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15 Harvie Road

NATURAL HAZARDS ASSESSMENT

Barrie-Bryne Developments Limited

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Issue	Date	Description
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Document Contents

1	Introduction	1
1.1	Objectives	1
1.2	Guidelines and Background Information	1
1.3	Methodology	2
2	Site Description.....	3
2.1	Topography	3
2.2	Preliminary Hydrogeological Investigation.....	5
2.3	Geotechnical	5
2.4	Environmental/Natural Heritage.....	5
3	Proposed Development	7
4	Background Information.....	8
4.1	City of Barrie Drainage Master Plan, 2019	8
4.2	Transportation Improvements for Bryne Drive Detail Design, 2018	8
4.3	Harvie Road and Big Bay Point Road New Crossing of Highway 400, 2018	8
5	Existing Flood Hazard Assessment.....	9
5.1	Lovers Creek	10
5.2	Whiskey Creek	10
6	Cut/Fill Assessment.....	11
6.1	Lovers Creek	11
6.2	Whiskey Creek	12
7	Proposed Flood Hazard Assessment.....	13
7.1	Lovers Creek	13
7.2	Whiskey Creek	13
8	Erosion Hazard Assessment	15



9 Summary.....16

Figures

Figure 1: Site Location Plan 4

Appendices

Appendix A: Draft Plan of Subdivision

Appendix B: Background Information

Appendix C: Lovers Creek Existing Condition Hydraulic Model Results

Appendix D: Whiskey Creek Existing Condition Hydraulic Model Results

Appendix E: Lovers Creek Cut/Fill Assessment

Appendix F: Whiskey Creek Cut/Fill Assessment

Appendix G: Lovers Creek Proposed Condition Hydraulic Model Results

Appendix H: Whiskey Creek Proposed Condition Hydraulic Model Results



1 Introduction

Tatham Engineering Limited (Tatham) has been retained by Barrie-Bryne Development Limited to undertake a natural hazards assessment to establish the flood and erosion hazard limits associated with Whiskey Creek and Lovers Creek, and consequently the developable area, of 15 Harvie Road in support of Draft Plan approval, OPA and ZBA applications. This report summarizes the natural hazards assessment completed in support of the proposed development.

1.1 OBJECTIVES

The objectives of this Natural Hazards assessment are as follows:

- Establish the existing flood hazard limit associated with Whiskey Creek and Lovers Creek across the subject property;
- Evaluate options to adjust or alter the existing floodplain through a cut/fill balance aimed at maintaining the available floodplain storage volumes provided on-site while regularizing the allowable development limits for a more efficient design; and
- Establish the erosion hazard limit associated with Whiskey Creek and Lovers Creek across the subject property.

1.2 GUIDELINES AND BACKGROUND INFORMATION

This report has been prepared utilizing the following background reports, engineering drawings and guidelines:

- Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF, formerly known as Ontario Ministry of Natural Resources) *Technical Guide River & Stream Systems: Flood Hazard Limit*, 2002;
- Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF, formerly known as Ontario Ministry of Natural Resources) *Technical Guide River & Stream Systems: Erosion Hazard Limit*, 2002;
- Hatch Infrastructure *Harvie Road and Big Bay Point Road New Crossing Over Highway 400 Detailed Design – Drainage and Hydrology Report (Draft)*, 2017;
- Hatch Infrastructure *Harvie Road and Big Bay Point Road New Crossing – Highway 400 Issued for Construction Drawings*, 2018;
- Hatch Infrastructure *Transportation Improvements for Bryne Drive, Detailed Design Drainage and Stormwater Management Report*, December 2018;



- The Ministry of the Environment, Conservation, and Parks (MECP, formerly known as Ministry of Environment), *Stormwater Management Practices Planning and Design Manual* (2003);
- Lake Simcoe Region Conservation Authority (LSRCA), *Technical Guidelines for SWM Submissions* (2016);
- City of Barrie Storm Drainage and Stormwater Management Policies and Design Guidelines (2022); and

This report has also been prepared utilizing the following site-specific background reports & studies:

- WSP Canada Inc. *Geotechnical Desktop Review Highway 400 & Harvie Road, Barrie Ontario* (March 2022);
- WSP Canada Inc. *Preliminary Hydrogeological Investigation Highway 400 & Harvie Road, Barrie Ontario* (March 2022);
- Beacon Environmental Ltd. *Preliminary Environmental Impact Study Bryne Drive City of Barrie* (March 2022); and
- Tatham Engineering Limited *15 Harvie Road Preliminary Stormwater Management Report* (March 2022).

1.3 METHODOLOGY

This Natural Hazards assessment has been prepared in accordance with Section 3.1 of the Provincial Policy Statement, specifically the Ministry of Northern Development, Mines, Natural Resources and Forestry (formerly known as the Ministry of Natural Resources) *Technical Guide for River & Stream Systems: Flood Hazard Limit* and *Technical Guide for River & Stream Systems: Erosion Hazard Limit*. The methodology used to delineate the flood and erosion hazard limits is further discussed in subsequent sections of this report.



2 Site Description

The subject site consists of approximately 33.3 ha of undeveloped land and is bound by Harvie Road to the north, Highway 400 to the east, Thrushwood Drive/Megan Crescent and existing residential development to the west and Bryne Drive and existing commercial developments to the south. Upstream reaches of Whiskey Creek and Lovers Creek also bisect the site, flowing east towards Highway 400. The site is located within the Lake Simcoe Region Conservation Authority (LSRCA) watershed. Due to the presence of Lovers Creek and Whiskey Creek, the site is located partially within the LSRCA regulated area.

The east half of the site is legally described as:

PART OF LOT 7 CONCESSION 12 INNISFIL, S/T LT180101 & LT96445; CITY OF BARRIE

The west half of the site is legally described as:

PARTS OF LOTS 5, 6 & 7 PLAN 67 AND PART OF LOT 7 CONCESSION 12 INNISFIL; S/T IN27834 & LT180101; SUBJECT TO AN EASMENT IN GROSS OVER PART 1 PLAN 51R37280 AS IN SC1010404; CITY OF BARRIE

The subject property is centrally bisected by a ROW which has been dedicated to the City for the future extension of Bryne Drive. The Bryne Drive extension is a City project designed by Hatch Infrastructure. Construction of Bryne Drive is expected to commence in 2022. A key plan illustrating the site location is provided in Figure 1, overleaf.

2.1 TOPOGRAPHY

Information relating to existing topography, ground cover, and drainage patterns was obtained through a review of relevant background studies, available plans, base mapping, and topographic surveys, and was confirmed during site visits.

A detailed topographic survey was completed by J.D. Barnes Ltd. in June 2007. This survey has been reviewed and compared against other available contour maps and appears to be accurate and sufficient for preliminary design purposes. Based on review of the topographic survey, ground surface elevations range between 304.0 metres above sea level (masl) at the southwestern site limit and 288.0 masl at the northeastern site limit.

If required, additional topographic survey will be completed during the detailed design stage to reflect completion of the Bryne Drive extension and Harvie Road improvements.



Figure 1: Site Location Plan



2.2 PRELIMINARY HYDROGEOLOGICAL INVESTIGATION

A Preliminary Hydrogeological Investigation (March 2022), prepared by WSP Canada Inc. (WSP) was completed to characterize the preliminary hydrogeological conditions on-site and assess the potential impacts the groundwater regime may have on the proposed development. A preliminary water balance assessment was also completed as part of their hydrogeological investigation. Seven drilled boreholes and seven monitoring wells were installed to understand the geological lithology and stratigraphy. During the monitoring season (December 2021 – January 2022) groundwater was present at depths ranging from 2.50 metres below ground surface (mbgs) to 12.14 mbgs. Monitoring wells MW21-02s and MW21-02d were dry during the December monitoring periods. The groundwater surface as provided by WSP has been utilized for the preliminary design of the proposed SWM controls. As additional groundwater monitoring information becomes available, the design of any impacted SWM controls will be revised, if required.

2.2.1 Source Water Protection

The site is located within the South Georgian Bay Lake Simcoe Source Protection Region but is not located within a Highly Vulnerable Aquifer (HVA) or Surface Water Intake Protection Zone (IPZ). However, the site does fall within a Significant Groundwater Recharge Area (SGRA) with a vulnerability score of 4 which is representative of a moderate contamination risk.

2.2.2 Preliminary Infiltration Rates

Soil infiltration rates were estimated based on hydraulic conductivity tests and grain size distribution analyses completed at the site. In-situ soils were found to be moderate to well-draining with infiltration rates ranging between 13 mm/hour to 82 mm/hour.

2.3 GEOTECHNICAL

The Geotechnical Investigation Report (2022), prepared by WSP Canada Inc. was completed to identify the subsurface conditions and determine the engineering properties of the in-situ soils for the design and construction of the proposed development.

The report describes the existing soils as silty sand, sandy silt, sand, clayey silt, and clayey sand, generally extending to the borehole termination depths of 7.6 mbg. Topsoil was encountered with thicknesses ranging from 0.12 to 0.61 mbg.

2.4 ENVIRONMENTAL/NATURAL HERITAGE

Beacon Environmental Ltd. (Beacon) completed a preliminary Environmental Impact Study (EIS) in support of the proposed development to identify existing natural heritage features on-site and



to address the potential ecological impacts the proposed development may have on the natural heritage features.



3 Proposed Development

The proposed development consists of a residential component (west of the Bryne Drive extension) and an employment lands component (east of the Bryne Drive extension).

The residential half of the site proposes 66 semi-detached units, 138 street townhouses, 34 back-to-back townhouses, and two mid-rise residential blocks (3.59 ha) with a total of 539 units. The west half of the site also includes the hydro servicing easement/corridor, a 0.90 ha park block, a 0.67 ha SWM block (Block 73) and a 0.35 ha open space block.

It should be noted that unit counts provided for the Mid-Rise Residential Blocks (539 units) are estimates only for the purposes of this analysis. The Mid-Rise Residential Blocks are subject to future Site Plan Approval requirements at which time the unit counts will be confirmed. As site plans are not available at the time of this report the expected unit counts, building sizes, and impervious lot coverage have been assumed. Notes are included in the calculations where these assumptions are applied.

The employment half of the site proposes 8 employment blocks (12.69 ha) and also includes the 30.0 m MTO Highway 400 road widening, a 1.15 ha SWM block (Block 72) and two open space blocks (2.46 ha).

The proposed development includes two accesses from Thrushwood Drive and an east-west access from the Bryne Drive extension.

The proposed Draft Plan of Subdivision is included in Appendix A for reference.



4 Background Information

A comprehensive review of available background information specific to the subject lands and adjacent developments have been reviewed and utilized in as part of this Natural Hazards assessment. A summary of the contents of each and how it was utilized is provided below. Relevant excerpts referenced directly are provided in Appendix B.

4.1 CITY OF BARRIE DRAINAGE MASTER PLAN, 2019

The City of Barrie Drainage Master Plan (DMP) was prepared by Tatham Engineering Limited to identify existing drainage deficiencies throughout the City, evaluate alternative solutions to address the deficiencies and recommended preferred alternative solutions to be implemented to fulfill requirements of the Municipal Class Environmental Assessment (EA) process. City wide minor and major drainage system models were developed and used to evaluate the drainage systems city wide.

The hydraulic models of the Barrie Creeks Subwatershed (including Whiskey Creek) and Lovers Creek Subwatershed developed for the DMP served as the basis for the hydraulic models used to establish the flood hazard limits across the subject property. The models have been updated to include the topographic survey data collected and the transportation improvements described next.

4.2 TRANSPORTATION IMPROVEMENTS FOR BRYNE DRIVE DETAIL DESIGN, 2018

Hatch was retained by the City of Barrie to complete detail design of proposed transportation improvements for Bryne Drive which included the widening and extension of Bryne Drive northerly to Essa Road. As part of the transportation improvements, the detailed design of new crossings over Lovers Creek and Whiskey Creek and the realignment of the reach of Lovers Creek upstream of Bryne Drive have been completed. The new crossings and the realigned reach of Lovers Creek have been incorporated into the existing conditions hydraulic model described further in subsequent sections of this report.

4.3 HARVIE ROAD AND BIG BAY POINT ROAD NEW CROSSING OF HIGHWAY 400, 2018

Hatch prepared a detailed design SWM report and detailed engineering drawings for the Harvie Road and Big Bay Point Road crossing project which included realigning a reach of Whiskey Creek immediately upstream of Highway 400 and constructing a new crossing under Highway 400. The new crossing and the realigned reach of Whiskey Creek have been incorporated into the existing conditions hydraulic model described further in subsequent sections of this report.



5 Existing Flood Hazard Assessment

Whiskey Creek and Lovers Creek have been identified as two on-site features that require consideration under Section 3.1 of the Provincial Policy Statement for natural hazards. In the Draft Plan of Subdivision these two features are left undisturbed after development and the natural hazards associated with each have been considered.

The existing condition HEC-RAS hydraulic models of both Lovers Creek and Whiskey Creek generated through the Barrie Drainage Master Plan were updated using the site-specific topographic survey data collected along with the revised peak flows generated from the Visual OTTHYMO hydrologic model for this project as described in the *15 Harvie Road Preliminary Stormwater Management Report*. To establish the Regulatory floodplain for both creeks, both the 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm peak flows were assessed through the HEC-RAS models. The greater of the 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm forms the Regulatory Storm.

As discussed, in 2018 Hatch was retained by the City of Barrie to complete the detailed design of the proposed extension of Bryne Drive through the subject property to Essa Road. Part of their design included culvert crossings of both Lovers Creek and Whiskey Creek. The reach of Lovers Creek upstream of the Bryne Drive extension is also planned to be realigned to suit the proposed road alignment. The Bryne Drive Improvements 100% Design Drawings (Hatch Ltd., 2020) are available through the City and the proposed extension is scheduled for construction in 2022. The Bryne Drive culvert crossing designs for both Lovers Creek and Whiskey Creek and the realigned reach of Lovers Creek have been included in the existing condition HEC-RAS models to establish the ultimate flood hazard limits across the subject property.

Similarly, Hatch was retained by the City of Barrie to complete the detailed design of the proposed Harvie Road and Big Bay Point Road Crossing of Highway 400. Part of the design included realigning the reach of Whiskey Creek between the extension of Bryne Drive and Highway 400 and constructing a new culvert crossing under Highway 400. The construction of the Harvie Road and Big Bay Point Road Crossing of Highway 400 was recently completed, including the realignment of Whiskey Creek and the new Highway 400 culvert crossing. The topographic survey of the subject property was collected prior to the construction of the new crossing of Highway 400. As such, the design of the Harvie Road and Big Bay Point Road Crossing of Highway 400 was incorporated into the Whiskey Creek HEC-RAS model to reflect existing conditions.

The results of the HEC-RAS hydraulic models for each watercourse are described in the following sections.



5.1 LOVERS CREEK

The results of the hydrologic analysis completed in support of the Draft Plan approval estimate the existing 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm peak flows through the subject reach of Lovers Creek to be 1.13 m³/s and 5.59 m³/s, respectively.

The existing Lovers Creek crossing of Highway 400 has sufficient capacity to convey the peak flow generated by the 1:100-year return frequency design storm downstream. However, the Highway 400 culvert crossing does not have sufficient capacity to convey the Regional (Hurricane Hazel) Storm peak flow downstream without overtopping Highway 400. During the Regional Storm, runoff will overtop Highway 400 at a depth of 0.23 m, equating to a water surface elevation of 299.80 m. Highway 400 and the crossing create a backwater condition within the upstream reach of Lovers Creek that extends to the proposed Bryne Drive extension, flooding portions of 15 Harvie Drive.

The Lovers Creek existing flood hazard limit through the subject property is illustrated on the Lovers Creek Existing Conditions Natural Hazards Plan (Drawing NH-1) enclosed. The results of the HEC-RAS hydraulic model are enclosed in Appendix C for reference.

5.2 WHISKEY CREEK

The results of the hydrologic analysis completed in support of the Draft Plan approval estimate the existing 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm peak flows through the subject reach of Whiskey Creek to be 5.95 m³/s and 21.32 m³/s, respectively.

The improvements along Whiskey Creek completed as part of the Harvie Road and Big Bay Point Road Crossing of Highway 400 have sufficient capacity to convey the peak flow generated by the 1:100-year return frequency design storm downstream. However, the new Highway 400 culvert crossing does not have sufficient capacity to convey the Regional (Hurricane Hazel) Storm peak flow downstream without overtopping Highway 400. During the Regional Storm, runoff will overtop Highway 400 at a depth of 0.63 m, equating to a water surface elevation of 291.62 m. Highway 400 and the new crossing create a backwater condition within the upstream reach of Whiskey Creek that extends to the proposed Bryne Drive extension, flooding the northeast corner of 15 Harvie Drive.

The Whiskey Creek existing flood hazard limit through the subject property is illustrated on the Whiskey Creek Existing Conditions Natural Hazards Plan (Drawing NH-4) enclosed. The results of the HEC-RAS hydraulic model are enclosed in Appendix D for reference.



6 Cut/Fill Assessment

As discussed, the existing Lovers Creek Highway 400 crossing creates a backwater condition within the upstream reach of Lovers Creek that extends to the proposed Bryne Drive extension, flooding portions of 15 Harvie Drive. Similarly, the backwater condition created by Highway 400 and the new Whiskey Creek crossing creates a backwater condition along Whiskey Creek upstream of Highway 400 to the proposed Bryne Drive extension. This backwater condition floods the northeast corner of 15 Harvie Drive.

The floodlines along both Lovers Creek and Whiskey Creek through the subject property are irregular, extending out of the channel corridor into the property in topographic lows. As Highway 400 creates a backwater condition upstream along both creeks, the floodplain within these topographic lows is used for storage only and is not required for flood conveyance. As such, there is an opportunity to regrade portions of the channel corridor to regularize the development design while still maintaining floodplain storage.

It is proposed to regrade sections of the channel corridors along both Whiskey Creek and Lovers Creek. The regrading will occur above the 1:100-year return frequency design storm floodplain. Material cut from the channel corridor to create floodplain storage will be used to fill in the topographic lows. To ensure floodplain storage is maintained, a cut/fill assessment has been conducted, the results of which are described in the following sections.

6.1 LOVERS CREEK

Under existing conditions, there is approximately 35,500 m³ of storage provided between Highway 400 and Bryne Drive below the Regional Storm water level along Lovers Creek.

Above the 1:100-year return frequency design storm floodplain, we proposed to fill approximately 4,200 m³ of the Regulatory floodplain to regularize the development limits along Lovers Creek between Bryne Drive and Highway 400. To maintain the existing Regulatory floodplain storage volume provided in this area, approximately 4,300 m³ of material will be cut and removed from the floodplain through grading above the 1:100-year return frequency design storm floodplain. As such, the total floodplain storage provided under proposed conditions is approximately 35,600 m³.

The cut/fill analysis completed for Lovers Creek is provided in Appendix E for reference and is illustrated on the Lovers Creek Proposed Condition Natural Hazards Plan (Drawing NH-2) and the Lovers Creek Cross-sections Plan (Drawing NH-3) enclosed.



6.2 WHISKEY CREEK

Under existing conditions, there is approximately 110,500 m³ of storage provided between Highway 400 and Bryne Drive below the Regional Storm water level along Whiskey Creek.

Above the 1:100-year return frequency design storm floodplain, we proposed to fill approximately 3,200 m³ of the Regulatory floodplain to regularize the development limits along Whiskey Creek between Bryne Drive and Highway 400. To maintain the existing Regulatory floodplain storage volume provided in this area, approximately 2,200 m³ of material will be cut and removed from the floodplain through grading above the 1:100-year return frequency design storm floodplain. Also, an additional 1,800 m³ of storage is available in SWMF#2 between the Regional (Hurricane Hazel) storm flood elevation (291.62 m) and the 1:100-year return frequency design storm water level in SWMF#2. As such, the total floodplain storage provided under proposed conditions is approximately 111,300 m³.

SWMF#2 has been designed with an emergency overflow weir sill elevation of 291.40 m which is above the ponds 1:100-year return frequency design storm water level (291.33 m) and 0.22 m below the Regional (Hurricane Hazel) storm flood elevation in Whiskey Creek. As such, the backwater condition created by Highway 400 upstream along Whiskey Creek will flood SWMF#2 to a maximum elevation of 291.62 m during the Regional storm.

The cut/fill analysis completed for Whiskey Creek is provided in Appendix F for reference and is illustrated on the Whiskey Creek Proposed Condition Natural Hazards Plan (Drawing NH-5) and the Whiskey Creek Cross-sections Plans (Drawings NH-6 and NH-7) enclosed.



7 Proposed Flood Hazard Assessment

To assess the change in flood levels resulting from the grading changes proposed in Section 6, the Lovers Creek and Whiskey Creek HEC-RAS hydraulic models were updated to include the grading changes. In addition, the HEC-RAS models were updated to include the proposed 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm peak flows. The results of the HEC-RAS hydraulic models for each watercourse are described in the following sections.

7.1 LOVERS CREEK

The stormwater management controls proposed within the 15 Harvie Road development have been designed to attenuate the runoff leaving the proposed development to pre-development levels for the 1:2-year through 1:100-year return frequency design storms as per provincial policies. However, Regional control is not provided. As such, the proposed 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm peak flows through the subject reach of Lovers Creek established through the hydrologic analysis are estimated to be 1.13 m³/s and 6.07 m³/s, respectively.

Along Lovers Creek upstream of Highway 400 the Regional Storm water levels will increase by 0.01 m under proposed conditions because of the increase in the Regional Storm peak flow. The proposed Regional Storm water level between Highway 400 and the proposed Bryne Drive extension is 299.81 m and the depth of flow over Highway 400 during the Regional Storm is 0.24 m. The increase in water levels is attributed to the increase in peak flow as the floodplain storage provided upstream of Highway 400 along Lovers Creek is maintained.

The Lovers Creek proposed flood hazard limit through the subject property is illustrated on the Lovers Creek Proposed Conditions Natural Hazards Plan (Drawing NH-2) enclosed. The results of the HEC-RAS hydraulic model are enclosed in Appendix G for reference.

7.2 WHISKEY CREEK

The proposed 1:100-year return frequency design storm and Regional (Hurricane Hazel) Storm peak flows through the subject reach of Whiskey Creek established through the hydrologic analysis are estimated to be 5.95 m³/s and 21.07 m³/s, respectively.

The proposed grading between the 1:100-year return frequency design storm floodplain and Regional (Hurricane Hazel) Storm floodplain does not impact flood levels upstream of Highway 400 as Highway 400 creates a backwater condition upstream through Whiskey Creek and sets the Regional Storm water level. Based on these results, the flooding associated with Whiskey Creek across 15 Harvie Road is strictly floodplain storage and this area is not required for



conveyance of flow. The proposed Regional Storm flood elevation along Whiskey Creek between Highway 400 and the proposed Bryne Drive extension remains 291.62 m under proposed conditions and the proposed grading will not aggravate flooding in the area as the floodplain storage volume is being maintained.

The Whiskey Creek proposed flood hazard limit through the subject property is illustrated on the Whiskey Creek Proposed Conditions Natural Hazards Plan (Drawing NH-5) enclosed. The results of the HEC-RAS hydraulic model are enclosed in Appendix H for reference.



8 Erosion Hazard Assessment

Whiskey Creek and Lovers Creek through the subject property are categorized as confined river systems. The erosion hazard limit for both watercourses has been defined in accordance with Section 3.1 of the Provincial Policy Statement, specifically the Ministry of Natural Resources (now the Ministry of Northern Development, Mines, Natural Resources and Forestry) *Technical Guide for River & Stream Systems: Erosion Hazard Limit*. The erosion hazard limit for confined watercourses is defined as the sum of the toe erosion allowance, stable slope allowance and erosion access allowance as follows:

- Toe erosion allowance – the Geotechnical Investigation Report (2022), prepared by WSP Canada describes the existing soils on-site as silty sand, sandy silt, sand, clayey silt, and clayey sand. Given the site soils, a conservative toe erosion allowance of 15 m has been applied.
- Stable slope allowance – In the absence of a slope stability analysis, the stable slope allowance applied is defined as a horizontal distance equal to three (3) times the height of the slope measured farther landward from the toe erosion allowance.
- Erosion Access Allowance – from the stable top of slope, a 6 m erosion access allowance has been applied in accordance with the recommendations of the Technical Guide.

To delineate the erosion hazard limit, cross-sections of the watercourse through the slope were generated from the topographic survey data collected for the subject property and the toe erosion, stable slope, and erosion access allowance were applied to the cross-sections. From the cross-sections, the top of stable slope and erosion hazard limit were superimposed onto the available aerial photo and topographic survey.

The existing erosion hazard limits for Lovers Creek and Whiskey Creek are illustrated on the Lovers Creek Existing Conditions Natural Hazards Plan (Drawing NH-1) and Whiskey Creek Existing Conditions Natural Hazards Plan (Drawing NH-4) enclosed. The toe erosion allowance, stable slope allowance, erosion access allowance and existing erosion hazard limit are illustrated on the Lovers Creek Cross-sections Plan (Drawings NH-3) and Whiskey Creek Cross-sections Plans (Drawings NH-6 and NH-7) enclosed.



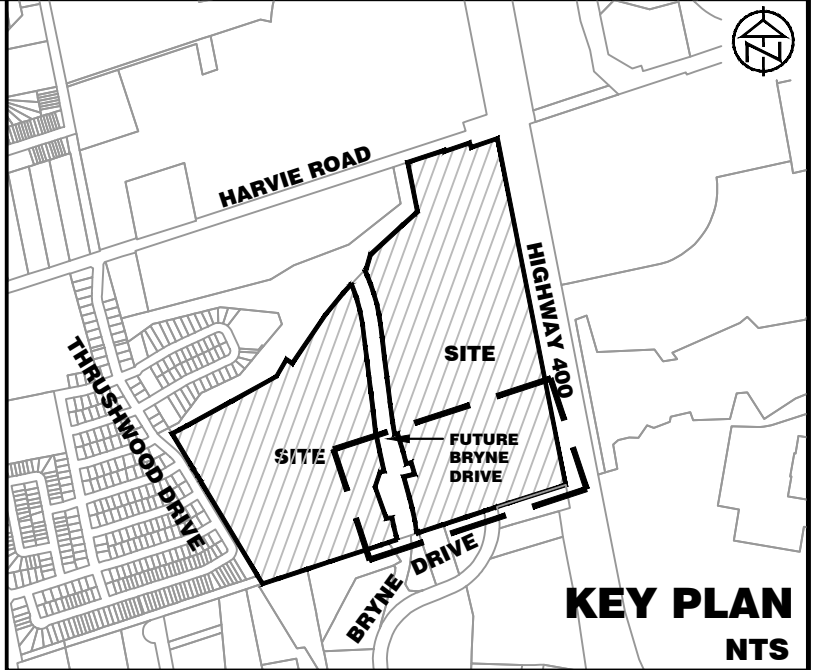
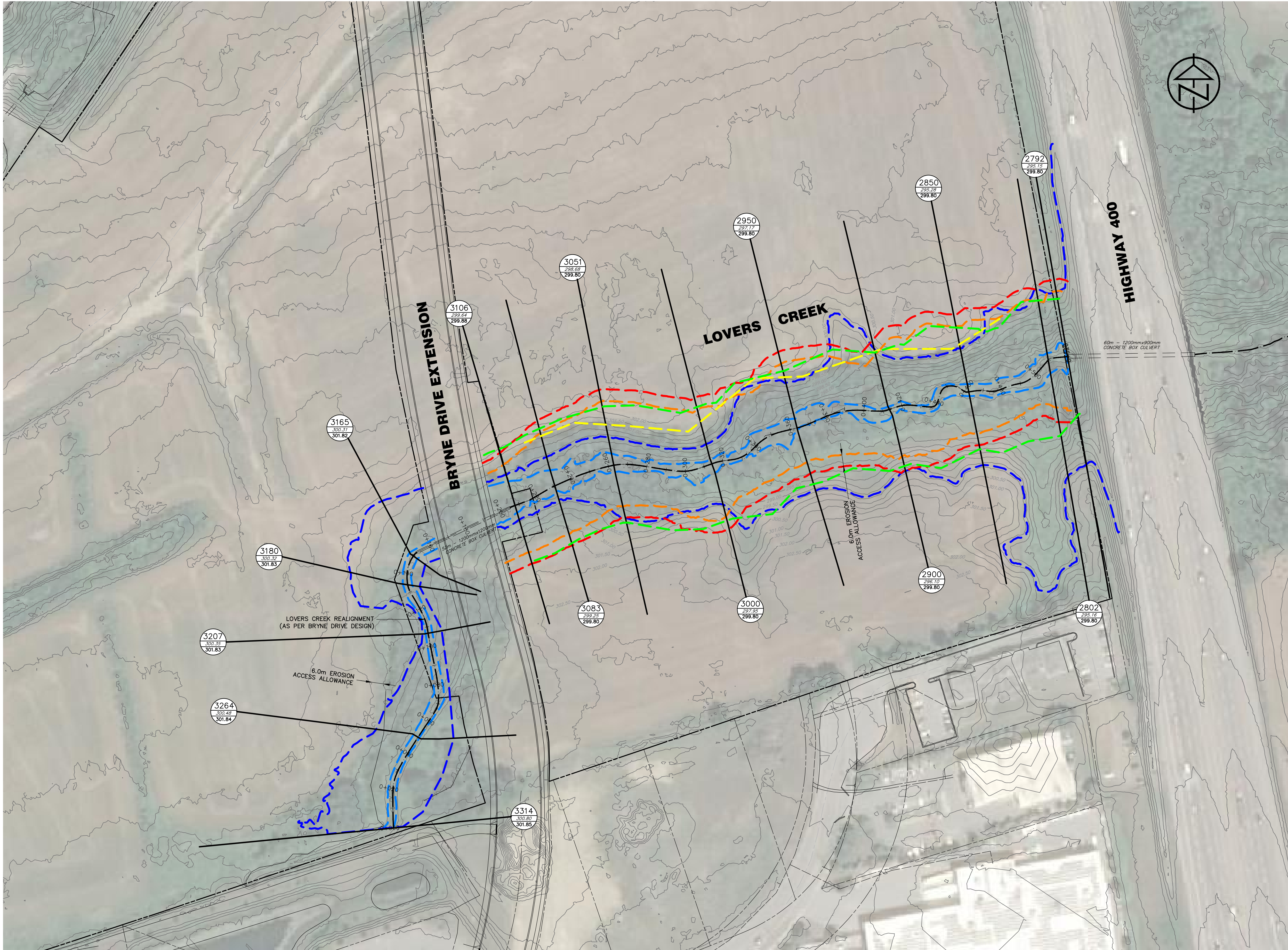
9 Summary

This Natural Hazards Assessment has been prepared in support of Draft Plan approval for the proposed development of 15 Harvie Road in the City of Barrie. This Natural Hazards Assessment has been completed in accordance with Section 3.1 of the Provincial Policy Statement, specifically The Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (formerly known as Ontario Ministry of Natural Resources) Technical Guide River & Stream Systems: Flood Hazard Limit and Erosion Hazard Limit.

The existing 1:100-year return frequency design storm and Regional (Hurricane Hazel) storm floodplains have been established for Lovers Creek and Whiskey Creek through the subject property through a HEC-RAS hydraulic analysis. To regularize the development limits and improve the development design, grading above the 1:100-year flood level along both creeks is proposed. To prevent adverse downstream impacts, the existing floodplain storage provided along both creeks will be maintained through a cut/fill balance. As grading is to occur above the 1:100-year return frequency design storm flood elevations and the developments stormwater management controls will attenuate peak flows to each creek to pre-development levels for the 1:100-year design storm, the 1:100-year flood levels will not change under proposed conditions. The Regional Storm flood elevations along Whiskey Creek will also be maintained while the Lovers Creek Regional Storm Flood elevations will increase across the subject property by 0.01 m due to an increase in the Regional Storm peak flow.

The erosion hazard limit associated with Lovers Creek and Whiskey Creek, both confined river systems through the subject property, has been defined as the sum of a 15 m toe erosion allowance, 3:1 (horizontal:vertical) stable slope allowance, and 6 m erosion access allowance. The Draft Plan of Subdivision has been prepared respecting the natural hazards defined herein and the established natural heritage setbacks.





- LEGEND:**
- 280.0 — EXISTING CONTOURS (0.5 m INTERVALS)
 - LOVERS CREEK
 - 1:100-YEAR DESIGN STORM FLOODLINE
 - EXISTING REGIONAL (HURRICANE HAZEL) STORM FLOODLINE
 - SITE BOUNDARY
 - EXISTING PROPERTY LINE
 - HEC-RAS CROSS-SECTION
 - 1:100-YEAR DESIGN STORM FLOOD ELEVATION
 - REGIONAL (HURRICANE HAZEL) STORM FLOOD ELEVATION
 - EXISTING EROSION HAZARD LIMIT
 - STAKED TOP OF BANK
 - 30m ENVIRONMENTAL SETBACK
 - TOP OF STABLE SLOPE

PROPOSED BRYNE DRIVE DESIGN FROM BRYNE DRIVE IMPROVEMENTS CAPLAN AVENUE TO HARVIE ROAD 100% DESIGN DRAWING SUBMISSION (HATCH LTD, 2020)

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DRAWING REFERENCES

TOPOGRAPHIC FEATURES AND LEGAL BOUNDARIES SHOWN ON THIS PLAN FROM SURVEY (JOB NO. 07-11-125-00-A), PREPARED BY J.D. BARNES LIMITED, OLS., DATED JULY 6, 2017.

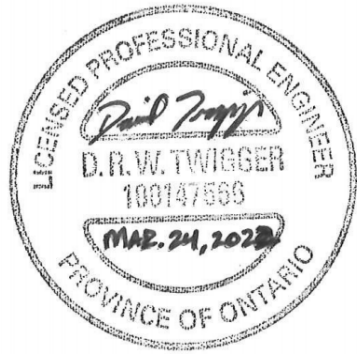
PROPOSED DRAFT PLAN INFORMATION SHOWN ON THIS PLAN FROM DRAWING D3 (PROJECT NO. 9683), PREPARED BY WESTON CONSULTING PLANNING & DESIGN, DATED MARCH 2, 2022.

ELEVATION

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM GEODETIC SURVEY OF CANADA STATION 0011968U500 HAVING A PUBLISHED ELEVATION OF 253.17m.

No.	REVISION DESCRIPTION	DATE
1	NHA 1ST SUBMISSION	03/24/22

ENGINEER STAMP

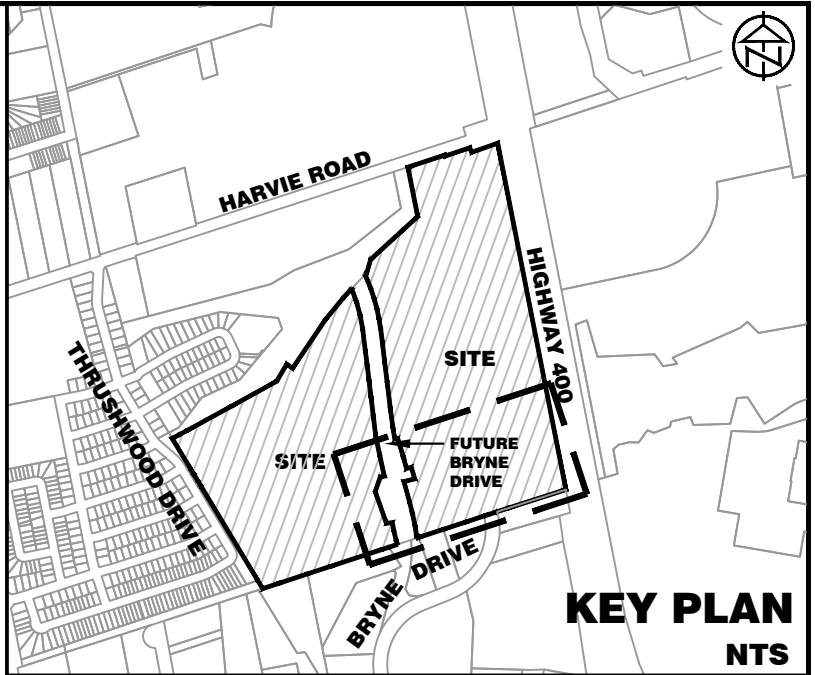
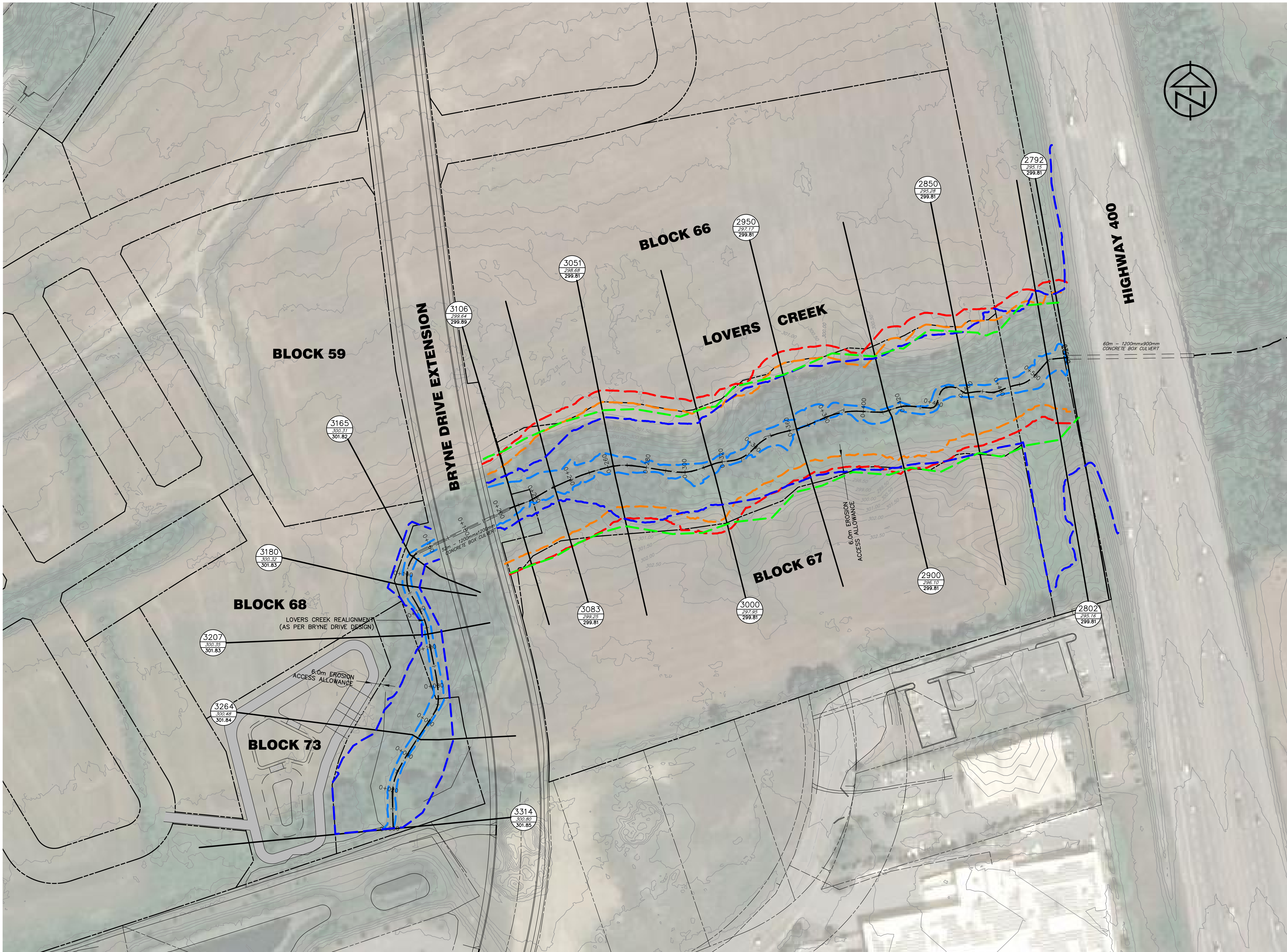


**15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.**

**LOVERS CREEK
EXISTING CONDITIONS
NATURAL HAZARD PLAN**



DESIGN: DM	FILE: 421487	DWG: NH-1
DRAWN: LMB	DATE: FEBRUARY 2022	
CHECK: DRT	SCALE: 1:750	



- LEGEND:**
- EXISTING CONTOURS (0.5 m INTERVALS)
 - LOVERS CREEK
 - 1:100-YEAR DESIGN STORM FLOODLINE
 - PROPOSED REGIONAL (HURRICANE HAZEL) STORM FLOODLINE
 - SITE BOUNDARY
 - EXISTING PROPERTY LINE
 - HEC-RAS CROSS-SECTION
 - 1:100-YEAR DESIGN STORM FLOOD ELEVATION
 - REGIONAL (HURRICANE HAZEL) STORM FLOOD ELEVATION
 - EXISTING EROSION HAZARD LIMIT
 - 30m ENVIRONMENTAL SETBACK
 - TOP OF STABLE SLOPE

PROPOSED BRYNE DRIVE DESIGN FROM BRYNE DRIVE IMPROVEMENTS CAPLAN AVENUE TO HARVIE ROAD 100% DESIGN DRAWING SUBMISSION (HATCH LTD, 2020)

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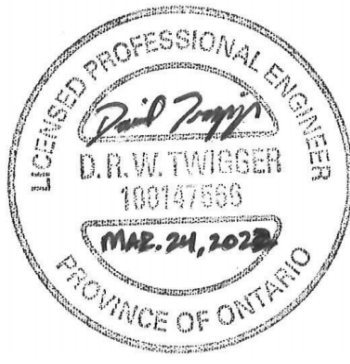
PROPOSED DRAFT PLAN INFORMATION SHOWN ON THIS PLAN FROM DRAWING D3 (PROJECT NO. 9683), PREPARED BY WESTON CONSULTING PLANNING & DESIGN, DATED MARCH 2, 2022.

ELEVATION

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM GEODETIC SURVEY OF CANADA STATION 0011968U500 HAVING A PUBLISHED ELEVATION OF 253.17m.

