27 May 2015

Inuvialuit Water Board
P.O. Box 2531
302, 125 Mackenzie Road
Inuvik, NT X0E 0T0

Attention: Mardy Semmler, Executive Director

RE: BAR-C TUNUNUK POINT
DOCK REMOVAL PROJECT DETAILED REPORT (PDR)

In 2014, Imperial Oil Resources Ventures Limited (Imperial) initiated the cleanup and remediation of the former BAR-C DEW Line site and former exploration drilling and staging area at the southern tip of Richards Island known as Tununuk Point (the Site). As part of the site cleanup, the existing Imperial dock is planned to be removed.

The Inuvialuit Water Board (IWB) issued Water licence No. N7L1-1836 to Imperial with respect to the Site remediation; however, it is understood that the IWB requires a project detailed report (PDR) for the removal of the Imperial dock. The following docoument is intended to supply this requested information.

REGULATORY APPLICATIONS

As a result of discussions with the ILA (Land Owner/Leassor) it has been determined that the Imperial barge landing dock should be removed / dismantled.

Imperial contacted the Environmental Impact Screening Committee (EISC), Transport Canada (TC), the Department of Fisheries and Oceans (DFO) and Inuvialuit Land Administration (ILA). A summary of applications can be found in Table A.

Table A Summary of Dock Removal Applications

Agency	Reference
Inuvialuit Land Administration	Land Use Permit ILA14IQ011
Transport Canada	2015-600031
Department of Fisheries and Oceans	15-HCAA-00470
Environmental Impact Screening Committee	EISC Registry File No. 02-15-02

The following community corporations and committees have also been contacted in order to identify any concerns and address them as required: Inuvik Community Corporation (ICC), Inuvik Hunters and Trappers Committee (IHTC), Tuktoyaktuk Community Corporation (TCC), Tuktoyaktuk Hunters and Trappers Committee (THTC).

A request has also been sent to all four corporations and committees above expressing the opportunity to meet the first week of July.

DESCRIPTION OF FACILITY

Constructed in 1973, the wharf consists of a 67.5 m long by 30.5 m wide on the west and 22.5 m on the east sheet pile bulkhead that was used to offload supplies and equipment. The Site is located on the East Channel of the Mackenzie River at the confluence with Neklek Channel midway between Inuvik and Tuktoyaktuk.

The sheet pile bulkhead wall consists of a single internal wale system, with a double internal wale system used at the southwest corner. There is a steel channel cap plate that is secured along the top of the sheet piles. The wall is backfilled with gravel, sourced from an adjacent borrow pit. The surfacing of the wharf is gravel. Wall components consist of the following:

- BELVAL Z.250 steel sheet piles (“Z sections”).
- Internal wales consisting of 2C255x70 (channels) secured to the wall at each location with two 43 mm diameter bolts and 180 mm by 180 mm by 37 mm thick plate washer.
- A 305 mm by 75 mm steel channel cap plate secured with 19 mm diameter bolts at every second inpan / outpan location and intermittently tack welded to the sheets.

There are six pipe bollards at the facility used for vessel mooring (four along the berth face and two at the inshore corners of the facility). The fendering system consists of tires secured with wire ropes to the cap plate, spaced along the berth face. There are four safety ladders located along the berth face consisting of flat bar rungs welded to the sheets.

Reinforcements to the sheet piles walls on the southwest corner of the dock were completed in September 2014 and April 2015. A series of cables attached to deadmen were used as temporary repair measures after a partial wall collapse in late August 2014.

DECOMMISSIONING PROCEDURE

Decommissioning of the dock will occur in stages and typically proceed from the downstream (i.e. east) to upstream (i.e. west) side using primarily land-based equipment including an excavator, a rock truck, front-end loader, and a crane.

Decommissioning tasks will generally include:

- Removal of bollards, cap plate, deadman anchors, tie-rods and associated hardware on the sheet piles.
- Removal of the main wall sheet piles.
- Removal of the deeper fill materials and transfer to an appropriate backfilling location near the former site airstrip.
- Reshaping of the shoreline area to closely match existing profile.
- Completing documentation of the decommissioning.

All steel materials and any contaminated soils which cannot be treated at the Site will be shipped off site to appropriate landfills outside of the Northwest Territories. Grading of the shoreline will be completed to the best of abilities to align with the natural surrounding area.

