JULY 7, 2024
PROJECT NO. 2021-185

LOT 31 CLARK STREET
HYDROLOGY AND HYDRAULIC REPORT

TOWN OF THE BLUE MOUNTAINS

CAPES ENGINEERING

355310 BLUE MOUNTAINS-EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0

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Introduction

CAPES Engineering Ltd. has been retained by Pantone Capital Inc. to prepare a hydrology and hydraulic report in support of a Site Plan Agreement for the site located at the intersection of Highway 26, Grey Rd 2 and Clark Street in the Town of The Blue Mountains.

The 3.74 ha site is currently vacant land partially covered in trees and open field space. There is an Environmental Protection Area along a portion of the west and south part of the site and through a swath in the middle of the site. The EP zone through the central part of the site splits the property roughly into north and south sections. It is proposed to construct a two storey, 1,300 .64 sq. m (footprint) industrial building including 37.2 sq. m office space (Building A) in the southern part of the site. In addition, it is proposed to construct 5 single story self-storage buildings (Buildings B-G) on the southern part of the site north of Building A along with internal access road and parking.

The northern part of the site will be developed with a 1 story, 1,750.10 sq. m Industrial building with separate parking from the south part of the site. The north and south parts of the site will connect using a roadway through the EP area.

There is a small watercourse located along the western part of the site which flows east through a neighbouring property to the subject property where it turns sharply to the south and flows along the western edge of the site to Clark Street. The watercourse splits at Clark Street with some flow going under the road via a culvert and some flow continuing back through the site on the eastern side of the property.

The GSCA have requested that the potential flooding on the site from this watercourse be determined in order to support the development of the site.

The intent of this study is to demonstrate the extent of the flooding in the area, provide solutions for mitigating against the flooding and to demonstrate that safe access and egress for the site can be achieved.

Existing Study Area Conditions

The existing 3.74 ha site, located at the intersection of Highway 26, Grey Rd. 2 and Clark Street in the Town of The Blue Mountains, is legally described as Con. 8 and 9 Pt Lot 31 Pt RD ALLOW RP 16R3512 Part 1 and RP 16R4224 Parts 2 and 3. Please refer to the Legal Plan for the site in **Appendix A**.

The roughly triangular shaped site is bound by Highway 26 to the north-east, by the Town owned sewage lagoons and an industrial subdivision to the west and Clark Street and Grey Rd. 2 to the south. The site is currently vacant with a driveway entrance off Clark Street and gravel driveway.

The site is partially regulated by the GSCA for a watercourse that travels from west to east across the midpoint of the site as well as along the northern ditch of Clark Street and the along the western edge of the site.

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The GSCA requested an EIS be prepared for the site. Roots Environmental was retained to complete an initial due diligence environmental investigation in 2021 with the full EIS completed Dec. 2022. We understand that Species-At-Risk (SAR) were previously identified on the site by the MNRF but none were found on the site by Roots and suitable habitat for those species were also not present on site and it was determined that the SAR occurrences may have been within 1 km of the site and not on the site itself.

A watercourse was confirmed to flow south along the western boundary of the site to the north ditch on Clark Street and then a portion of the flow travels north-east through the site to Highway 26. A second watercourse was identified on GSCA mapping through the middle of the site but was not found during subsequent visits. The EIS describes the watercourse as follows,

"The watercourse appears to be the result of drainage from adjacent industrial/commercial uses, municipal lagoons, and agricultural lands to the west. No observation of fish species were observed and it is likely this drainage feature only contributes to downstream fish habitat"

The EIS recommends a 10 m buffer from the watercourse along the western and eastern parts of the site. For more information, please refer to the full EIS submitted separately.

The site generally slopes from west to east at an average of 4.4% in the northern part of the site and 1% in the southern part of the site. There are several mounds of earth/fill/topsoil in the middle of the site which affect the overall drainage patterns locally but overall, all surface runoff flow reaches the western ditch of Highway 26 and then flows under Highway 26 via a 1.3 m x 2.5 m concrete box culvert.

Clark Street along the south edge of the site is a 20.12 m road allowance Municipally controlled two lane road with an asphalt surface and open ditches. It is understood through information provided by the Town that the intersection of Grey Rd. 2 and Clark Street may be closed in the future, however, there has been no timeline provided or confirmation that this will occur.

Grey Rd. 2 along the south-east edge of the site is also a two-lane road with open ditches but it is controlled by Grey County.

Highway 26 along the north-east part of the site is currently a 2 lane road with a right hand turning lane for southbound traffic turning onto Grey Rd. 2. The highway has open ditches on both sides of the road. A hydro transmission line crosses through the development site in an easement and extends to the south edge of the highway. This portion of the Highway is controlled by the MTO and is currently being studied (by the MTO) for an expansion.

The study area for this report is limited to approximately 20 m west of the western boundary of the site, the south side of Clark Street and the NE side of Highway 26.

Please refer to **Figure 1** for the extent of the study area and location of the watercourse for this report and to **Appendix B** for select photos of key locations.

The watercourse through the study area is narrow at between 1-2 m wide, shallow at generally less than 0.5 m deep and generally filled with grasses or bare dirt bottom. The channel was dry during our site visit in August 2023 and was noted as dry in Oct. 2021, and April and August 2022 during the EIS site investigation. The watercourse appears to be a man-made drainage channel as it is straight and has a regular cross section. It travels south along the west side of the site to a 600 mm dia. CSP culvert under

Clark Street. The watercourse continues east on the south side of Clark Street to a 600 mm dia. CSP culvert under Grey Rd. 2.

The flow that does not pass under Clark Street from the site is directed east through a partially buried 450 mm dia. CSP culvert at the driveway entrance to the site. Flow continues east in the north ditch of Clark Street and is then diverted north back through the east side of the site in a man-made channel to a 1.52 m x 2.44 m wide concrete box culvert under Hwy 26. The channel is fairly consistent in width, depth and shape throughout the study area.

The overbank areas of the watercourse are generally dense grasses, shrubs with some trees.

Background Information Review

The Town of the Blue Mountains initiated a Drainage Master Plan in 2021 with the intent to present the final report to Town Council sometime in 2023. The "60% complete" report has been made public via the Town website and includes the study area. Although not yet officially adopted, the Master Drainage Plan is being used by the GSCA as a screening tool to identify potential problem areas and inform their comments on development applications.

The draft version of the report identifies the subject watercourse as "Watercourse 52" which is shown on the Master Plan Figure 2C. The existing condition flood inundation map for watercourse is shown on Figure 5E. The flood map indicates some localized flooding on the site as well as two spills across the site, however the magnitude of the spills (flow magnitude) are not identified in this version of the report.

The study indicates that contributing drainage area for Watercourse 52 is 310.0 ha (Figure 2) which includes the entire drainage area to the discharge point at Georgian Bay and that the total flow in the Regional Storm Event is 12.1 cms. The Master Plan proposes upgrading the 600 mm dia. culvert crossing at Clark Street to a 3300 x 1200 box culvert (embedded by 300 mm) which would accommodate up to the 50 yr storm event. There is no timeline for the proposed upgrades.

Please refer to excerpts from the Master Drainage Plan including **Appendix C** of our report for reference.

We believe that the contributing catchment area to the upstream end (west side) of the site for the watercourse is significantly smaller than the full 310 ha. Using the Master Plan Figure 2 we have delineated a drainage area of 173 ha to the west side of the development site (see **Figure 2** below). or approximately 55% of the total drainage area. We propose to pro-rate the Master Plan calculated flow for the Timmins event of 12.1 cms to 55% to represent the smaller flows. The calculated pro-rated peak flow for the Regional storm is 6.665 cms.

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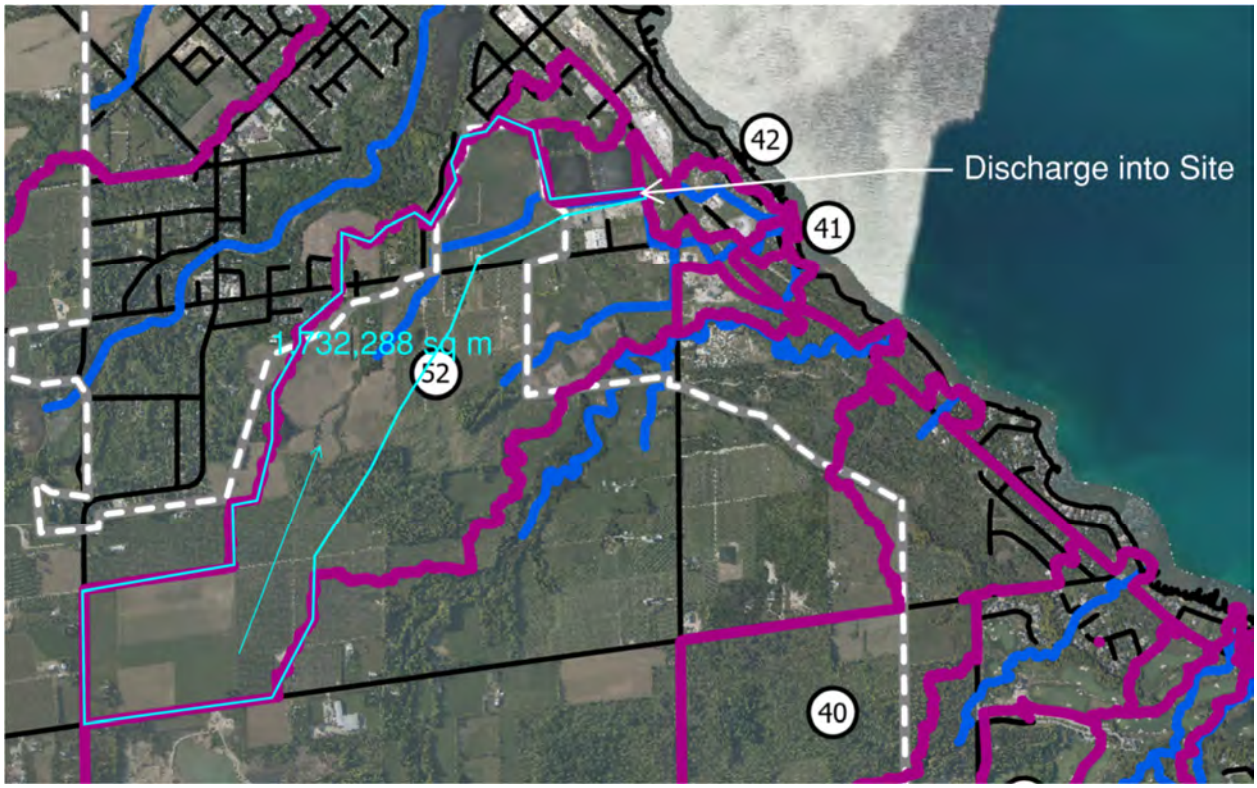
Figure 2 – Modified Figure 2 from Master Drainage Plan – Estimated Drainage Area to Site



Although flood plain modelling has been completed for the Master Drainage Plan, there is no specific details of the modelling that has been completed (cross section locations, no digital model provided etc.) and as such it is proposed that a new hydraulic model specifically for the development site will need to be created using the Master Drainage Plan pro-rated design flows.

Existing Condition Hydraulic Modelling

We have utilized the background information and hydrology results obtained from the Master Drainage Study to develop a new hydraulic HEC-RAS floodplain model. Civil 3D has been used to produce a digital terrain model for the subject area using information obtained from Grey County GIS (2019 Grey County LiDAR data set) and site-specific topographic survey information.

As an initial step the Grey County LiDAR information was adjusted based on site specific topo information obtained for the development site including Clark Street, Grey Rd. 2 and Hwy 26. The Master Plan completed a similar exercise and found that on average the DEM needed to be adjusted by -0.375 m.

Our hydraulic analysis made reference to both a detailed topographic survey of the subject site prepared by SMC Geomatics, (making reference to vertical and horizontal control established using Leica Smartnet RTK), as well as LiDAR DEM data received from the Town of the Blue Mountains. A digital elevation model was constructed of both pieces of data in the form of a Civil 3D surface, and vertical surface information was compared from the 2 sources. It was found that on average over the surface area of the site, the detailed topographic survey was 0.24m higher than the LiDAR DEM data. As such, the LiDAR DEM data was globally raised 0.24m to match the interface of the detailed topographic

survey, and the 2 surfaces were pasted together to create a composite surface (with detailed topographic survey taking precedent, with the LiDAR DEM being secondary at the perimeter of the site as required) to cover the extents of the HEC RAS cross sections referenced in this report.

Sufficient topographic survey info was available for the watercourse and the site, and the LiDAR information was only used for areas offsite (primarily west of the property on private lands).

The HEC-RAS import and export tools within Civil 3D allow the watercourse alignments, cross sections and profiles created from AutoCAD Tin surfaces to be exported as GIS entities, into the HEC-RAS environment. Working within the Civil 3D environment facilitates generation of geo-referenced cross sections and floodlines and tends to avoid errors associated with traditional approaches that rely on manual input.

HEC-RAS Version 6.3.1, developed by the U.S. Army Corps of Engineers, has been utilized in accordance with GSCA Hydraulic Standards. This model estimates the change in water surface elevation between selected valley cross sections and runs embedded computational routines to account for local increases in water levels due to bridges and/or other flow obstructions. The model is intended for utilization in the analysis of water surface profiles of steady state, gradually varied, one-dimensional flow, in natural and man-made channels.

A number of considerations are required in the selection of data and parameters to be used in the application of the HEC-RAS model to the floodplains of the study area, including the location of cross-sections and hydraulic structures, hydraulic input parameters and boundary conditions.

Cross Sections

Floodplain boundaries and the lateral extension of flows along a natural stream are typically controlled by the topographic relief and conveyance structures within the stream corridor. This relief is quantified in terms of ground surface elevations and/or contours. For utilization in the HEC-RAS program the topographic relief is represented by cross sections of the stream corridor taken perpendicular to the direction of flow.

Cross sections need to be taken at small enough spacing to accurately represent the channel geometry and to ensure sudden changes in cross section or slope are accounted for in the model. The total distance between the first and last cross sections required to represent the valley system is referred to as the reach length. Please refer to the defined reaches in **Table 1**.

Table 1 – River Reaches

Reach	Upstream Cross Section	Downstream Cross Section
EX-WC	RS 589.26	RS 2.16

The digitized cross sections were initially taken looking from left to right in the upstream direction, which is opposite to the orientation required in HEC RAS. Once the cross sections were imported to HEC RAS they need to be reversed to have the proper orientation (left to right looking downstream).

Cross sections have been cut perpendicular to the anticipated major system flow path through the site and watercourses, and at key locations as follows:

- Changes in channel and/or valley cross-sectional shape.
- Rapid changes in channel or valley slope.
- Significant changes in channel or valley roughness.
- Upstream and downstream of bridges.
- At all defined control points.
- Upstream and downstream of all channel confluences.

Following the initial evaluation of the cross-section selections as noted above, additional sections were added to the model when calculations indicated any of the following conditions:

- Where energy slope decreased or increased significantly.
- When significant changes in the conveyance of adjacent sections were observed.
- Where topographic representation of flow between cross sections indicated unrealistic transition.

Upon using this set of criteria to select the cross sections, these were then reviewed, and edits were made where necessary in the HEC-RAS software. HEC-RAS input geometry files were re-cut from the topographic survey data and iterated through a visual examination of plotted cross sections and model-generated warnings until the number of warnings generated by the software were minimized, eliminated or deemed to not have any impact on the generated floodplain extents.

Hydraulic Structures

Hydraulic structure information was based on review of previous work completed and confirmed with site investigation. This data included the location, orientation, elevation, width and height, composition, inlet/outlet characteristics.

Hydraulic structures were limited to the culverts under Clark Street and Hwy 26 as culverts down and upstream of the study area have little potential to change the flood elevation for a given reach assuming a constant flow due to the distances and relative elevation changes.

We have assumed that based on the watercourse trajectory and the elevations of the site that there will be two lateral weir structure locations which will primarily control the on-site flood extent and spill locations. The first lateral weir location is at the 90-degree bend in the watercourse at the west side of the site. The ground surface elevations on the east side of the watercourse can potentially allow flow to spill over the banks of the watercourse and flow east to HWY 26. The second location is at Clark Street where the watercourse can flow partially through the 600 mm dia. CSP culvert with the possibility of flood depth exceeding the road surface and flowing south over the roadway.

We believe that the box culvert at Hwy 26 will have little impact on the flood elevation while the culvert under Clark Street will provide only limited flood flow relief. Finally, we believe that the 450 mm dia.

CSP culvert under the existing driveway to the site will have little impact on the floodplain as the driveway surface elevation is quite low and we believe that a minor amount of ponding west of the entrance will cause water to flow over the driveway before it can get deep enough to flow over Clark Street.

Please refer to **Table 2** below for a list of the structure characteristics for information only.

Table 2 – HEC RAS Hydraulic Structures

Flow Location	Size (mm)	Length (m)	Inv. (Up)	Inv. (Down)	Material/Type	HEC RAS STA
West Side of Site (Lateral Weir)	3 m wide (perpendicular to spill direction)	34 m	186.50	186.37	Broad Crested Weir	588
Clark Street (Lateral Weir)	7.5 m wide (perpendicular to spill direction)	100 m	186.00	185.54	Broad Crested Weir	351.85
Clark Street	600 mm	18 m	184.73	184.53	CSP	351.85
Access Driveway	450 mm	8 m	185.00	184.98	CSP	N/A
Hwy 26	1.52 m x 2.44 m	22.3 m	182.24	182.13	Conc. Box	21.39

We have set HEC RAS to remove (and quantify) the flow that spills over the lateral weirs from the model. However, with the lateral weir at the west side of the property we have taken the spill amount calculated by the software and reintroduced the flow at STA 45.41.

Hydraulic Parameters

HEC RAS requires the input of various hydraulic parameters have been referenced from the HEC-RAS User Manual and Design Chart 2.01 from the 1997 MTO Drainage Management Manual as follows:

Manning's 'n' values are used to compute flow friction losses and have been summarized in the HEC-RAS description editor. Please refer to **Table 3** below for the Mannings n values for the reaches used in the HEC RAS Model.

Table 3 – Manning's n values Channel & Overbank Areas

Reach	Left Of Bank Manning n	Channel Manning n	Right Of Bank Manning n
EX-WC (RS 589.26-2.16)	0.06 – Light Brush and Trees	0.035 – Earth, fairly uniform section, weeds and dirt	0.006 – Light Brush and Trees

HEC RAS limits the location of lateral structures relative to the channel and as such we have used the west edge of the top of bank (left bank) with the lateral weir located within HEC RAS immediately beside

the left bank. The Clark Street lateral weir is located at the Right Bank and is represented by the road surface). There is little variation in n value between the channel itself and the majority of the overbank areas.

Boundary Conditions

We have made the assumption that the reach is flowing under normal (uniform) flow conditions at the upstream and downstream ends of the study area. We have measured the bed slope of the channel at the boundary using information obtained from the topographic survey and County info and utilized that as the energy slope for the normal boundary condition 0.6% slope for both the upstream and downstream ends.

A summary of boundary condition parameters used has been outlined in **Table 4** below.

Table 4 – Reach Boundary Conditions

Reach	Upstream Boundary Condition	Downstream Boundary Condition
EX-WC	Normal Depth = 0.006	Normal Depth = 0.003

Model Flows

We have used a peak flow of 6.665 cms inserted at the upstream end of the hydraulic model (STA 589.26). Through iterative modelling it was found that the initial lateral weir allows for 4.54 cms to flow east across the site towards Hwy 26 with the remaining 2.125 cms flowing south in the watercourse to Clark Street. At Clark Street the 600 mm dia. CSP under Clark Street is only able to convey 0.28 cms and the flooding does not get deep enough to overtop Clark Street, so 1.84 cms continues east and then north through the site watercourse. We have assumed that the 4.54 cms spill that happens at the upstream end of the site will rejoin the main model flow at STA 45.41 and will equal 6.38 cms and will continue to the Hwy 26 Box Culvert.

It appears in the current version of HEC RAS that when the flow optimization is turned on with lateral weirs and flow is allowed to leave the model that the attempt to reintroduce flow further downstream (ie. at STA 45.41) does not function correctly and the software continues to try and optimize the flow even in the absence of another lateral weir structure downstream of STA 45.41.

In order to ensure that the flows are modelled correctly we have generated a second model using the same existing condition model geometry from STA 204.1 downstream and the upstream lateral weirs removed and flow optimization off. The flow of 1.84 cms is introduced at STA 204.1 and the additional 4.54 cms is introduced at STA 45.41. This second model ensures that the true flood elevations are demonstrated within the MTO corridor and on the east side of the site.

As per the request of the GSCA we have also reviewed the floodplain model for the 5, 25 and 100 year storm events to determine at storm events will the spill occur across the site. We have applied the same prorated factor (55% of flow) to these other storm events which generate 1.54 cms, 2.97 cms and 4.29 cms respectively.

Existing Condition Hydraulic Modelling Results

The floodplain results for the Regional storm event have been plotted on **Drawing F1** and the summary table results have been provided in **Appendix D**.

The resulting floodplain for the site varies in elevation from 186.85 at the upstream end of the model to 183.13 at the downstream end. In the Regional event there is a spill of 4.54 cms east across the middle part of the site to the HWY 26 culvert. The spill is approximately 0.5 to 0.8 m deep through this section.

There is 2.125 cms of flow that continues south and is generally contained within the low flow channel of the watercourse. At Clark Street 0.28 cms is directed through the 600 mm dia. CSP under Clark Street and the flood level reaches an elevation of 185.60 which is only 0.30 m higher than the site driveway finished grade and generally 0.15 m below the CL of Clark Street.

Approximately 1.84 cms continues east in the north ditch of Clark Street and then heads north along the east side of the site. The initial spill flow of 4.54 cms rejoins the watercourse at STA 45 and is directed through the box culvert at Hwy 26, which has sufficient capacity to accommodate the flow.

In the 5 year storm event there is still a small amount of spill across the site (0.02 cms), and we believe that in the 2 year event there would be no spill, although we do not have peak flows for the 2 year event to confirm this assumption. Please refer to **Appendix D** for the HEC RAS floodplain results for all of the noted storm events.

Proposed Condition Hydraulic Model

As per the consultation with the GSCA it is proposed to provide a constructed channel across the development site to convey the flood spill to Hwy. 26 while ensuring that there will not be any negative impact on the development.

We have used the same cross section locations, lateral weir structures and input parameters from the existing condition model and have just adjusted the cross-section elevations for the portions of the site which will be developed.

It is proposed to direct the spill flow, which increases slightly from 4.55 cms in the existing condition to 4.64 cms in the post development Timmins event, north along the west side of the site using low earth berms. The flow will be directed to a 900 mm x 1800 mm concrete box culvert at 0.5% slope (capacity = 6.30 cms, **Appendix E**) which will discharge the flow north of the proposed industrial building. Additional earth berms will be used to direct the flow east towards the Hwy. 26 ditch system.

There is only one other location where the proposed development will have an impact on the floodplain and that occurs at the proposed entrance to the site. The new driveway will push the floodplain elevation up and flow needs to be either conveyed under the driveway or over the driveway at a flow depth less than 0.8 m to meet the safe access and egress criteria of the GSCA. We have opted to convey the entire 2.02 cms flow through a 900 mm x 1800 mm box culvert embedded 450 mm or an open bottom 450 mm x 1800 mm concrete box culvert at 1.2% slope (capacity 5.24 cms). It is proposed that 100% of the flow will be conveyed through the culvert with no overtopping and therefore the GSCA safe access and egress criteria is fully met. The proposed access culvert has sufficient capacity to convey the flow even in the event it is 50% blocked.

We have also completed a version of the post development HEC RAS model that eliminates all the lateral structures and the cross sections upstream of STA 204.1 to ensure that the flow optimization sub routine in the software which determines the magnitude of the spills does not reduce the flows downstream of the Clark Street where no additional spill occurs.

Please refer to **Figure F2** for the proposed floodplain condition and to **Appendix E** for the HEC RAS results.

There is no change to the floodplain elevations compared to the existing condition floodplain with the proposed development works and implementation of the new spill flow path to the north. The presented floodplain on Figure F2 includes all potential backwater impacts from the flood condition at HWY 26 and the flood level at Hwy 26 does not impact on the flood extent, level or capacity of any of the upstream conveyance structures proposed.

Conclusions & Recommendations

We have undertaken a review of the previous hydrology and hydraulic work completed for the study area at Lot 31 Clark Street in the Town of the Blue Mountains. A small man-made channel, referred to as “Watercourse 52” in the Town of the Blue Mountains Master Drainage Plan (60% completed, March 2023).

The watercourse enters the subject property from the west and takes a 90 degree turn to the south and flows in a narrow, straight uniform channel to Clark Street. At Clark Street the watercourse flows east in the north ditch with some flow going through a 600 mm dia. culvert to the south side of the road and the remainder flowing east and then north back through the site. The flow discharges at an existing concrete box culvert under Hwy. 26.

The drainage area and prorated peak flows for the watercourse is approximately 173 ha and 6.665 cms as derived from information in the Master Drainage Plan.

The model we have developed for the existing condition study demonstrates that there is a significant spill across the site from west to east where the watercourse enters the site. There are also two areas of localized flooding, one near Clark Street and one on the east side of the site.

It is proposed that the site will be developed with a number of self storage, commercial and industrial buildings complete with an internal access road, parking and a stormwater management facility. Through consultation with the GSCA it was agreed that the identified spill across the site could be redirected and contained to facilitate the development.

We propose to redirect the spill north around the north end of the industrial building using a combination of grassed channel and a concrete box culvert. The spill route has been designed to only allow flow through when it reaches the existing condition flood elevation of 186.37 to ensure that the current flow split is approximately maintained.

Safe access and egress to the site is to be provided by installing a new open bottom concrete box culvert at the access road which will accommodate 190% of the Regional storm flow. We believe that the proposed development works will have no impact on the floodplain depths or extent and will not alter the current flow pattern of the system.

Report Prepared By:

Clayton Capes, MSc. P.Eng.

CAPES Engineering Ltd.

Figures

Grey County GIS | Figure 1 - Study Area Extents

Legend

Assessment Parcel

Site Boundary

Watercourse

Culvert Crossing

Notes

0 100 200 m

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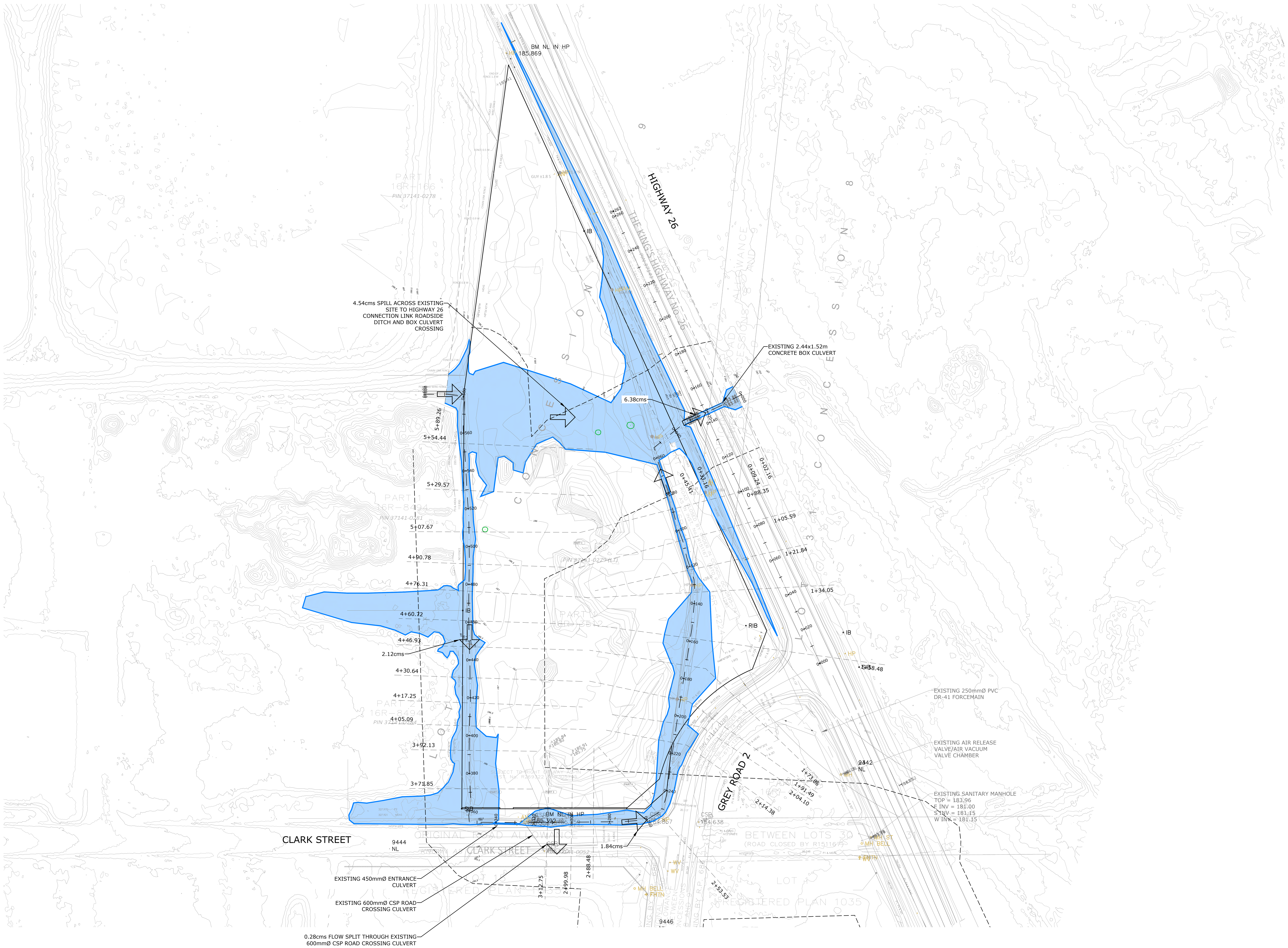
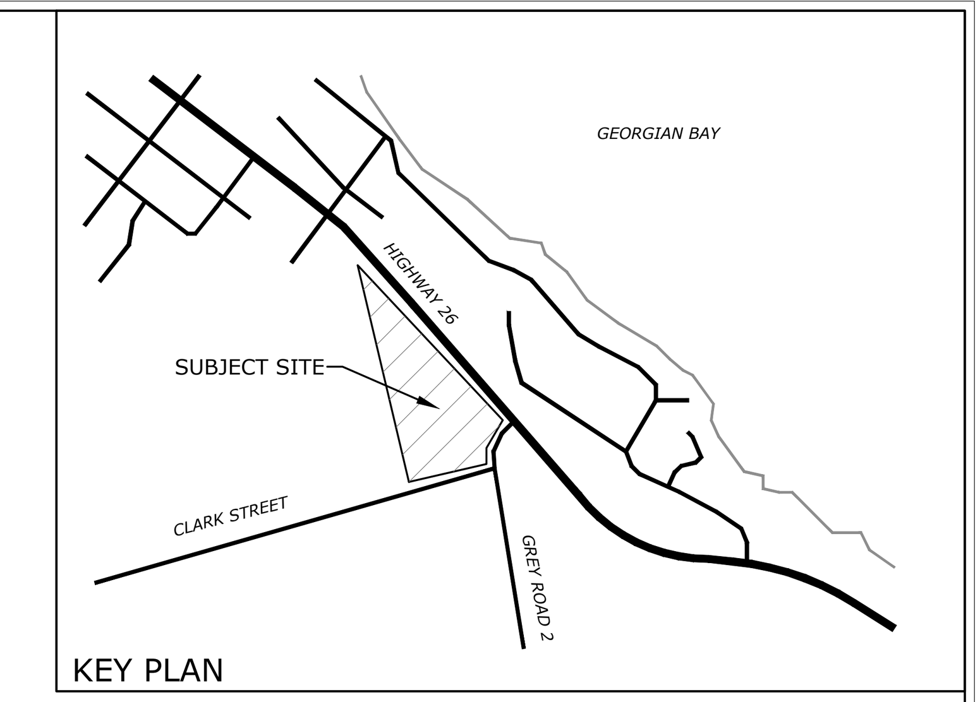
Drawings





KEY PLAN

LEGEND

EXTENT OF EXISTING FLOODPLAIN

DIRECTION OF FLOW

EXISTING FLOODPLAIN CONDITIONS	
STATION	ELEVATION
0+589.26	186.86
0+554.44	186.49
0+529.57	186.42
0+507.67	186.39
0+490.78	186.34
0+476.31	186.31
0+460.72	186.28
0+446.93	186.29
0+430.64	186.29
0+417.25	186.28
0+405.09	186.27
0+392.13	186.27
0+371.85	186.24
0+312.75	185.60
0+299.98	185.23
0+288.48	185.12
0+253.53	184.92
0+214.38	184.87
0+204.10	184.86
0+191.49	184.84
0+173.06	184.83
0+158.48	184.82
0+134.05	184.64
0+121.84	184.39
0+105.59	184.32
0+088.35	184.03
0+045.41	183.80
0+033.16	183.82
0+009.24	183.26
0+002.16	183.13

Notes

2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

No	Revision	Date
1	HYDRAULIC ANALYSIS	23/10/17
2	REVISED HYDRAULIC ANALYSIS	24/06/28

NOTES:

TOPOGRAPHIC SURVEY PREPARED BY SMC GEOMATICS, ELEVATIONS SHOWN ARE GEODETIC

BENCHMARK: NAIL IN HYDRO POLE AT SOUTH END OF SUBJECT SITE, ELEVATION 185.392

BOUNDARY CONDITIONS SHOWN INTERPRETED FROM PLAN PREPARED BY VAN HARTEN SURVEYING INC., AND SHOWN APPROXIMATELY HEREIN. THIS IS NOT A PLAN OF SURVEY, AND CANNOT BE USED TO DEFINE SITE BOUNDARY CONDITIONS

Client
PANTONE CAPITAL INC.

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Lot 31 Clark St. Site Plan

EXISTINGS CONDITIONS FLOODPLAIN EXTENTS

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	22/08/09	FIG1
Project No. 2021-185		Rev No. 3	
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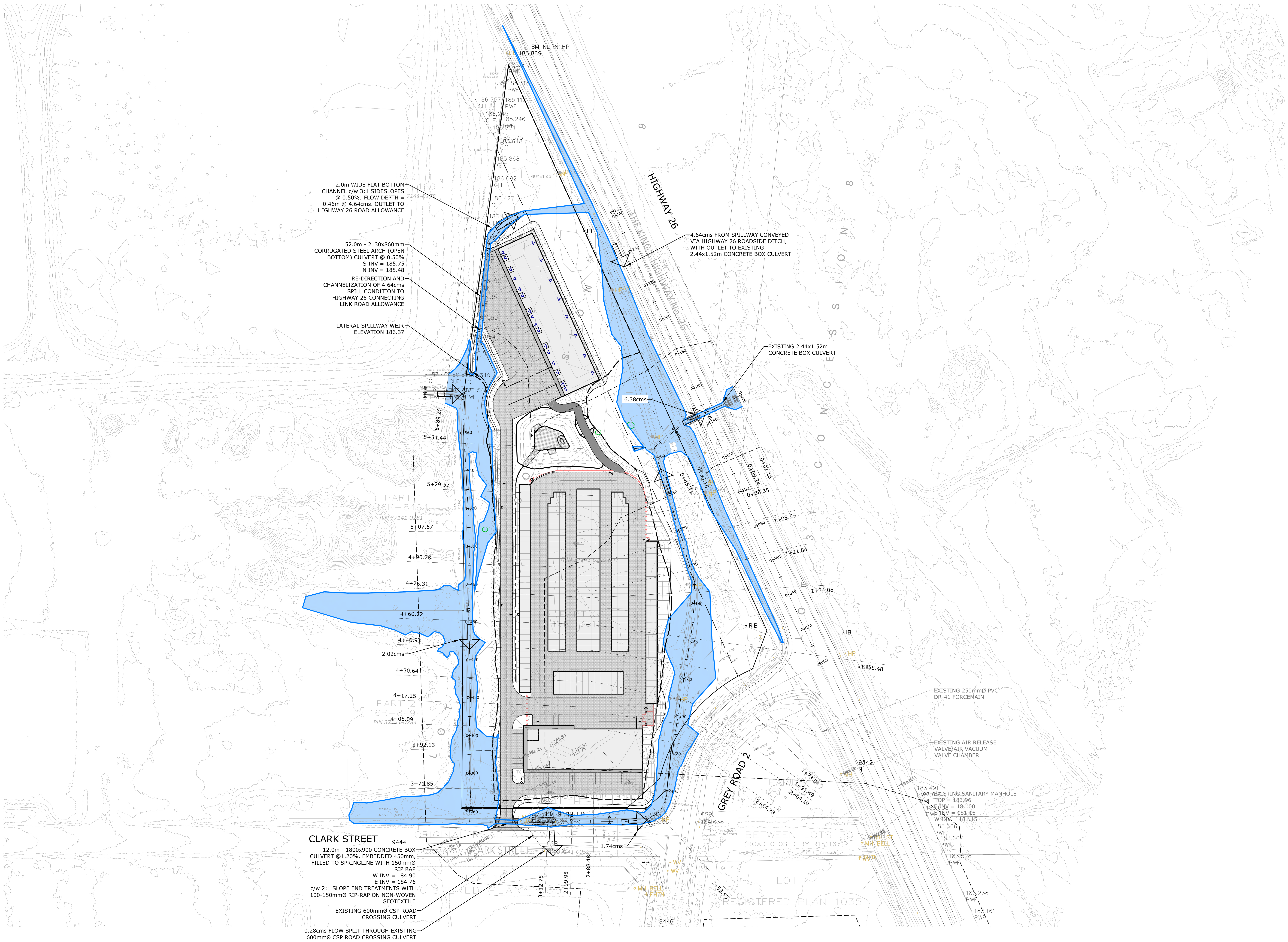
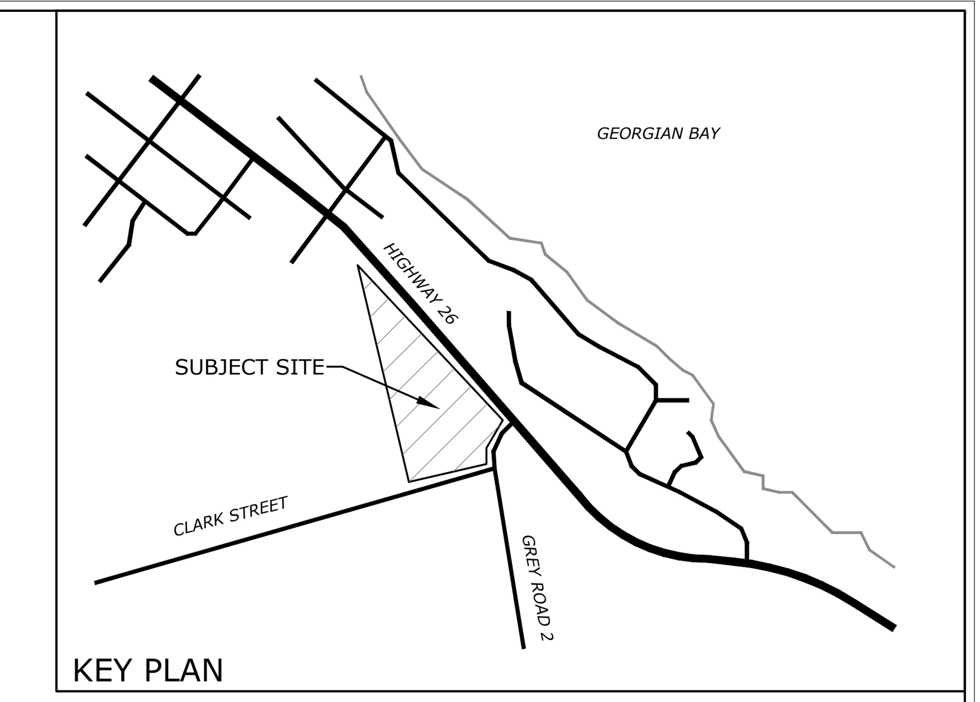




LEGEND

EXTENT OF POST-DEVELOPMENT FLOODPLAIN

DIRECTION OF FLOW

POST-DEVELOPMENT FLOODPLAIN CONDITIONS

STATION	ELEVATION
0+589.26	186.86
0+554.44	186.50
0+529.57	186.41
0+507.67	186.39
0+490.78	186.34
0+476.31	186.31
0+460.72	186.29
0+446.93	186.29
0+430.64	186.29
0+417.25	186.28
0+405.09	186.28
0+392.13	186.28
0+371.85	186.25
0+312.75	185.59
0+299.98	185.22
0+288.48	185.11
0+253.53	184.91
0+214.38	184.86
0+204.10	184.85
0+191.49	184.84
0+173.06	184.82
0+158.48	184.81
0+134.05	184.61
0+121.84	184.38
0+105.59	184.30
0+088.35	184.02
0+045.41	183.80
0+033.16	183.82
0+009.24	183.26
0+002.16	183.13

Notes

1. This drawing is the exclusive property of CAPES Engineering Ltd. The reproduction of any part without express written consent of this Corporation is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to CAPES Engineering Ltd. prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.

No	Revision	Date
1	HYDRAULIC ANALYSIS	23/12/07
2	REVISED HYDRAULIC ANALYSIS	24/06/28

NOTES:

TOPOGRAPHIC SURVEY PREPARED BY SMC GEOMATICS, ELEVATIONS SHOWN ARE GEODETIC

BENCHMARK: NAIL IN HYDRO POLE AT SOUTH END OF SUBJECT SITE, ELEVATION 185.392

BOUNDARY CONDITIONS SHOWN INTERPRETED FROM PLAN PREPARED BY VAN HARTEN SURVEYING INC., AND SHOWN APPROXIMATELY HEREIN. THIS IS NOT A PLAN OF SURVEY, AND CANNOT BE USED TO DEFINE SITE BOUNDARY CONDITIONS

Client
PANTONE CAPITAL INC.

CAPES ENGINEERING

355310 BLUE MOUNTAINS - EUPHRASIA TOWNLINE
CLARKSBURG, ON NOH 1J0
WWW.CAPESENGINEERING.COM

Lot 31 Clark St. Site Plan

POST DEVELOPMENT FLOODPLAIN EXTENTS

Designed	Checked	Date	Drawing No.
K. GRIFFIN	C. CAPES	22/08/09	FIG2
Project No. 2021-185		Rev No. 3	
Scale 1:1,000	0 20 40 60m		

Appendices

Appendix A – Legal and Draft Plan

PLAN OF SURVEY OF

PART OF LOT 31
CONCESSIONS 9 AND 10
AND
PART OF THE ROAD ALLOWANCE BETWEEN CONCESSIONS 8 AND 9
(GEOGRAPHIC TOWNSHIP OF COLLINGWOOD)
TOWN OF THE BLUE MOUNTAINS
COUNTY OF GREY

THE INTENDED PLOT SIZE OF THIS PLAN IS 610mm IN WIDTH BY 915mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:750

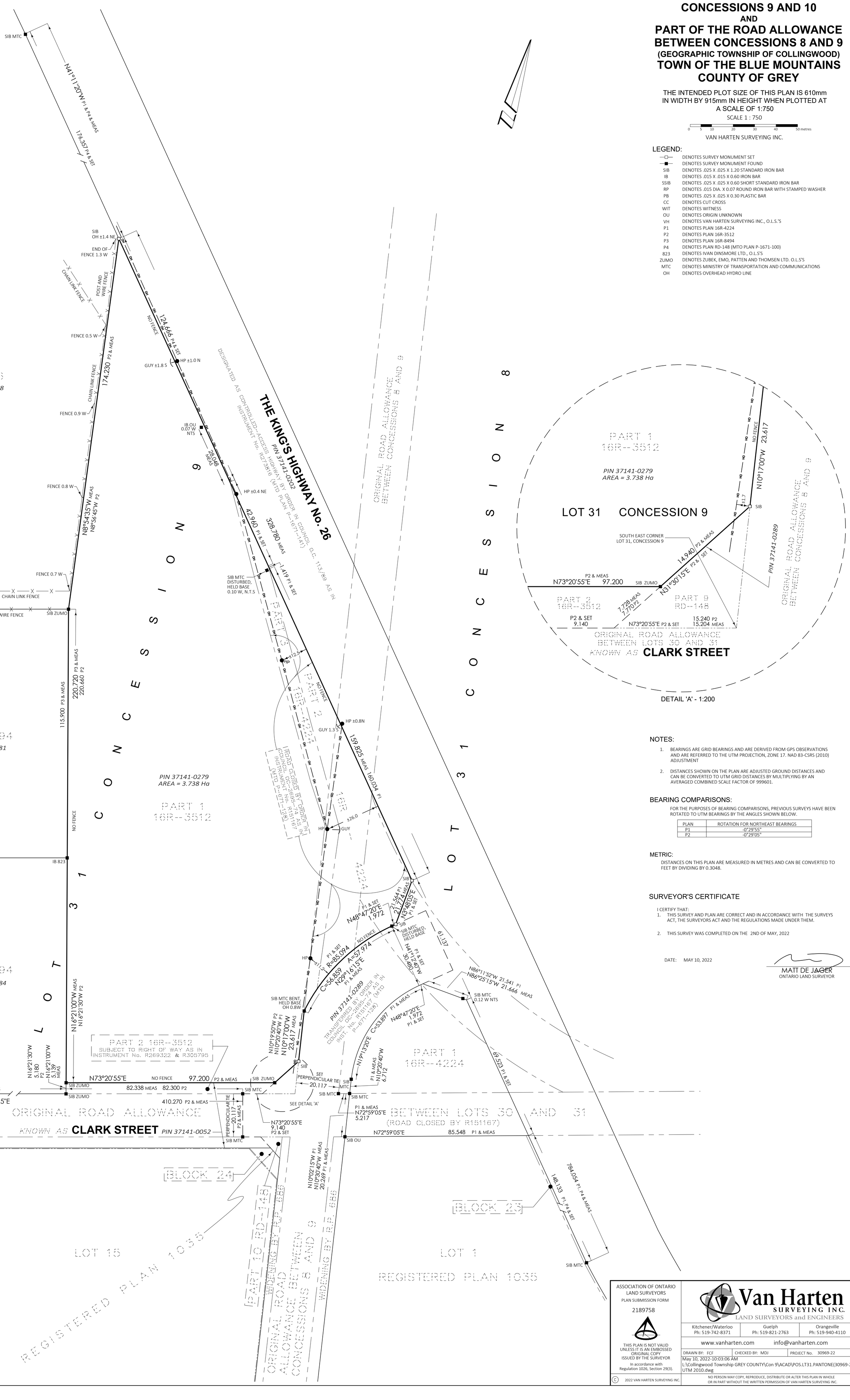
SCALE 1 : 750

0 5 10 20 30 40 50 metres

VAN HARTEN SURVEYING INC.