No.	REVISION DESCRIPTION	DATE
1	NHA 1ST SUBMISSION	03/24/22

ENGINEER STAMP



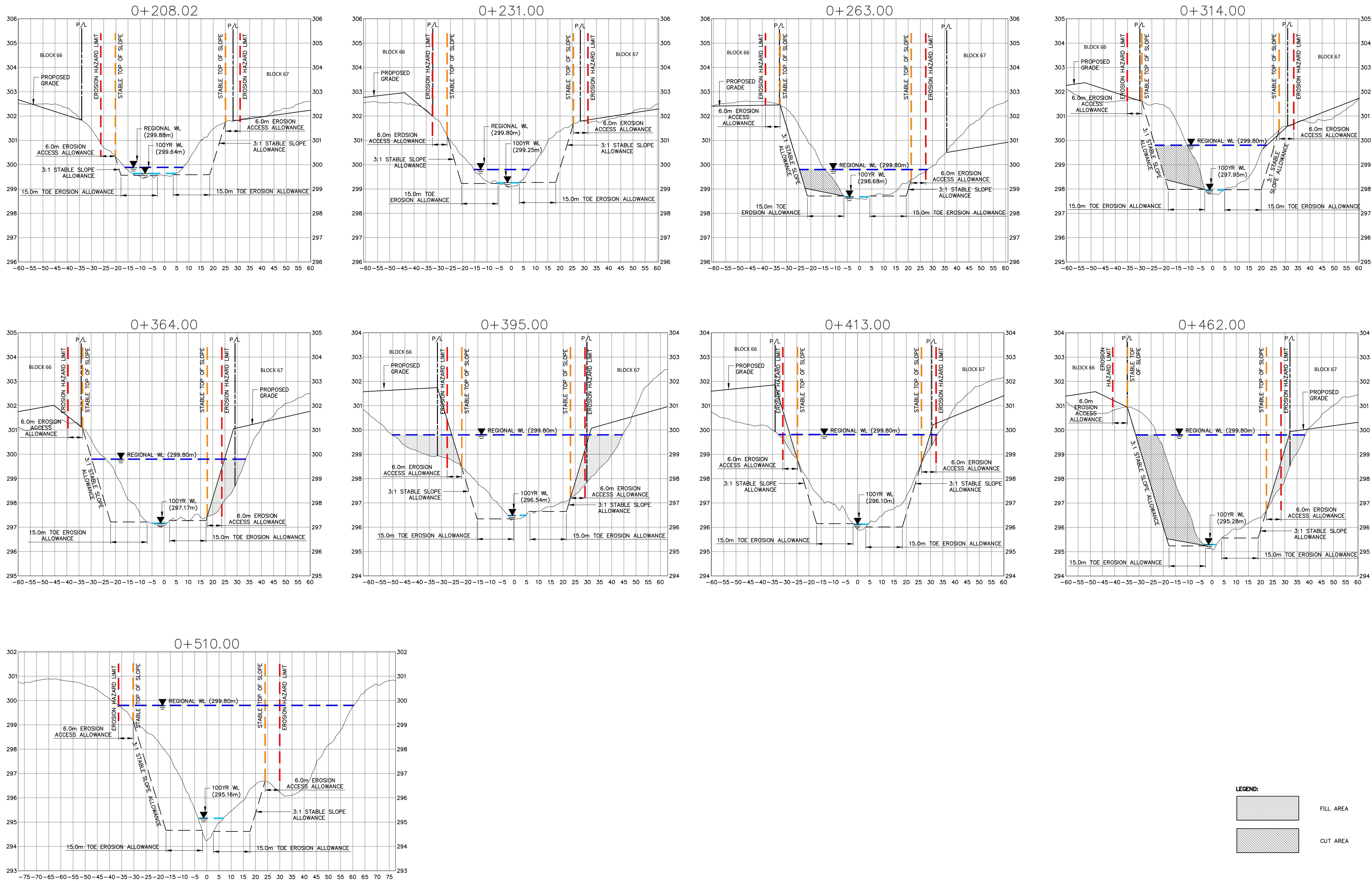
**15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.**

**LOVERS CREEK
PROPOSED CONDITIONS
NATURAL HAZARD PLAN**



DESIGN: DM	FILE: 421487
DRAWN: LMB	DATE: FEBRUARY 2022
CHECK: DRT	SCALE: 1:750

**DWG:
NH-2**



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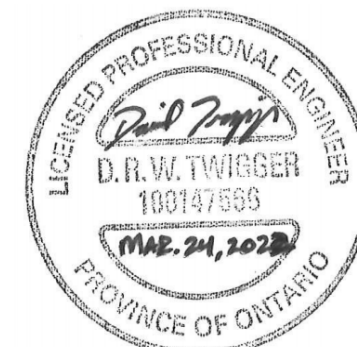
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No.	REVISION DESCRIPTION	DATE
1	NHA 1ST SUBMISSION	03/24/22

ENGINEER STAMP

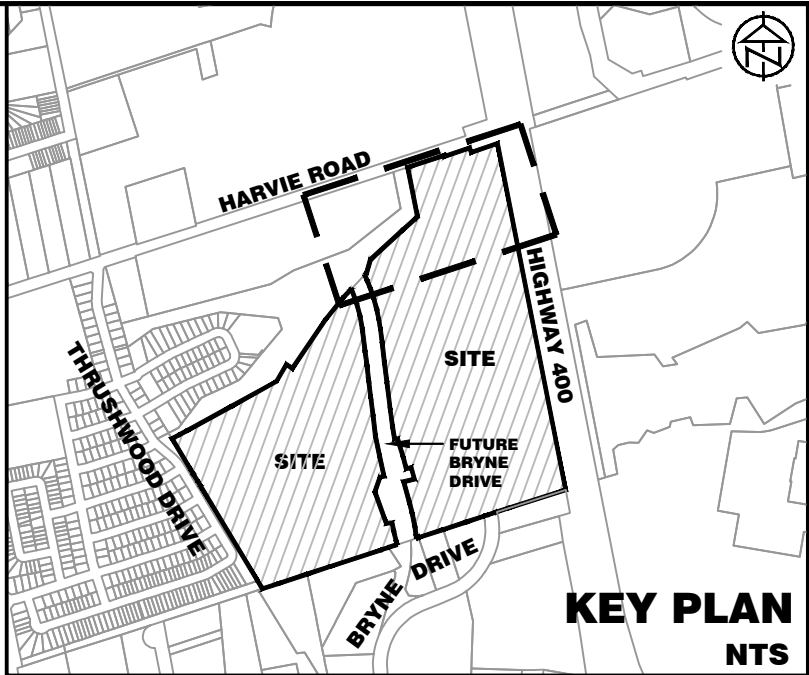
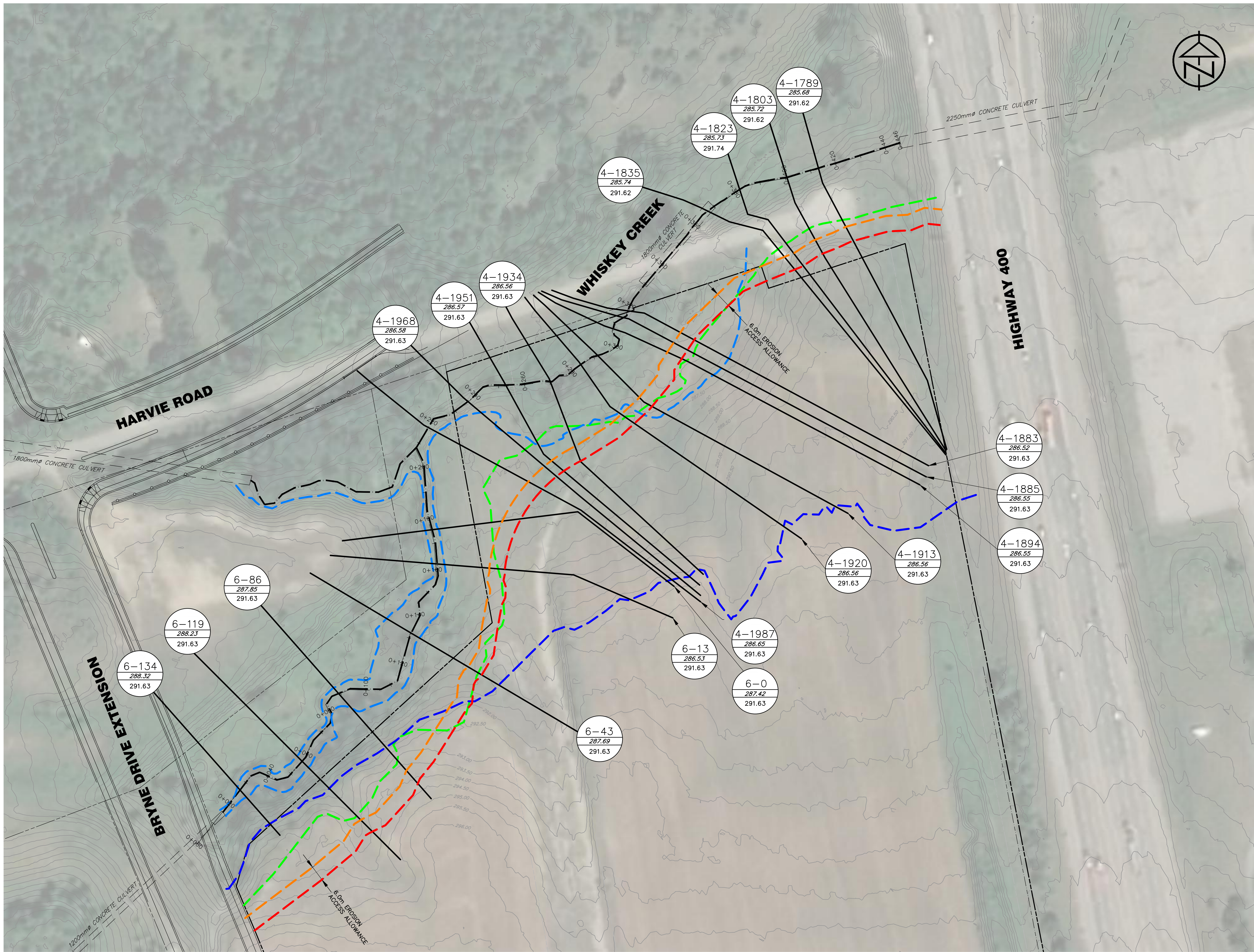


**15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.**

**LOVERS CREEK
CROSS-SECTIONS PLAN**



DESIGN: DM	FILE: 421487	DWG: NH-3
DRAWN: LMB	DATE: FEBRUARY 2022	
CHECK: DRT	SCALE: H1:750, V1:75	



- LEGEND:
- 280.0 EXISTING CONTOURS (0.5 m INTERVALS)
 - LOVERS CREEK
 - 1:100-YEAR DESIGN STORM FLOODLINE
 - EXISTING REGIONAL (HURRICANE HAZEL) STORM FLOODLINE
 - SITE BOUNDARY
 - EXISTING PROPERTY LINE
 - HEC-RAS CROSS-SECTION
 - 1:100-YEAR DESIGN STORM FLOOD ELEVATION
 - REGIONAL (HURRICANE HAZEL) STORM FLOOD ELEVATION
 - EXISTING EROSION HAZARD LIMIT
 - 30m ENVIRONMENTAL SETBACK
 - TOP OF STABLE SLOPE

PROPOSED BRYNE DRIVE DESIGN FROM BRYNE DRIVE IMPROVEMENTS CAPLAN AVENUE TO HARVIE ROAD 100% DESIGN SUBMISSION (HATCH LTD. 2020)

HARVIE ROAD IMPROVEMENTS FROM HARVIE ROAD AND BIG BAY POINT ROAD NEW CROSSING - HIGHWAY 400 CONTRACT #2018-OCT DRAWING SET (HATCH-ISSUED FOR CONSTRUCTION SEPTEMBER 2018)

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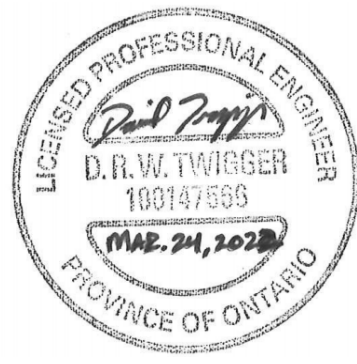
PROPOSED DRAFT PLAN INFORMATION SHOWN ON THIS PLAN FROM DRAWING D3 (PROJECT NO. 9683), PREPARED BY WESTON CONSULTING PLANNING & DESIGN, DATED MARCH 2, 2022.

ELEVATION

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No.	REVISION DESCRIPTION	DATE
1	NHA 1ST SUBMISSION	03/24/22

ENGINEER STAMP



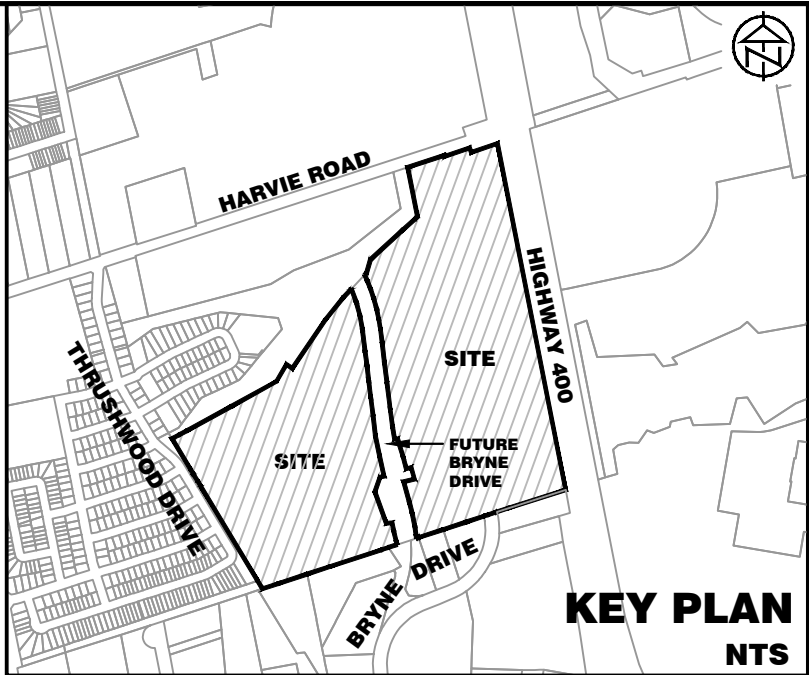
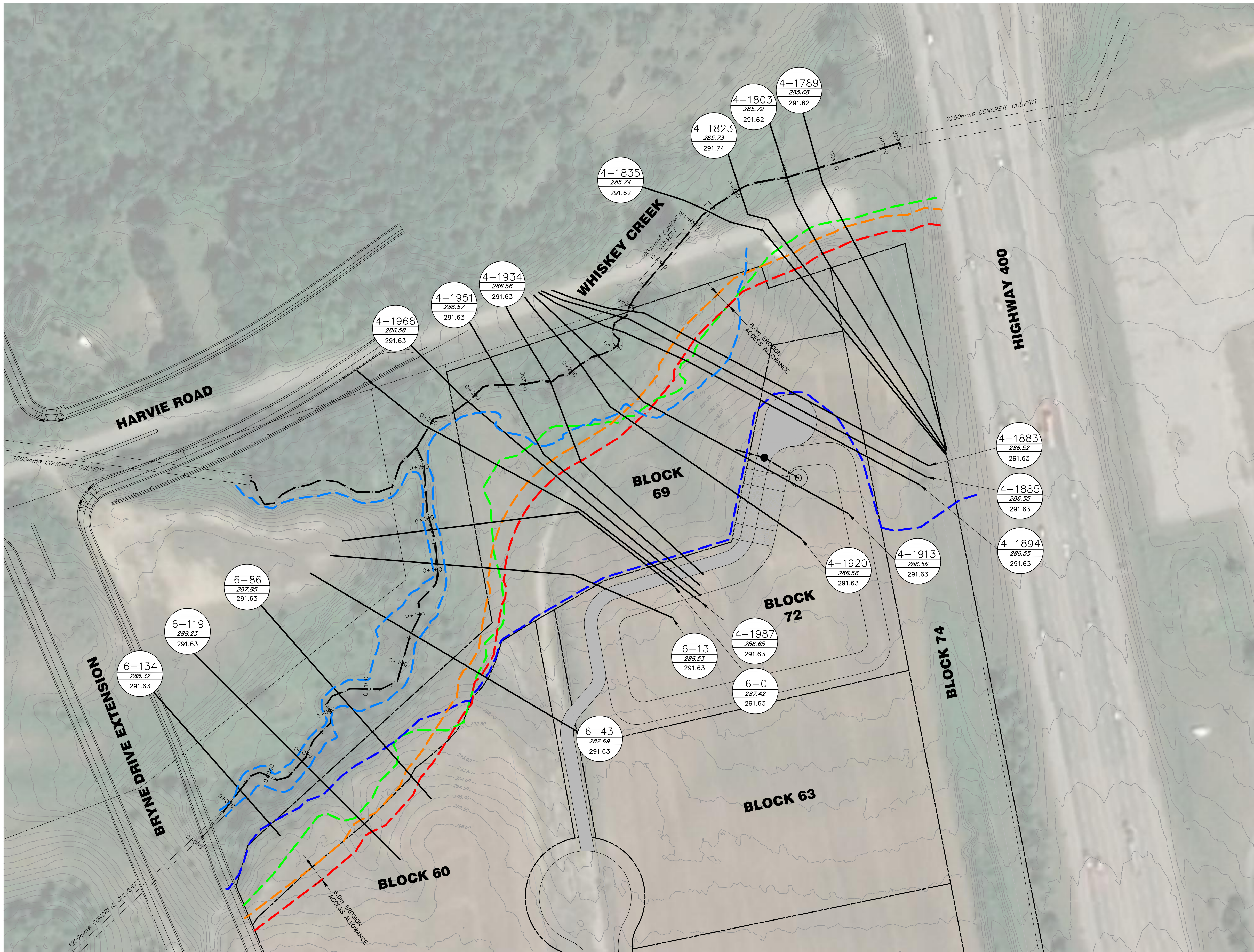
15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.

WHISKEY CREEK
EXISTING CONDITIONS
NATURAL HAZARD PLAN



DESIGN: DM	FILE: 421487
DRAWN: LMB	DATE: FEBRUARY 2022
CHECK: DRT	SCALE: 1:750

DWG:
NH-4



- LEGEND:
- 280.0 EXISTING CONTOURS (0.5 m INTERVALS)
 - LOVERS CREEK
 - 1:100-YEAR DESIGN STORM FLOODLINE
 - PROPOSED REGIONAL (HURRICANE HAZEL) STORM FLOODLINE
 - SITE BOUNDARY
 - EXISTING PROPERTY LINE
 - HEC-RAS CROSS-SECTION
 - 1:100-YEAR DESIGN STORM FLOOD ELEVATION
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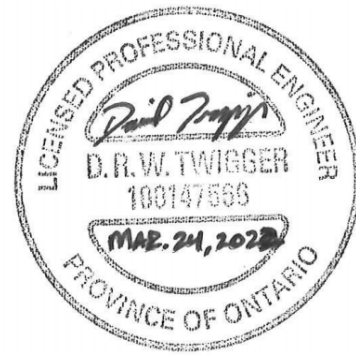
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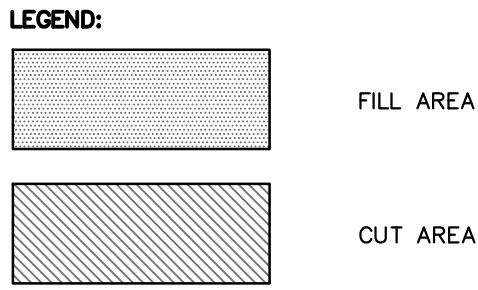
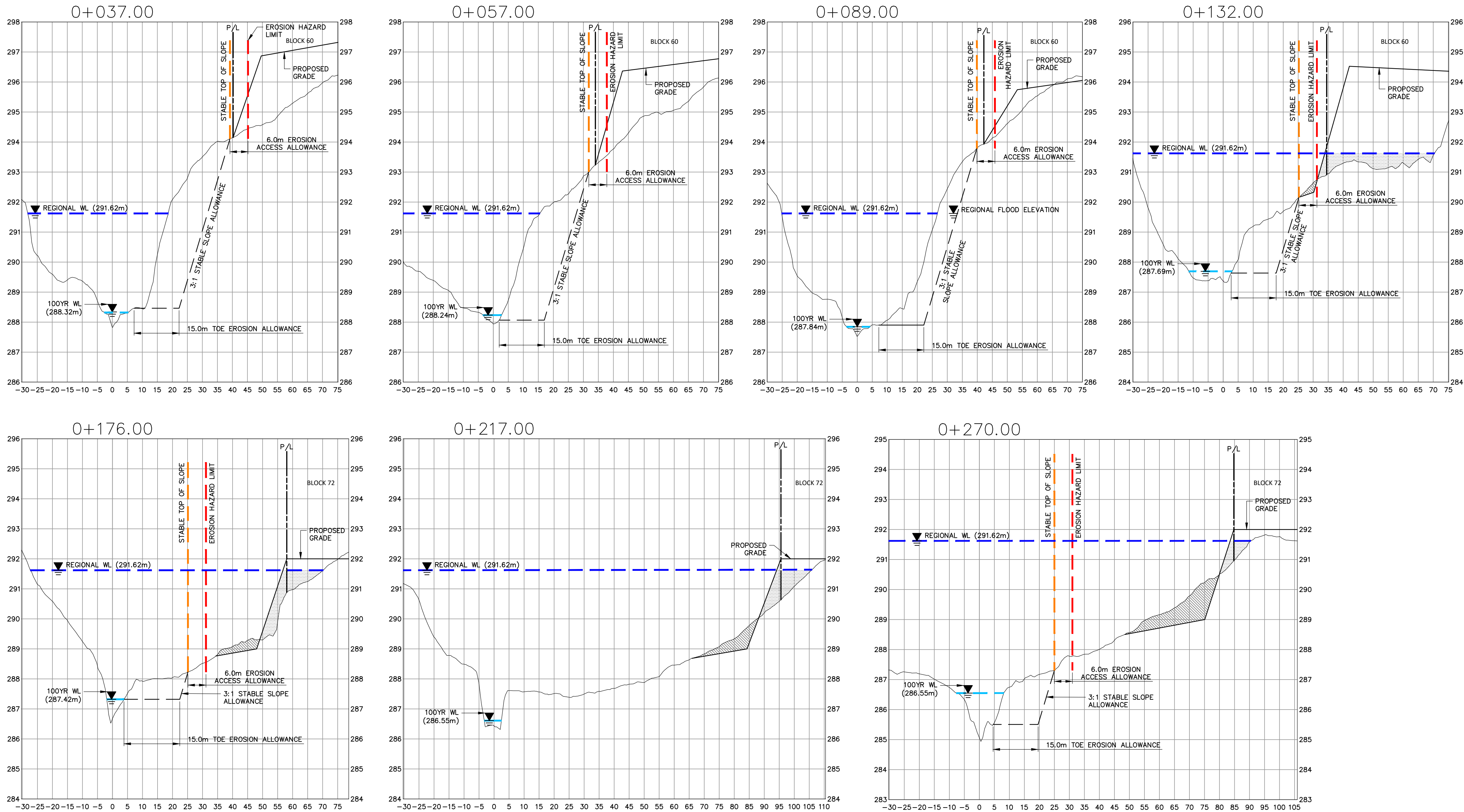


15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.

WHISKEY CREEK
PROPOSED CONDITIONS
NATURAL HAZARD PLAN



DESIGN: DM	FILE: 421487	DWG: NH-5
DRAWN: LMB	DATE: FEBRUARY 2022	
CHECK: DRT	SCALE: 1:750	



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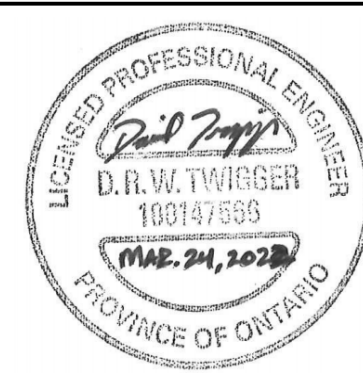
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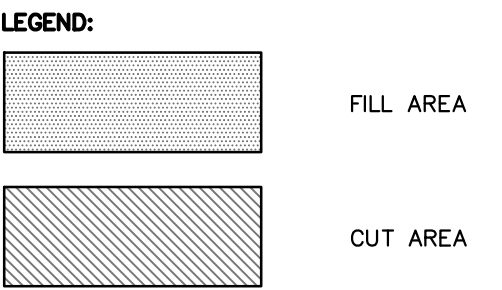
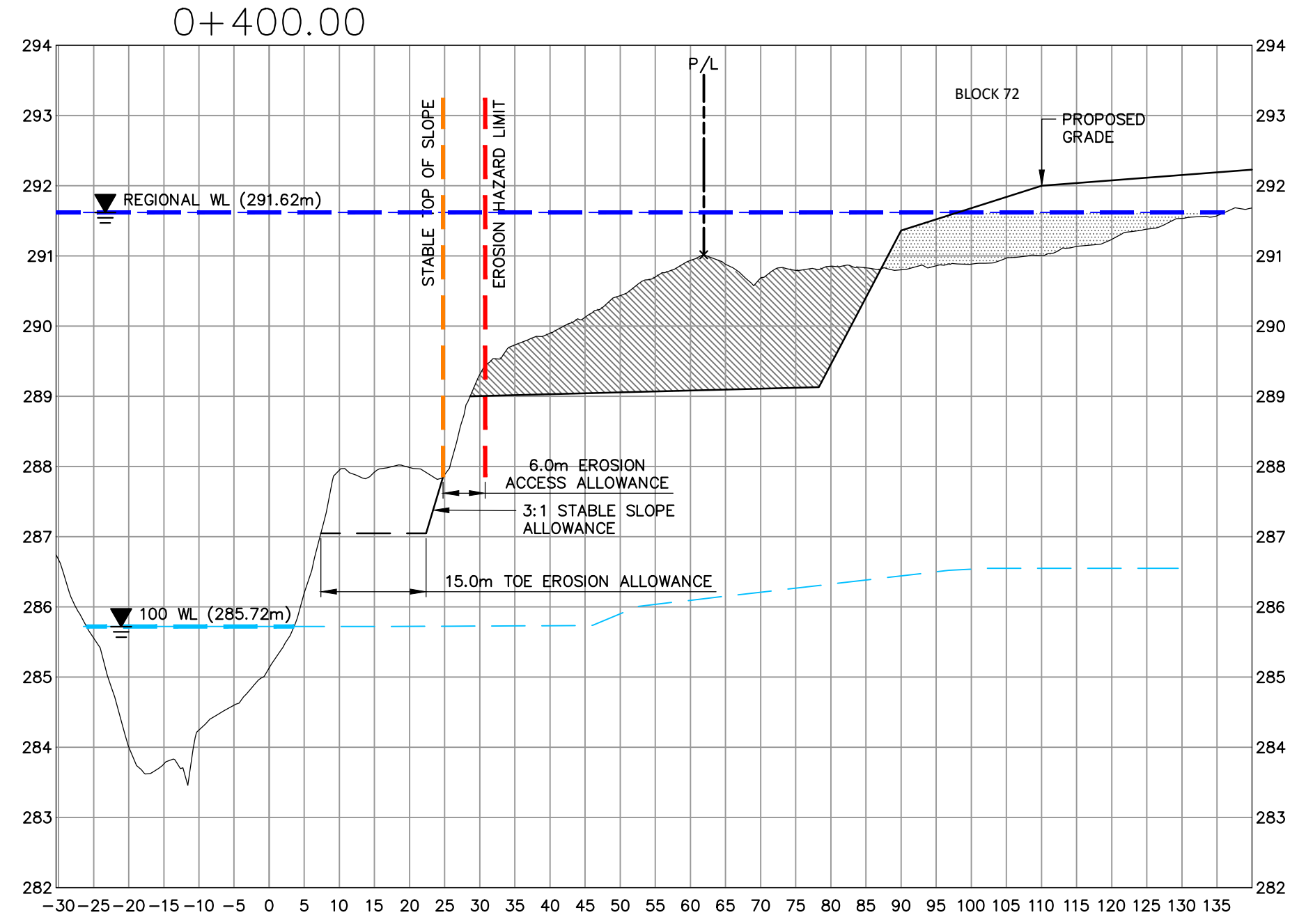
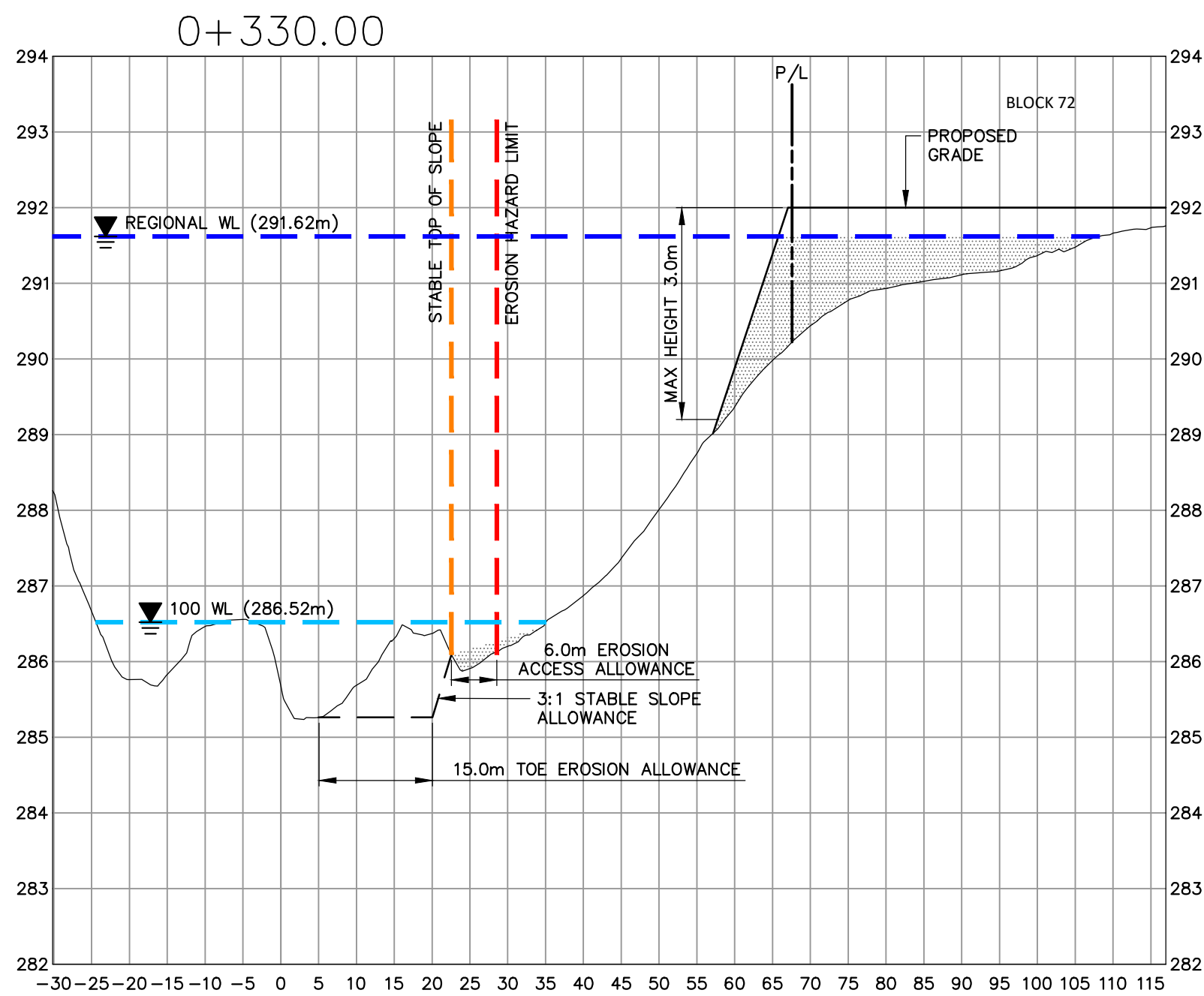
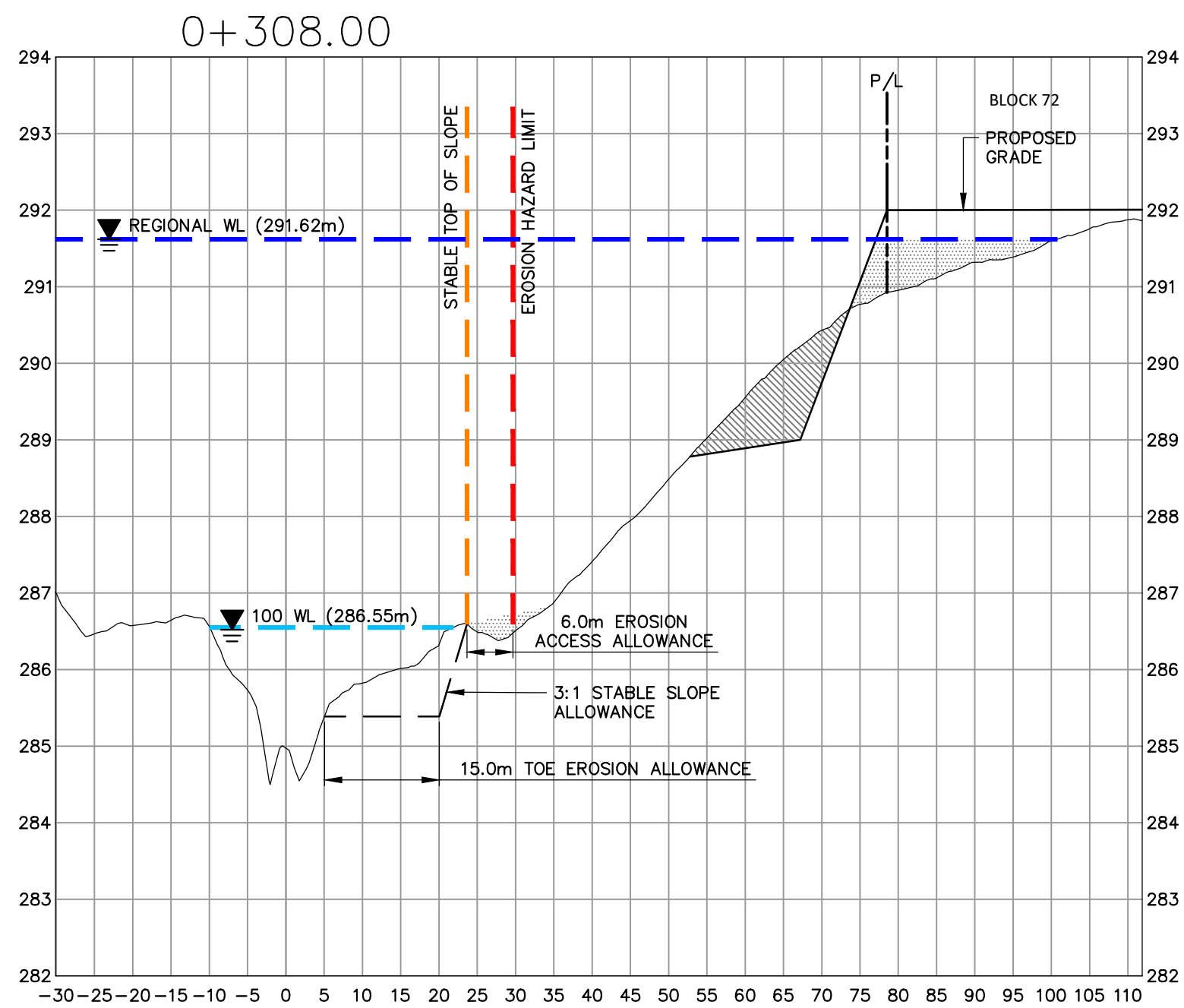


15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.

WHISKEY CREEK
CROSS-SECTIONS PLAN



DESIGN: DM	FILE: 421487	DWG:
DRAWN: LMB	DATE: FEBRUARY 2022	NH-6
CHECK: DRT	SCALE: H1:750, V1:75	



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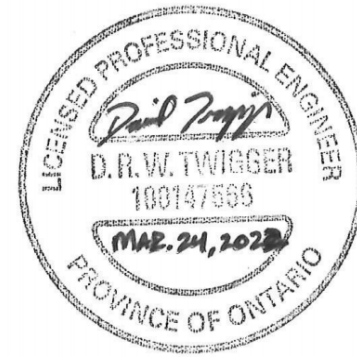
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No.	REVISION DESCRIPTION	DATE
1	NHA 1ST SUBMISSION	03/24/22

ENGINEER STAMP



15 HARVIE ROAD
CITY OF BARRIE
BARRIE - BRYNE DEVELOPMENTS LTD.

WHISKEY CREEK
CROSS-SECTIONS PLAN

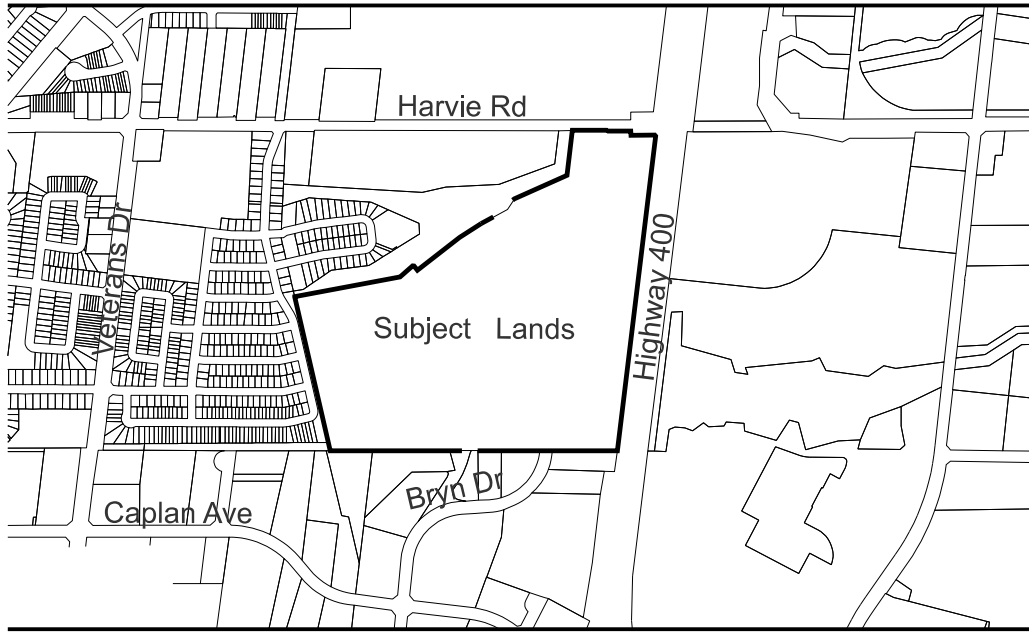


DESIGN: DM	FILE: 421487	DWG: NH-7
DRAWN: LMB	DATE: FEBRUARY 2022	
CHECK: DRT	SCALE: H1:750, V1:75	

Appendix A: Draft Plan of Subdivision

DRAFT PLAN OF SUBDIVISION

PART OF LOTS 5, 6 AND 7
REGISTERED PLAN 67
AND
PART OF LOT 7
CONCESSION 12
NOW IN THE GEOGRAPHIC TOWNSHIP OF INNISFIL
CITY OF BARRIE
COUNTY OF SIMCOE



OWNER'S CERTIFICATE:
I authorize Weston Consulting Group Inc. to prepare and submit
this plan for draft approval.

Date: _____

BARRIE-BRYNE DEVELOPMENTS
3200 HIGHWAY 7
VAUGHAN, ON L4K 5Z5
647-362-3212

SURVEYOR'S CERTIFICATE:
I hereby certify that the boundaries of the lands being subdivided
and their correct relationship to the adjacent lands are accurately
and correctly shown on this plan.