The AECOM Project Execution Plan for the dock decommissioning is presented in **Appendix A**. Dock photos are also attached in **Appendix B**.

In order to minimize any effects to the environment from the dock removal, a number of measures have been incorporated in Section 5 “Potential Issues and Mitigations” of Appendix A. Any direction received from the Department of Fisheries and Oceans (DFO) will be reviewed and considered as well.

SCHEDULE

Dock removal is planned to start approximately August 25, 2015 and be completed by approximately September 24, 2015.
The dock is required and will be used for the remediation work planned in 2015. Therefore, removing it will be the last task accomplished prior to demobilization from the Site.

CLOSURE

We trust that the information provided in this PDR satisfies your current requirements and provides suitable documentation for your records

Please feel free to contact the undersigned if you have any questions or comments.

Sincerely,

Ramy Rahbani
IOL Project Manager
587 476 4262 Tel
ramy.rahbani@esso.ca

Appendix A AECOM Dock Removal Execution Plan

AECOM
101 – 18817 Stoney Plain Road NW
Edmonton, AB, Canada T5S 0C2
www.aecom.com

780 486 7000 tel
780 486 7070 fax

May 8, 2015

Project No: 60313567

Regarding: 2015 Execution Plan - Area H (Dock Removal)

1. Work Site Description

This document outlines the proposed methods to remove the sheet pile barge landing dock at Area H following the substantial completion of remedial activities at BAR-C in 2015. Select photographs of Area H are attached.

2. Equipment Required

- Excavators
- Clamshell bucket
- Crane
- Vibratory hammer
- Dump trucks
- Pickup trucks
- Barge and Tug support

3. PPE Required

- CSA approved footwear
- Hard hats
- Cut Resistant gloves
- Safety glasses
- Rain gear and Cold gear (as necessary)
- Other protective equipment, including the above mentioned items, will be worn as warranted by site conditions and hazards that have been identified on the work site.

4. Work Tasks

The steps to remove the dock at Area H are as follows:

1. Near the beginning of the summer work, obtain surface samples over the dock area at a depth of 0.1 to 0.2 m and at a grid spacing of 6 m x 6 m to determine if anything has been spilled or deposited in this area. Excavate and confirmatory test any areas that exceed criteria. Afterwards all material is considered below criteria unless visual or olfactory evidence is obtained to the contrary.

2. After primary demobilization, re-locate the barge camp from the south side to the west side of the dock with the camp anchor to shore rather than the dock.
3. Excavate the fill in stages. Stage 1 excavation consists of removing the fill immediately next to the sheet pile walls along the perimeter of the dock to a depth of 2 m to 3 m below the existing dock surface depending on the river bed depth and the river elevation.
4. Perform additional Stage 1 excavations between the tie rods to a depth that is not more than 1.8 m higher than the depth of the riverbed at the exterior face of the walls. Do not cut tie rods or expose the deadman anchors until this level is reached. Stage 1 excavations may be carried out as deep as the level of the existing river bottom outside the wall. The excavated slope should not be any steeper than 1 vertical to 2 horizontal (approx. 28 degrees).
5. Once Stage 1 excavation is complete, cut the tie rods at the wale and where they daylight at the excavated slope. Remove the front wale sections connections to the sheet piles and store the tie-rods and wales in an area away from the dock work zone.
6. Extract sheet piles by lifting them out of the ground while using a vibratory hammer suspended from a crane. Move the sheets to an area away from the dock work zone.
7. Begin removal of the sheet piles from the east end (downstream) to minimize silt transport due to the river current.
8. Excavate the interior section of the dock in order to expose the deadman anchors and the remaining tie-rods. Remove and store the materials in an area away from the dock work zone.
9. Begin excavation of the retained fill at the shore end of the east wall. The sequence of excavation by location along the three walls should be planned to minimize sedimentation into the river. It is anticipated that working from the shoreline on the east wall and finishing at the shoreline on the west wall will be the most efficient and protective.
10. Perform the Stage 2 excavations using an excavator or a crane equipped with a clamshell bucket to shape the slope to be similar to the surrounding shoreline. The elevations of the excavated area should be slightly higher than the existing river bed at the exterior of the walls. Enough of the dock fill should be removed so that the remaining material does not significantly extend into the channel. The objective is to provide a smooth slope from the existing riverbed to the ground above the waterline.
11. Place the excavated materials into the open pit areas in the South Borrow Area in Area F. The last wetter materials may be difficult to transport up the hill so they should be placed along the toe of the existing hill at the landward side of the dock area (estimated capacity of 600 m^3).