LEGEND:

—□—	DENOTES SURVEY MONUMENT SET
—■—	DENOTES SURVEY MONUMENT FOUND
SIB	DENOTES .025 X .025 X 1.20 STANDARD IRON BAR
IB	DENOTES .015 X .015 X 0.60 IRON BAR
SSIB	DENOTES .025 X .025 X 0.60 SHORT STANDARD IRON BAR
RP	DENOTES .015 DIA. X 0.07 ROUND IRON BAR WITH STAMPED WASHER
PB	DENOTES .025 X .025 X 0.30 PLASTIC BAR
CC	DENOTES CUT CROSS
WIT	DENOTES WITNESS
OU	DENOTES ORIGIN UNKNOWN
VH	DENOTES VAN HARTEN SURVEYING INC., O.L.S.'S
P1	DENOTES PLAN 16R-4224
P2	DENOTES PLAN 16R-3512
P3	DENOTES PLAN 16R-8494
P4	DENOTES PLAN RD-148 (MTO PLAN P-1671-100)
823	DENOTES IVAN DINSMORE LTD., O.L.S'S
ZUMO	DENOTES ZUBEK, EMO, PATTEN AND THOMSEN LTD. O.L.S'S
MTC	DENOTES MINISTRY OF TRANSPORTATION AND COMMUNICATIONS
OH	DENOTES OVERHEAD HYDRO LINE



DETAIL 'A' - 1:200

NOTES:

1. BEARINGS ARE GRID BEARINGS AND ARE DERIVED FROM GPS OBSERVATIONS AND ARE REFERRED TO THE UTM PROJECTION, ZONE 17. NAD 83-CSRS (2010) ADJUSTMENT
2. DISTANCES SHOWN ON THE PLAN ARE ADJUSTED GROUND DISTANCES AND CAN BE CONVERTED TO UTM GRID DISTANCES BY MULTIPLYING BY AN AVERAGED COMBINED SCALE FACTOR OF 999601.

BEARING COMPARISONS:

FOR THE PURPOSES OF BEARING COMPARISONS, PREVIOUS SURVEYS HAVE BEEN ROTATED TO UTM BEARINGS BY THE ANGLES SHOWN BELOW.

PLAN	ROTATION FOR NORTHEAST BEARINGS
P1	-0°29'55"
P2	-0°29'05"

METRIC:

DISTANCES ON THIS PLAN ARE MEASURED IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THIS SURVEY WAS COMPLETED ON THE 2ND OF MAY, 2022

DATE: MAY 10, 2022

MATT DE JAGER
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2189758

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3).

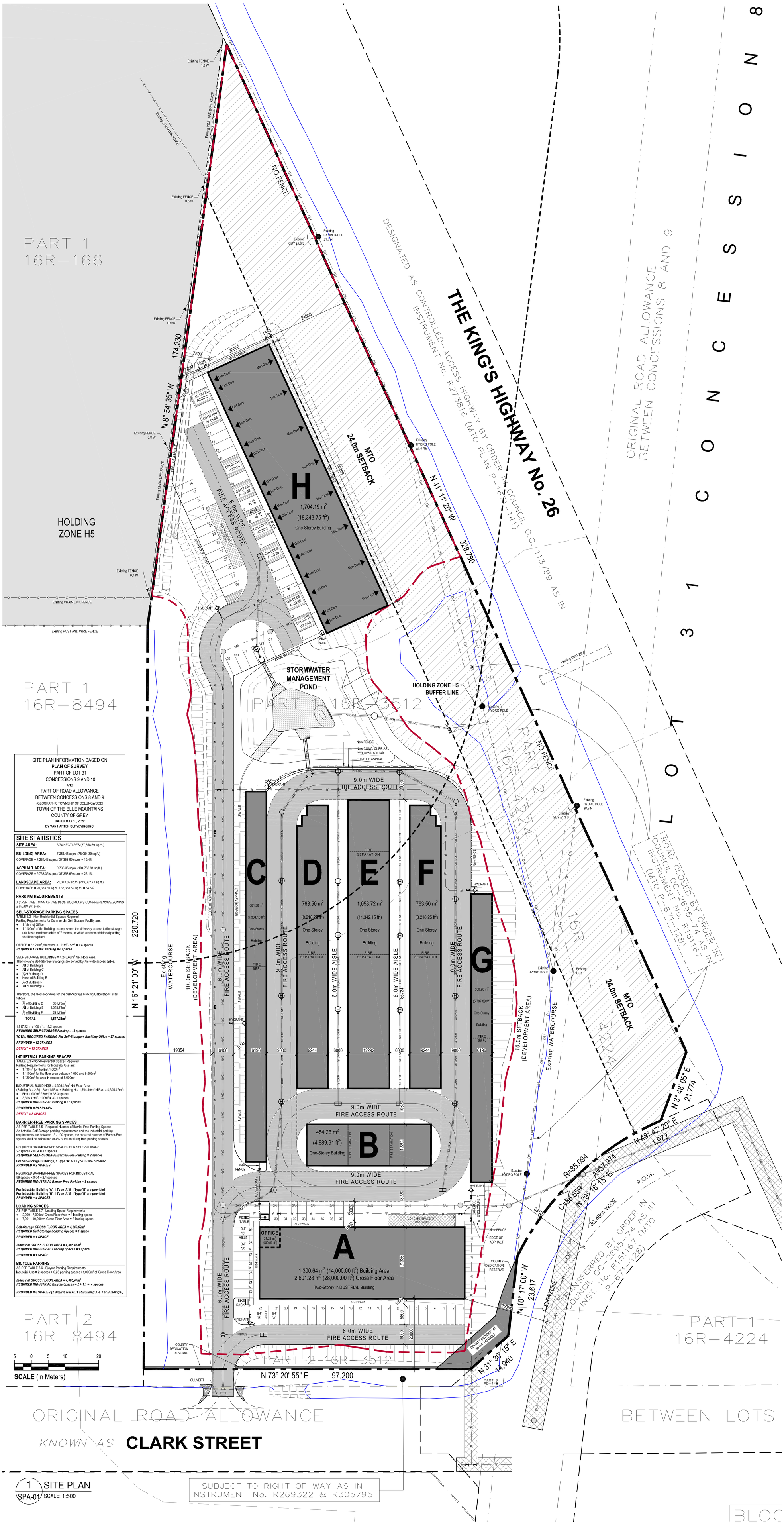
Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

Kitchener/Waterloo	Guelph	Orangeville
Ph: 519-742-8371	Ph: 519-821-2763	Ph: 519-940-4110

www.vanharten.com info@vanharten.com

DRAWN BY: FCF	CHECKED BY: MDJ	PROJECT No. 30969-22

May 10, 2022-10:03:06 AM
L:\Collingwood Township GREY COUNTY\Con 9\ACAD\POS.LT31.PANTONE(30969-22) UTM 2010.dwg



1 SITE PLAN
SPA-01 SCALE: 1:500

SITE PLAN INFORMATION BASED ON
PLAN OF SURVEY
PART OF LOT 31
CONCESSIONS 9 AND 10
AND
PART OF ROAD ALLOWANCE
BETWEEN CONCESSIONS 8 AND 9
(GEOGRAPHIC TOWNSHIP OF COLLINGWOOD)
TOWN OF THE BLUE MOUNTAINS
COUNTY OF GREY
DATED MAY 10, 2022
BY VAN HARTEN SURVEYING INC.

SITE STATISTICS

SITE AREA: 3.74 HECTARES (37,358.69 sq.m.)

BUILDING AREA: 7,251.45 sq.m. (78,054.39 sq.ft.)
COVERAGE = 7,251.45 sq.m. / 37,358.69 sq.m. = 19.4%

ASPHALT AREA: 9,733.35 sq.m. (104,768.91 sq.ft.)
COVERAGE = 9,733.35 sq.m. / 37,358.69 sq.m. = 26.1%

LANDSCAPE AREA: 20,373.89 sq.m. (219,302.73 sq.ft.)
COVERAGE = 20,373.89 sq.m. / 37,358.69 sq.m. = 54.5%

PARKING REQUIREMENTS

AS PER THE TOWN OF THE BLUE MOUNTAINS COMPREHENSIVE ZONING BY-LAW 2018-65.

SELF-STORAGE PARKING SPACES
TABLE 5.3 - Non-Residential Spaces Required
Parking Requirements for Commercial Self Storage Facility are:
- 1 / 5m² of Office
- 1 / 100m² of the Building, except where the driveway access to the storage unit has a minimum width of 7 metres, in which case no additional parking shall be required.

OFFICE = 37.21m², therefore 37.21m² / 5m² = 7.4 spaces
REQUIRED OFFICE Parking = 8 spaces

SELF STORAGE BUILDINGS = 4,246.62m² Net Floor Area
The following Self-Storage Buildings are served by 7m wide access aisles.
- All of Building B
- All of Building C
- ½ of Building D
- None of Building E
- ½ of Building F
- All of Building G

Therefore, the Net Floor Area for the Self-Storage Parking Calculations is as follows:

½ of Building D	381.75m²
All of Building E	1,053.72m²
½ of Building F	381.75m²
TOTAL	**1,817.22m²**

1,817.22m² / 100m² = 18.2 spaces
REQUIRED SELF-STORAGE Parking = 19 spaces
TOTAL REQUIRED PARKING For Self-Storage + Ancillary Office = 27 spaces
PROVIDED = 12 SPACES
DEFICIT = 15 SPACES

INDUSTRIAL PARKING SPACES
TABLE 5.3 - Non-Residential Spaces Required
Parking Requirements for Industrial Use are:
- 1 / 30m² for the first 1,000m²
- 1 / 100m² for the floor area between 1,000 and 5,000m²
- 1 / 200m² for area in excess of 5,000m²

INDUSTRIAL BUILDINGS = 4,305.47m² Net Floor Area
(Building A = 2,601.28m² N.F.A. + Building H = 1,704.19m² N.F.A. = 4,305.47m²)
- First 1,000m² / 30m² = 33.3 spaces
- 3,305.47m² / 100m² = 33.1 spaces

REQUIRED INDUSTRIAL Parking = 67 spaces
PROVIDED = 59 SPACES
DEFICIT = 8 SPACES

BARRIER-FREE PARKING SPACES
AS PER TABLE 5.5 - Required Number of Barrier Free Parking Spaces
As both the Self-Storage parking requirements and the Industrial parking requirements are between 13 - 100 spaces, the required number of Barrier-Free spaces shall be calculated at 4% of the total required parking spaces.

REQUIRED BARRIER-FREE SPACES FOR SELF-STORAGE
27 spaces x 0.04 = 1.1 spaces
REQUIRED SELF-STORAGE Barrier-Free Parking = 2 spaces

For Self-Storage Buildings, 1 Type 'A' & 1 Type 'B' are provided
PROVIDED = 2 SPACES

REQUIRED BARRIER-FREE SPACES FOR INDUSTRIAL
59 spaces x 0.04 = 2.4 spaces
REQUIRED INDUSTRIAL Barrier-Free Parking = 3 spaces

For Industrial Building 'A', 1 Type 'A' & 1 Type 'B' are provided
For Industrial Building 'H', 1 Type 'A' & 1 Type 'B' are provided
PROVIDED = 4 SPACES

LOADING SPACES
AS PER TABLE 5.7 - Loading Space Requirements
- 2,000 - 7,000m² Gross Floor Area = 1 loading space
- 7,001 - 10,000m² Gross Floor Area = 2 loading space

Self-Storage GROSS FLOOR AREA = 4,246.62m²
REQUIRED Self-Storage Loading Spaces = 1 space
PROVIDED = 1 SPACE

Industrial GROSS FLOOR AREA = 4,305.47m²
REQUIRED INDUSTRIAL Loading Spaces = 1 space
PROVIDED = 1 SPACE

BICYCLE PARKING
AS PER TABLE 5.6 - Bicycle Parking Requirements
Industrial Use = 2 spaces + 0.25 parking spaces / 1,000m² of Gross Floor Area

Industrial GROSS FLOOR AREA = 4,305.47m²
REQUIRED INDUSTRIAL Bicycle Spaces = 2 + 1.1 = 4 spaces

PROVIDED = 8 SPACES (2 Bicycle Racks, 1 at Building A & 1 at Building H)

GENERAL NOTES

THESE NOTES APPLY TO ALL DRAWINGS.

1 ALL DRAWINGS ARE THE PROPERTY OF THE ARCHITECT. REPRODUCTION OF DRAWINGS WITHOUT PRIOR WRITTEN PERMISSION OF THE ARCHITECT IS PROHIBITED.

2 DO NOT SCALE THE DRAWINGS - USE ONLY NOTED DIMENSIONS

3 CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS SHOWN ON DRAWINGS AND ON SITE PRIOR TO COMMENCEMENT OF ANY WORK AND REPORT ANY DISCREPANCIES TO THE ARCHITECT.

4 DIMENSIONS SHOWN ON DRAWINGS ARE NOMINAL ONLY AND SHALL BE ADJUSTED TO SUIT ON-SITE CONDITIONS.

5 ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST REVISED EDITION OF THE ONTARIO BUILDING CODE AND ALL APPLICABLE LAW.

BUILDING AREAS

SELF-STORAGE BUILDINGS
BUILDING #1

B	454.26 sq.m.
C	681.36 sq.m.
D	763.50 sq.m.
E	1,053.72 sq.m.
F	763.50 sq.m.
G	530.28 sq.m.
TOTAL	4,246.62 sq.m (45,710.24 sq.ft.)

INDUSTRIAL BUILDINGS
BUILDING #2

A	1,300.64 sq.m. (14,000.00 sq.ft.)

BUILDING #3

H	1,704.19 sq.m. (18,343.75 sq.ft.)
TOTAL	3,004.83 sq.m (32,343.75 sq.ft.)

TOTAL BUILDING AREA = 7,251.45 sq.m.

GROSS FLOOR AREAS

SELF STORAGE BUILDINGS
SAME AS BUILDING AREA FOR BUILDING #1
(GROUP OF BUILDINGS B-G)
TOTAL 4,246.62 sq.m (45,710.24 sq.ft.)

INDUSTRIAL BUILDINGS
BUILDING #2

A	2,601.28 sq.m. (28,000.00 sq.ft.)

BUILDING #3

H	1,704.19 sq.m. (18,343.75 sq.ft.)
TOTAL	4,305.47 sq.m (46,343.75 sq.ft.)

TOTAL GROSS FLOOR AREA = 8,552.09 sq.m.

LEGEND

- PROPERTY LINE
- DEVELOPMENT AREA
- WATER COURSE
- HOLDING ZONE & BUFFER LINE

NO.	DATE (YYYY-MM-DD)	ITEM
9	2024 06 21	ISSUED TO CONSULTANTS (REV-09)
8	2023 12 21	ISSUED FOR SPA SECOND SUBMISSION
7	2023 11 17	ISSUED TO CONSULTANTS (REV-08)
6	2023 11 13	ISSUED TO CLIENT FOR REVIEW
5	2023 02 06	ISSUED TO CLIENT FOR REVIEW
4	2022 12 16	ISSUED FOR SPA FIRST SUBMISSION
3	2022 09 16	ISSUED FOR REVIEW
2	2022 07 14	ISSUED TO CONSULTANTS
1	2022 07 11	ISSUED FOR REVIEW

REVISIONS

JMA Jessica MacDonald Architect Inc.
+1 705-325-0761
jessica@jmarchitect.ca
25 Mississaga St. E. UPPER
Unit #3, Orillia, ON | L3V 1V4

TITLE
SITE PLAN & SITE STATISTICS

NEW CONSTRUCTION OF:
THORNBURY SELF-STORAGE
Lot 31 Clark Street Town of Blue Mountain, Ontario

DRAWN/CHECKED	DATE
JM	DECEMBER 22, 2023
CAD FILE	**ISSUED FOR**
spa-01_proposed site plan_22013..dwg	SITE PLAN APPROVAL
STAMP	**PROJECT**
ONTARIO ASSOCIATION OF ARCHITECTS — JESSICA EDEN MACDONALD LICENCE 9582	22-013
	DRAWING
	SPA-01

Appendix B – Study Area Photos

Photo (Upper Left) – Watercourse 52 – West side of site looking north from Clark S. (June. 2023)

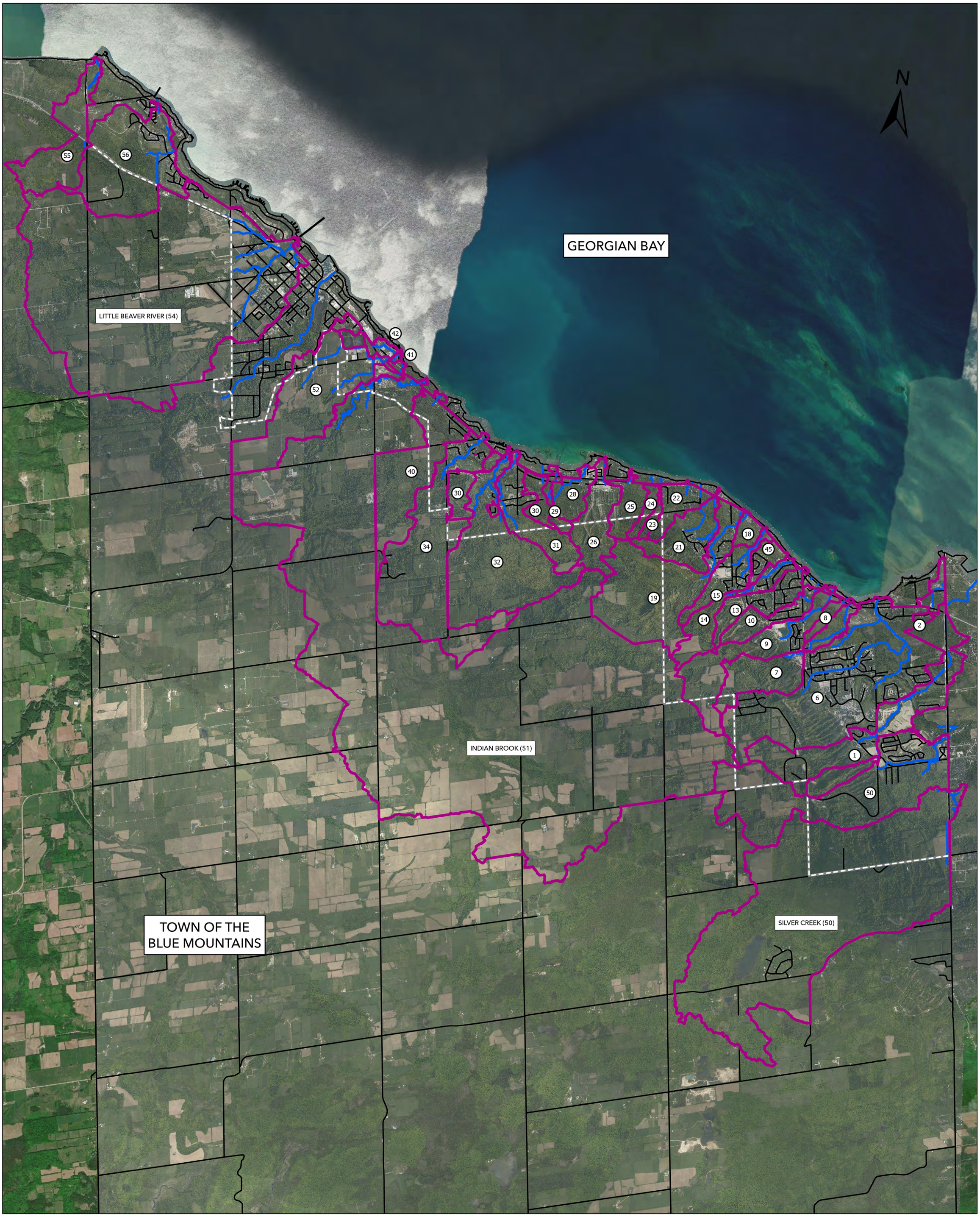
Photo (Upper Right) – Watercourse/Channel at Clark Street (north Side) looking east (Nov 2022)

Photo (Bottom Left) – Watercourse/Channel at Clark Street (north Side) looking east (June 2023)

Photo (Bottom Right) – Watercourse/Channel East side of site looking east (Nov 2022)

Photo – Concrete Box Culvert at Hwy 26 – Looking North (Nov. 2022)

Appendix C – Background Information



LEGEND

- WATERCOURSE HYDRAULIC MODEL LIMITS
- WATERSHED BOUNDARY
- ① WATERSHED NO.
- ROAD
- MUNICIPAL BOUNDARY
- SETTLEMENT AREA BOUNDARY

TATHAM ENGINEERING

TOWN OF THE BLUE MOUNTAINS MASTER DRAINAGE PLAN

WATERSHED MAP

FIG: **2**

SCALE: 1:35,000 | DATE: NOV 2021 | DRAWN: KKS

NOTE
THE 1:100-YEAR 3.5 HR CHICAGO,6 HR SCS, 12 HR SCS AND 24 HR SCS DESIGN STORM DISTRIBUTIONS WERE APPLIED TO MTO IDF CURVE DATA AND ASSESSED AS PER TOWN STANDARDS TO IDENTIFY OVERLAND FLOW ROUTE DEFICIENCIES. THE WORST CASE (HIGHEST) PEAK FLOW GENERATED BY THE VARIOUS DESIGN STORMS HAS BEEN USED TO IDENTIFY DEFICIENCIES.

THE 24HR SCS DESIGN STORM DISTRIBUTIONS PRODUCED THE HIGHEST PEAK FLOWS FOR ALL WATERSHEDS IN THE STUDY AREA. THE 24 HR SCS DESIGN STORM DISTRIBUTION HAS BEEN USED TO IDENTIFY CULVERT/BRIDGE DEFICIENCIES AS PER TOWN STANDARDS.

No.	REVISION DESCRIPTION	DATE
1.	EXISTING CONDITION REPORT (30% SUBMISSION)	DEC 2021

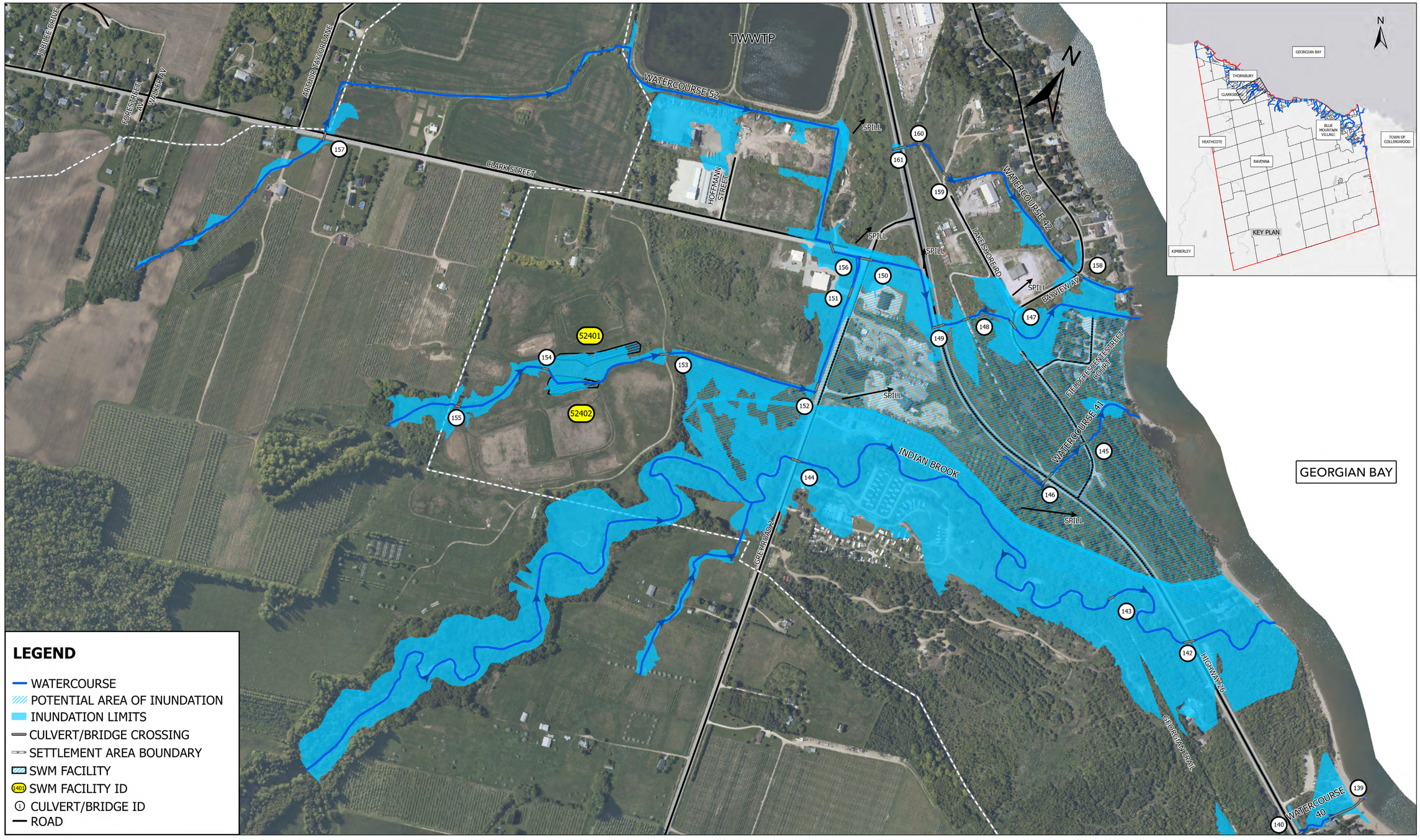
ENGINEERS STAMP

TOWN OF THE BLUE MOUNTAINS DRAINAGE MASTER PLAN

MAJOR DRAINAGE SYSTEM DEFICIENCY MAP (EXISTING CONDITION)

TATHAM ENGINEERING

DESIGN: DAM	FILE: 121076	DWG:	2C
DRAWN: KKS	DATE: OCT 2021		
CHECK: DRT	SCALE: 1:5000		



LEGEND

- WATERCOURSE
- POTENTIAL AREA OF INUNDATION
- INUNDATION LIMITS
- CULVERT/BRIDGE CROSSING
- SETTLEMENT AREA BOUNDARY
- SWM FACILITY
- (401) SWM FACILITY ID
- ① CULVERT/BRIDGE ID
- ROAD

0 0.07 0.15 0.3 0.45 0.6 Kilometers

NOTE
THIS MAP IS NOT A REGULATORY FLOODMAP. THIS MAP HAS BEEN PREPARED TO ESTIMATE THE EXTENT OF FLOODING IN THE AREA SHOWN FOR THE TOWN OF THE BLUE MOUNTAINS DRAINAGE MASTER PLAN ONLY.

INUNDATION LIMITS GENERATED FROM THE GREATER OF THE 1:100-YEAR AND REGIONAL (TIMMINS) STORM PEAK FLOWS.

No.	REVISION DESCRIPTION	DATE
1.	EXISTING CONDITIONS REPORT (30% SUBMISSION)	NOV 2021
2.	EXISTING CONDITIONS REPORT (60% SUBMISSION)	SEPT 2022

ENGINEERS STAMP

TOWN OF THE BLUE MOUNTAINS DRAINAGE MASTER PLAN

WATERCOURSE 41, 42, 52 & INDIAN BROOK EXISTING FLOOD INUNDATION MAP

TATHAM ENGINEERING

DESIGN: DAM	FILE: 121076	DWG:	5E
DRAWN: KKS	DATE: SEPT 2022		
CHECK: DRT	SCALE: 1:3500		

WATERCOURSE / OUTLET	AREA (ha)	DESIGN STORM PEAK FLOW (m^3/s)			
		1:5-YEAR	1:25-YEAR	1:100-YEAR	TIMMINS
Silver Creek North of Holly Court (50)	42.5	0.5	1.1	1.7	2.3
Silver Creek South of Holly Court (50)	240.9	9.6	15.2	19.4	17.1
Silver Creek South of Mount View Court (50)	1,412.3	30.0	53.6	75.6	78.4
Indian Brook (51)	3,544.5	82.3	141.6	194.1	223.8
Watercourse 52	310.0	2.8	5.4	7.8	12.1
Little Beaver River (54)	1,562.6	37.3	64.9	89.0	98.5
Watercourse 55	160.3	7.0	11.8	16.1	13.9
Boulder Channel (56)	311.1	3.7	10.0	14.8	19.1

The peak flow results from the VO hydrologic analysis of the 1:2-year through 1:100-year return frequency design storms and the Regional Storm were entered into the HEC-RAS 1D steady state hydraulic model at flow change locations specified at each bridge/culvert crossing.

There is significant spill and redistribution of flow between Watercourse 1, 2, 6, 7, 9, 10 and Outlets 8, 11 and 12. This has been analyzed through a 2D HEC-RAS unsteady state model that also accounts for storage in the watershed (floodplain and watercourse). Peak inflows, spills and ultimate outflows are summarized in Table 5. For more details regarding the spills and distribution of flows in the 2D model area, refer to the *Existing Conditions Report*.

Manning's Coefficient

Project Details

TOBM Drainage Master Plan	121076

Prepared By

CMM	July 28, 2021

Municipality

Town of Blue Mountains

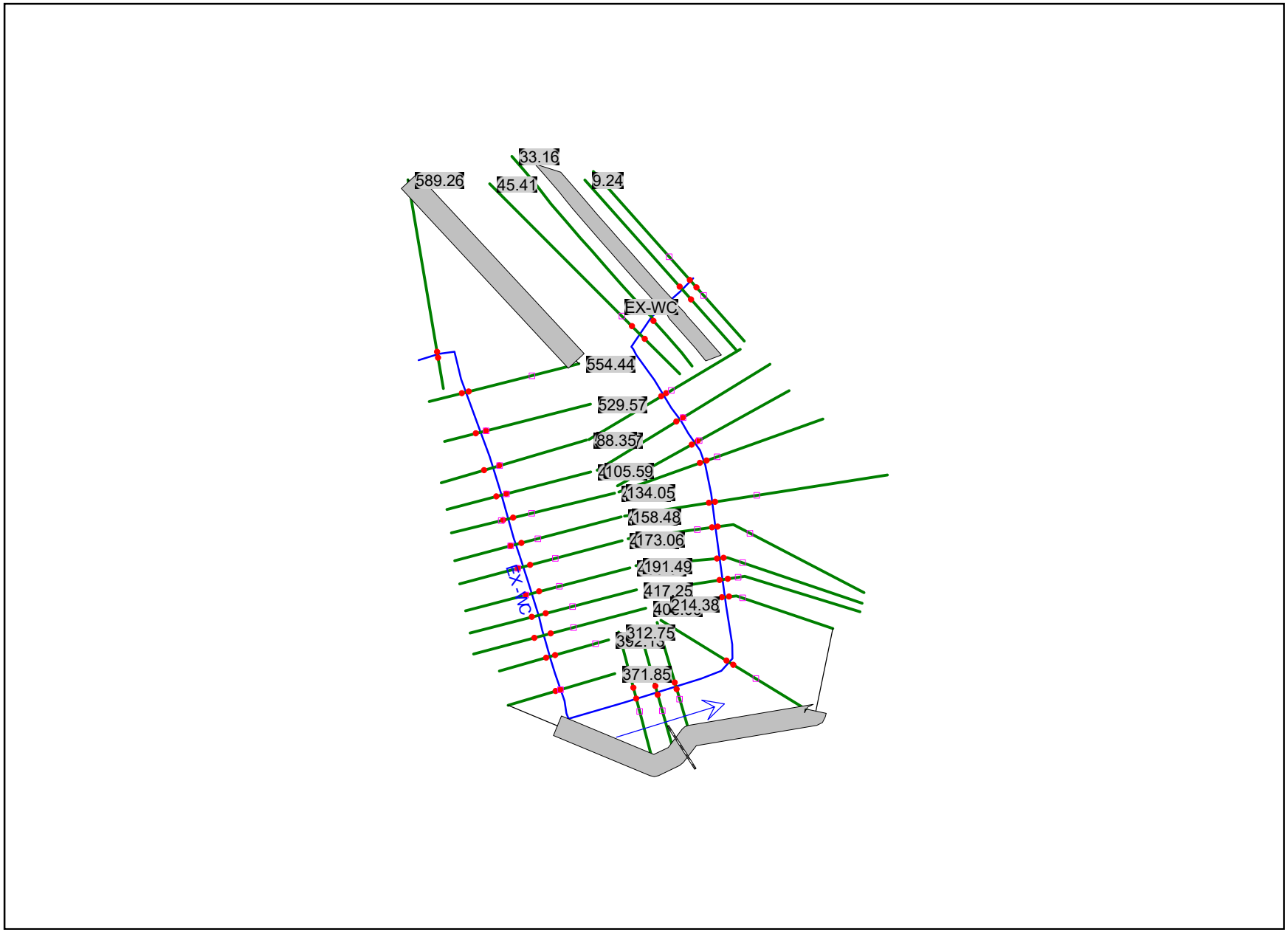
Watercourse DB

Watercourse 52

Cross Section Range	Overbank Manning's	Jusitification of Choice	Channel Manning's	Jusitification of Choice
0 - 761	0.040 - 0.100	Open fields, some light to heavy brush.	0.035	Straight, weeds and rocks
29 - 720	0.040 - 0.080	Dirt parking lots, brush areas.	0.035	Straight, weeds and rocks
750 - 2040	0.040	Field crops	0.035	Straight, weeds and rocks
Reach 3: 60 - 1082	0.040 - 0.060	Open fields with some brush areas.	0.035	Straight, weeds and rocks
Reach 3: 1095 - 1230	0.080	Medium brush and fields.	0.035	Straight, weeds and rocks

Appendix D – Existing Condition HEC RAS Results

Existing Condition HEC RAS Model with Lateral Weirs



5 Yr Flood Plain Results

HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 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
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	589.26	PF 1	1.54	185.87	186.43	186.43	186.57	0.019967	1.67	0.93	3.37	1.00
EX-WC	588		Lat Struct									
EX-WC	554.44	PF 1	1.52	185.84	186.40	186.11	186.40	0.000251	0.24	11.63	39.36	0.12
EX-WC	529.57	PF 1	1.52	185.74	186.33	186.14	186.38	0.003882	0.93	1.64	4.10	0.47
EX-WC	507.67	PF 1	1.52	185.61	186.31	185.95	186.33	0.001217	0.57	2.66	5.85	0.27
EX-WC	490.78	PF 1	1.52	185.52	186.27	185.94	186.30	0.001907	0.74	2.06	4.15	0.33
EX-WC	476.31	PF 1	1.52	185.46	186.25	185.89	186.27	0.001505	0.66	2.32	4.75	0.30
EX-WC	460.72	PF 1	1.52	185.34	186.23	185.83	186.25	0.001208	0.61	2.51	4.92	0.27
EX-WC	446.93	PF 1	1.52	185.13	186.24	185.63	186.24	0.000222	0.29	6.72	18.15	0.12
EX-WC	430.64	PF 1	1.52	185.23	186.23	185.64	186.24	0.000240	0.31	5.89	12.90	0.13
EX-WC	417.25	PF 1	1.52	185.15	186.23	185.58	186.23	0.000288	0.35	4.44	7.93	0.14
EX-WC	405.09	PF 1	1.52	184.98	186.22	185.52	186.23	0.000271	0.32	4.71	7.83	0.13
EX-WC	392.13	PF 1	1.52	185.00	186.22	185.48	186.23	0.000131	0.26	8.54	23.29	0.09
EX-WC	371.85	PF 1	1.52	185.87	186.20	186.11	186.22	0.006375	0.83	2.86	13.09	0.56
EX-WC	351.85		Lat Struct									
EX-WC	312.75	PF 1	1.52	185.35	185.57	185.57	185.62	0.017719	1.15	1.92	21.20	0.90
EX-WC	299.98	PF 1	1.29	184.74	185.16	185.05	185.21	0.006404	0.98	1.32	4.58	0.58
EX-WC	288.48	PF 1	1.29	184.65	185.06	184.98	185.13	0.007390	1.10	1.23	5.31	0.63
EX-WC	253.53	PF 1	1.29	184.41	184.84	184.76	184.88	0.006264	0.99	1.58	7.83	0.58
EX-WC	214.38	PF 1	1.29	184.19	184.78	184.51	184.79	0.001049	0.53	3.83	15.65	0.25
EX-WC	204.1	PF 1	1.29	184.12	184.77	184.45	184.78	0.000946	0.51	3.15	11.68	0.24
EX-WC	191.49	PF 1	1.29	184.19	184.75	184.52	184.77	0.001154	0.56	3.31	11.98	0.26
EX-WC	173.06	PF 1	1.29	183.94	184.74	184.35	184.75	0.000577	0.48	4.05	13.19	0.19
EX-WC	158.48	PF 1	1.29	183.94	184.73	184.41	184.74	0.000805	0.52	4.14	30.95	0.23
EX-WC	134.05	PF 1	1.29	184.10	184.54	184.54	184.67	0.020171	1.61	0.80	3.01	1.00
EX-WC	121.84	PF 1	1.29	183.89	184.29	184.26	184.40	0.014144	1.43	0.90	3.06	0.84
EX-WC	105.59	PF 1	1.29	183.61	184.21	184.05	184.26	0.004713	0.98	1.32	3.46	0.50
EX-WC	88.35	PF 1	1.29	183.47	183.94	183.94	184.10	0.020687	1.76	0.74	2.34	1.00
EX-WC	45.41	PF 1	1.06	182.73	183.02	183.02	183.12	0.021232	1.40	0.76	3.84	1.00
EX-WC	33.16	PF 1	1.06	182.45	182.81	182.68	182.82	0.001370	0.42	3.65	27.55	0.27
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	1.06	182.55	182.74	182.73	182.80	0.018814	1.02	1.04	7.77	0.89
EX-WC	2.16	PF 1	1.06	182.25	182.68	182.57	182.72	0.006001	0.89	1.20	4.64	0.56

25 yr Storm - Floodplain Results

HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 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
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	589.26	PF 1	2.97	185.87	186.62	186.62	186.76	0.011534	1.74	2.25	10.52	0.82
EX-WC	588		Lat Struct									
EX-WC	554.44	PF 1	1.81	185.84	186.45	186.11	186.45	0.000220	0.24	13.53	39.53	0.11
EX-WC	529.57	PF 1	1.81	185.74	186.38	186.18	186.43	0.004134	1.00	1.81	4.27	0.49
EX-WC	507.67	PF 1	1.81	185.61	186.35	185.99	186.37	0.001361	0.62	2.90	6.09	0.29
EX-WC	490.78	PF 1	1.81	185.52	186.30	185.98	186.34	0.002259	0.82	2.20	4.27	0.37
EX-WC	476.31	PF 1	1.81	185.46	186.28	185.93	186.31	0.001820	0.74	2.46	4.88	0.33
EX-WC	460.72	PF 1	1.81	185.34	186.26	185.87	186.28	0.001508	0.69	2.63	5.03	0.30
EX-WC	446.93	PF 1	1.81	185.13	186.26	185.67	186.27	0.000279	0.33	7.19	18.59	0.14
EX-WC	430.64	PF 1	1.81	185.23	186.26	185.68	186.26	0.000298	0.36	6.21	13.17	0.14
EX-WC	417.25	PF 1	1.81	185.15	186.25	185.62	186.26	0.000369	0.40	4.62	8.22	0.16
EX-WC	405.09	PF 1	1.81	184.98	186.25	185.56	186.25	0.000348	0.37	4.88	7.98	0.15
EX-WC	392.13	PF 1	1.81	185.00	186.25	185.52	186.25	0.000171	0.29	9.07	25.33	0.11
EX-WC	371.85	PF 1	1.81	185.87	186.22	186.12	186.24	0.007163	0.91	3.07	13.13	0.59
EX-WC	351.85		Lat Struct									
EX-WC	312.75	PF 1	1.81	185.35	185.59	185.59	185.64	0.014999	1.14	2.40	23.35	0.84
EX-WC	299.98	PF 1	1.55	184.74	185.20	185.08	185.25	0.006520	1.03	1.50	4.84	0.59
EX-WC	288.48	PF 1	1.55	184.65	185.09	185.01	185.17	0.007949	1.20	1.39	5.66	0.66
EX-WC	253.53	PF 1	1.55	184.41	184.88	184.79	184.92	0.005731	1.01	1.91	8.27	0.56
EX-WC	214.38	PF 1	1.55	184.19	184.83	184.54	184.84	0.000963	0.54	4.60	16.63	0.25
EX-WC	204.1	PF 1	1.55	184.12	184.81	184.49	184.83	0.000923	0.54	3.72	12.50	0.24
EX-WC	191.49	PF 1	1.55	184.19	184.80	184.57	184.81	0.001098	0.58	3.90	12.82	0.26
EX-WC	173.06	PF 1	1.55	183.94	184.79	184.38	184.80	0.000612	0.52	4.78	20.98	0.20
EX-WC	158.48	PF 1	1.55	183.94	184.78	184.45	184.79	0.000733	0.53	5.83	36.72	0.22
EX-WC	134.05	PF 1	1.55	184.10	184.57	184.57	184.72	0.020615	1.72	0.90	3.12	1.02
EX-WC	121.84	PF 1	1.55	183.89	184.34	184.29	184.45	0.013097	1.47	1.06	3.22	0.82
EX-WC	105.59	PF 1	1.55	183.61	184.26	184.08	184.32	0.004647	1.03	1.51	3.62	0.51
EX-WC	88.35	PF 1	1.55	183.47	183.99	183.99	184.16	0.020256	1.84	0.84	2.46	1.00
EX-WC	45.41	PF 1	1.30	182.73	183.06	183.06	183.16	0.020268	1.45	0.89	4.11	1.00
EX-WC	33.16	PF 1	1.30	182.45	182.86	182.70	182.86	0.001054	0.41	4.95	32.60	0.24
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	1.30	182.55	182.78		182.83	0.012791	0.96	1.35	8.31	0.76
EX-WC	2.16	PF 1	1.30	182.25	182.72	182.61	182.77	0.006006	0.93	1.40	5.04	0.56

100 yr Storm - Floodplain Results

HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 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
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	589.26	PF 1	4.29	185.87	186.71	186.71	186.87	0.010754	1.90	3.31	12.29	0.82
EX-WC	588		Lat Struct									
EX-WC	554.44	PF 1	1.94	185.84	186.47	186.13	186.47	0.000208	0.24	14.40	39.66	0.11
EX-WC	529.57	PF 1	1.94	185.74	186.40	186.19	186.45	0.004218	1.02	1.90	4.35	0.50
EX-WC	507.67	PF 1	1.94	185.61	186.37	186.01	186.39	0.001414	0.64	3.01	6.21	0.30
EX-WC	490.78	PF 1	1.94	185.52	186.32	186.00	186.36	0.002404	0.86	2.27	4.33	0.38
EX-WC	476.31	PF 1	1.94	185.46	186.29	185.95	186.32	0.001951	0.77	2.53	4.94	0.34
EX-WC	460.72	PF 1	1.94	185.34	186.27	185.89	186.30	0.001638	0.72	2.69	5.09	0.32
EX-WC	446.93	PF 1	1.94	185.13	186.28	185.68	186.28	0.000296	0.35	7.43	18.81	0.14
EX-WC	430.64	PF 1	1.94	185.23	186.27	185.70	186.28	0.000322	0.37	6.38	13.23	0.15
EX-WC	417.25	PF 1	1.94	185.15	186.26	185.64	186.27	0.000406	0.42	4.72	8.38	0.17
EX-WC	405.09	PF 1	1.94	184.98	186.26	185.58	186.27	0.000383	0.39	4.97	8.13	0.16
EX-WC	392.13	PF 1	1.94	185.00	186.26	185.54	186.26	0.000186	0.31	9.37	26.07	0.11
EX-WC	371.85	PF 1	1.94	185.87	186.23	186.13	186.25	0.007269	0.94	3.20	13.15	0.60
EX-WC	351.85		Lat Struct									
EX-WC	312.75	PF 1	1.94	185.35	185.59	185.59	185.65	0.014904	1.17	2.55	23.63	0.85
EX-WC	299.98	PF 1	1.68	184.74	185.21	185.10	185.27	0.006564	1.06	1.59	4.97	0.60
EX-WC	288.48	PF 1	1.68	184.65	185.11	185.03	185.18	0.008146	1.25	1.47	5.84	0.67
EX-WC	253.53	PF 1	1.68	184.41	184.90	184.80	184.94	0.005538	1.02	2.07	8.48	0.56
EX-WC	214.38	PF 1	1.68	184.19	184.85	184.55	184.86	0.000938	0.55	4.95	17.00	0.24
EX-WC	204.1	PF 1	1.68	184.12	184.83	184.50	184.85	0.000923	0.56	3.98	12.87	0.24
EX-WC	191.49	PF 1	1.68	184.19	184.82	184.58	184.84	0.001091	0.60	4.17	13.26	0.26
EX-WC	173.06	PF 1	1.68	183.94	184.81	184.40	184.82	0.000633	0.54	5.27	26.45	0.21
EX-WC	158.48	PF 1	1.68	183.94	184.80	184.46	184.81	0.000682	0.52	6.65	38.33	0.21
EX-WC	134.05	PF 1	1.68	184.10	184.60	184.60	184.75	0.019610	1.73	0.97	3.44	1.00
EX-WC	121.84	PF 1	1.68	183.89	184.37	184.31	184.48	0.012650	1.48	1.13	3.30	0.81
EX-WC	105.59	PF 1	1.68	183.61	184.29	184.10	184.34	0.004610	1.05	1.61	3.70	0.51
EX-WC	88.35	PF 1	1.68	183.47	184.01	184.01	184.19	0.020200	1.88	0.90	2.52	1.00
EX-WC	45.41	PF 1	1.41	182.73	183.07	183.07	183.18	0.019990	1.48	0.95	4.22	0.99
EX-WC	33.16	PF 1	1.41	182.45	182.88	182.71	182.88	0.000942	0.41	5.62	35.59	0.23
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	1.41	182.55	182.80		182.84	0.011165	0.94	1.50	8.53	0.72
EX-WC	2.16	PF 1	1.41	182.25	182.74	182.62	182.79	0.006004	0.95	1.49	5.21	0.57