Date: _____

PIER DE ROSA, OLS, OUP
JD BARNES LTD
142 COMMERCE PARK DRIVE, UNIT V
BARRIE, ONTARIO L4N 5W6
PHONE: _____

ADDITIONAL INFORMATION:
[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13],
as amended to December 12, 2021.
a), b), e), f), g), j) & l) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - sandy silt to sand
k) - all services to be made available by developer

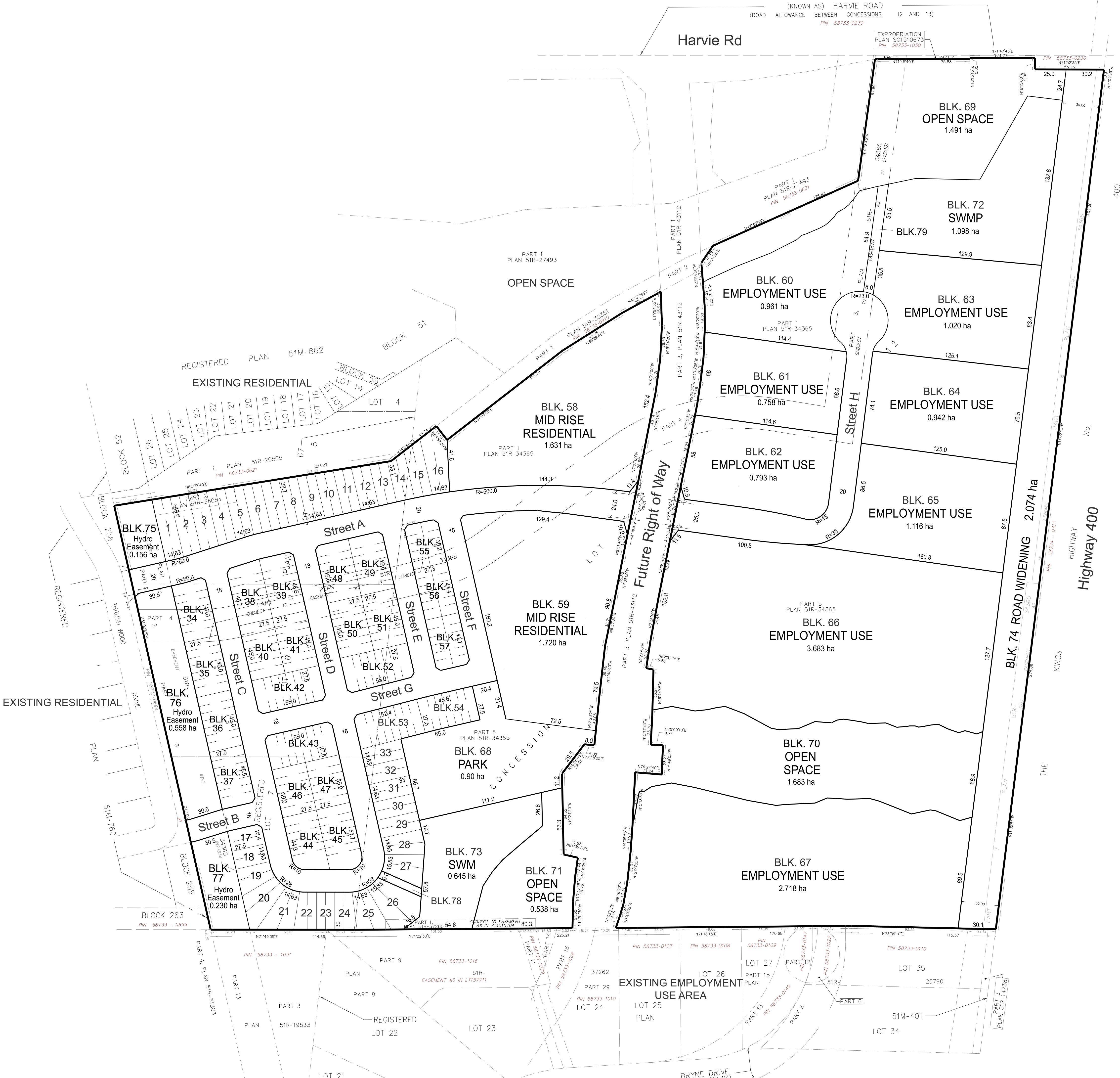
DEVELOPMENT STATISTICS:	
BLOCKS	AREA(HA)
Semi-Detached (7.315 m) [Lots 1-33]:	1.914 ha
Street Townhouses (6.0 m) [Blk 34-54]:	2.721 ha
Back to Back Townhouses (6.4 m) [Blk 55-57]:	0.322 ha
Mid Rise Residential [Blk 58-59]:	3.351 ha
Employment Uses [Blks 60-67]:	11.992 ha
Park [Block 68]:	0.900 ha
Open Space [Blk 69-71]:	3.712 ha
SWMP [Blk 72,73]:	1.743 ha
Road Widening [Blk 74]:	2.074 ha
Hydro Easement [Blk 75-77]:	0.944 ha
Access Easement [Blk 78,79]:	0.092 ha
Roads:	3.496 ha
Total:	33.261 ha

SCALE 1:1500
0 75m

WESTON CONSULTING
Vaughan: 201 Millway Ave, Suite 19
Vaughan, Ontario L4K 5K8
T. 905.738.6060 F. 905.738.6637
Toronto: 268 Berkeley St.
Toronto, Ontario M5A 2X1
T. 416.640.9917 F. 905.738.6637

REVISIONS LIST	
02 MAR 2021	Revise Park & SWM & Open Space limits per Constraints Plan & dimensions & stats.
27 JAN 2021	Insert new survey. Update blocks, dimensions & stats.
10 JAN 2021	Revise S.W.M.P. Blk 72. Add block dimensioning & update stats.
23 DEC 2021	Revise Semi-detached frontages to 7.315 m wide
21 DEC 2021	First draft

File Number: 9683
Drawn By: SM
Planner: RG
Scale: 1:1500
CAD: 9683/D3 Draft Plan_2022_03_02.dgn
Drawing Number: **D3**



Appendix B: Background Information

52m - 1.2 x 1.2m CONC. BOX
CULVERT WITH 0.3m
EMBODMENT @ 0.6%

RIVERSTONE INLET TREATMENT
ROUNDED GRANITE FIELD STONE
6m L x 3m W x 0.3m D

LOVERS CREEK REALIGNMENT
2m BOTTOM WIDTH
SIDE SLOPES 3:1
SEE DETAILS IN DWG. NO. STM05

PARABOLIC GRATE TO
PREVENT TRESPASSING
AS PER B04.050

RIP-RAP EMBANKMENT PROTECTION
R50 UP TO 301.12m

LOVERS CREEK WEST SIDE DITCH
2m BOTTOM WIDTH
SIDE SLOPE 2:1
SEE DETAILS IN DWG. NO. STM06



PLAN: LOVERS CREEK CULVERT
SCALE 1:250

LOVERS CREEK EAST SIDE DITCH
2m BOTTOM WIDTH
SIDE SLOPES 3:1
SEE DETAILS IN DWG. NO. STM06

RIP-RAP EMBANKMENT PROTECTION
R50 UP TO ELEV. 301.12m

ENDWALL WITH GRATING
AS PER OPSD B04.050

RIVER STONE OUTLET TREATMENT
ROUNDED GRANITE FIELD STONE
10.4m L x 6.6m W x 0.4m D
SEE OUTLET POOL DETAIL 1

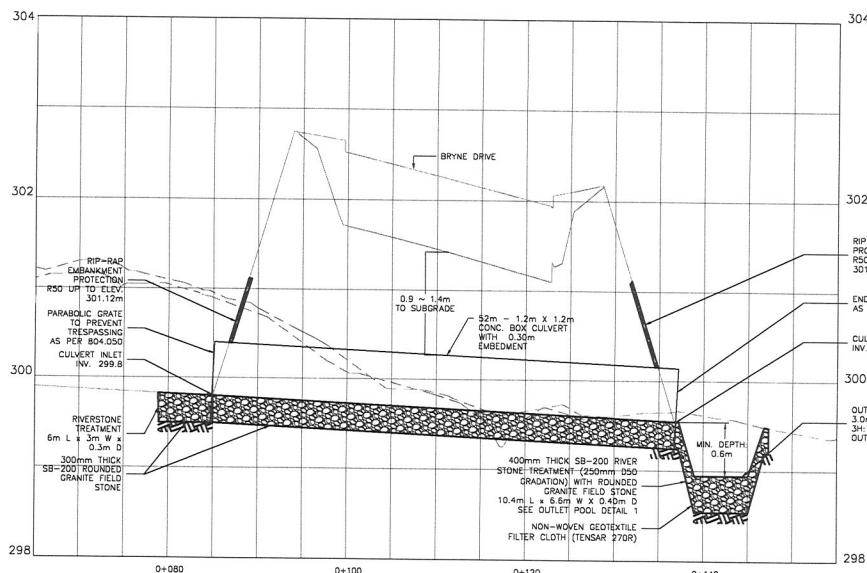
EXISTING CREEK
LEFT BANK

EXISTING CREEK
CENTERLINE

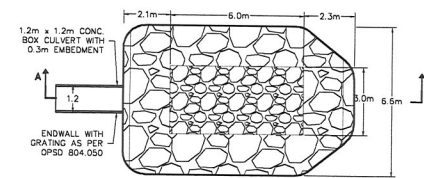
EXISTING CREEK
RIGHT BANK

NOTES:

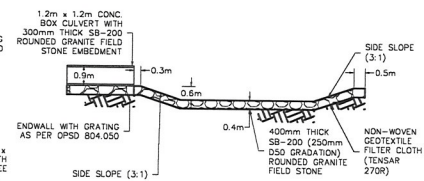
1. FOR GENERAL ENVIRONMENTAL NOTES, REFER TO (DWG. NO. STM12)
2. CULVERT CROSSING DETAIL TO BE READ IN CONJUNCTION WITH POST DEVELOPMENT CATCHMENT PLAN (DWG. NO. STM02A)
3. RIP-RAP/RIVER STONE TREATMENT DIMENSION, LENGTH (L) X WIDTH (W) X DEPTH (D)
4. ALL RIP-RAP/RIVER STONE TREATMENT SHOULD BE ROUNDED GRANITE FIELD STONE.
5. FOR LOVERS CREEK REALIGNMENT DETAILS, REFER TO DWG. NO. STM 05.
6. FOR LOVERS CREEK WEST SIDE AND EAST SIDE DITCH, REFER TO DWG. NO. STM 06.



PROFILE: LOVERS CREEK CULVERT
SCALE 1:250



PLAN OUTLET POOL DETAIL 1
SCALE 1:10



SECTION A-A
SCALE 1:10

GENERAL NOTES
REFER TO CURRENT CITY OF BARRIE STANDARDS FOR APPLICABLE GENERAL NOTES.

HATCH

BENCH MARKS
DISTANCE NOTE
DISTANCES SHOWN HEREIN ARE GRID DISTANCES AND CAN BE CONVERTED TO GROUND DISTANCES BY MULTIPLYING BY THE BEARING NOTE.
BEARING NOTE
BARRIE VERT. CONTROL NETWORK IS BASED ON THE 1984 NAD 83 DATUM. BARRIE VERT. CONTROL NETWORK IS BASED ON THE 1984 NAD 83 DATUM. BARRIE VERT. CONTROL NETWORK IS BASED ON THE 1984 NAD 83 DATUM.
BENCH MARK V010065470
BENCH MARK V010065470 IS A CONCRETE HEADWALL OF UNDERGROUND STORM SEWER EXISTENCE ON WEST SIDE OF BRYNE DRIVE NORTH 150m WEST OF CENTRAL LINE OF BRYNE DRIVE. BENCH MARK V010065470 IS A CONCRETE HEADWALL OF UNDERGROUND STORM SEWER EXISTENCE ON WEST SIDE OF BRYNE DRIVE NORTH 150m WEST OF CENTRAL LINE OF BRYNE DRIVE. BENCH MARK V010065470 IS A CONCRETE HEADWALL OF UNDERGROUND STORM SEWER EXISTENCE ON WEST SIDE OF BRYNE DRIVE NORTH 150m WEST OF CENTRAL LINE OF BRYNE DRIVE.

NO.	REVISIONS	DATE	APPROVED
A	30% SUBMISSION	14/02/2018	T.K.
B	60% DD SUBMISSION	16/03/2018	T.K.
C	90% DD SUBMISSION	20/01/2018	T.K.
D	100% DD SUBMISSION	18/09/2020	T.K.

CITY OF BARRIE
ACCEPTED

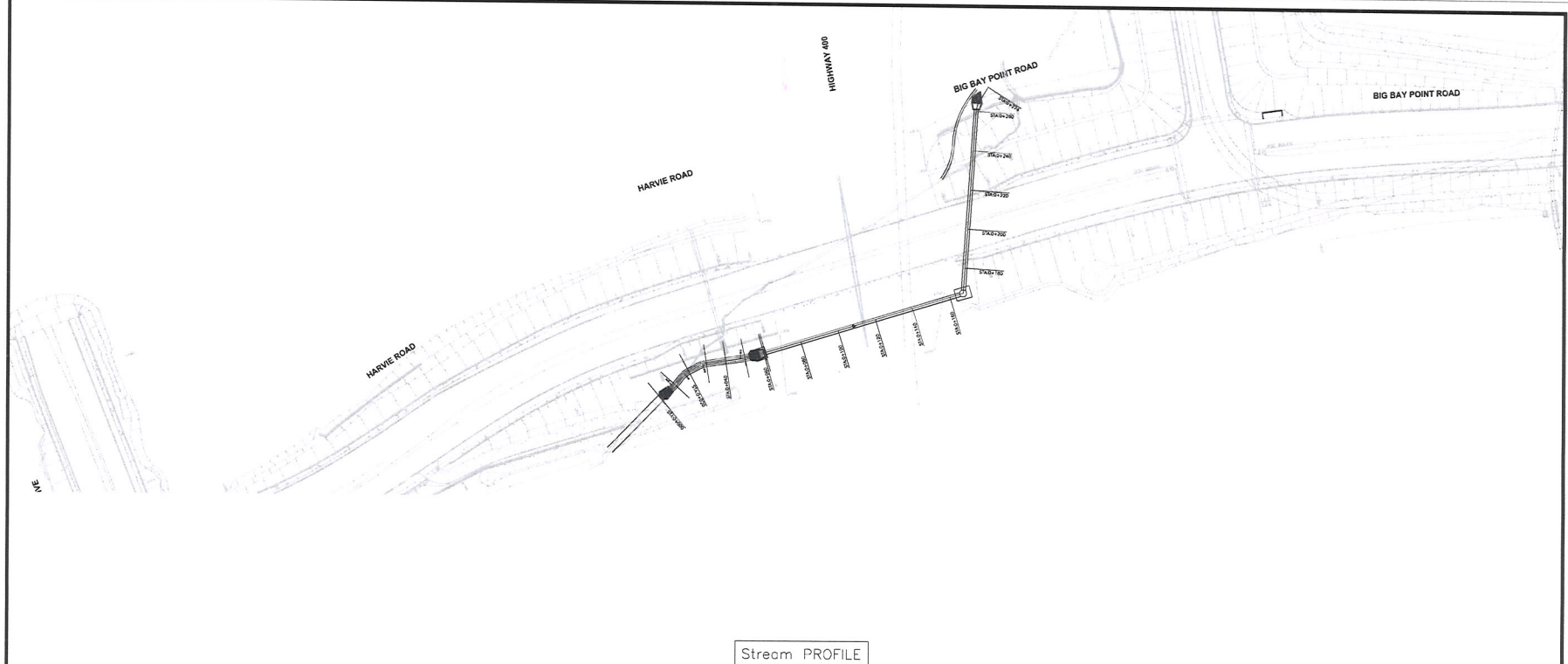
DATE: 18/09/2020
DEPARTMENT OF INFRASTRUCTURE

BRYNE DRIVE IMPROVEMENTS
CAPLAN AVENUE TO HARVE ROAD

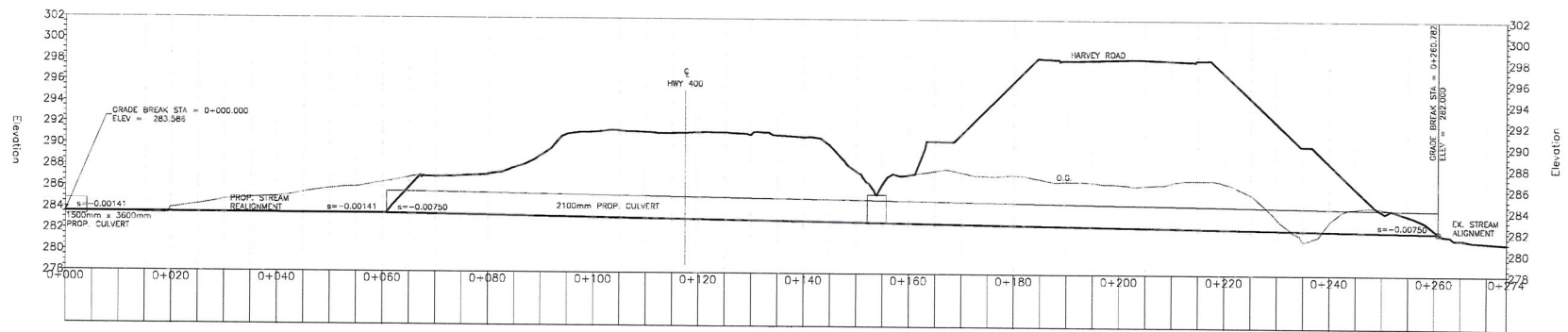
PROPOSED LOVERS CREEK
CULVERT
PLAN & PROFILE

Barrie
ENGINEERING DEPARTMENT

SCALE: HORIZ. N.T.S. VERT. N.T.S. CONTRACT NO. STM04
DESIGN: JZ DRAWN: JZ SHEET NO. 000
REVIEWED: DJ DATE: 2018.11.20



Stream PROFILE



HATCH

NO.	REVISIONS	DATE	APPROVED
A	90% SUBMISSION	2017/10/16	B.R.

NOT TO SCALE

HARVIE AND BIG BAY POINT ROAD
NEW CROSSING - HIGHWAY 400

PLAN / PROFILE
HARVIE ROAD
STREAM REALIGNMENT

Barrie

ENGINEERING DEPARTMENT

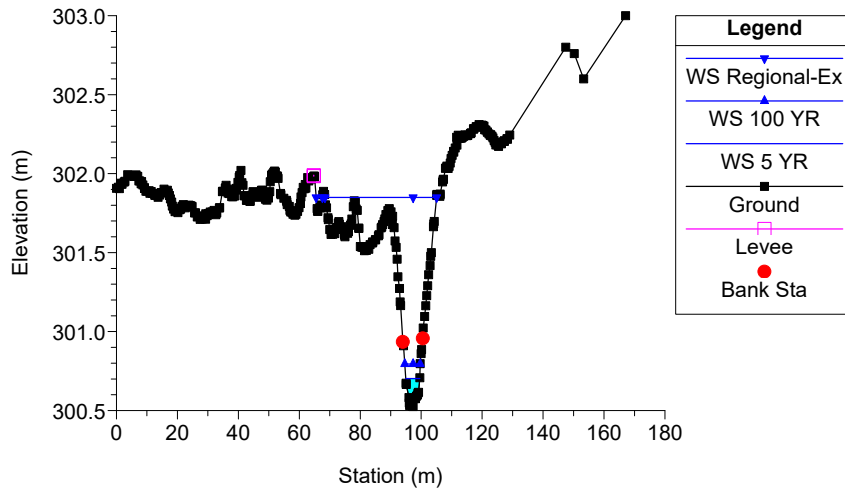
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DESIGN: DJ	DRAWN: CL	SHEET NO.
REVIEWED: -A-	DATE: 2017.10.16	STM11

DOC: H351997-70-260-SEG1-0024 REV-001

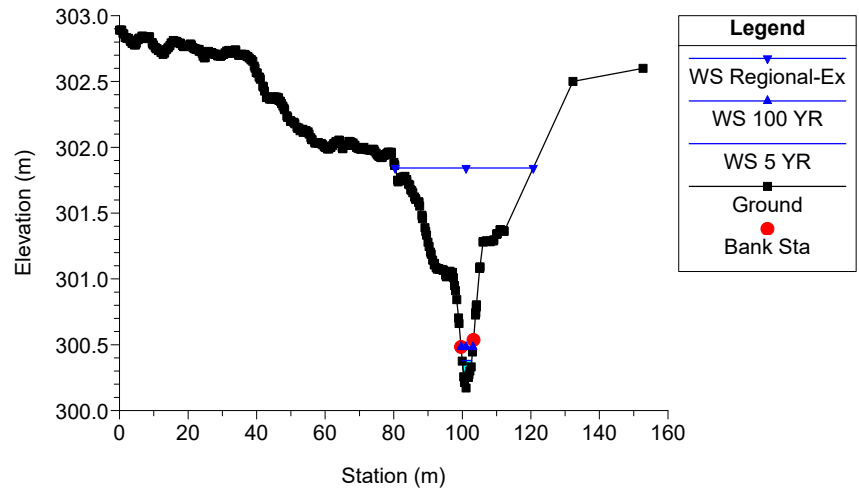
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PLOT LOCATION: C:\Users\hatch\Documents\Hatch\Projects\2017\H351997-70-260-SEG1-0024\STM11.dwg
PLOT SCALE: 1:50

Appendix C: Lovers Creek Existing Condition Hydraulic Model Results

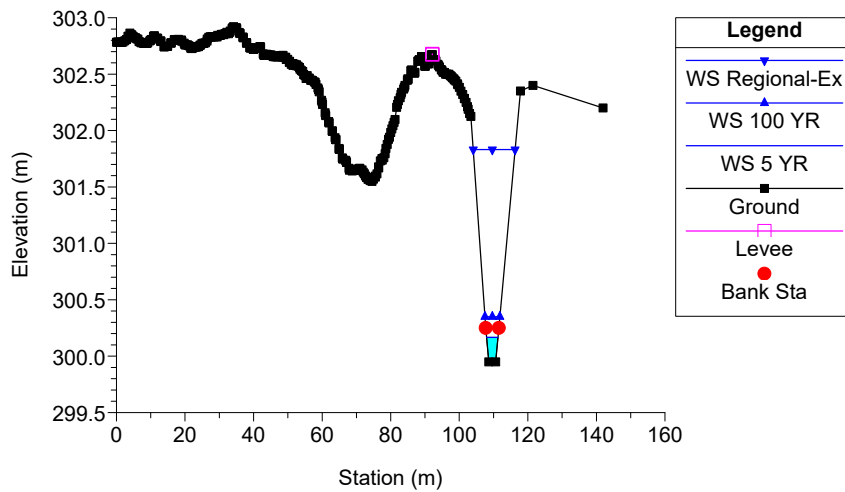
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3314 Revised per Proposed Bryne Drive Extension



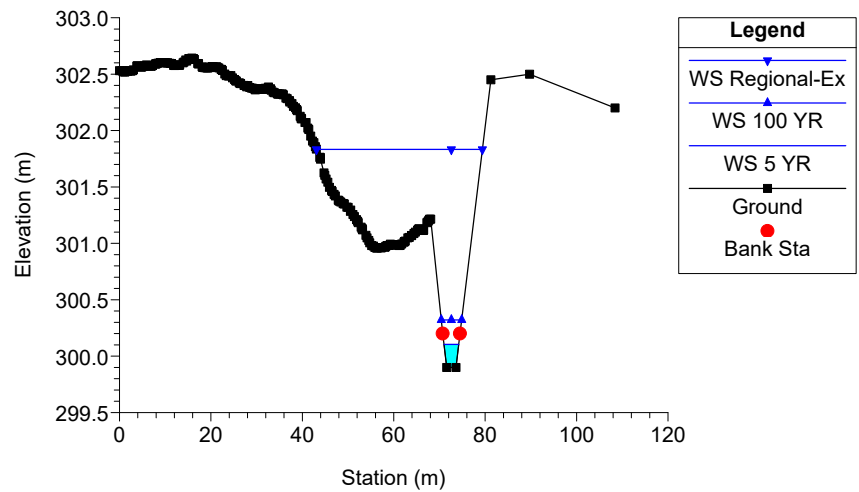
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3264 Revised per Proposed Bryne Drive Extension



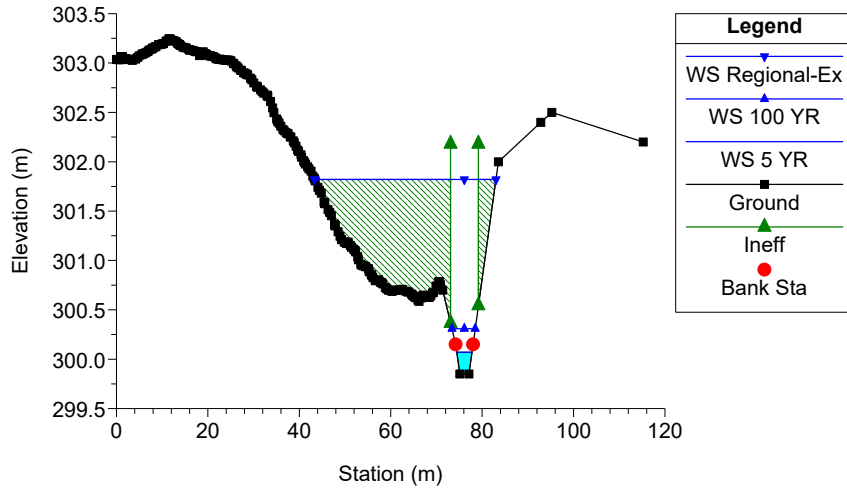
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3207 Revised per Proposed Bryne Drive Extension



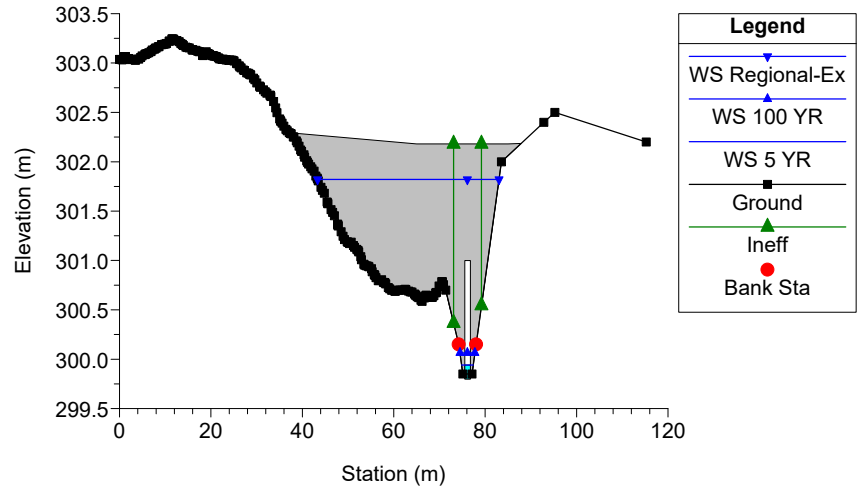
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3180 Revised per Proposed Bryne Drive Extension



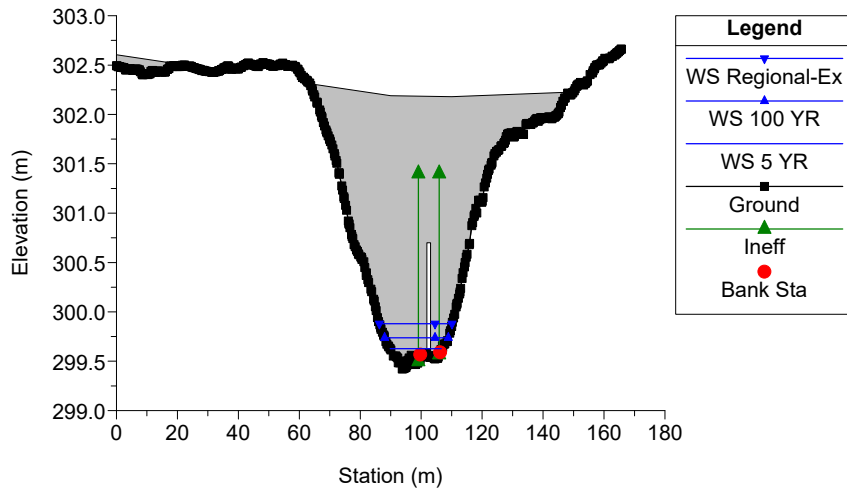
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3165 Revised per Proposed Bryne Drive Extension



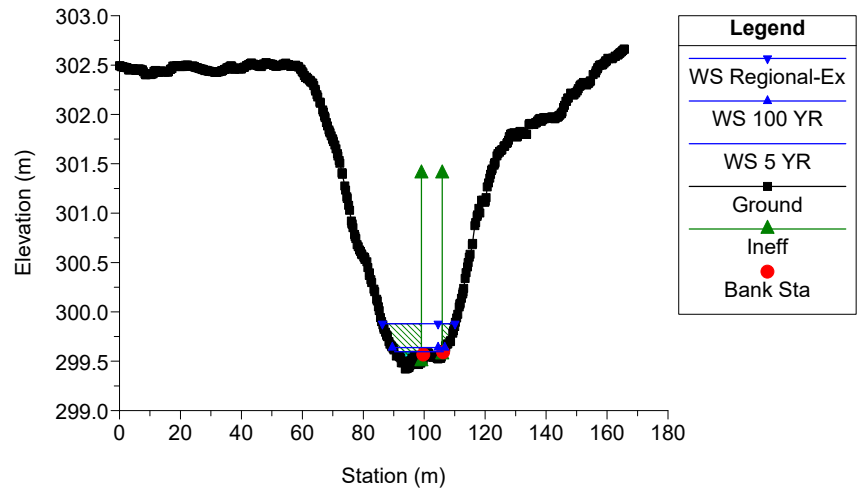
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3135 Culv



Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3135 Culv

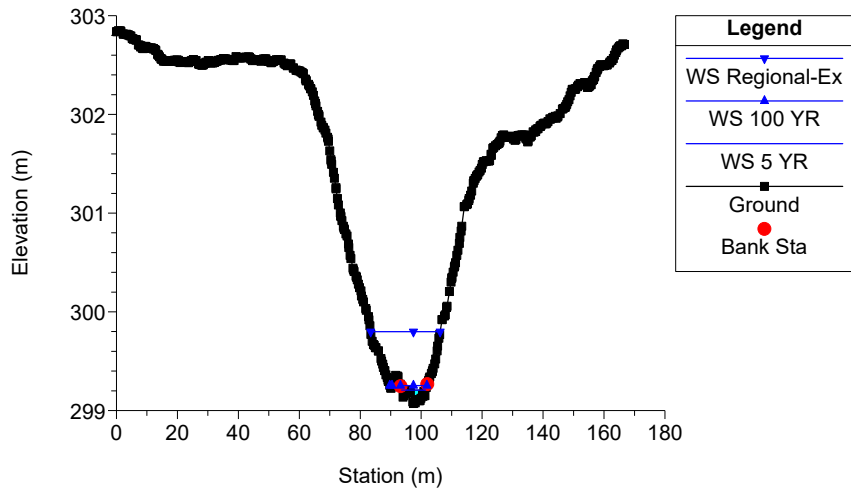


Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3106 Culv



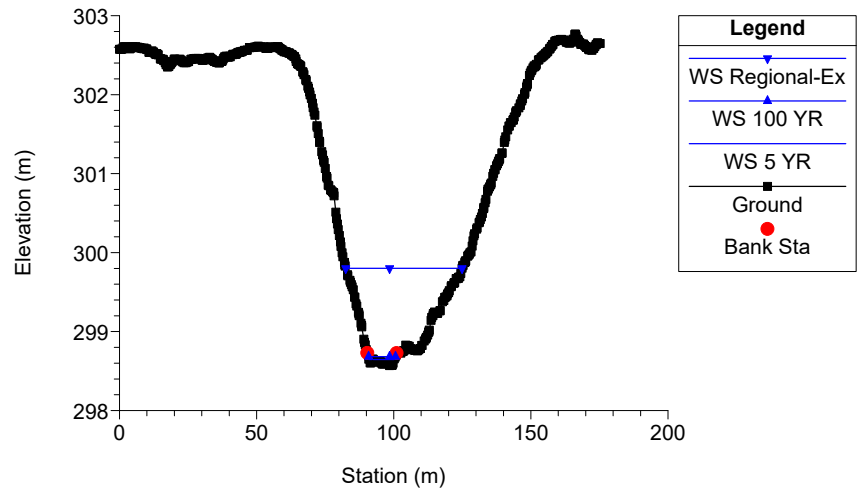
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3083



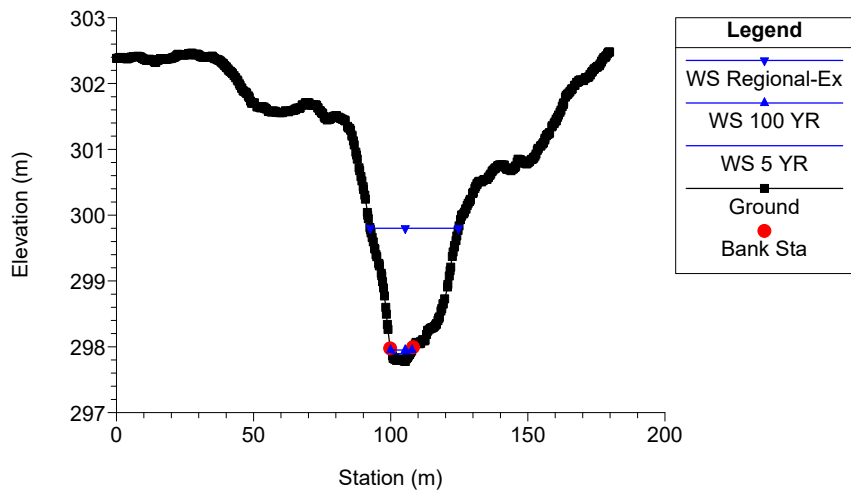
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3051



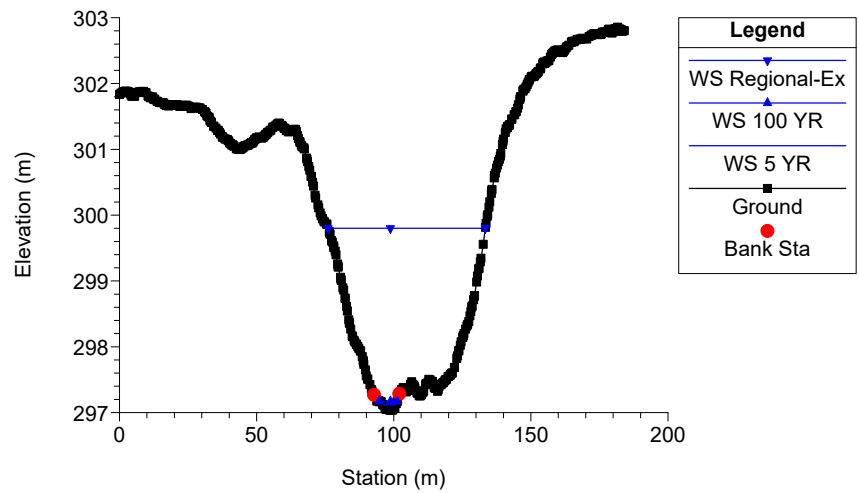
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3000



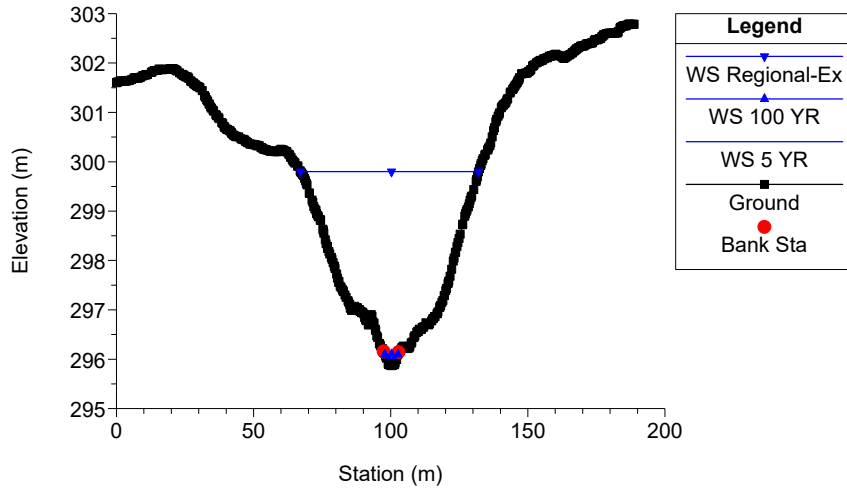
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2950



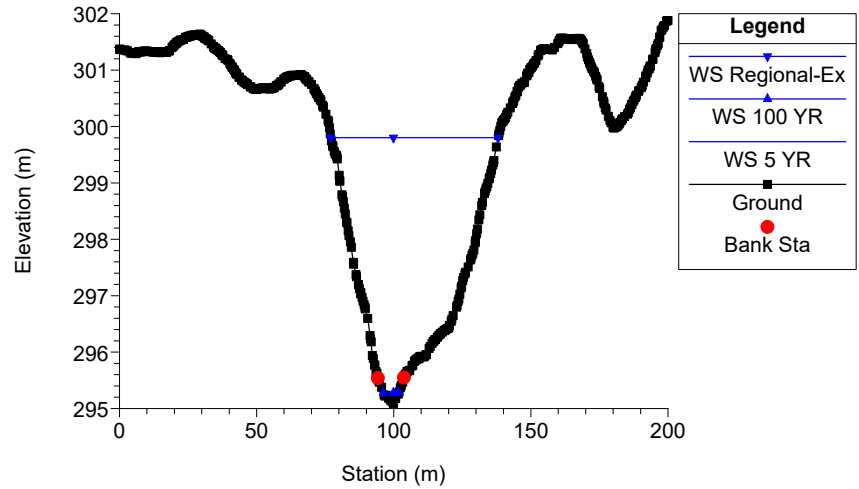
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2900



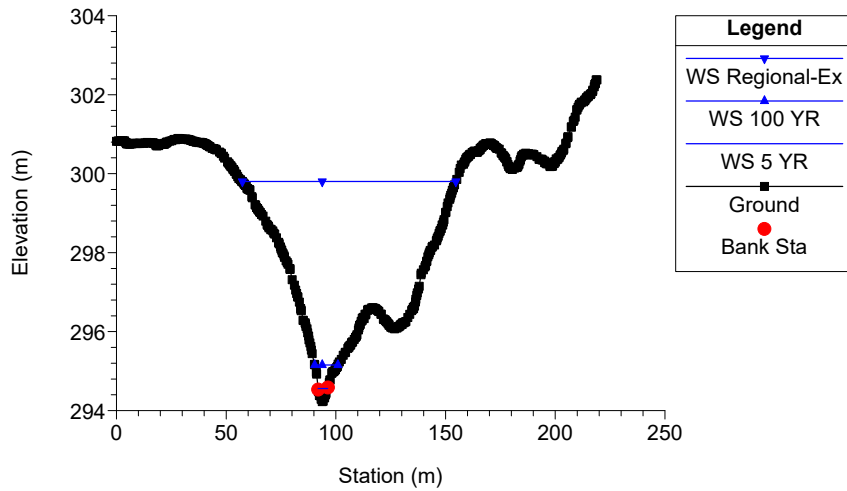
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2850



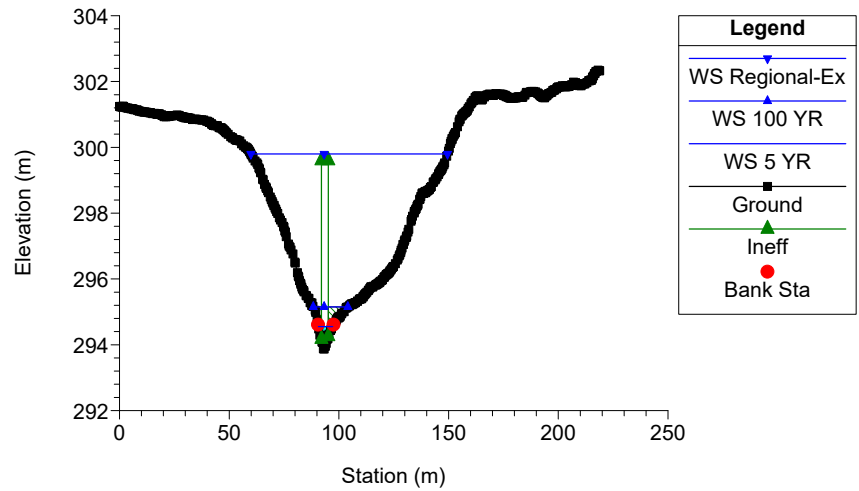
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2802



Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

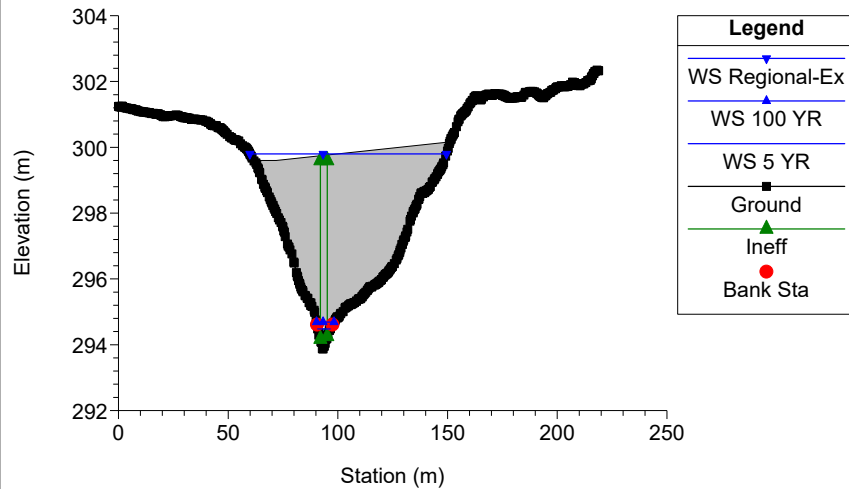
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2792



Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry

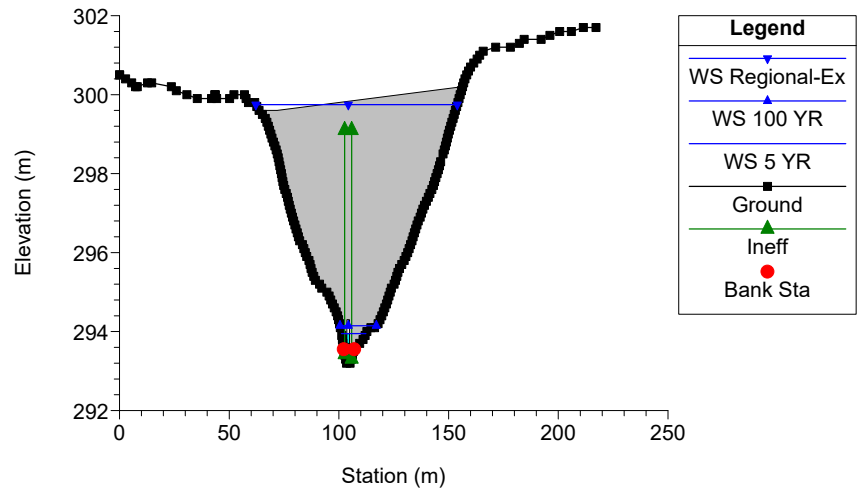
River = LoversTrib1 Reach = Trib1.4 RS = 2746 Culv Highway 400 (101)



Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry

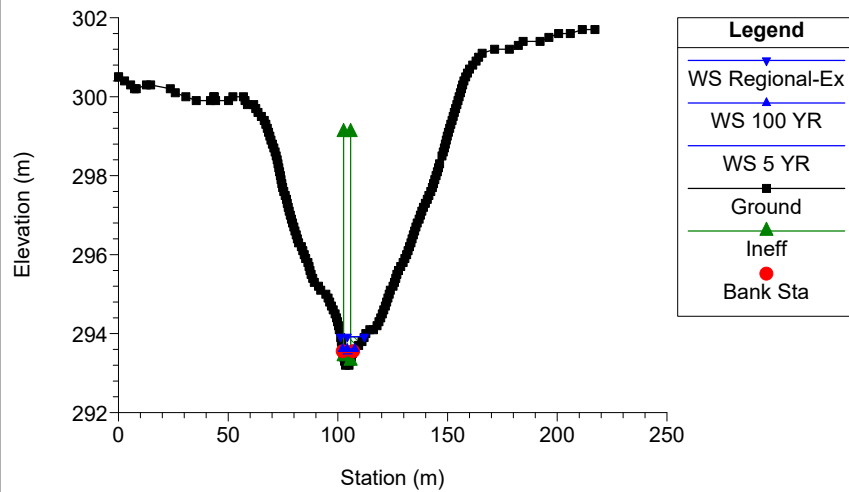
River = LoversTrib1 Reach = Trib1.4 RS = 2746 Culv Highway 400 (101)



Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry

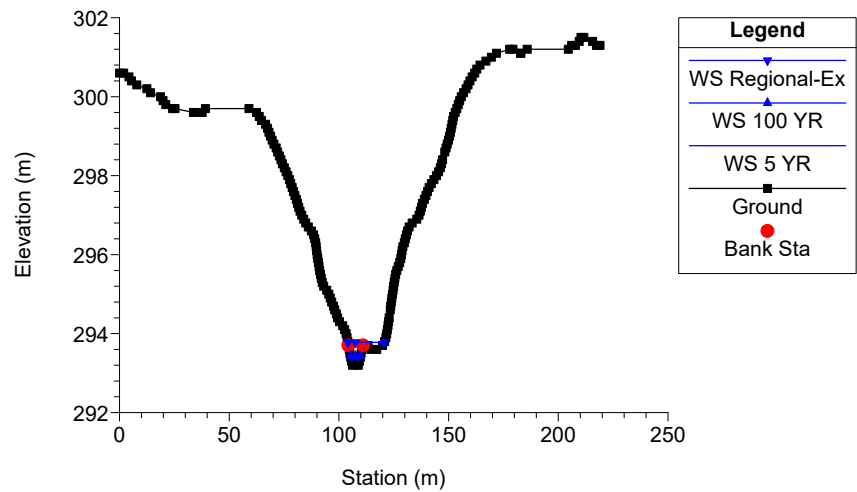
River = LoversTrib1 Reach = Trib1.4 RS = 2723



