

HATCH

SYSTRA
INTERNATIONAL
BRIDGE
TECHNOLOGIES

 **Kiewit**



City of Kingston - Third Crossing of the Cataraqui River -
Parks Canada Environmental Impact Analysis
Detailed Impact Analysis

Appendix H In Water Turbidity Curtain Turtle Fence Scope of Work (Kiewit - September 2019)



Kiewit

Kingston 3rd Crossing
In-Water Turbidity Curtain – Turtle Fence
Scope of Work

Revision 3

Date: September 3, 2019

In-Water Turtle Fence Installation Scope of Work – Revision Dates

Rev	Reason for Issue	Revision Date (YYYY-MM-DD)	Description of Revision
0	Issued for review	2019-08-23	Creation of document
1	Issued for review	2019-08-30	Updated Means & Methods
2	Issued for review	2019-08-30	AETC & Parks Comments
3	Issued for review	2019-09-03	Parks Comments

The signatures below indicate that this document demonstrates that the signatories are aware of all the requirements contained herein and are committed to ensuring their provision.

	Name	Signature	YYYY-MM-DD
Prepared by:			
Review By:			

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1 Introduction

The City of Kingston (Owner) has retained a project team consisting of Peter Kiewit Sons ULC (Kiewit), Hatch Ltd. (Hatch) and SYSTRA International Bridge Technologies (SYSTRA) as the primary proponents (Integrated Project Delivery (IPD) Team to construct the Third Crossing of the Cataraqui River (Project). The Project consists of a bridge over the Cataraqui River and associated shore land works within the City that will link John Counter Boulevard on the west side and Gore Road on the east side (project / project corridor).

Kiewit

Kiewit has been selected as the contractor responsible for building the new Third Crossing. Kiewit's infrastructure experience includes the design and construction of bridges, ferry terminals, roads, canals and other transportation projects that have helped shape the landscape across Ontario and other Canadian provinces.

Hatch and Systra

As the design engineers Hatch with the support of Systra IBT will work closely with the contractor to ensure their solutions are optimized, including environmental prosperity, cultural vibrancy and innovative design. In building the Third Crossing bridge, Hatch is committed to the quality, health and safety and sustainability of the project, the community and the workers.

1.1 Objectives

The following Permit Scope of work is provided as part of Review package for the proposed installation of in-water Turbidity Curtain and Turtle Fence for the Kingston 3rd Crossing Project. Its purpose is to meet regulatory expectations for mitigation measures during construction activities. The Plan outlines steps to be taken by Kiewit and Subcontractor personnel to ensure there are minimal negative impacts on terrestrial or aquatic environments, wildlife or fisheries values, water quality or cultural resources in the work areas.

The plan is one of the specific plans discussed in the Kiewit Environmental Management Plan to be developed for work that has a high potential for environmental impacts such as those associated with work in or near water. These plans provide specific environmental mitigation measures for each step of the activity in addition to the general measures provided in the workplans.

The plan will be updated throughout the construction phase as required to ensure that mitigation measures are effective.

The Project Environmental Manager (PEM) for the construction phase has the overall responsibility for the Plan and must approve any changes. Any work outside of the scope of this Plan or deemed not in compliance with the Plan is not permitted and will result in activities being suspended. Work will resume following the consultation of the Owner and applicable agencies (as needed) by the PEM and implementation of additional measures

as required. Kiewit Site Supervisors have the overall responsibility for the implementation of the Plan and all site and subcontractor personnel are required to abide by the measures as outlined.

Comments resulting from inspections or inquiries from regulatory agencies or Project Owners can be directed to the PEM who will discuss with Project Management. Activities in question that may require additional measures or alternative methods will be suspended until an agreed upon path forward is determined.

Specifically, the primary objectives of this plan are:

- To minimize the disturbance and protect aquatic and terrestrial resources

1.2 Scope of Work

The work to be covered as part of this plan includes the following: (text in italics identifies aspects of work to be completed near and in-water)

- a. Vegetation Removal*
- b. Turbidity Curtain Assembly*
- c. Turtle Exclusion Fence Assembly*
- d. Aquatic Exclusionary Turbidity Curtain (AETC) Installation*
- e. Aquatic Exclusionary Turbidity Curtain (AETC) Removal*

2 Compliance with Legal and Other Requirements

Kiewit will meet all environmental, legal and contractual requirements of the Project and adhere to corporate environmental objectives.

2.1 Applicable Legislation

The following list outlines the legislation and regulations that have been identified as most applicable to the Surface Water and Erosion and Sediment Control Plan:

- Environmental Protection Act
- Fisheries Act
- Canadian Environmental Quality Guidelines (CCME)
- Species at Risk Act
- Historic Canal Regulations

3 Construction Plan and Schedule

Work will begin on the west shore in preparation of the in-water work. Aquatic Exclusionary Turbidity Curtain (AETC) will be pre-assembled as much as possible. This is a dual purpose turbidity curtain and turtle exclusion fence. A turbidity curtain is constructed and the turtle exclusion fence posts are secured to it. Equipment will include a forklift and pickup trucks.

The turbidity curtain will come assembled with float, curtain and chains at 15m lengths, so Kiewit will splice sections of turbidity curtain on shore. Posts and spacers for turtle fence mounting will be secured. Turtle fence height will be per the AETC drawing. The AETC will be furled and the bottom chain tied to the float for ease of installation.