Regional Storm - Floodplain Results

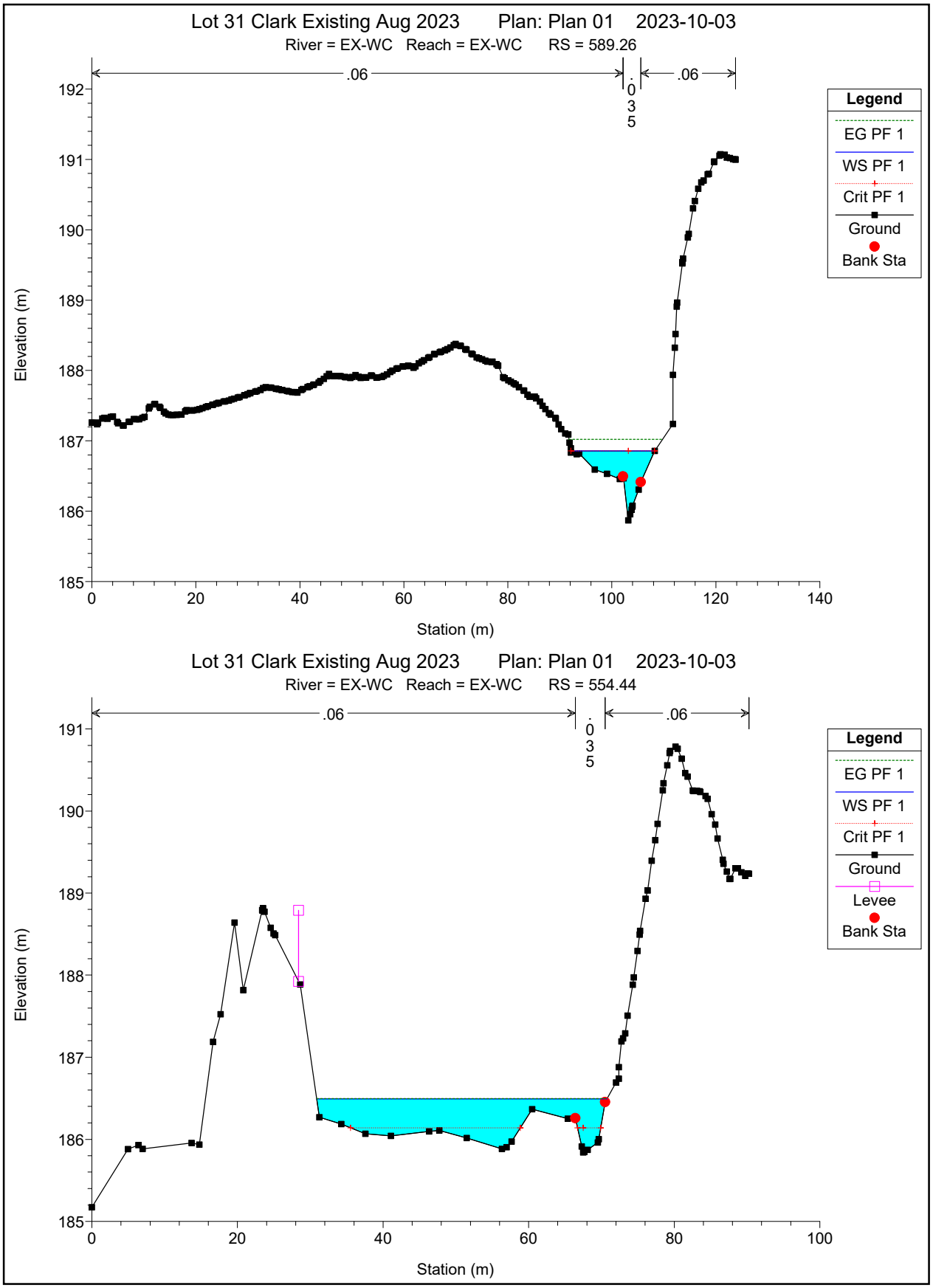
HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 1

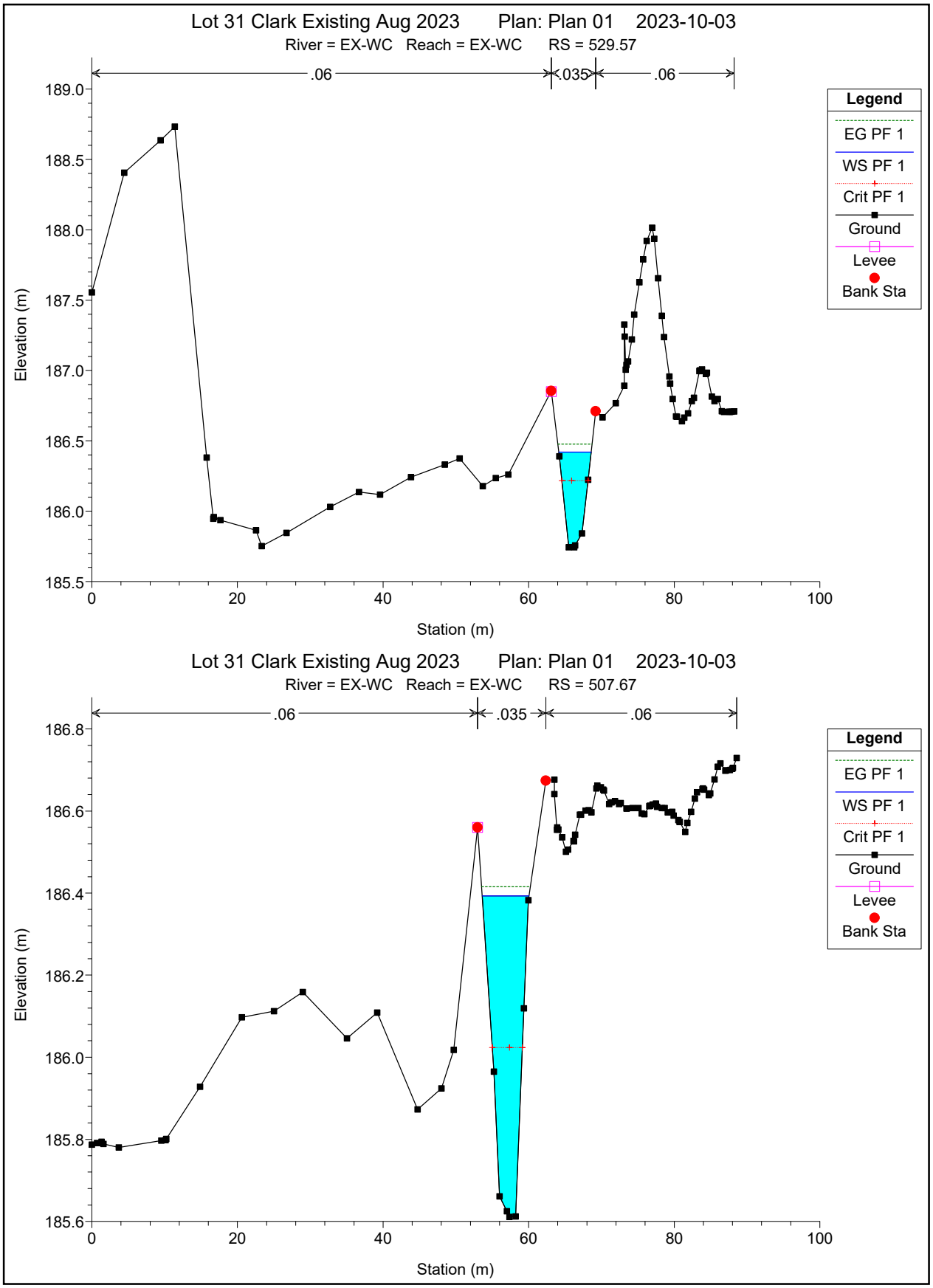
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	589.26	PF 1	6.67	185.87	186.86	186.86	187.02	0.009443	2.07	5.29	16.11	0.79
EX-WC	588		Lat Struct									
EX-WC	554.44	PF 1	2.12	185.84	186.49	186.14	186.50	0.000194	0.24	15.49	39.88	0.11
EX-WC	529.57	PF 1	2.12	185.74	186.42	186.22	186.48	0.004288	1.05	2.01	4.46	0.50
EX-WC	507.67	PF 1	2.12	185.61	186.39	186.02	186.42	0.001483	0.67	3.17	6.41	0.30
EX-WC	490.78	PF 1	2.12	185.52	186.34	186.03	186.38	0.002568	0.90	2.35	4.40	0.39
EX-WC	476.31	PF 1	2.12	185.46	186.31	185.98	186.35	0.002101	0.81	2.62	5.02	0.36
EX-WC	460.72	PF 1	2.12	185.34	186.28	185.91	186.31	0.001792	0.76	2.77	5.16	0.33
EX-WC	446.93	PF 1	2.12	185.13	186.29	185.70	186.30	0.000314	0.37	7.75	19.10	0.15
EX-WC	430.64	PF 1	2.12	185.23	186.29	185.72	186.29	0.000350	0.39	6.60	13.31	0.16
EX-WC	417.25	PF 1	2.12	185.15	186.28	185.65	186.29	0.000450	0.44	4.85	8.57	0.17
EX-WC	405.09	PF 1	2.12	184.98	186.27	185.60	186.28	0.000426	0.42	5.09	8.33	0.17
EX-WC	392.13	PF 1	2.12	185.00	186.27	185.58	186.28	0.000203	0.32	9.77	27.04	0.12
EX-WC	371.85	PF 1	2.12	185.87	186.24	186.14	186.26	0.007267	0.96	3.37	13.18	0.60
EX-WC	351.85		Lat Struct									
EX-WC	312.75	PF 1	2.11	185.35	185.60	185.60	185.66	0.015462	1.21	2.68	23.86	0.87
EX-WC	299.98	PF 1	1.84	184.74	185.23	185.12	185.29	0.006612	1.09	1.69	5.10	0.60
EX-WC	288.48	PF 1	1.84	184.65	185.12	185.05	185.21	0.008337	1.29	1.57	6.04	0.68
EX-WC	253.53	PF 1	1.84	184.41	184.92	184.82	184.96	0.005395	1.03	2.24	8.70	0.56
EX-WC	214.38	PF 1	1.84	184.19	184.87	184.57	184.88	0.000929	0.56	5.32	17.34	0.25
EX-WC	204.1	PF 1	1.84	184.12	184.86	184.52	184.87	0.000940	0.58	4.25	13.33	0.25
EX-WC	191.49	PF 1	1.84	184.19	184.84	184.59	184.86	0.001108	0.62	4.45	14.03	0.27
EX-WC	173.06	PF 1	1.84	183.94	184.83	184.42	184.84	0.000642	0.55	5.83	27.25	0.21
EX-WC	158.48	PF 1	1.84	183.94	184.82	184.48	184.83	0.000647	0.52	7.50	39.93	0.21
EX-WC	134.05	PF 1	1.84	184.10	184.64	184.64	184.77	0.015575	1.65	1.18	6.34	0.91
EX-WC	121.84	PF 1	1.84	183.89	184.39	184.33	184.51	0.012226	1.50	1.22	3.39	0.80
EX-WC	105.59	PF 1	1.84	183.61	184.32	184.12	184.37	0.004605	1.07	1.71	3.78	0.51
EX-WC	88.35	PF 1	1.84	183.47	184.03	184.03	184.22	0.019625	1.90	0.97	2.59	0.99
EX-WC	45.41	PF 1	1.58	182.73	183.09	183.09	183.21	0.020229	1.53	1.03	4.36	1.01
EX-WC	33.16	PF 1	1.58	182.45	182.91	182.72	182.91	0.000784	0.39	6.87	44.67	0.21
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	1.58	182.55	182.83		182.87	0.009312	0.91	1.73	9.04	0.67
EX-WC	2.16	PF 1	1.58	182.25	182.77	182.64	182.82	0.006000	0.97	1.62	5.45	0.57

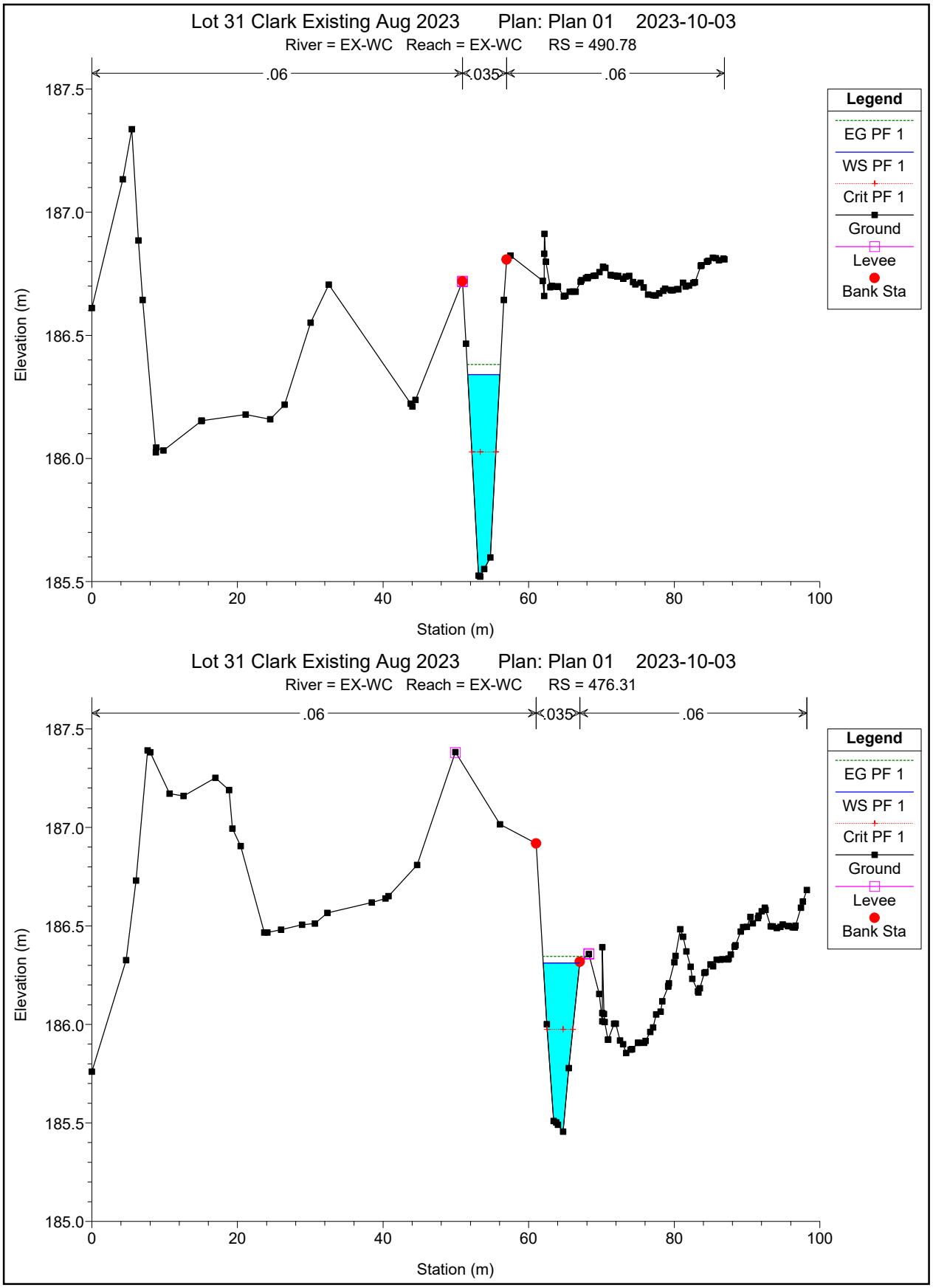
Timmins Storm - Floodplain Results

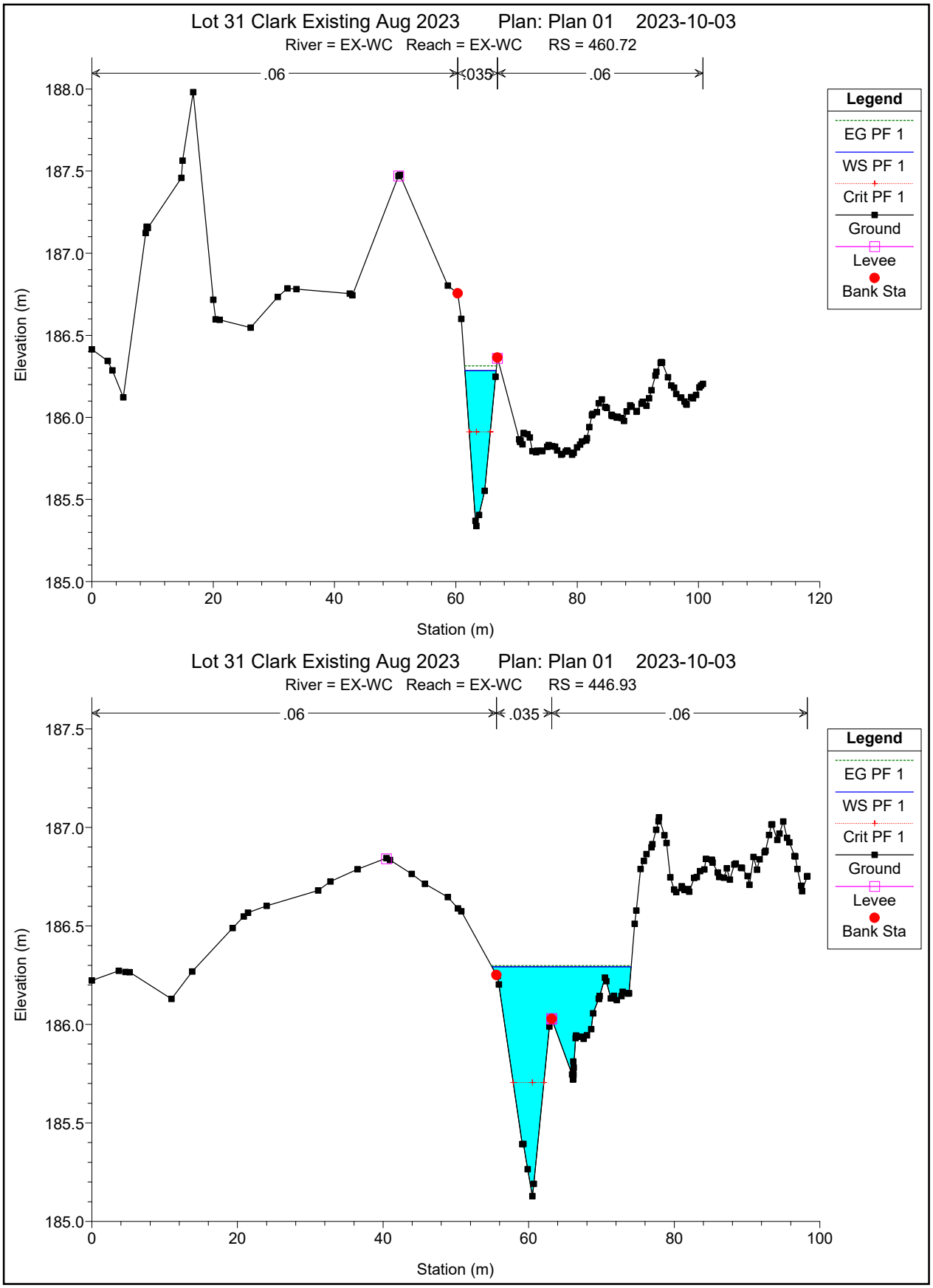
HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 1

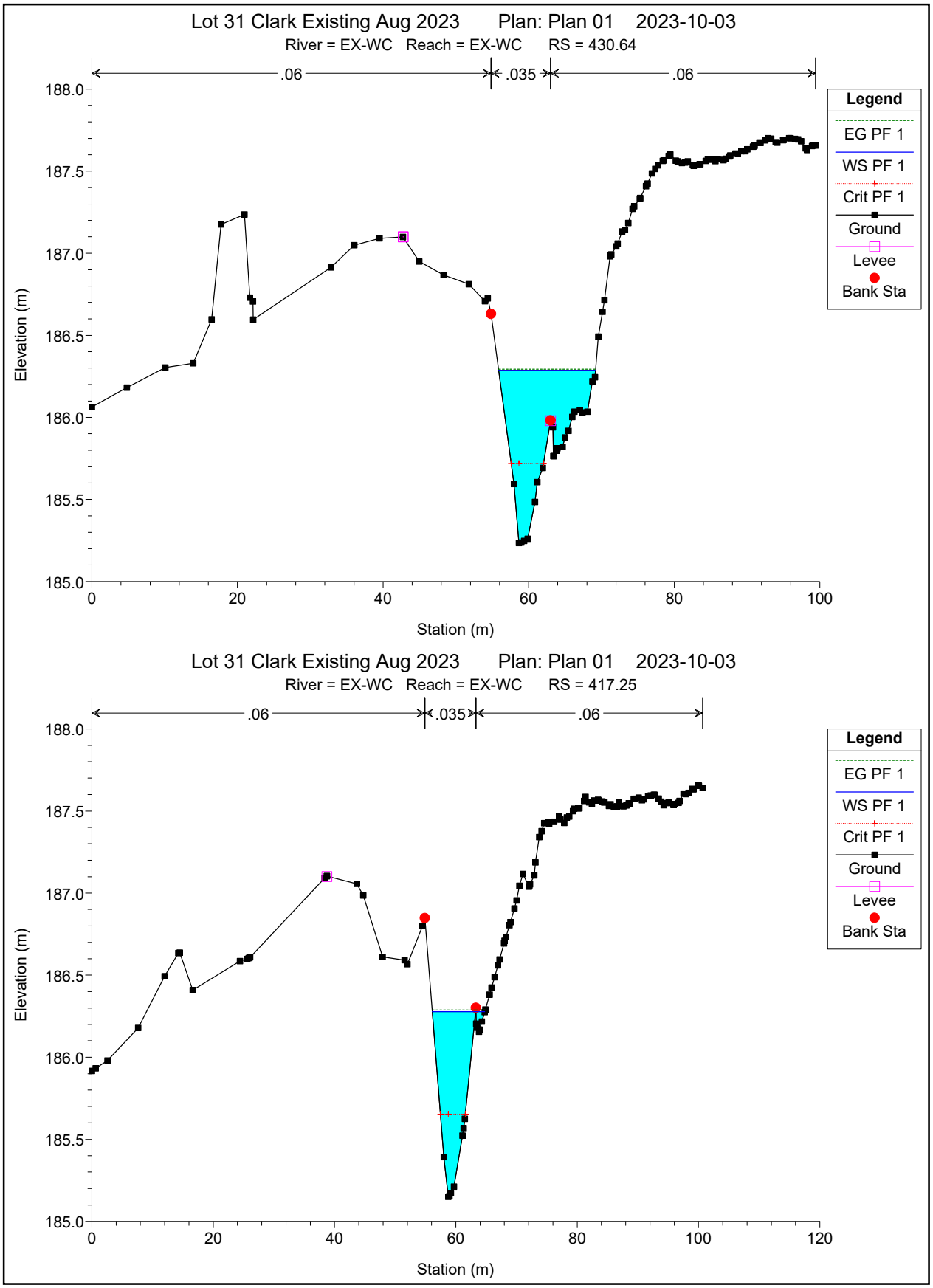
Reach	River Sta	Profile	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
			(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
EX-WC	588	PF 1	6.67	4.55	2.12	4.55		34.00	0.35	0.24	186.37	187.02	186.85	186.50	186.50
EX-WC	351.85	PF 1	2.12	0.28	1.84	0.01		5.76	0.02	0.01	185.54	186.06	186.02	184.96	184.91

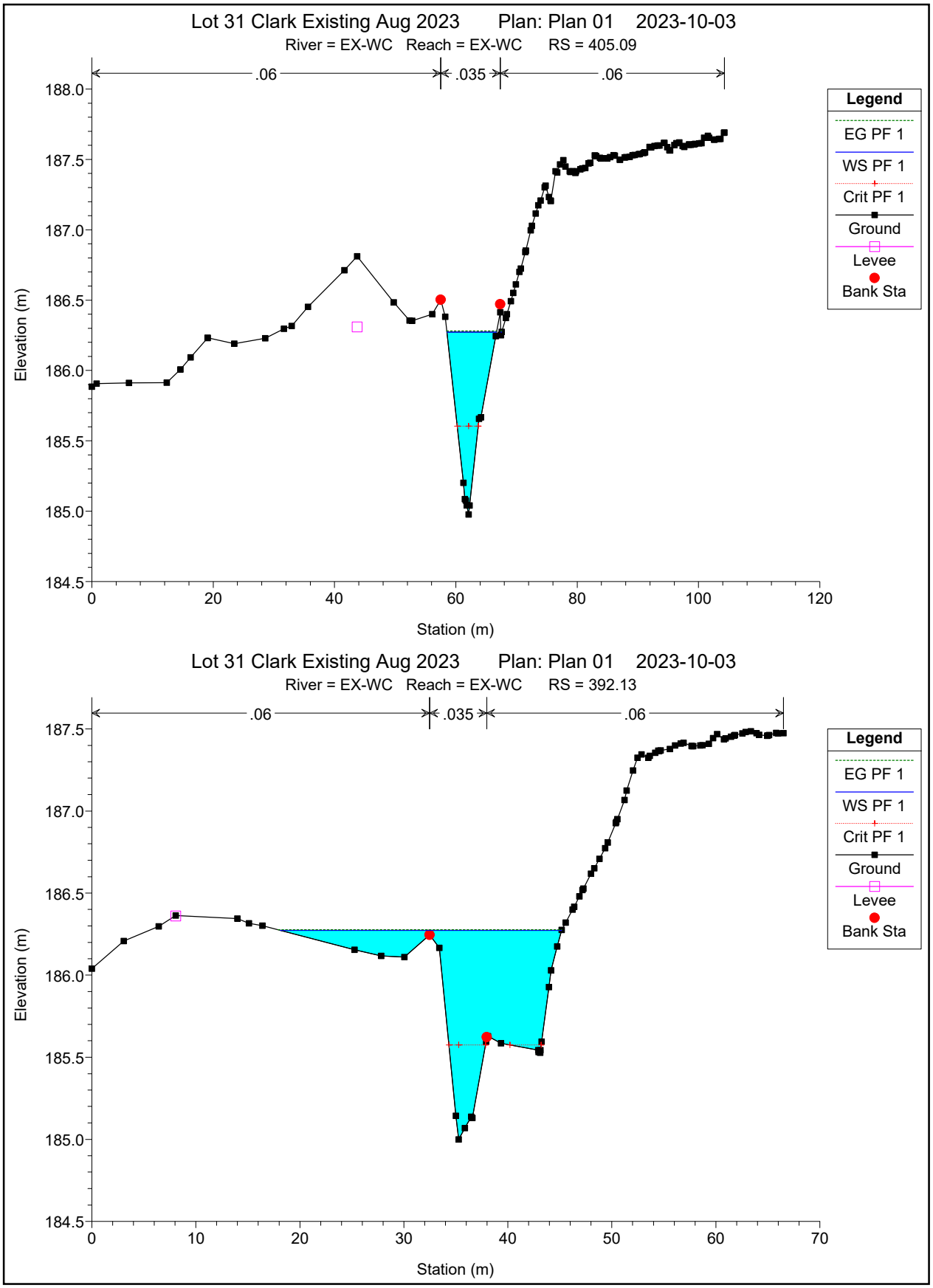

Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 589.26
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 554.44
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

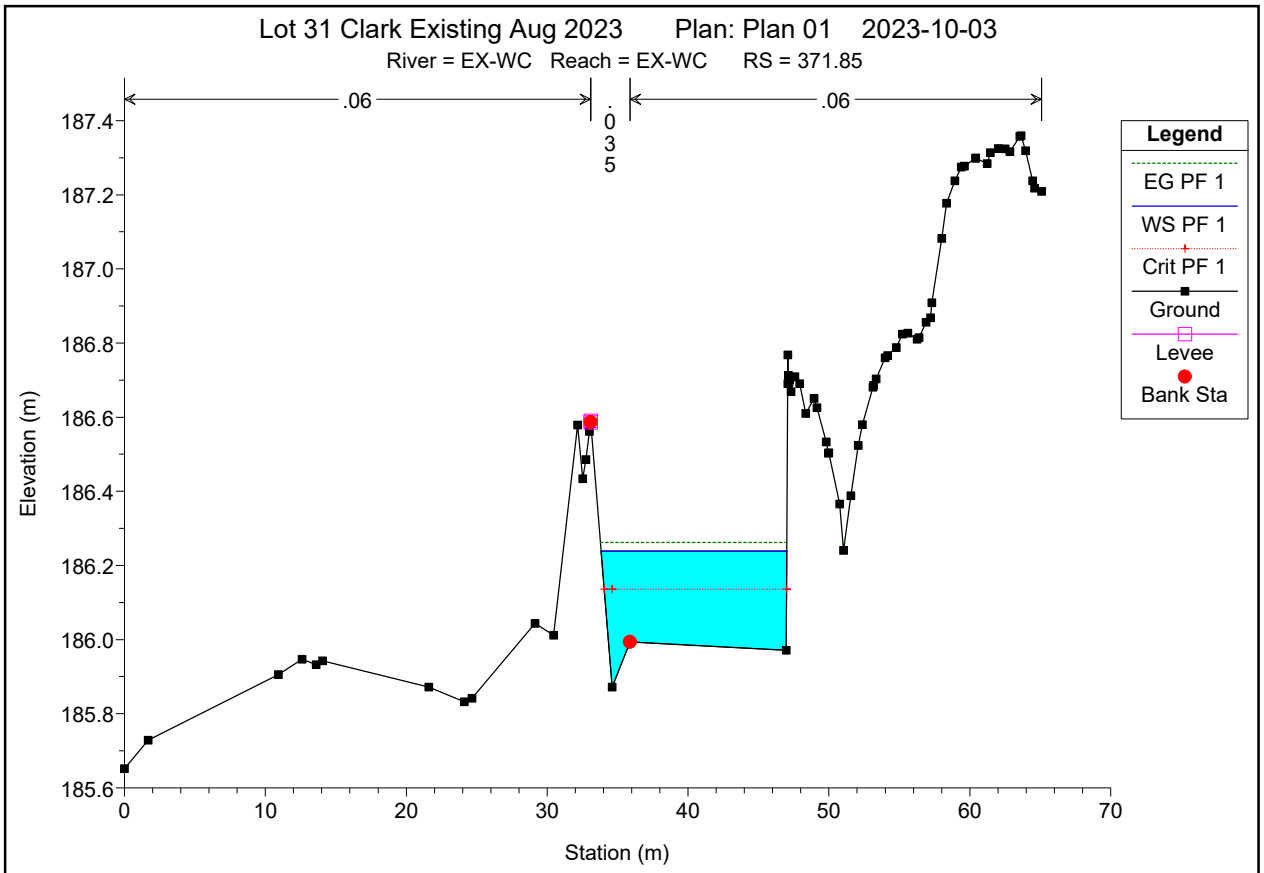

Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 529.57
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 507.67
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