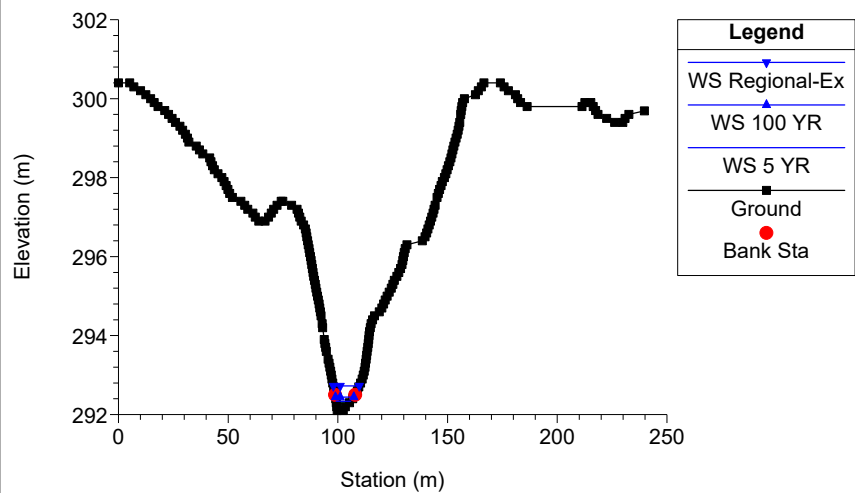
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry

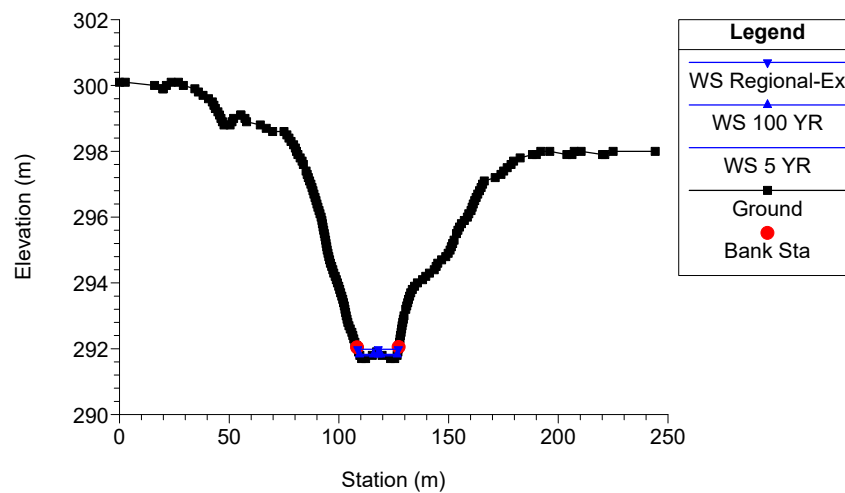
River = LoversTrib1 Reach = Trib1.4 RS = 2713



Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2664



Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2604



HEC-RAS Plan: Int-Exist River: LoversTrib1 Reach: Trib1.4

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Trib1.4	3314	5 YR	0.20	300.52	300.70	300.64	300.71	0.004198	0.38	0.53	4.59	0.36
Trib1.4	3314	100 YR	0.51	300.52	300.80	300.70	300.81	0.004029	0.52	0.97	5.06	0.38
Trib1.4	3314	Regional-Ex	4.06	300.52	301.85	301.01	301.86	0.000224	0.41	15.80	38.65	0.12
Trib1.4	3264	5 YR	0.20	300.17	300.38		300.40	0.010282	0.61	0.33	2.77	0.56
Trib1.4	3264	100 YR	0.51	300.17	300.48		300.51	0.009562	0.79	0.65	3.44	0.58
Trib1.4	3264	Regional-Ex	4.06	300.17	301.84		301.85	0.000124	0.36	23.30	40.28	0.09
Trib1.4	3207	5 YR	0.20	299.95	300.17	300.05	300.17	0.002043	0.35	0.58	3.30	0.27
Trib1.4	3207	100 YR	0.51	299.95	300.35	300.12	300.36	0.001204	0.41	1.28	4.33	0.23
Trib1.4	3207	Regional-Ex	4.06	299.95	301.83	300.52	301.84	0.000141	0.43	13.53	12.20	0.10
Trib1.4	3180	5 YR	0.20	299.90	300.10		300.11	0.002549	0.38	0.53	3.22	0.29
Trib1.4	3180	100 YR	0.51	299.90	300.32		300.33	0.000971	0.38	1.37	4.48	0.21
Trib1.4	3180	Regional-Ex	4.06	299.90	301.83		301.84	0.000052	0.27	30.06	36.31	0.06
Trib1.4	3165	5 YR	0.20	299.85	300.07	299.95	300.08	0.001950	0.34	0.58	3.32	0.26
Trib1.4	3165	100 YR	0.51	299.85	300.31	300.02	300.32	0.000677	0.34	1.58	5.10	0.17
Trib1.4	3165	Regional-Ex	4.06	299.85	301.82	300.42	301.83	0.000137	0.44	10.71	39.68	0.10
Trib1.4	3135		Culvert									
Trib1.4	3106	5 YR	0.20	299.52	299.60	299.59	299.62	0.037012	0.61	0.33	16.00	0.92
Trib1.4	3106	100 YR	0.51	299.52	299.64	299.63	299.67	0.029776	0.85	0.62	17.21	0.92
Trib1.4	3106	Regional-Ex	4.06	299.52	299.88	299.88	300.05	0.024207	1.85	2.26	23.86	1.03
Trib1.4	3083	5 YR	0.20	299.07	299.21	299.17	299.22	0.009845	0.40	0.51	7.87	0.50
Trib1.4	3083	100 YR	0.51	299.07	299.25	299.22	299.27	0.011130	0.58	0.89	9.39	0.57
Trib1.4	3083	Regional-Ex	4.06	299.07	299.80		299.81	0.000785	0.52	10.51	22.79	0.21
Trib1.4	3051	5 YR	0.20	298.57	298.65	298.64	298.66	0.037423	0.57	0.35	8.76	0.90
Trib1.4	3051	100 YR	0.51	298.57	298.68	298.68	298.71	0.030965	0.74	0.68	9.81	0.90
Trib1.4	3051	Regional-Ex	4.06	298.57	299.80		299.80	0.000046	0.19	32.74	42.38	0.06
Trib1.4	3000	5 YR	0.20	297.78	297.89		297.90	0.007889	0.40	0.50	6.60	0.46
Trib1.4	3000	100 YR	0.51	297.78	297.95		297.97	0.008295	0.55	0.93	7.82	0.51
Trib1.4	3000	Regional-Ex	4.06	297.78	299.80		299.80	0.000014	0.14	42.23	32.26	0.03
Trib1.4	2950	5 YR	0.20	297.03	297.12	297.12	297.15	0.040211	0.75	0.27	4.56	1.00
Trib1.4	2950	100 YR	0.51	297.03	297.17	297.17	297.21	0.036328	0.91	0.56	6.65	1.01
Trib1.4	2950	Regional-Ex	4.06	297.03	299.80		299.80	0.000002	0.06	109.29	57.28	0.01
Trib1.4	2900	5 YR	0.20	295.87	296.02		296.03	0.008178	0.50	0.40	3.79	0.49
Trib1.4	2900	100 YR	0.51	295.87	296.10		296.12	0.009002	0.69	0.74	4.76	0.55
Trib1.4	2900	Regional-Ex	4.06	295.87	299.80		299.80	0.000001	0.05	151.30	64.93	0.01
Trib1.4	2850	5 YR	0.20	295.09	295.23	295.23	295.26	0.040815	0.76	0.26	4.52	1.00
Trib1.4	2850	100 YR	0.51	295.09	295.28	295.28	295.33	0.036021	0.97	0.52	5.64	1.02
Trib1.4	2850	Regional-Ex	4.06	295.09	299.80		299.80	0.000000	0.04	174.26	60.97	0.01
Trib1.4	2802	5 YR	0.20	294.23	294.56		294.56	0.000806	0.24	0.85	4.35	0.17
Trib1.4	2802	100 YR	0.51	294.23	295.16		295.16	0.000038	0.13	4.93	10.56	0.05
Trib1.4	2802	Regional-Ex	4.06	294.23	299.80		299.80	0.000000	0.03	270.79	97.33	0.00
Trib1.4	2792	5 YR	0.47	293.87	294.55	294.14	294.56	0.000318	0.28	1.67	6.51	0.12
Trib1.4	2792	100 YR	1.13	293.87	295.15	294.27	295.15	0.000145	0.32	3.57	15.78	0.10
Trib1.4	2792	Regional-Ex	5.59	293.87	299.80	294.71	299.80	0.000000	0.04	271.27	89.59	0.01
Trib1.4	2746		Culvert									
Trib1.4	2723	5 YR	0.47	293.20	293.49	293.37	293.50	0.003755	0.60	0.79	4.16	0.38
Trib1.4	2723	100 YR	1.13	293.20	293.61	293.48	293.66	0.005450	0.95	1.19	5.63	0.50
Trib1.4	2723	Regional-Ex	5.59	293.20	293.92	293.92	294.26	0.017906	2.57	2.18	10.88	0.99
Trib1.4	2713	5 YR	0.47	293.20	293.34	293.34	293.39	0.032533	1.06	0.44	3.88	1.00
Trib1.4	2713	100 YR	1.13	293.20	293.43	293.43	293.52	0.028295	1.34	0.84	4.60	1.00
Trib1.4	2713	Regional-Ex	5.59	293.20	293.78	293.78	293.93	0.016079	1.79	4.06	16.51	0.87
Trib1.4	2664	5 YR	0.47	292.10	292.33	292.23	292.34	0.003790	0.45	1.05	6.64	0.36
Trib1.4	2664	100 YR	1.13	292.10	292.44	292.32	292.46	0.004407	0.61	1.87	8.38	0.41
Trib1.4	2664	Regional-Ex	5.59	292.10	292.72	292.58	292.80	0.006644	1.24	4.74	11.79	0.57
Trib1.4	2604	5 YR	0.47	291.70	291.78	291.78	291.81	0.040710	0.74	0.63	11.22	1.00
Trib1.4	2604	100 YR	1.13	291.70	291.83	291.83	291.87	0.037990	0.94	1.20	14.07	1.03
Trib1.4	2604	Regional-Ex	5.59	291.70	291.98	291.98	292.09	0.027070	1.44	3.87	18.53	1.01

HEC-RAS Plan: Int-Exist River: LoversTrib1 Reach: Trib1.4 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Trib1.4	2538	5 YR	0.47	290.10	290.37		290.37	0.001739	0.32	1.46	8.42	0.25
Trib1.4	2538	100 YR	1.13	290.10	290.48		290.49	0.001896	0.45	2.69	14.95	0.28
Trib1.4	2538	Regional-Ex	5.59	290.10	290.81		290.84	0.002245	0.84	9.24	22.24	0.35
Trib1.4	2473	5 YR	0.47	289.90	290.02	290.02	290.07	0.035094	0.95	0.49	5.36	1.00
Trib1.4	2473	100 YR	1.13	289.90	290.10	290.10	290.17	0.030648	1.17	0.97	6.98	1.00
Trib1.4	2473	Regional-Ex	5.59	289.90	290.35	290.35	290.51	0.018507	1.82	3.89	14.76	0.93
Trib1.4	2428	5 YR	0.47	288.90	289.00	288.94	289.01	0.002370	0.25	1.87	20.09	0.26
Trib1.4	2428	100 YR	1.13	288.90	289.07	288.98	289.07	0.002322	0.35	3.31	23.89	0.28
Trib1.4	2428	Regional-Ex	5.59	288.90	289.27		289.30	0.003207	0.72	8.95	30.12	0.38
Trib1.4	2384	5 YR	0.47	288.60	288.72	288.72	288.75	0.032598	0.72	0.65	10.19	0.91
Trib1.4	2384	100 YR	1.13	288.60	288.77	288.77	288.81	0.034753	0.96	1.18	12.57	1.00
Trib1.4	2384	Regional-Ex	5.59	288.60	288.91	288.91	289.00	0.022179	1.39	5.75	37.23	0.93
Trib1.4	2338	5 YR	0.47	286.90	286.97	286.97	287.00	0.044402	0.67	0.71	15.71	1.00
Trib1.4	2338	100 YR	1.13	286.90	287.01	287.01	287.04	0.031895	0.73	1.54	23.66	0.91
Trib1.4	2338	Regional-Ex	5.59	286.90	287.13	287.13	287.21	0.027174	1.31	4.46	27.46	0.99
Trib1.4	2299	5 YR	0.47	286.60	286.67	286.63	286.68	0.001684	0.18	2.69	38.23	0.21
Trib1.4	2299	100 YR	1.13	286.60	286.72		286.73	0.001725	0.26	4.61	39.78	0.23
Trib1.4	2299	Regional-Ex	5.59	286.60	286.89		286.90	0.002274	0.52	11.39	41.10	0.31
Trib1.4	2288	5 YR	0.47	286.30	286.43	286.43	286.46	0.042912	0.72	0.65	12.43	1.01
Trib1.4	2288	100 YR	1.13	286.30	286.48	286.48	286.51	0.039378	0.78	1.45	23.25	1.00
Trib1.4	2288	Regional-Ex	5.59	286.30	286.57	286.57	286.63	0.035904	1.12	4.99	43.44	1.05
Trib1.4	2214	5 YR	0.47	283.00	283.12		283.13	0.010415	0.46	1.02	13.82	0.53
Trib1.4	2214	100 YR	1.13	283.00	283.17		283.19	0.013257	0.70	1.65	14.99	0.65
Trib1.4	2214	Regional-Ex	5.59	283.00	283.30	283.30	283.42	0.023375	1.55	3.99	19.30	0.97
Trib1.4	2163	5 YR	0.47	282.30	282.40		282.42	0.020779	0.52	0.91	16.72	0.71
Trib1.4	2163	100 YR	1.13	282.30	282.45	282.42	282.47	0.015412	0.67	1.71	18.37	0.68
Trib1.4	2163	Regional-Ex	5.59	282.30	282.65		282.70	0.008385	1.03	6.00	23.44	0.60
Trib1.4	2140	5 YR	0.47	281.90	282.04	282.01	282.06	0.013404	0.60	0.78	8.21	0.62
Trib1.4	2140	100 YR	1.13	281.90	282.11	282.08	282.14	0.015111	0.79	1.43	10.99	0.70
Trib1.4	2140	Regional-Ex	5.59	281.90	282.28	282.28	282.40	0.025427	1.58	3.53	14.08	1.01
Trib1.4	2078	5 YR	0.47	280.60	280.69	280.69	280.72	0.041057	0.74	0.64	11.39	1.00
Trib1.4	2078	100 YR	1.13	280.60	280.74	280.74	280.78	0.035009	0.93	1.21	13.65	1.00
Trib1.4	2078	Regional-Ex	5.59	280.60	281.22		281.23	0.001217	0.53	10.64	24.56	0.25
Trib1.4	2060	5 YR	0.47	280.10	280.23		280.23	0.004391	0.34	1.37	14.52	0.36
Trib1.4	2060	100 YR	1.13	280.10	280.34		280.35	0.001745	0.35	3.29	18.38	0.25
Trib1.4	2060	Regional-Ex	5.59	280.10	281.22		281.23	0.000092	0.25	28.15	36.39	0.08
Trib1.4	2037	5 YR	1.00	279.60	279.81	279.81	279.90	0.027549	1.32	0.76	5.20	0.99
Trib1.4	2037	100 YR	2.36	279.60	279.95	279.95	280.11	0.023017	1.76	1.34	7.50	1.00
Trib1.4	2037	Regional-Ex	6.75	279.60	281.13	280.27	281.19	0.001083	1.07	6.29	34.90	0.28
Trib1.4	2020		Culvert									
Trib1.4	1992	5 YR	2.96	278.70	279.07	279.07	279.26	0.021830	1.90	1.55	8.59	1.00
Trib1.4	1992	100 YR	6.17	278.70	279.30	279.30	279.61	0.018646	2.44	2.53	10.67	1.00
Trib1.4	1992	Regional-Ex	8.93	278.70	279.47	279.47	279.86	0.017034	2.75	3.25	12.40	1.00
Trib1.4	1976	5 YR	2.96	277.60	277.97	277.96	278.10	0.023136	1.61	1.84	6.63	0.97
Trib1.4	1976	100 YR	6.17	277.60	278.14	278.14	278.35	0.020611	2.05	3.05	7.68	0.99
Trib1.4	1976	Regional-Ex	8.93	277.60	278.26	278.26	278.53	0.018406	2.29	4.06	8.45	0.98
Trib1.4	1921	5 YR	2.96	276.30	276.63	276.63	276.76	0.025566	1.57	1.88	7.57	1.01
Trib1.4	1921	100 YR	6.17	276.30	276.80	276.80	276.98	0.022776	1.88	3.28	9.25	1.01
Trib1.4	1921	Regional-Ex	8.93	276.30	276.90	276.90	277.13	0.020364	2.11	4.28	10.25	0.99
Trib1.4	1850	5 YR	3.88	274.40	274.72	274.72	274.85	0.025254	1.60	2.42	9.41	1.01
Trib1.4	1850	100 YR	7.87	274.40	274.88	274.88	275.07	0.022222	1.94	4.06	10.72	1.01
Trib1.4	1850	Regional-Ex	9.52	274.40	274.94	274.94	275.15	0.021424	2.04	4.67	11.14	1.00
Trib1.4	1800	5 YR	3.88	273.30	273.68		273.78	0.015270	1.40	2.77	9.03	0.81
Trib1.4	1800	100 YR	7.87	273.30	273.86		274.01	0.015104	1.75	4.50	10.37	0.85
Trib1.4	1800	Regional-Ex	9.52	273.30	273.92	273.86	274.09	0.014990	1.85	5.15	10.81	0.86
Trib1.4	1750	5 YR	3.88	272.60	273.02		273.11	0.011748	1.30	2.98	9.03	0.72
Trib1.4	1750	100 YR	7.87	272.60	273.20		273.35	0.011769	1.72	4.68	10.38	0.77

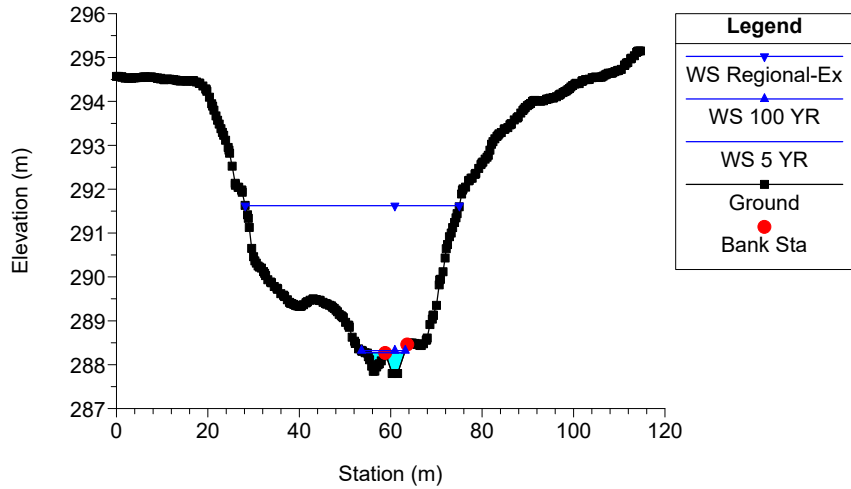
HEC-RAS Plan: Int-Exist River: LoversTrib1 Reach: Trib1.4 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Trib1.4	1750	Regional-Ex	9.52	272.60	273.26		273.43	0.011772	1.86	5.32	10.89	0.78
Trib1.4	1700	5 YR	3.88	271.70	272.15	272.15	272.33	0.021242	1.87	2.14	6.62	0.98
Trib1.4	1700	100 YR	7.87	271.70	272.37	272.37	272.63	0.017312	2.30	3.76	8.14	0.96
Trib1.4	1700	Regional-Ex	9.52	271.70	272.45	272.45	272.73	0.016251	2.42	4.42	8.66	0.94
Trib1.4	1650	5 YR	3.88	270.10	270.77	270.77	270.98	0.018277	2.05	2.12	6.01	0.94
Trib1.4	1650	100 YR	7.87	270.10	271.04	271.04	271.31	0.015201	2.49	3.96	8.21	0.92
Trib1.4	1650	Regional-Ex	9.52	270.10	271.12	271.12	271.42	0.014470	2.61	4.72	9.10	0.91
Trib1.4	1600	5 YR	3.88	268.10	268.62		268.70	0.009648	1.27	3.07	8.17	0.66
Trib1.4	1600	100 YR	7.87	268.10	268.84		268.97	0.009225	1.56	5.04	9.71	0.68
Trib1.4	1600	Regional-Ex	9.52	268.10	268.91		269.05	0.008967	1.67	5.73	10.18	0.69
Trib1.4	1550	5 YR	3.88	267.70	268.25		268.31	0.006439	1.10	3.53	8.98	0.55
Trib1.4	1550	100 YR	7.87	267.70	268.43		268.55	0.007484	1.52	5.35	10.49	0.63
Trib1.4	1550	Regional-Ex	9.52	267.70	268.49		268.63	0.007907	1.67	5.98	10.93	0.66
Trib1.4	1500	5 YR	3.88	267.30	267.61	267.61	267.74	0.025264	1.58	2.46	9.80	1.00
Trib1.4	1500	100 YR	7.87	267.30	267.77	267.77	267.95	0.021627	1.92	4.13	11.71	0.99
Trib1.4	1500	Regional-Ex	9.52	267.30	267.82	267.82	268.03	0.020472	2.03	4.76	12.39	0.99
Trib1.4	1450	5 YR	3.88	265.60	266.18	266.15	266.31	0.016848	1.61	2.45	7.82	0.86
Trib1.4	1450	100 YR	7.87	265.60	266.35	266.35	266.58	0.018089	2.16	3.92	9.76	0.96
Trib1.4	1450	Regional-Ex	9.52	265.60	266.42	266.42	266.67	0.017092	2.28	4.61	10.58	0.95
Trib1.4	1400	5 YR	3.88	264.80	265.16	265.16	265.30	0.024783	1.65	2.35	8.56	1.01
Trib1.4	1400	100 YR	7.87	264.80	265.82		265.86	0.001453	0.88	9.91	15.58	0.30
Trib1.4	1400	Regional-Ex	9.52	264.80	265.39	265.39	265.62	0.020655	2.14	4.48	10.22	1.00

Appendix D: Whiskey Creek Existing Condition Hydraulic Model Results

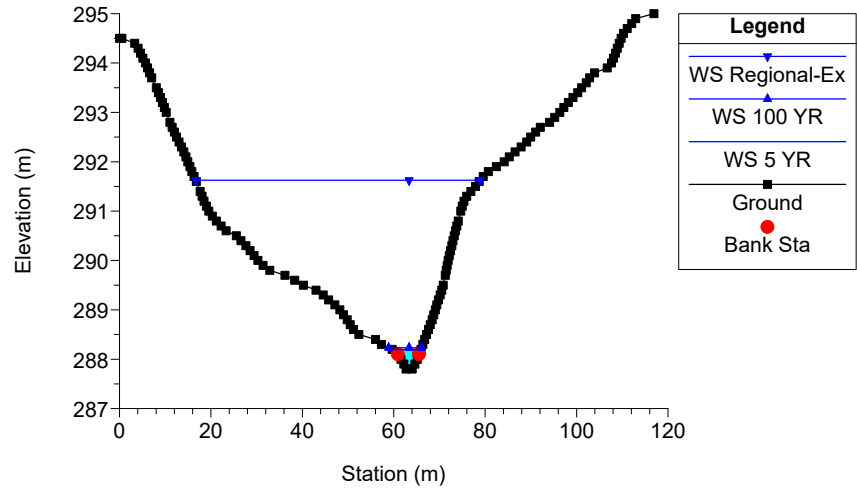
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 134



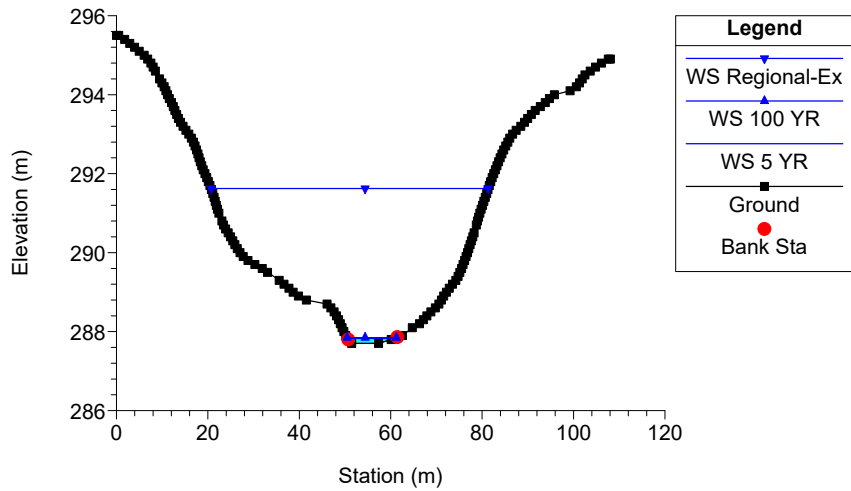
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 119



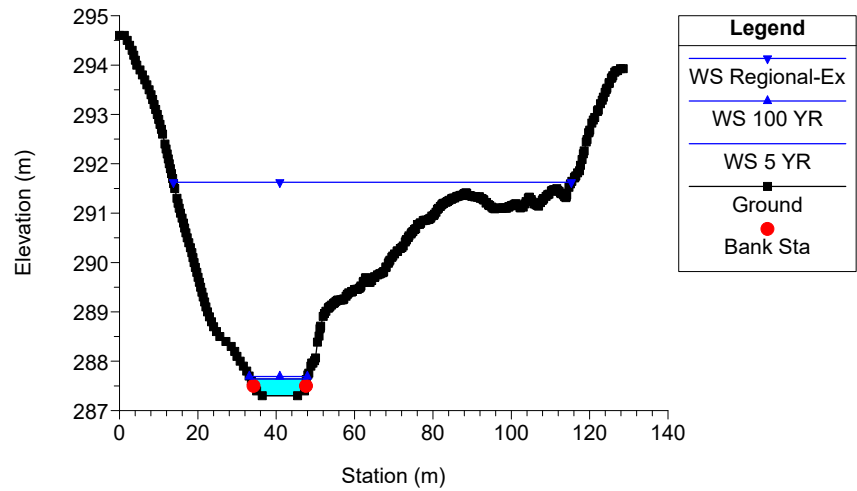
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 86



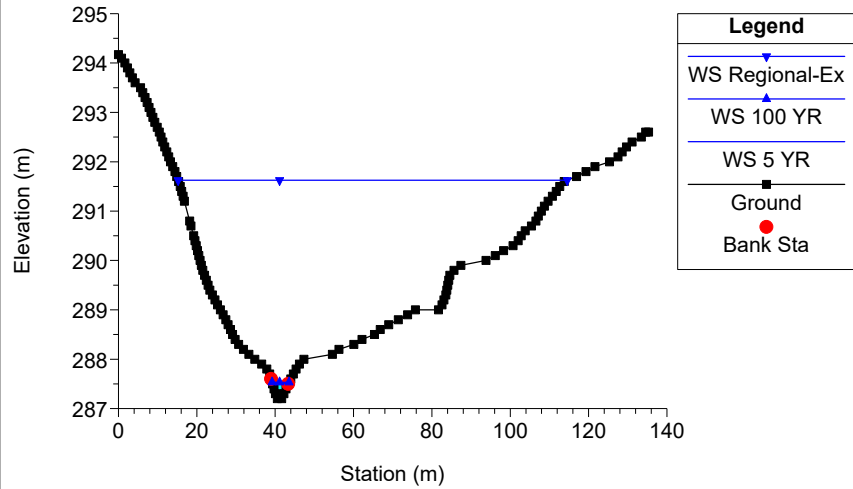
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 43



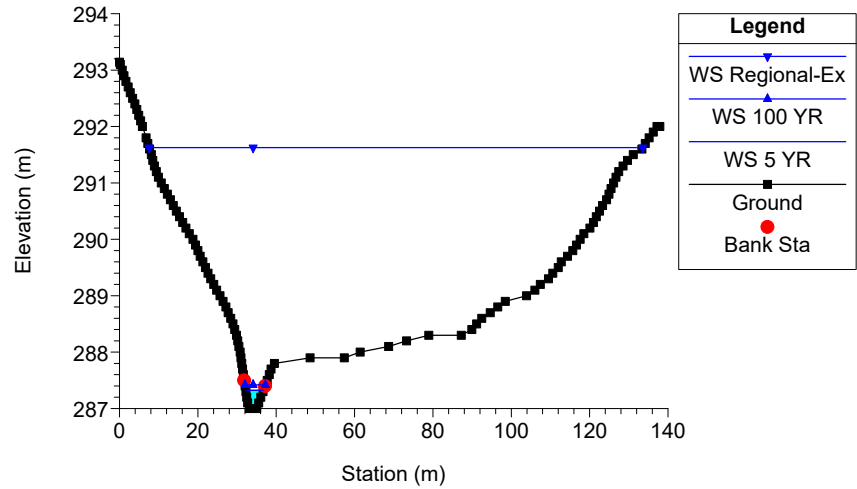
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 13



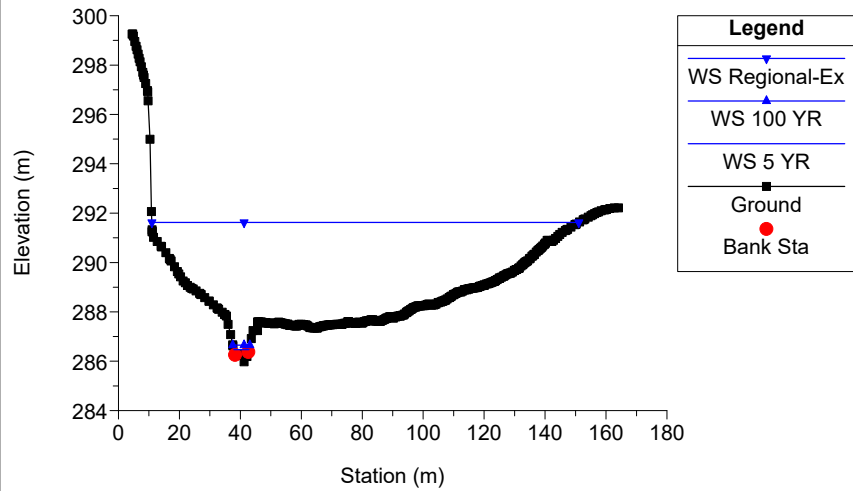
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 0



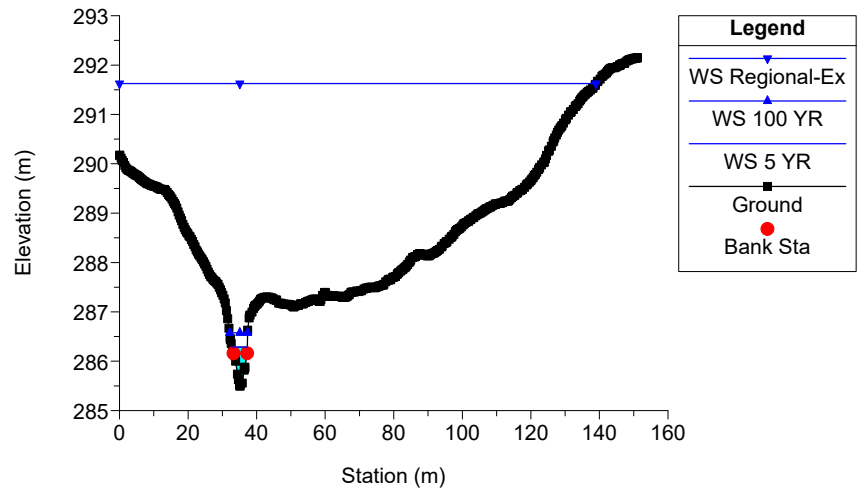
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1987



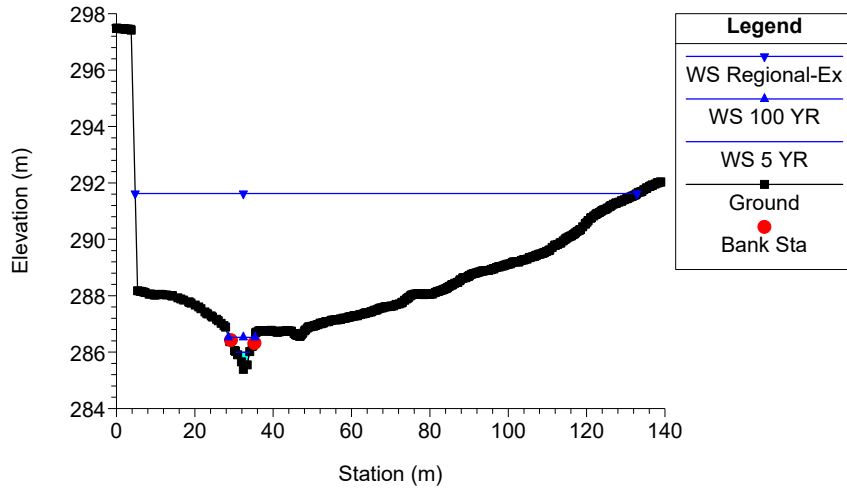
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1968



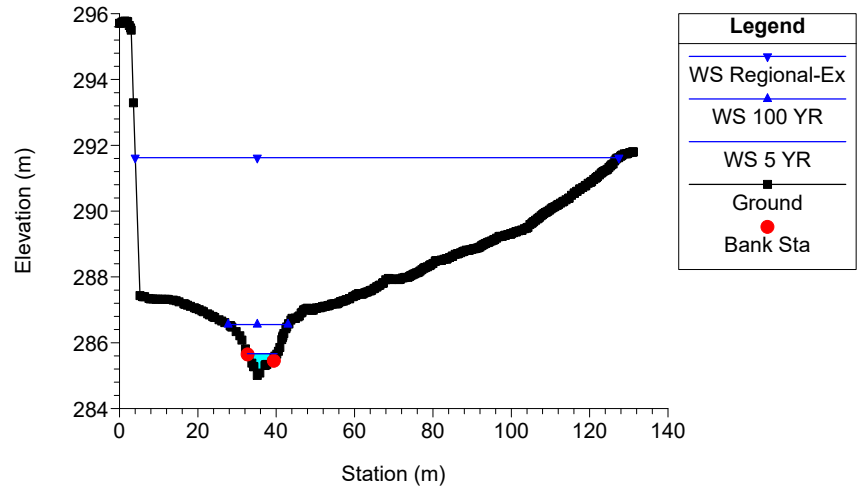
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1951



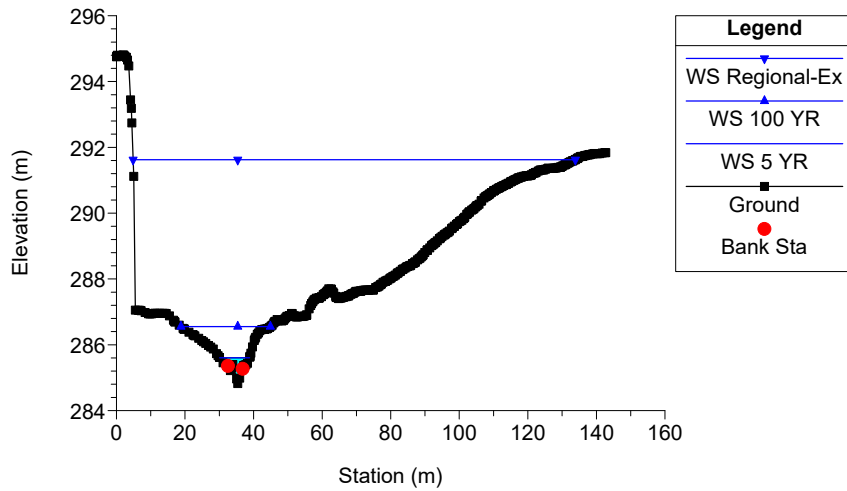
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1934



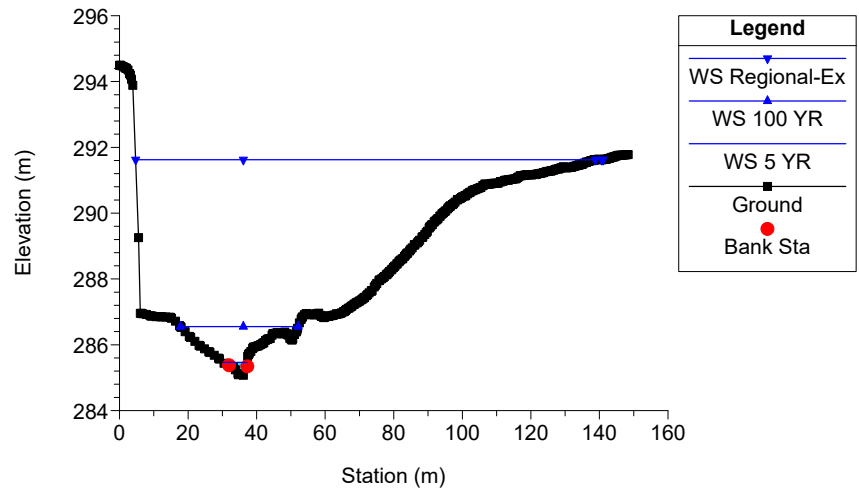
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1920



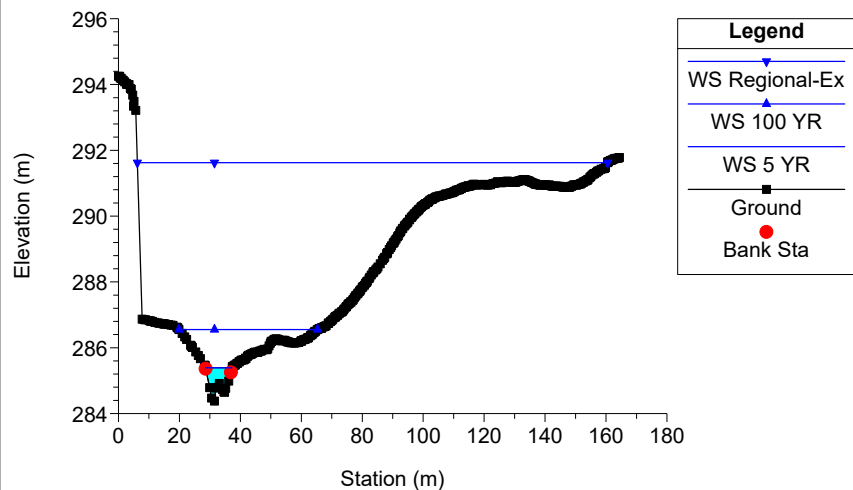
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1913



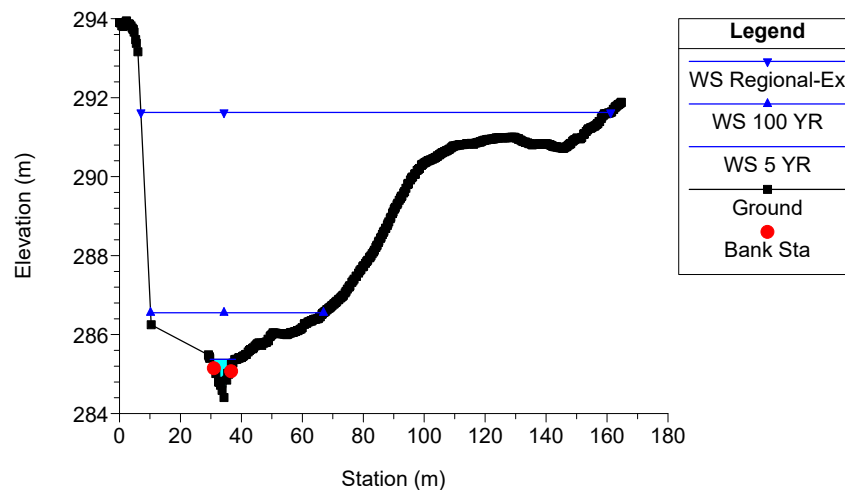
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1894



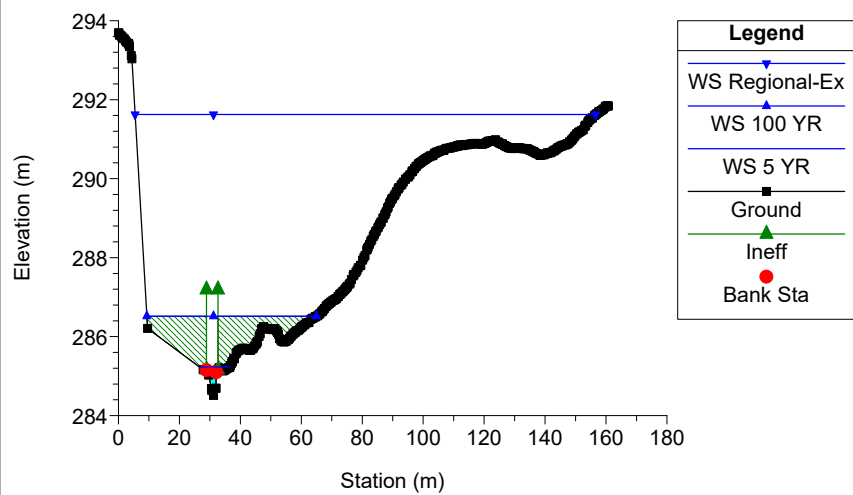
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1885



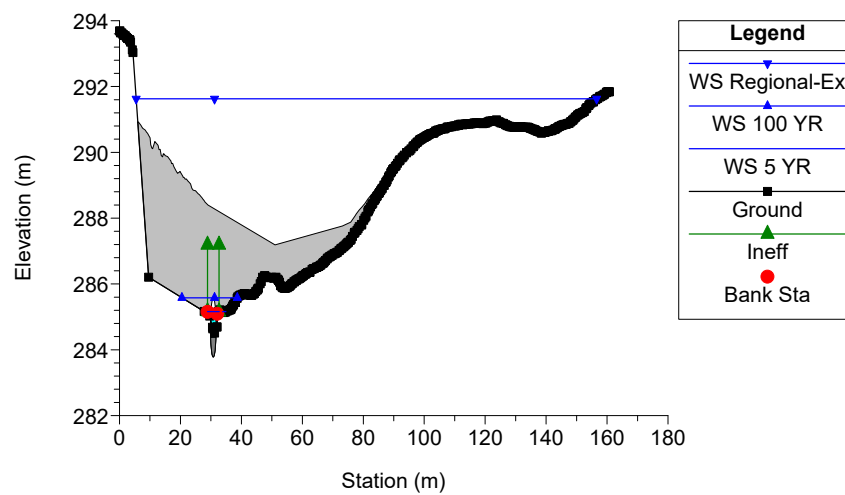
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1883



