REPORT

Permafrost Protection Plan

Soil Remediation at Former Wellsite Unipkat I-22,
Inuvialuit Settlement Region, Northwest Territories

Submitted to:

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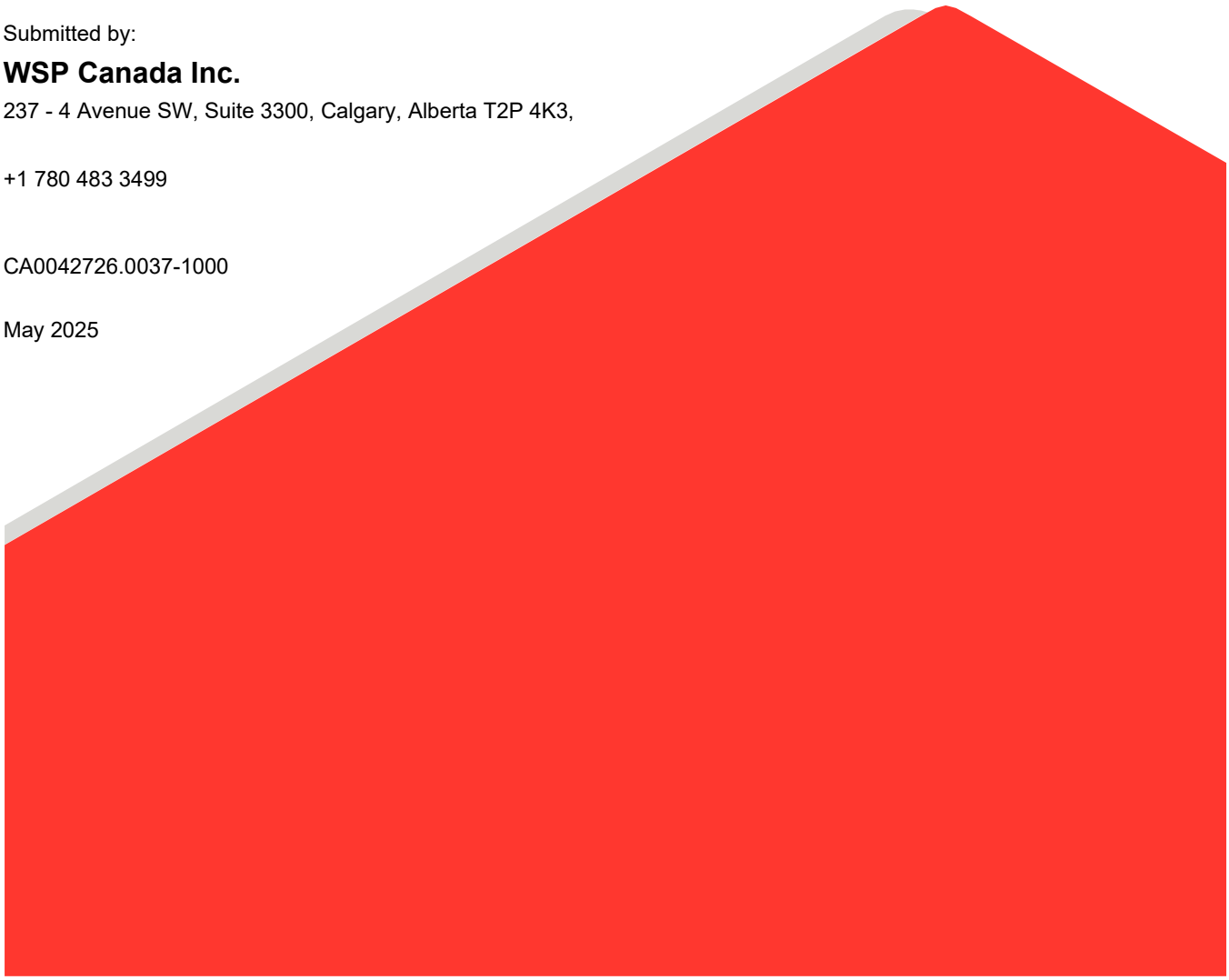
May 2025