It was considered to install a silt fence suspended from a floating boom around the full dock area. However due to the swift river currents and their direction such is considered problematic even if the silt curtain is tied off and anchored to the riverbed with chains or cables. The curtain and the boom are likely to be torn, ripped or carried away by currents. It is noted the sheeting is to remain in place as long as practical and removals staged from the east to minimize dispersal of sediment into the waterway.

5. Potential Issues and Mitigations

Issue: Accidentally breaking a tie rod during excavation inducing additional failures.

Mitigation: Employ a spotter especially during initial excavation efforts to direct operations and ensure buckets do not hit tie-rods. As stage 1 excavation gets deeper demand on the tie rods is diminished as the earth load on the bulkhead is reduced.

Issue: Continued failure at the sinkhole and zippering breaking of tie-rods at adjacent sections.

Mitigation: Inspect winter repair measures before commencing operations. Keep water level behind bulkhead even with outside. Prioritize excavation in failed areas. Employ measures similar to above to ensure supplemental cables are disturbed as little as possible during excavation.

Issue: Full failure of wall at sinkhole (toe kickout).

Mitigation: Keep all equipment and workmen a safe distance from the sinkhole. All workmen to wear floatation devices during this work

Issue: Breach in sheet pile wall during demolition causing sedimentation

Mitigation: The sequence of demolition activities is established to provide mitigation of such an occurrence. The removal of Stage 1 materials in advance of the sheet pile demolition reduces the volume of native soils that could be eroded in the event of a breach, while maintaining stability in the sheet pile wall after the tie-rod anchor system is removed. Therefore, the maximum amount of soils will be removed prior to the sheet pile demolition reducing the risk of sedimentation as much as possible.

MEET EXIST. GRADE
FIELD DETERMINE

APPROXIMATE
PROPOSED
CONTOURS
(SOLID TYP.)

B
4

A
3

7 654 400N
512 950E

7 654 400N
512 300E

7 654 400N
512 000E

7 654 350N
512 950E

7 654 350N
512 000E

REMOVE
8"ø PIPE
DEADMEN

REMOVE TIERODS
2M O.C. V.I.F.

30.60M EXTRACT SHEET PILES

EXIST. SHORELINE

REMOVE SUPPLEMENTAL CABLE TIE BACKS

REMOVE SHEET PILE DEADMAN (FIELD VERIFY LOCATION)

REMOVE TIERODS
2M O.C. V.I.F

EXIST.
SINKHOLE
-5.0

APPROXIMATE PROPOSED
SHORELINE

REMOVE
TIERODS
2M O.C.
V.I.F.