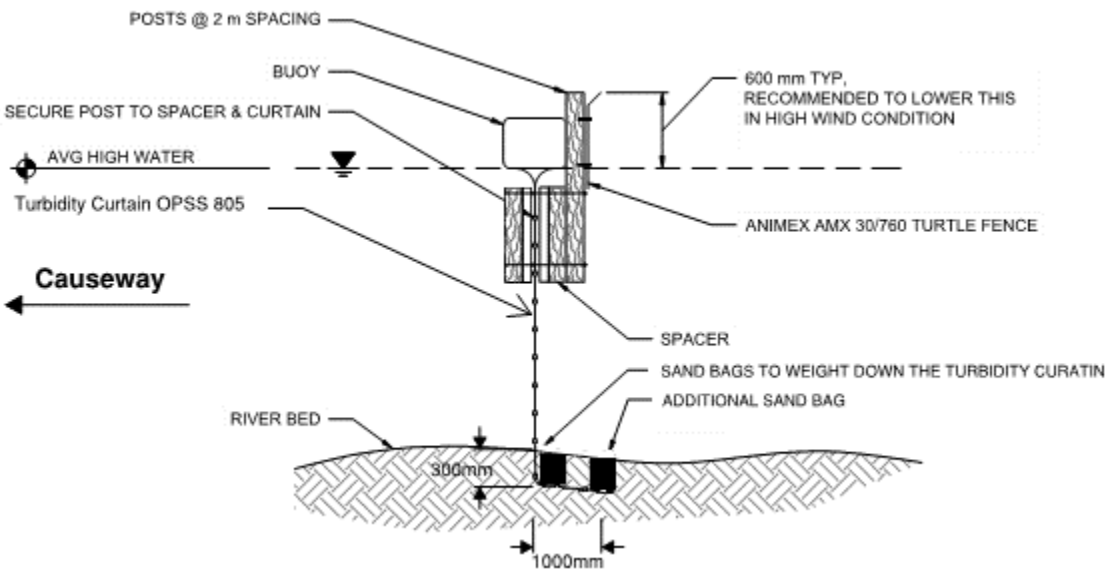


Figure 1

In-water work will be accessed via a boat dock at the west shore. Equipment will include vegetation removing equipment, crew boats, barge, power tools and hand tools necessary to perform the work.

Areas required to leave vegetation in place will be staked. Vegetation will be removed from the turtle exclusion zone, except at future turtle crossing locations, prior to AETC installation. This will encourage turtles to evacuate the area and provide easier monitoring of the area during construction. The vegetation removal will be sequenced to encourage the turtles to leave the exclusion zone. Vegetation removal will be performed by a subcontractor with experience removing vegetation in the Rideau Canal and training in managing aquatic wildlife in the event it is brought into the weed harvesting machine.

Sorting of wildlife will occur to ensure only vegetation is removed from the site. Based on project experience, wildlife doesn't often enter the machine as they can hear and see the machine coming. There are two personnel on board. The weed skip is up front, manages the incoming weeds and can see anything that may be brought into the machine. The operator can also see what is coming into the machine and has the advantage of a 4k camera mounted over the conveyor and a large screen to view. Wildlife encountered is immediately returned to the water nearby, outside the work area. Species and numbers of individuals recovered during aquatic vegetation removal will be recorded.

Removed vegetation will be placed on shore, above high water, to dry. Once dried, it will be taken to a compost facility. If wildlife is encountered in the unloading process, it is transferred back to the water.

Posts will be installed ahead of the turbidity curtain to enable attachment of the system. Once the determined length of turbidity curtain is connected and prepared for turtle fence attachment, it will be lined up at the shoreline and pulled into the water, perpendicular to the shoreline, with a work boat to the outer limits of the design alignment. It will be positioned in the proposed alignment and unfurled. Once in position, weights will be added to the curtain to achieve the required 300mm embedment.

Once the north and south alignment is positioned in a segment, crews will begin the wildlife exclusion process. Techniques for excluding turtles from the area will be approved by Parks Canada and informed by expert advice from ECCC.

AMX 760 turtle fence will be prepared on shore and unrolled one roll at a time. The end is secured to the post at shore and the rest of the section is pulled out with a work boat and lined up with turbidity curtain. Starting from the end, the turtle fence is secured to the posts and measured to confirm height above water level meets the AETC drawing requirements.

A visual inspection of the system will be performed upon completion of each component. Once a segment is completed, an inspection of the exclusion zone will be performed to ensure there is no unintentionally trapped wildlife. This will consist of a defishing program and a baited hoop net protocol to be approved by Parks Canada and informed by expert advice from ECCC.

During future construction activities that fall under other permitted work, turtle crossings will be installed at approximately spans 1, 4, 6, 11 and 14.

In accordance with the Inspection and Monitoring Plan, damaged sections of AETC will be repaired. See Appendix A for Construction Schedule.

4 Environmental Management

4.1 General

This plan takes into account the overall installation of the turbidity and turtle fence and environmental mitigation measures to prevent negative impacts to the environment, which are based on:

- Awareness
- Best Management Practices (BMP)
- Planning

4.2 Awareness

All Project personnel are required to attend environmental awareness training as part of the Project site orientation. This training will include information on Species at Risk and requirements for control measures, hazardous material management and general environmental mitigation measures. All personnel will be instructed on their responsibility to abide by legislation and company policies.

4.3 Best Management Practices

4.3.1 Turbidity Curtains

A turbidity curtain is a flexible, impermeable barrier used to trap sediment in water bodies. This curtain is generally weighted at the bottom to ensure that sediment does not travel under the curtain, which is supported at the top through a flotation system. It allows for the containment of sediment laden water providing time for the particles to settle out.

- Curtain to be installed completely around work area
- Ensure curtain is sufficient length to extend to bottom of riverbed, and under the weights that will be added to the curtain to achieve the required 300mm embedment
- Place curtain outside of toe of slope of material being placed
- Leave adequate slack for curtain to move with currents and water levels
- Secure sections of curtains together on shore before deploying
- Inspect on regular basis for sediment accumulation to prevent curtain from sinking and ensure anchors and floats remain in place

4.3.2 Turtle Fence

A turtle fence is a constructed out of solid plastic and has been designed to ensure it will not harm turtle species and will prevent turtles from entering areas where they could be exposed to harm. See attached Animex data sheet.