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Version and Review History

Rev	Date	Description	Author Name	Peer Review	PM Review	SME Review	Production Review	Senior Review
A	15 April 2025	Issued as Draft	Stephanie Villeneuve 25 February 2025	n/a	Brennan Vervoort 7 March 2025	Julia Krizan 14 March 2025	Kate De Castro 21 April 2025	Patrick Kalita 7 April 2025
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Table of Contents

1.0 INTRODUCTION

1.1 Background

WSP Canada Inc. (WSP) has prepared this Permafrost Protection Plan (the Plan) on behalf of Shell Canada Limited (Shell) to support the soil remediation at the former wellsite Unipkat I-22 (the Site) in the Inuvialuit Settlement Region (ISR), Northwest Territories (NWT) (the Project). The purpose of this Plan is to describe the permafrost protection measures the ice road construction, maintenance and use, remediation and transportation activities at the Site.

The Plan will be effective upon its approval and will be implemented during the Project. Paper copies of this Plan will be available at the Site and all personnel will have access to paper and digital copies.

1.2 Location and Description

The Site is approximately 115 kilometres (km) northwest of Inuvik, in the ISR in the Mackenzie Delta, NWT at latitude 69°11’36.07” N and longitude 135°20’33.88” W. The site location is presented in Figure A1 (Appendix A).

Access to the Site in winter will be via ice road extension from the Inuvik to Aklavik public ice road and snowpack ramp, as presented in Figure A2 (Appendix A). The ice road extension to the Site will pass through Inuvialuit 7(1)(A) Private Lands and will follow the Mackenzie River East Channel and Arvoknar Channel (Figure A2, Appendix A). Access to the Site in summer will be via barge, boat or helicopter.

Shell developed the Site as an exploratory natural gas well site in 1972 and 1973 and re-entered in 1996 for additional well abandonment activities. Historically, the Site consisted of a camp sump, a well centre (e.g., a historical well marker), a drilling waste sump, a drilling flare pit and wood pilings used to support surface infrastructure above the ground.

1.3 Project Summary

The scope of work for the Project consists of the following activities:

- Potential mobilization of a self-contained barge camp with select soil remediation equipment (e.g., soil treatment equipment, loaders, excavators etc.) stored on-board in late summer or early fall of 2025 (submitted under Environmental Impact Screening Committee [EISC] Registry File [04/25-18]) to be anchored at the Site and frozen-in and winterized for the winter field program that will use an ice road extension for access.
- Construction of an approximately 110 km long ice road extension from a junction approximately 30 km north along the Government of Northwest Territories (GNWT) Inuvik to Aklavik public ice road. This will allow site access for equipment as well as the off-site transport and disposal of waste materials. The ice road extension will cross Inuvialuit 7(1)(A) Private Lands and will follow the Mackenzie River East Channel and Arvoknar Channel (Figure A2, Appendix A). It is expected that ice road reconnaissance and profiling will begin in December 2025 and construction will be completed in February 2026. A snowpack ramp will be constructed at the Site to allow access for equipment and crew.
- Mobilization of remaining equipment (office trailer, including heated portable toilets, soil treatment equipment, skid steers, loaders, excavators, fuel trucks and fuel tanks, and other miscellaneous equipment) and self-contained winter camp (if the barge camp was not mobilized and frozen-in at the Site) to the Site via the ice road for the duration of the winter season.