21.41M EXTRACT SHEET PILES

EXIST. SHORELINE

REMOVE DIAGONAL
CORNER TIERODS

REMOVE DIAGONAL
CORNER TIERODS

ORIGINAL TIERODS
BROKEN AT PARTIALLY
FAILED LENGTH OF WALL

PARTIALLY FAILED
SECTION OF WALL

67.6M EXTRACT SHEET PILES

PREVAILING
CURRENT
DIRECTION

EXISTING SITE PLAN & REMOVALS

SCALE: 1:333

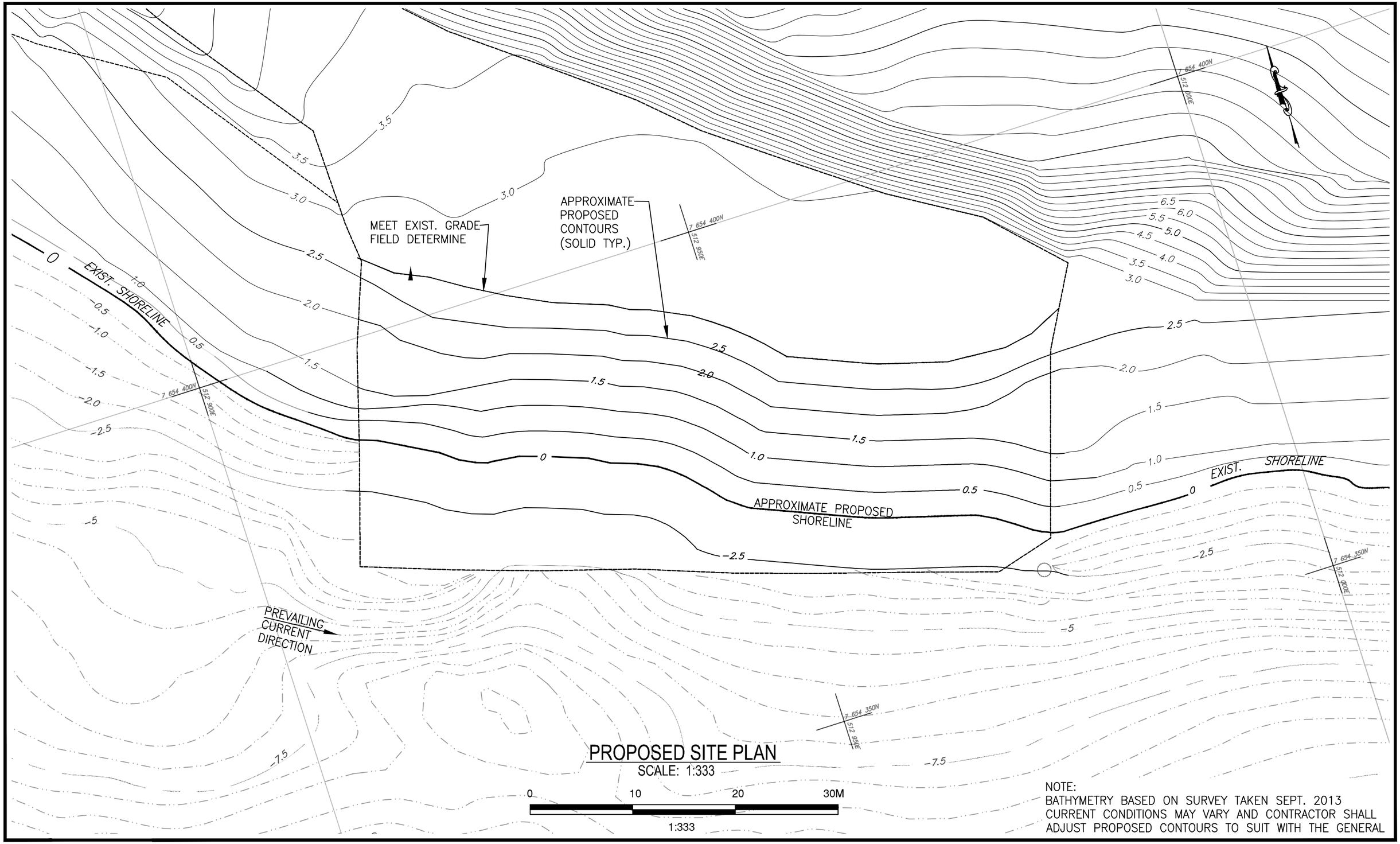
0 10 20 30M

1:333

NOTE:
BATHYMETRY BASED ON SURVEY TAKEN SEPT. 2013
CURRENT CONDITIONS MAY VARY AND CONTRACTOR SHALL ADJUST PROPOSED CONTOURS TO SUIT WITH THE GENERAL INTENT THAT PROPOSED CONTOURS ARE INTENDED TO CONNECT UPSTREAM AND DOWNSTREAM RIVERBANK CONTOURS.