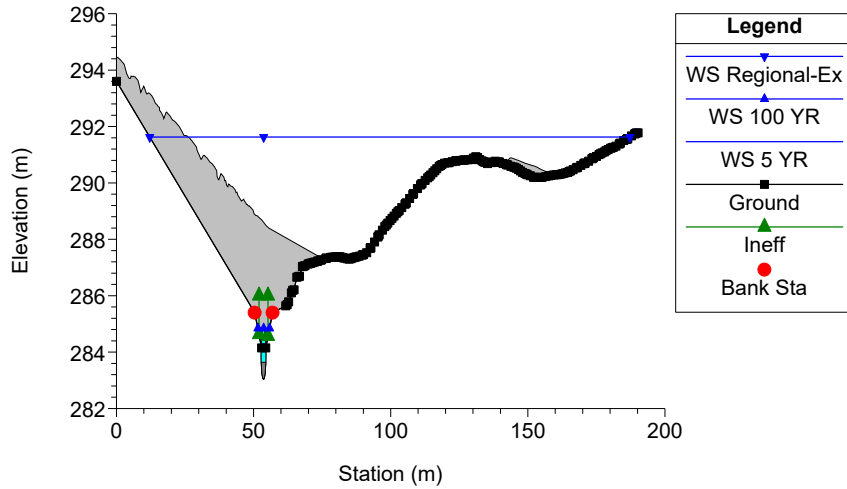
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1852 Culv



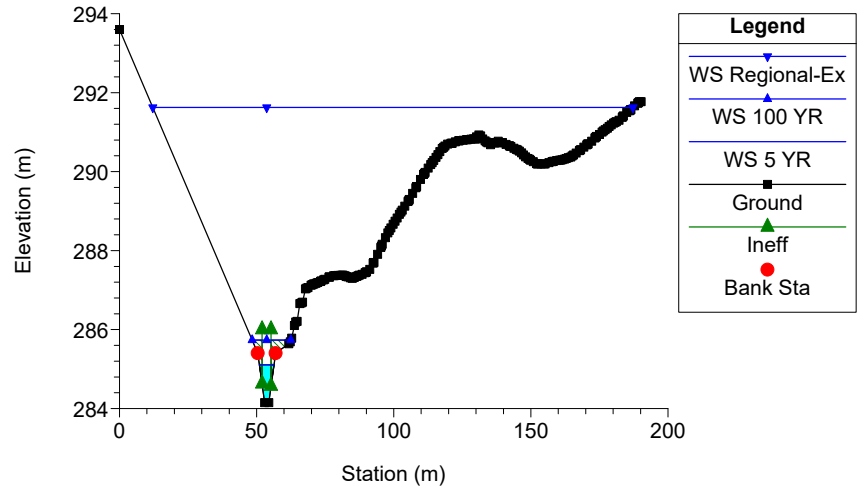
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1852 Culv



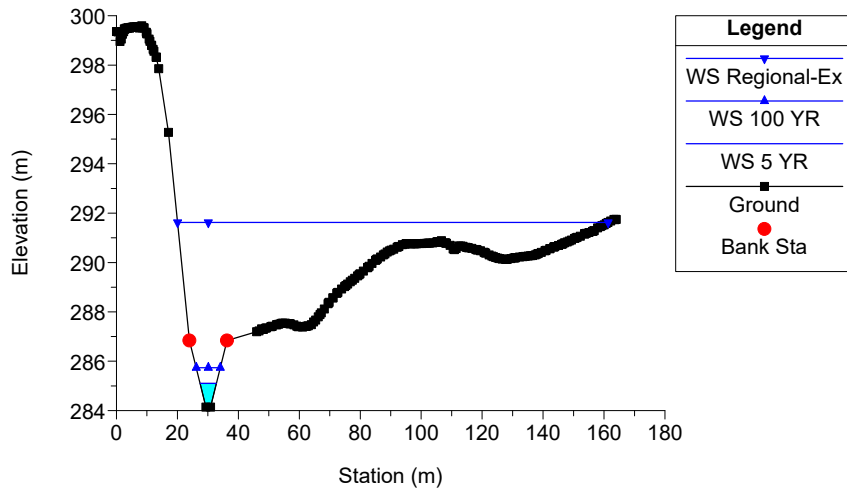
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1841



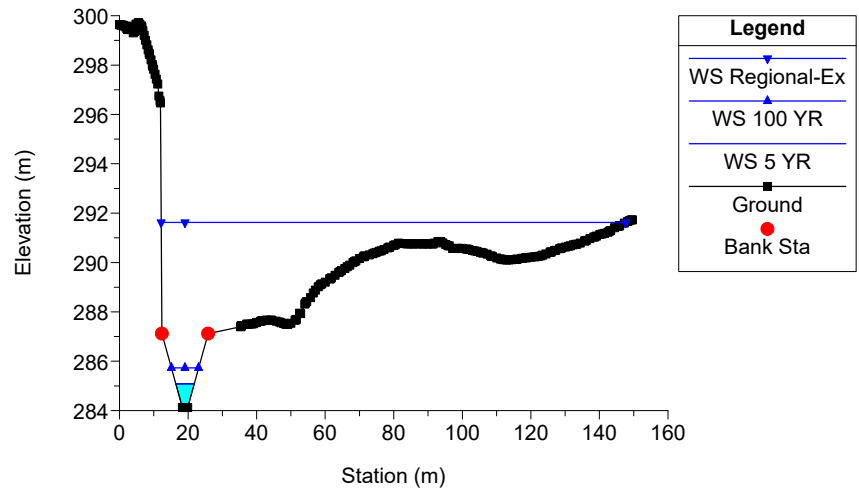
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1835



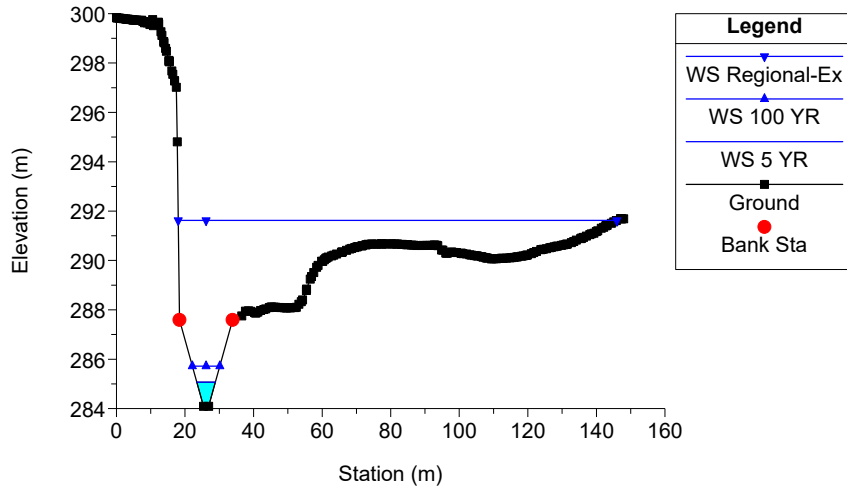
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1823



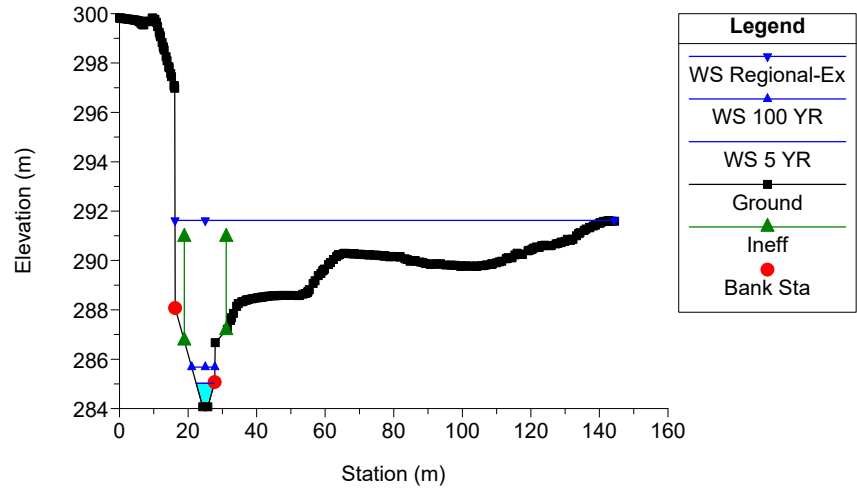
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1803



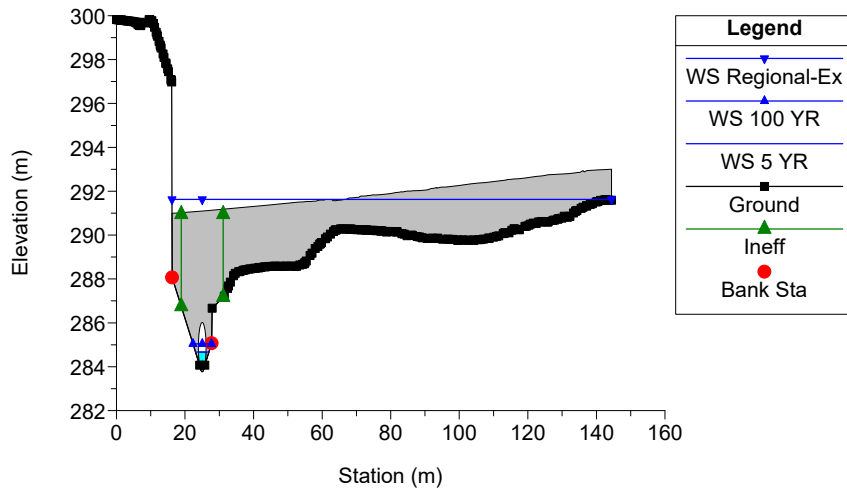
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1789



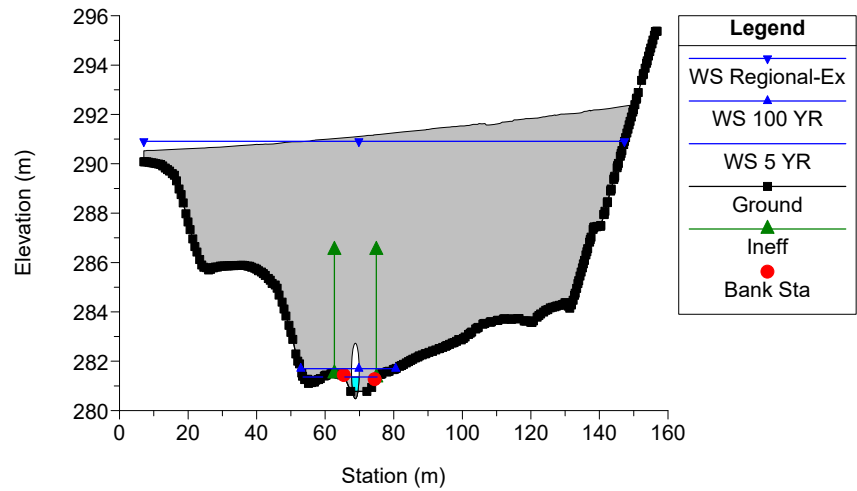
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1786.8 Culv



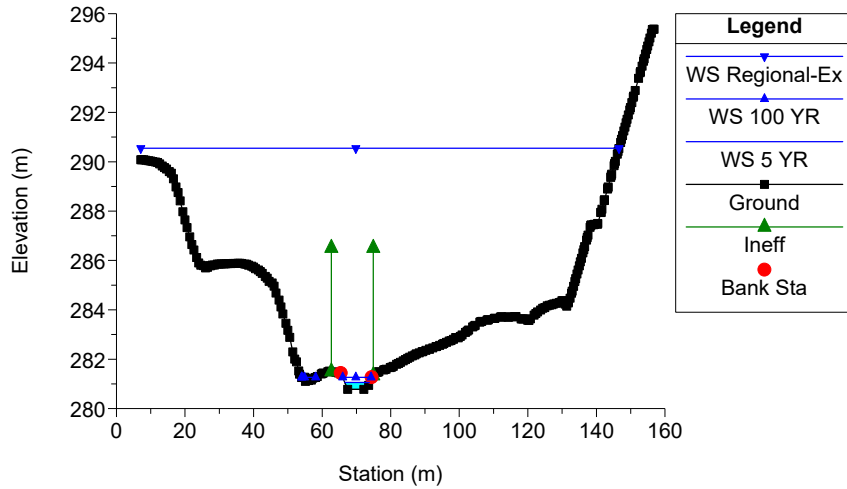
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1786.8 Culv



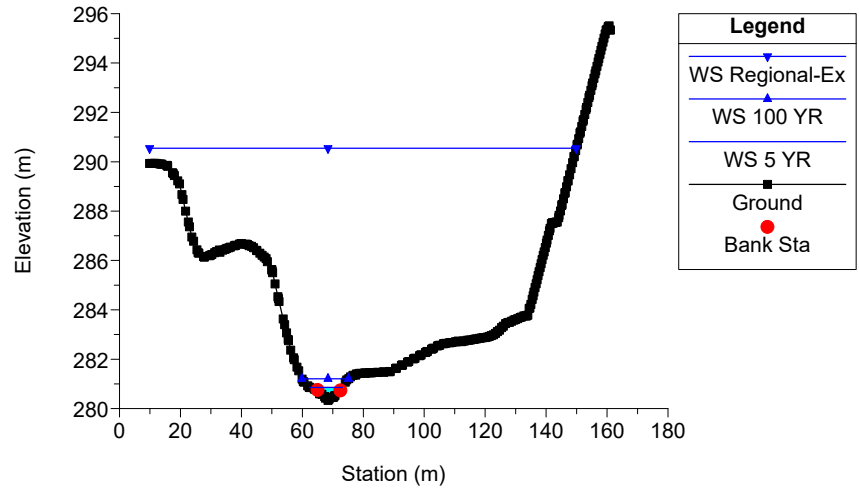
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1717



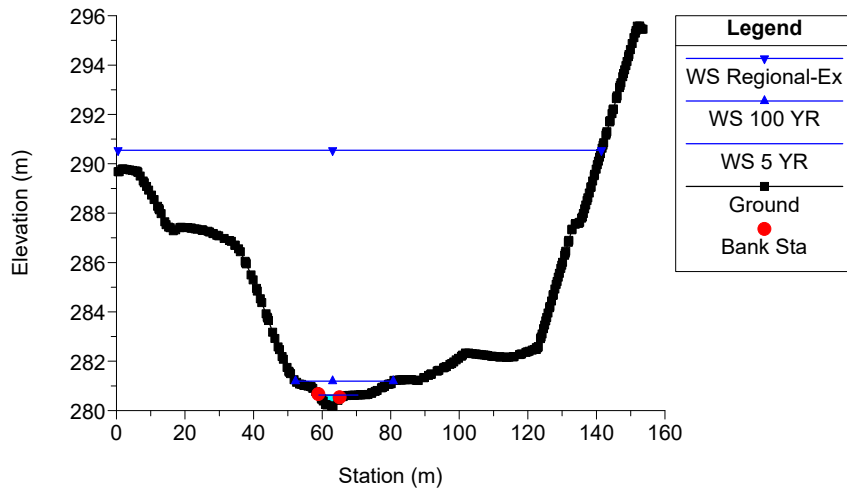
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1709



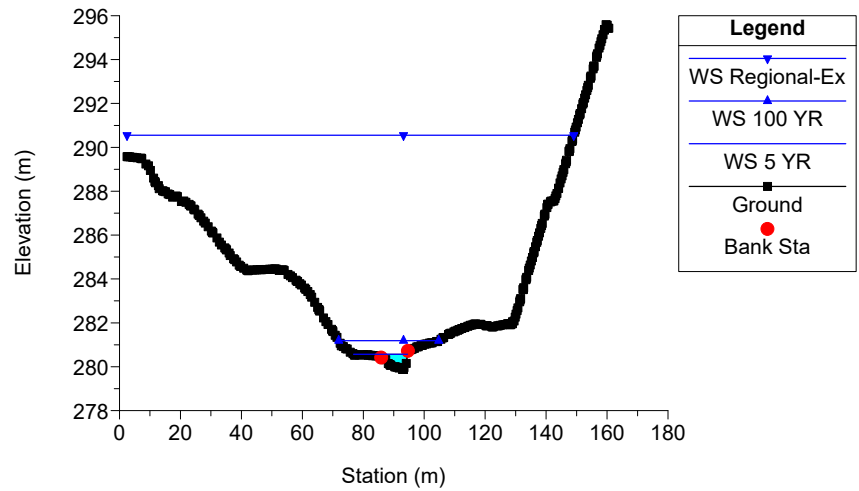
Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1702



Harvie Road Subdivision Base HEC-RAS Plan: Interim Existing Conditions 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1690



HEC-RAS Plan: Int-Exist

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
6	432	5 YR	5.29	293.40	294.00	294.00	294.16	0.012779	1.96	4.57	17.51	0.82
6	432	100 YR	15.58	293.40	294.49		294.61	0.005974	2.02	15.72	25.85	0.62
6	432	Regional-Ex	14.62	293.40	294.45		294.57	0.006345	2.03	14.63	25.42	0.64
6	420	5 YR	5.29	292.60	293.49	293.49	293.78	0.015869	2.56	2.80	5.84	0.94
6	420	100 YR	15.58	292.60	294.15	294.15	294.46	0.009403	3.00	11.17	20.33	0.80
6	420	Regional-Ex	14.62	292.60	294.12	294.12	294.43	0.009306	2.94	10.53	19.66	0.80
6	403	5 YR	5.29	292.70	293.40		293.50	0.006900	1.52	5.39	17.20	0.61
6	403	100 YR	15.58	292.70	294.03		294.10	0.002943	1.57	19.39	27.32	0.45
6	403	Regional-Ex	14.62	292.70	293.98		294.06	0.003029	1.56	18.24	26.87	0.45
6	381	5 YR	5.29	292.20	293.43		293.45	0.000683	0.72	12.64	17.96	0.21
6	381	100 YR	15.58	292.20	294.01		294.06	0.001187	1.24	24.97	29.67	0.30
6	381	Regional-Ex	14.62	292.20	293.97		294.02	0.001059	1.16	24.03	25.49	0.28
6	349	5 YR	5.29	292.30	293.07	293.07	293.36	0.016692	2.46	2.64	6.02	0.95
6	349	100 YR	15.58	292.30	293.67	293.67	293.95	0.009672	2.84	11.58	24.54	0.80
6	349	Regional-Ex	14.62	292.30	293.64	293.64	293.92	0.009467	2.77	10.95	23.52	0.79
6	328	5 YR	5.29	291.50	291.98		292.08	0.015359	1.79	4.99	14.75	0.86
6	328	100 YR	15.58	291.50	292.23	292.23	292.51	0.024244	3.04	9.12	17.92	1.17
6	328	Regional-Ex	14.62	291.50	292.21	292.21	292.47	0.024210	2.97	8.72	17.64	1.16
6	306	5 YR	5.29	291.00	291.52	291.50	291.69	0.017798	1.94	3.76	15.28	0.93
6	306	100 YR	15.58	291.00	291.86	291.85	292.07	0.012853	2.42	11.59	25.73	0.87
6	306	Regional-Ex	14.62	291.00	291.83	291.83	292.04	0.013758	2.43	10.72	25.23	0.89
6	290	5 YR	5.29	290.85	291.29	291.28	291.43	0.016389	1.74	3.93	14.30	0.88
6	290	100 YR	15.58	290.85	291.63	291.60	291.87	0.013982	2.41	9.34	17.31	0.90
6	290	Regional-Ex	14.62	290.85	291.67		291.85	0.009962	2.12	10.08	17.57	0.76
6	269	5 YR	5.29	290.70	291.10		291.17	0.008270	1.23	4.71	13.23	0.62
6	269	100 YR	15.58	290.70	291.35	291.29	291.58	0.013531	2.18	8.18	14.45	0.86
6	269	Regional-Ex	14.62	290.70	291.61		291.71	0.003645	1.42	12.16	15.57	0.47
6	249	5 YR	5.29	290.40	290.79	290.79	290.92	0.022706	1.60	3.60	16.55	0.97
6	249	100 YR	15.58	290.40	291.05	291.05	291.27	0.017674	2.18	9.03	23.64	0.95
6	249	Regional-Ex	14.62	290.40	291.63		291.66	0.001015	0.85	24.95	31.33	0.26
6	241	5 YR	1.05	290.10	290.40	290.40	290.48	0.029300	1.31	0.80	4.63	1.01
6	241	100 YR	1.34	290.10	290.43	290.43	290.53	0.026512	1.40	0.98	6.02	0.99
6	241	Regional-Ex	14.62	290.10	291.61		291.64	0.001432	1.16	24.66	28.96	0.32
6	134	5 YR	1.05	287.80	288.27		288.29	0.003094	0.62	2.21	8.64	0.36
6	134	100 YR	1.34	287.80	288.32		288.34	0.003261	0.68	2.62	9.57	0.37
6	134	Regional-Ex	14.62	287.80	291.63		291.63	0.000020	0.25	112.70	46.86	0.04
6	119	5 YR	1.05	287.80	288.20	288.07	288.23	0.005035	0.77	1.42	6.24	0.46
6	119	100 YR	1.34	287.80	288.23	288.11	288.27	0.005490	0.87	1.66	7.19	0.49
6	119	Regional-Ex	14.62	287.80	291.63		291.63	0.000017	0.25	129.07	62.26	0.04
6	86	5 YR	1.05	287.70	287.83	287.83	287.88	0.033212	1.01	1.05	10.22	1.00
6	86	100 YR	1.34	287.70	287.85	287.85	287.91	0.031792	1.08	1.25	10.77	1.00
6	86	Regional-Ex	14.62	287.70	291.63		291.63	0.000007	0.16	158.14	60.68	0.03
6	43	5 YR	1.05	287.30	287.64		287.64	0.000456	0.25	4.29	14.31	0.14
6	43	100 YR	1.34	287.30	287.69		287.69	0.000452	0.27	5.03	14.79	0.14
6	43	Regional-Ex	14.62	287.30	291.63		291.63	0.000005	0.15	185.59	101.58	0.02
6	13	5 YR	1.05	287.20	287.51	287.49	287.59	0.023149	1.29	0.81	4.08	0.92
6	13	100 YR	1.34	287.20	287.53	287.53	287.64	0.026619	1.47	0.91	4.32	1.00
6	13	Regional-Ex	14.62	287.20	291.63		291.63	0.000005	0.14	242.84	99.35	0.02
6	0	5 YR	1.05	287.00	287.32		287.37	0.011136	0.99	1.06	4.53	0.65
6	0	100 YR	1.34	287.00	287.42		287.46	0.006440	0.88	1.53	5.26	0.52
6	0	Regional-Ex	14.62	287.00	291.63		291.63	0.000002	0.10	339.09	125.99	0.01
4	1987	5 YR	2.04	285.98	286.47	286.47	286.61	0.024911	1.66	1.27	4.98	1.00
4	1987	100 YR	4.21	285.98	286.65	286.65	286.86	0.019642	2.04	2.21	5.62	0.97
4	1987	Regional-Ex	18.38	285.98	291.63		291.63	0.000001	0.08	426.99	140.13	0.01
4	1968	5 YR	2.04	285.50	286.29		286.34	0.005048	1.05	1.98	4.53	0.48
4	1968	100 YR	4.21	285.50	286.58		286.66	0.004349	1.33	3.40	5.28	0.48
4	1968	Regional-Ex	18.38	285.50	291.63		291.63	0.000001	0.08	437.39	139.00	0.01

HEC-RAS Plan: Int-Exist (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	1951	5 YR	2.04	285.39	286.00	286.00	286.17	0.026203	1.82	1.12	3.44	1.02
4	1951	100 YR	4.21	285.39	286.53		286.59	0.003796	1.10	3.91	6.77	0.44
4	1951	Regional-Ex	18.38	285.39	291.63		291.63	0.000001	0.08	430.42	128.12	0.01
4	1934	5 YR	2.04	285.01	285.67		285.70	0.004079	0.82	2.54	7.59	0.43
4	1934	100 YR	4.21	285.01	286.55		286.56	0.000230	0.44	12.02	15.27	0.12
4	1934	Regional-Ex	18.38	285.01	291.63		291.63	0.000001	0.08	435.79	123.43	0.01
4	1920	5 YR	2.04	284.82	285.61	285.45	285.65	0.004151	0.92	2.68	8.70	0.44
4	1920	100 YR	4.21	284.82	286.55		286.56	0.000201	0.43	17.17	26.09	0.12
4	1920	Regional-Ex	18.38	284.82	291.63		291.63	0.000001	0.08	444.12	128.99	0.01
4	1913	5 YR	2.04	285.07	285.46	285.46	285.58	0.023475	1.51	1.42	7.11	0.96
4	1913	100 YR	4.21	285.07	286.55		286.56	0.000125	0.34	22.21	34.38	0.09
4	1913	Regional-Ex	18.38	285.07	291.63		291.63	0.000001	0.09	438.83	134.54	0.01
4	1894	5 YR	2.04	284.38	285.39		285.40	0.000617	0.42	4.89	8.70	0.17
4	1894	100 YR	4.21	284.38	286.55		286.55	0.000032	0.20	34.33	45.46	0.05
4	1894	Regional-Ex	18.38	284.38	291.63		291.63	0.000001	0.08	485.62	154.34	0.01
4	1885	5 YR	2.04	284.40	285.37		285.39	0.001574	0.65	3.35	8.31	0.28
4	1885	100 YR	4.21	284.40	286.55		286.55	0.000028	0.19	43.85	56.73	0.05
4	1885	Regional-Ex	18.38	284.40	291.63		291.63	0.000001	0.08	494.72	154.19	0.01
4	1883	5 YR	2.04	284.51	285.23	285.12	285.33	0.011177	1.43	1.47	10.00	0.68
4	1883	100 YR	4.21	284.51	286.52	285.35	286.54	0.000432	0.69	6.36	55.64	0.17
4	1883	Regional-Ex	18.38	284.51	291.63	286.20	291.63	0.000001	0.07	493.87	151.11	0.01
4	1852	Culvert										
4	1841	5 YR	2.04	284.15	285.11	284.61	285.13	0.000936	0.74	2.75	5.32	0.26
4	1841	100 YR	4.21	284.15	285.74	284.82	285.77	0.000611	0.87	4.82	14.14	0.23
4	1841	Regional-Ex	18.38	284.15	291.62	285.74	291.62	0.000001	0.08	457.26	175.08	0.01
4	1835	5 YR	2.04	284.14	285.10		285.12	0.001013	0.62	3.28	5.34	0.25
4	1835	100 YR	4.21	284.14	285.73		285.75	0.000470	0.56	7.48	7.88	0.18
4	1835	Regional-Ex	18.38	284.14	291.62		291.62	0.000001	0.10	340.02	141.31	0.01
4	1823	5 YR	2.04	284.12	285.08		285.10	0.000990	0.62	3.31	5.36	0.25
4	1823	100 YR	4.21	284.12	285.73		285.74	0.000452	0.55	7.59	7.93	0.18
4	1823	Regional-Ex	18.38	284.12	291.62		291.62	0.000001	0.10	315.00	135.51	0.01
4	1803	5 YR	2.04	284.09	285.07		285.09	0.000939	0.61	3.37	5.41	0.24
4	1803	100 YR	4.21	284.09	285.72		285.74	0.000425	0.54	7.76	8.02	0.18
4	1803	Regional-Ex	18.38	284.09	291.62		291.62	0.000002	0.11	274.68	127.91	0.01
4	1789	5 YR	2.64	284.07	285.03	284.60	285.06	0.001713	0.81	3.27	5.33	0.33
4	1789	100 YR	5.95	284.07	285.68	284.89	285.72	0.000843	0.82	7.25	6.78	0.25
4	1789	Regional-Ex	21.32	284.07	291.62	285.60	291.62	0.000002	0.13	285.32	128.19	0.02
4	1786.8	Culvert										
4	1717	5 YR	2.64	280.78	281.06	281.06	281.18	0.025260	1.53	1.73	7.19	0.99
4	1717	100 YR	5.95	280.78	281.26	281.24	281.43	0.018447	1.81	3.28	11.64	0.92
4	1717	Regional-Ex	21.32	280.78	290.55	281.74	290.55	0.000000	0.06	865.20	139.51	0.01
4	1709	5 YR	2.64	280.33	280.85		280.91	0.007681	1.05	2.68	10.81	0.58
4	1709	100 YR	5.95	280.33	281.21		281.26	0.002921	1.04	7.24	15.25	0.40
4	1709	Regional-Ex	21.32	280.33	290.55		290.55	0.000000	0.06	883.72	140.02	0.01
4	1702	5 YR	2.64	280.17	280.63	280.59	280.73	0.015435	1.40	2.02	11.37	0.81
4	1702	100 YR	5.95	280.17	281.19		281.21	0.001130	0.75	13.75	28.52	0.26
4	1702	Regional-Ex	21.32	280.17	290.55		290.55	0.000000	0.06	919.85	141.01	0.01
4	1690	5 YR	2.64	279.87	280.57		280.59	0.001877	0.64	4.51	17.72	0.30
4	1690	100 YR	5.95	279.87	281.19		281.20	0.000349	0.48	19.41	32.82	0.15
4	1690	Regional-Ex	21.32	279.87	290.55		290.55	0.000000	0.05	965.76	146.60	0.01
4	1680	5 YR	2.64	279.78	280.55		280.56	0.000679	0.50	6.77	14.36	0.19
4	1680	100 YR	5.95	279.78	281.18		281.19	0.000229	0.45	26.20	48.51	0.13
4	1680	Regional-Ex	21.32	279.78	290.55		290.55	0.000000	0.06	878.41	176.20	0.01
4	1668	5 YR	3.30	279.49	280.54	279.99	280.54	0.000445	0.48	9.57	23.79	0.16
4	1668	100 YR	7.23	279.49	281.17	280.16	281.18	0.000308	0.57	17.57	27.94	0.15
4	1668	Regional-Ex	23.43	279.49	290.55	280.60	290.55	0.000001	0.09	818.31	214.03	0.01

HEC-RAS Plan: Int-Exist (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	1649		Culvert									
4	1631	5 YR	3.30	278.00	279.00	278.46	279.02	0.001411	0.76	5.57	24.12	0.26
4	1631	100 YR	7.23	278.00	279.18	278.77	279.26	0.003147	1.29	7.57	25.14	0.39
4	1631	Regional-Ex	23.43	278.00	280.73	279.39	280.80	0.001052	1.35	24.17	61.74	0.26
4	1619	5 YR	3.30	278.27	278.93	278.75	278.98	0.004226	1.08	4.69	19.48	0.47
4	1619	100 YR	7.23	278.27	279.13	278.99	279.21	0.004852	1.42	8.77	21.11	0.53
4	1619	Regional-Ex	23.43	278.27	280.74		280.75	0.000302	0.76	75.26	62.87	0.16
4	1580	5 YR	3.30	278.11	278.50	278.50	278.64	0.021968	1.67	2.17	9.87	0.97
4	1580	100 YR	7.23	278.11	278.70	278.70	278.87	0.014907	1.94	5.27	18.30	0.87
4	1580	Regional-Ex	23.43	278.11	280.73		280.74	0.000149	0.57	89.77	57.19	0.11
4	1545	5 YR	3.30	277.06	278.05		278.08	0.001505	0.82	4.31	6.25	0.29
4	1545	100 YR	7.23	277.06	278.73		278.76	0.000674	0.83	13.71	20.80	0.22
4	1545	Regional-Ex	23.43	277.06	280.73		280.74	0.000130	0.65	80.79	44.14	0.11
4	1514	5 YR	3.30	277.16	278.04		278.05	0.000617	0.54	6.83	10.08	0.19
4	1514	100 YR	7.23	277.16	278.74		278.75	0.000211	0.48	27.97	38.74	0.12
4	1514	Regional-Ex	23.43	277.16	280.73		280.73	0.000048	0.40	124.44	57.25	0.07
4	1487	5 YR	3.30	276.96	278.04		278.04	0.000102	0.25	13.99	17.89	0.08
4	1487	100 YR	7.23	276.96	278.74		278.74	0.000069	0.30	33.79	34.67	0.07
4	1487	Regional-Ex	23.43	276.96	280.73		280.73	0.000030	0.33	127.68	56.90	0.05
4	1481	5 YR	3.63	276.96	278.02	277.34	278.03	0.000539	0.58	6.35	14.78	0.19
4	1481	100 YR	8.21	276.96	278.70	277.58	278.73	0.000483	0.77	10.90	28.22	0.19
4	1481	Regional-Ex	23.76	276.96	280.73	278.15	280.73	0.000049	0.42	131.10	77.30	0.07
4	1470		Culvert									
4	1459	5 YR	3.63	276.78	277.10	277.10	277.26	0.022886	1.76	2.06	29.15	1.00
4	1459	100 YR	8.21	276.78	277.33	277.33	277.61	0.019324	2.32	3.53	29.56	1.00
4	1459	Regional-Ex	23.76	276.78	277.89	277.89	278.45	0.015283	3.31	7.18	31.52	1.00
4	1452	5 YR	3.63	276.68	276.96		277.05	0.017518	1.36	2.68	10.38	0.85
4	1452	100 YR	8.21	276.68	277.12	277.10	277.30	0.017716	1.89	4.43	10.74	0.92
4	1452	Regional-Ex	23.76	276.68	277.55	277.52	277.92	0.014561	2.72	9.20	11.67	0.94
4	1427	5 YR	3.63	276.39	276.71		276.76	0.007408	0.97	3.74	12.38	0.56
4	1427	100 YR	8.21	276.39	276.93		277.01	0.006114	1.27	6.50	12.52	0.56
4	1427	Regional-Ex	23.76	276.39	277.44		277.62	0.005368	1.87	12.93	12.85	0.59
4	1403	5 YR	3.63	275.99	276.36	276.34	276.48	0.018988	1.52	2.47	9.24	0.90
4	1403	100 YR	8.21	275.99	276.54	276.54	276.76	0.019317	2.10	4.22	10.53	0.98
4	1403	Regional-Ex	23.76	275.99	276.99	276.99	277.39	0.015052	2.91	9.77	13.83	0.97
4	1367	5 YR	3.63	275.68	275.94		275.99	0.009351	0.94	3.91	16.75	0.61
4	1367	100 YR	8.21	275.68	276.09		276.18	0.009471	1.31	6.50	17.72	0.66
4	1367	Regional-Ex	23.76	275.68	276.42		276.62	0.010255	2.03	12.59	19.82	0.76
4	1303	5 YR	3.63	274.70	275.00	275.00	275.12	0.020780	1.57	2.69	13.01	0.93
4	1303	100 YR	8.21	274.70	275.18	275.18	275.35	0.017718	2.00	5.37	16.84	0.93
4	1303	Regional-Ex	23.76	274.70	275.54	275.54	275.82	0.014950	2.70	13.35	24.57	0.95
4	1252	5 YR	3.63	273.80	274.03	273.97	274.07	0.010471	0.95	4.10	19.38	0.64
4	1252	100 YR	8.21	273.80	274.09	274.09	274.22	0.024107	1.68	5.26	19.72	1.01
4	1252	Regional-Ex	23.76	273.80	274.37	274.37	274.64	0.019458	2.39	11.05	21.42	1.01
4	1220	5 YR	3.63	273.30	273.47	273.47	273.55	0.028354	1.29	3.20	21.36	1.00
4	1220	100 YR	8.21	273.30	273.86		273.89	0.002286	0.81	12.24	24.71	0.35
4	1220	Regional-Ex	23.76	273.30	274.31		274.37	0.002443	1.24	23.95	27.37	0.40
4	1173	5 YR	3.63	272.40	273.25		273.25	0.000435	0.41	12.95	29.75	0.16
4	1173	100 YR	8.21	272.40	273.86		273.86	0.000170	0.39	33.78	37.31	0.11
4	1173	Regional-Ex	23.76	272.40	274.30		274.32	0.000447	0.77	51.78	44.23	0.19
4	1160	5 YR	3.74	272.40	273.21	272.83	273.23	0.001345	0.67	5.59	13.92	0.27
4	1160	100 YR	8.45	272.40	273.85	273.04	273.86	0.000303	0.49	28.33	45.07	0.14
4	1160	Regional-Ex	24.48	272.40	274.29	273.50	274.31	0.000609	0.86	52.27	60.35	0.21
4	1129		Culvert									
4	1100	5 YR	3.86	271.20	271.62	271.62	271.81	0.022014	1.95	1.98	25.27	1.01
4	1100	100 YR	8.71	271.20	271.90	271.90	272.23	0.018038	2.54	3.43	29.49	1.00

HEC-RAS Plan: Int-Exist (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	1100	Regional-Ex	24.81	271.20	272.57	272.57	273.23	0.014292	3.60	6.89	39.55	1.00
4	1094	5 YR	3.86	271.00	271.50	271.50	271.58	0.015128	1.57	4.96	30.56	0.82
4	1094	100 YR	8.71	271.00	271.61	271.61	271.72	0.018643	2.08	8.48	32.62	0.96
4	1094	Regional-Ex	24.81	271.00	271.85	271.83	272.04	0.021368	2.91	16.71	35.81	1.09
4	1039	5 YR	3.86	270.10	270.55	270.55	270.62	0.011664	1.35	4.78	36.44	0.72
4	1039	100 YR	8.71	270.10	270.67	270.67	270.77	0.012974	1.73	9.62	43.46	0.80
4	1039	Regional-Ex	24.81	270.10	270.90	270.90	271.05	0.014801	2.40	21.86	62.16	0.91
4	1011	5 YR	3.86	269.10	269.81		269.94	0.009932	1.60	2.54	5.95	0.70
4	1011	100 YR	8.71	269.10	270.12	270.12	270.28	0.007860	1.93	8.04	35.70	0.67
4	1011	Regional-Ex	24.81	269.10	270.48	270.48	270.63	0.007271	2.34	27.14	82.10	0.69
4	959	5 YR	3.86	268.80	269.04	269.04	269.11	0.030640	1.35	4.11	30.98	1.04
4	959	100 YR	8.71	268.80	269.14	269.14	269.24	0.028353	1.76	7.40	35.23	1.08
4	959	Regional-Ex	24.81	268.80	269.36	269.36	269.54	0.023080	2.37	16.97	54.25	1.08
4	906	5 YR	3.86	267.80	268.08		268.12	0.009876	0.89	4.43	22.96	0.61
4	906	100 YR	8.71	267.80	268.33		268.37	0.003146	0.84	13.00	48.75	0.39
4	906	Regional-Ex	24.81	267.80	268.78		268.81	0.001560	0.93	40.75	66.73	0.31
4	858	5 YR	3.86	267.20	268.10		268.10	0.000034	0.14	39.97	61.27	0.05
4	858	100 YR	8.71	267.20	268.35		268.35	0.000070	0.23	55.30	66.93	0.07
4	858	Regional-Ex	24.81	267.20	268.78		268.79	0.000161	0.43	86.68	73.51	0.11
4	827	5 YR	3.86	267.20	268.10		268.10	0.000017	0.09	51.65	105.05	0.03
4	827	100 YR	8.71	267.20	268.35		268.35	0.000025	0.13	78.44	118.03	0.04
4	827	Regional-Ex	24.81	267.20	268.78		268.79	0.000040	0.21	135.00	147.85	0.05
4	786	5 YR	3.86	267.06	268.08	267.50	268.10	0.000690	0.64	6.92	9.26	0.21
4	786	100 YR	8.71	267.06	268.28	267.75	268.34	0.001753	1.16	8.84	10.21	0.34
4	786	Regional-Ex	24.81	267.06	268.78	268.30	268.79	0.000035	0.21	111.60	87.58	0.05
4	737	5 YR	3.86	267.30	268.01	267.69	268.04	0.001966	0.85	5.24	9.55	0.33
4	737	100 YR	8.71	267.30	268.30	267.91	268.31	0.000114	0.26	37.41	63.61	0.08
4	737	Regional-Ex	24.81	267.30	268.77	268.30	268.78	0.000132	0.36	67.60	64.64	0.10
4	683	5 YR	3.86	267.30	267.88	267.64	267.92	0.002799	0.87	4.65	9.86	0.38
4	683	100 YR	8.71	267.30	268.22	267.84	268.28	0.002530	1.15	8.24	11.44	0.39
4	683	Regional-Ex	24.81	267.30	268.31	268.31	268.72	0.014364	2.92	9.32	11.98	0.95
4	635	5 YR	3.86	267.10	267.76	267.48	267.79	0.002426	0.87	4.71	9.32	0.36
4	635	100 YR	8.71	267.10	268.10	267.70	268.16	0.002434	1.18	8.17	11.16	0.39
4	635	Regional-Ex	24.81	267.10	268.49	268.10	268.50	0.000101	0.30	71.24	61.77	0.08
4	590	5 YR	3.86	267.00	267.59	267.39	267.65	0.004437	1.07	3.71	8.04	0.47
4	590	100 YR	8.71	267.00	267.93	267.62	268.02	0.003851	1.40	6.68	9.42	0.48
4	590	Regional-Ex	24.81	267.00	268.49	268.10	268.49	0.000075	0.27	82.47	72.14	0.07
4	562	5 YR	3.86	266.80	267.52	267.23	267.56	0.002248	0.82	4.89	9.88	0.34
4	562	100 YR	8.71	266.80	267.88	267.45	267.94	0.002001	1.07	8.85	11.93	0.35
4	562	Regional-Ex	24.81	266.80	268.49	267.93	268.49	0.000090	0.32	81.30	79.09	0.08
4	521	5 YR	3.86	266.70	267.39	267.10	267.43	0.002564	0.91	4.44	8.30	0.37
4	521	100 YR	8.71	266.70	267.74	267.33	267.82	0.002563	1.23	7.68	9.92	0.40
4	521	Regional-Ex	24.81	266.70	268.44	267.87	268.48	0.000899	1.05	31.10	39.45	0.26
4	482	5 YR	3.86	266.70	267.32	267.05	267.36	0.002380	0.85	4.76	9.21	0.36
4	482	100 YR	8.71	266.70	267.69	267.26	267.75	0.002175	1.12	8.36	10.48	0.37
4	482	Regional-Ex	24.81	266.70	268.42	267.72	268.45	0.000748	0.96	33.05	39.67	0.24
4	447	5 YR	3.86	266.58	267.27	266.90	267.29	0.001428	0.70	5.68	9.85	0.28
4	447	100 YR	8.71	266.58	267.64	267.10	267.68	0.001482	0.96	9.59	11.27	0.31
4	447	Regional-Ex	24.81	266.58	268.39	267.58	268.43	0.000678	0.94	33.81	40.17	0.23
4	408	5 YR	3.86	266.49	267.18		267.22	0.002550	0.86	4.57	8.81	0.36
4	408	100 YR	8.71	266.49	267.54		267.61	0.002340	1.15	8.05	10.32	0.38
4	408	Regional-Ex	24.81	266.49	268.32		268.39	0.001433	1.34	25.28	39.49	0.33
4	372	5 YR	3.86	266.25	267.13		267.15	0.001121	0.71	5.80	8.98	0.26
4	372	100 YR	8.71	266.25	267.49		267.54	0.001466	1.05	9.32	10.74	0.31
4	372	Regional-Ex	24.81	266.25	268.27		268.34	0.001257	1.37	26.30	38.28	0.31
4	321	5 YR	3.86	266.10	267.05		267.09	0.001633	0.86	4.94	7.72	0.31
4	321	100 YR	8.71	266.10	267.34		267.44	0.002741	1.38	7.41	8.92	0.42