5 In-Water Work

5.1 General

The following measures will be implemented by Kiewit during the installation of the turbidity and Turtle fence execution of the work. These measures will apply to the overall installation

Communications

- The PEM will attend a pre-activity meeting with the supervisors of the work in order to make them aware of identified values and concerns in the project area and the measures outlined in this plan.
- The PEM will review the terms and conditions of obtained regulatory approvals and the requirements to abide by these conditions. Site Supervisors, including those of any subcontractor, will convey the above requirements to site personnel through daily toolbox meetings.
- All supervisory personnel, including subcontractors, will review a copy of applicable permits and approvals relating to the scope of work. The Site Supervisor will review conditions of the approval with their personnel and provide a sign-off sheet to the PEM prior to the start of activities.

Equipment

- All equipment will be cleaned of contaminants prior to being brought to the site
- All equipment, including subcontractors, are required to be in good working order upon arrival and prior to commencing any operations.
- Oil changes, greasing, fueling or maintenance of equipment will not take place within 30 m of any surface water where practical. Maintenance is permitted on equipment working on temporary in-water access with the use of sufficiently sized spill trays and impermeable tarps to contain any leaks or spills.
- A hydrocarbon spill response kit will be kept on site and with each piece of equipment at all times during the work.
- Any maintenance related equipment operating fluids, grease, lube, etc., shall be stored in covered areas complete with secondary containment.
- All equipment will be equipped with a suitable size (typically, 5-10 lb ABC type) extinguisher.
- Any equipment working adjacent to or placed in the water will be inspected daily to ensure it is free from any leaks of oil, grease or other contaminants.
- Surfaces to be in-contact with water and bilges of marine vessels (e.g. barges, work boats) to be disinfected prior to arriving onsite.
- Equipment working in-water (e.g. excavator booms) requiring grease service will only be permitted to use a marine specific product that is resistant to washout.

Fueling

- Fueling activities will be performed according to the Fueling Procedure as outlined in the CEMP Fuel Management Plan (see Appendix G of the EMP).

Waste Management

Waste will be managed as outlined in the Waste Management Plan (see Appendix P of the EMP).

- All food waste shall be properly bagged and placed daily in an enclosed area not accessible to wildlife until final removal from site. Sufficient waste containers are to be kept onsite.
- Any hazardous or liquid industrial materials generated from equipment maintenance activities shall be stored in covered areas with secondary containment until removed from site.
- All waste material shall be handled and disposed in compliance with MECP guidelines. Contact the PEM if there are any questions or concerns.

Spill Response

- All spills or releases of equipment operating fluids and hazardous materials will be managed as outlined in the Spill Prevention and Response Plan (see Appendix C of the EMP).

Water Quality

- Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life will form the baseline for water and streambed quality (see <http://ceqg-rcqe.ccme.ca/en/index.html#void>).
- Activities causing turbidity or release of sediment will comply with the CCME Guidelines on Total Particulate Matter (see <http://ceqg-rcqe.ccme.ca/download/en/217>).
- Turbidity will be monitored visually onsite, should installation activities result in sediment disturbance work will be modified to meet the above guidelines.

6 Monitoring

6.1 General

The Kiewit Environmental Department will monitor the effectiveness and general conditions of the in-water turtle fence as part of the daily environmental monitoring. This will include daily visual inspections of the AETC to ensure compliance. This will ensure that:

- The fence is functioning as per the design
- Control measures have been implemented as required
- The fence will be monitored for presence /absence of turtle activity
- The inspection will also note maintenance issues that need to be addressed
- These items will be recorded, and the Environmental Department will coordinate the required maintenance

6.2 Turtle Fence Inspection Frequency and Means & Methods

Initial Inspection of the AETC will be performed upon completion of a full section. The upper portion of the fence will have a visual inspection. The lower portion will have both a visual inspection and “Pole” inspection to ensure compliance with the AETC drawing.

The visual inspection of the top of the AETC ensures the turtle fence is properly aligned, secured and plumb to prevent turtles from entering the exclusion zone over the AETC. The visual inspection of the bottom of the AETC ensures alignment and general conformance at mudline. The Pole inspection ensures the TCTF is embedded 300mm to prevent turtles from entering the exclusion zone underneath it.

Once the period of turtle risk has passed, AETC inspection frequency will be reduced to monthly (when weather and environmental conditions allow) until the next season’s window.

6.3 Precipitation Events

The main factor that has the potential to impact the turtle fence is a significant weather event (such as high winds or heavy rain). During and after such events, the turbidity curtain and the turtle fence will be monitored to ensure they are functioning as intended and are not overloaded. The fence or curtain will be repaired and/or replaced as required.

6.4 Removal of Turbidity Curtain and Turtle Fence

Upon completion of construction activities (under separate application), the AETC will be removed. Removal will utilize the same methodology, equipment and access as installation. The sequence will be performed in reverse to safely remove the AETC.

7 Construction Site Winterization and / or Winter Operations

The Project Winterization Plan describes the resources and procedures that will be implemented for the Kingston 3rd Crossing during the winter months. Below are the construction operations scheduled to take place during the winter months:

- Placement of material for the construction of the causeway
- Foundation and drilling of casings
- Pier cap construction
- Trestle installation and;
- Installation of girders for the bridge

8 Reporting

The following reports will be provided to the IPD team as specified in the Kingston 3rd Crossing Validation Report:

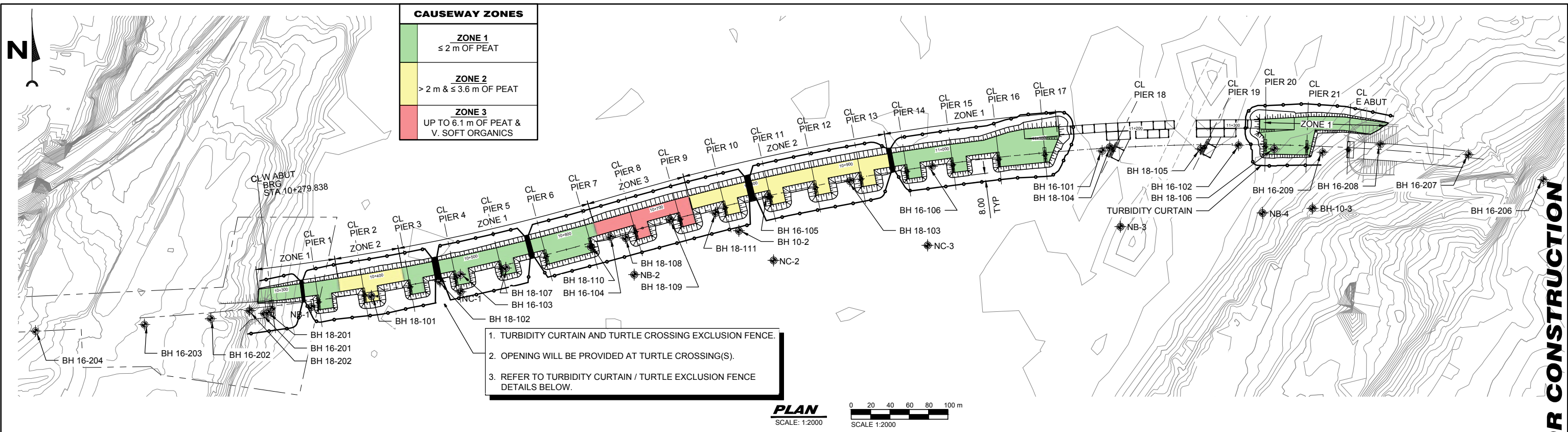
- Monthly Report, which will include a summary of site visits and compliance monitoring
- Annual compliance report
- Final compliance report

The following reports will be provided to Parks Canada:

- Vegetation Removal Report, including:
 - Species recovered from vegetation
 - Number of individuals
 - Location recovered
 - Location returned
 - Date

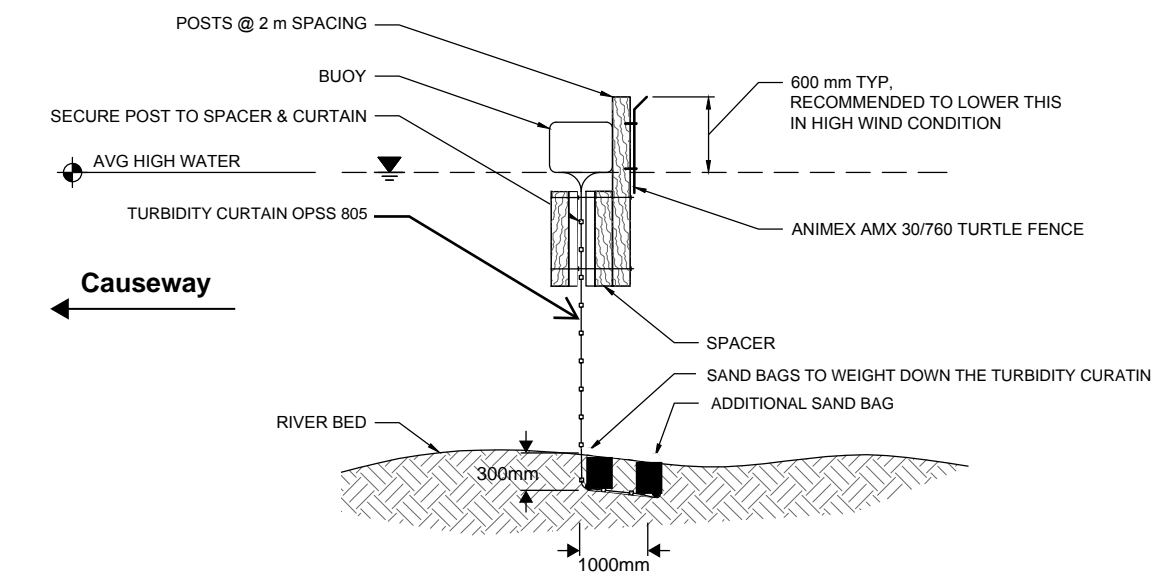
Appendix A Construction Schedule

Estimated Date		26-Aug	2-Sep	9-Sep	16-Sep	23-Sep	30-Sep	7-Oct	14-Oct	21-Oct	28-Oct
		Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
Planning											
AETC In-Water Work Application											
AETC In-Water Work Permit			3-Sep								
On Shore Work											
AETC Mock-Up											
Prepare Turbidity Curtain											
Stage Turtle Fence											
In-Water Work											
Vegetation Removal											
Install Segment 1 AETC											
Install Segment 2 AETC											
Install Segment 3 AETC											
Install Segment 4 AETC											
Install Segment 5 AETC											
Future In-Water Work											
Start Causeway Construction											
Notes											
Remove AETC at project completion											
Causeway Construction falls under separate permit											



1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
3. REFER TO TURBIDITY CURTAIN / TURTLE EXCLUSION FENCE DETAILS BELOW.