AECOM

BAR-C - Tununuk Point, NWT
Existing Site Plan & Removals
Figure 1



PROPOSED SITE PLAN

SCALE: 1:333

0 10 20 30M

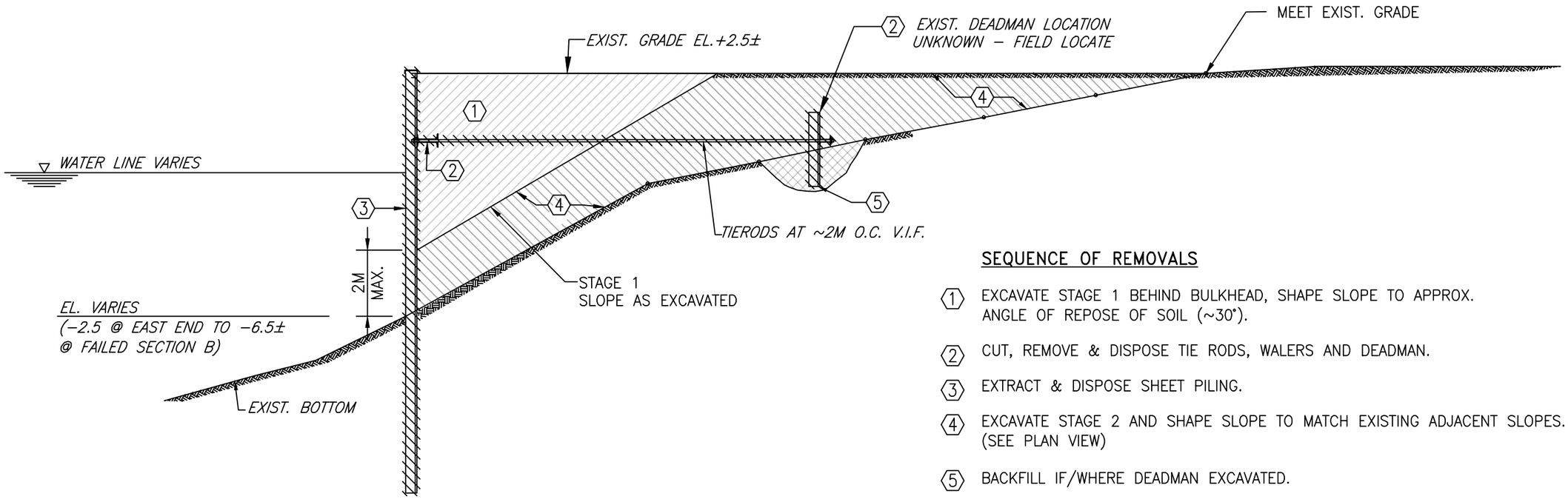
1:333

NOTE:
BATHYMETRY BASED ON SURVEY TAKEN SEPT. 2013
CURRENT CONDITIONS MAY VARY AND CONTRACTOR SHALL ADJUST PROPOSED CONTOURS TO SUIT WITH THE GENERAL