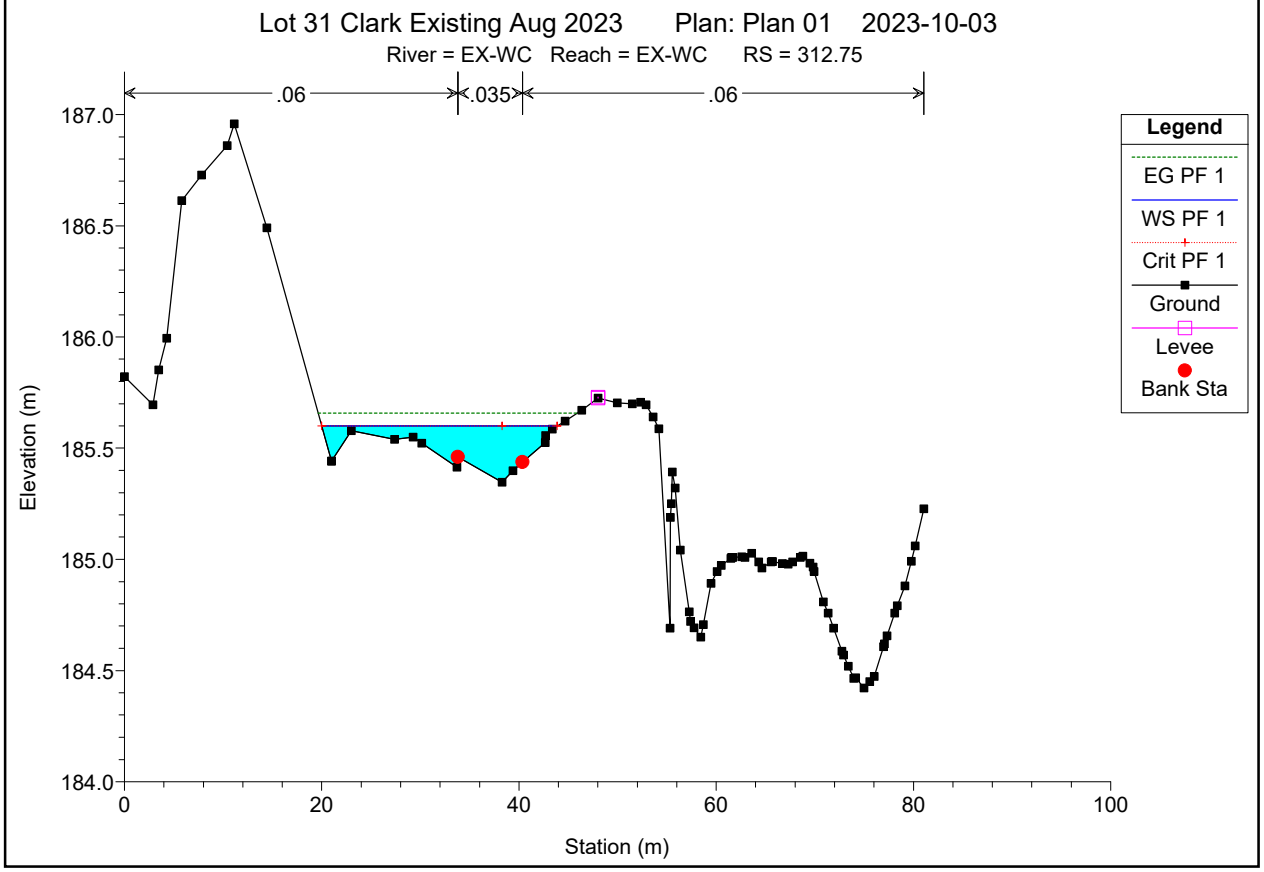

Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 490.78
.06
.035
.06
187.5
187.0
186.5
186.0
185.5
Elevation (m)
0
20
40
60
80
100
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 476.31
.06
.035
.06
187.5
187.0
186.5
186.0
185.5
185.0
Elevation (m)
0
20
40
60
80
100
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 460.72
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 446.93
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 430.64
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 417.25
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 405.09
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 392.13
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 371.85
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 312.75
.06
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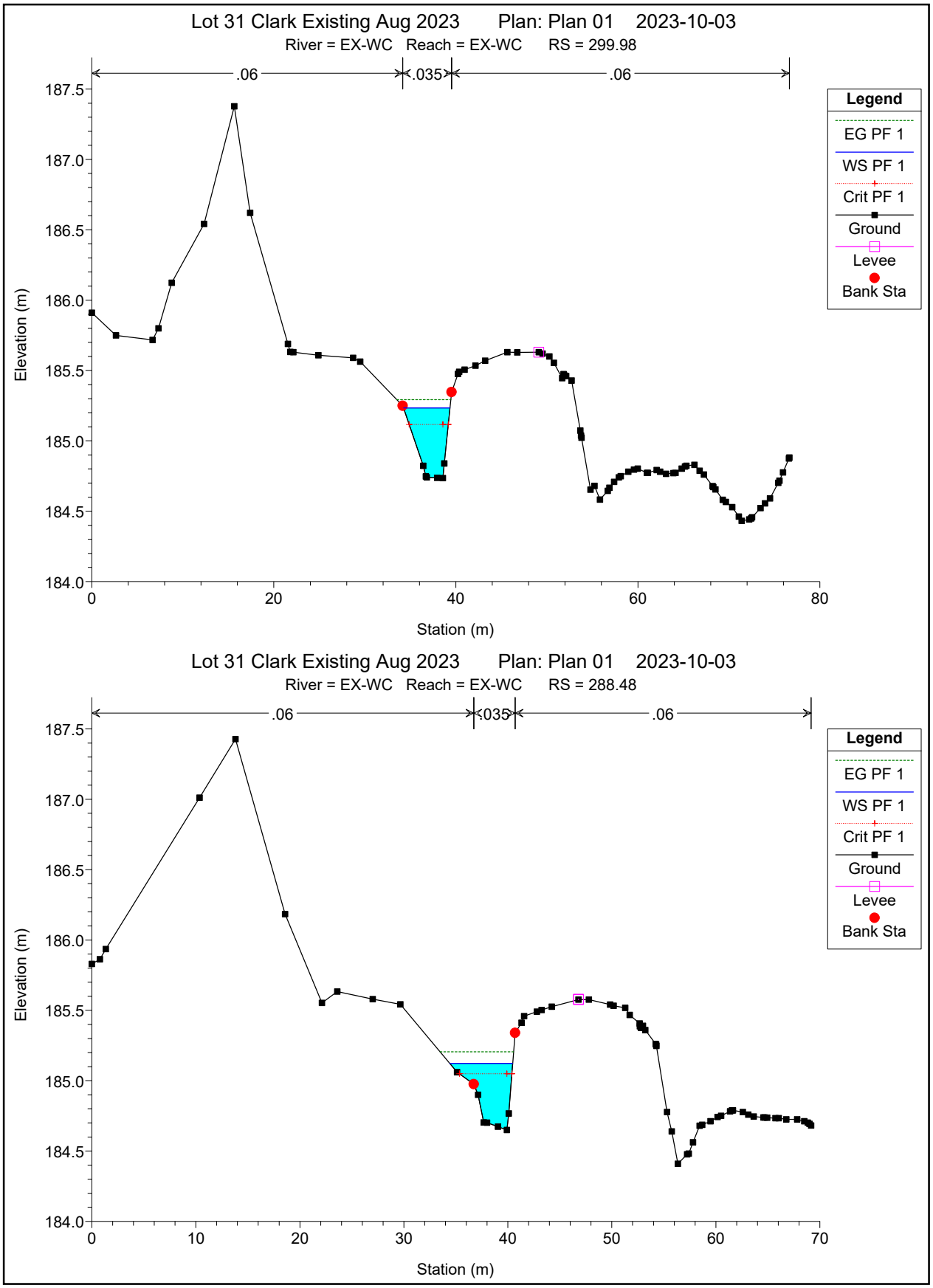
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 299.98
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 288.48
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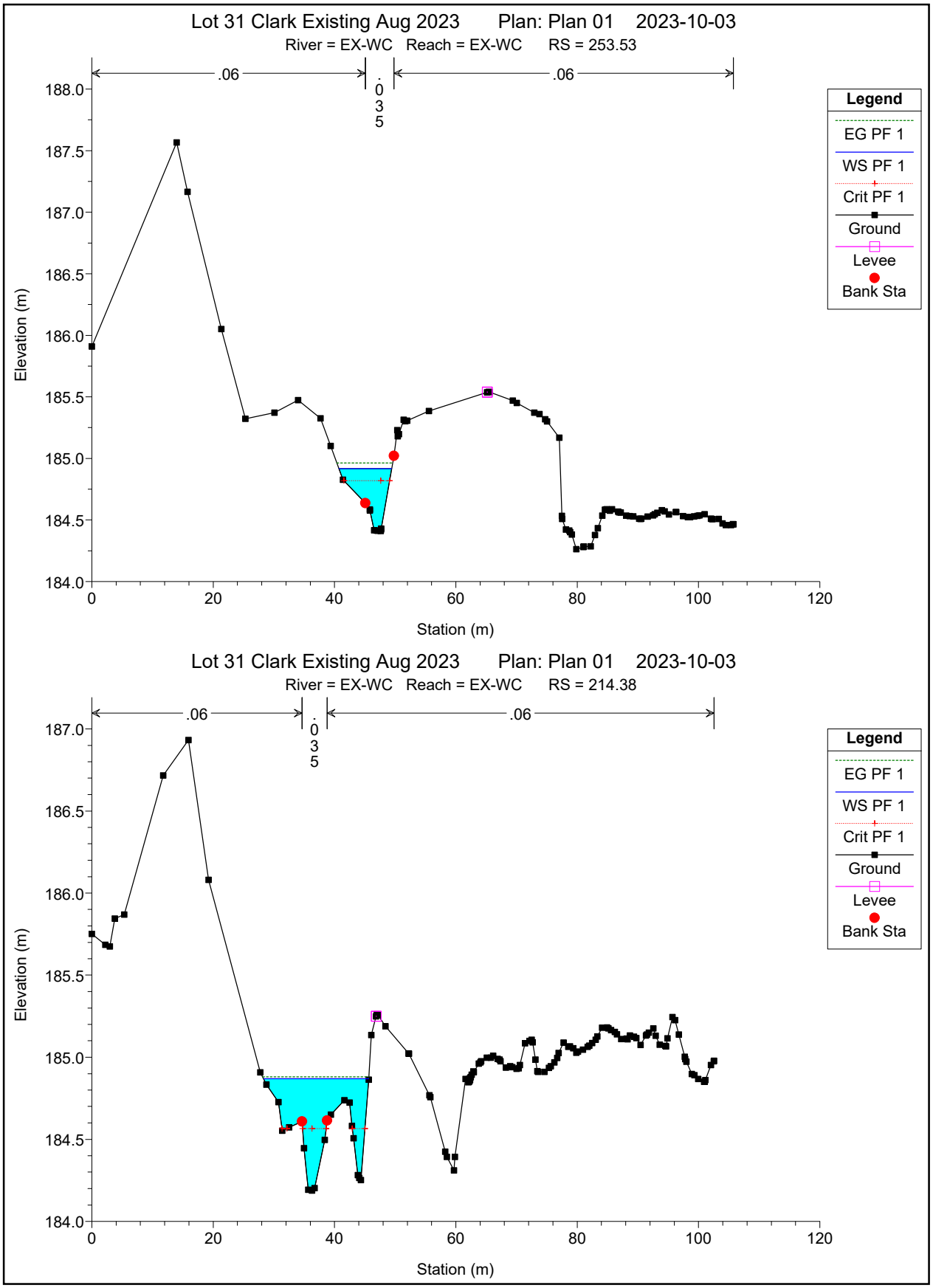
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 253.53
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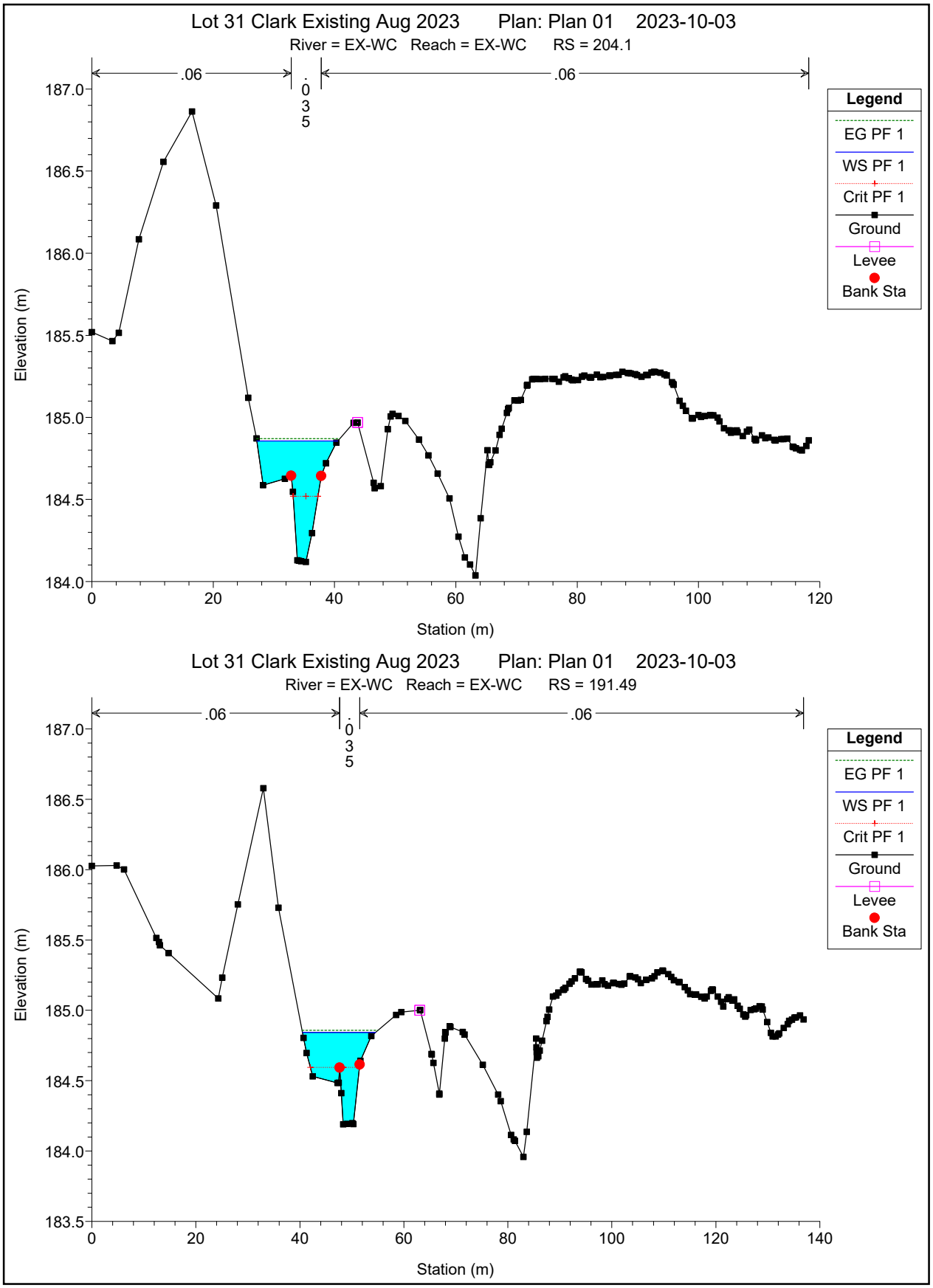
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 214.38
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 204.1
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.035
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 191.49
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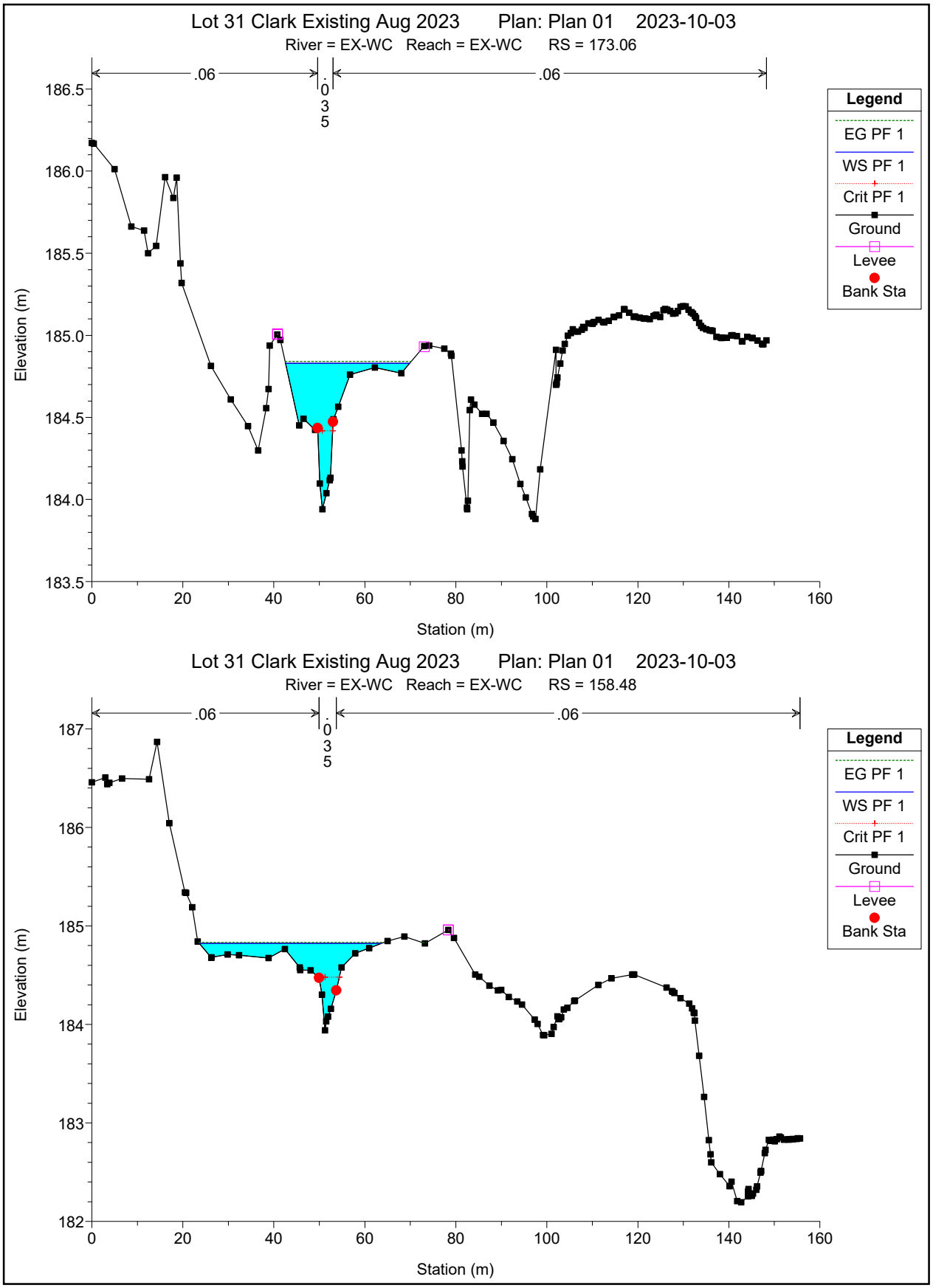
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 173.06
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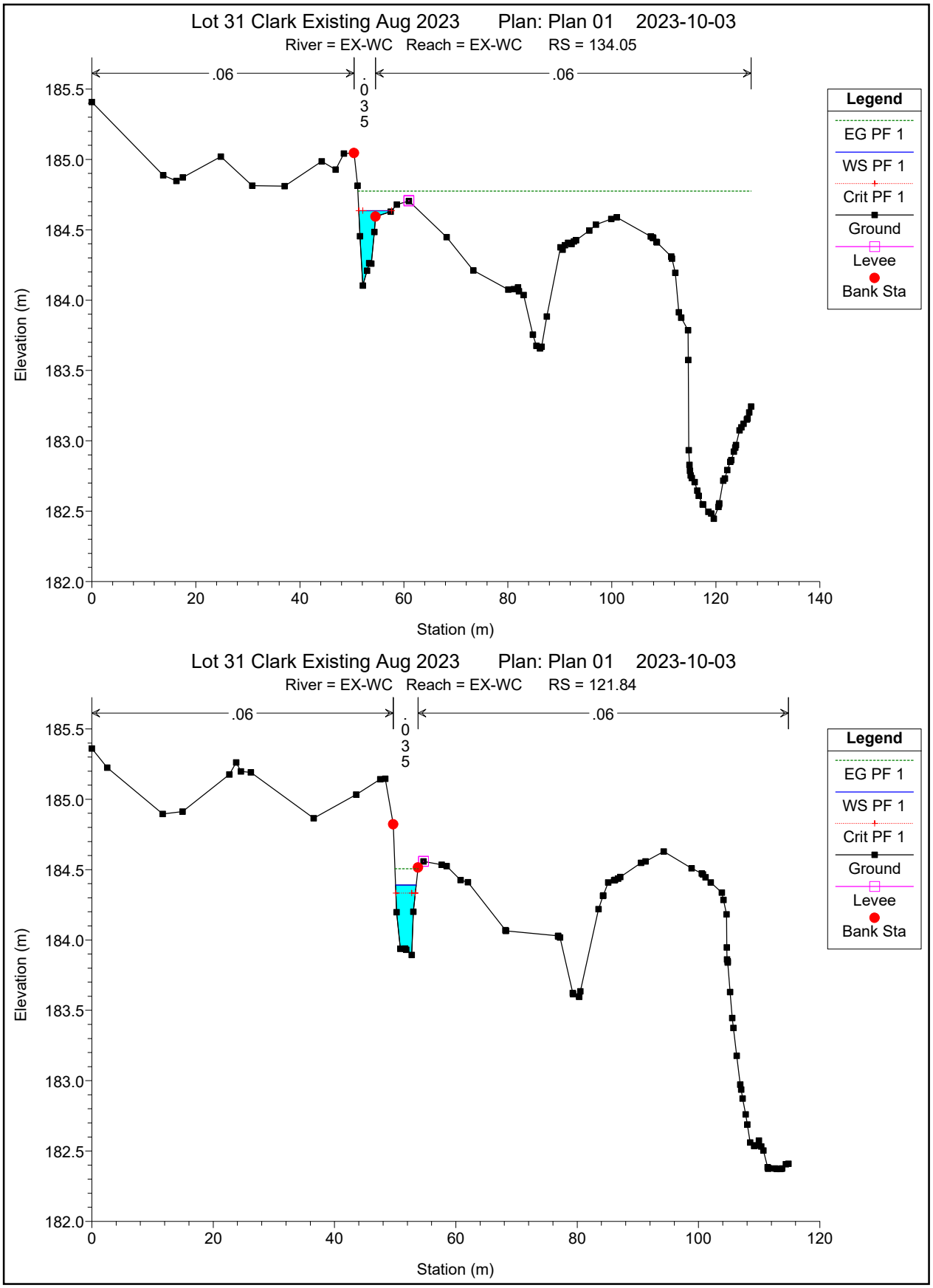
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 158.48
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 134.05
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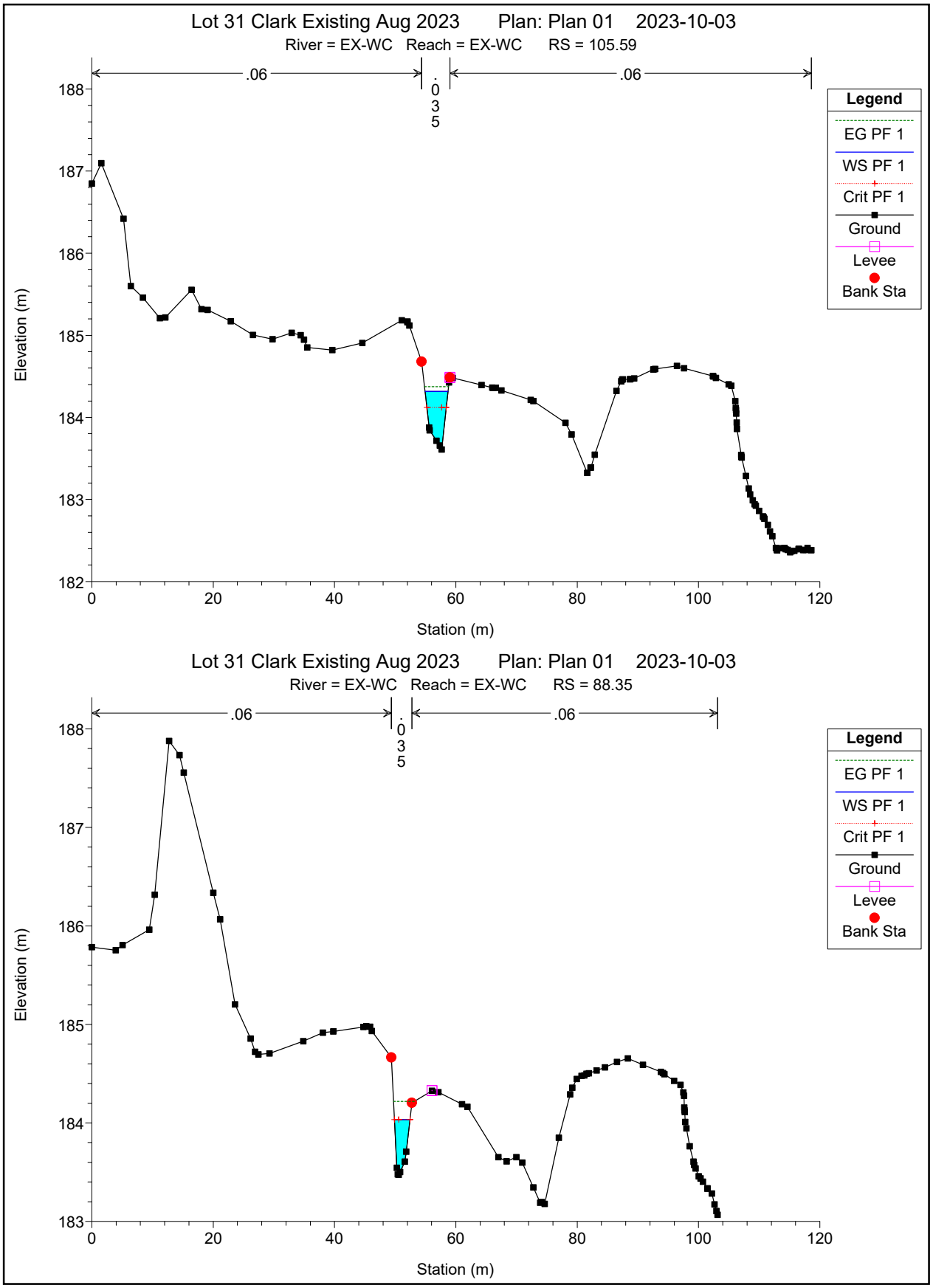
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 121.84
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 105.59
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 88.35
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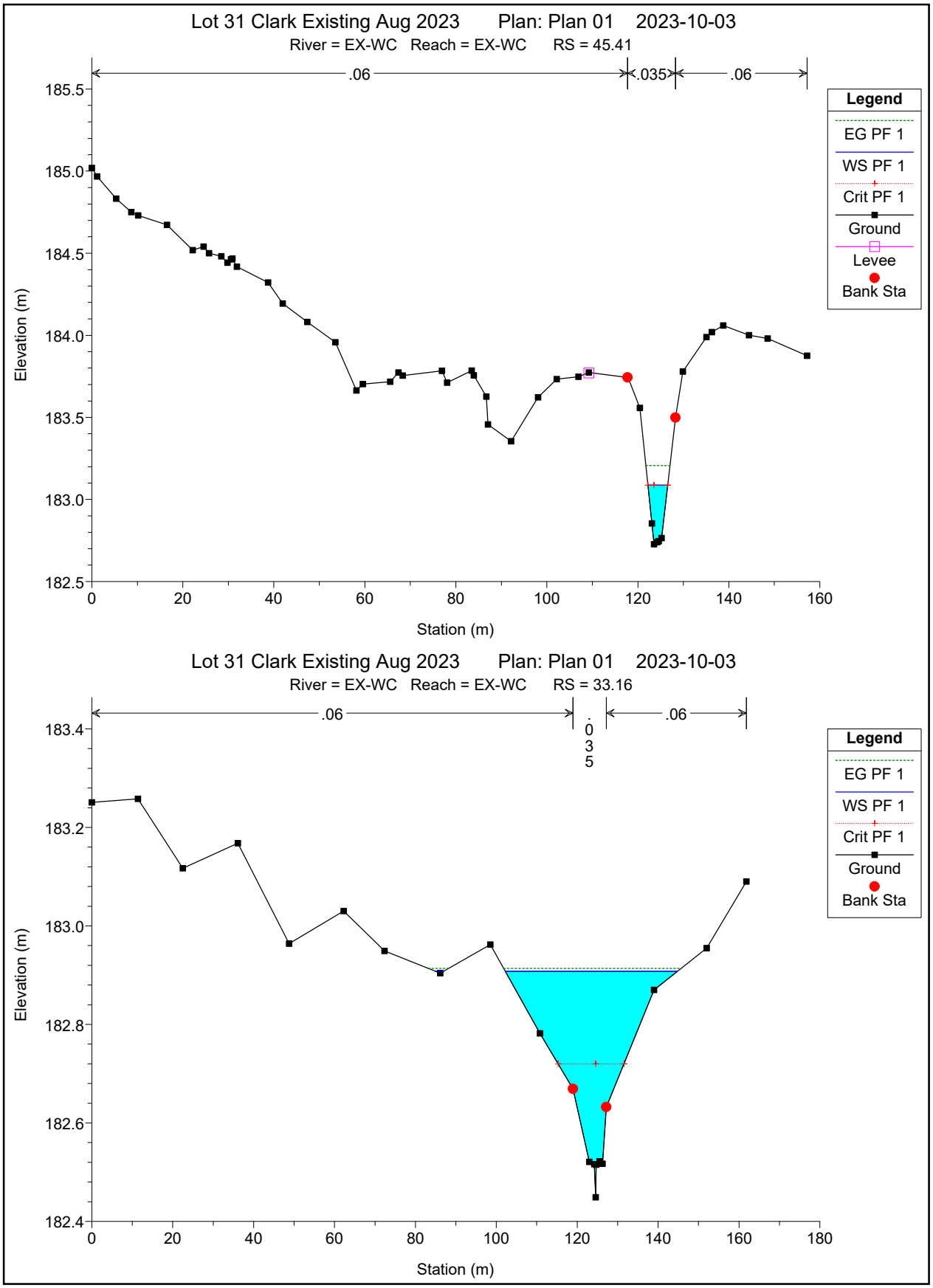
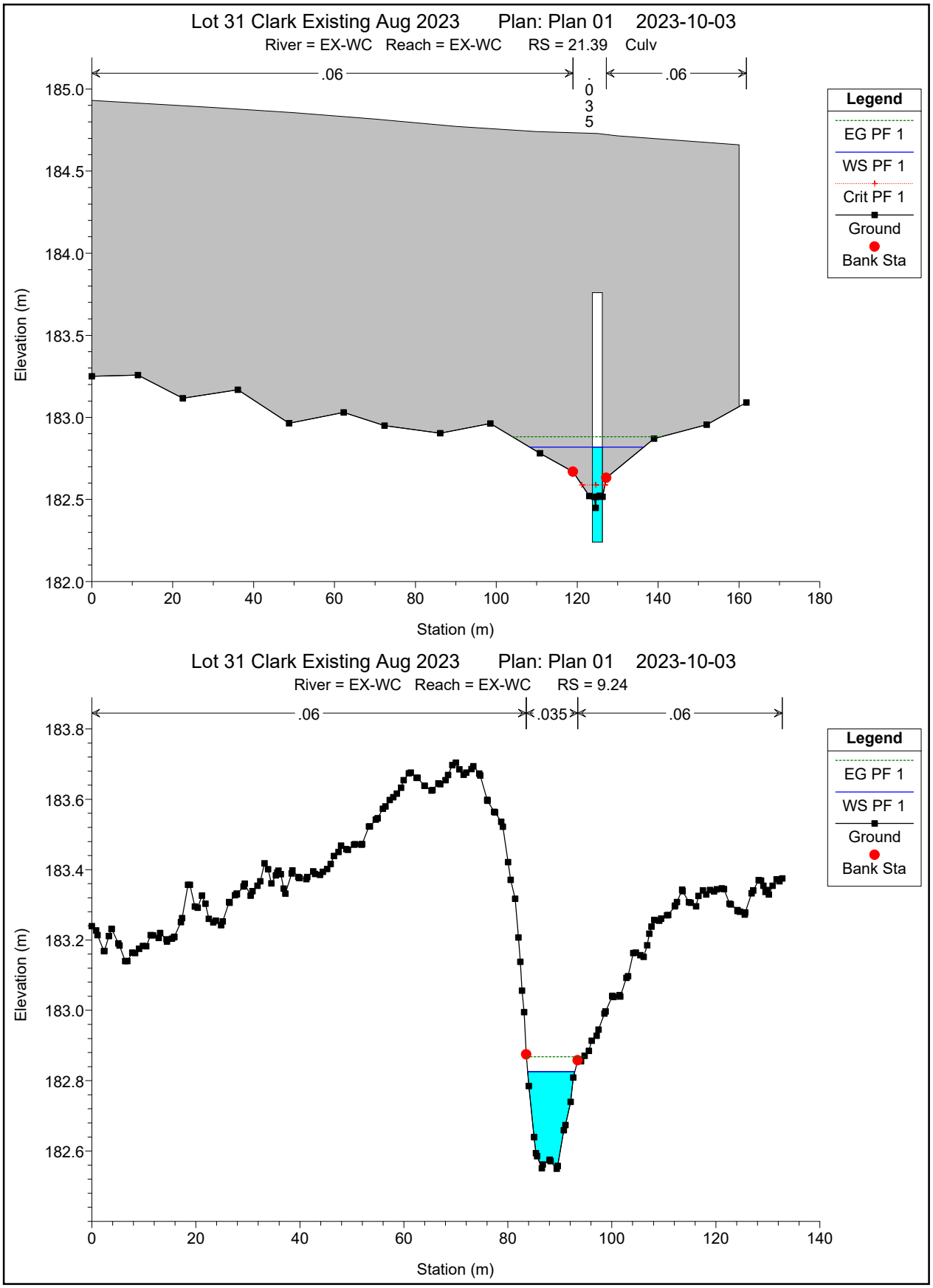
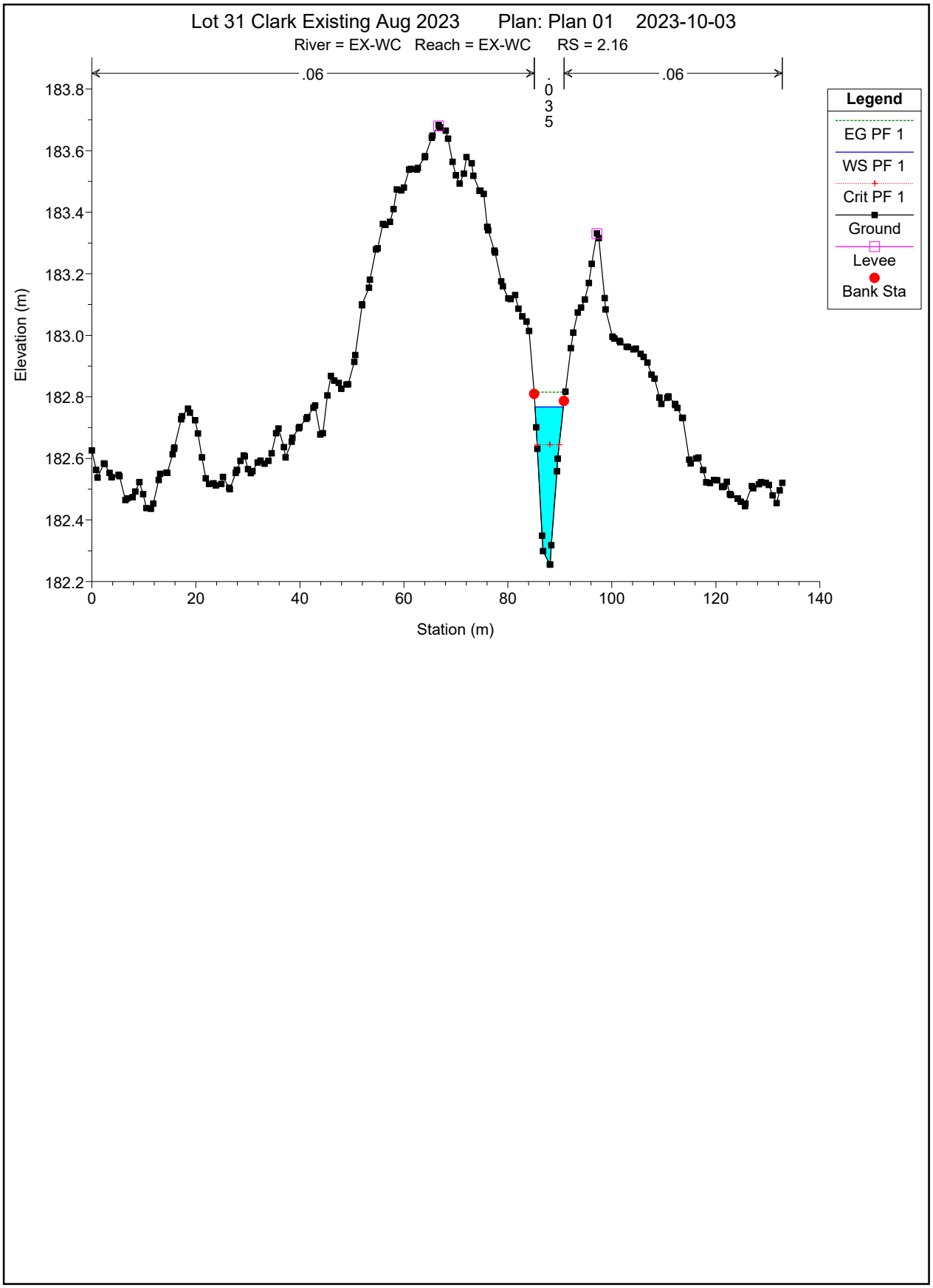
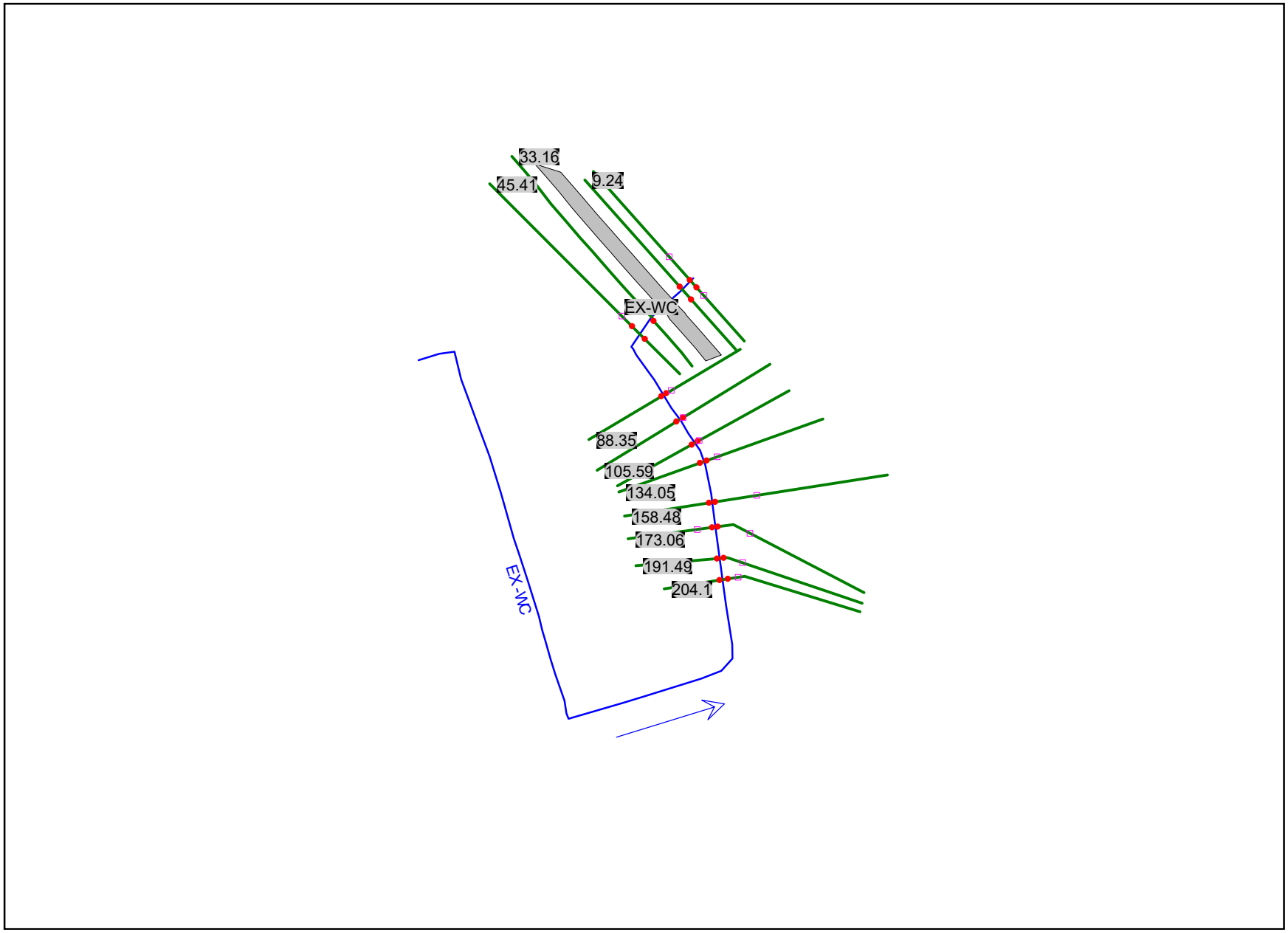
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 45.41
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 33.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 21.39 Culv
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 9.24
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Lot 31 Clark Existing Aug 2023 Plan: Plan 01 2023-10-03
River = EX-WC Reach = EX-WC RS = 2.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
182.2
0
20
40
60
80
100
120
140
Station (m)

Modified Existing Condition Model with Lateral Weirs Removed

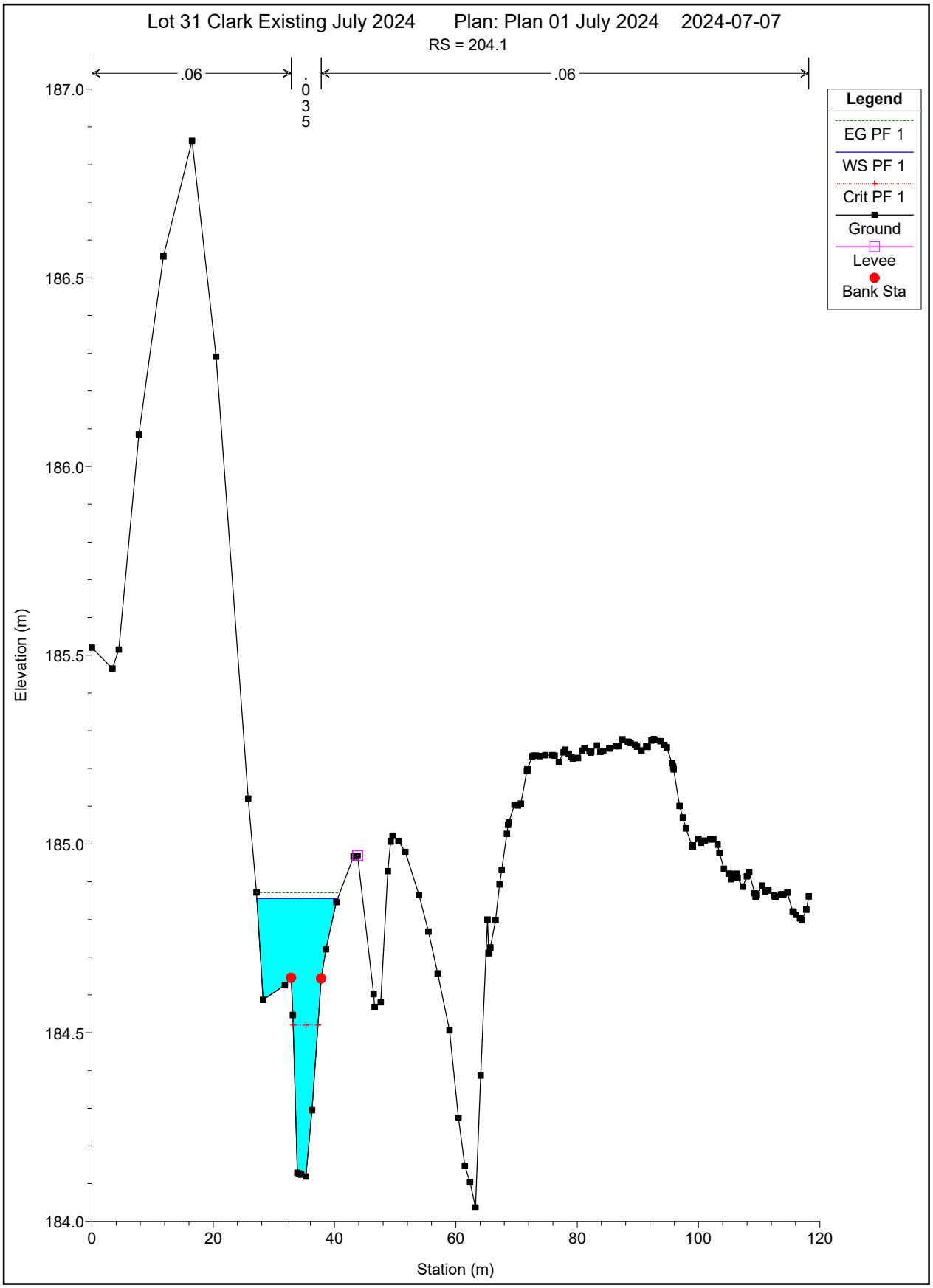


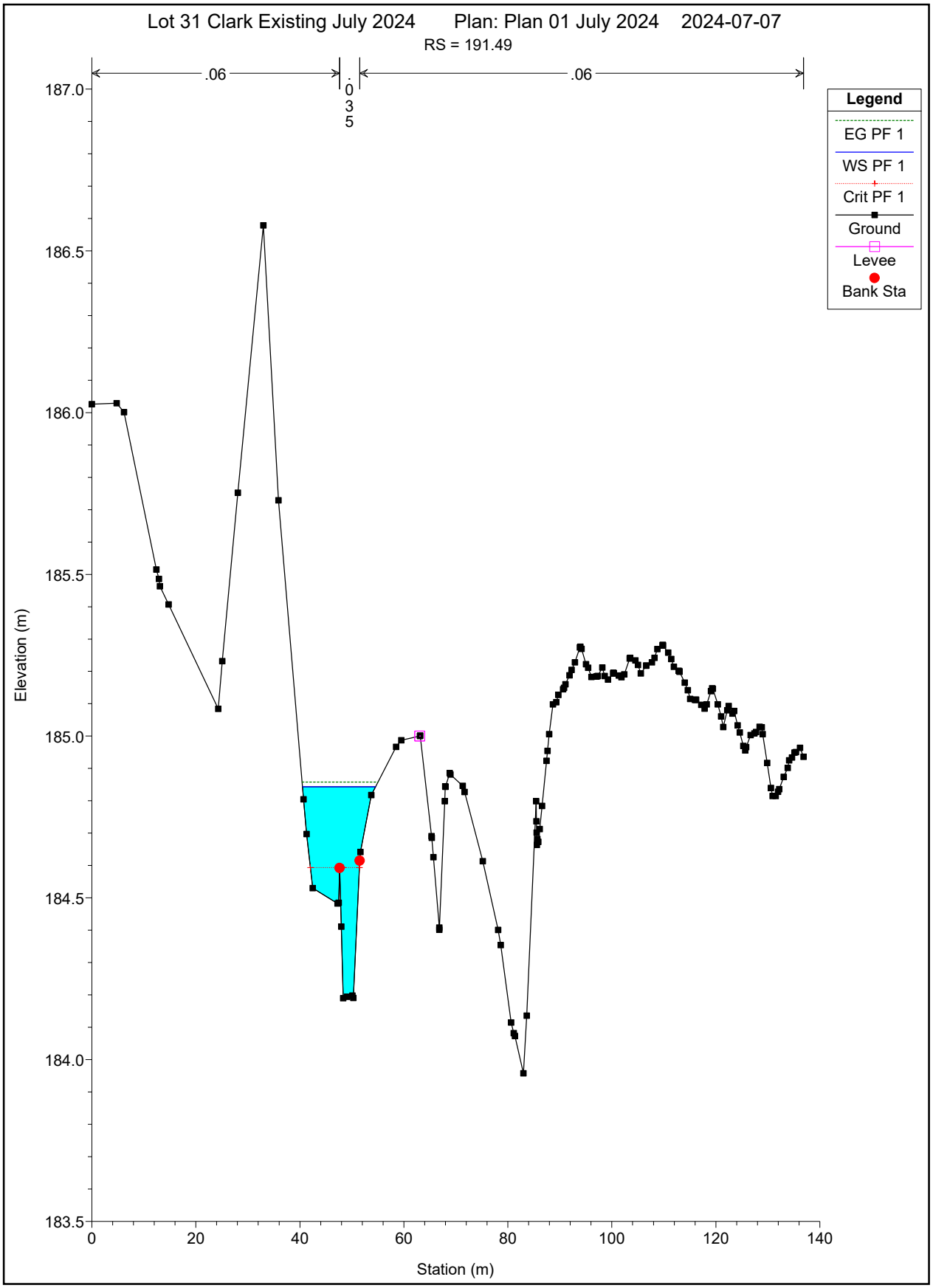
Modified Existing Condition HEC RAS Model - Lateral Weirs Removed

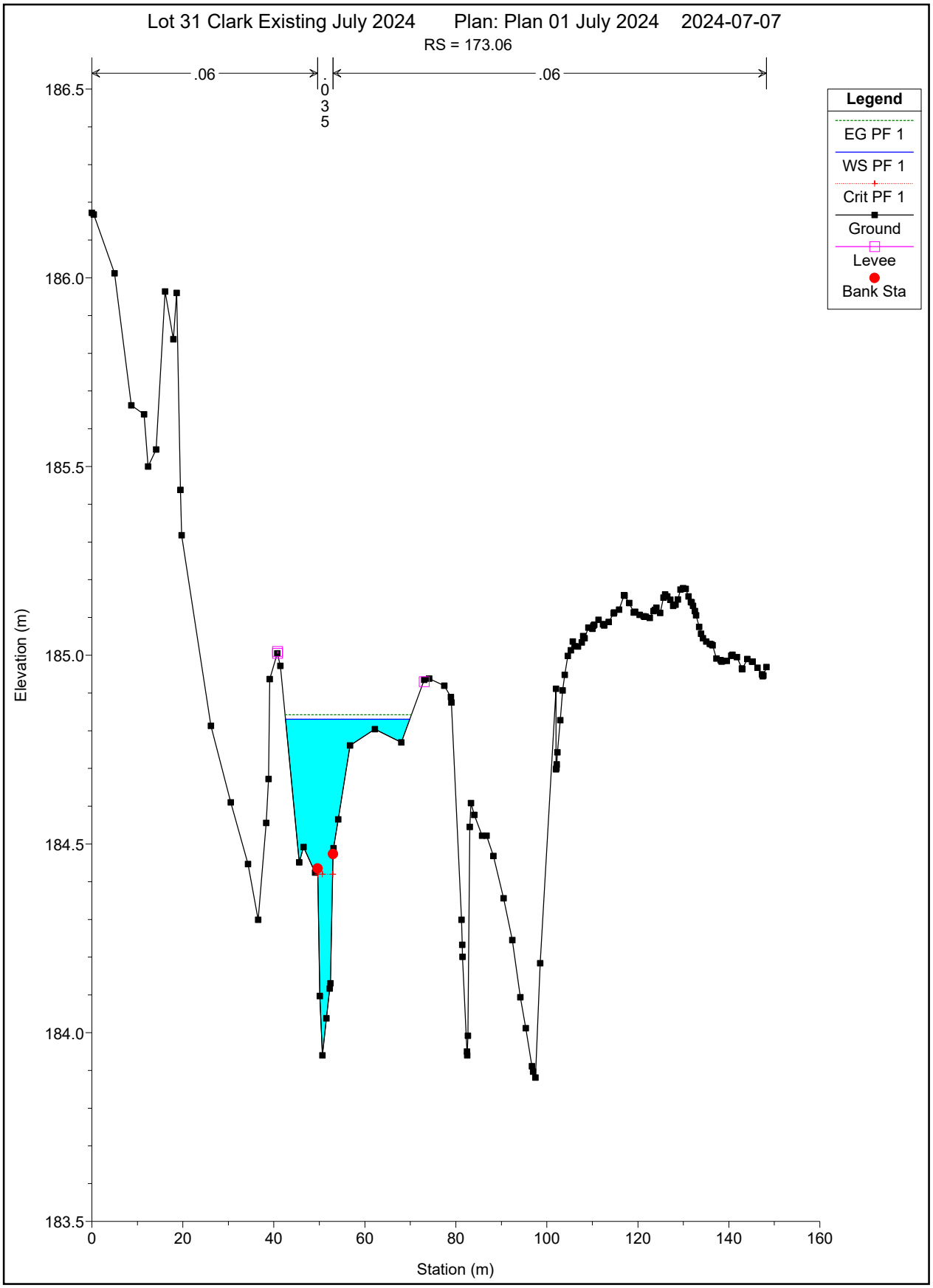
HEC-RAS Plan: 2021-185 Ex July 2024 River: EX-WC Reach: EX-WC Profile: PF 1

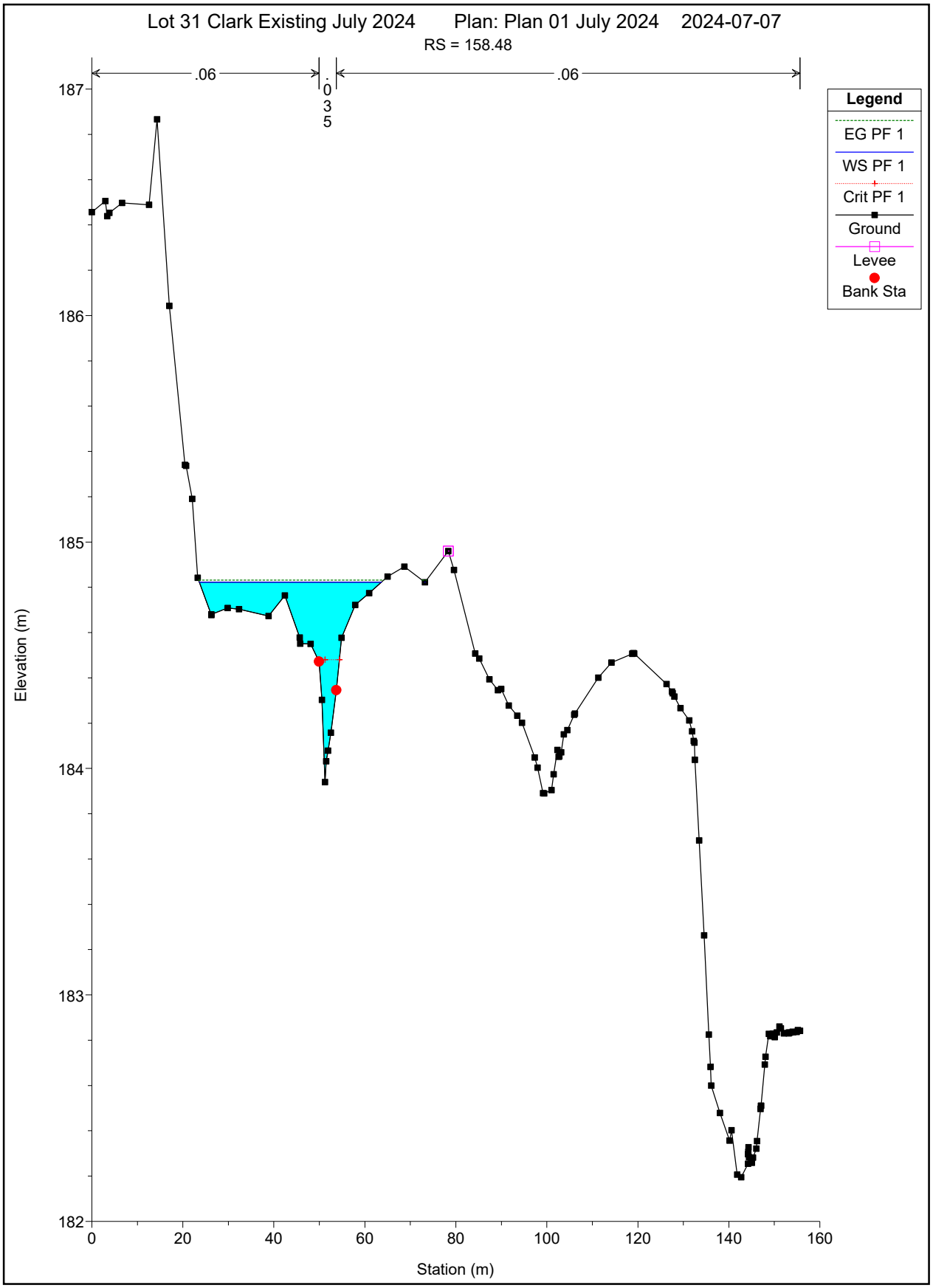
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	204.1	PF 1	1.84	184.12	184.86	184.52	184.87	0.000939	0.58	4.26	13.35	0.25
EX-WC	191.49	PF 1	1.84	184.19	184.84	184.59	184.86	0.001106	0.62	4.47	14.06	0.27
EX-WC	173.06	PF 1	1.84	183.94	184.83	184.42	184.84	0.000640	0.55	5.86	27.28	0.21
EX-WC	158.48	PF 1	1.84	183.94	184.82	184.48	184.83	0.000644	0.52	7.53	40.05	0.21
EX-WC	134.05	PF 1	1.84	184.10	184.63	184.63	184.78	0.015883	1.67	1.17	6.30	0.92
EX-WC	121.84	PF 1	1.84	183.89	184.39	184.34	184.51	0.012202	1.50	1.22	3.40	0.80
EX-WC	105.59	PF 1	1.84	183.61	184.32	184.12	184.38	0.004596	1.07	1.71	3.78	0.51
EX-WC	88.35	PF 1	1.84	183.47	184.03	184.03	184.22	0.019709	1.91	0.97	2.59	1.00
EX-WC	45.41	PF 1	6.38	182.73	183.80	183.45	183.83	0.001732	0.83	13.58	74.38	0.34
EX-WC	33.16	PF 1	6.38	182.45	183.82	182.90	183.82	0.000008	0.10	138.18	161.84	0.03
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	6.38	182.55	183.26		183.30	0.001867	0.89	10.86	48.38	0.36
EX-WC	2.16	PF 1	6.38	182.25	183.13	183.00	183.27	0.006003	1.64	4.71	15.39	0.65