HEC-RAS Plan: Int-Exist (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	321	Regional-Ex	24.81	266.10	267.93		268.21	0.004917	2.45	13.49	15.51	0.60
4	285	5 YR	3.86	266.30	266.97		267.01	0.003036	0.94	5.66	18.19	0.40
4	285	100 YR	8.71	266.30	267.28		267.33	0.002502	1.14	12.52	26.70	0.39
4	285	Regional-Ex	24.81	266.30	268.03		268.06	0.001063	1.12	51.81	78.89	0.28
4	249	5 YR	3.86	266.10	266.58	266.58	266.76	0.023773	1.84	2.10	6.18	1.01
4	249	100 YR	8.71	266.10	266.83	266.83	267.11	0.020200	2.34	3.74	7.04	1.00
4	249	Regional-Ex	24.81	266.10	267.40	267.40	267.92	0.014891	3.22	8.28	9.04	0.97
4	210	5 YR	3.86	264.50	265.03	265.03	265.21	0.022844	1.92	2.02	5.57	1.01
4	210	100 YR	8.71	264.50	265.30	265.30	265.60	0.017892	2.45	3.72	6.86	0.98
4	210	Regional-Ex	24.81	264.50	265.92	265.92	266.45	0.013487	3.34	8.83	9.64	0.95
4	181	5 YR	3.86	263.10	263.71		263.82	0.008837	1.49	2.66	5.83	0.66
4	181	100 YR	8.71	263.10	263.92	263.87	264.20	0.014051	2.36	3.96	6.51	0.88
4	181	Regional-Ex	24.81	263.10	264.50	264.50	265.10	0.014399	3.53	8.32	8.44	0.98
4	145	5 YR	3.86	262.90	263.21	263.21	263.31	0.024863	1.40	2.75	12.91	0.97
4	145	100 YR	8.71	262.90	263.36	263.36	263.52	0.022762	1.77	4.95	16.79	1.00
4	145	Regional-Ex	24.81	262.90	263.69	263.69	263.97	0.016645	2.41	11.48	22.85	0.96
4	95	5 YR	3.86	261.70	261.93	261.93	262.01	0.027440	1.25	3.60	26.53	0.98
4	95	100 YR	8.71	261.70	262.04	262.04	262.16	0.023574	1.61	6.62	30.20	0.99
4	95	Regional-Ex	24.81	261.70	262.29	262.29	262.47	0.016973	2.11	16.74	47.76	0.93
4	64	5 YR	3.86	260.20	260.47	260.47	260.57	0.026955	1.41	2.74	13.63	1.00
4	64	100 YR	8.71	260.20	260.61	260.61	260.77	0.023828	1.74	5.00	16.45	1.01
4	64	Regional-Ex	24.81	260.20	260.92	260.92	261.21	0.019010	2.38	10.49	19.22	1.00
4	0	5 YR	3.86	259.35	259.92		259.92	0.000651	0.39	10.52	25.42	0.18
4	0	100 YR	8.71	259.35	260.25		260.26	0.000519	0.49	19.51	28.26	0.18
4	0	Regional-Ex	24.81	259.35	260.50		260.55	0.001662	1.05	26.77	30.76	0.33

Appendix E: Lovers Creek Cut/Fill Assessment

Cut/Fill Report

Generated: 2022-03-22 16:58:41

By user: LBadke

Drawing: T:\2021 PROJECTS\421487 - Harvie Road Subdivision -
Barrie\C3D\Design\Models\T:\2021 PROJECTS\421487 - Harvie Road
Subdivision - Barrie\C3D\Design\Models\421487-FLDX01.dwg

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Lovers - Regional Flood Volume - Proposed	full	1.000	1.000	62989.55	65089.87	35640.23	29449.63<Cut>
Lovers - Regional Flood Volume - Existing	full	1.000	1.000	62989.55	77758.64	35480.97	42277.67<Cut>

Totals				
	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Total	125979.11	142848.51	71121.20	71727.30<Cut>

* Value adjusted by cut or fill factor other than 1.0

Appendix F: Whiskey Creek Cut/Fill Assessment

Cut/Fill Report

Generated: 2022-03-22 16:58:53

By user: LBadke

Drawing: T:\2021 PROJECTS\421487 - Harvie Road Subdivision -
Barrie\C3D\Design\Models\T:\2021 PROJECTS\421487 - Harvie Road
Subdivision - Barrie\C3D\Design\Models\421487-FLDX01.dwg

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Whiskey - Regional Flood Volume - Existing	full	1.000	1.000	43910.33	13343.22	110524.43	97181.21<Fill>
Whiskey - Regional Flood Volume - Proposed	full	1.000	1.000	36326.36	5690.67	109503.17	103812.50<Fill>
Totals							
				2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Total				80236.69	19033.89	220027.60	200993.72<Fill>

* Value adjusted by cut or fill factor other than 1.0

Base of Pond Elevation Top of Pond Elevation
290.00 292.00

Elevation (masl)	Depth (m)	Areas		Volumes	
		Area (m ²)	Average Area (m ²)	Volume (m ³)	Cumulative Volume (m ³)
290.00	0.00	4,299.35	4,299.35	-	-
290.10	0.10	4,435.63	4,367.49	436.7	436.7
290.20	0.20	4,571.91	4,503.77	450.4	887.1
290.30	0.30	4,708.18	4,640.04	464.0	1,351.1
290.40	0.40	4,844.46	4,776.32	477.6	1,828.8
290.50	0.50	4,980.74	4,912.60	491.3	2,320.0
290.60	0.60	5,117.01	5,048.88	504.9	2,824.9
290.70	0.70	5,253.29	5,185.15	518.5	3,343.4
290.80	0.80	5,389.57	5,321.43	532.1	3,875.6
290.90	0.90	5,525.85	5,457.71	545.8	4,421.3
291.00	1.00	5,662.12	5,593.99	559.4	4,980.7
291.10	1.10	5,798.40	5,730.26	573.0	5,553.8
291.20	1.20	5,934.68	5,866.54	586.7	6,140.4
291.30	1.30	6,070.96	6,002.82	600.3	6,740.7
291.40	1.40	6,207.23	6,139.09	613.9	7,354.6
291.50	1.50	6,343.51	6,275.37	627.5	7,982.1
291.60	1.60	6,479.79	6,411.65	641.2	8,623.3
291.70	1.70	6,616.07	6,547.93	654.8	9,278.1
291.80	1.80	6,752.34	6,684.20	668.4	9,946.5
291.90	1.90	6,888.62	6,820.48	682.0	10,628.6
292.00	2.00	7,024.90	6,956.76	695.7	11,324.2

→ 291.33m 6924.87 m³
→ 291.62m 8754.26 m³
Δ = 1,829.39 m³

Note: Bolded values have been measured directly in Civil 3D

Stage Discharge Table

Outlet Control #1		Outlet Control #2		Emergency Control	
Orifice Plate #1		Weir		Emergency Spillway	
Orifice Dia. (mm)	125	Bottom Width of Wei	0.60	Bottom Width of Weir (m)	14.9
Orifice Invert (m)	290.00	Weir Sill Elevation	290.55	Weir Sill Elevation (m)	291.4
Orifice Area (m ²)	0.012	Weir Constant	1.700	Weir Constant	Varies
Orifice Coef.	0.63	Side Slope	0	Side Slope	10:1
For shaded cells calculations refer to the partially full orifice calculation sheet		For shaded cells refer to SWM Facility #2 Weir Calculation Sheet		For shaded cells refer to SWM Facility #2 Emergency Spillway Calculation Sheet	

Orifice Equation $Q = C \times A \times (2gH)^{0.5}$ C = constant g = Acceleration due to gravity
 A = area of opening (m²)
 Q = flow rate (m³/s) H = net head on the orifice

Elevation (masl)	Head (m)	Discharge (m ³ /s)	Head (m)	Discharge (m ³ /s)	Emergency Spillway	Hydraulic Control	Total Discharge (m ³ /s)
					(m ³ /s)		
290.00	0.00	0.000	0.00	0.000	0.000	Orifice Plate #1	0.000
290.10	0.04	0.005	0.00	0.000	0.000	Orifice Plate #1	0.005
290.20	0.14	0.013	0.00	0.000	0.000	Orifice Plate #1	0.013
290.30	0.24	0.017	0.00	0.000	0.000	Orifice Plate #1	0.017
290.40	0.34	0.020	0.00	0.000	0.000	Orifice Plate #1	0.020
290.50	0.44	0.023	0.00	0.000	0.000	Orifice Plate #1	0.023
290.60	0.54	0.025	0.05	0.011	0.000	Orifice Plate #1	0.036
290.70	0.64	0.027	0.15	0.059	0.000	Weir	0.086
290.80	0.74	0.029	0.25	0.128	0.000	Weir	0.157
290.90	0.84	0.031	0.35	0.211	0.000	Weir	0.242
291.00	0.94	0.033	0.45	0.308	0.000	Weir	0.341
291.10	1.04	0.035	0.55	0.416	0.000	Weir	0.451
291.20	1.14	0.037	0.65	0.535	0.000	Weir	0.572
291.30	1.24	0.038	0.75	0.663	0.000	Weir	0.701
291.40	1.34	0.040	0.85	0.799	0.000	Weir	0.839
291.50	1.44	0.041	0.95	0.944	0.719	Weir	1.704
291.60	1.54	0.042	1.05	1.097	2.252	Emergency Spillway	3.391
291.70	1.64	0.044	1.15	1.258	4.445	Emergency Spillway	5.747
291.80	1.74	0.045	1.25	1.425	7.252	Emergency Spillway	8.722
291.90	1.84	0.046	1.35	1.600	10.665	Emergency Spillway	12.311
292.00	1.94	0.048	1.45	1.781	14.688	Emergency Spillway	16.517

PROJECT	15 Harvie Road	FILE	421487
		DATE	03 07 2022
SUBJECT	SWM Facility #2 Operating Characteristics	NAME	LB
		PAGE	5 OF 5

Operation Summary

4-Hour Chicago

STORM	Storage	Release Rate	Elevation
	m ³	m ³ /s	m
25 mm	1,906	0.020	290.42
1:2-year	2,862	0.040	290.61
1:5-year	3,549	0.113	290.74
1:10-year	3,992	0.175	290.82
1:25-year	4,554	0.265	290.92
1:50-year	4,951	0.335	290.99
1:100-year	5,367	0.416	291.07

24-Hour SCS

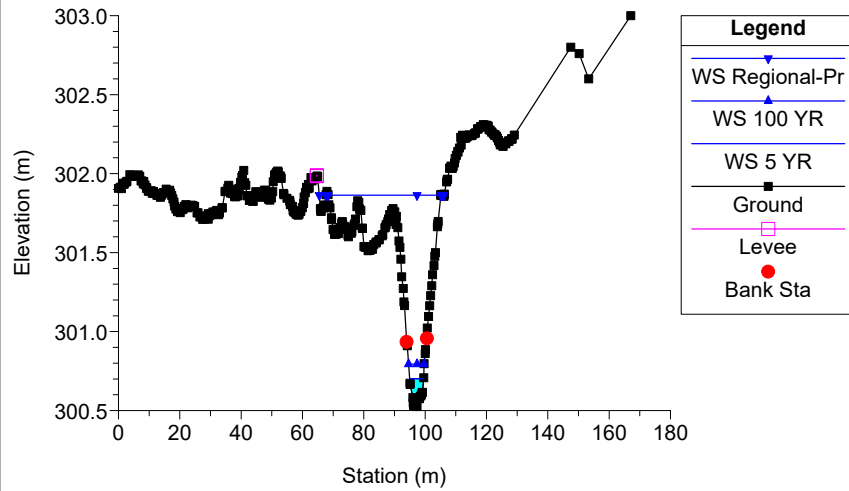
STORM	Storage	Release Rate	Elevation
	m ³	m ³ /s	m
1:2-year	3,241	0.076	290.68
1:5-year	4,224	0.211	290.86
1:10-year	4,873	0.321	290.98
1:25-year	5,683	0.478	291.12
1:50-year	6,307	0.607	291.23
1:100-year	6,925	0.740	291.33
Hazel	7,621	1.206	291.44

Appendix G: Lovers Creek Proposed Condition Hydraulic Model Results

Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

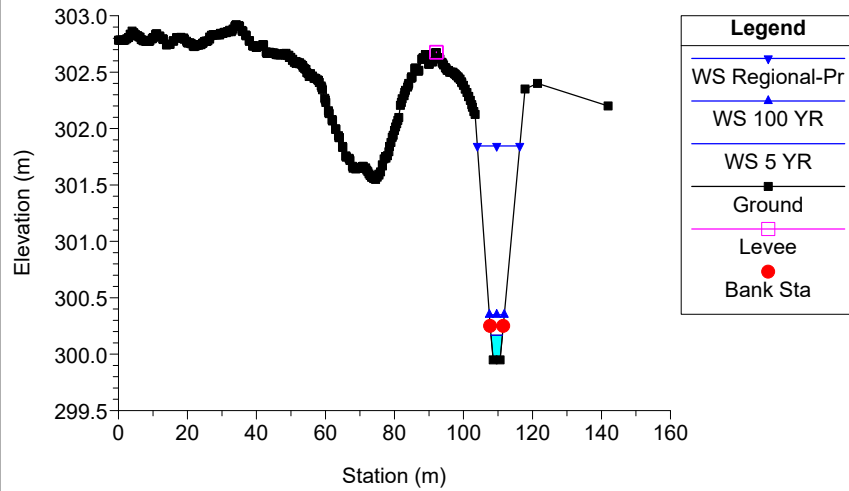
River = LoversTrib1 Reach = Trib1.4 RS = 3314 Revised per Proposed Bryne Drive Extension



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

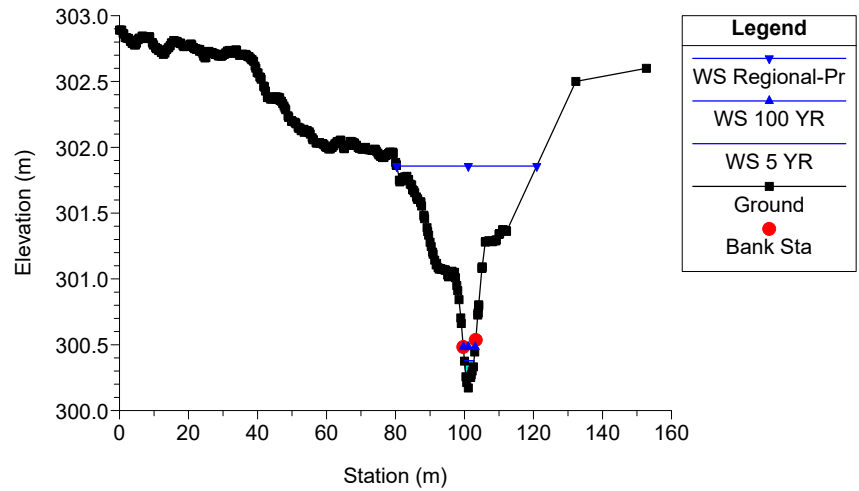
River = LoversTrib1 Reach = Trib1.4 RS = 3207 Revised per Proposed Bryne Drive Extension



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

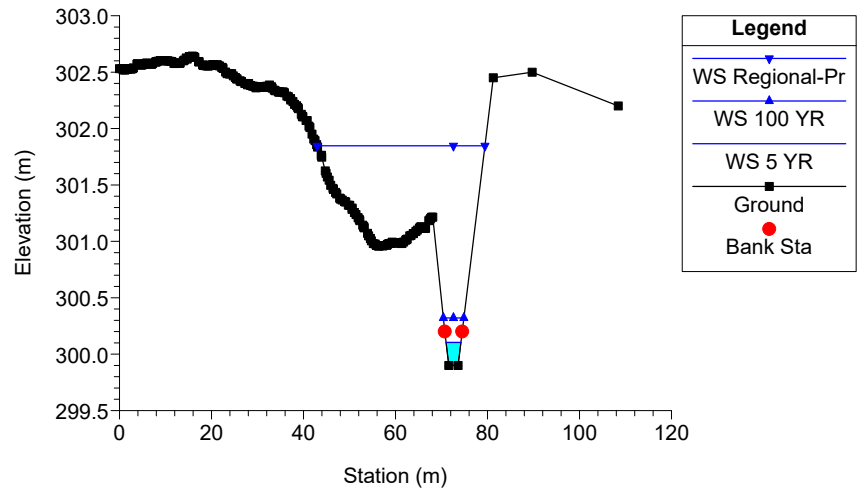
River = LoversTrib1 Reach = Trib1.4 RS = 3264 Revised per Proposed Bryne Drive Extension

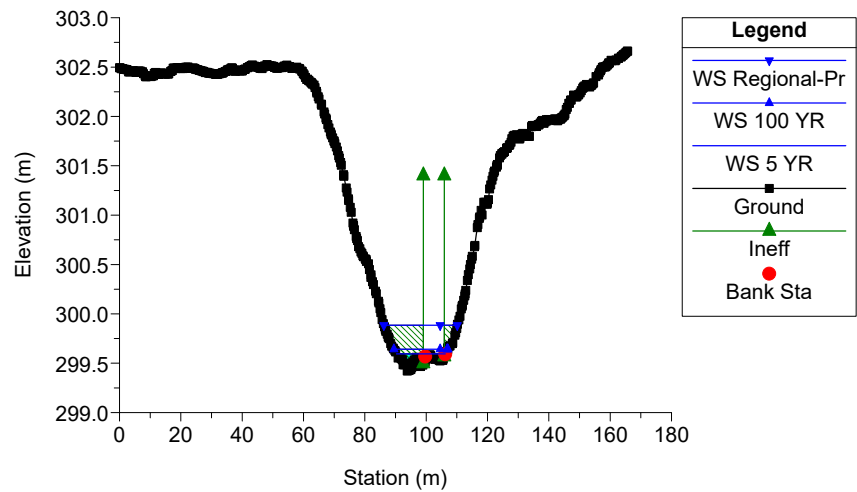
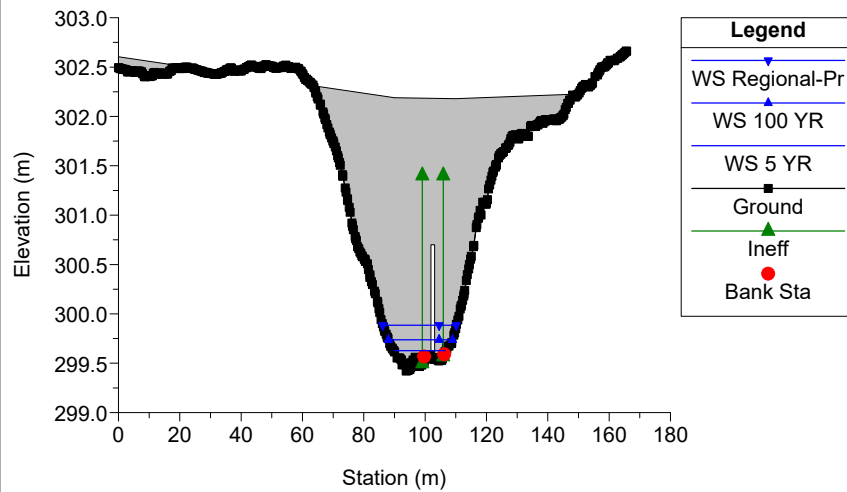
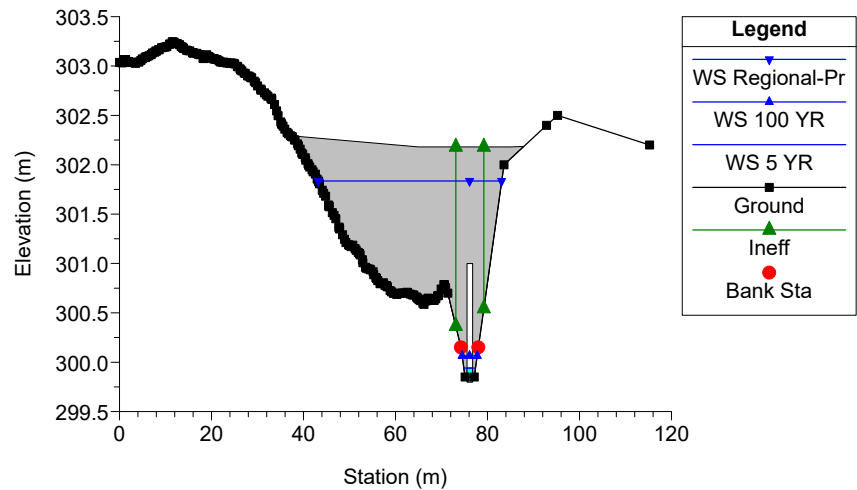
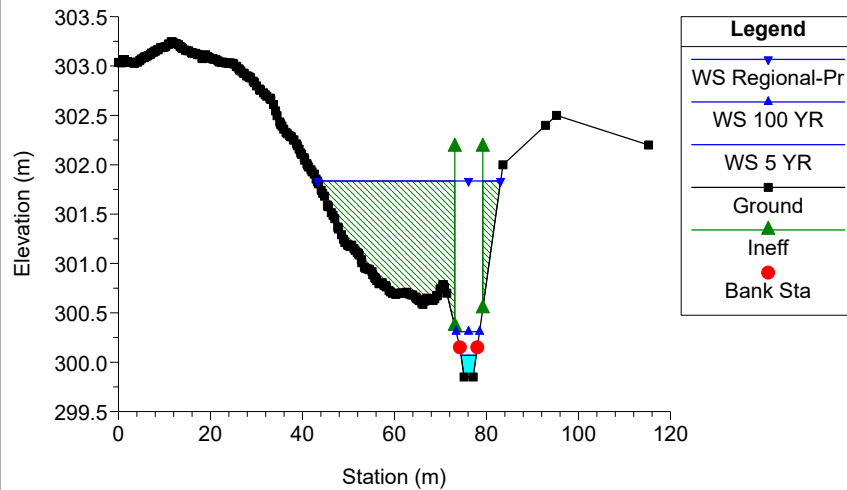


Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

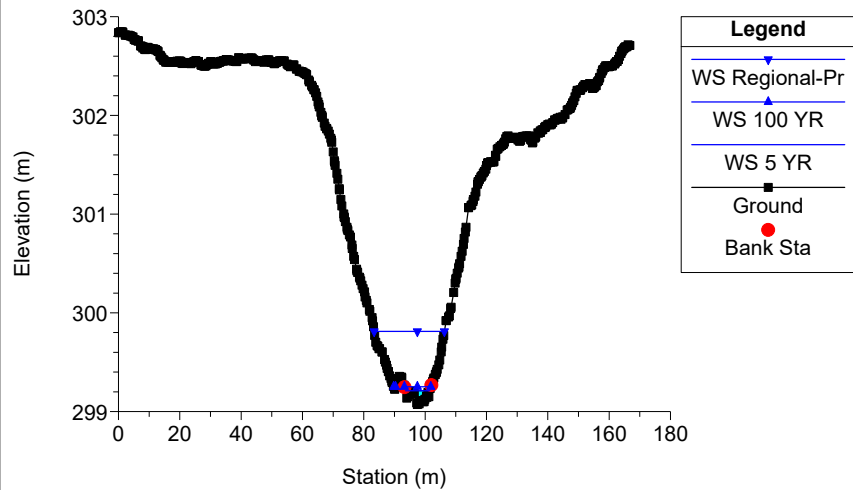
River = LoversTrib1 Reach = Trib1.4 RS = 3180 Revised per Proposed Bryne Drive Extension





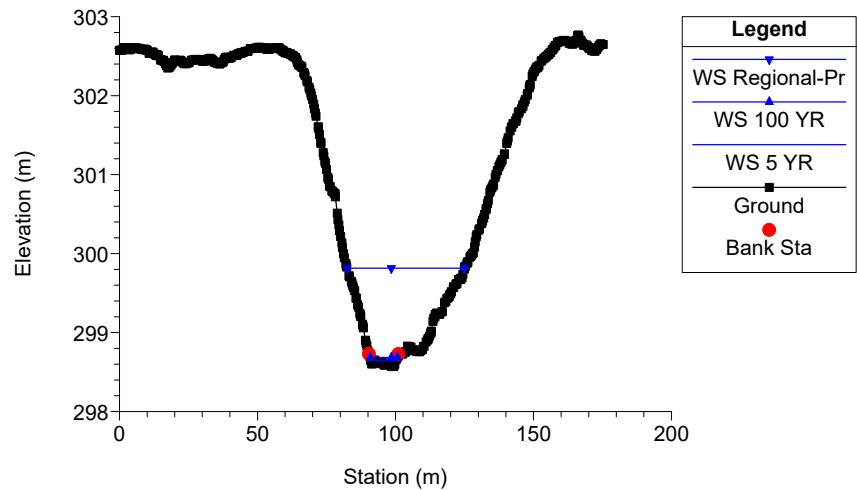
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3083



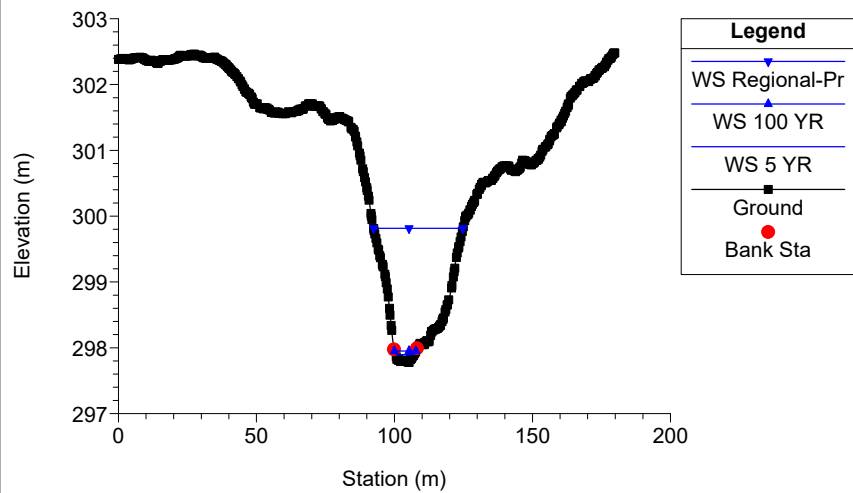
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3051



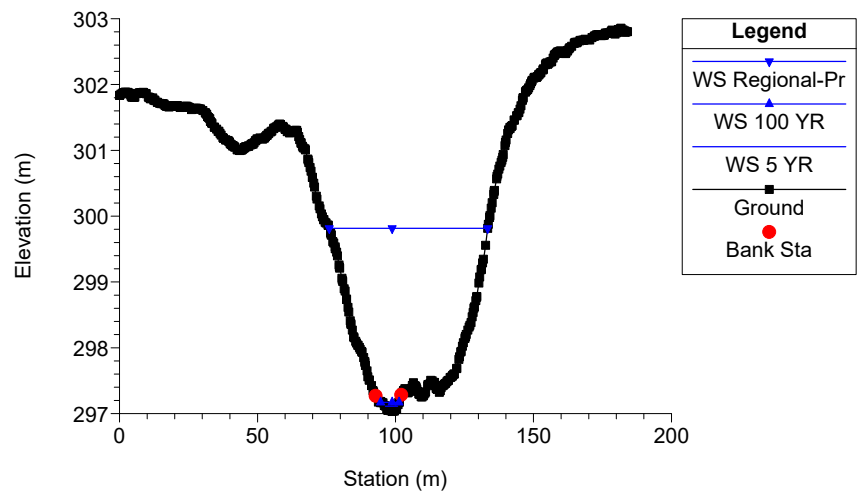
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 3000



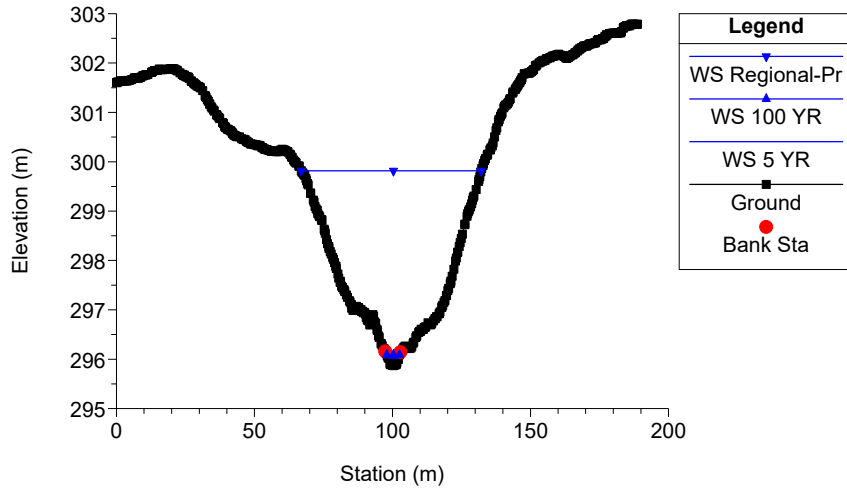
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2950



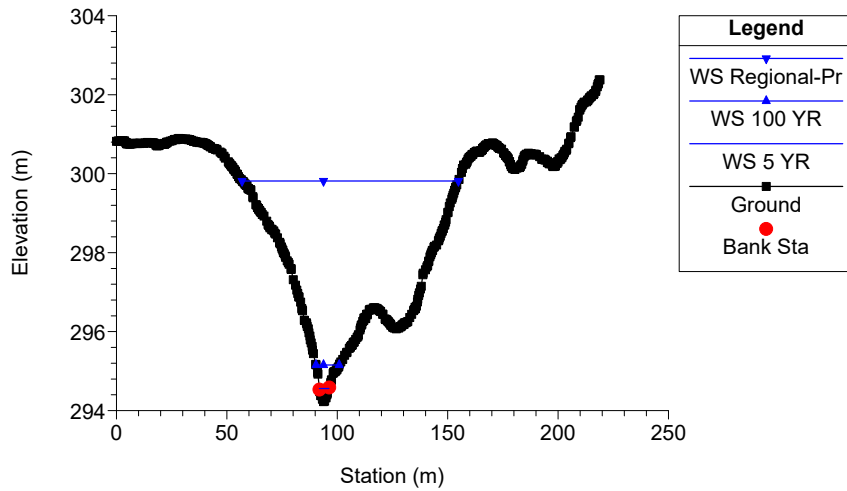
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2900



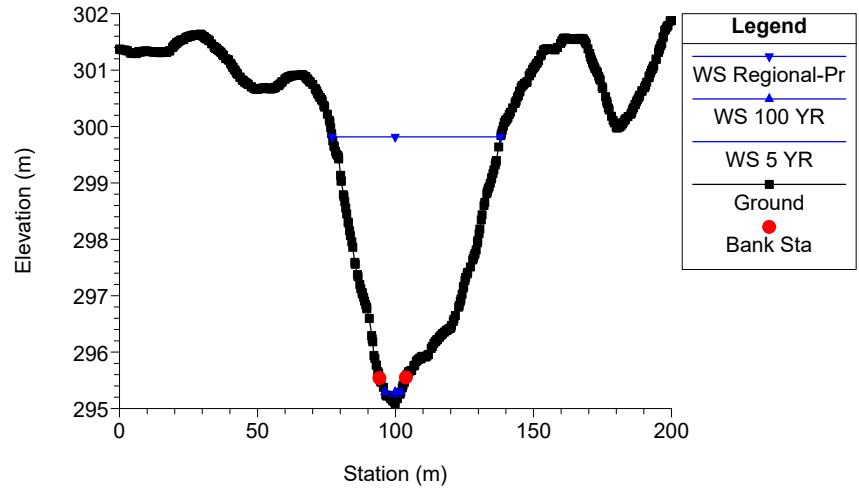
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2802



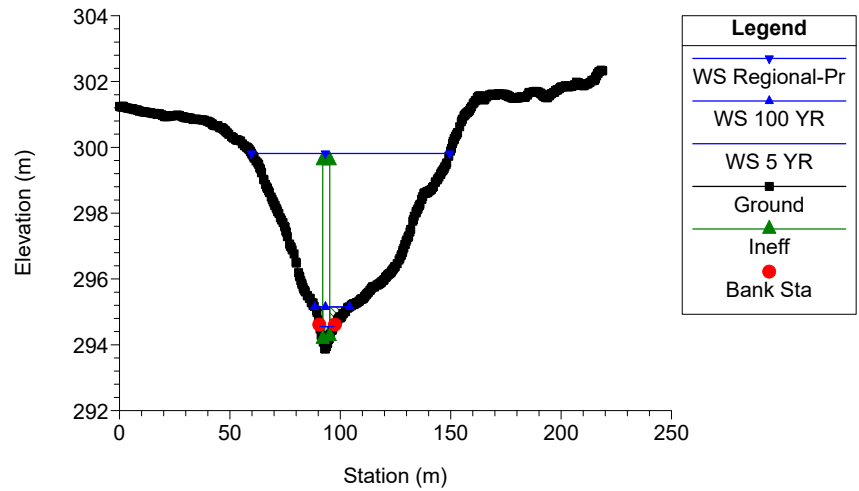
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2850



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

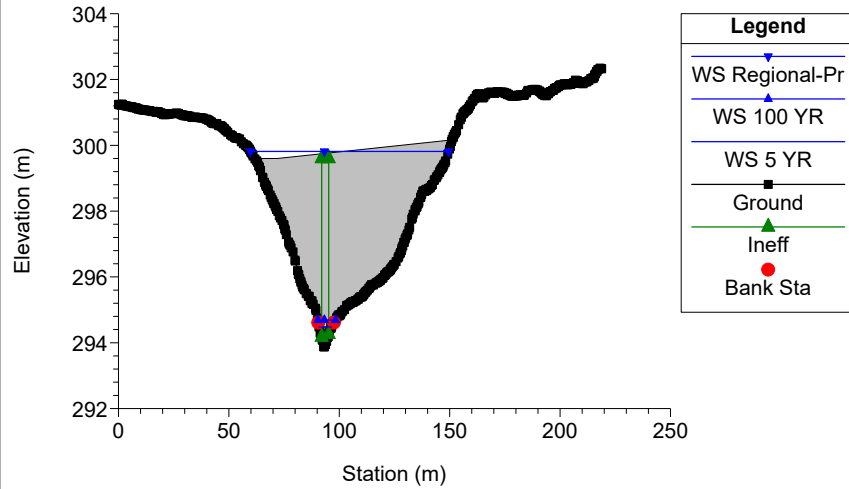
Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2792



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

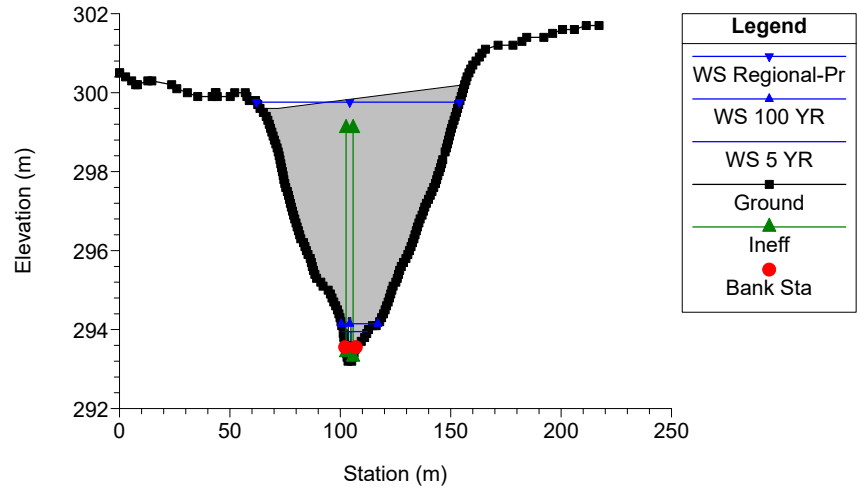
River = LoversTrib1 Reach = Trib1.4 RS = 2746 Culv Highway 400 (101)



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

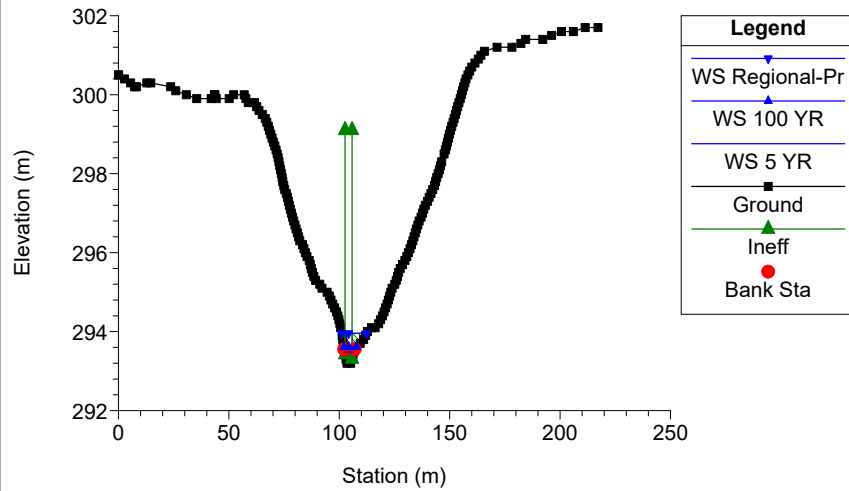
River = LoversTrib1 Reach = Trib1.4 RS = 2746 Culv Highway 400 (101)



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

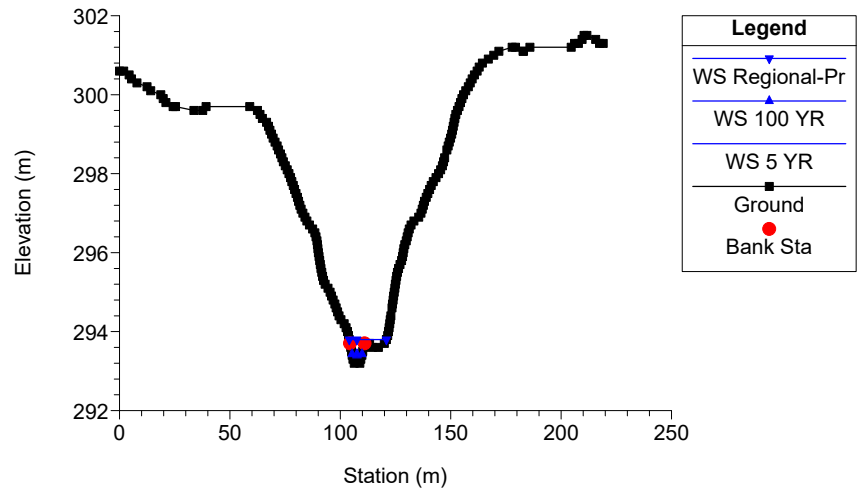
River = LoversTrib1 Reach = Trib1.4 RS = 2723



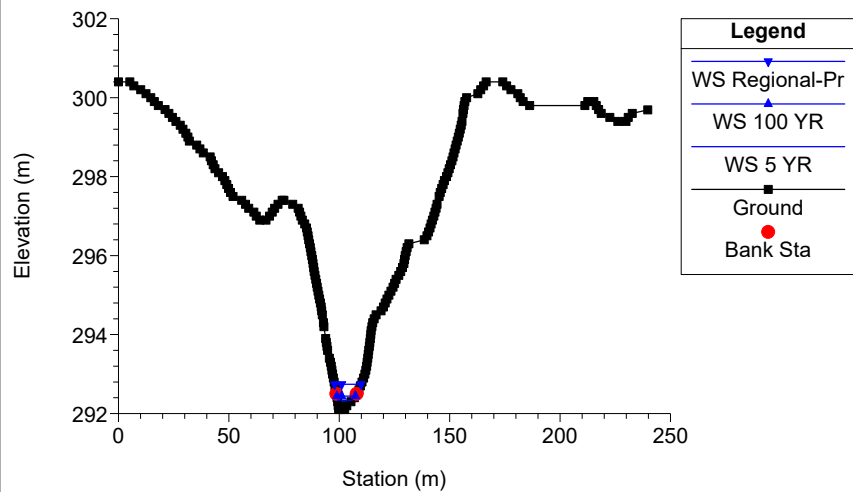
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry

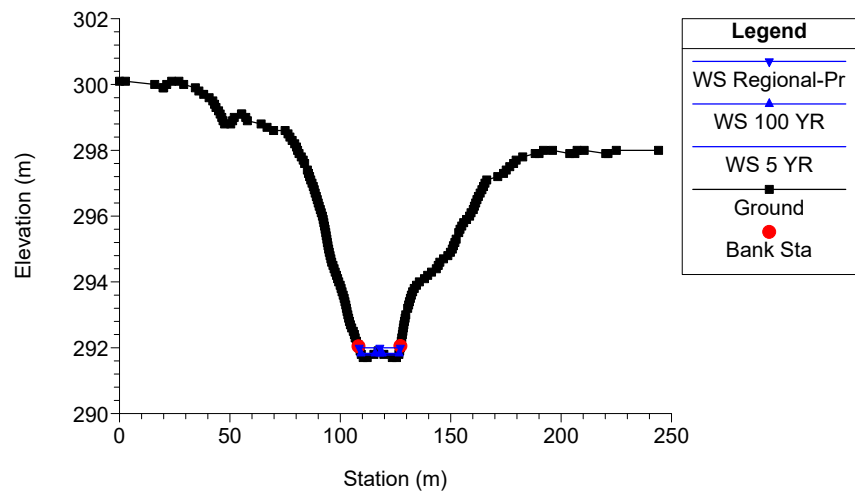
River = LoversTrib1 Reach = Trib1.4 RS = 2713



Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2664



Geom: Interim Existing Condition Geometry
River = LoversTrib1 Reach = Trib1.4 RS = 2604