PLAN
SCALE: 1:2000



TYPICAL CROSS SECTION OF AQUATIC EXCLUSIONARY TURBIDITY CURTAIN (AETC)
SCALE: 1:30

PRELIMINARY - NOT FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION	CHK'D
08-22-19	J.R.P.	ISSUED FOR REVIEW		



DESIGNED BY
A.E.M.
DRAWN BY
J.R.P.
CHECKED BY

PRINT IS ONE HALF INDICATED SCALE

SCALE
AS NOTED
IF SHEET IS LESS THAN 22"x34" IT IS A REDUCED PRINT SCALE REDUCED ACCORDINGLY
DATE (MM-DD-YY)
08-22-19



PROJECT TITLE
KINGSTON THIRD CROSSING BRIDGE IPD

PROJECT LOCATION
KINGSTON, ON

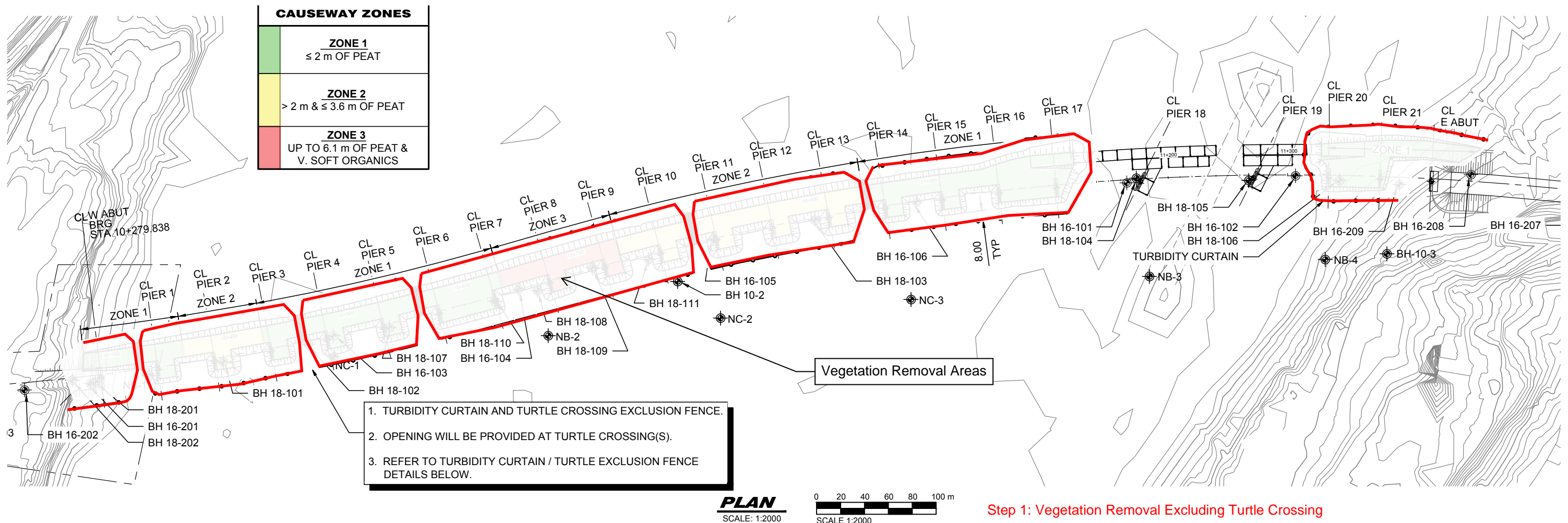
JOB NO.
19-171

PROJECT TASK
TEMPORARY ACCESS CAUSEWAY

TASK NO.
TURTLE PASSAGE

DRAWING SUBJECT
CAUSEWAY PLAN & TYPICAL TURTLE FENCE SECTION

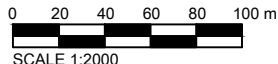
SHEET NO.
1 OF 1



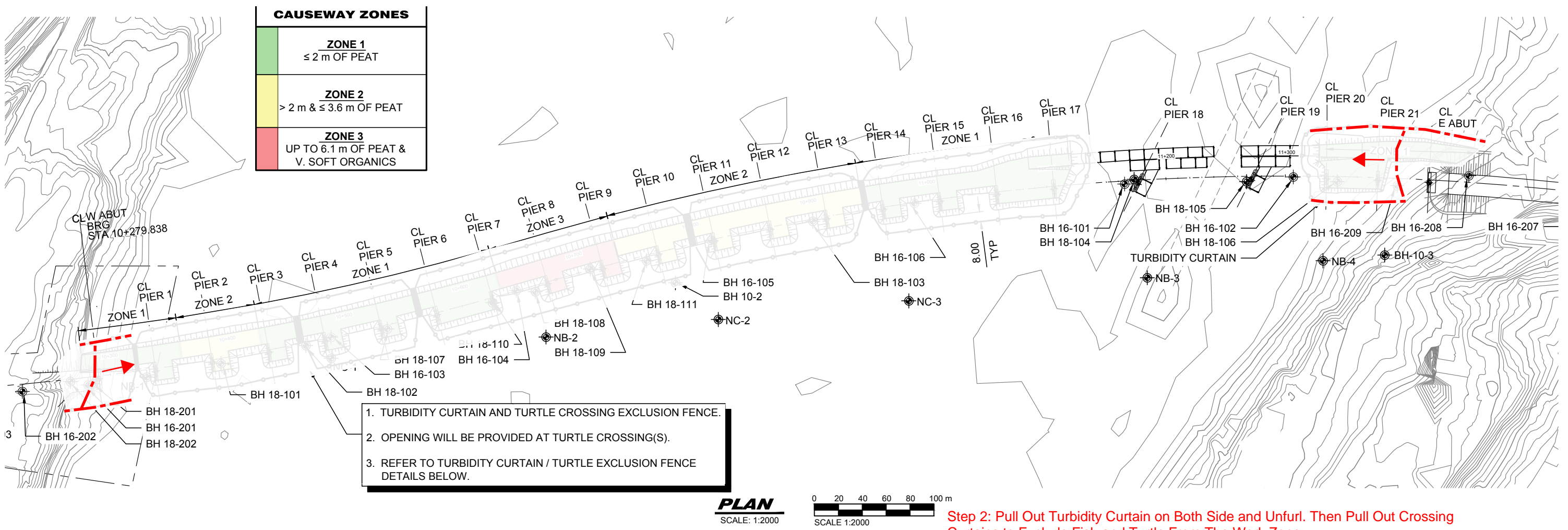
CAUSEWAY ZONES	
	ZONE 1 ≤ 2 m OF PEAT
	ZONE 2 > 2 m & ≤ 3.6 m OF PEAT
	ZONE 3 UP TO 6.1 m OF PEAT & V. SOFT ORGANICS

1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
3. REFER TO TURBIDITY CURTAIN / TURTLE EXCLUSION FENCE DETAILS BELOW.