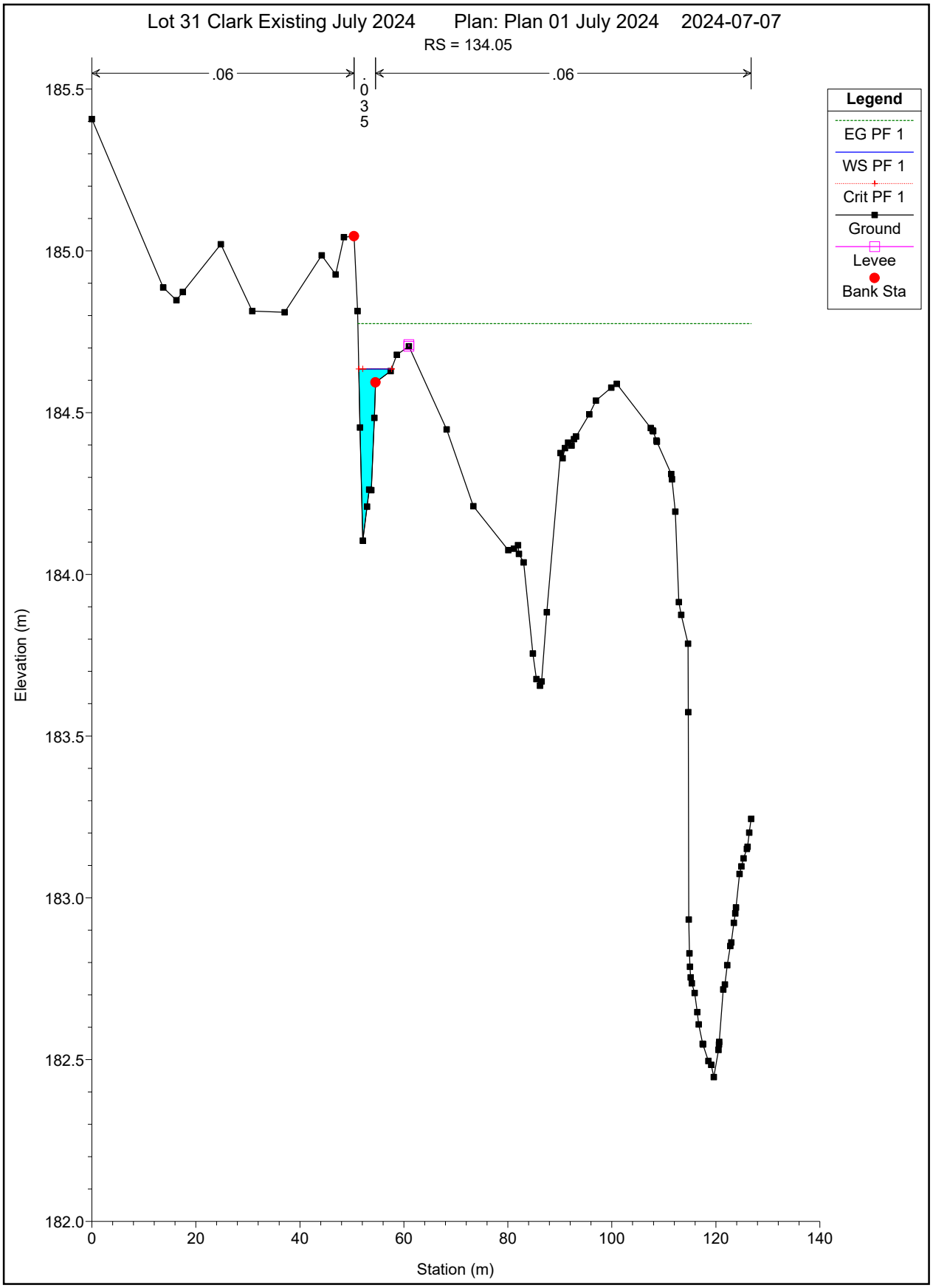
Modified HEC RAS Section Results - Timmins Storm - Lateral Weirs Removed

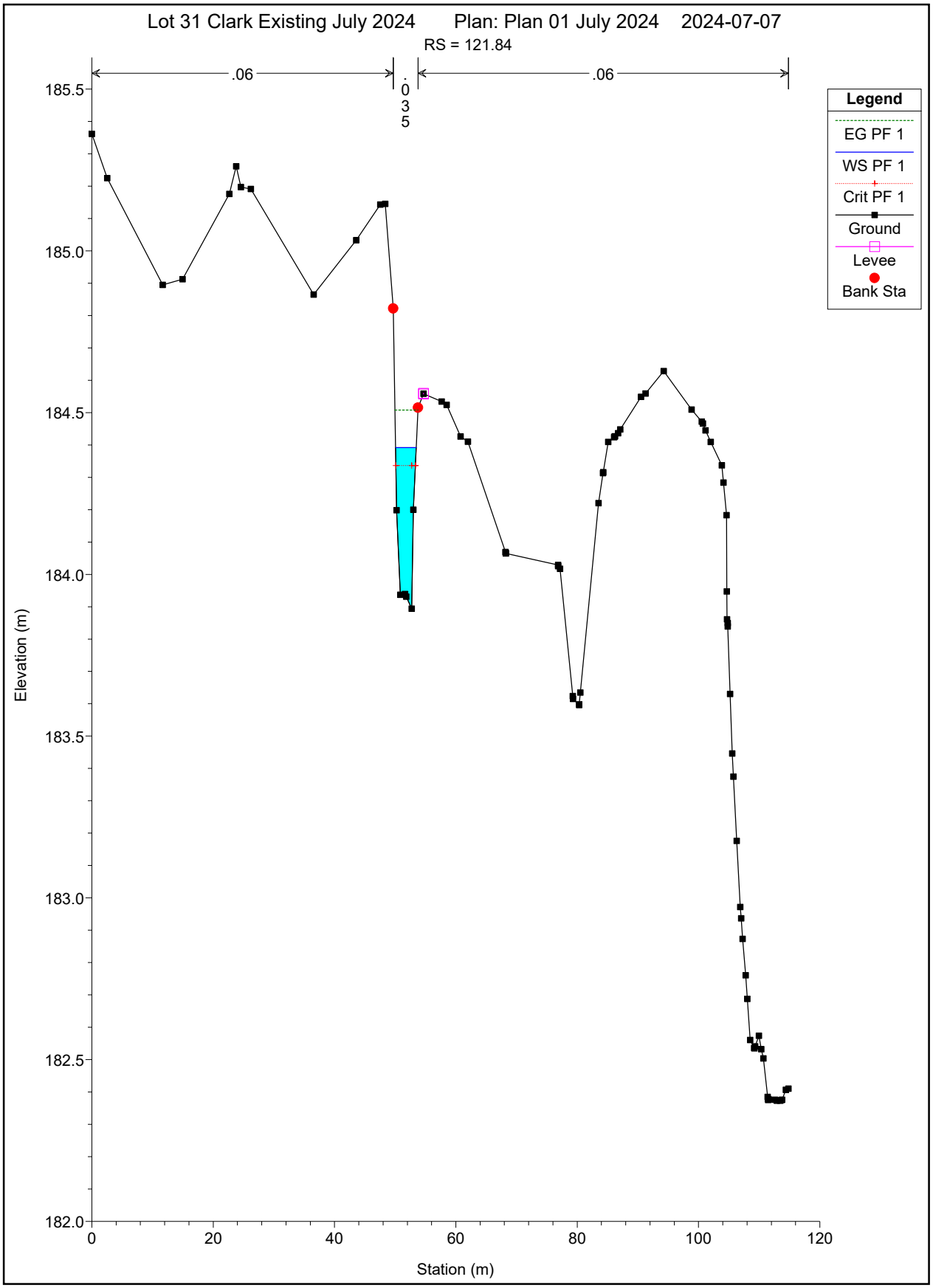


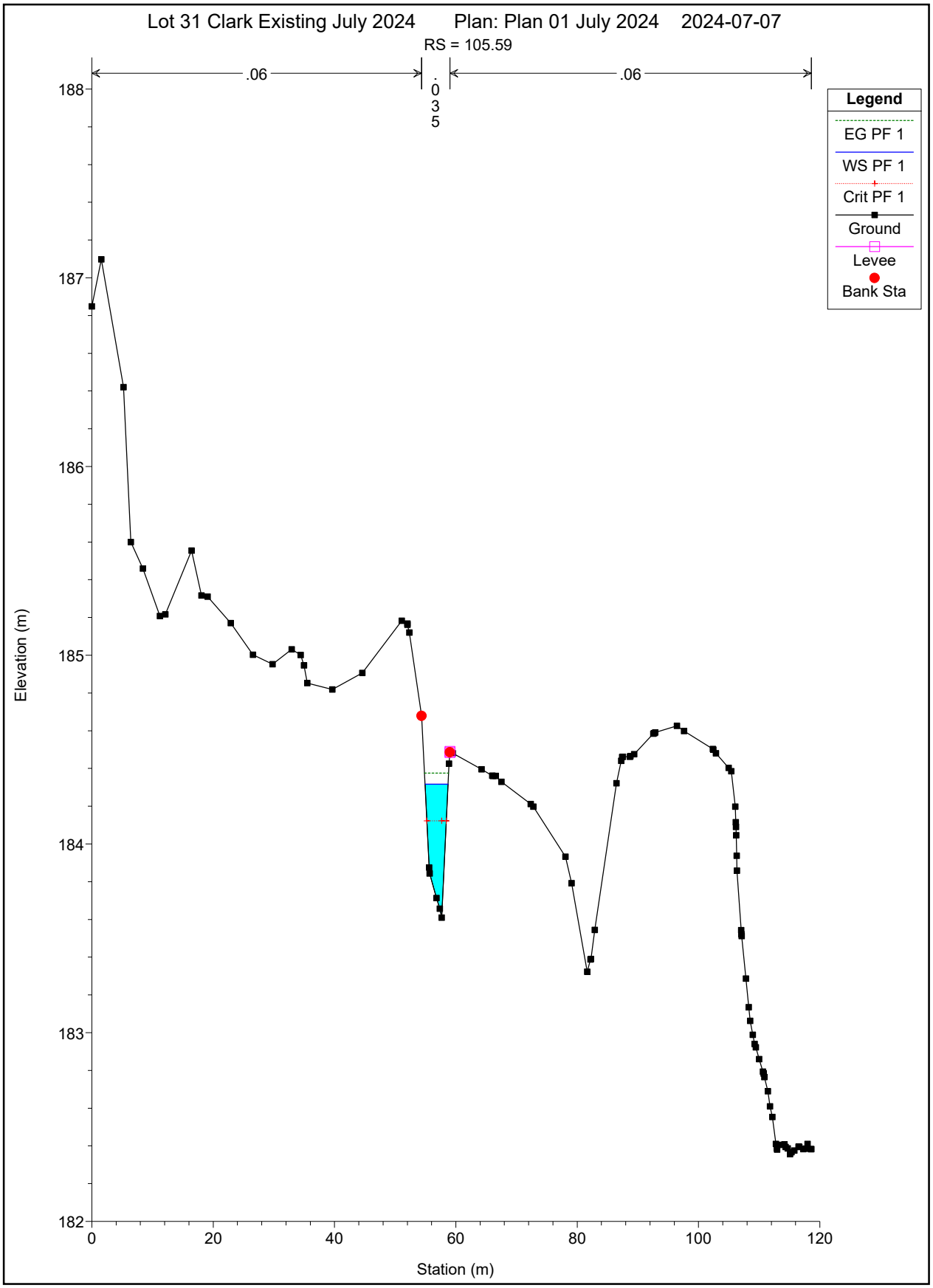

Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 191.49
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
187.0
186.5
186.0
185.5
185.0
184.5
184.0
183.5
0
20
40
60
80
100
120
140

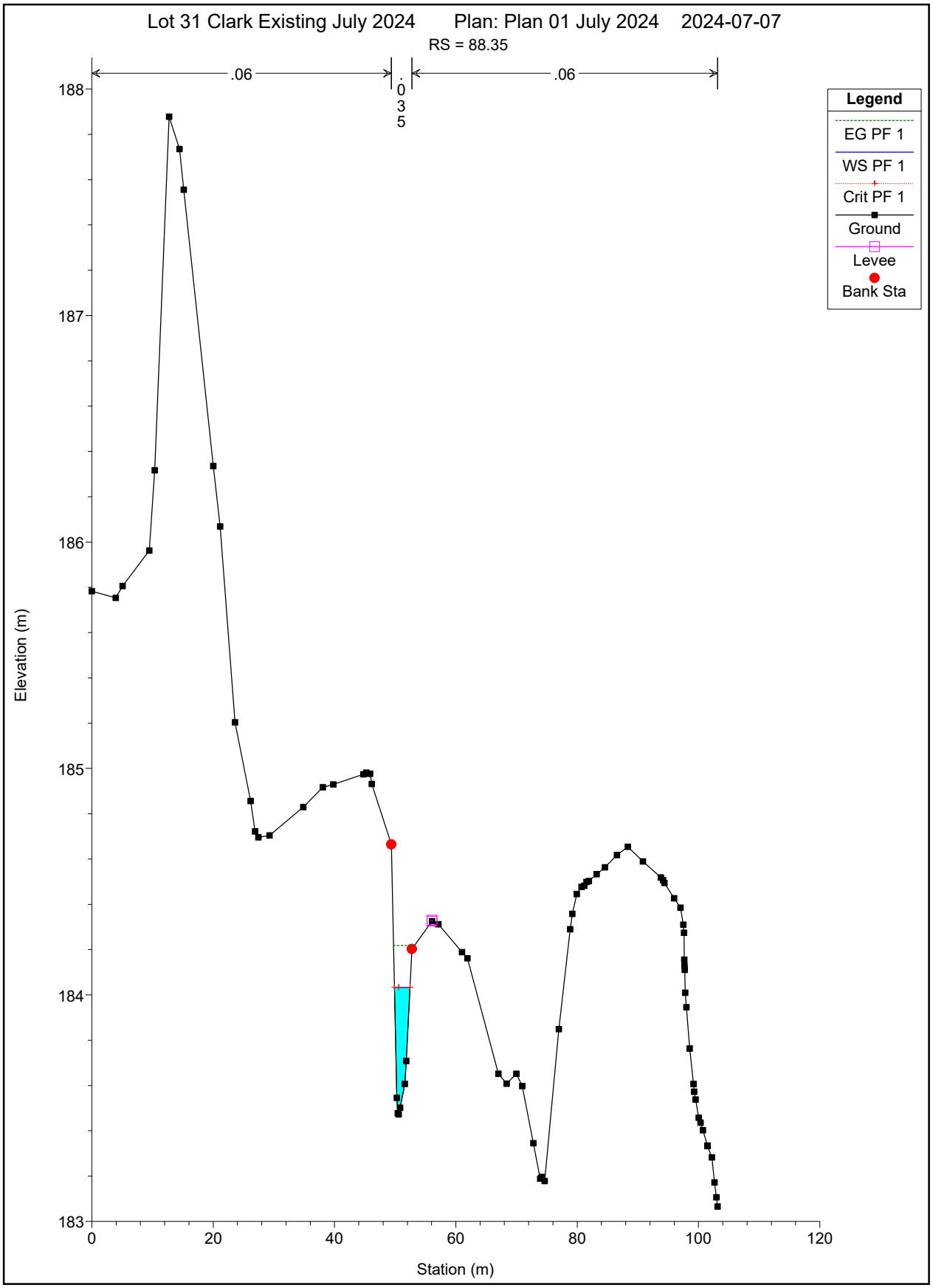

Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 173.06
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
186.5
186.0
185.5
185.0
184.5
184.0
183.5
0
20
40
60
80
100
120
140
160
Station (m)

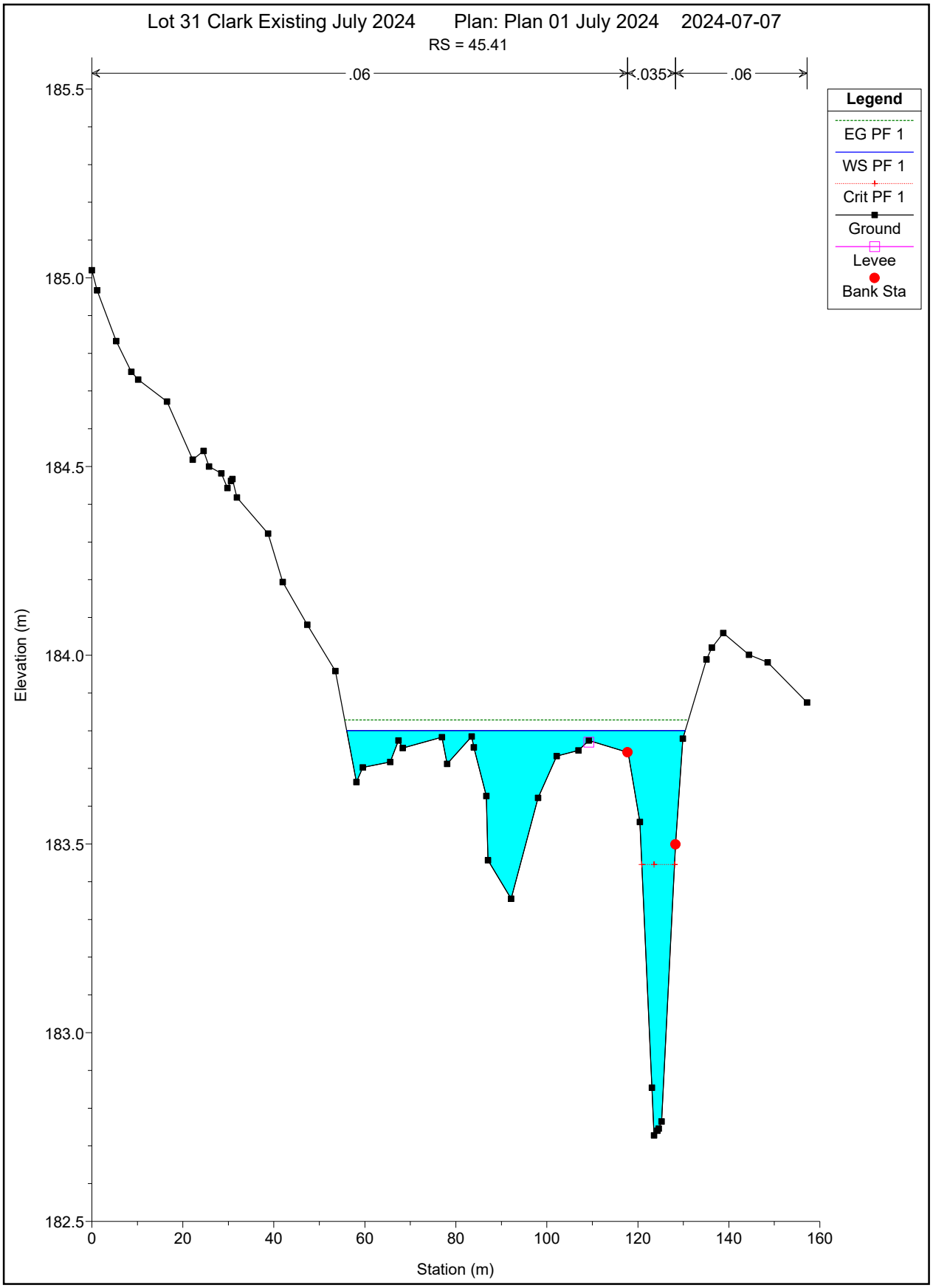

Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 158.48
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
187
186
185
184
183
182
0
20
40
60
80
100
120
140
160

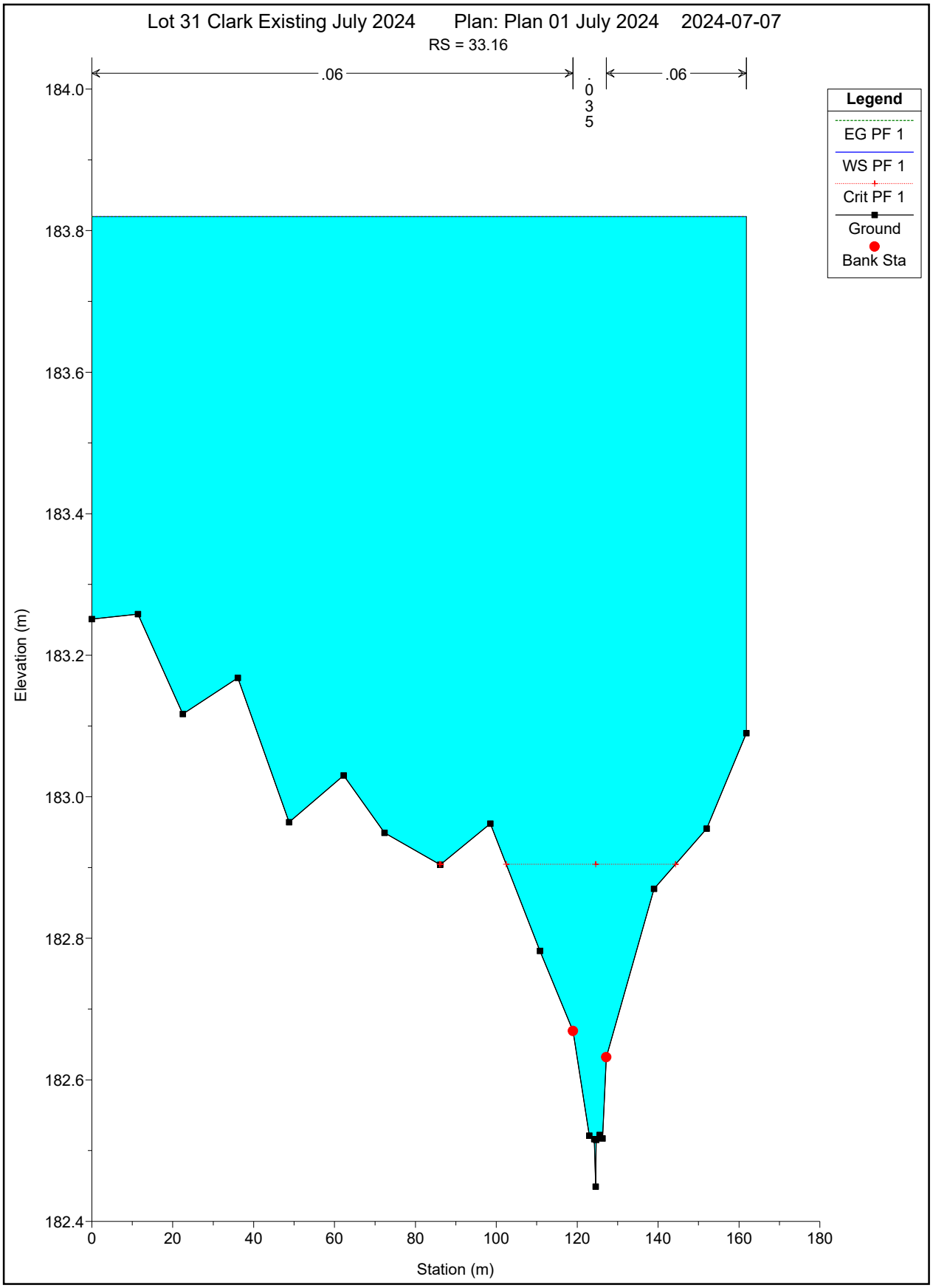

Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 134.05
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
185.5
185.0
184.5
184.0
183.5
183.0
182.5
182.0
0
20
40
60
80
100
120
140
Station (m)

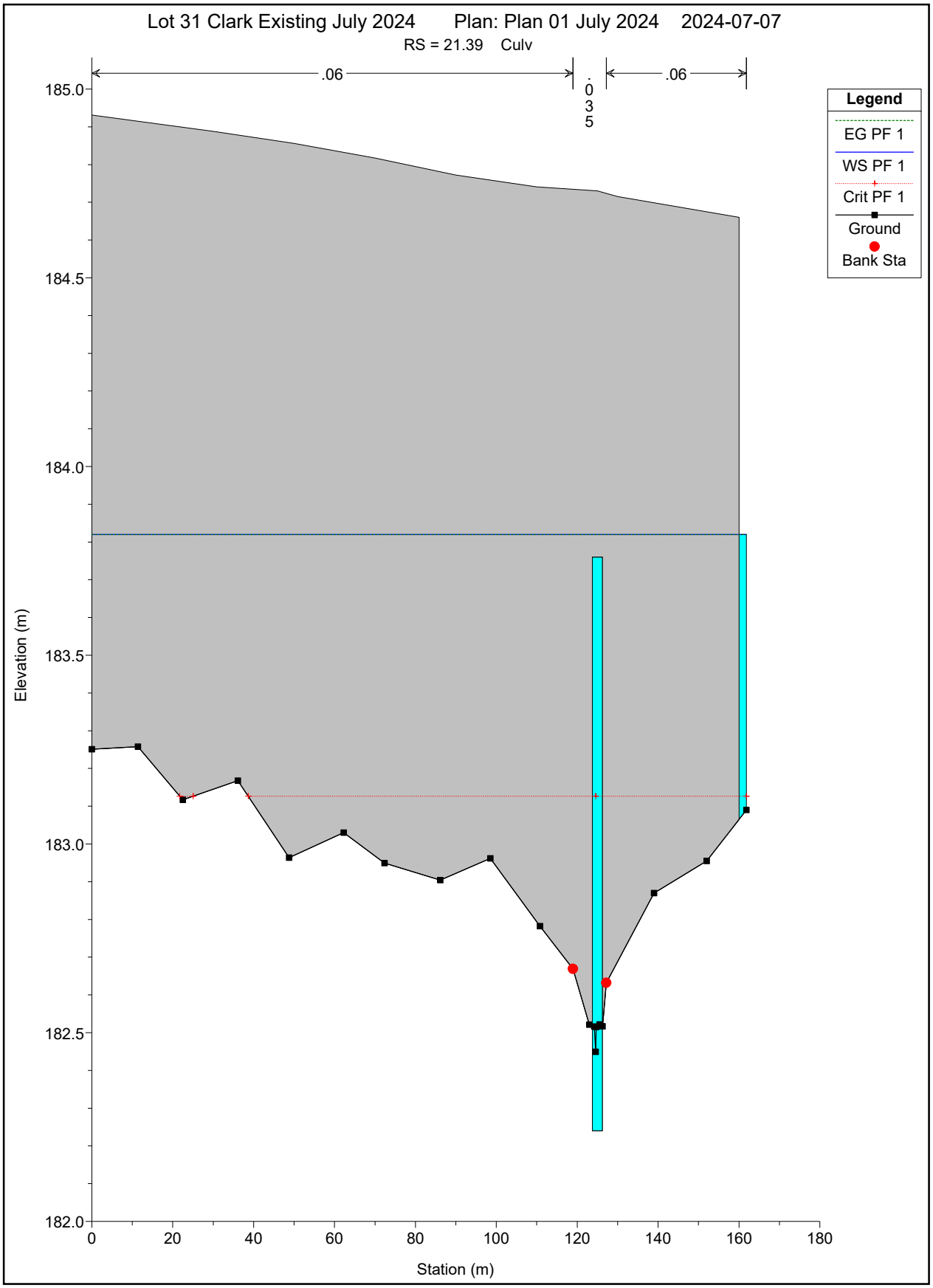

Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 121.84
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
185.5
185.0
184.5
184.0
183.5
183.0
182.5
182.0
0
20
40
60
80
100
120
Station (m)


Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 105.59
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
188
187
186
185
184
183
182
0
20
40
60
80
100
120


Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 88.35
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
188
187
186
185
184
183
0
20
40
60
80
100
120


Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 45.41
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
185.5
185.0
184.5
184.0
183.5
183.0
182.5
0
20
40
60
80
100
120
140
160
Station (m)


Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 33.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
184.0
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
0
20
40
60
80
100
120
140
160
180


Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 21.39 Culv
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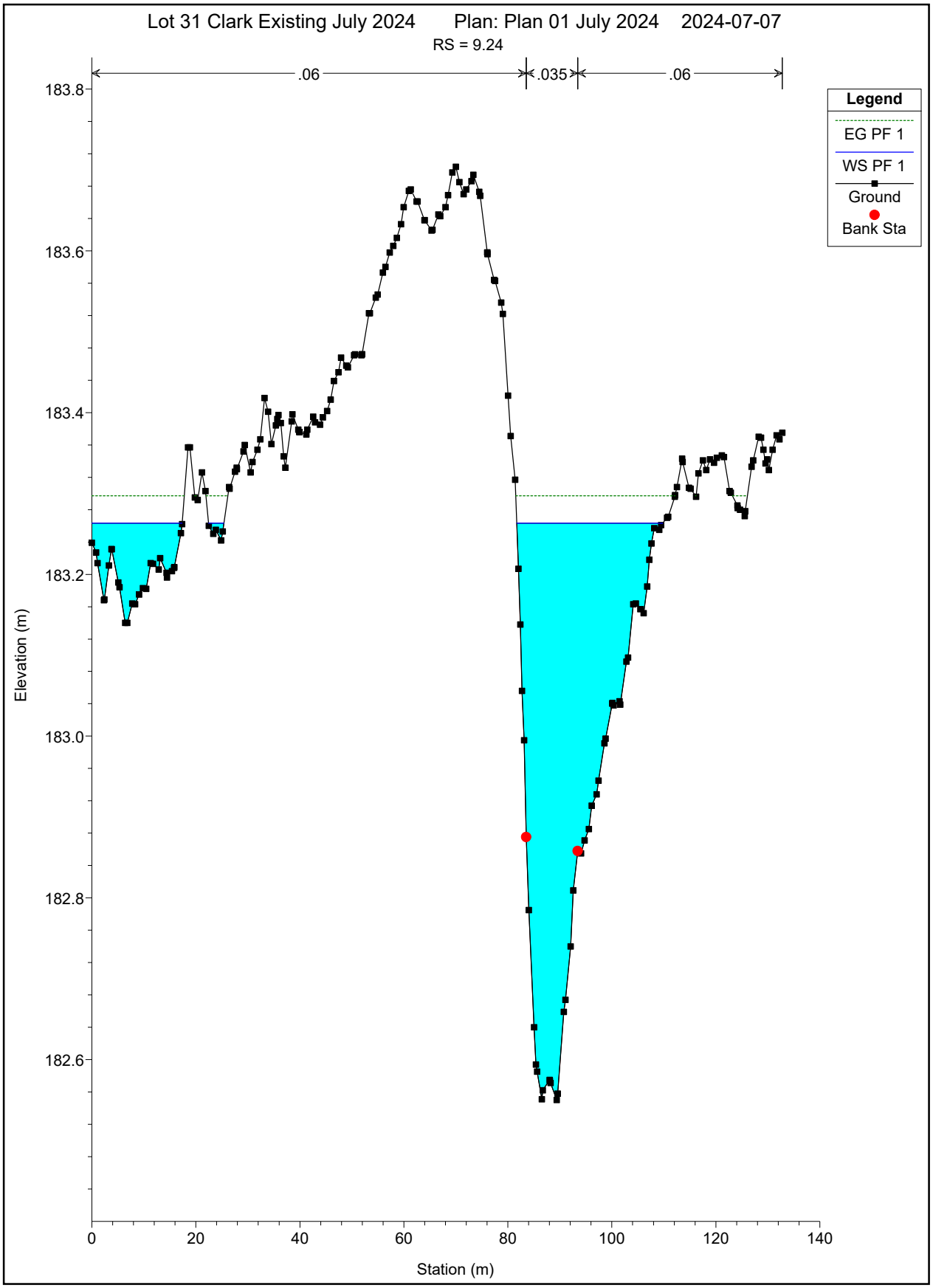
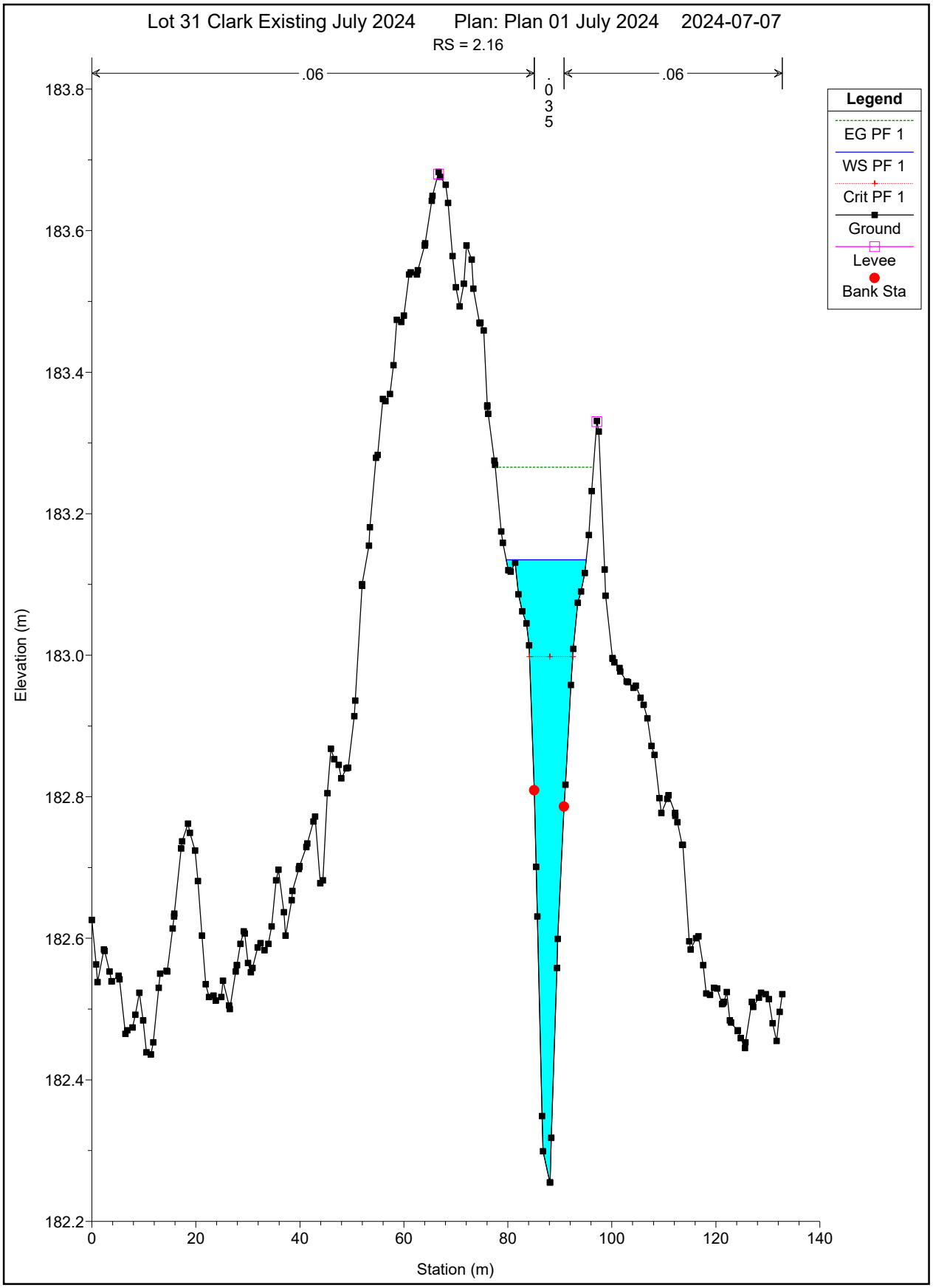
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
185.0
184.5
184.0
183.5
183.0
182.5
182.0
0
20
40
60
80
100
120
140
160
180
Station (m)


Lot 31 Clark Existing July 2024
Plan: Plan 01 July 2024
2024-07-07
RS = 9.24
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
183.8
183.6
183.4
183.2
183.0
182.8
182.6
Elevation (m)
0
20
40
60
80
100
120
140
Station (m)


Lot 31 Clark Existing July 2024 Plan: Plan 01 July 2024 2024-07-07
RS = 2.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
182.2
0
20
40
60
80
100
120
140
Station (m)

Appendix E – Proposed Condition HEC RAS Results

Culvert Capacity Calculations

Box Culvert Capacity - Proposed Access Road

Pipe So	Pipe Rise	Pipe Span	Actual Pipe Capacity	Velocity	Pipe Length	Time of Flow
%	mm	mm	m^3/s	m/s	m	minutes
1.20	450	1800	**5.24**	6.467	12	0.03

Embedded

Box Culvert Capacity - Proposed Spill Bypass Box Culvert

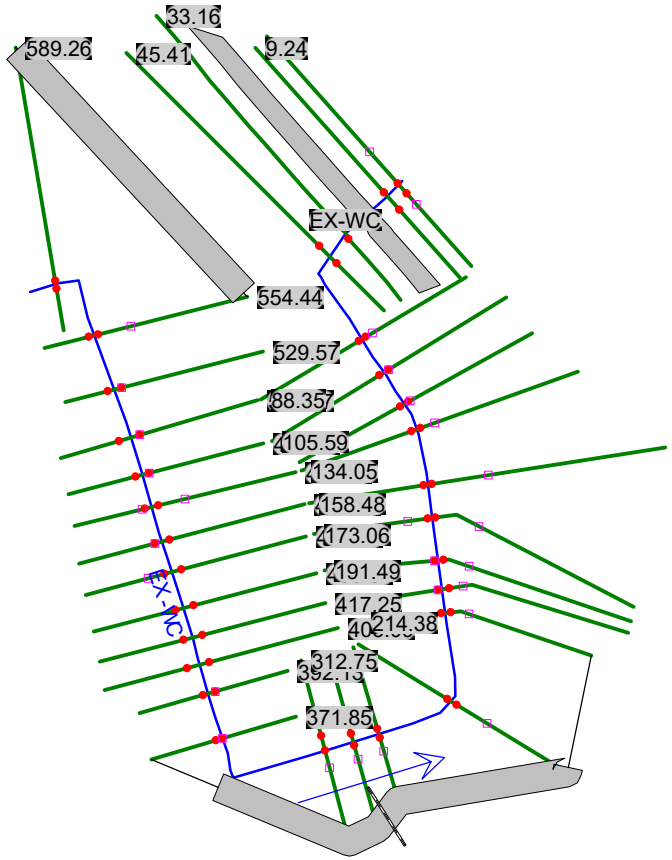
Pipe So	Pipe Rise	Pipe Span	Actual Pipe Capacity	Velocity	Pipe Length	Time of Flow
%	mm	mm	m^3/s	m/s	m	minutes
0.50	900	1800	**6.30**	3.891	41	0.18

Mannings Equation

$$Q = (1.0/n) \times A \times R_h^{(2/3)} \times S_o^{(1/2)}$$

where:

Q = discharge through channel in m^3/s
A = cross sectional area of channel at flow depth
R_h = wetted perimeter = By/(B+2y)
B = Channel Width
y = flow depth
n = roughness coefficient = concrete = 0.015
S_o = Channel Slope


33.16
589.26
45.41
9.24
EX-WC
554.44
529.57
88.357
105.59
134.05
158.48
173.06
191.49
417.25
214.38
312.75
371.85
EX-WC

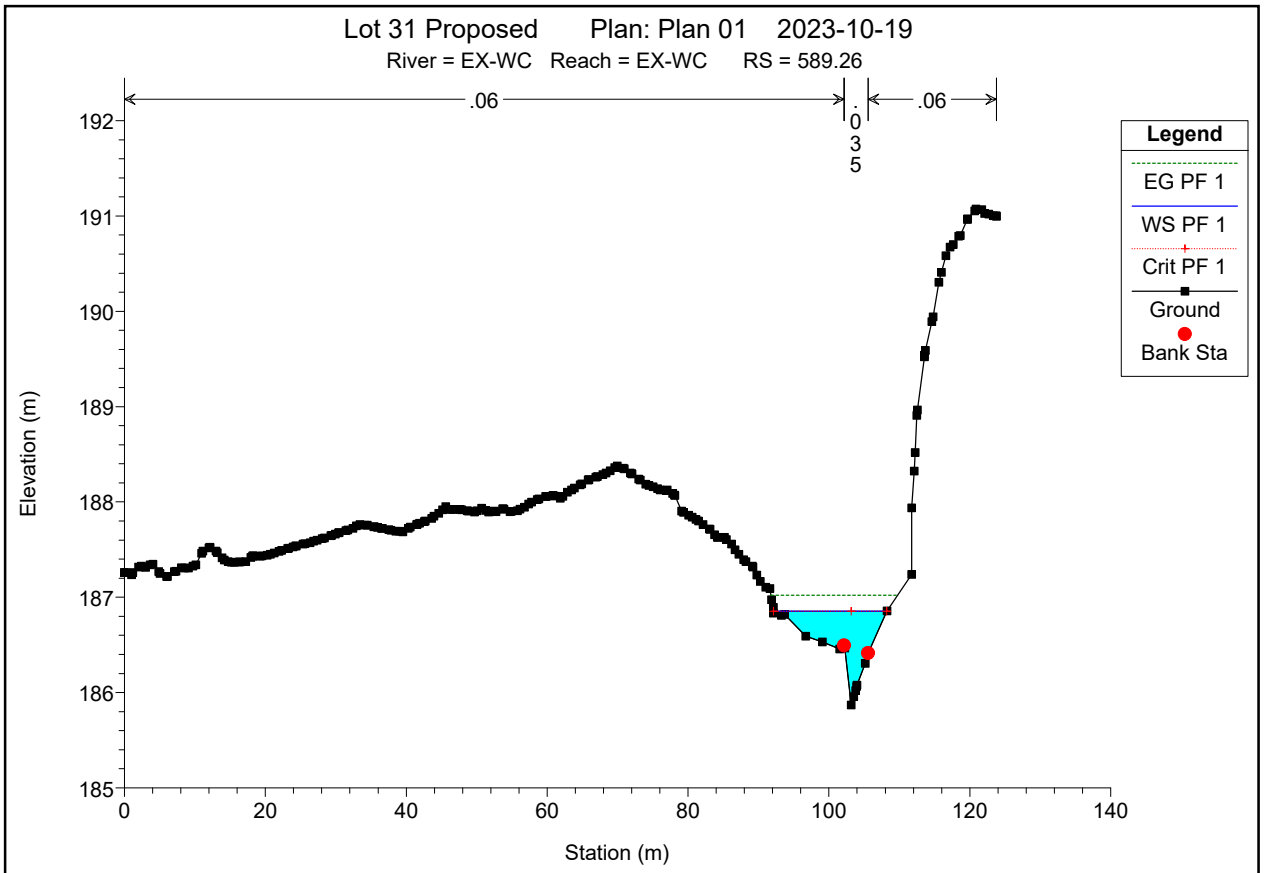
Proposed Condition HEC RAS Results

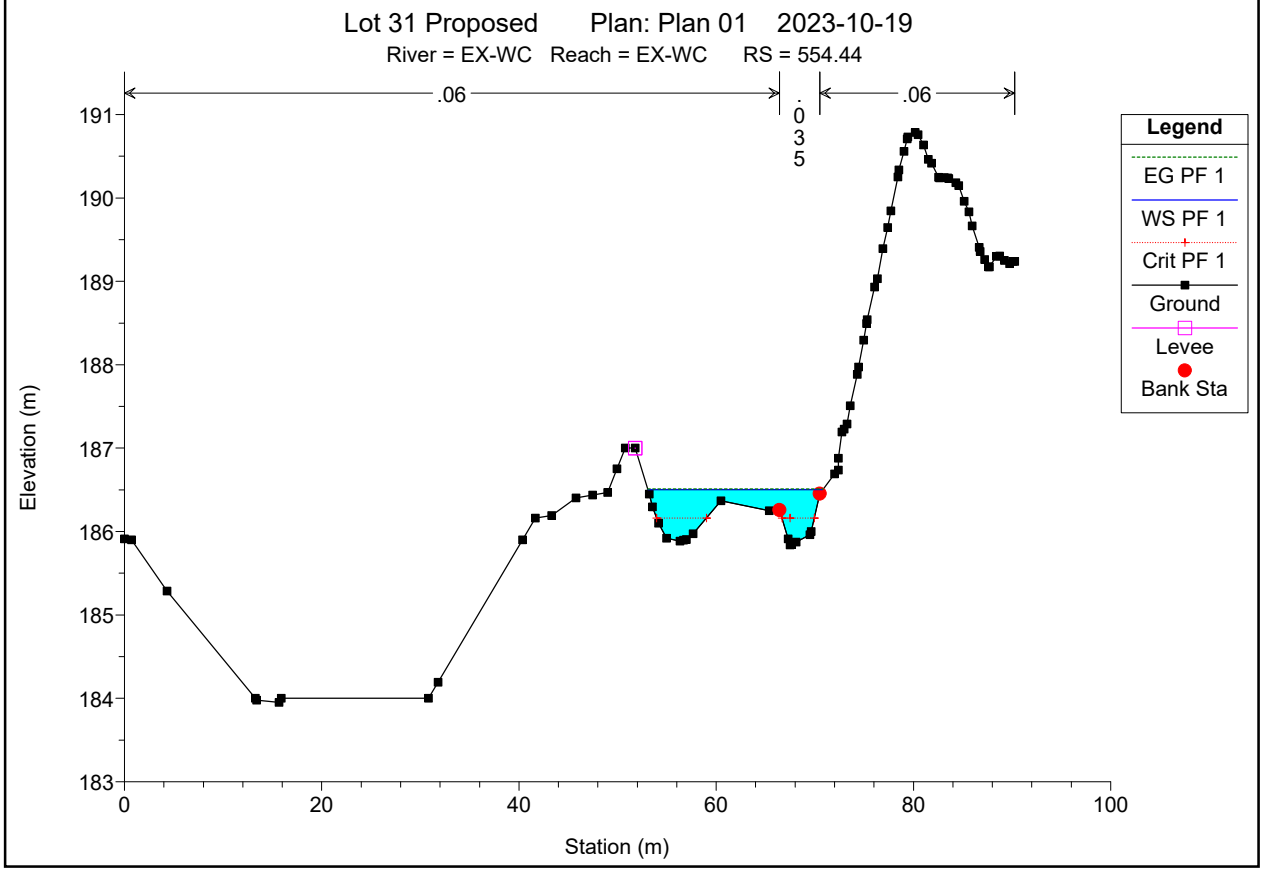
HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 1