- Excavation and on-site thermal treatment of approximately 3,800 cubic metres (m^3) of soil containing petroleum hydrocarbons (PHCs) contaminants of concern (CoCs; PHC Fraction F2 and Type B Hydrocarbons) at concentrations above the proposed soil quality objectives (SQOs) at the Site using Enhanced Thermal Conduction (ETC). ETC involves transfer of a heated airstream (typically between 300 and 450 degrees Celsius [°C]) to volatilize and destroy PHCs in soil whose concentrations are above the proposed SQOs. To facilitate this, soil will be placed in treatment cells in which heat is applied via a dedicated air burner fueled by diesel. Prior to heating, the cell of soil is covered as a means of capturing the PHC vapour off-gas that is generated by the heating. Throughout the process, the generated PHC vapours will be channeled to a thermal oxidizer outside of the treatment cell for destruction prior to atmospheric release. The thermal oxidizer will be operated within defined parameters and monitored to ensure the efficient and complete destruction of PHC vapours. The proposed site layout and remedial extents are presented in Figure A3 (Appendix A).
- Excavation and off-site disposal of approximately 100 m^3 of soil containing barite (i.e., true total barium) at concentrations above the proposed SQOs, at an approved disposal facility.
- If remediation activities are completed during the winter of 2026, select equipment may be demobilized from the Site via the ice road prior to breakup. Some equipment may be secured on site or on the barge camp (potentially anchored at the Site) to be demobilized from the Site following 2026 spring breakup.
- Select equipment that was demobilized from the Site prior to breakup, and a barge camp (if a winter camp was used) will be re-mobilized by barge and boat to the Site in June 2026 to resume soil remediation, if required. If a barge camp was used during the winter of 2026 (potentially anchored at the Site), it will remain during breakup and re-open to continue operations for the summer of 2026, if required.
- If required, remedial activities, including ETC treatment, may resume during the summer and fall months of 2026.
- Installation of post-remedial groundwater monitoring wells and pre- and post-remedial thermistors (proposed locations in Figure A3, Appendix A) during the winter (pre-remedial) and summer/fall (post-remedial) months of 2026, including monitoring well sampling of existing and newly installed groundwater monitoring wells.
- Final demobilization by barge in the summer/fall of 2026, before freeze-up.
- Post-remedial groundwater and thermal monitoring, completed as day trips from Inuvik via boat or helicopter access, in the summer/fall of 2027.
- Removal of remaining wood pilings at the Site using the previously employed perimeter drilling method (EISC Registry File [10/22-01]) anticipated during a 2027/2028 winter field program.
- Fuel storage at the Site will be in appropriate fuel tanks and trucks for refueling of the equipment and ETC units, fuel storage and refueling areas will be bermed. Drip trays and secondary containment will be used at fuel storage and refueling areas.

1.4 Project Contacts

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1.5 Roles and Responsibilities

Shell is responsible for the overall content and success of this Plan. Shell's contractors are responsible for the implementation of this Plan and are expected to adhere to it. All personnel working on the Project, including Shell employees, contractors, and consultants, will be made aware of this Plan.

2.0 PEMAFROST CONDITIONS AT THE SITE

The Mackenzie Delta Low Arctic north (LA*n*) Ecoregion is characterized by continuous permafrost with scattered permafrost features such as drained lakes, low-centre polygons and pingos (ECG 2012). In the Mackenzie River Delta, permafrost thickness is generally less than 90 m thick, and contains deep unfrozen zones (taliks), which may extend to the base of the permafrost. The depth of the active layer generally ranges from 0.3 to 1.0 metres below ground surface (mbgs) but is largely a function of ground surface insulation, vegetation cover, level of ground disturbance, and winter snow cover (Heginbottom 1998).

Records collected between 2007 and 2010 from three historical thermistors prior to Site remediation in 2011 indicated that the permafrost depths were approximately 2, 1.6 and 1.5 mbgs on the south edge of the drilling waste sump, centre of drilling waste sump and north of the drilling waste sump, respectively.

The approximate depth to the base of the active layer (i.e., depth to permafrost) was also noted on available borehole logs completed during historical site investigations dating back to 2007 (i.e., September 2007, August 2010, April 2011 and August 2022). The approximate depth to permafrost ranged from 0.7 to 5.2 mbgs in boreholes advanced during the 2022 environmental site assessment activities, with the deepest observed from a borehole directly adjacent to the Arvoknar Channel in an area subject to significant erosion. The approximate depth to permafrost at other borehole locations advanced in 2022 to the west, where less erosion is visible along the shoreline of the channel, ranged from 1.7 to 2.5 mbgs. The approximate depth to permafrost ranged from 0.7 to 2.2 mbgs at boreholes advanced within areas of historical site activities.