PLAN
SCALE: 1:2000



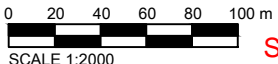
Step 1: Vegetation Removal Excluding Turtle Crossing



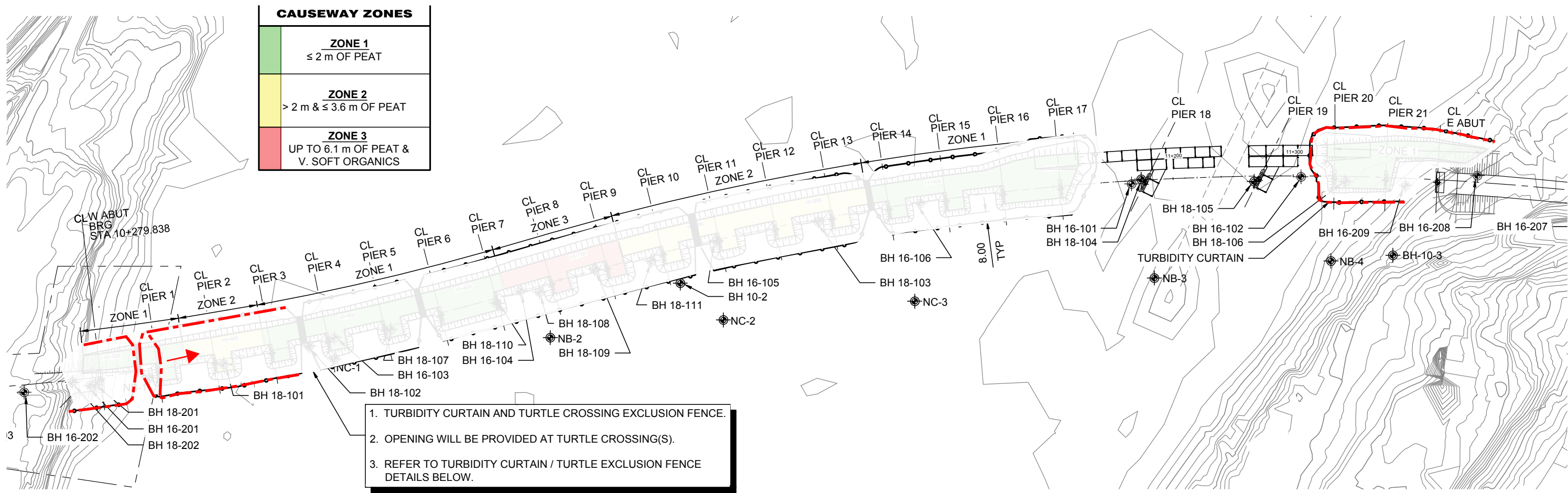
CAUSEWAY ZONES	
	ZONE 1 ≤ 2 m OF PEAT
	ZONE 2 > 2 m & ≤ 3.6 m OF PEAT
	ZONE 3 UP TO 6.1 m OF PEAT & V. SOFT ORGANICS

1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
3. REFER TO TURBIDITY CURTAIN / TURTLE EXCLUSION FENCE DETAILS BELOW.

PLAN
SCALE: 1:2000



Step 2: Pull Out Turbidity Curtain on Both Side and Unfurl. Then Pull Out Crossing Curtains to Exclude Fish and Turtle From The Work Zone

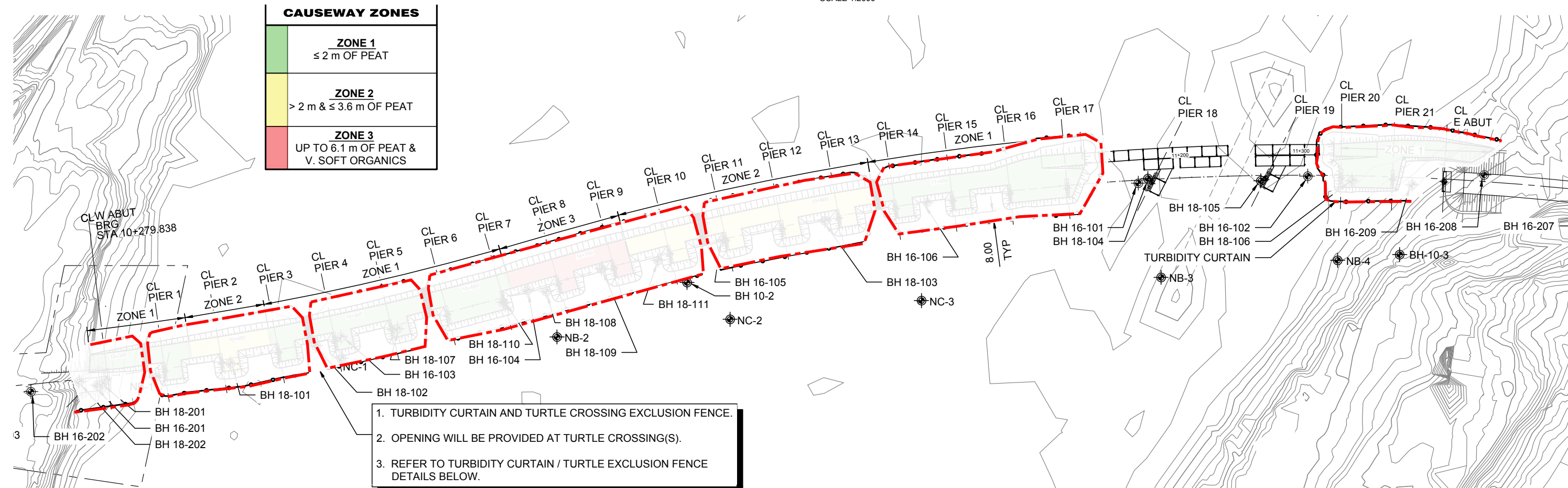


1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
3. REFER TO TURBIDITY CURTAIN / TURTLE EXCLUSION FENCE DETAILS BELOW.