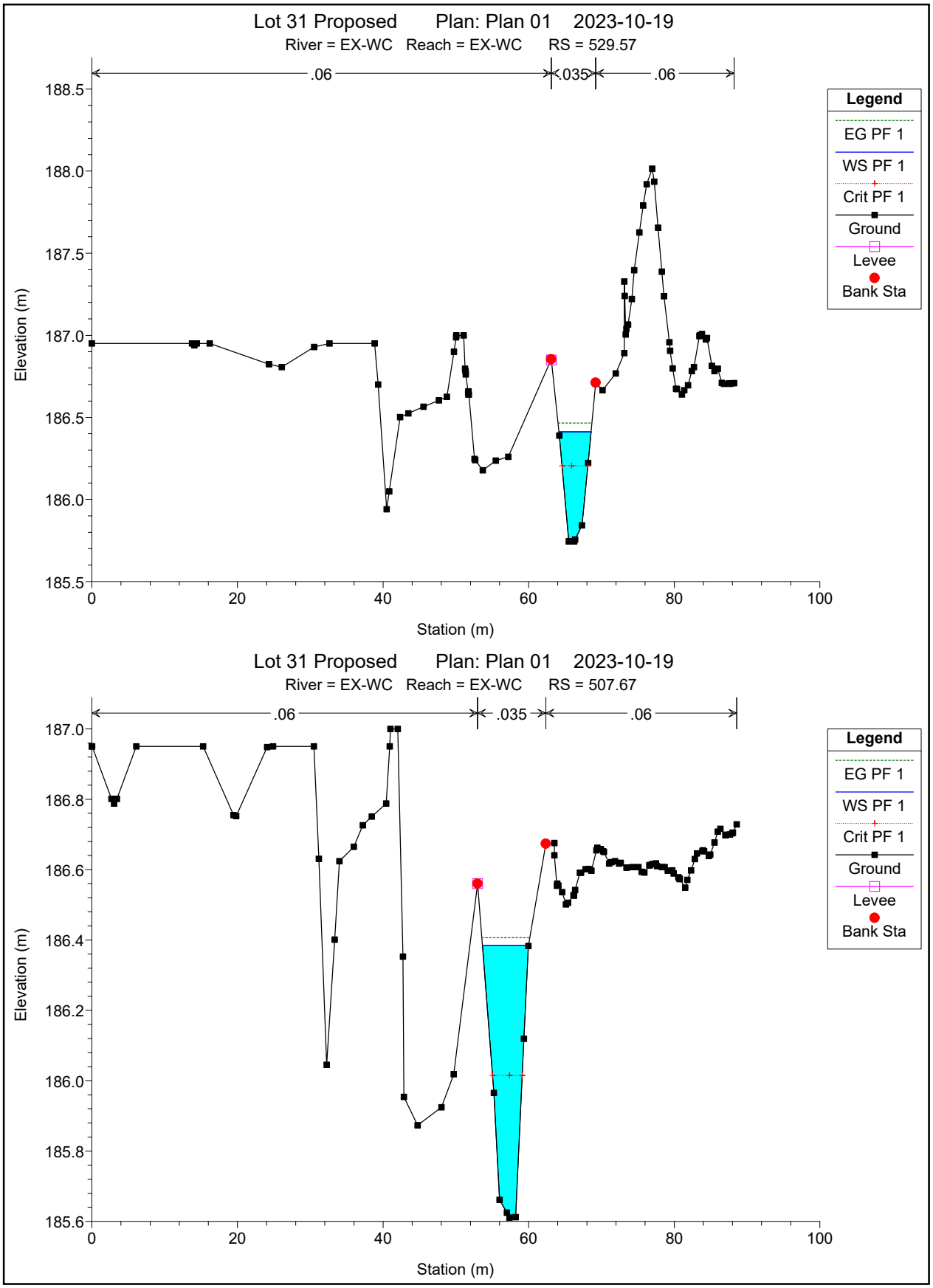
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	589.26	PF 1	6.67	185.87	186.86	186.86	187.02	0.009443	2.07	5.29	16.11	0.79
EX-WC	588		Lat Struct									
EX-WC	554.44	PF 1	2.02	185.84	186.50	186.16	186.51	0.000855	0.50	6.39	17.74	0.23
EX-WC	529.57	PF 1	2.02	185.74	186.41	186.21	186.47	0.004129	1.03	1.97	4.42	0.49
EX-WC	507.67	PF 1	2.02	185.61	186.39	186.01	186.41	0.001396	0.65	3.12	6.32	0.29
EX-WC	490.78	PF 1	2.02	185.52	186.34	186.01	186.37	0.002382	0.86	2.34	4.39	0.38
EX-WC	476.31	PF 1	2.02	185.46	186.31	185.96	186.34	0.001925	0.77	2.61	5.02	0.34
EX-WC	460.72	PF 1	2.02	185.34	186.29	185.90	186.31	0.001620	0.73	2.78	5.17	0.32
EX-WC	446.93	PF 1	2.02	185.13	186.29	185.69	186.30	0.000284	0.35	7.77	19.12	0.14
EX-WC	430.64	PF 1	2.02	185.23	186.29		186.29	0.000316	0.37	6.62	13.32	0.15
EX-WC	417.25	PF 1	2.02	185.15	186.28		186.29	0.000406	0.42	4.87	8.60	0.17
EX-WC	405.09	PF 1	2.02	184.98	186.28		186.28	0.000383	0.39	5.12	8.37	0.16
EX-WC	392.13	PF 1	2.02	185.00	186.28	185.55	186.28	0.000182	0.31	9.75	23.79	0.11
EX-WC	371.85	PF 1	2.02	185.87	186.25	186.13	186.27	0.006023	0.89	3.48	13.22	0.55
EX-WC	351.85		Lat Struct									
EX-WC	312.75	PF 1	2.01	185.35	185.59	185.59	185.67	0.020460	1.34	1.93	13.37	0.99
EX-WC	299.98	PF 1	1.75	184.74	185.22	185.10	185.28	0.006588	1.07	1.63	5.02	0.60
EX-WC	288.48	PF 1	1.75	184.65	185.11	185.04	185.19	0.008293	1.27	1.51	5.92	0.68
EX-WC	253.53	PF 1	1.75	184.41	184.91	184.81	184.95	0.005338	1.01	2.16	8.60	0.55
EX-WC	214.38	PF 1	1.75	184.19	184.86	184.56	184.87	0.000898	0.55	5.19	17.23	0.24
EX-WC	204.1	PF 1	1.75	184.12	184.85	184.51	184.86	0.000896	0.56	4.16	13.14	0.24
EX-WC	191.49	PF 1	1.75	184.19	184.84	184.57	184.85	0.001052	0.60	4.37	13.81	0.26
EX-WC	173.06	PF 1	1.75	183.94	184.82	184.41	184.84	0.000606	0.54	5.69	27.04	0.20
EX-WC	158.48	PF 1	1.75	183.94	184.81	184.47	184.83	0.000756	0.56	5.63	25.65	0.23
EX-WC	134.05	PF 1	1.75	184.10	184.61	184.61	184.76	0.018552	1.72	1.02	4.53	0.98
EX-WC	121.84	PF 1	1.75	183.89	184.38	184.32	184.49	0.012462	1.49	1.17	3.34	0.81
EX-WC	105.59	PF 1	1.75	183.61	184.30	184.11	184.36	0.004608	1.06	1.65	3.73	0.51
EX-WC	88.35	PF 1	1.75	183.47	184.02	184.02	184.20	0.019945	1.89	0.93	2.55	1.00
EX-WC	45.41	PF 1	1.49	182.73	183.08	183.08	183.19	0.020492	1.52	0.98	4.27	1.01
EX-WC	33.16	PF 1	1.49	182.45	182.89	182.71	182.90	0.000873	0.40	6.15	38.73	0.22
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	1.49	182.55	182.81		182.86	0.010115	0.93	1.60	8.72	0.69
EX-WC	2.16	PF 1	1.49	182.25	182.75	182.63	182.80	0.006002	0.96	1.55	5.32	0.57

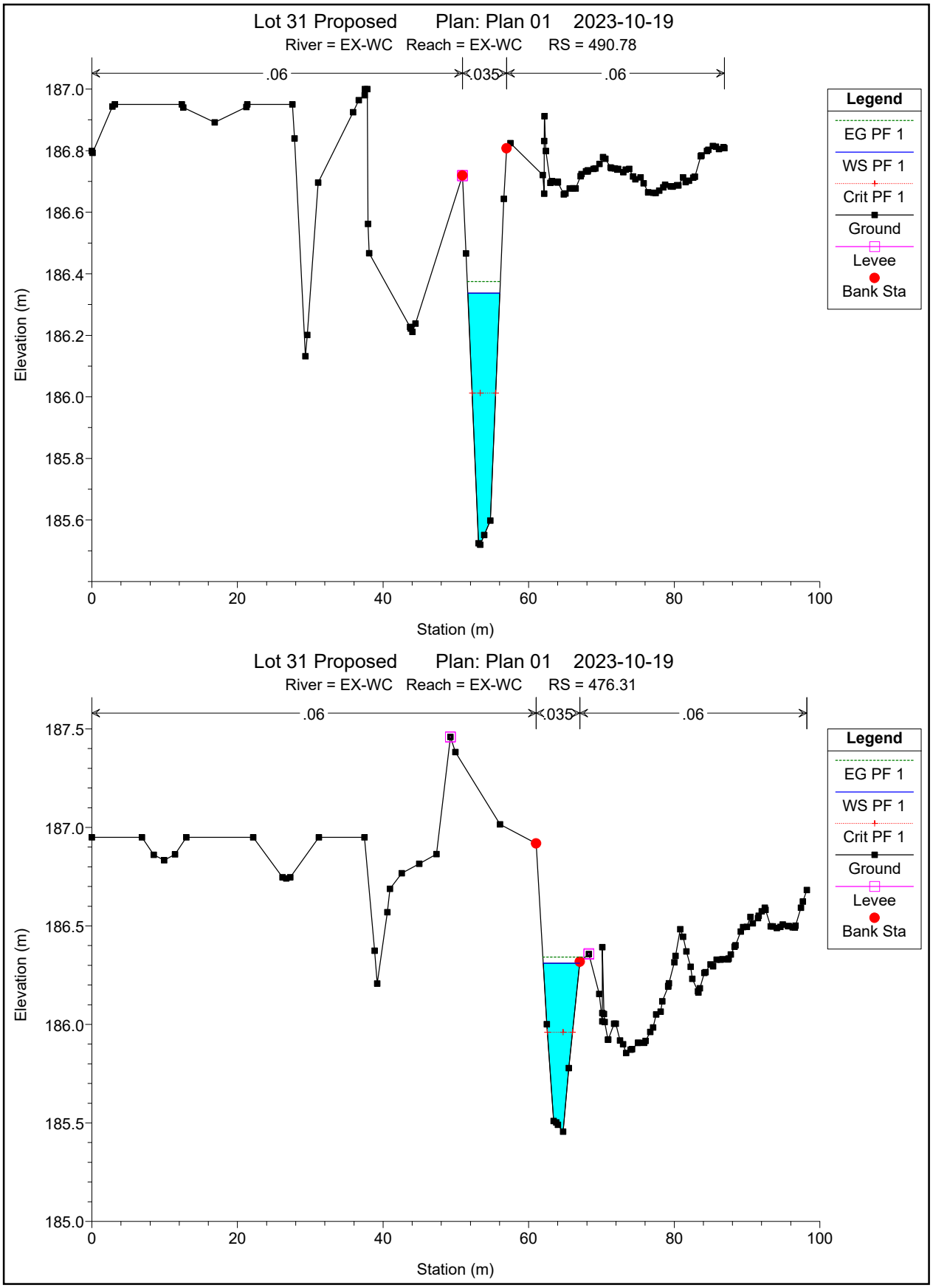
HEC-RAS Plan: Plan 01 River: EX-WC Reach: EX-WC Profile: PF 1

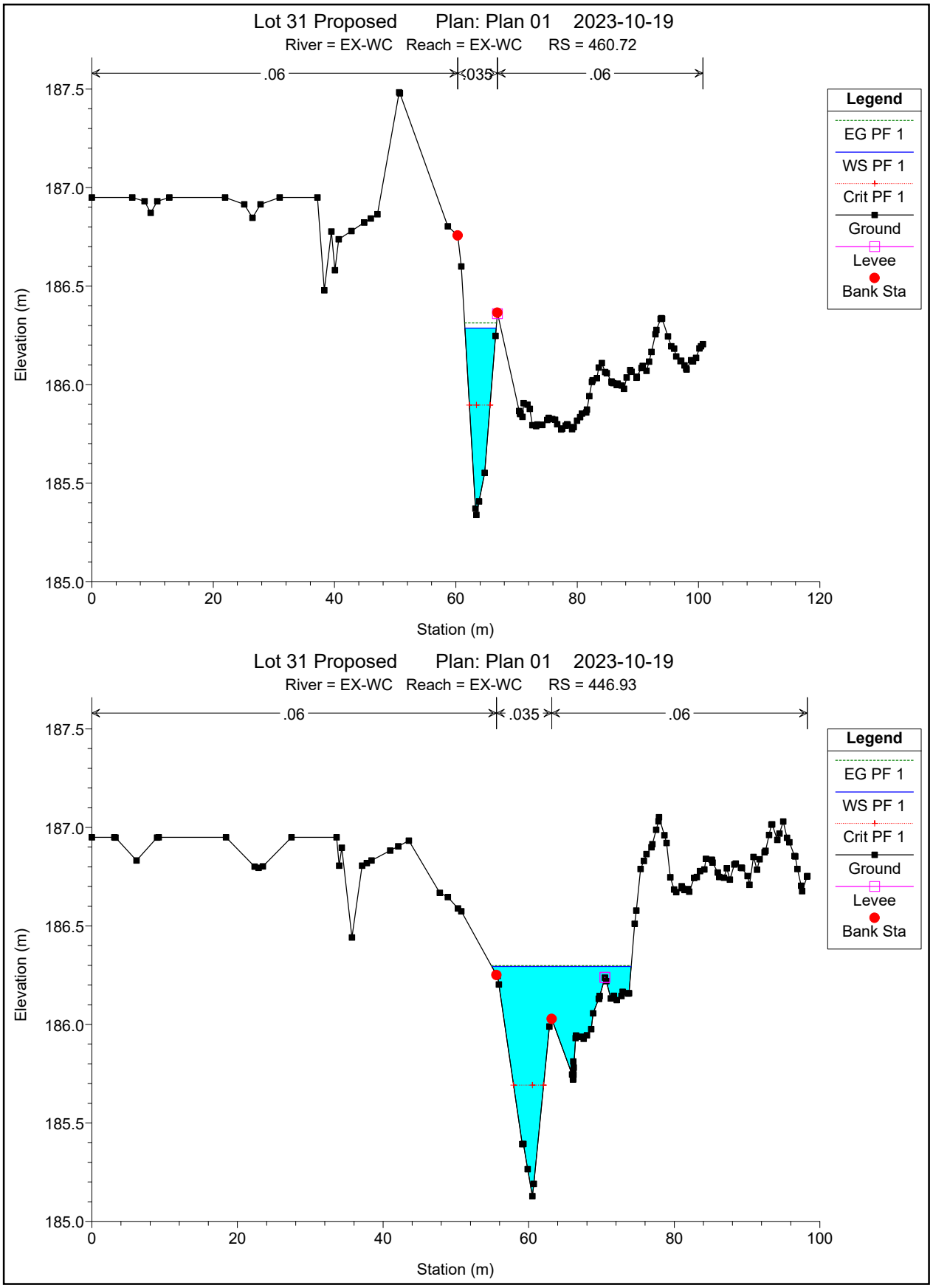
Reach	River Sta	Profile	Q US	Q Leaving Total	Q DS	Q Weir	Q Gates	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
			(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
EX-WC	588	PF 1	6.66	4.64	2.02	4.64		34.00	0.35	0.24	186.37	187.02	186.85	186.52	186.51
EX-WC	351.85	PF 1	2.02	0.28	1.75	0.01		5.54	0.02	0.01	185.54	186.06	186.02	184.95	184.91

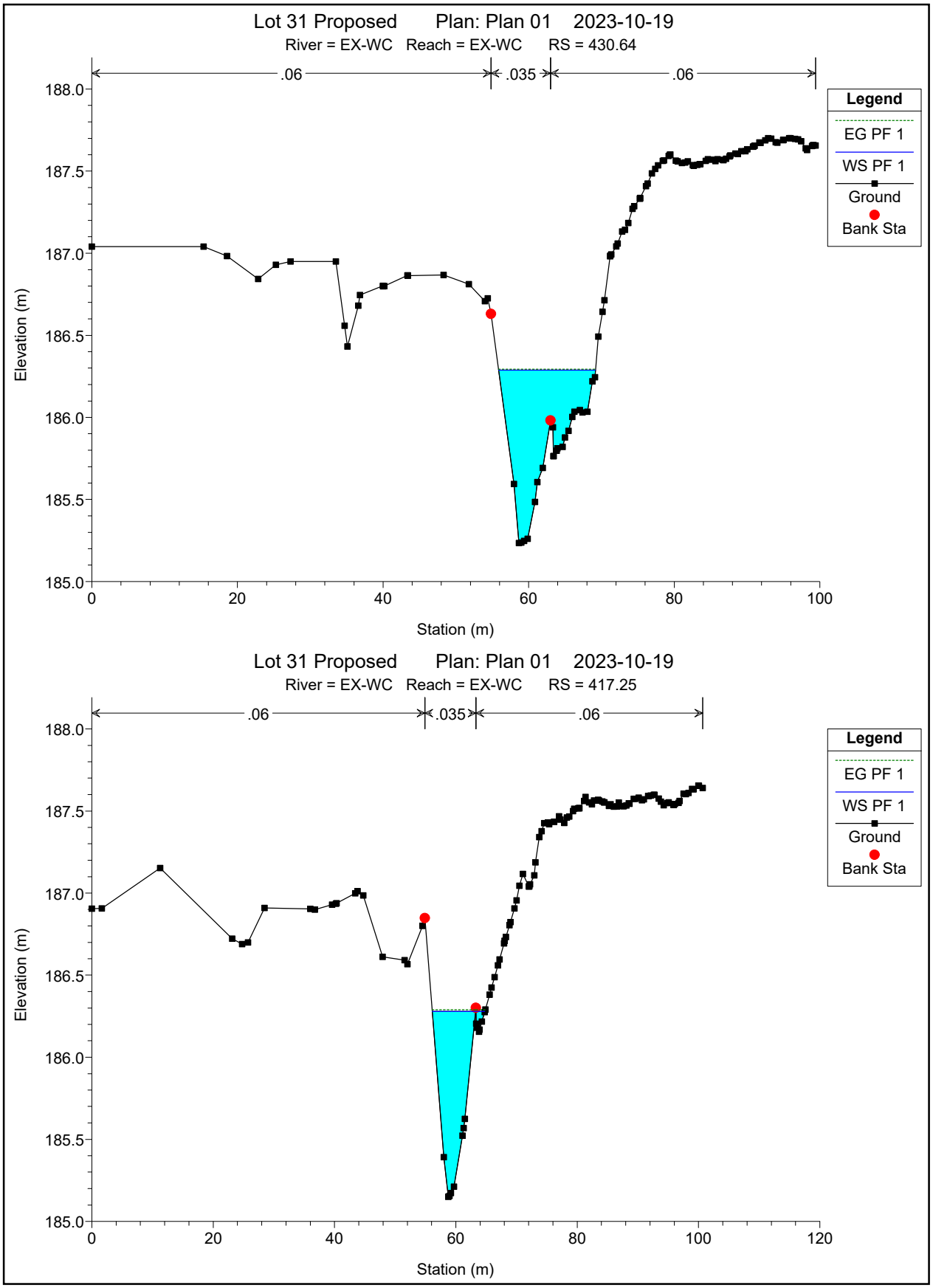

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 589.26
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
192
191
190
189
188
187
186
185
0
20
40
60
80
100
120
140

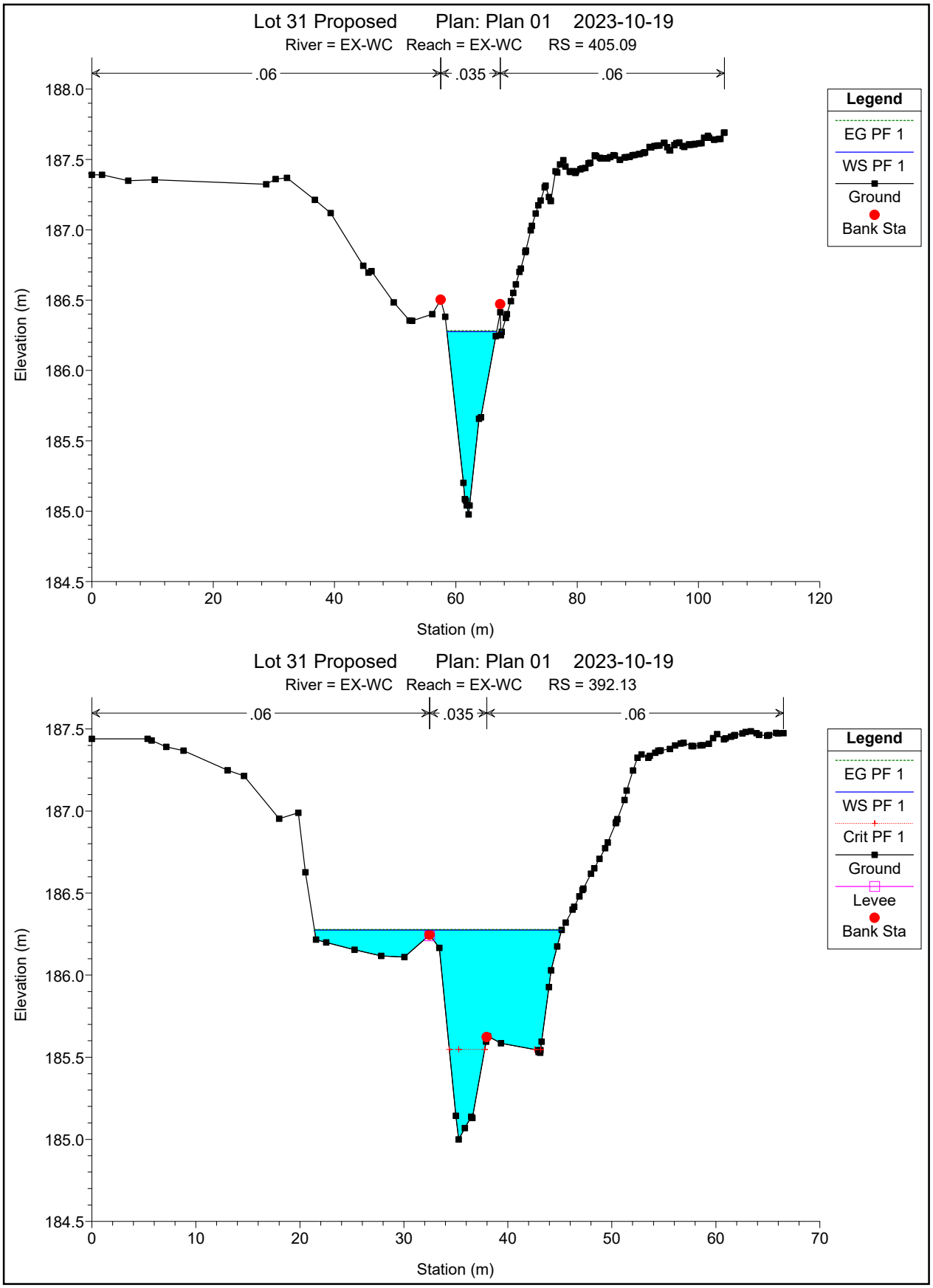

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 554.44
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
191
190
189
188
187
186
185
184
183
0
20
40
60
80
100

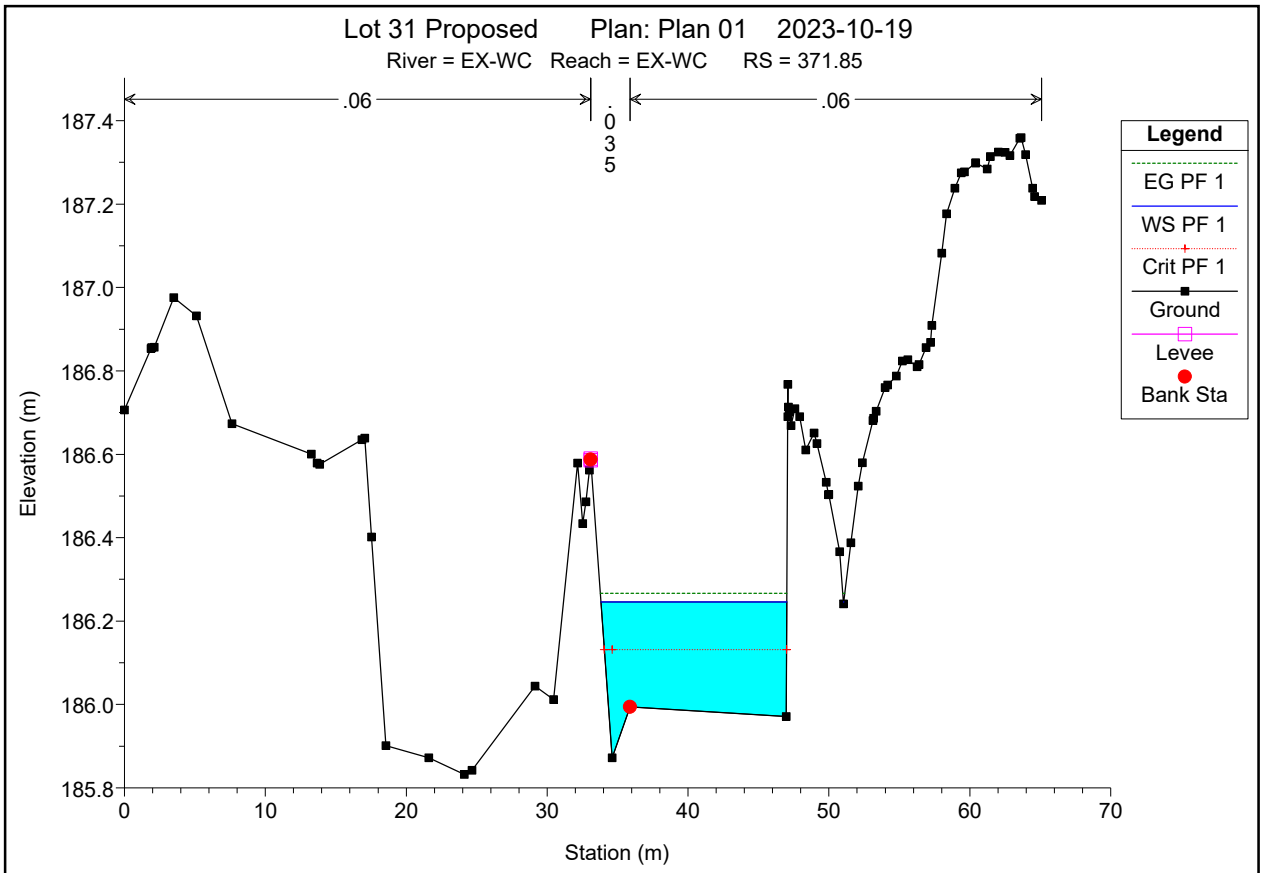

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 529.57
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 507.67
.06
.035
.06
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

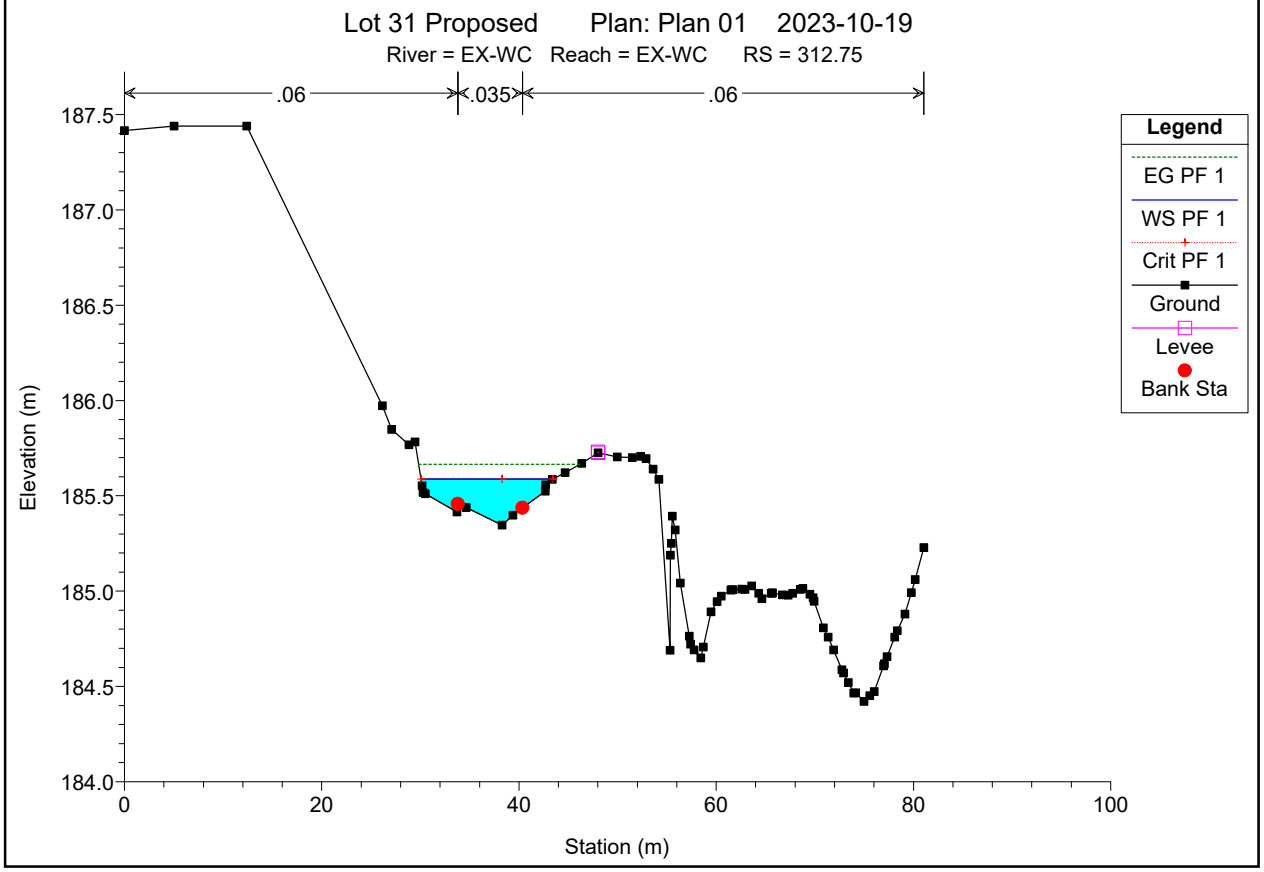

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 490.78
.06
.035
.06
187.0
186.8
186.6
186.4
186.2
186.0
185.8
185.6
Elevation (m)
0
20
40
60
80
100
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 476.31
.06
.035
.06
187.5
187.0
186.5
186.0
185.5
185.0
Elevation (m)
0
20
40
60
80
100
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

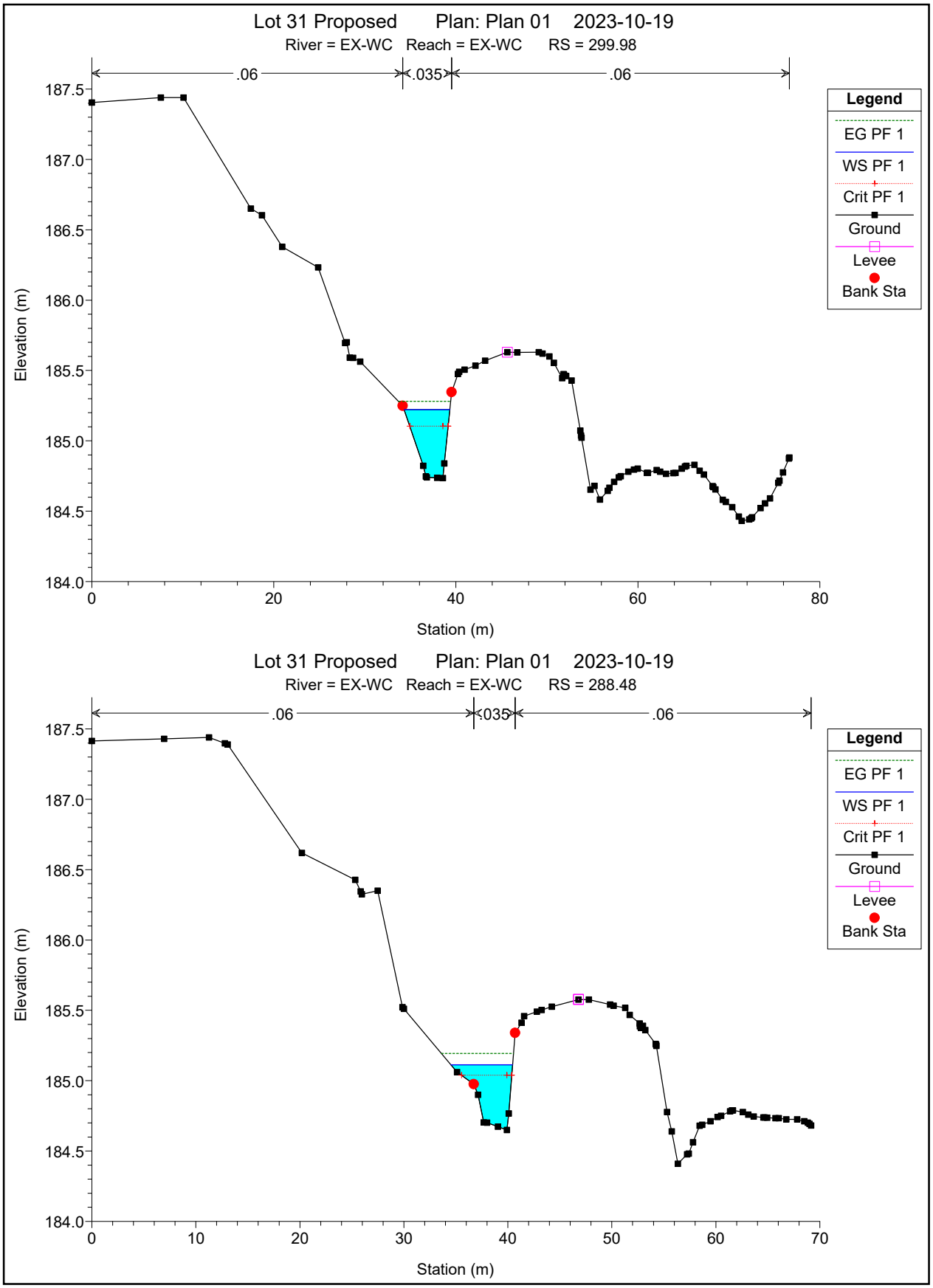

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 460.72
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 446.93
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

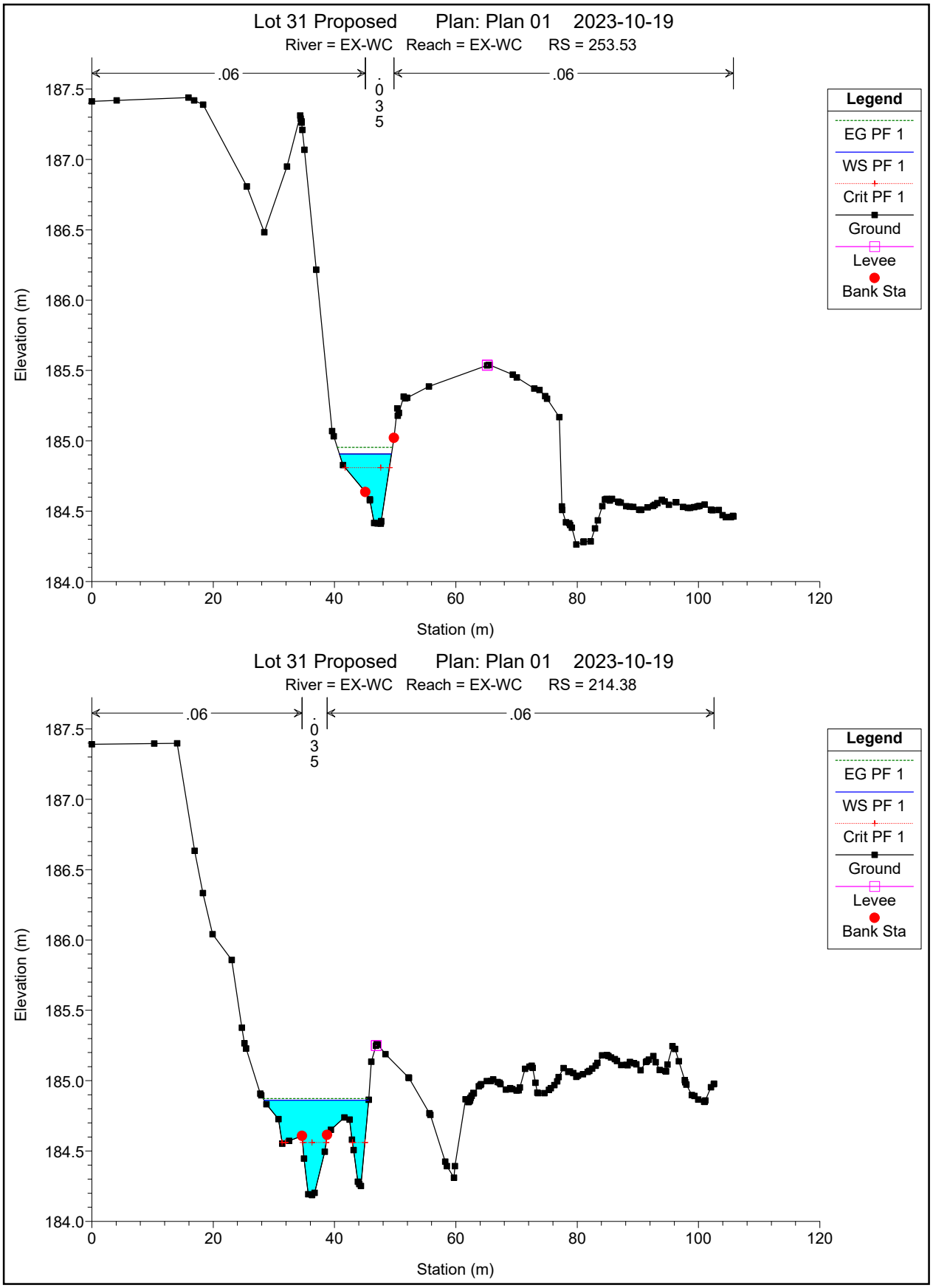

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 430.64
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 417.25
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

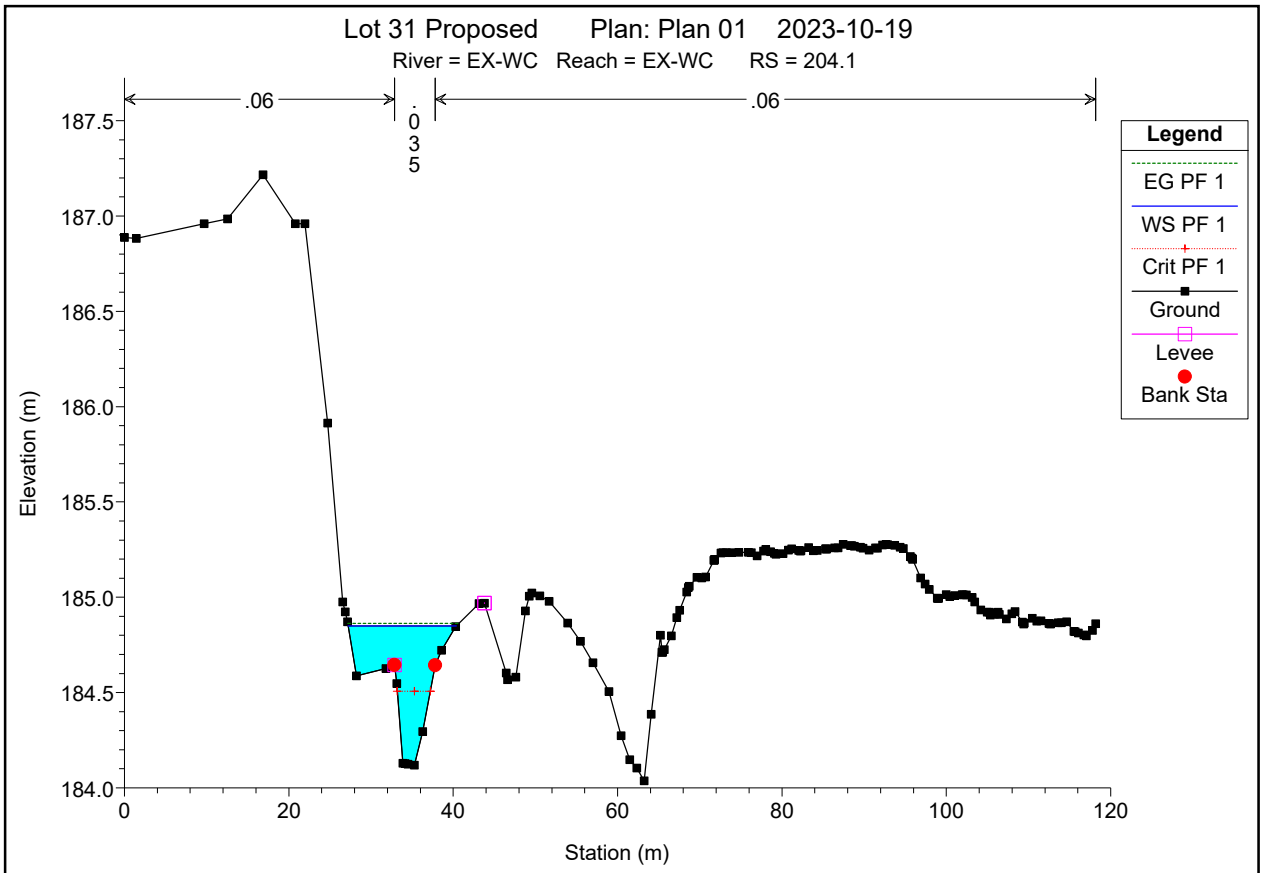

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 405.09
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 392.13
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