Short-term effects on permafrost (such as permafrost melting) are expected during the ex-situ thermal remediation of PHC-impacted soils. The treated soils will be used to backfill the excavation (once they meet SQO criteria).

The following general mitigation measures will be implemented to mitigate potential effects on permafrost:

- The potential winter camp (if on land) and the office trailer will be stationed on a minimum 15 cm pad of snow and ice in previously disturbed area of the Site, if possible.
- The fuel storage area and equipment/supplies staging area will be in previously disturbed areas of the Site, where possible.
- Use track-mounted or low ground-bearing heavy equipment where possible.
- Minimize overall vehicle use (trucks and heavy equipment), and where possible, travel around the Site on paths/trails that are either existing or established at the outset of the work.
- Keep travel to level terrain and avoid traversing steep slopes in mobile equipment/vehicles.
- Protect trails and work areas, as needed with wood and/or drill mats.
- Minimize access to the shoreline by mobile equipment/vehicles (i.e., restrict to mobilization/demobilization).
- Recontour disturbed areas as part of reclamation activities.
- Excavation of impacted soils will be completed in stages, limiting the duration of permafrost exposure.
- The permafrost at the base of the excavation will be insulated, as necessary, to limit deterioration if exposed during the summer. At a minimum, extruded polystyrene insulation (or soil) will be temporarily placed at the base of the excavation and topped with soil fill. Additional protection measures may be implemented as required.
- Clearing of vegetation (if required) will be limited to the area of the excavation, soil treatment cells and staging area. Vegetation and organic layer will protect the underlying permafrost outside the soil treatment areas.
- Prevent surface water from entering an open excavation, using grading, ditches or berms and prevent precipitation from entering the excavation, using tarps or other cover.
- Install pre- and post-remedial thermistors for thermal monitoring to evaluate pre-remediation baseline conditions and monitor post-remediation permafrost.

3.0 PERMAFROST PROTECTION

Declining permafrost levels in the Arctic are affecting ecology, hydrology, and topography, which in turn leads to food and infrastructure concerns. Permafrost thaw also results in the release of stored carbon to the atmosphere, exacerbating the progression of climate change (Natali et al. 2014). Given the potentially serious consequences of its degradation, the anticipated effects of the remedial works on the permafrost at the Site are considered in the following.

Table A lists the potential risks to permafrost posed by the Project activities (Remedial Action Plan, Appendix B of the Project Description). Given that the work is expected to occur over multiple seasons, separate concerns have been raised for the different scenarios.