PLAN
SCALE: 1:2000

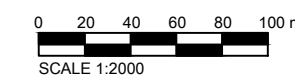


Step 3: Repeat Step 2 process for each turtle exclusion zone

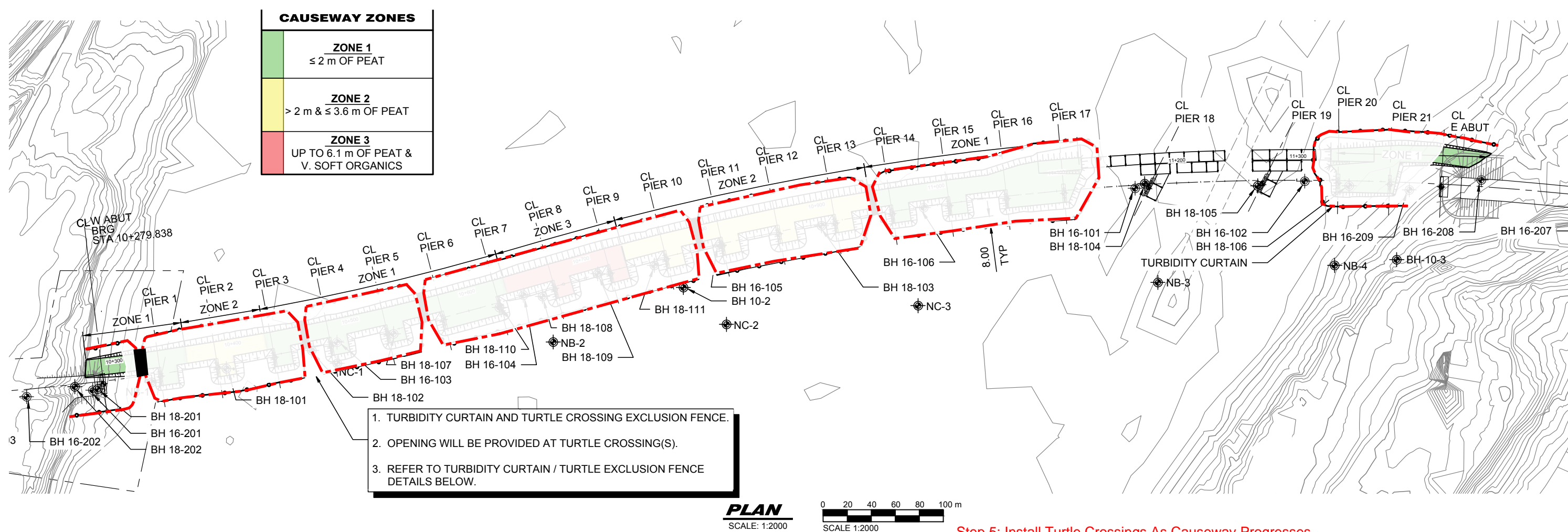


1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
3. REFER TO TURBIDITY CURTAIN / TURTLE EXCLUSION FENCE DETAILS BELOW.

PLAN
SCALE: 1:2000

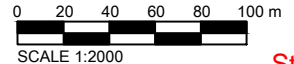


Step 4: Complete all Turbidity Curtain. Unfurl and close in the turtle crossings

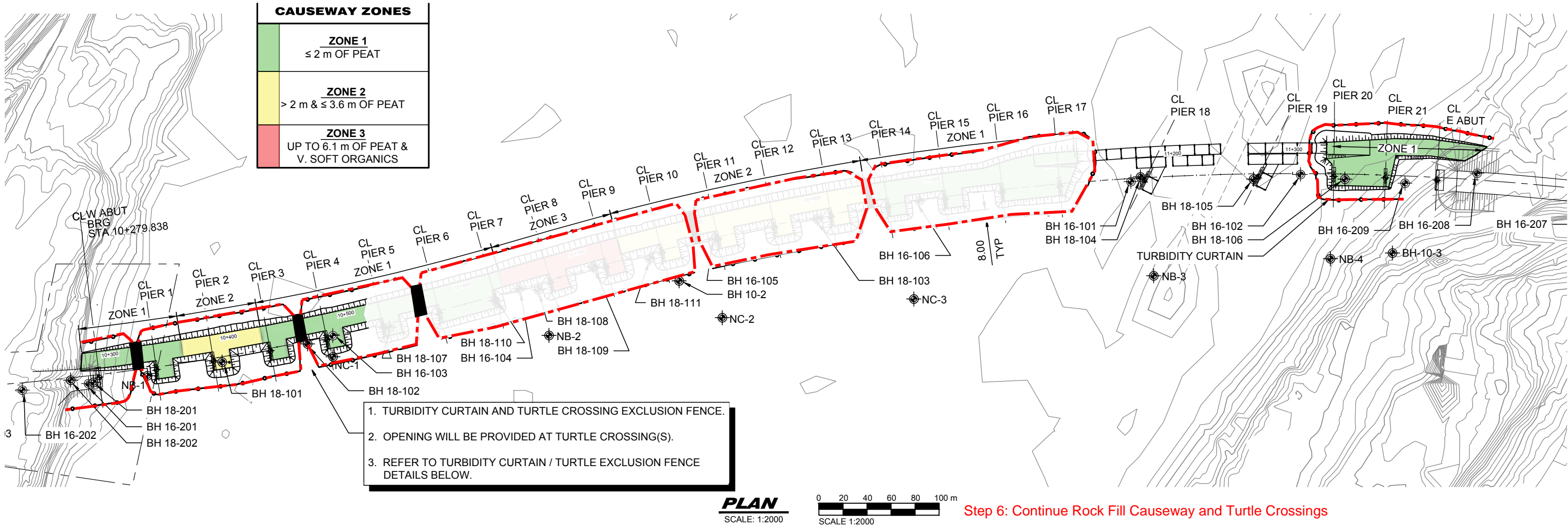


1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
3. REFER TO TURBIDITY CURTAIN / TURTLE EXCLUSION FENCE DETAILS BELOW.

PLAN
SCALE: 1:2000

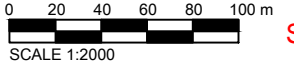


Step 5: Install Turtle Crossings As Causeway Progresses.