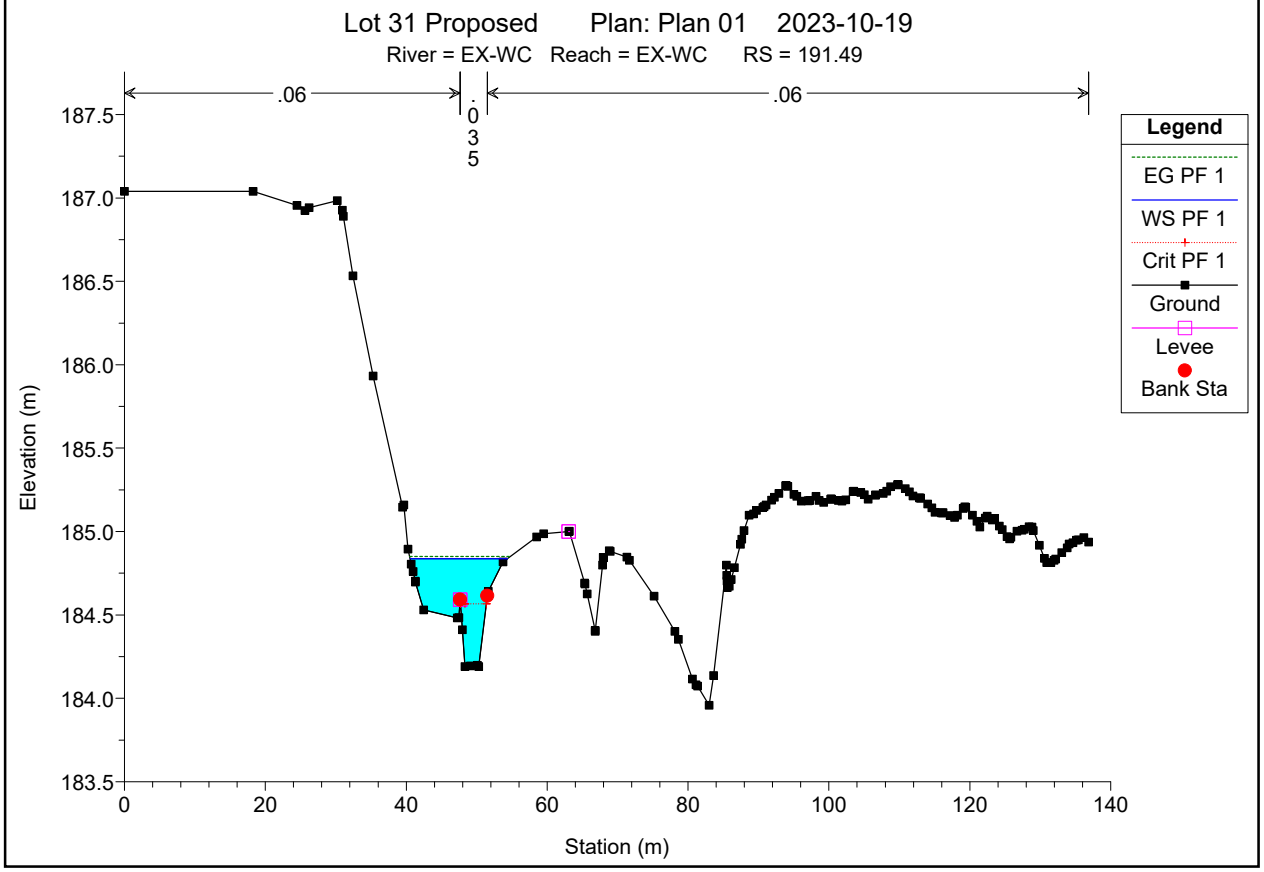

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 371.85
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

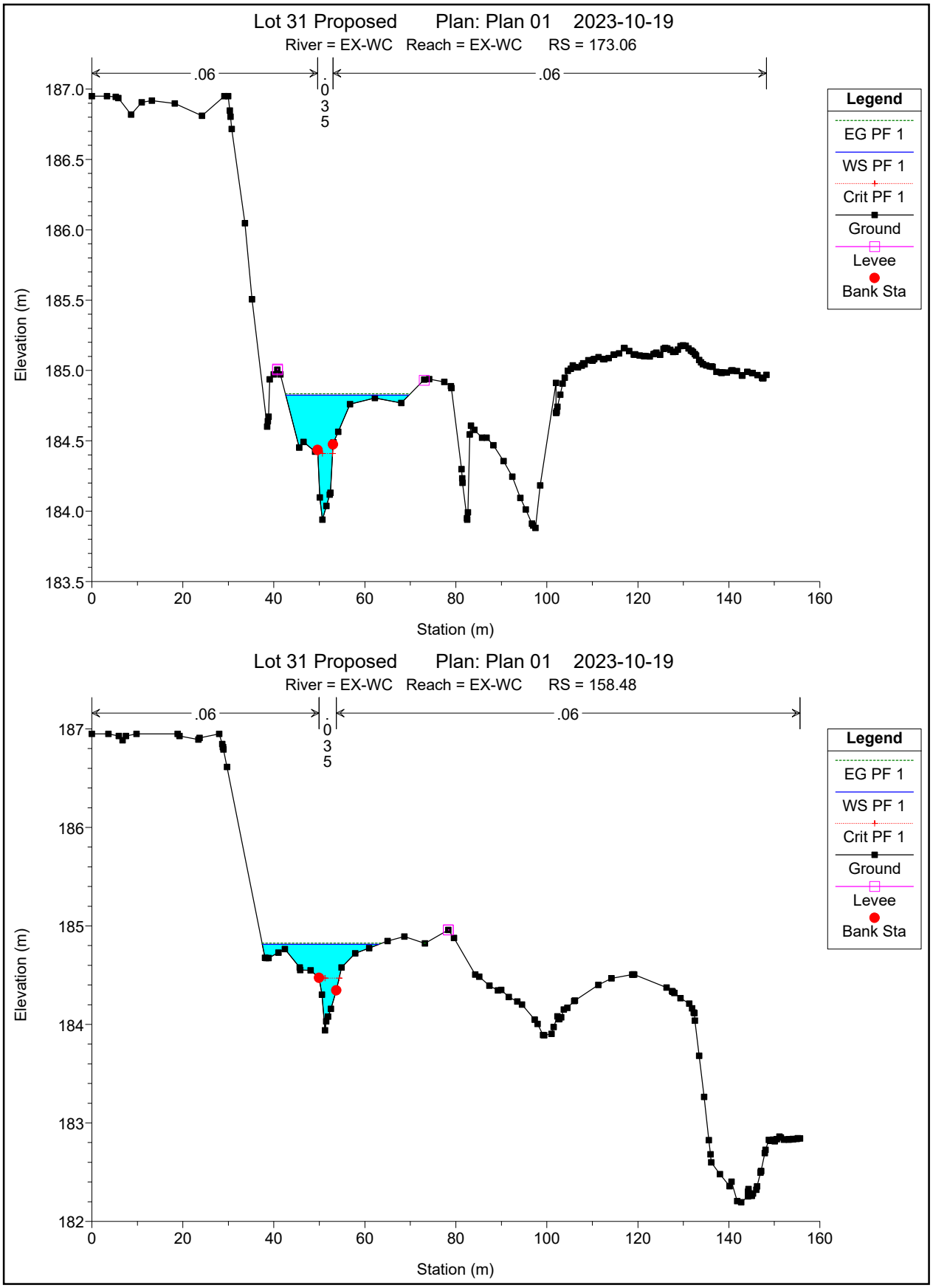

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 312.75
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

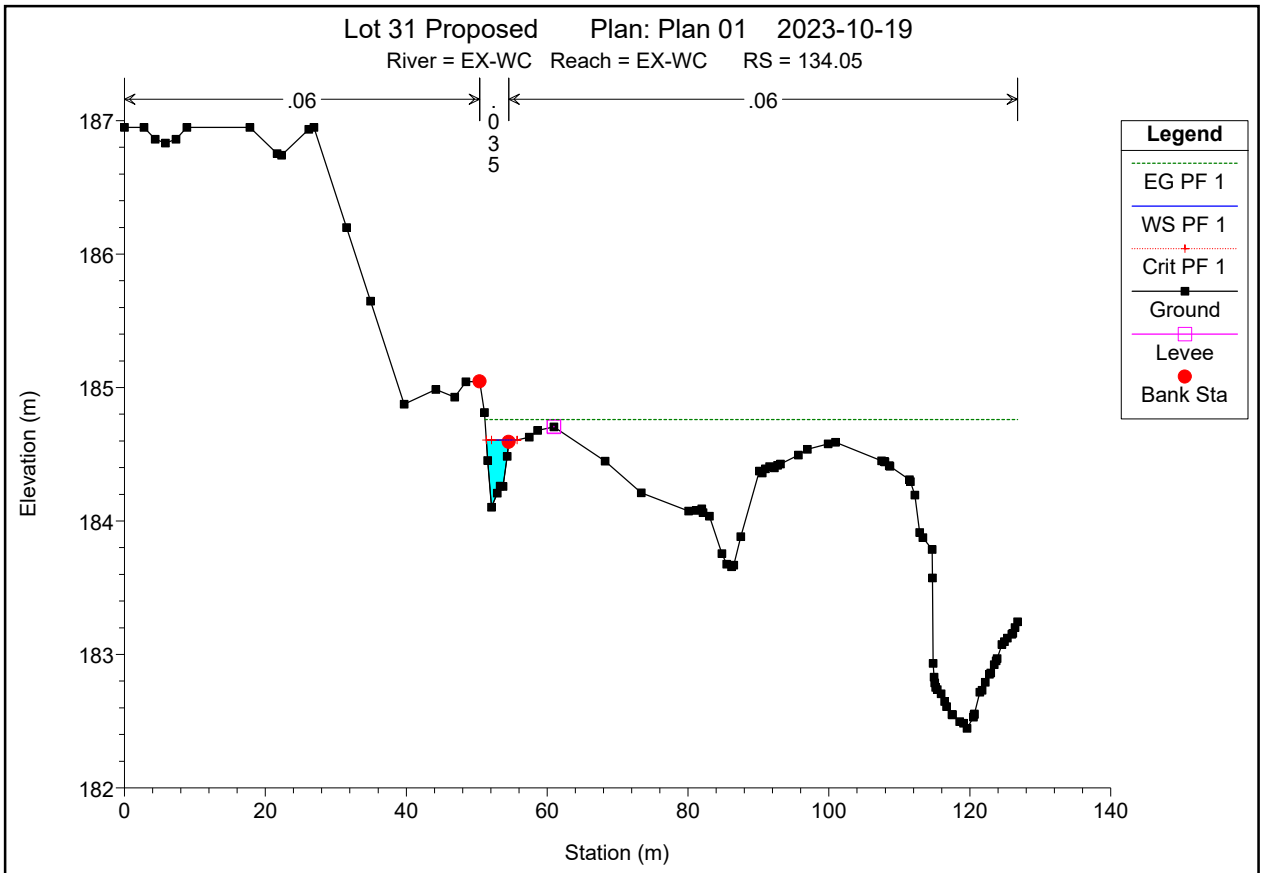

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 299.98
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187.5
187.0
186.5
186.0
185.5
185.0
184.5
184.0
0
20
40
60
80
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 288.48
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187.5
187.0
186.5
186.0
185.5
185.0
184.5
184.0
0
10
20
30
40
50
60
70
Station (m)

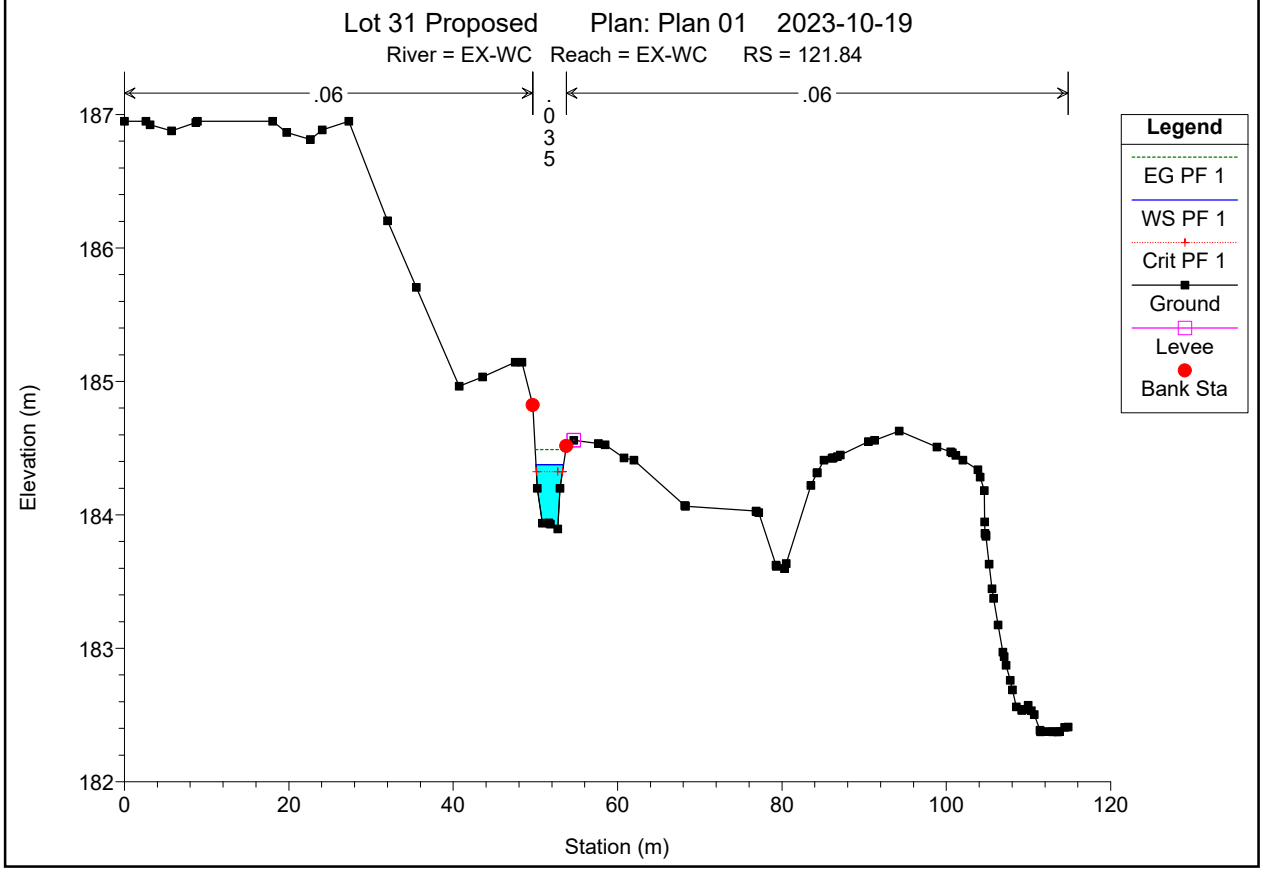

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 253.53
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
187.5
187.0
186.5
186.0
185.5
185.0
184.5
184.0
0
20
40
60
80
100
120
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 214.38
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

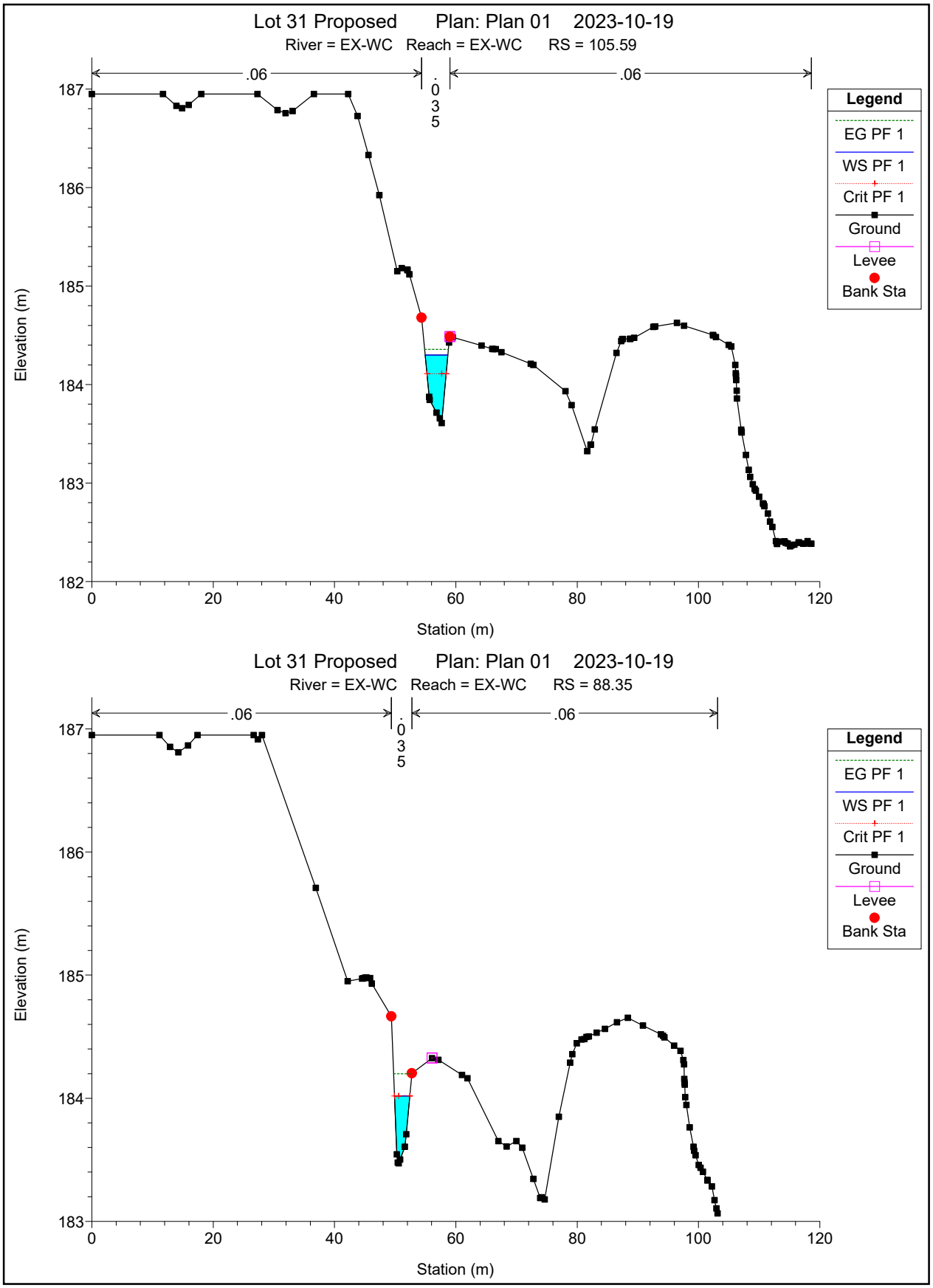

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 204.1
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

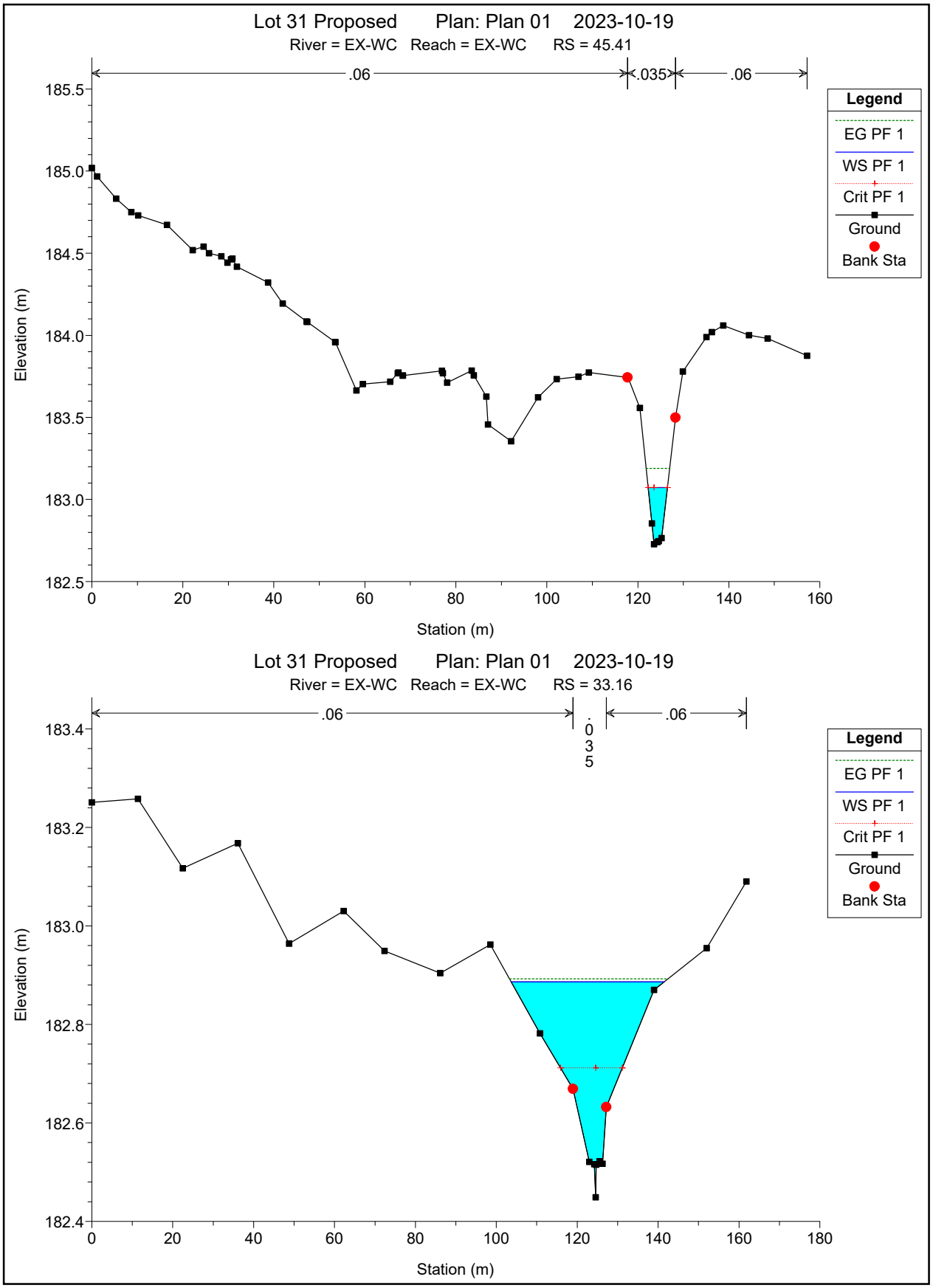

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 191.49
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

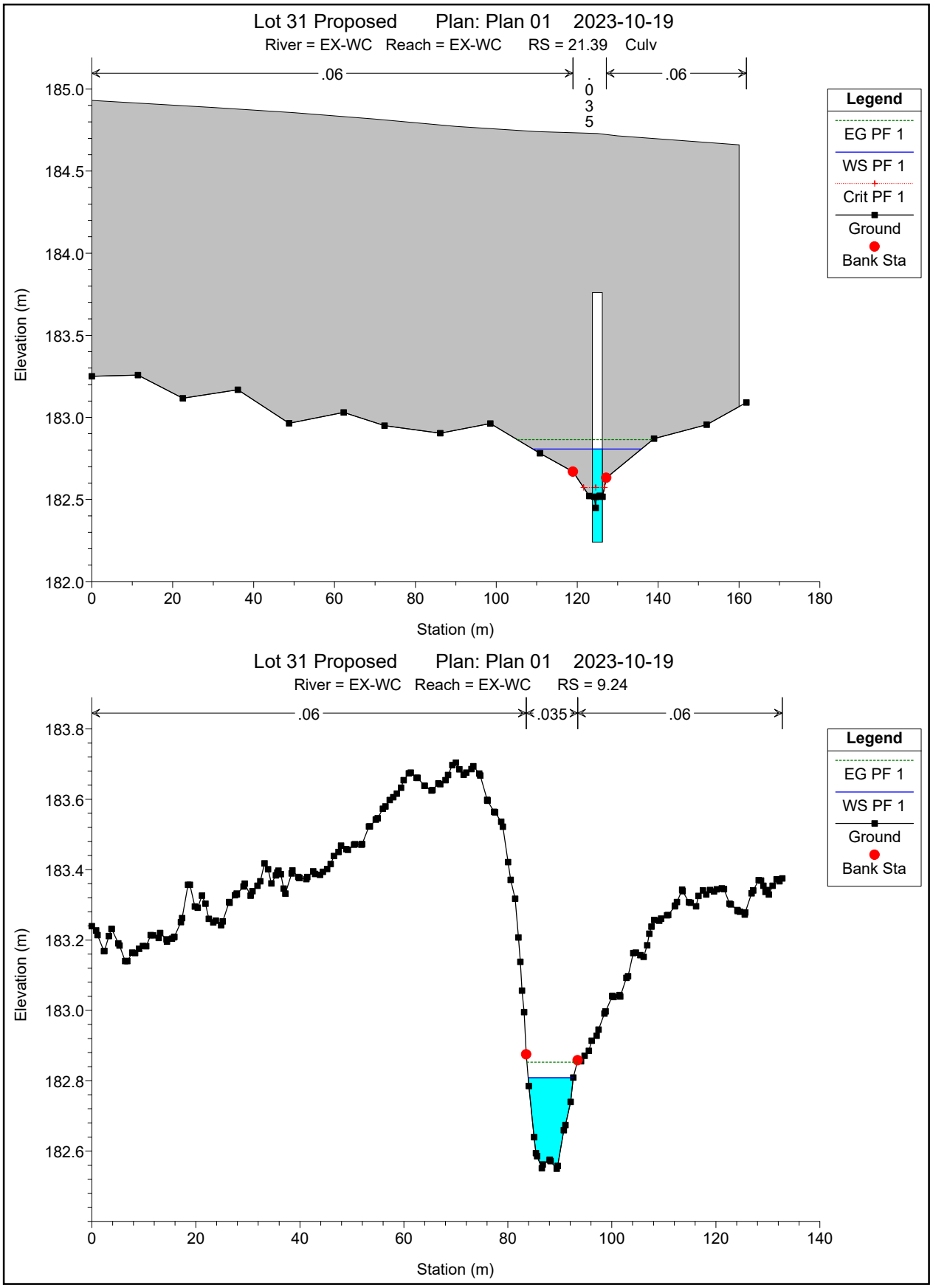

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 173.06
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 158.48
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

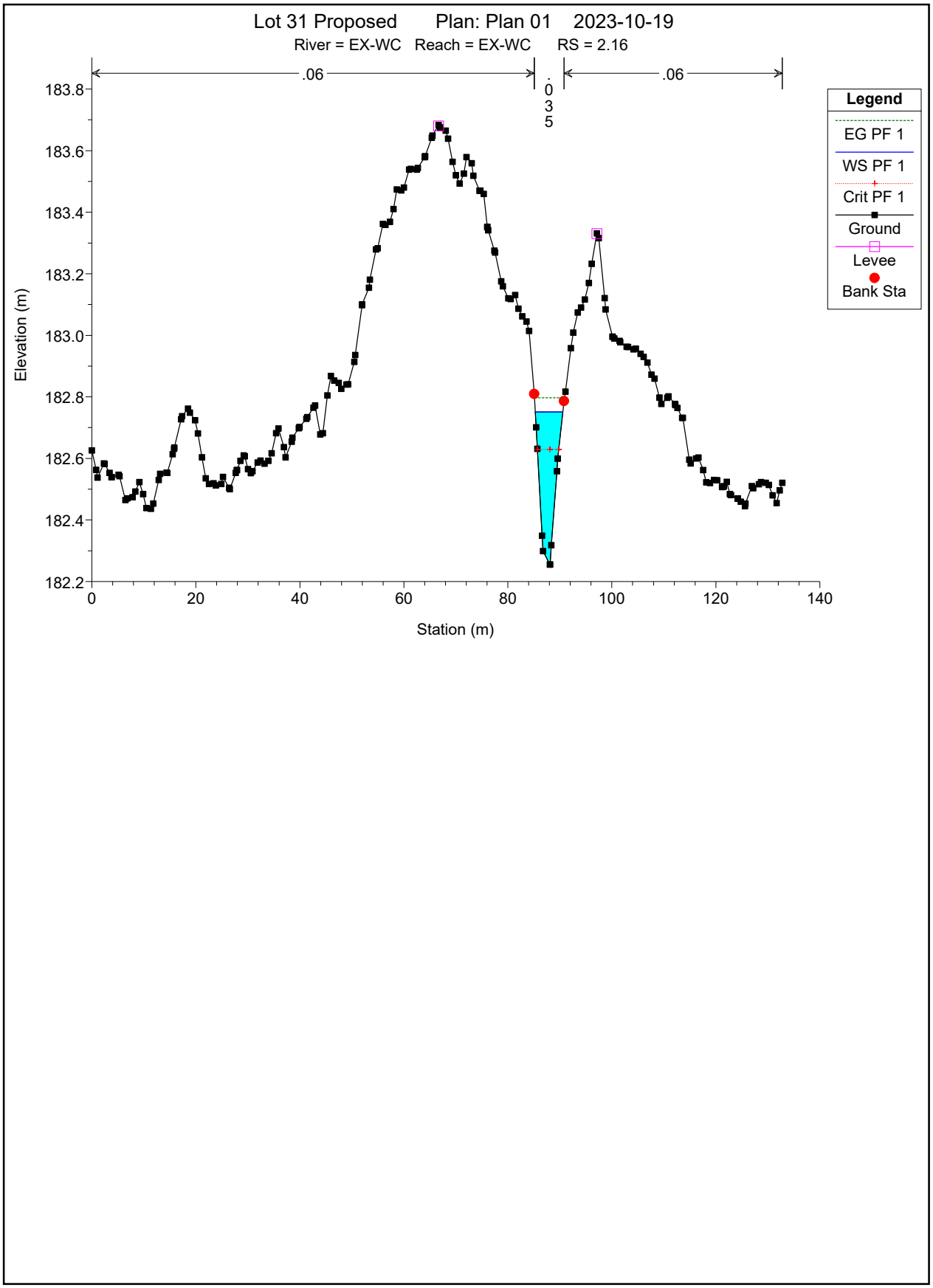

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 134.05
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
187
186
185
184
183
182
0
20
40
60
80
100
120
140


Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 121.84
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
187
186
185
184
183
182
0
20
40
60
80
100
120

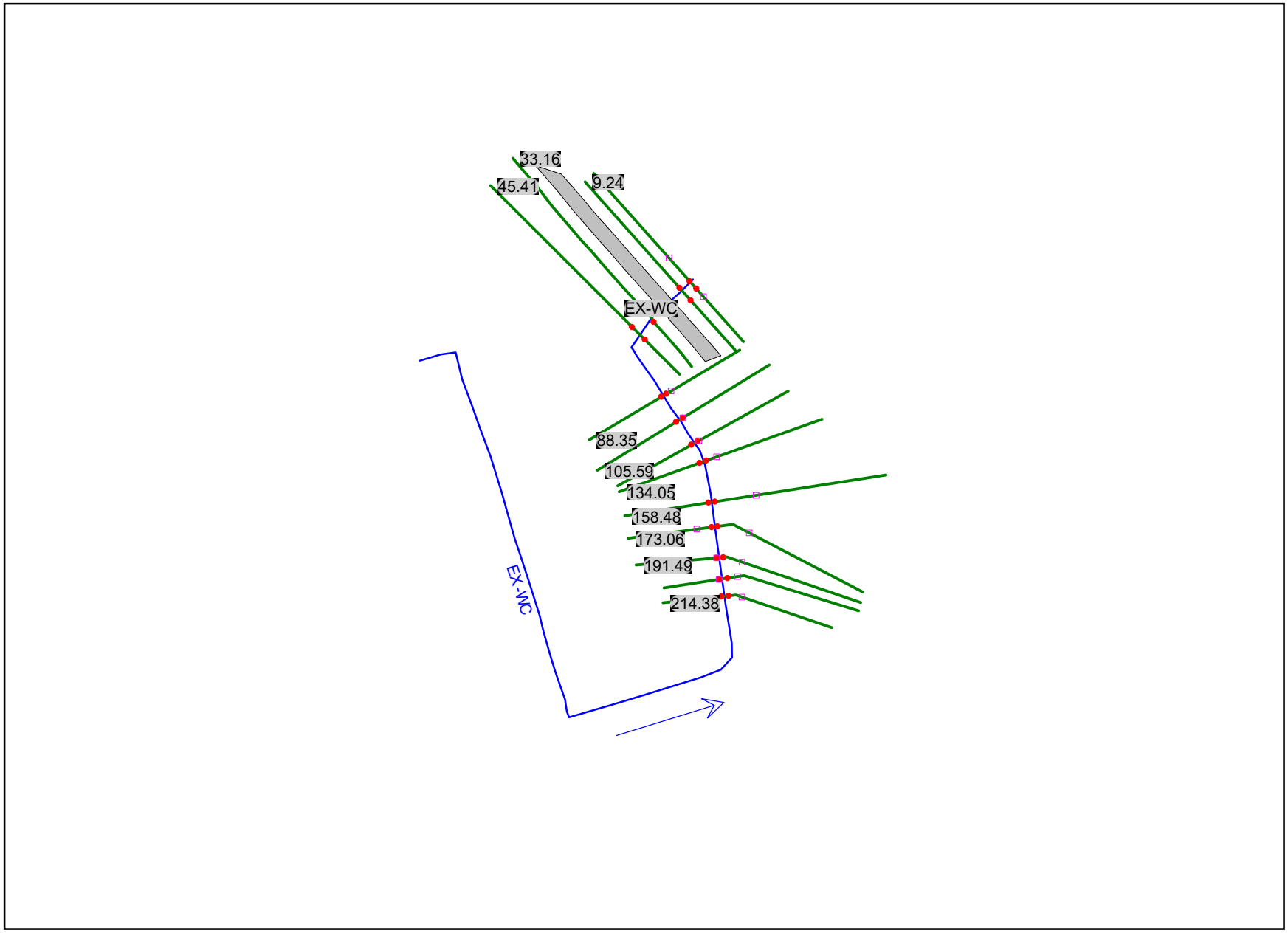

Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 105.59
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 88.35
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 45.41
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 33.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 21.39 Culv
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 9.24
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Lot 31 Proposed Plan: Plan 01 2023-10-19
River = EX-WC Reach = EX-WC RS = 2.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
182.2
0
20
40
60
80
100
120
140
Station (m)

Modified Proposed Condition Model with Lateral Weirs Removed

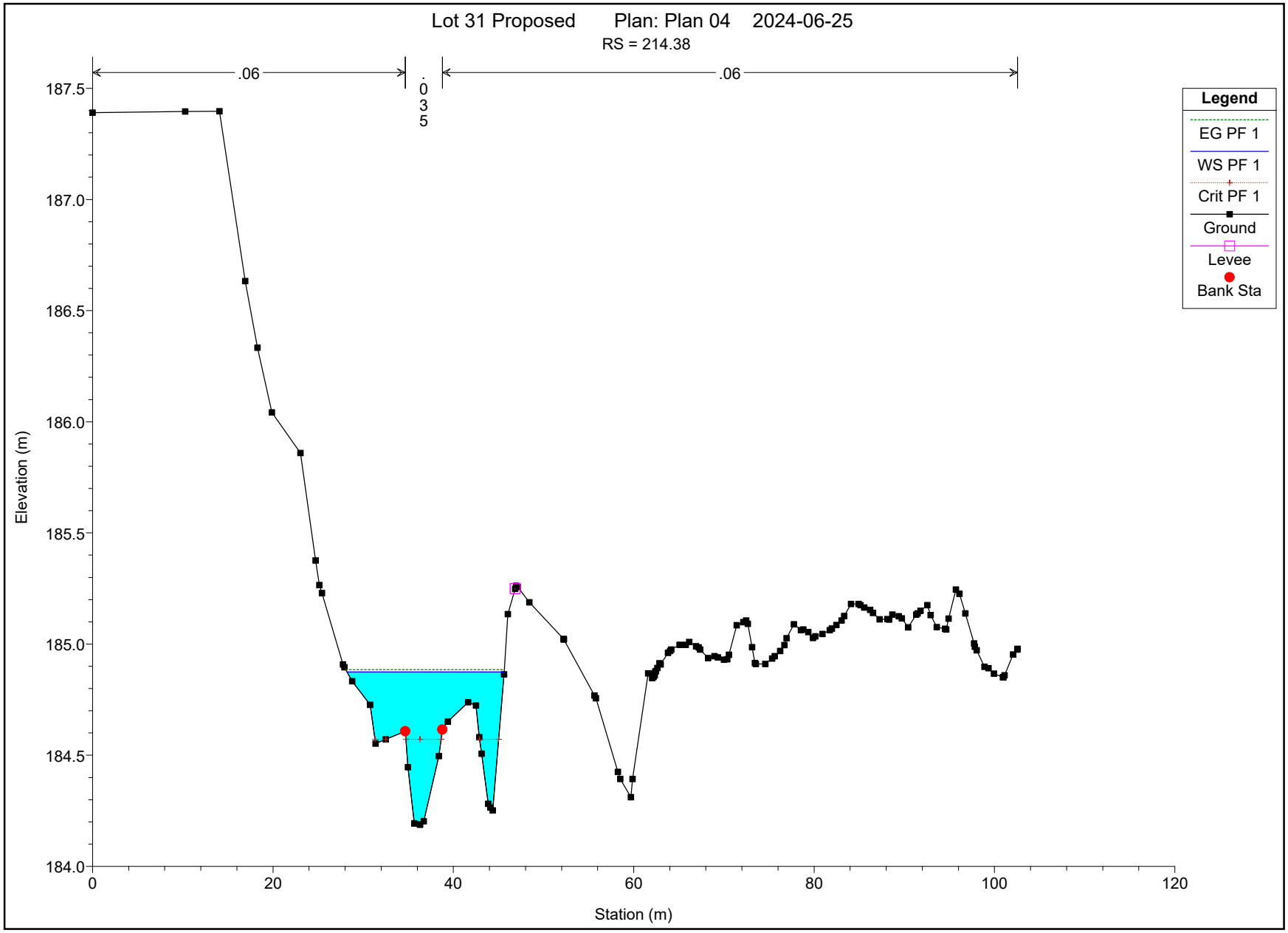


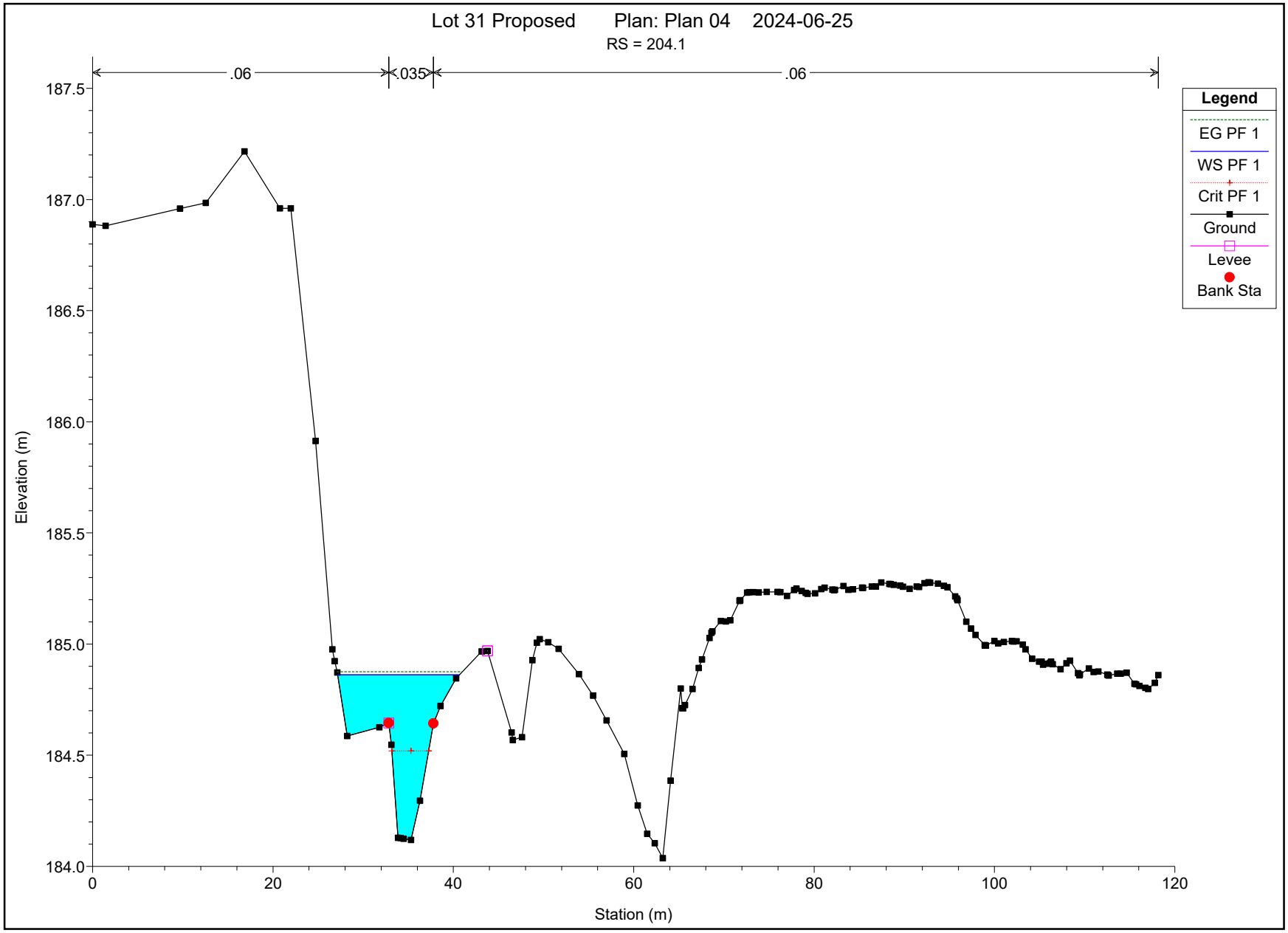
Proposed Condition Modified HEC RAS Results with Lateral Weirs Removed

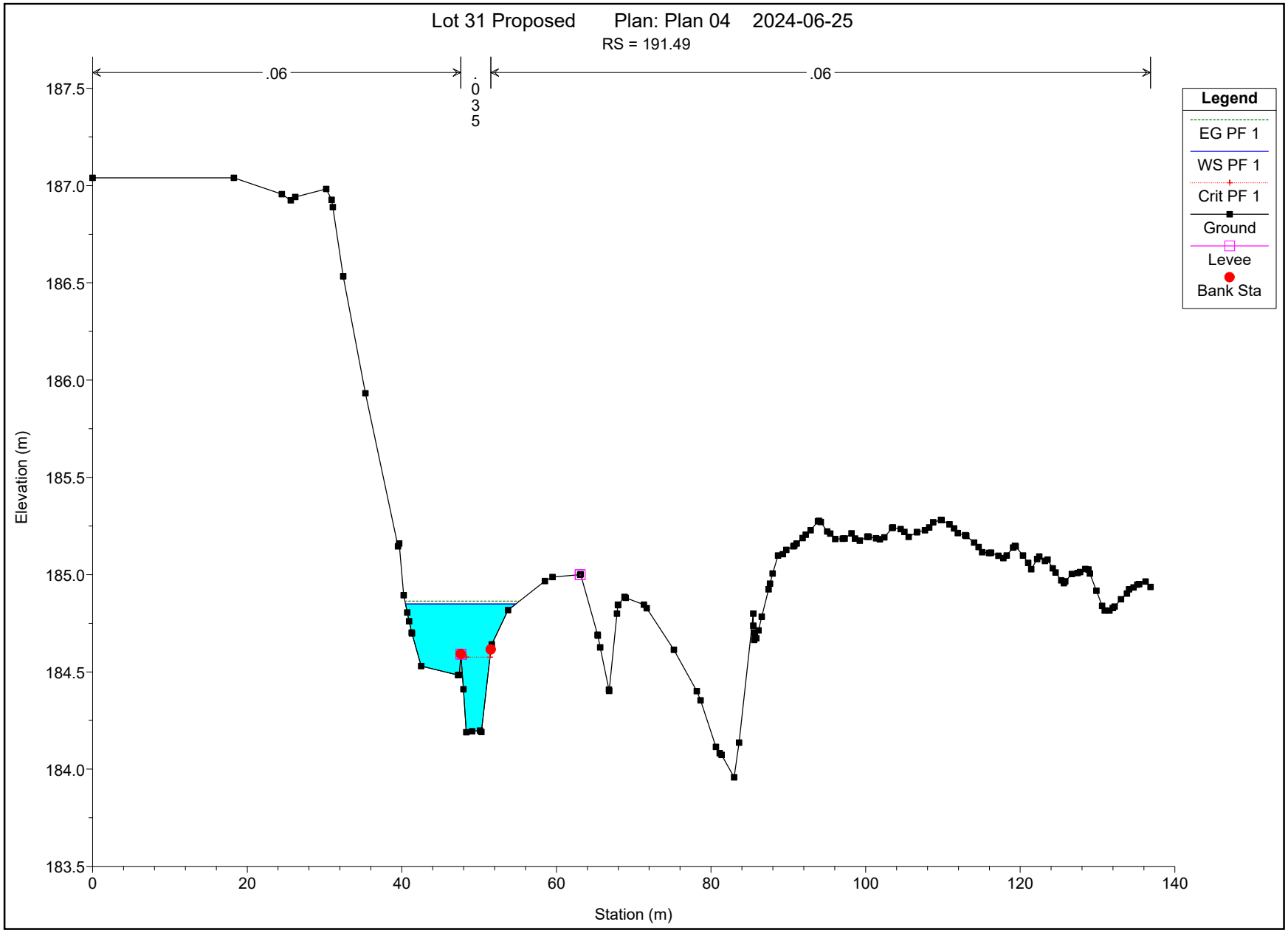
HEC-RAS Plan: Plan 04 River: EX-WC Reach: EX-WC Profile: PF 1