HEC-RAS Plan: Whiskey-Proposed Condition River: LoversTrib1 Reach: Trib1.4

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Trib1.4	3314	5 YR	0.20	300.52	300.70	300.64	300.71	0.004309	0.38	0.52	4.59	0.36
Trib1.4	3314	100 YR	0.51	300.52	300.79	300.69	300.81	0.004110	0.53	0.97	5.06	0.38
Trib1.4	3314	Regional-Pr	4.09	300.52	301.86	301.01	301.87	0.000213	0.41	16.36	39.40	0.12
Trib1.4	3264	5 YR	0.20	300.17	300.38		300.40	0.010513	0.61	0.33	2.76	0.57
Trib1.4	3264	100 YR	0.51	300.17	300.48		300.51	0.009551	0.79	0.65	3.44	0.58
Trib1.4	3264	Regional-Pr	4.09	300.17	301.86		301.86	0.000118	0.36	23.89	40.64	0.09
Trib1.4	3207	5 YR	0.20	299.95	300.17	300.04	300.17	0.001998	0.34	0.58	3.31	0.26
Trib1.4	3207	100 YR	0.51	299.95	300.35	300.12	300.36	0.001210	0.41	1.27	4.33	0.23
Trib1.4	3207	Regional-Pr	4.09	299.95	301.85	300.51	301.85	0.000139	0.43	13.70	12.28	0.10
Trib1.4	3180	5 YR	0.20	299.90	300.10		300.11	0.002526	0.37	0.53	3.23	0.29
Trib1.4	3180	100 YR	0.51	299.90	300.32		300.33	0.000971	0.38	1.37	4.48	0.21
Trib1.4	3180	Regional-Pr	4.09	299.90	301.85		301.85	0.000050	0.26	30.60	36.50	0.06
Trib1.4	3165	5 YR	0.20	299.85	300.07	299.94	300.08	0.001951	0.34	0.58	3.32	0.26
Trib1.4	3165	100 YR	0.51	299.85	300.31	300.02	300.32	0.000677	0.34	1.58	5.10	0.17
Trib1.4	3165	Regional-Pr	4.09	299.85	301.84	300.42	301.84	0.000135	0.44	10.80	39.85	0.10
Trib1.4	3135	Culvert										
Trib1.4	3106	5 YR	0.20	299.52	299.59	299.59	299.62	0.044604	0.64	0.31	15.94	0.99
Trib1.4	3106	100 YR	0.51	299.52	299.64	299.63	299.67	0.026608	0.82	0.64	17.37	0.87
Trib1.4	3106	Regional-Pr	4.09	299.52	299.89	299.89	300.05	0.023477	1.84	2.29	23.94	1.02
Trib1.4	3083	5 YR	0.20	299.07	299.21	299.18	299.22	0.008795	0.38	0.52	7.95	0.47
Trib1.4	3083	100 YR	0.51	299.07	299.25	299.22	299.27	0.012034	0.59	0.87	9.27	0.59
Trib1.4	3083	Regional-Pr	4.09	299.07	299.81		299.82	0.000734	0.51	10.81	22.91	0.20
Trib1.4	3051	5 YR	0.20	298.57	298.64	298.64	298.66	0.046714	0.61	0.33	8.58	1.00
Trib1.4	3051	100 YR	0.51	298.57	298.68	298.68	298.71	0.027716	0.72	0.71	9.86	0.86
Trib1.4	3051	Regional-Pr	4.09	298.57	299.82		299.82	0.000026	0.14	45.27	54.56	0.04
Trib1.4	3000	5 YR	0.20	297.78	297.89		297.90	0.007266	0.39	0.52	6.64	0.44
Trib1.4	3000	100 YR	0.51	297.78	297.95		297.97	0.008164	0.55	0.93	7.83	0.51
Trib1.4	3000	Regional-Pr	4.09	297.78	299.82		299.82	0.000005	0.09	78.56	57.30	0.02
Trib1.4	2950	5 YR	0.20	297.03	297.11	297.11	297.15	0.051310	0.82	0.24	4.43	1.11
Trib1.4	2950	100 YR	0.51	297.03	297.17	297.17	297.21	0.036562	0.91	0.56	6.65	1.01
Trib1.4	2950	Regional-Pr	4.09	297.03	299.82		299.82	0.000001	0.05	127.24	60.44	0.01
Trib1.4	2900	5 YR	0.20	295.87	296.02		296.03	0.006890	0.47	0.42	3.86	0.46
Trib1.4	2900	100 YR	0.51	295.87	296.09		296.12	0.010523	0.72	0.70	4.65	0.59
Trib1.4	2900	Regional-Pr	4.09	295.87	299.82		299.82	0.000001	0.05	151.49	63.22	0.01
Trib1.4	2850	5 YR	0.20	295.09	295.22	295.22	295.26	0.060898	0.93	0.21	3.62	1.23
Trib1.4	2850	100 YR	0.51	295.09	295.29	295.29	295.33	0.026899	0.88	0.58	5.76	0.89
Trib1.4	2850	Regional-Pr	4.09	295.09	299.82		299.82	0.000000	0.04	163.46	51.65	0.01
Trib1.4	2802	5 YR	0.20	294.23	294.56		294.56	0.000806	0.24	0.85	4.35	0.17
Trib1.4	2802	100 YR	0.51	294.23	295.16		295.16	0.000038	0.13	4.93	10.56	0.05
Trib1.4	2802	Regional-Pr	4.09	294.23	299.82		299.82	0.000000	0.03	272.27	97.91	0.00
Trib1.4	2792	5 YR	0.47	293.87	294.55	294.14	294.56	0.000318	0.28	1.67	6.51	0.12
Trib1.4	2792	100 YR	1.13	293.87	295.15	294.26	295.15	0.000145	0.32	3.57	15.78	0.10
Trib1.4	2792	Regional-Pr	6.07	293.87	299.82	294.74	299.82	0.000000	0.04	272.63	89.76	0.01
Trib1.4	2746	Culvert										
Trib1.4	2723	5 YR	0.47	293.20	293.49	293.37	293.50	0.003751	0.60	0.79	4.16	0.38
Trib1.4	2723	100 YR	1.13	293.20	293.61	293.47	293.66	0.005400	0.95	1.20	5.66	0.49
Trib1.4	2723	Regional-Pr	6.07	293.20	293.96	293.96	294.31	0.017756	2.65	2.29	11.29	1.00
Trib1.4	2713	5 YR	0.47	293.20	293.34	293.34	293.39	0.032533	1.06	0.44	3.88	1.00
Trib1.4	2713	100 YR	1.13	293.20	293.43	293.43	293.52	0.028295	1.34	0.84	4.60	1.00
Trib1.4	2713	Regional-Pr	6.07	293.20	293.80	293.80	293.95	0.015806	1.83	4.40	16.77	0.87
Trib1.4	2664	5 YR	0.47	292.10	292.34	292.23	292.35	0.003582	0.44	1.07	6.69	0.35
Trib1.4	2664	100 YR	1.13	292.10	292.44	292.32	292.46	0.004378	0.60	1.87	8.39	0.41
Trib1.4	2664	Regional-Pr	6.07	292.10	292.74	292.60	292.83	0.006922	1.30	4.95	11.99	0.59
Trib1.4	2604	5 YR	0.47	291.70	291.78	291.78	291.81	0.049452	0.80	0.59	10.88	1.09
Trib1.4	2604	100 YR	1.13	291.70	291.83	291.83	291.87	0.037990	0.94	1.20	14.07	1.03
Trib1.4	2604	Regional-Pr	6.07	291.70	292.00	292.00	292.11	0.025845	1.47	4.13	18.63	1.00

HEC-RAS Plan: Whiskey-Proposed Condition River: LoversTrib1 Reach: Trib1.4 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Trib1.4	2538	5 YR	0.47	290.10	290.37		290.37	0.001777	0.33	1.44	8.39	0.25
Trib1.4	2538	100 YR	1.13	290.10	290.48		290.49	0.001947	0.46	2.66	14.80	0.28
Trib1.4	2538	Regional-Pr	6.07	290.10	290.83		290.87	0.002294	0.87	9.75	22.47	0.35
Trib1.4	2473	5 YR	0.47	289.90	290.02	290.02	290.07	0.035094	0.95	0.49	5.36	1.00
Trib1.4	2473	100 YR	1.13	289.90	290.10	290.10	290.17	0.030648	1.17	0.97	6.98	1.00
Trib1.4	2473	Regional-Pr	6.07	289.90	290.37	290.37	290.53	0.017975	1.86	4.21	15.18	0.92
Trib1.4	2428	5 YR	0.47	288.90	289.00	288.94	289.01	0.002321	0.25	1.88	20.13	0.26
Trib1.4	2428	100 YR	1.13	288.90	289.06	288.98	289.07	0.002581	0.37	3.19	23.60	0.30
Trib1.4	2428	Regional-Pr	6.07	288.90	289.28		289.31	0.003370	0.76	9.32	30.36	0.39
Trib1.4	2384	5 YR	0.47	288.60	288.72	288.71	288.75	0.032270	0.72	0.65	10.21	0.91
Trib1.4	2384	100 YR	1.13	288.60	288.78	288.76	288.82	0.025480	0.86	1.31	13.12	0.87
Trib1.4	2384	Regional-Pr	6.07	288.60	288.93	288.93	289.01	0.021268	1.41	6.21	37.48	0.92
Trib1.4	2338	5 YR	0.47	286.90	286.97	286.97	287.00	0.044402	0.67	0.71	15.71	1.00
Trib1.4	2338	100 YR	1.13	286.90	287.00	287.00	287.04	0.062708	0.90	1.26	23.19	1.23
Trib1.4	2338	Regional-Pr	6.07	286.90	287.14	287.14	287.23	0.025915	1.34	4.78	27.69	0.98
Trib1.4	2299	5 YR	0.47	286.60	286.67	286.62	286.68	0.001620	0.18	2.72	38.27	0.21
Trib1.4	2299	100 YR	1.13	286.60	286.72		286.73	0.001699	0.26	4.64	39.79	0.23
Trib1.4	2299	Regional-Pr	6.07	286.60	286.90		286.92	0.002373	0.55	11.83	41.18	0.32
Trib1.4	2288	5 YR	0.47	286.30	286.43	286.43	286.46	0.042912	0.72	0.65	12.43	1.01
Trib1.4	2288	100 YR	1.13	286.30	286.47	286.47	286.51	0.046722	0.84	1.35	22.22	1.08
Trib1.4	2288	Regional-Pr	6.07	286.30	286.58	286.58	286.64	0.030762	1.10	5.52	44.02	0.99
Trib1.4	2214	5 YR	0.47	283.00	283.12		283.13	0.010166	0.46	1.03	13.84	0.53
Trib1.4	2214	100 YR	1.13	283.00	283.17		283.19	0.012308	0.69	1.69	15.06	0.62
Trib1.4	2214	Regional-Pr	6.07	283.00	283.32	283.32	283.44	0.022132	1.57	4.32	20.04	0.96
Trib1.4	2163	5 YR	0.47	282.30	282.40		282.42	0.021065	0.52	0.90	16.71	0.71
Trib1.4	2163	100 YR	1.13	282.30	282.45		282.47	0.016522	0.69	1.68	18.29	0.70
Trib1.4	2163	Regional-Pr	6.07	282.30	282.66		282.72	0.008616	1.07	6.28	23.66	0.61
Trib1.4	2140	5 YR	0.47	281.90	282.04	282.02	282.06	0.012777	0.59	0.79	8.29	0.61
Trib1.4	2140	100 YR	1.13	281.90	282.11	282.07	282.14	0.013798	0.77	1.48	11.07	0.67
Trib1.4	2140	Regional-Pr	6.07	281.90	282.29	282.29	282.43	0.024399	1.60	3.79	14.40	1.00
Trib1.4	2078	5 YR	0.47	280.60	280.69	280.69	280.72	0.045315	0.77	0.61	11.21	1.05
Trib1.4	2078	100 YR	1.13	280.60	280.73	280.73	280.78	0.040102	0.97	1.16	13.50	1.06
Trib1.4	2078	Regional-Pr	6.07	280.60	281.22		281.24	0.001443	0.58	10.62	24.54	0.27
Trib1.4	2060	5 YR	0.47	280.10	280.23		280.24	0.004217	0.34	1.39	14.57	0.35
Trib1.4	2060	100 YR	1.13	280.10	280.34		280.35	0.001784	0.35	3.27	18.35	0.26
Trib1.4	2060	Regional-Pr	6.07	280.10	281.22		281.23	0.000108	0.27	28.14	36.39	0.08
Trib1.4	2037	5 YR	1.00	279.60	279.81	279.81	279.90	0.027979	1.33	0.75	5.19	1.00
Trib1.4	2037	100 YR	2.36	279.60	279.95	279.95	280.11	0.022410	1.75	1.35	7.56	0.99
Trib1.4	2037	Regional-Pr	6.75	279.60	281.13	280.28	281.19	0.001083	1.07	6.29	34.90	0.28
Trib1.4	2020		Culvert									
Trib1.4	1992	5 YR	2.96	278.70	279.07	279.07	279.26	0.021504	1.90	1.56	8.60	0.99
Trib1.4	1992	100 YR	6.17	278.70	279.31	279.31	279.61	0.018307	2.42	2.55	10.70	0.99
Trib1.4	1992	Regional-Pr	8.93	278.70	279.47	279.47	279.86	0.017172	2.76	3.24	12.38	1.00
Trib1.4	1976	5 YR	2.96	277.60	277.97	277.96	278.10	0.023596	1.62	1.83	6.62	0.98
Trib1.4	1976	100 YR	6.17	277.60	278.14	278.14	278.35	0.020611	2.05	3.05	7.68	0.99
Trib1.4	1976	Regional-Pr	8.93	277.60	278.26	278.26	278.53	0.018406	2.29	4.06	8.45	0.98
Trib1.4	1921	5 YR	2.96	276.30	276.63	276.63	276.76	0.025060	1.56	1.89	7.58	1.00
Trib1.4	1921	100 YR	6.17	276.30	276.80	276.80	276.98	0.022776	1.88	3.28	9.25	1.01
Trib1.4	1921	Regional-Pr	8.93	276.30	276.90	276.90	277.13	0.020364	2.11	4.28	10.25	0.99
Trib1.4	1850	5 YR	3.88	274.40	274.72	274.72	274.85	0.024652	1.59	2.44	9.43	1.00
Trib1.4	1850	100 YR	7.87	274.40	274.88	274.88	275.07	0.021912	1.93	4.08	10.74	1.00
Trib1.4	1850	Regional-Pr	9.52	274.40	274.94	274.94	275.15	0.021710	2.05	4.65	11.13	1.01
Trib1.4	1800	5 YR	3.88	273.30	273.68		273.78	0.015292	1.40	2.77	9.02	0.81
Trib1.4	1800	100 YR	7.87	273.30	273.86	273.80	274.01	0.014892	1.74	4.52	10.39	0.84
Trib1.4	1800	Regional-Pr	9.52	273.30	273.92		274.09	0.015007	1.85	5.14	10.81	0.86
Trib1.4	1750	5 YR	3.88	272.60	273.02		273.11	0.011873	1.31	2.97	9.02	0.72
Trib1.4	1750	100 YR	7.87	272.60	273.19		273.35	0.011998	1.73	4.65	10.36	0.78

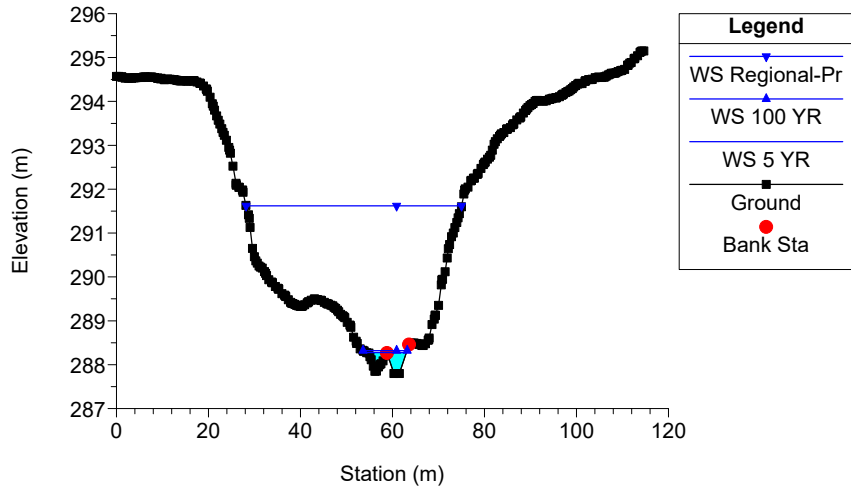
HEC-RAS Plan: Whiskey-Proposed Condition River: LoversTrib1 Reach: Trib1.4 (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Trib1.4	1750	Regional-Pr	9.52	272.60	273.26		273.43	0.011890	1.86	5.30	10.88	0.79
Trib1.4	1700	5 YR	3.88	271.70	272.15	272.15	272.33	0.021242	1.87	2.14	6.62	0.98
Trib1.4	1700	100 YR	7.87	271.70	272.37	272.37	272.63	0.017312	2.30	3.76	8.14	0.96
Trib1.4	1700	Regional-Pr	9.52	271.70	272.45	272.45	272.73	0.016251	2.42	4.42	8.66	0.94
Trib1.4	1650	5 YR	3.88	270.10	270.78	270.78	270.98	0.017884	2.03	2.14	6.04	0.93
Trib1.4	1650	100 YR	7.87	270.10	271.04	271.04	271.31	0.014986	2.47	3.99	8.24	0.91
Trib1.4	1650	Regional-Pr	9.52	270.10	271.12	271.12	271.42	0.014470	2.61	4.72	9.10	0.91
Trib1.4	1600	5 YR	3.88	268.10	268.62		268.70	0.009722	1.27	3.06	8.16	0.66
Trib1.4	1600	100 YR	7.87	268.10	268.84		268.97	0.009181	1.56	5.05	9.71	0.68
Trib1.4	1600	Regional-Pr	9.52	268.10	268.92		269.06	0.008747	1.66	5.78	10.21	0.68
Trib1.4	1550	5 YR	3.88	267.70	268.25		268.31	0.006308	1.09	3.56	9.00	0.54
Trib1.4	1550	100 YR	7.87	267.70	268.43		268.55	0.007616	1.53	5.32	10.46	0.63
Trib1.4	1550	Regional-Pr	9.52	267.70	268.49		268.63	0.007907	1.67	5.98	10.93	0.66
Trib1.4	1500	5 YR	3.88	267.30	267.61	267.61	267.74	0.025264	1.58	2.46	9.80	1.00
Trib1.4	1500	100 YR	7.87	267.30	267.77	267.77	267.95	0.021627	1.92	4.13	11.71	0.99
Trib1.4	1500	Regional-Pr	9.52	267.30	267.82	267.82	268.03	0.020472	2.03	4.76	12.39	0.99
Trib1.4	1450	5 YR	3.88	265.60	266.18	266.15	266.31	0.016936	1.61	2.44	7.81	0.87
Trib1.4	1450	100 YR	7.87	265.60	266.35	266.35	266.58	0.018089	2.16	3.92	9.76	0.96
Trib1.4	1450	Regional-Pr	9.52	265.60	266.42	266.42	266.67	0.017092	2.28	4.61	10.58	0.95
Trib1.4	1400	5 YR	3.88	264.80	265.17	265.17	265.30	0.024185	1.64	2.37	8.58	1.00
Trib1.4	1400	100 YR	7.87	264.80	265.82		265.86	0.001449	0.88	9.92	15.60	0.30
Trib1.4	1400	Regional-Pr	9.52	264.80	265.39	265.39	265.62	0.020655	2.14	4.48	10.22	1.00

Appendix H: Whiskey Creek Proposed Condition Hydraulic Model Results

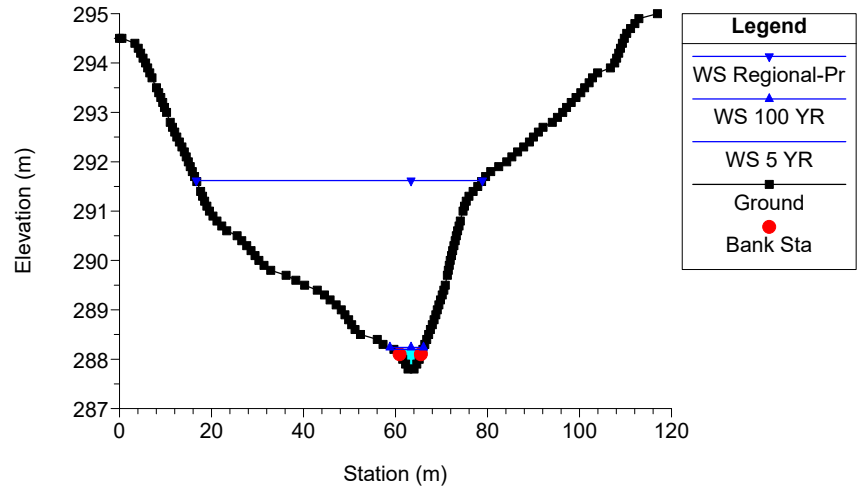
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 134



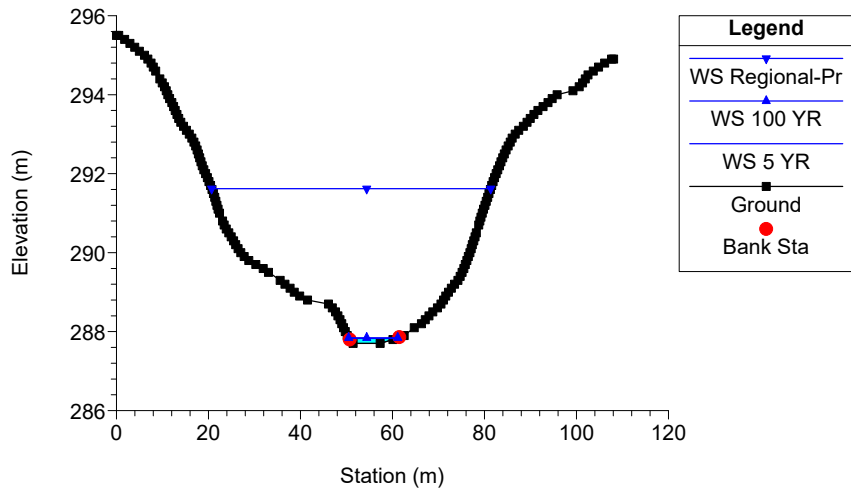
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 119



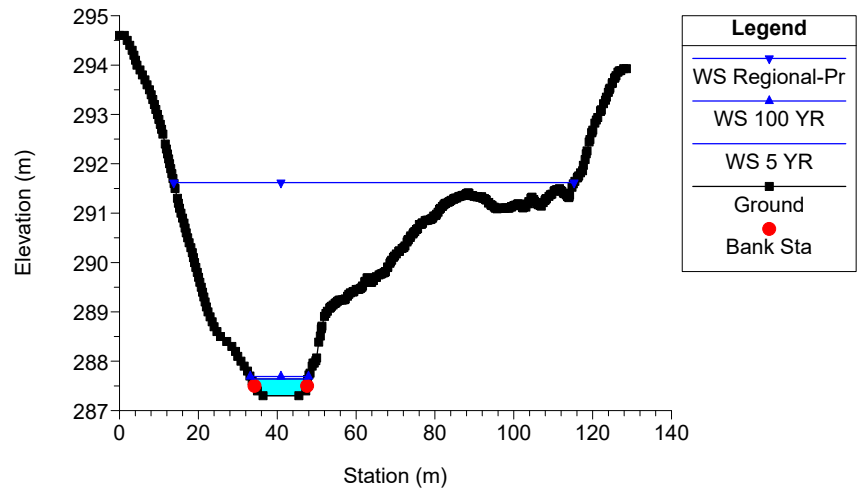
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 86



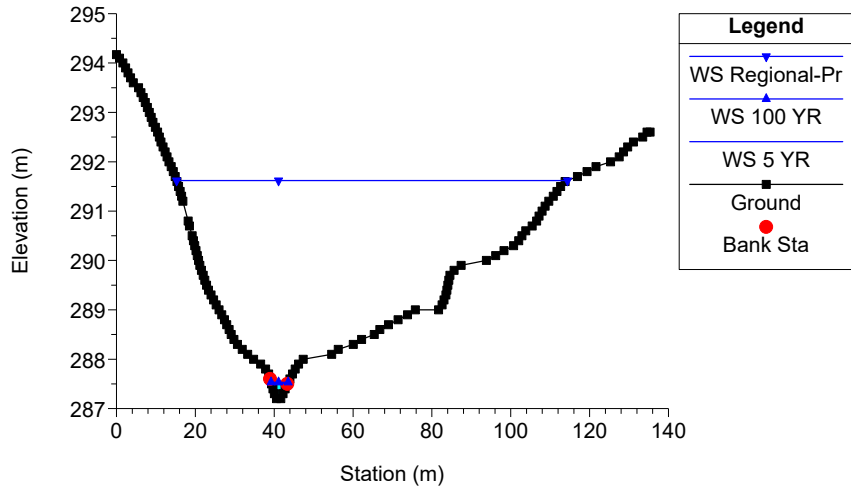
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 43



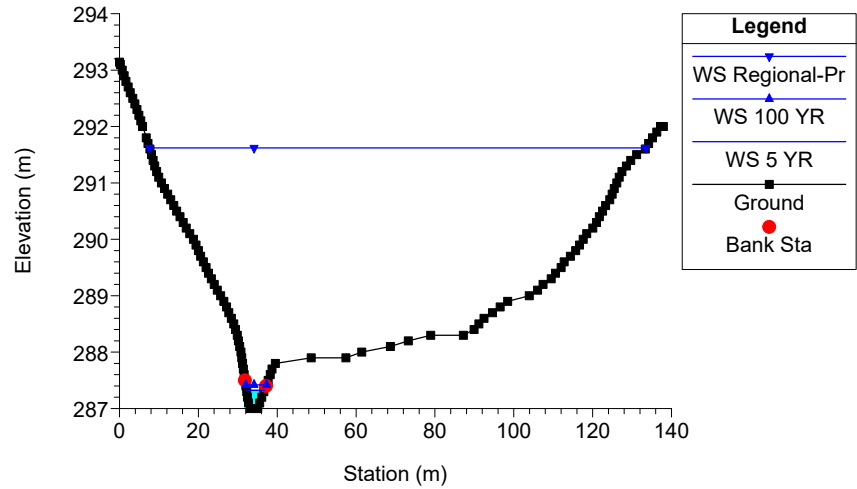
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 13



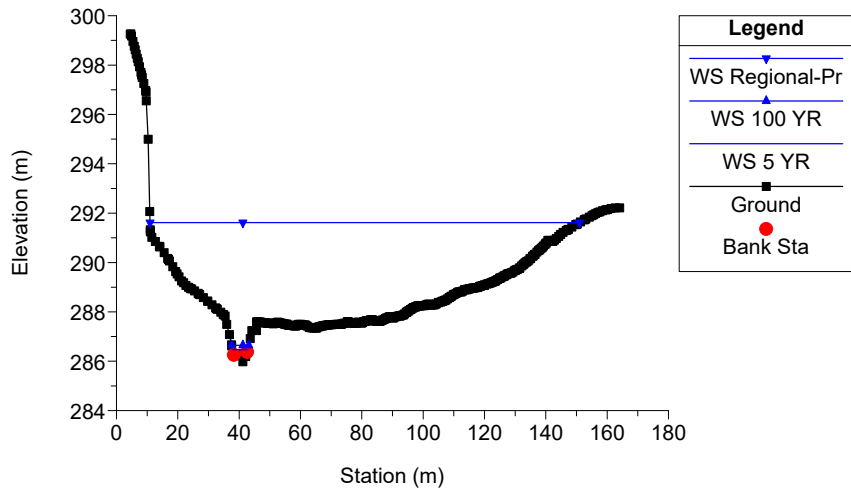
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 6 RS = 0



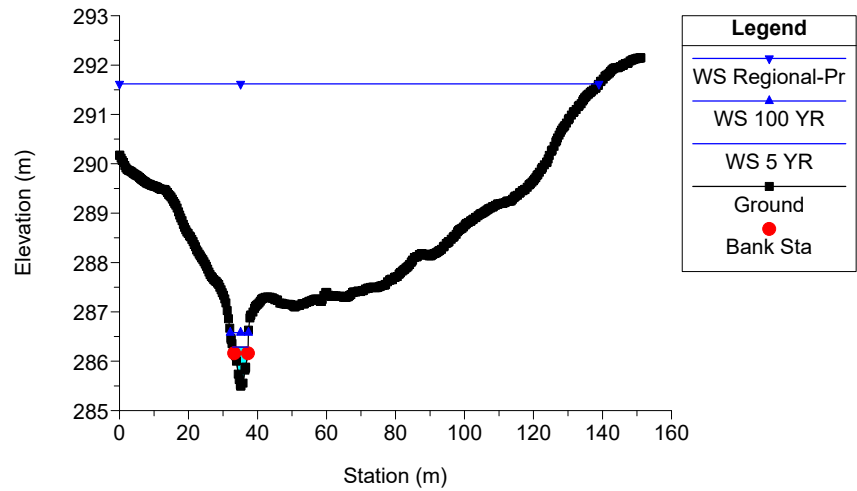
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1987

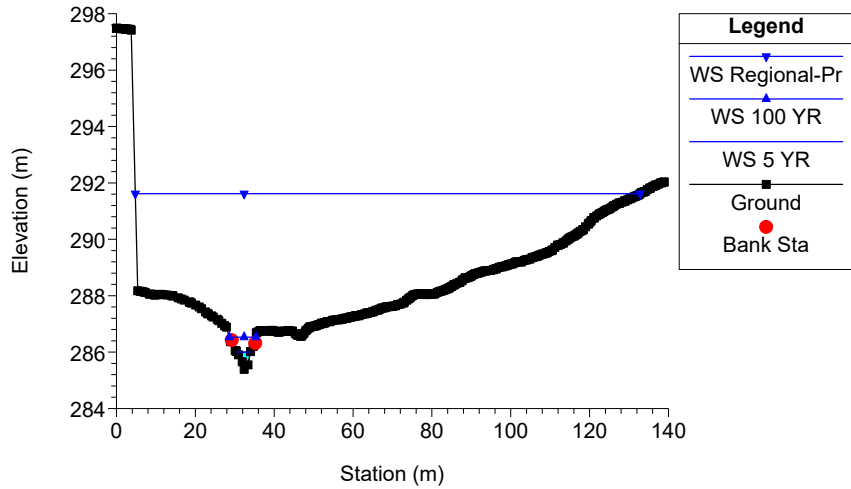


Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

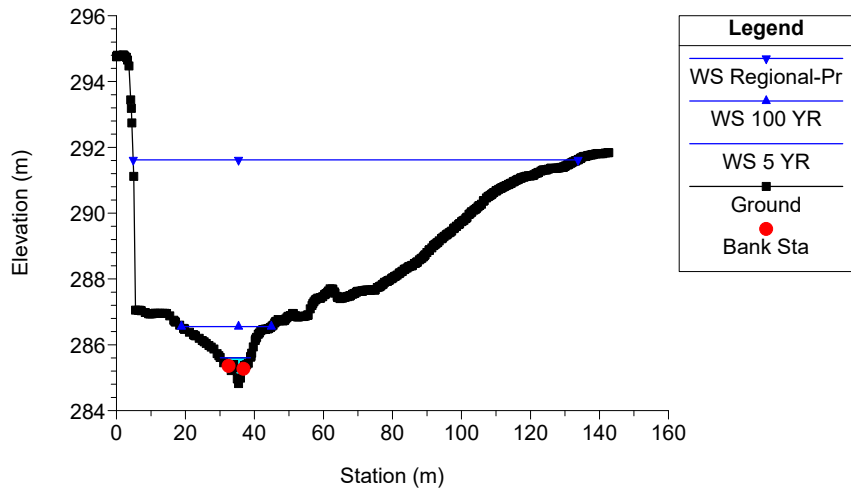
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1968



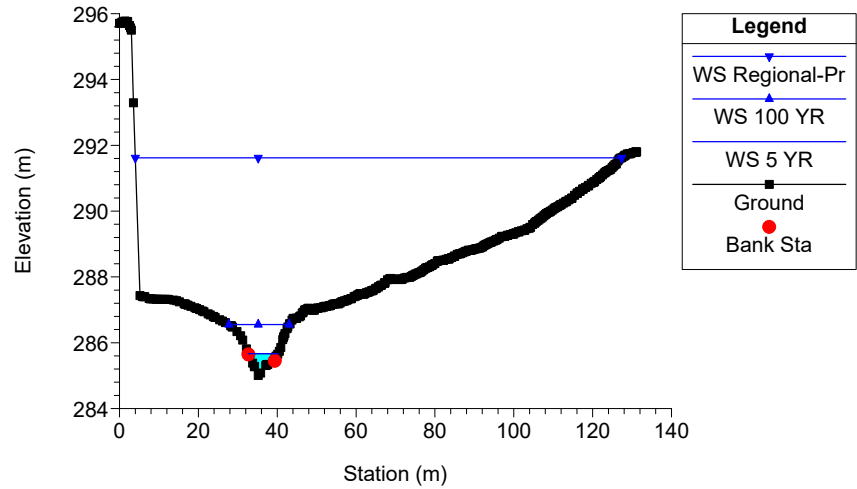
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1951



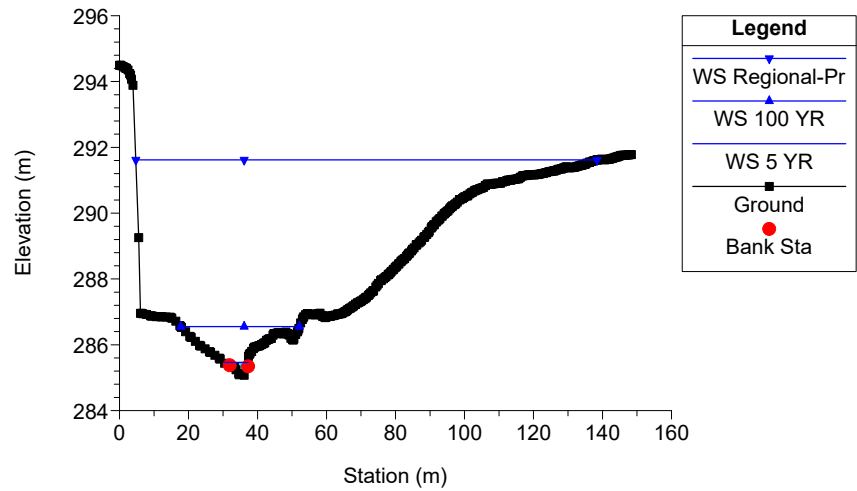
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1920



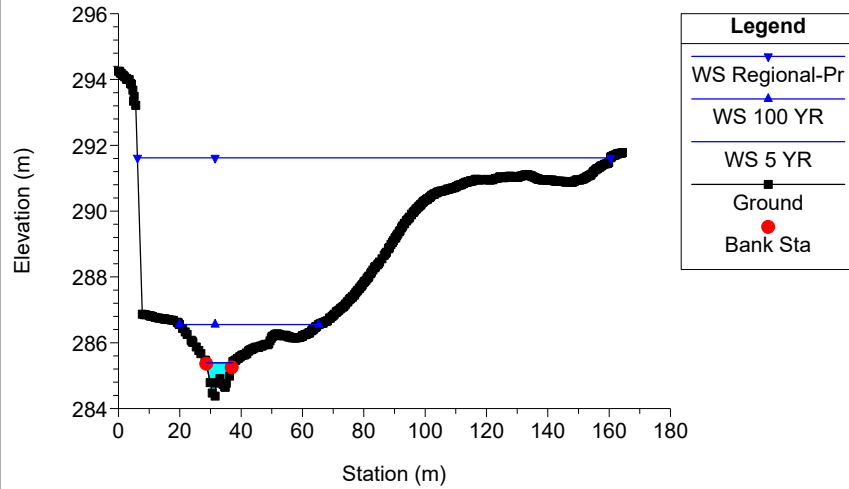
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1934



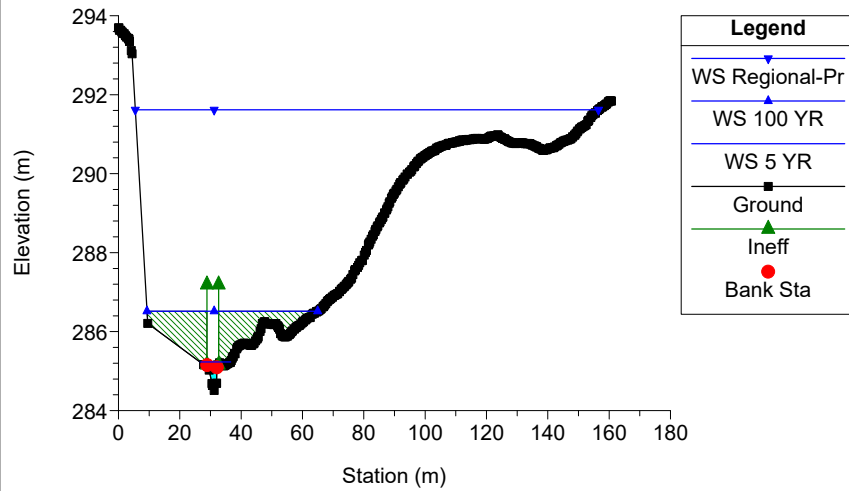
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1913



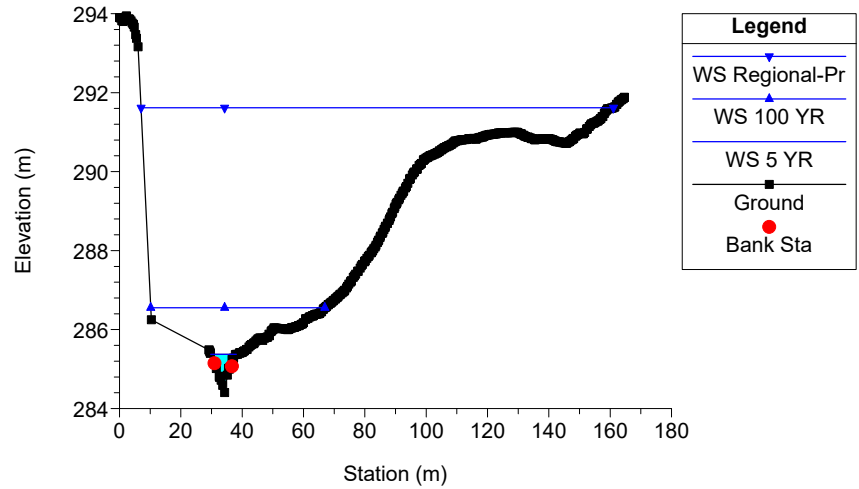
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1894



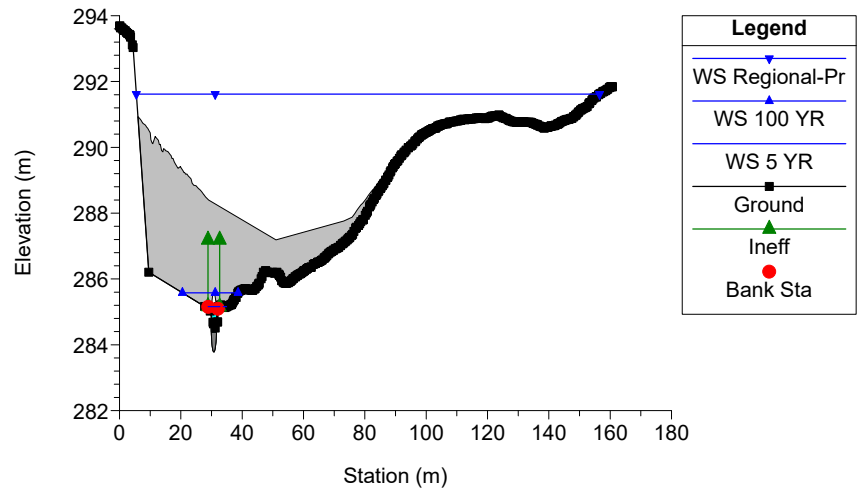
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1883



Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1885

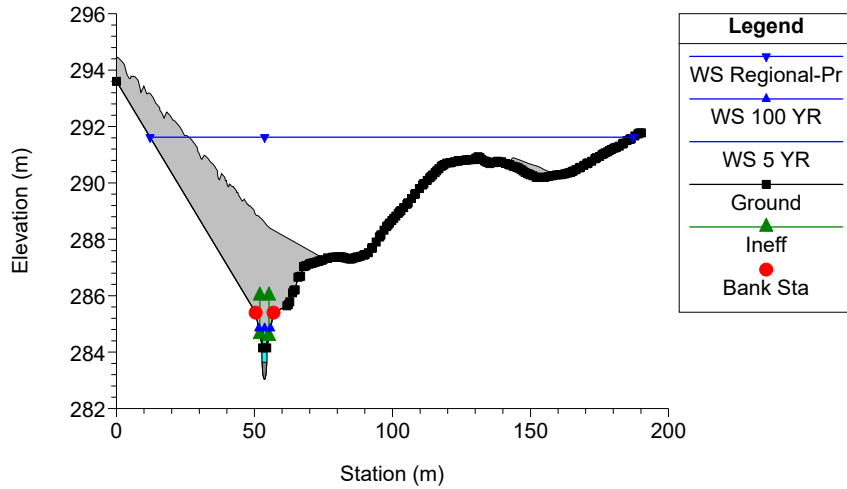


Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1852 Culv



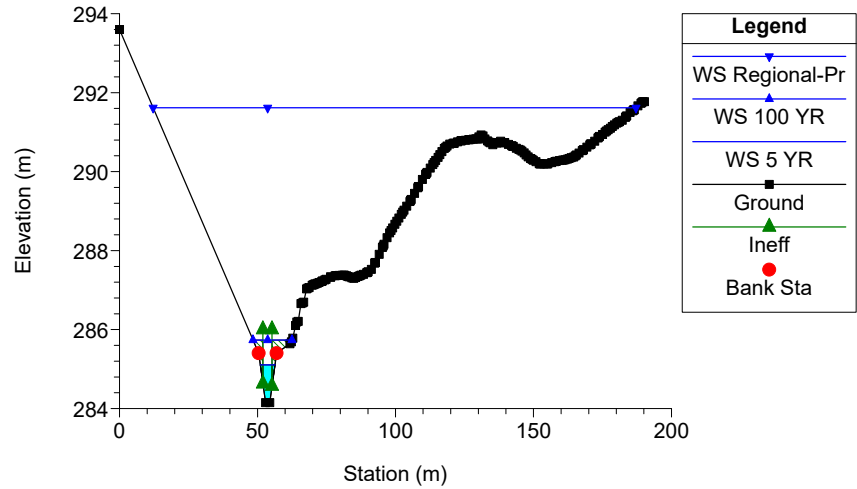
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1852 Culv



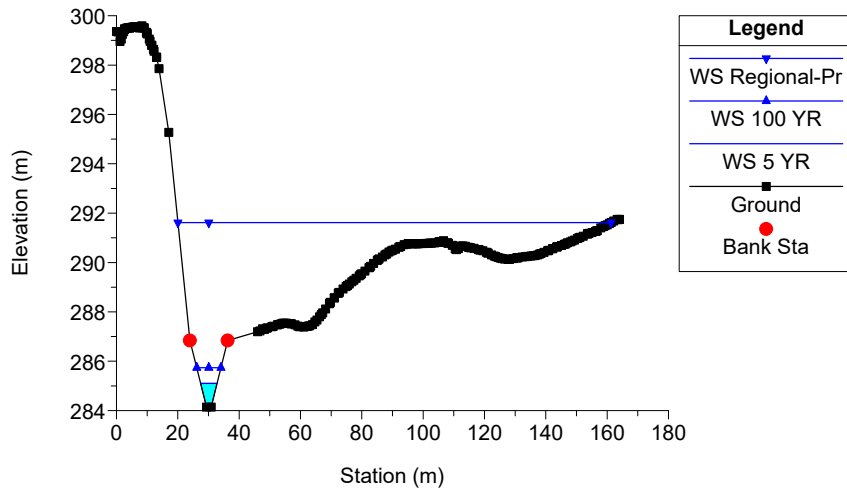
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1841