AECOM

BAR-C - Tununuk Point, NWT
Proposed Site Plan
Figure 2

-



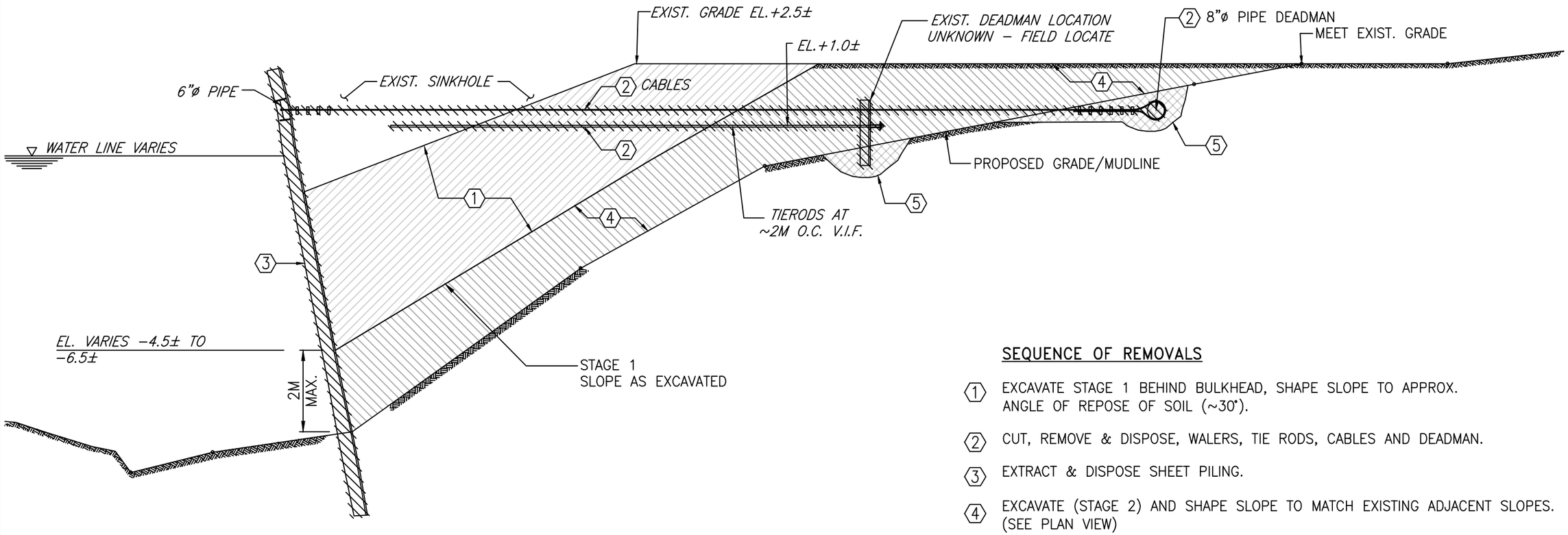
SEQUENCE OF REMOVALS

1. EXCAVATE STAGE 1 BEHIND BULKHEAD, SHAPE SLOPE TO APPROX. ANGLE OF REPOSE OF SOIL (~30°).
2. CUT, REMOVE & DISPOSE TIE RODS, WALERS AND DEADMAN.
3. EXTRACT & DISPOSE SHEET PILING.
4. EXCAVATE STAGE 2 AND SHAPE SLOPE TO MATCH EXISTING ADJACENT SLOPES. (SEE PLAN VIEW)
5. BACKFILL IF/WHERE DEADMAN EXCAVATED.

A/1 SECTION
SCALE: 1:100

0 2 4 6 8 10M

1:100



SEQUENCE OF REMOVALS

1. EXCAVATE STAGE 1 BEHIND BULKHEAD, SHAPE SLOPE TO APPROX. ANGLE OF REPOSE OF SOIL (~30°).
2. CUT, REMOVE & DISPOSE, WALERS, TIE RODS, CABLES AND DEADMAN.
3. EXTRACT & DISPOSE SHEET PILING.
4. EXCAVATE (STAGE 2) AND SHAPE SLOPE TO MATCH EXISTING ADJACENT SLOPES. (SEE PLAN VIEW)
5. BACKFILL IF/WHERE DEADMAN EXCAVATED.

B/1 SECTION
SCALE: 1:100

0 2 4 6 8 10M

1:100

PHOTOGRAPHIC RECORD – Area H

Site Name:	Site Location:	Project No.
BAR-C	Tununuk Point, NT	60313567

Photo No.	Date:
1	13/07/2014

Description:

View of the Area H dock from the barge

Photo No.	Date:
2	13/07/2014

Description:

Dock and staging area (facing NE)

PHOTOGRAPHIC RECORD – Area H

Site Name:	Site Location:	Project No.
BAR-C	Tununuk Point, NT	60313567

Photo No.	Date:
3	13/07/2014

Description:

Dock and staging area (facing E)

Photo No.	Date:
4	23/07/2014

Description:

Aerial view of the Area H dock

PHOTOGRAPHIC RECORD – Area H

Site Name:	Site Location:	Project No.
BAR-C	Tununuk Point, NT	60313567

Photo No.	Date:
5	05/09/2014

Description:

Sheet pile failure and associated erosion of soil

Photo No.	Date:
6	18/04/2015

Description:

Repair of sheet pile failure

Appendix B Dock photographs

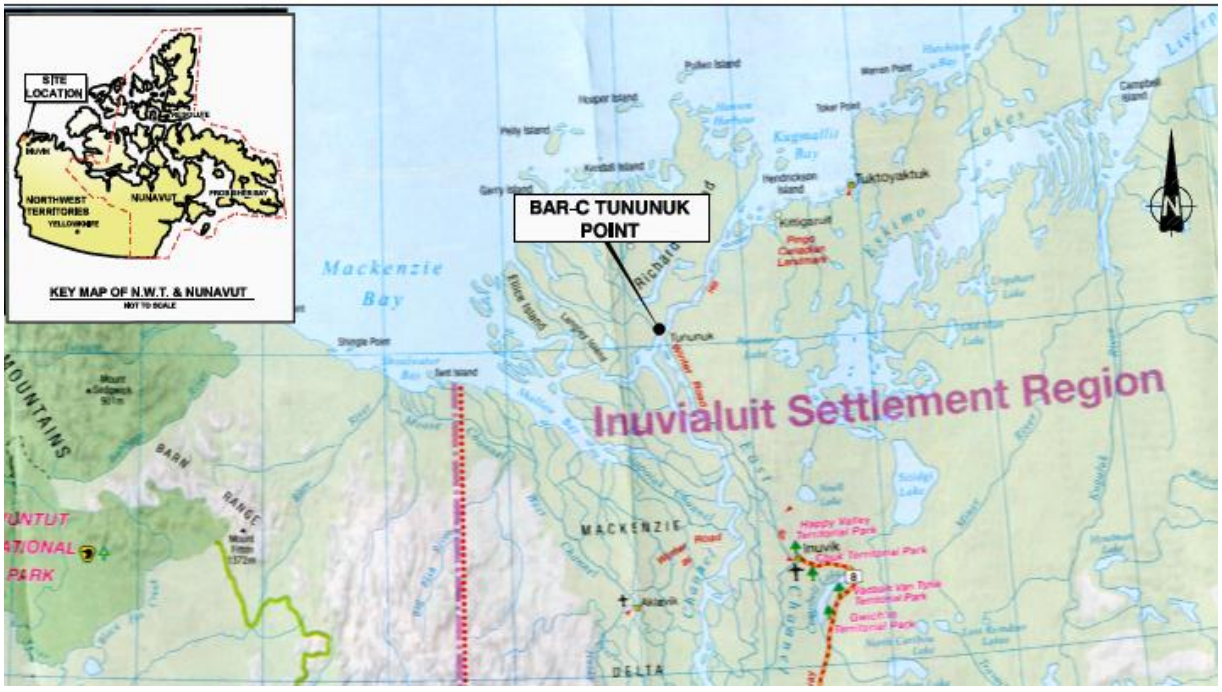


Figure 1: Site Location

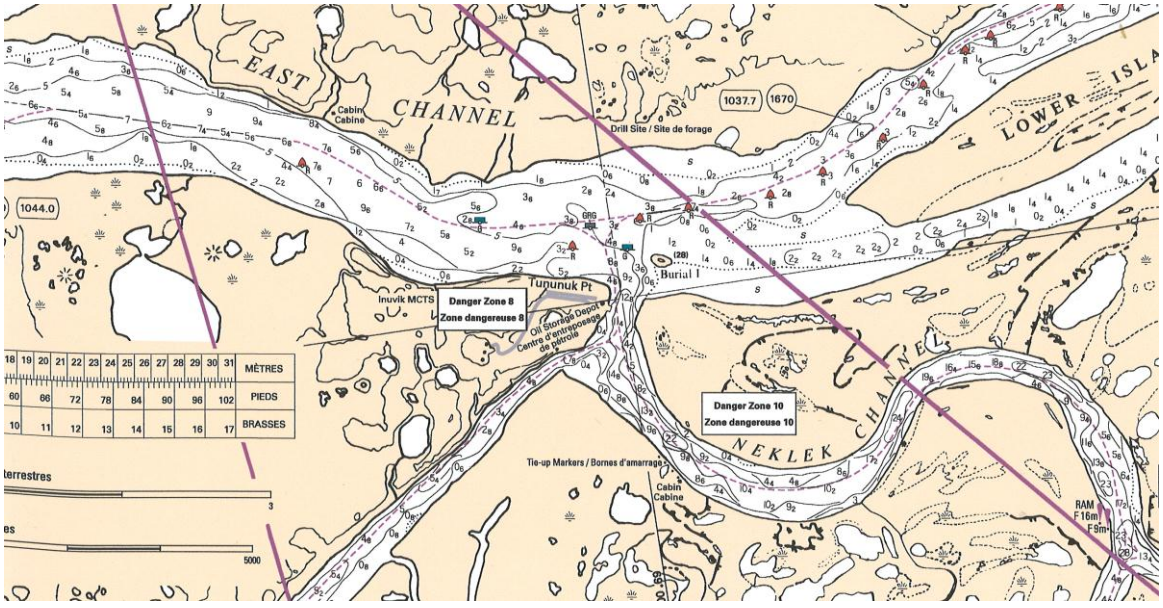


Figure 2: Chart and Location Plan.

Photo 1: General view of the west wall.

Photo 2: General view of the south wall.

Photo 3: General view of the east wall.

Photo 4: Aerial view of the dock