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
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
EX-WC	214.38	PF 1	1.84	184.19	184.87	184.57	184.89	0.000890	0.55	5.42	17.43	0.24
EX-WC	204.1	PF 1	1.84	184.12	184.86	184.52	184.88	0.000903	0.57	4.34	13.50	0.24
EX-WC	191.49	PF 1	1.84	184.19	184.85	184.58	184.86	0.001057	0.61	4.55	14.29	0.26
EX-WC	173.06	PF 1	1.84	183.94	184.84	184.42	184.85	0.000608	0.54	6.04	27.54	0.20
EX-WC	158.48	PF 1	1.84	183.94	184.83	184.48	184.84	0.000747	0.56	5.98	26.88	0.23
EX-WC	134.05	PF 1	1.84	184.10	184.63	184.63	184.78	0.016108	1.67	1.16	6.26	0.92
EX-WC	121.84	PF 1	1.84	183.89	184.39	184.34	184.51	0.012202	1.50	1.22	3.40	0.80
EX-WC	105.59	PF 1	1.84	183.61	184.32	184.12	184.38	0.004596	1.07	1.71	3.78	0.51
EX-WC	88.35	PF 1	1.84	183.47	184.03	184.03	184.22	0.019709	1.91	0.97	2.59	1.00
EX-WC	45.41	PF 1	6.38	182.73	183.80		183.83	0.001732	0.83	13.59	74.38	0.34
EX-WC	33.16	PF 1	6.38	182.45	183.82	182.90	183.82	0.000008	0.10	138.18	161.84	0.03
EX-WC	21.39		Culvert									
EX-WC	9.24	PF 1	6.38	182.55	183.26		183.30	0.001867	0.89	10.86	48.38	0.36
EX-WC	2.16	PF 1	6.38	182.25	183.13	183.00	183.27	0.006003	1.64	4.71	15.39	0.65

Proposed Condition Modified HEC RAS with Lateral Weirs Removed




Lot 31 Proposed Plan: Plan 04 2024-06-25
RS = 204.1
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187.5
187.0
186.5
186.0
185.5
185.0
184.5
184.0
0
20
40
60
80
100
120
Station (m)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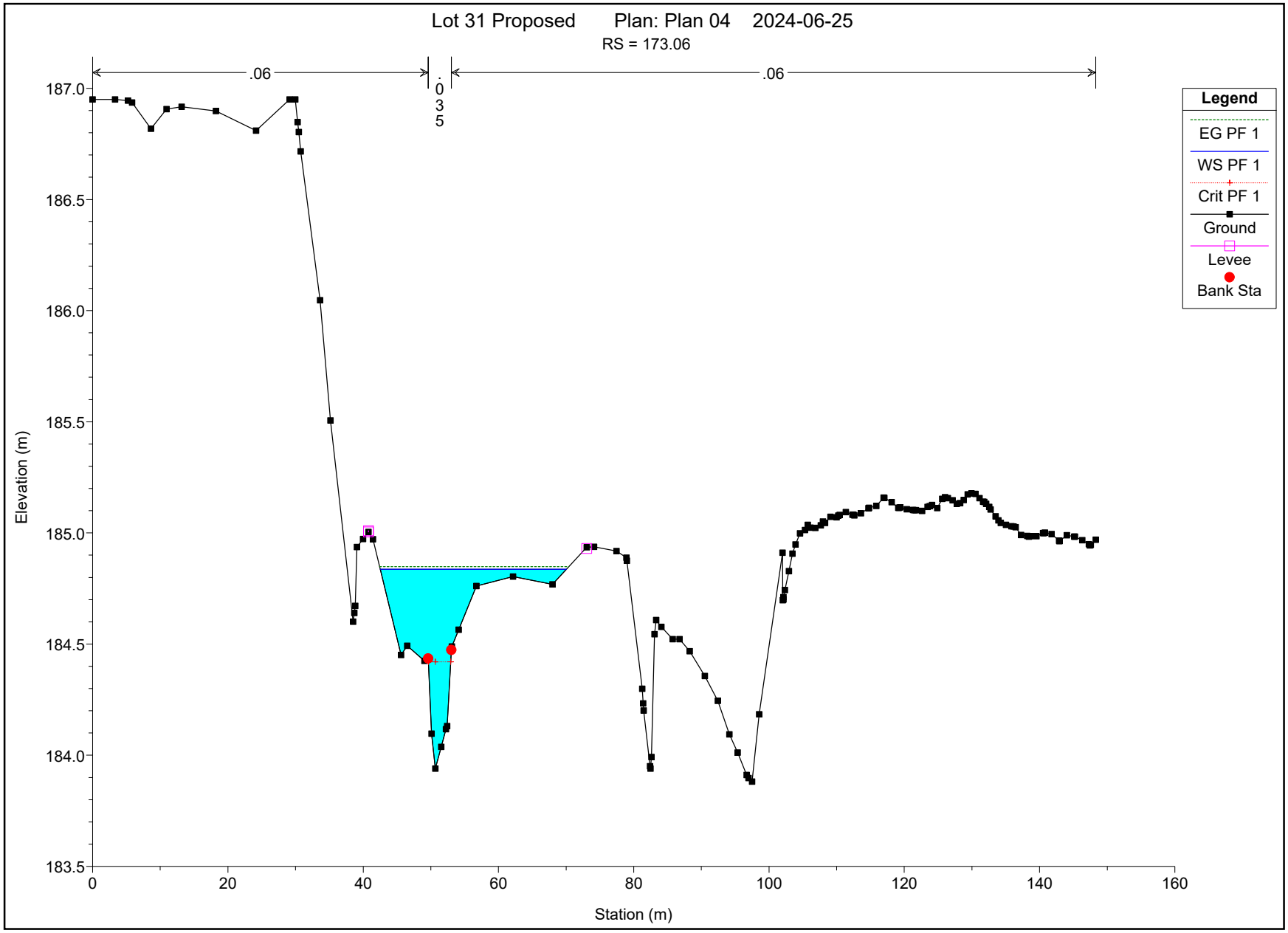
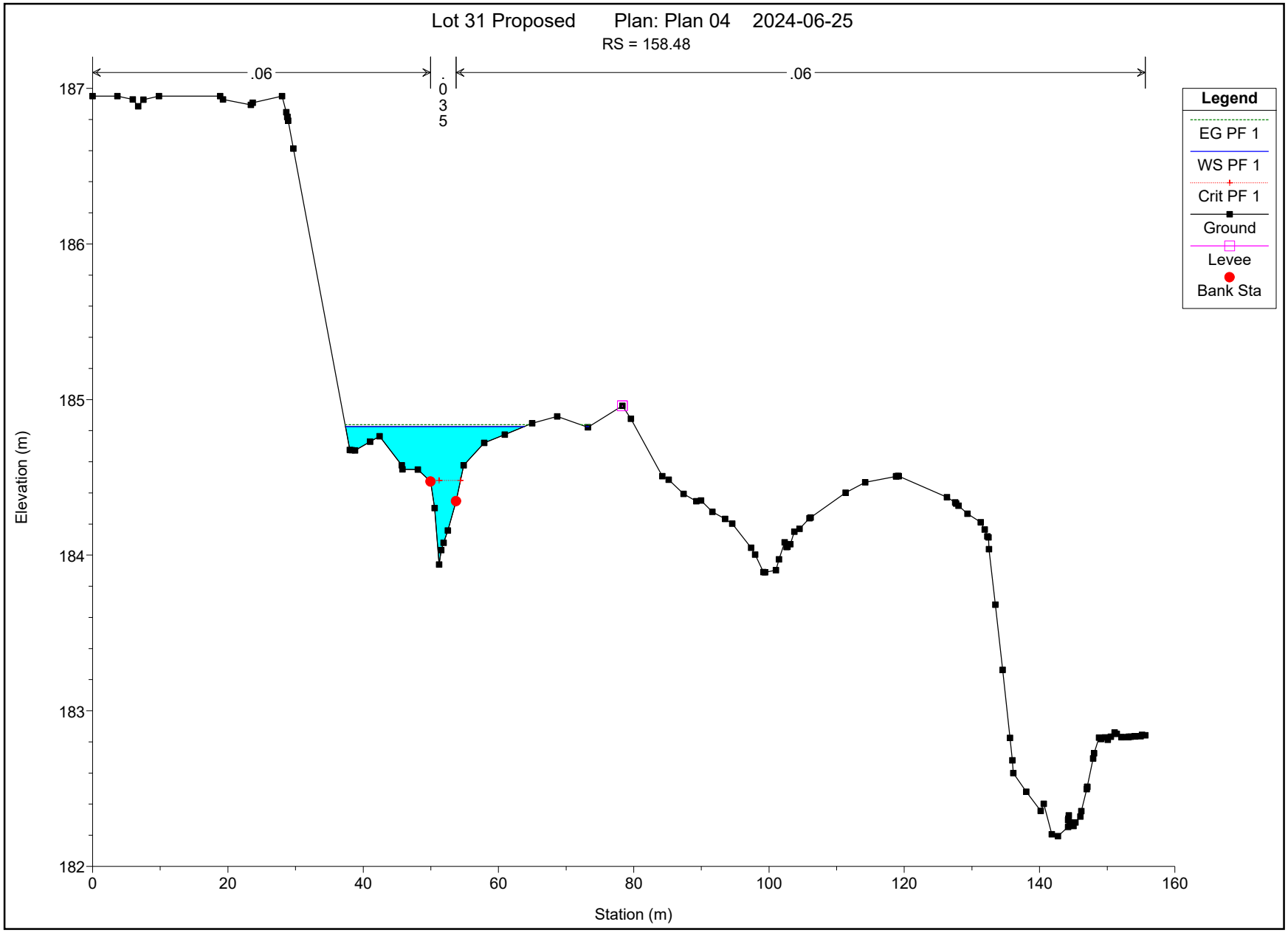
RS = 191.49
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187.5
187.0
186.5
186.0
185.5
185.0
184.5
184.0
183.5
0
20
40
60
80
100
120
140
Station (m)


Lot 31 Proposed Plan: Plan 04 2024-06-25
RS = 173.06
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187.0
186.5
186.0
185.5
185.0
184.5
184.0
183.5
0
20
40
60
80
100
120
140
160
Station (m)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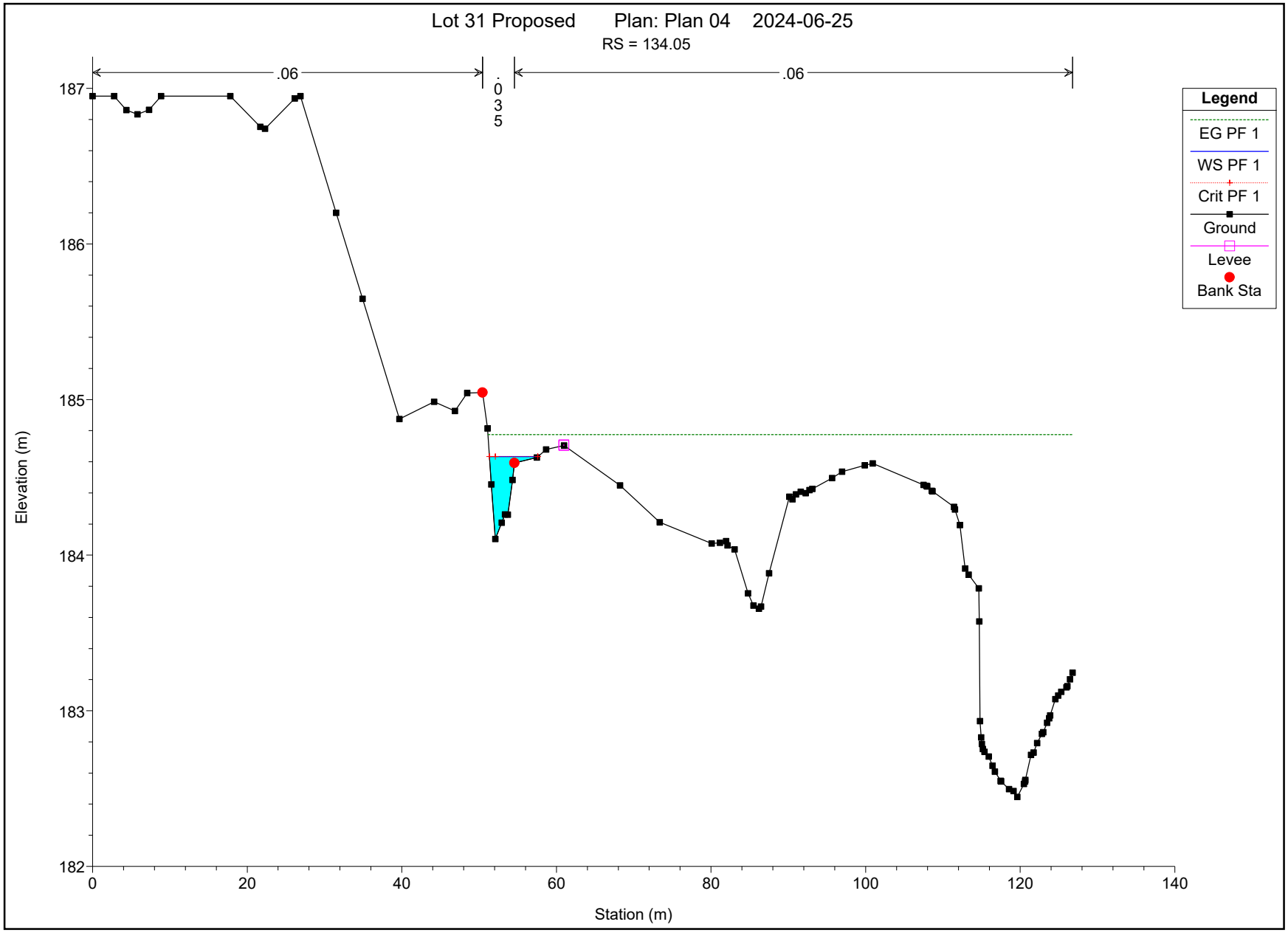
RS = 158.48
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187
186
185
184
183
182
0
20
40
60
80
100
120
140
160
Station (m)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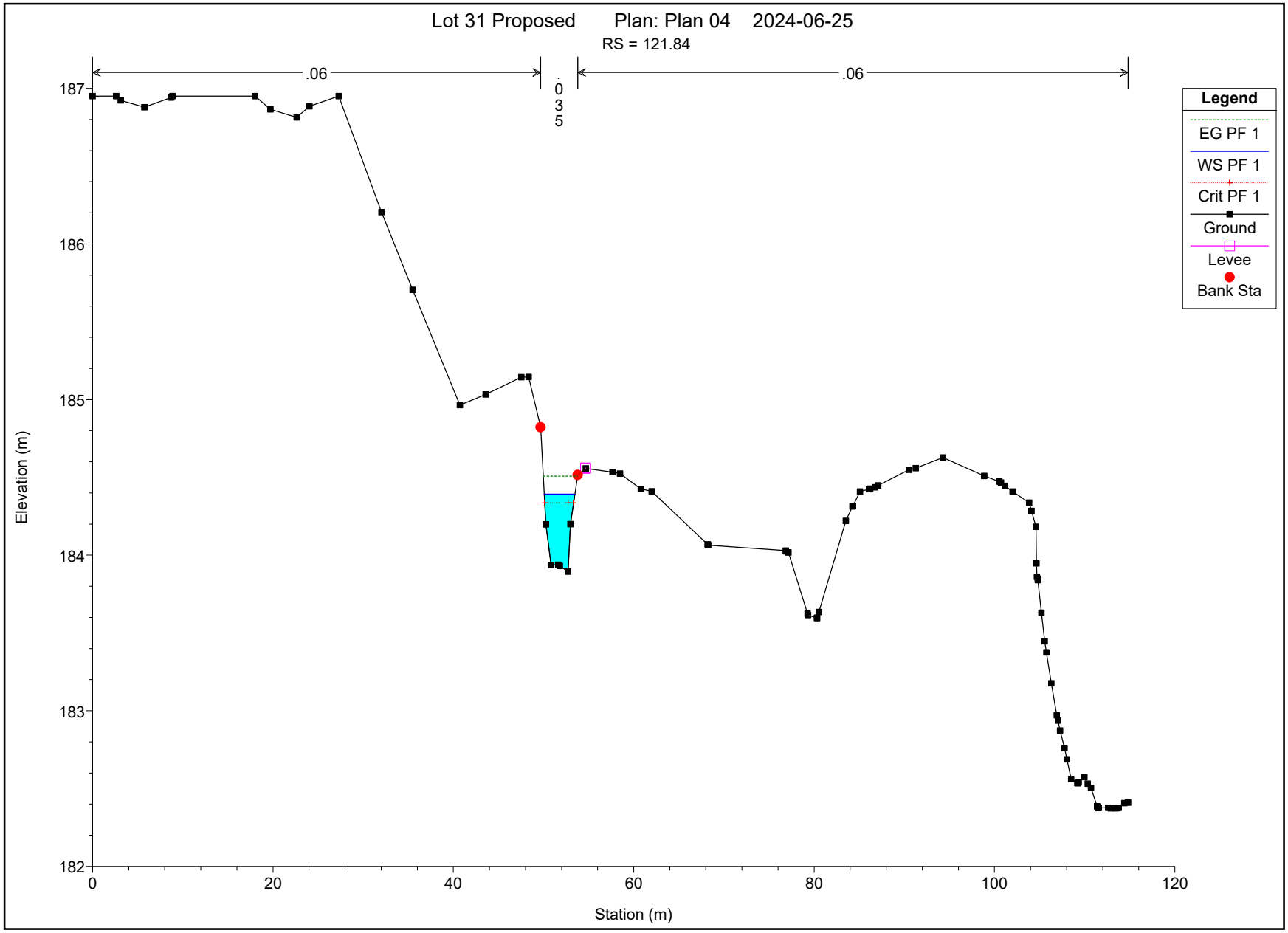
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187
186
185
184
183
182
0
20
40
60
80
100
120
140
Station (m)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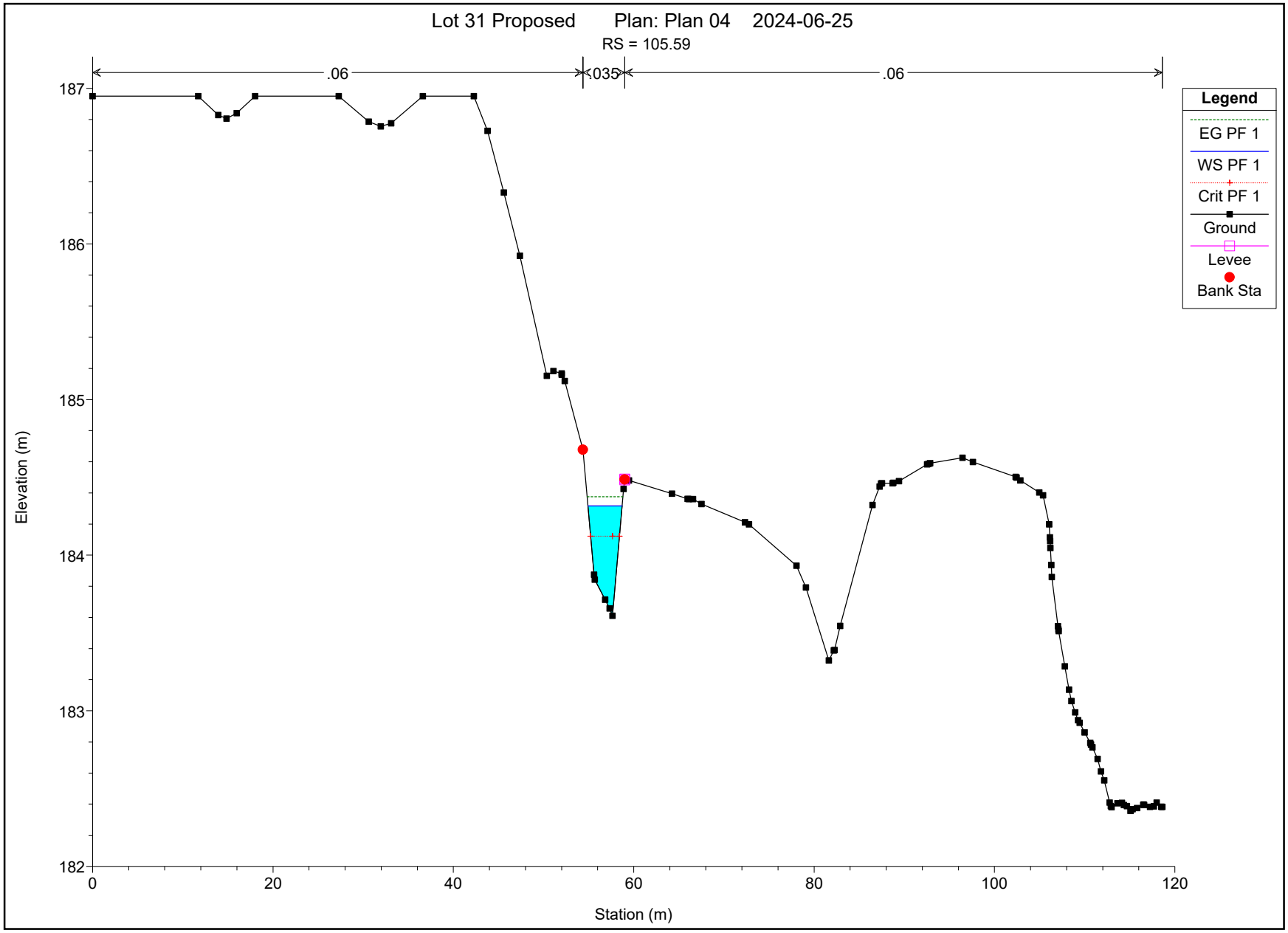
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187
186
185
184
183
182
0
20
40
60
80
100
120
Station (m)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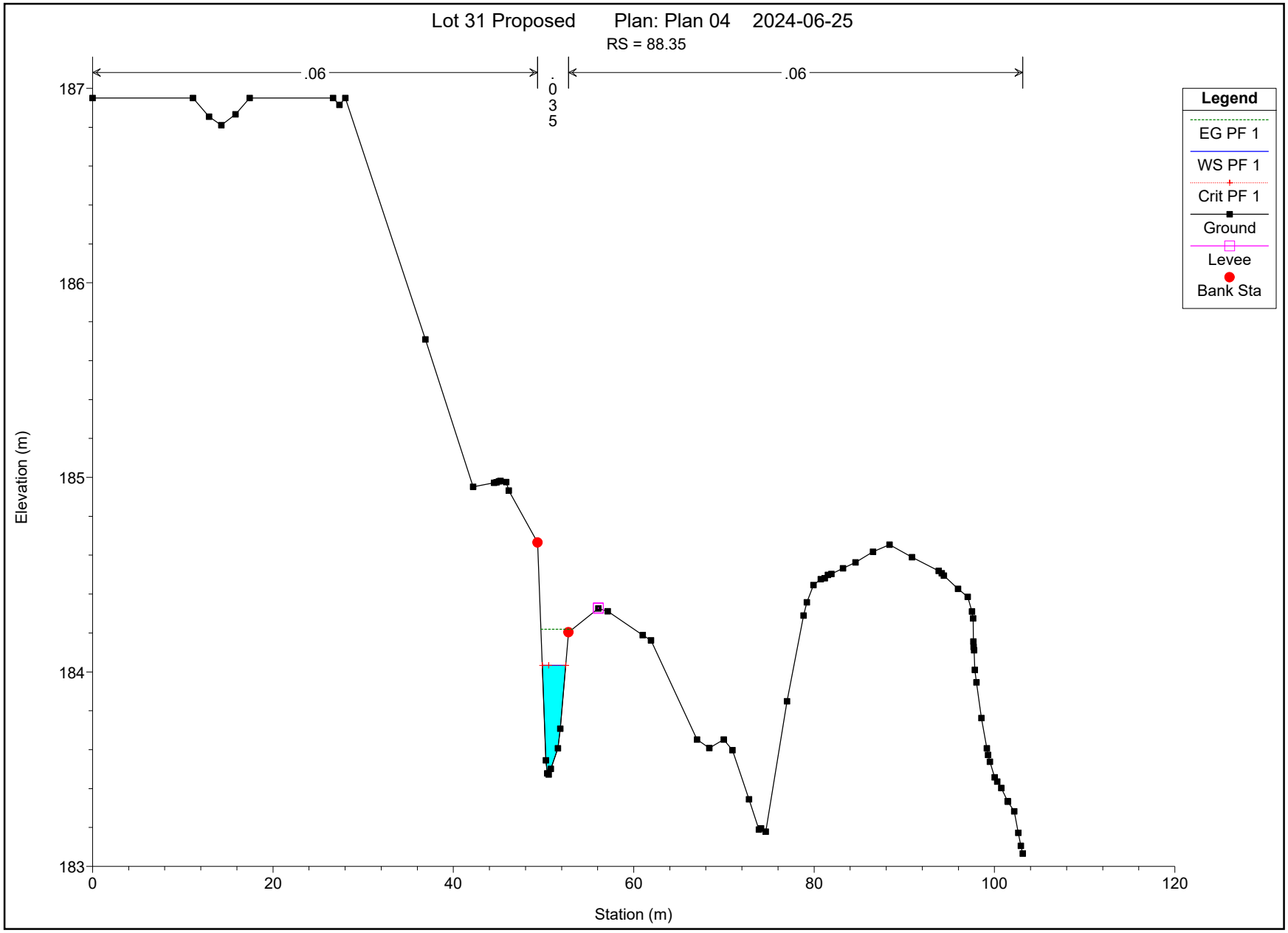
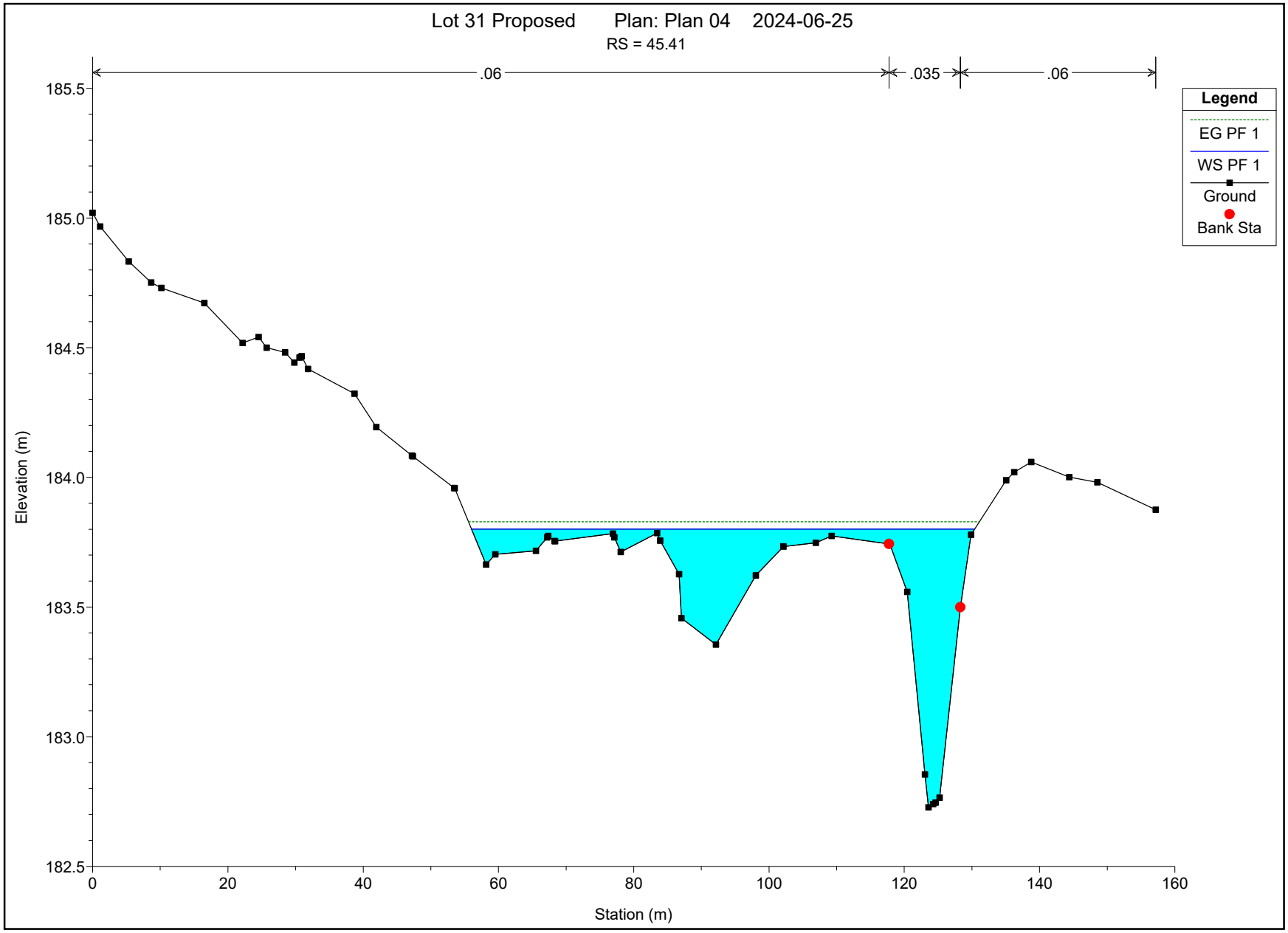
RS = 105.59
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187
186
185
184
183
182
0
20
40
60
80
100
120
Station (m)


Lot 31 Proposed Plan: Plan 04 2024-06-25
RS = 88.35
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
187
186
185
184
183
0
20
40
60
80
100
120
Station (m)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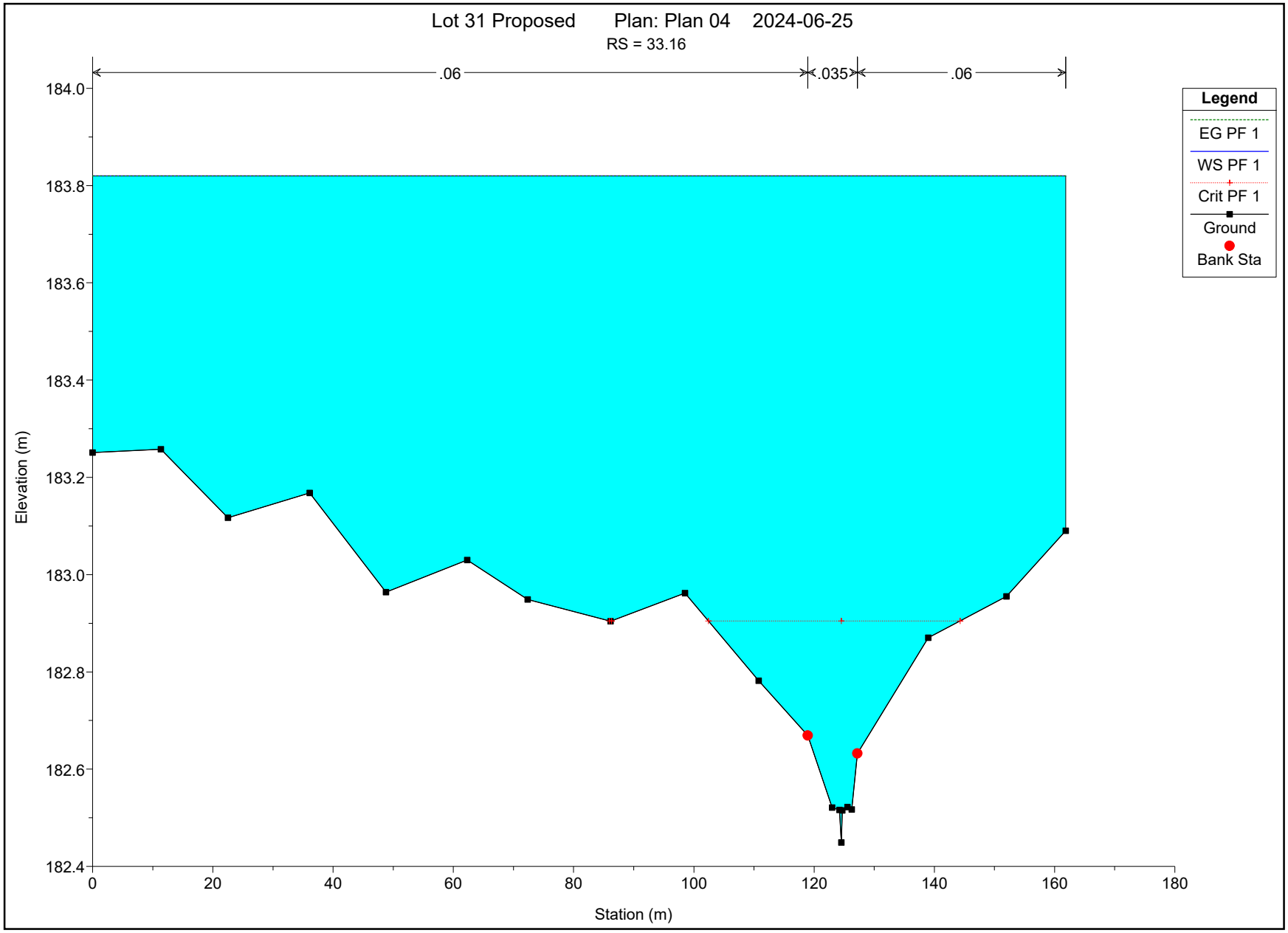
RS = 45.41
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
185.5
185.0
184.5
184.0
183.5
183.0
182.5
0
20
40
60
80
100
120
140
160
Station (m)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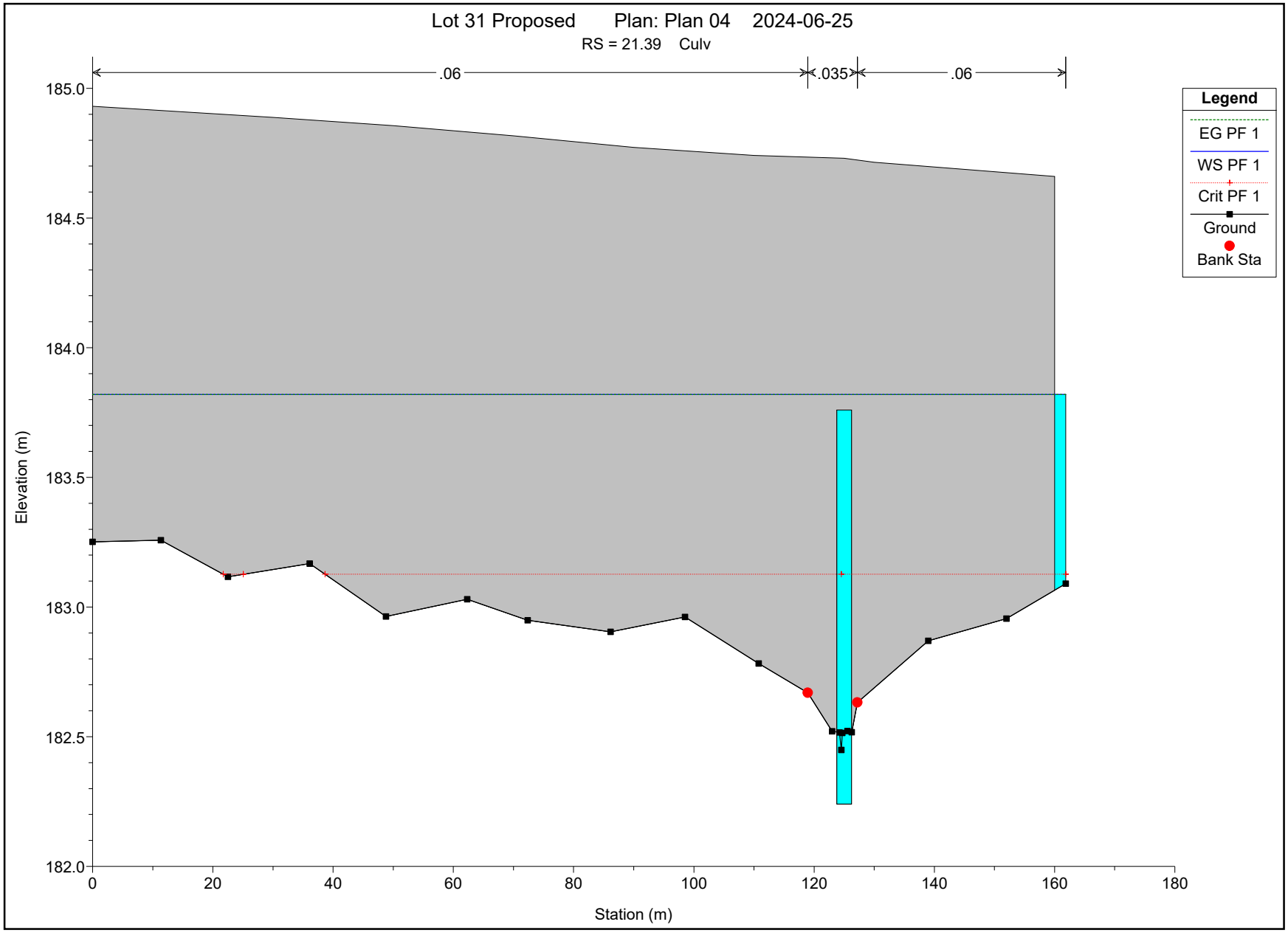
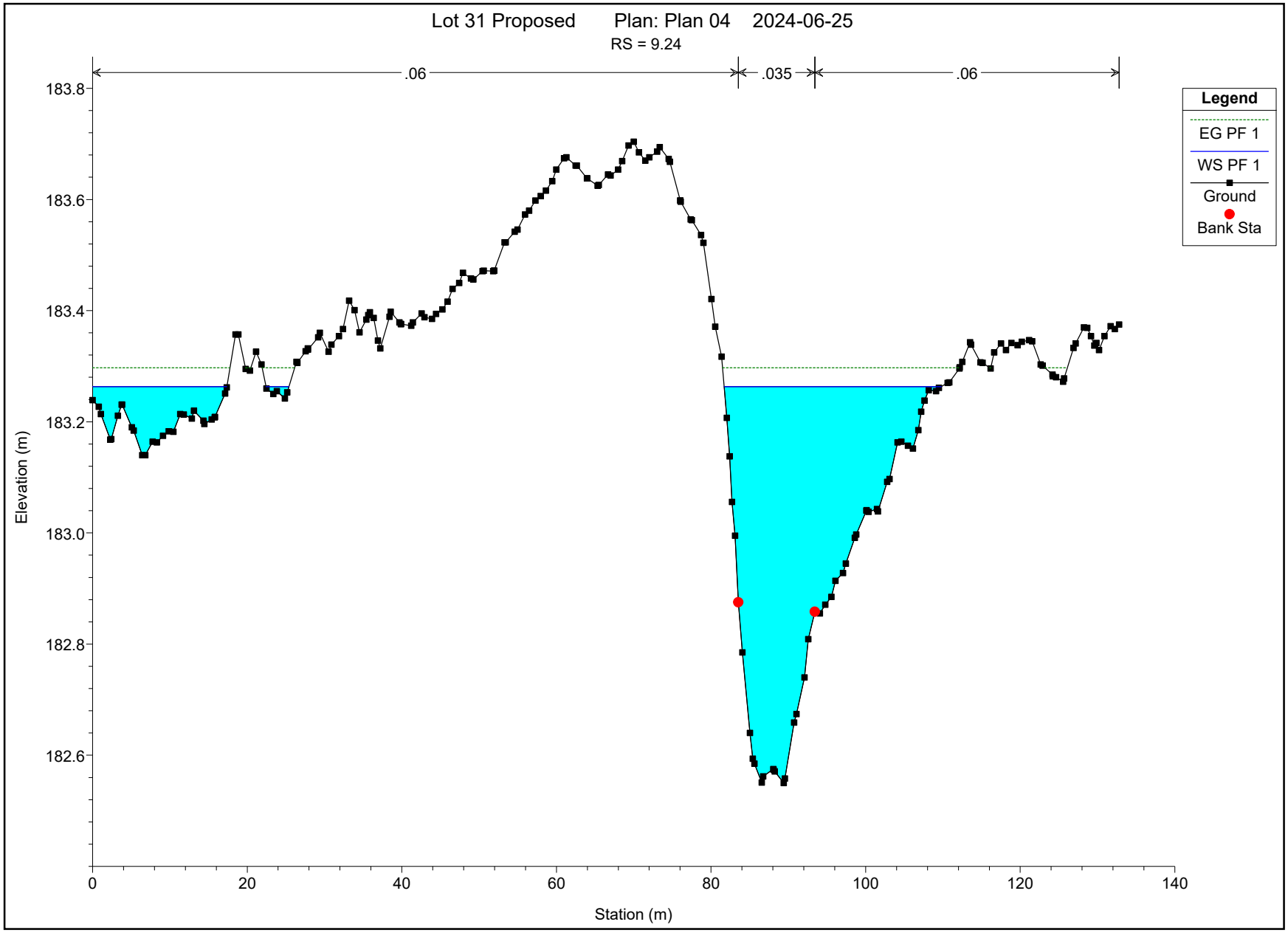
RS = 33.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
184.0
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
0
20
40
60
80
100
120
140
160
180
Station (m)


Lot 31 Proposed Plan: Plan 04 2024-06-25
RS = 21.39 Culv
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
185.0
184.5
184.0
183.5
183.0
182.5
182.0
0
20
40
60
80
100
120
140
160
180
Station (m)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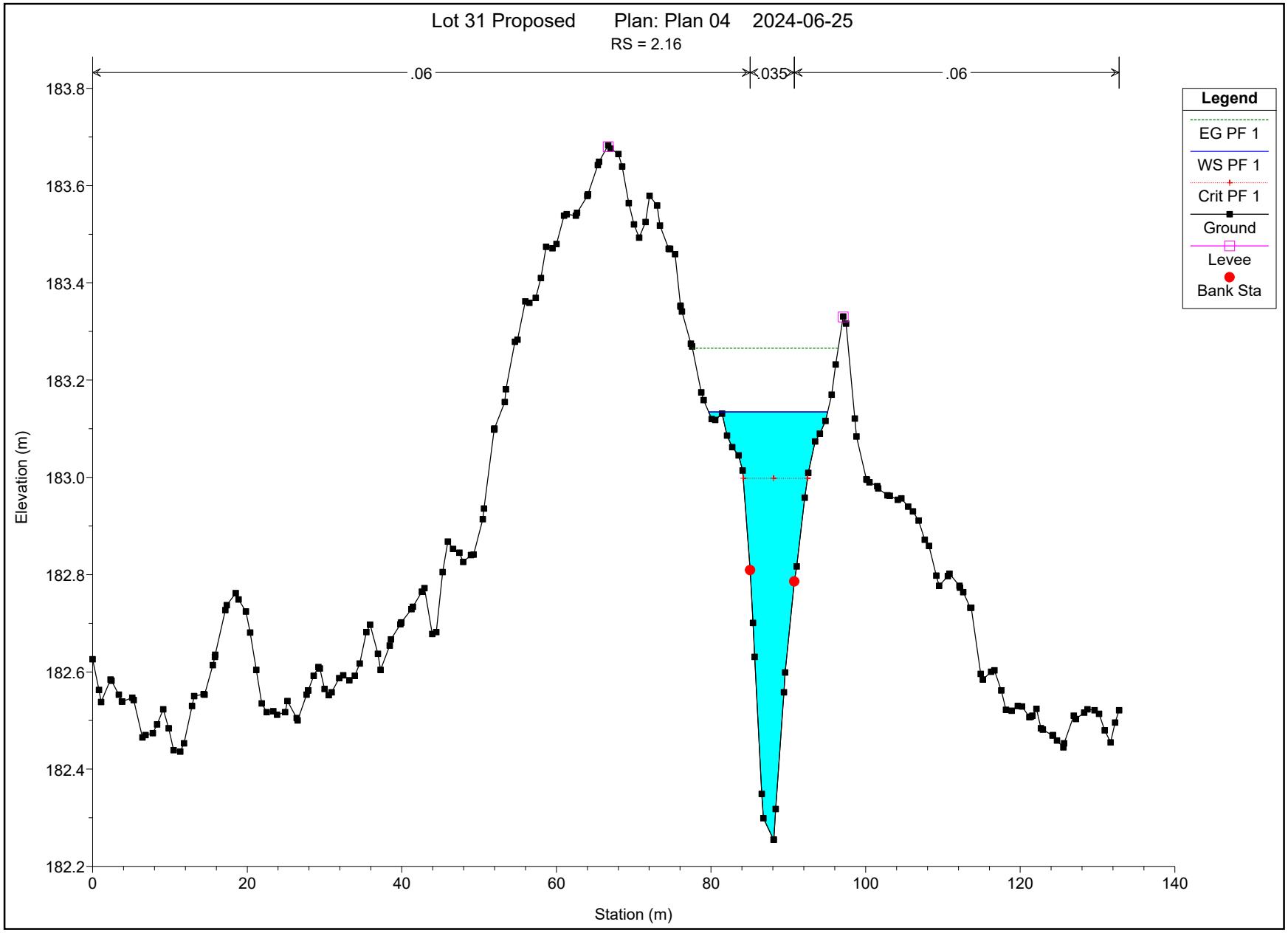
.06
.035
.06
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
183.8
183.6
183.4
183.2
183.0
182.8
182.6
0
20
40
60
80
100
120
140
Station (m)


Lot 31 Proposed Plan: Plan 04 2024-06-25
RS = 2.16
.06
.035
.06
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
183.8
183.6
183.4
183.2
183.0
182.8
182.6
182.4
182.2
0
20
40
60
80
100
120
140
Station (m)