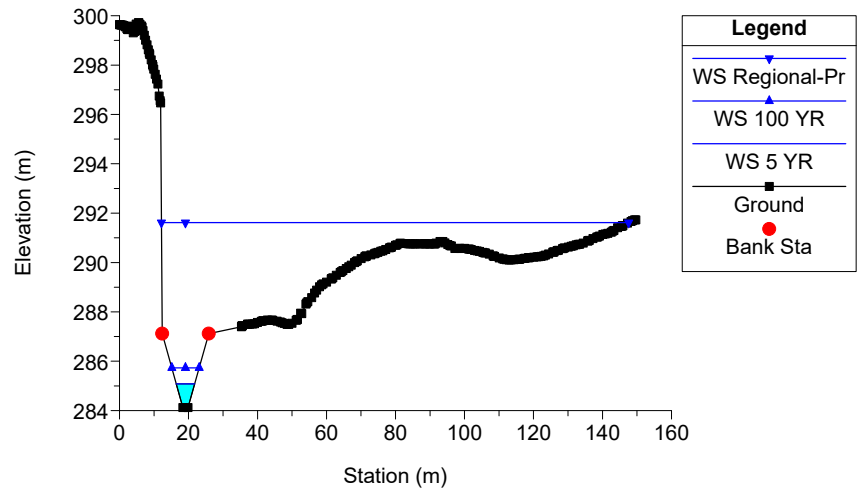
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1835

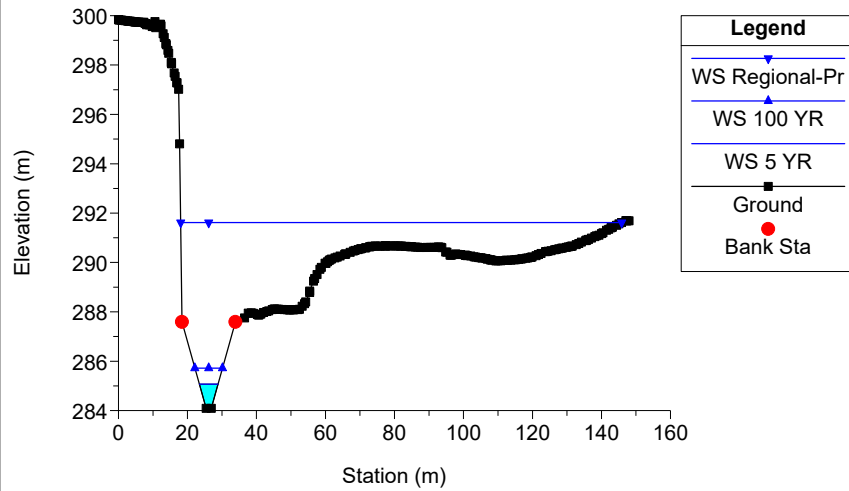


Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

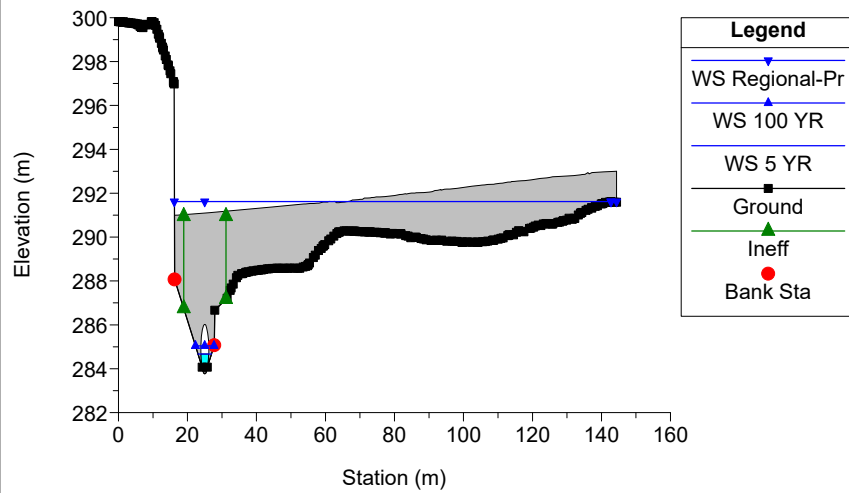
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1823



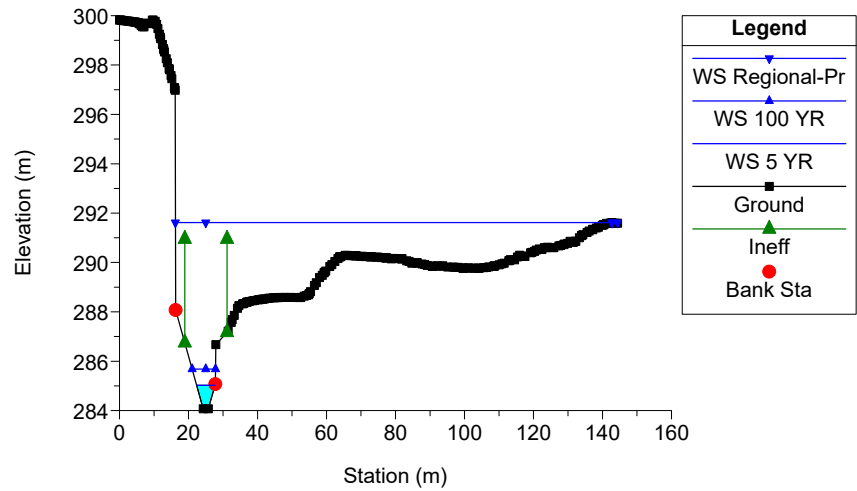
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1803



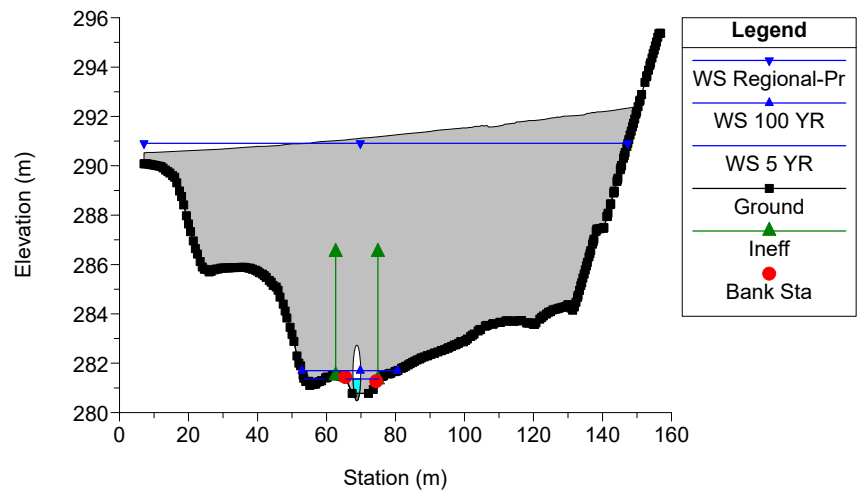
Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1786.8 Culv



Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1789

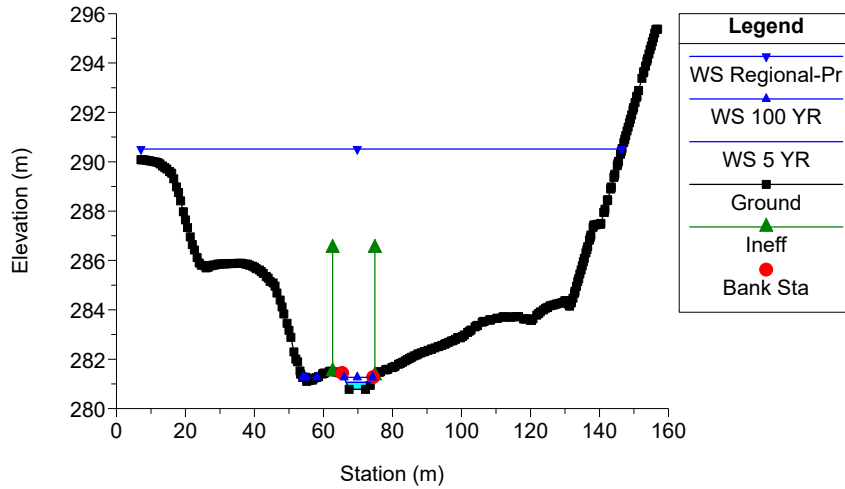


Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1786.8 Culv



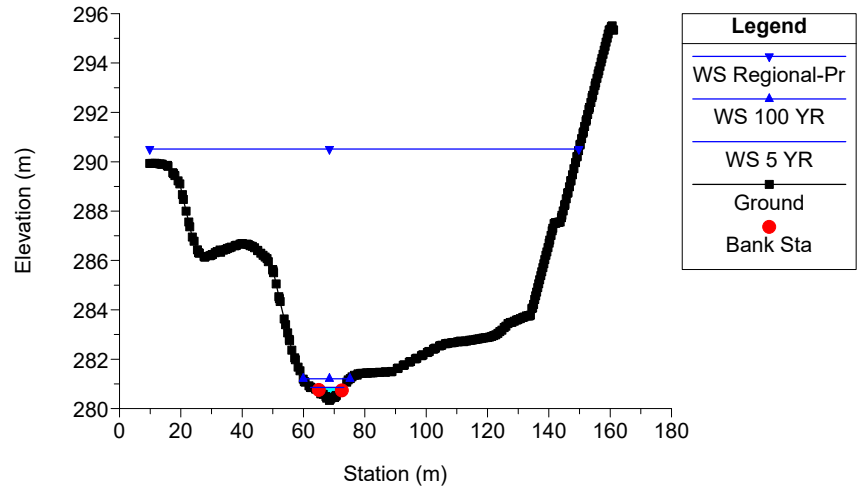
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1717



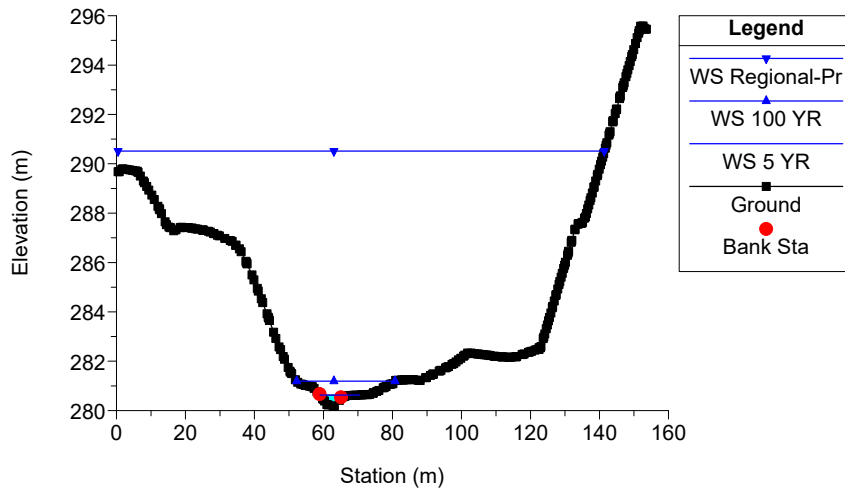
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1709



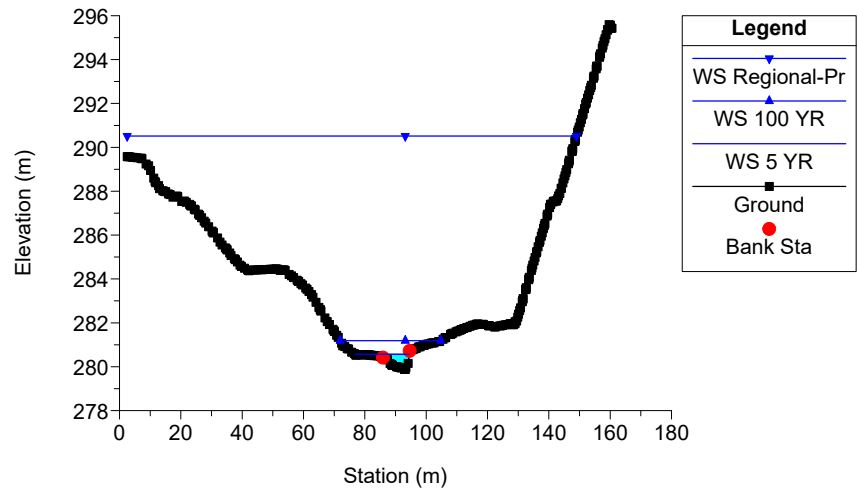
Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1702



Harvie Road Subdivision Base HEC-RAS Plan: 1) Whiskey-Proposed Condition 3/16/2022

Geom: Interim Existing Condition Geometry
River = Whiskey Reach = 4 RS = 1690



HEC-RAS Plan: Whiskey-Proposed Condition

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
6	432	5 YR	5.29	293.40	293.99	293.99	294.16	0.013106	1.98	4.51	17.36	0.83
6	432	100 YR	15.58	293.40	294.50		294.62	0.005735	1.99	15.96	25.94	0.61
6	432	Regional-Pr	14.81	293.40	294.47		294.58	0.006109	2.01	14.99	25.56	0.63
6	420	5 YR	5.29	292.60	293.48	293.48	293.78	0.016781	2.61	2.74	5.77	0.96
6	420	100 YR	15.58	292.60	294.14	294.14	294.46	0.009800	3.05	10.94	20.09	0.82
6	420	Regional-Pr	14.81	292.60	294.12	294.12	294.43	0.009501	2.97	10.56	19.69	0.80
6	403	5 YR	5.29	292.70	293.41		293.50	0.006805	1.51	5.43	17.22	0.61
6	403	100 YR	15.58	292.70	294.03		294.11	0.002916	1.56	19.46	27.35	0.45
6	403	Regional-Pr	14.81	292.70	293.99		294.07	0.002993	1.56	18.51	26.99	0.45
6	381	5 YR	5.29	292.20	293.43		293.45	0.000683	0.72	12.64	17.96	0.21
6	381	100 YR	15.58	292.20	294.01		294.06	0.001180	1.24	25.03	29.69	0.30
6	381	Regional-Pr	14.81	292.20	293.98		294.03	0.001063	1.17	24.26	25.72	0.28
6	349	5 YR	5.29	292.30	293.07	293.07	293.36	0.016692	2.46	2.64	6.02	0.95
6	349	100 YR	15.58	292.30	293.66	293.66	293.95	0.009999	2.87	11.38	24.22	0.81
6	349	Regional-Pr	14.81	292.30	293.64	293.64	293.93	0.009868	2.82	10.86	23.37	0.80
6	328	5 YR	5.29	291.50	291.98		292.08	0.015324	1.78	4.99	14.75	0.86
6	328	100 YR	15.58	291.50	292.24	292.24	292.51	0.024105	3.03	9.14	17.93	1.16
6	328	Regional-Pr	14.81	291.50	292.21	292.21	292.48	0.024375	2.99	8.78	17.68	1.17
6	306	5 YR	5.29	291.00	291.52	291.51	291.69	0.017851	1.95	3.75	15.25	0.93
6	306	100 YR	15.58	291.00	291.85	291.84	292.07	0.013603	2.47	11.33	25.59	0.89
6	306	Regional-Pr	14.81	291.00	291.83	291.82	292.04	0.013442	2.42	10.94	25.36	0.88
6	290	5 YR	5.29	290.85	291.29	291.28	291.43	0.016290	1.73	3.94	14.31	0.87
6	290	100 YR	15.58	290.85	291.63	291.60	291.87	0.013959	2.41	9.35	17.31	0.90
6	290	Regional-Pr	14.81	290.85	291.67		291.86	0.010315	2.15	10.05	17.56	0.78
6	269	5 YR	5.29	290.70	291.10		291.17	0.008396	1.24	4.68	13.22	0.63
6	269	100 YR	15.58	290.70	291.35	291.29	291.58	0.013463	2.18	8.19	14.46	0.86
6	269	Regional-Pr	14.81	290.70	291.61		291.71	0.003820	1.45	12.07	15.55	0.49
6	249	5 YR	5.29	290.40	290.79	290.79	290.92	0.022706	1.60	3.60	16.55	0.97
6	249	100 YR	15.58	290.40	291.05	291.05	291.27	0.017677	2.18	9.03	23.64	0.95
6	249	Regional-Pr	14.81	290.40	291.62		291.65	0.001063	0.87	24.77	31.24	0.26
6	241	5 YR	1.05	290.10	290.40	290.40	290.48	0.028479	1.30	0.81	4.66	1.00
6	241	100 YR	1.34	290.10	290.43	290.43	290.53	0.025762	1.39	0.99	6.10	0.98
6	241	Regional-Pr	14.81	290.10	291.60		291.64	0.001502	1.19	24.45	28.89	0.32
6	134	5 YR	1.05	287.80	288.27		288.29	0.003073	0.62	2.22	8.65	0.36
6	134	100 YR	1.34	287.80	288.32		288.34	0.003213	0.68	2.64	9.58	0.37
6	134	Regional-Pr	14.81	287.80	291.62		291.62	0.000020	0.26	112.40	46.84	0.04
6	119	5 YR	1.05	287.80	288.20	288.08	288.23	0.004928	0.77	1.43	6.27	0.45
6	119	100 YR	1.34	287.80	288.24	288.11	288.27	0.005236	0.86	1.69	7.31	0.48
6	119	Regional-Pr	14.81	287.80	291.62		291.62	0.000018	0.25	128.68	62.17	0.04
6	86	5 YR	1.05	287.70	287.83	287.83	287.88	0.033212	1.01	1.05	10.22	1.00
6	86	100 YR	1.34	287.70	287.84	287.84	287.91	0.034807	1.11	1.21	10.67	1.04
6	86	Regional-Pr	14.81	287.70	291.62		291.62	0.000007	0.17	157.76	60.64	0.03
6	43	5 YR	1.05	287.30	287.64		287.64	0.000456	0.25	4.29	14.31	0.14
6	43	100 YR	1.34	287.30	287.69		287.69	0.000452	0.27	5.03	14.79	0.14
6	43	Regional-Pr	14.81	287.30	291.62		291.62	0.000006	0.16	184.95	101.52	0.02
6	13	5 YR	1.05	287.20	287.51	287.49	287.59	0.023149	1.29	0.81	4.08	0.92
6	13	100 YR	1.34	287.20	287.53	287.53	287.64	0.026619	1.47	0.91	4.32	1.00
6	13	Regional-Pr	14.81	287.20	291.62		291.62	0.000005	0.14	242.22	99.12	0.02
6	0	5 YR	1.05	287.00	287.32		287.37	0.011136	0.99	1.06	4.53	0.65
6	0	100 YR	1.34	287.00	287.42		287.46	0.006317	0.87	1.54	5.27	0.51
6	0	Regional-Pr	14.81	287.00	291.62		291.62	0.000002	0.10	338.31	125.91	0.01
4	1987	5 YR	2.04	285.98	286.47	286.47	286.61	0.024911	1.66	1.27	4.98	1.00
4	1987	100 YR	4.21	285.98	286.65	286.65	286.86	0.019919	2.05	2.20	5.62	0.97
4	1987	Regional-Pr	18.44	285.98	291.62		291.62	0.000001	0.08	426.11	140.05	0.01
4	1968	5 YR	2.04	285.50	286.29		286.34	0.005052	1.05	1.98	4.53	0.48
4	1968	100 YR	4.21	285.50	286.58		286.67	0.004335	1.33	3.41	5.28	0.48
4	1968	Regional-Pr	18.44	285.50	291.62		291.62	0.000001	0.08	436.52	138.93	0.01

HEC-RAS Plan: Whiskey-Proposed Condition (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	1951	5 YR	2.04	285.39	286.00	286.00	286.17	0.025251	1.80	1.14	3.46	1.00
4	1951	100 YR	4.21	285.39	286.53		286.59	0.003774	1.09	3.92	6.78	0.44
4	1951	Regional-Pr	18.44	285.39	291.62		291.62	0.000001	0.08	429.62	128.06	0.01
4	1934	5 YR	2.04	285.01	285.67		285.70	0.004079	0.82	2.54	7.59	0.43
4	1934	100 YR	4.21	285.01	286.55		286.56	0.000229	0.44	12.02	15.27	0.12
4	1934	Regional-Pr	18.44	285.01	291.62		291.62	0.000001	0.08	435.02	123.30	0.01
4	1920	5 YR	2.04	284.82	285.61	285.45	285.65	0.004151	0.92	2.68	8.70	0.44
4	1920	100 YR	4.21	284.82	286.55		286.56	0.000201	0.43	17.17	26.09	0.12
4	1920	Regional-Pr	18.44	284.82	291.62		291.62	0.000001	0.08	443.31	128.96	0.01
4	1913	5 YR	2.04	285.07	285.46	285.46	285.58	0.023475	1.51	1.42	7.11	0.96
4	1913	100 YR	4.21	285.07	286.55		286.56	0.000125	0.34	22.22	34.38	0.09
4	1913	Regional-Pr	18.44	285.07	291.62		291.62	0.000001	0.09	437.99	133.73	0.01
4	1894	5 YR	2.04	284.38	285.39		285.40	0.000616	0.42	4.89	8.70	0.17
4	1894	100 YR	4.21	284.38	286.55		286.55	0.000032	0.20	34.33	45.46	0.05
4	1894	Regional-Pr	18.44	284.38	291.62		291.62	0.000001	0.08	484.66	154.31	0.01
4	1885	5 YR	2.04	284.40	285.37		285.39	0.001572	0.64	3.35	8.31	0.28
4	1885	100 YR	4.21	284.40	286.55		286.55	0.000028	0.19	43.86	56.74	0.05
4	1885	Regional-Pr	18.44	284.40	291.62		291.62	0.000001	0.08	493.76	154.02	0.01
4	1883	5 YR	2.04	284.51	285.23	285.12	285.33	0.011193	1.43	1.47	10.00	0.68
4	1883	100 YR	4.21	284.51	286.52	285.35	286.54	0.000432	0.69	6.36	55.64	0.17
4	1883	Regional-Pr	18.44	284.51	291.62	286.21	291.62	0.000001	0.07	492.93	151.03	0.01
4	1852	Culvert										
4	1841	5 YR	2.04	284.15	285.11	284.61	285.13	0.000936	0.74	2.75	5.32	0.26
4	1841	100 YR	4.21	284.15	285.74	284.82	285.77	0.000611	0.87	4.82	14.14	0.23
4	1841	Regional-Pr	18.44	284.15	291.62	285.74	291.62	0.000001	0.08	456.16	174.95	0.01
4	1835	5 YR	2.04	284.14	285.10		285.12	0.001013	0.62	3.28	5.34	0.25
4	1835	100 YR	4.21	284.14	285.74		285.75	0.000470	0.56	7.48	7.88	0.18
4	1835	Regional-Pr	18.44	284.14	291.62		291.62	0.000001	0.10	339.13	141.21	0.01
4	1823	5 YR	2.04	284.12	285.08		285.10	0.000990	0.62	3.31	5.36	0.25
4	1823	100 YR	4.21	284.12	285.73		285.74	0.000452	0.55	7.59	7.93	0.18
4	1823	Regional-Pr	18.44	284.12	291.62		291.62	0.000001	0.10	314.15	135.42	0.01
4	1803	5 YR	2.04	284.09	285.07		285.09	0.000939	0.61	3.37	5.41	0.24
4	1803	100 YR	4.21	284.09	285.72		285.74	0.000425	0.54	7.76	8.02	0.18
4	1803	Regional-Pr	18.44	284.09	291.62		291.62	0.000002	0.11	273.87	127.82	0.01
4	1789	5 YR	2.64	284.07	285.03	284.61	285.06	0.001712	0.81	3.27	5.33	0.33
4	1789	100 YR	5.95	284.07	285.68	284.89	285.72	0.000843	0.82	7.25	6.78	0.25
4	1789	Regional-Pr	21.07	284.07	291.62	285.60	291.62	0.000002	0.13	284.52	128.18	0.02
4	1786.8	Culvert										
4	1717	5 YR	2.64	280.78	281.06	281.06	281.18	0.024149	1.50	1.76	7.21	0.97
4	1717	100 YR	5.95	280.78	281.26	281.24	281.43	0.018447	1.81	3.28	11.64	0.92
4	1717	Regional-Pr	21.07	280.78	290.51	281.74	290.51	0.000000	0.06	860.31	139.44	0.01
4	1709	5 YR	2.64	280.33	280.85		280.91	0.007681	1.05	2.68	10.81	0.58
4	1709	100 YR	5.95	280.33	281.21		281.26	0.002921	1.04	7.24	15.25	0.40
4	1709	Regional-Pr	21.07	280.33	290.51		290.51	0.000000	0.06	878.81	139.95	0.01
4	1702	5 YR	2.64	280.17	280.63	280.59	280.73	0.015435	1.40	2.02	11.37	0.81
4	1702	100 YR	5.95	280.17	281.19		281.21	0.001130	0.75	13.75	28.52	0.26
4	1702	Regional-Pr	21.07	280.17	290.51		290.51	0.000000	0.06	914.91	140.94	0.01
4	1690	5 YR	2.64	279.87	280.57		280.59	0.001877	0.64	4.51	17.72	0.30
4	1690	100 YR	5.95	279.87	281.19		281.20	0.000349	0.48	19.41	32.82	0.15
4	1690	Regional-Pr	21.07	279.87	290.51		290.51	0.000000	0.05	960.62	146.53	0.01
4	1680	5 YR	2.64	279.78	280.55		280.56	0.000679	0.50	6.77	14.36	0.19
4	1680	100 YR	5.95	279.78	281.18		281.19	0.000229	0.45	26.20	48.51	0.13
4	1680	Regional-Pr	21.07	279.78	290.51		290.51	0.000000	0.06	872.24	176.12	0.01
4	1668	5 YR	3.30	279.49	280.54	279.99	280.54	0.000445	0.48	9.57	23.79	0.16
4	1668	100 YR	7.23	279.49	281.17	280.16	281.18	0.000308	0.57	17.57	27.94	0.15
4	1668	Regional-Pr	23.43	279.49	290.51	280.59	290.51	0.000001	0.09	810.81	213.94	0.01

HEC-RAS Plan: Whiskey-Proposed Condition (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	1649		Culvert									
4	1631	5 YR	3.30	278.00	279.00	278.46	279.02	0.001405	0.76	5.58	24.12	0.26
4	1631	100 YR	7.23	278.00	279.18	278.76	279.25	0.003184	1.30	7.53	25.12	0.40
4	1631	Regional-Pr	23.43	278.00	280.74	279.39	280.80	0.001049	1.35	24.19	61.76	0.26
4	1619	5 YR	3.30	278.27	278.93	278.75	278.98	0.004139	1.07	4.74	19.50	0.46
4	1619	100 YR	7.23	278.27	279.12	278.99	279.20	0.005130	1.45	8.58	21.04	0.54
4	1619	Regional-Pr	23.43	278.27	280.74		280.75	0.000301	0.76	75.37	62.90	0.16
4	1580	5 YR	3.30	278.11	278.50	278.50	278.64	0.021521	1.66	2.19	9.96	0.96
4	1580	100 YR	7.23	278.11	278.72	278.71	278.87	0.013478	1.88	5.50	18.51	0.83
4	1580	Regional-Pr	23.43	278.11	280.74		280.74	0.000148	0.57	89.87	57.21	0.11
4	1545	5 YR	3.30	277.06	278.05		278.08	0.001506	0.82	4.31	6.25	0.29
4	1545	100 YR	7.23	277.06	278.73		278.76	0.000674	0.83	13.72	20.80	0.22
4	1545	Regional-Pr	23.43	277.06	280.73		280.74	0.000129	0.64	80.88	44.15	0.11
4	1514	5 YR	3.30	277.16	278.04		278.05	0.000617	0.54	6.83	10.08	0.19
4	1514	100 YR	7.23	277.16	278.74		278.75	0.000211	0.48	27.97	38.74	0.12
4	1514	Regional-Pr	23.43	277.16	280.73		280.73	0.000048	0.40	124.55	57.27	0.07
4	1487	5 YR	3.30	276.96	278.04		278.04	0.000102	0.25	13.99	17.89	0.08
4	1487	100 YR	7.23	276.96	278.74		278.74	0.000069	0.30	33.79	34.67	0.07
4	1487	Regional-Pr	23.43	276.96	280.73		280.73	0.000030	0.33	127.78	56.91	0.05
4	1481	5 YR	3.63	276.96	278.02	277.34	278.03	0.000539	0.58	6.35	14.78	0.19
4	1481	100 YR	8.21	276.96	278.70	277.58	278.73	0.000483	0.77	10.90	28.22	0.19
4	1481	Regional-Pr	23.76	276.96	280.73	278.16	280.73	0.000049	0.42	131.25	77.32	0.07
4	1470		Culvert									
4	1459	5 YR	3.63	276.78	277.11	277.11	277.26	0.022268	1.75	2.08	29.15	0.99
4	1459	100 YR	8.21	276.78	277.33	277.33	277.61	0.019324	2.32	3.53	29.56	1.00
4	1459	Regional-Pr	23.76	276.78	277.90	277.90	278.45	0.014982	3.29	7.22	31.60	1.00
4	1452	5 YR	3.63	276.68	276.96		277.05	0.017395	1.36	2.69	10.38	0.84
4	1452	100 YR	8.21	276.68	277.12	277.10	277.30	0.017716	1.89	4.43	10.74	0.92
4	1452	Regional-Pr	23.76	276.68	277.55	277.52	277.92	0.014555	2.72	9.20	11.67	0.94
4	1427	5 YR	3.63	276.39	276.71		276.76	0.007515	0.98	3.73	12.38	0.57
4	1427	100 YR	8.21	276.39	276.93		277.01	0.006114	1.27	6.50	12.52	0.56
4	1427	Regional-Pr	23.76	276.39	277.44		277.62	0.005383	1.87	12.92	12.85	0.59
4	1403	5 YR	3.63	275.99	276.36	276.34	276.48	0.018871	1.52	2.47	9.25	0.89
4	1403	100 YR	8.21	275.99	276.54	276.54	276.76	0.019317	2.10	4.22	10.53	0.98
4	1403	Regional-Pr	23.76	275.99	277.00	277.00	277.39	0.014923	2.90	9.80	13.84	0.96
4	1367	5 YR	3.63	275.68	275.94		275.99	0.009402	0.94	3.90	16.75	0.61
4	1367	100 YR	8.21	275.68	276.09		276.18	0.009669	1.31	6.46	17.71	0.67
4	1367	Regional-Pr	23.76	275.68	276.41		276.62	0.010345	2.03	12.55	19.80	0.77
4	1303	5 YR	3.63	274.70	275.00	275.00	275.12	0.020658	1.57	2.70	13.02	0.93
4	1303	100 YR	8.21	274.70	275.18	275.18	275.35	0.017172	1.98	5.44	16.92	0.92
4	1303	Regional-Pr	23.76	274.70	275.54	275.54	275.82	0.014950	2.70	13.35	24.57	0.95
4	1252	5 YR	3.63	273.80	274.02	273.97	274.07	0.010557	0.95	4.09	19.37	0.64
4	1252	100 YR	8.21	273.80	274.09	274.09	274.22	0.024107	1.68	5.26	19.72	1.01
4	1252	Regional-Pr	23.76	273.80	274.37	274.37	274.64	0.019458	2.39	11.05	21.42	1.01
4	1220	5 YR	3.63	273.30	273.47	273.47	273.55	0.027935	1.28	3.21	21.37	0.99
4	1220	100 YR	8.21	273.30	273.86		273.89	0.002226	0.80	12.35	24.73	0.34
4	1220	Regional-Pr	23.76	273.30	274.32		274.39	0.002329	1.22	24.34	27.48	0.39
4	1173	5 YR	3.63	272.40	273.25		273.25	0.000435	0.41	12.95	29.75	0.16
4	1173	100 YR	8.21	272.40	273.86		273.86	0.000168	0.39	33.93	37.35	0.11
4	1173	Regional-Pr	23.76	272.40	274.32		274.34	0.000434	0.76	52.39	44.54	0.18
4	1160	5 YR	3.74	272.40	273.21	272.84	273.23	0.001345	0.67	5.59	13.92	0.27
4	1160	100 YR	8.45	272.40	273.85	273.04	273.86	0.000298	0.49	28.53	45.14	0.14
4	1160	Regional-Pr	24.48	272.40	274.30	273.50	274.33	0.000584	0.85	53.16	61.76	0.21
4	1129		Culvert									
4	1100	5 YR	3.86	271.20	271.62	271.62	271.81	0.022361	1.96	1.97	25.25	1.01
4	1100	100 YR	8.71	271.20	271.89	271.89	272.23	0.018459	2.56	3.40	29.43	1.01

HEC-RAS Plan: Whiskey-Proposed Condition (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	1100	Regional-Pr	24.81	271.20	272.56	272.56	273.23	0.014360	3.61	6.88	39.50	1.00
4	1094	5 YR	3.86	271.00	271.50	271.50	271.58	0.015128	1.57	4.96	30.56	0.82
4	1094	100 YR	8.71	271.00	271.61	271.61	271.72	0.018643	2.08	8.48	32.62	0.96
4	1094	Regional-Pr	24.81	271.00	271.86	271.83	272.04	0.020505	2.87	16.95	35.87	1.07
4	1039	5 YR	3.86	270.10	270.55	270.55	270.62	0.011152	1.33	4.89	36.51	0.71
4	1039	100 YR	8.71	270.10	270.67	270.67	270.77	0.012887	1.72	9.64	43.47	0.80
4	1039	Regional-Pr	24.81	270.10	270.89	270.89	271.05	0.015507	2.44	21.50	62.05	0.93
4	1011	5 YR	3.86	269.10	269.82		269.94	0.009746	1.59	2.56	5.97	0.69
4	1011	100 YR	8.71	269.10	270.12	270.12	270.28	0.008096	1.95	7.88	35.25	0.68
4	1011	Regional-Pr	24.81	269.10	270.48	270.48	270.63	0.007033	2.31	27.57	82.36	0.67
4	959	5 YR	3.86	268.80	269.04	269.04	269.11	0.030640	1.35	4.11	30.98	1.04
4	959	100 YR	8.71	268.80	269.14	269.14	269.24	0.027351	1.74	7.49	35.31	1.06
4	959	Regional-Pr	24.81	268.80	269.36	269.36	269.54	0.023080	2.37	16.97	54.25	1.08
4	906	5 YR	3.86	267.80	268.08		268.12	0.009536	0.88	4.48	23.04	0.60
4	906	100 YR	8.71	267.80	268.33		268.37	0.003135	0.84	13.02	48.80	0.39
4	906	Regional-Pr	24.81	267.80	268.78		268.81	0.001555	0.93	40.80	66.75	0.31
4	858	5 YR	3.86	267.20	268.10		268.10	0.000034	0.14	39.97	61.27	0.05
4	858	100 YR	8.71	267.20	268.35		268.35	0.000070	0.23	55.30	66.94	0.07
4	858	Regional-Pr	24.81	267.20	268.78		268.79	0.000161	0.43	86.70	73.51	0.11
4	827	5 YR	3.86	267.20	268.10		268.10	0.000017	0.09	51.65	105.05	0.03
4	827	100 YR	8.71	267.20	268.35		268.35	0.000025	0.13	78.44	118.03	0.04
4	827	Regional-Pr	24.81	267.20	268.78		268.79	0.000040	0.21	135.03	147.89	0.05
4	786	5 YR	3.86	267.06	268.08	267.50	268.10	0.000690	0.64	6.92	9.26	0.21
4	786	100 YR	8.71	267.06	268.28	267.75	268.34	0.001753	1.16	8.84	10.21	0.34
4	786	Regional-Pr	24.81	267.06	268.78	268.30	268.79	0.000035	0.21	111.62	87.58	0.05
4	737	5 YR	3.86	267.30	268.01	267.68	268.04	0.001966	0.85	5.24	9.55	0.33
4	737	100 YR	8.71	267.30	268.30	267.91	268.31	0.000114	0.26	37.41	63.61	0.08
4	737	Regional-Pr	24.81	267.30	268.77	268.30	268.78	0.000132	0.36	67.62	64.64	0.10
4	683	5 YR	3.86	267.30	267.88	267.63	267.92	0.002797	0.87	4.65	9.86	0.38
4	683	100 YR	8.71	267.30	268.22	267.84	268.28	0.002529	1.15	8.24	11.44	0.39
4	683	Regional-Pr	24.81	267.30	268.31	268.31	268.72	0.014491	2.93	9.29	11.96	0.95
4	635	5 YR	3.86	267.10	267.76	267.48	267.79	0.002423	0.87	4.71	9.32	0.36
4	635	100 YR	8.71	267.10	268.10	267.70	268.16	0.002434	1.18	8.17	11.16	0.39
4	635	Regional-Pr	24.81	267.10	268.49	268.10	268.49	0.000102	0.30	70.88	61.76	0.08
4	590	5 YR	3.86	267.00	267.59	267.39	267.65	0.004420	1.07	3.72	8.05	0.47
4	590	100 YR	8.71	267.00	267.93	267.62	268.02	0.003848	1.40	6.69	9.42	0.48
4	590	Regional-Pr	24.81	267.00	268.48	268.10	268.49	0.000076	0.27	82.05	72.12	0.07
4	562	5 YR	3.86	266.80	267.52	267.24	267.56	0.002235	0.82	4.90	9.89	0.34
4	562	100 YR	8.71	266.80	267.88	267.45	267.94	0.001999	1.07	8.85	11.93	0.35
4	562	Regional-Pr	24.81	266.80	268.48	267.92	268.49	0.000092	0.32	80.84	79.08	0.08
4	521	5 YR	3.86	266.70	267.39	267.10	267.43	0.002561	0.91	4.44	8.30	0.37
4	521	100 YR	8.71	266.70	267.74	267.34	267.82	0.002564	1.24	7.68	9.91	0.40
4	521	Regional-Pr	24.81	266.70	268.43	267.87	268.47	0.000923	1.06	30.83	39.43	0.26
4	482	5 YR	3.86	266.70	267.32	267.04	267.36	0.002384	0.85	4.76	9.21	0.36
4	482	100 YR	8.71	266.70	267.69	267.26	267.75	0.002176	1.12	8.36	10.48	0.37
4	482	Regional-Pr	24.81	266.70	268.41	267.72	268.45	0.000768	0.97	32.75	39.64	0.24
4	447	5 YR	3.86	266.58	267.27	266.90	267.29	0.001431	0.70	5.68	9.85	0.28
4	447	100 YR	8.71	266.58	267.64	267.11	267.68	0.001483	0.96	9.59	11.27	0.31
4	447	Regional-Pr	24.81	266.58	268.39	267.58	268.42	0.000697	0.95	33.48	40.13	0.23
4	408	5 YR	3.86	266.49	267.18		267.22	0.002550	0.86	4.57	8.81	0.36
4	408	100 YR	8.71	266.49	267.54		267.61	0.002343	1.15	8.04	10.31	0.38
4	408	Regional-Pr	24.81	266.49	268.30		268.38	0.001504	1.37	24.79	39.43	0.33
4	372	5 YR	3.86	266.25	267.13		267.15	0.001121	0.71	5.80	8.98	0.26
4	372	100 YR	8.71	266.25	267.49		267.54	0.001468	1.05	9.31	10.74	0.31
4	372	Regional-Pr	24.81	266.25	268.25		268.33	0.001333	1.40	25.67	38.08	0.32
4	321	5 YR	3.86	266.10	267.05		267.09	0.001633	0.86	4.94	7.72	0.31
4	321	100 YR	8.71	266.10	267.34		267.44	0.002741	1.38	7.41	8.92	0.42

HEC-RAS Plan: Whiskey-Proposed Condition (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
4	321	Regional-Pr	24.81	266.10	267.93		268.19	0.004753	2.41	13.47	14.86	0.59
4	285	5 YR	3.86	266.30	266.97		267.01	0.003036	0.94	5.66	18.19	0.40
4	285	100 YR	8.71	266.30	267.28		267.33	0.002502	1.14	12.52	26.70	0.39
4	285	Regional-Pr	24.81	266.30	268.03		268.06	0.001063	1.12	51.81	78.89	0.28
4	249	5 YR	3.86	266.10	266.58	266.58	266.76	0.023800	1.84	2.10	6.18	1.01
4	249	100 YR	8.71	266.10	266.83	266.83	267.11	0.020200	2.34	3.74	7.04	1.00
4	249	Regional-Pr	24.81	266.10	267.40	267.40	267.92	0.014891	3.22	8.28	9.04	0.97
4	210	5 YR	3.86	264.50	265.03	265.03	265.21	0.022902	1.92	2.01	5.57	1.01
4	210	100 YR	8.71	264.50	265.30	265.30	265.60	0.017773	2.45	3.73	6.87	0.97
4	210	Regional-Pr	24.81	264.50	265.92	265.92	266.45	0.013369	3.33	8.86	9.66	0.94
4	181	5 YR	3.86	263.10	263.71		263.82	0.008705	1.48	2.68	5.83	0.66
4	181	100 YR	8.71	263.10	263.92	263.87	264.20	0.014051	2.36	3.96	6.51	0.88
4	181	Regional-Pr	24.81	263.10	264.50	264.50	265.10	0.014399	3.53	8.32	8.44	0.98
4	145	5 YR	3.86	262.90	263.21	263.21	263.31	0.025686	1.42	2.72	12.85	0.99
4	145	100 YR	8.71	262.90	263.36	263.36	263.52	0.022762	1.77	4.95	16.79	1.00
4	145	Regional-Pr	24.81	262.90	263.69	263.69	263.97	0.016645	2.41	11.48	22.85	0.96
4	95	5 YR	3.86	261.70	261.94	261.94	262.01	0.026448	1.23	3.65	26.59	0.96
4	95	100 YR	8.71	261.70	262.04	262.04	262.16	0.023574	1.61	6.62	30.20	0.99
4	95	Regional-Pr	24.81	261.70	262.29	262.29	262.47	0.016508	2.09	16.91	47.80	0.92
4	64	5 YR	3.86	260.20	260.46	260.46	260.57	0.027864	1.42	2.71	13.55	1.02
4	64	100 YR	8.71	260.20	260.61	260.61	260.77	0.023828	1.74	5.00	16.45	1.01
4	64	Regional-Pr	24.81	260.20	260.92	260.92	261.21	0.019010	2.38	10.49	19.22	1.00
4	0	5 YR	3.86	259.35	259.92		259.92	0.000652	0.39	10.52	25.42	0.18
4	0	100 YR	8.71	259.35	260.25		260.26	0.000521	0.49	19.48	28.25	0.18
4	0	Regional-Pr	24.81	259.35	260.50		260.55	0.001656	1.05	26.81	30.77	0.33