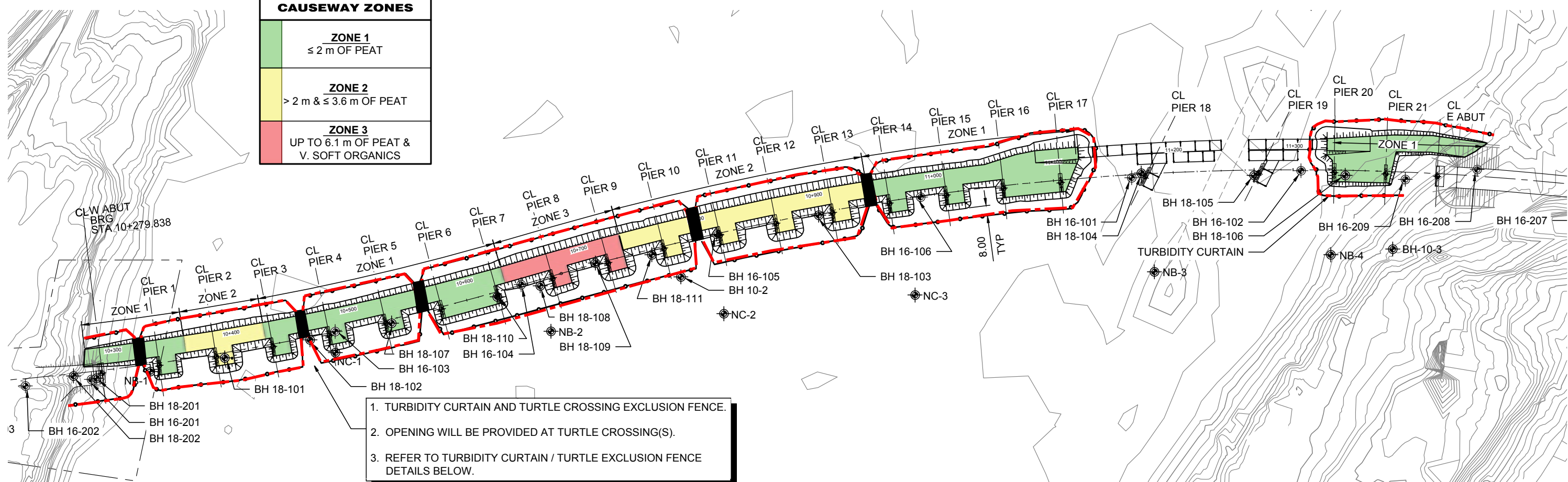
1. TURBIDITY CURTAIN AND TURTLE CROSSING EXCLUSION FENCE.
2. OPENING WILL BE PROVIDED AT TURTLE CROSSING(S).
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PLAN
SCALE: 1:2000



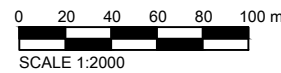
Step 6: Continue Rock Fill Causeway and Turtle Crossings

CAUSEWAY ZONES	
	ZONE 1 ≤ 2 m OF PEAT
	ZONE 2 > 2 m & ≤ 3.6 m OF PEAT
	ZONE 3 UP TO 6.1 m OF PEAT & V. SOFT ORGANICS



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PLAN
SCALE: 1:2000



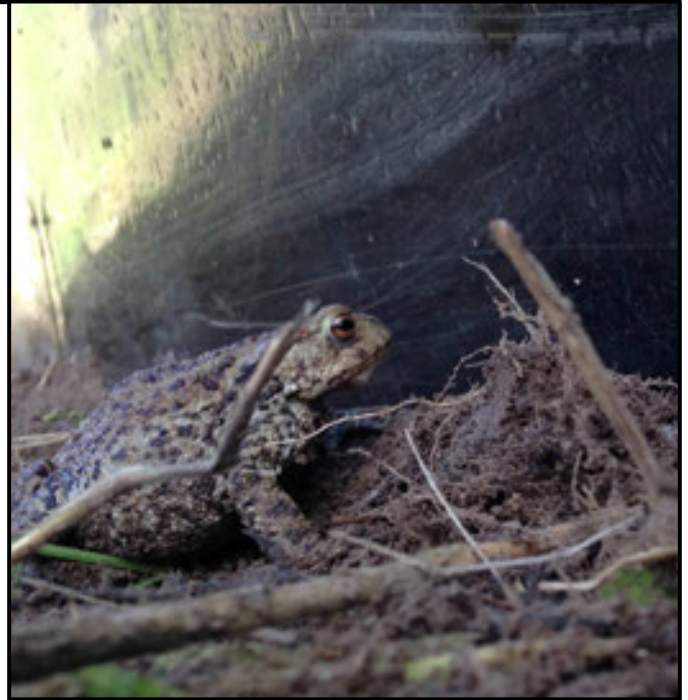
Step 7: Complete Causeway Rockfill

Data sheet

Animex Wildlife Exclusion Systems are the original exclusion solutions used to prevent protected wildlife from entering areas where they are at risk of harm during temporary and/or permanent construction impacts.

Animex products are an animal safe option for controlling the movement of wildlife and have been designed by biologists and engineers to combat all the failings of other commonly used fencing materials.

Animex barriers are re-usable and able to be recovered and re-installed on multiple sites or can be easily recycled if it becomes severely damaged and found no longer fit for purpose.



Typical <i>Animex</i> ® Properties	UNITS	ASTM TEST	<i>Animex</i> ®
Tensile strength (Yield)	%	D-6693	16.6
Tensile strength (Break)	%	D-6693	684
Tear Resistance	N	D-1004	289.2
Puncture Resistance	N	D-4833	570.2
Water flow rate (perforated products only)	gal/min/ft ²	D-4491	70
Reclaim Melt Temperature	°F	-	350

Key Properties:

- High strength-density ratio
- Recyclable
- High thermal resistance
- UV stabilized
- Multi-species functionality

Key Functions:

- Biological Survey Containment
- Construction Site Exclusion
- Highway & Roadway Exclusion
- Migration Control
- Invasive Species Control