.10	0.002142	0.37	8.48	32.77	0.23	0.37		
DFO4	80.85	10	3.93	78.89	80.13	79.44	80.13	0.002432	0.41	9.65	35.97	0.25	0.41		
DFO4	80.85	100	6.57	78.89	80.22	79.61	80.23	0.003087	0.43	15.31	63.16	0.28	0.43		
DFO4	60.62	5	3.16	78.77	80.06	79.30	80.06	0.001617	0.27	11.83	61.26	0.19	0.27		
DFO4	60.62	10	3.93	78.77	80.09	79.36	80.09	0.001537	0.28	13.95	64.26	0.19	0.28		
DFO4	60.62	100	6.57	78.77	80.19	79.54	80.19	0.001432	0.29	22.89	97.12	0.19	0.29		
DFO4	40.82	5	3.16	78.81	80.03	79.32	80.04	0.000952	0.23	13.73	59.85	0.15	0.23		
DFO4	40.82	10	3.93	78.81	80.07	79.38	80.07	0.000990	0.25	15.82	63.34	0.16	0.25		
DFO4	40.82	100	6.57	78.81	80.16	79.55	80.17	0.001042	0.29	22.39	72.38	0.17	0.29		
DFO4	34.98	5	3.16	78.78	80.03	79.29	80.03	0.001232	0.25	12.71	59.84	0.17	0.25		
DFO4	34.98	10	3.93	78.78	80.06	79.35	80.06	0.001233	0.27	14.79	63.07	0.18	0.27		
DFO4	34.98	100	6.57	78.78	80.16	79.52	80.16	0.001235	0.31	21.30	72.55	0.18	0.31		
DFO4	25.34		Culvert												
DFO4	16.39	5	3.16	78.77	80.00	79.30	80.00	0.000855	0.22	14.17	59.64	0.15	0.22		
DFO4	16.39	10	3.93	78.77	80.04	79.36	80.04	0.000817	0.24	16.66	62.33	0.15	0.24		
DFO4	16.39	100	6.57	78.77	80.15	79.54	80.15	0.000792	0.28	23.69	67.73	0.15	0.28		
DFO4	0.64	5	3.16	78.75	79.98	79.24	79.99	0.000700	0.21	15.09	60.15	0.13	0.21		
DFO4	0.64	10	3.93	78.75	80.03	79.30	80.03	0.000700	0.22	17.64	64.11	0.14	0.22		
DFO4	0.64	100	6.57	78.75	80.13	79.48	80.14	0.000701	0.24	27.81	92.47	0.14	0.24		