Table A: Potential Permafrost Concerns

Identified Concern	Winter Remediation Work	Summer Remediation Work
Site access	Winter site access will require construction of an ice road. A snowpack ramp will be constructed to access the Site from the ice road. This ramp will be built up to at least 15 cm to protect underling terrain and permafrost.	During the summer, site access will be by boat/barge or helicopter. Care will be taken to limit, to the extent practicable, additional vegetation clearing or earthworks in this area. Damaging vegetation, exposing soil, compacting organics/moss ground cover can all adversely affect the stability of permafrost.
Work and laydown area (75 m by 100 m)	If work proceeds during the winter, it is expected that vegetation will be cleared using brushing equipment, if required. Temporary access trails and work pads would then be constructed over the remaining ground cover using compacted snow with the addition of water as required. The potential winter camp (if on land) and the office trailer will be stationed on a minimum 15 cm pad of snow and ice in previously disturbed area of the Site, if possible Ground vegetation (moss, if present) would not be destroyed, and mineral soil would not be disturbed or exposed. The ETC treatment cells will be situated in an appropriate location that considers river water levels (i.e., flooding risks) and historical site activities.	Heavy loads on unfrozen soil can cause settlement, leading to ponded water and reduced insulation, both of which may affect permafrost. Brushing of vegetation for temporary access and the laydown area will be limited to the amounts needed, as this may adversely affect permafrost. Matts will be used to protect underlying terrain. It is expected that affected areas will naturally revegetate.
Soil excavation The remedial excavation may, in some areas, extend to the top of the permafrost (i.e., the bottom of the active layer), which will expose the permafrost to seasonal air temperatures and precipitation.	Average ambient temperatures during the months of January through March are expected to range from -20 to -30°C, which will preserve the permafrost and generally counteract effects of solar radiation. Any precipitation during this time will be snow. Excess amounts of snow will be removed from the excavation, if required. Minimal groundwater seepage may occur at depth (i.e., as the base of the proposed excavation is approached) as the active layer freezes. It is expected that the groundwater would freeze in place. However, if sufficient water is present, and conditions allow (pumps are operational), it will be decanted into temporary storage vessels (1 m^3 totes or tanks) for later treatment or disposal.	During the summer months, exposed permafrost will be subject to positive air temperatures and solar radiation. Depending on the timing of the work, average air temperatures may range from 10 to 20°C. Excavations where permafrost is exposed for long periods will be thermally protected (i.e., placement of fill or rigid insulation) from these warmer air temperatures as well as solar radiation. Additionally, the excavation will require protection from precipitation (e.g., through the use of tarps or other cover), which can contribute to permafrost degradation. Groundwater seepage may also occur. Standing water volumes within will be minimized, as practicable, by pumping the water directly into temporary storage vessels for treatment/disposal or direct discharge to the ground at an approved distance from the high-water line of the river provided that water

Identified Concern	Winter Remediation Work	Summer Remediation Work
		quality is acceptable according to issued permits. Where vegetation has been removed and soil disturbed (e.g., in the excavation areas) levelling and recontouring of affected areas will facilitate natural re-vegetation which will reduce future erosion of these areas and potential additional effects on permafrost.
Increased ground temperatures due to ETC process	A thermal break, in the form of rig mats, soil pads, rigid insulation, air gap, or other means may be required beneath the ETC units. The applicability of the insulative materials under the high temperature conditions will be assessed further, prior to mobilization, as further discussion will occur with the ETC contractor to quantify this issue. Thermistors will be installed below the initial treatment cells as well as in background locations to confirm assumptions about heat penetration and monitor potential adverse effects on permafrost conditions. If the thermistor data do not support assumptions, the process will be reviewed and modified accordingly.	
Elevated-temperature soils used as backfill. The ETC process is expected to operate at a temperature of at least 350°C. Placing soil that is warmer than the temperature in which it was removed will have an adverse effect on permafrost. The post-treatment cooling time to ambient temperatures is typically two to three days and that the process can be accelerated through a quenching (wetting) process.	Subzero air temperatures during the winter will allow the soil to cool faster and closer to the temperature at which it was excavated (~0°C). Windrowing the soil will further expedite the cooling process, if needed. Quenching with river water during the winter will likely not be warranted given the colder ambient temperatures. It will not likely be desirable, from the perspective of creating frozen clumps to later thaw in the ground. Adding excessive water to the treated soils would result in soil slurry; when frozen, form ice-rich soils that would settle and deform when thawed in the future.	Soils will be cooled to ambient air temperatures prior to re-placement in the excavation, and quenched with river water, if required. Allowing the soils to cool to ambient air temperature during the summer may not be sufficient, as the air temperatures are expected to be above the temperature at which the soils were removed near the bottom of the active layer (likely near 0°C). If, post-quenching, soil temperatures remain elevated, a layer of clean granular fill will be placed between the excavation base and the treated soils.
Overland flow, river level, infiltration The presence of water can affect permafrost by accelerating thaw faster than air temperature since it has a higher heat capacity and thermal conductivity than air.	The ETC process is expected to thaw ice entrained in the soil (as a result of the freezing active layer). However, the volume of water generated will be balanced to some degree by evaporative losses and so is expected to be minimal (<1 m^3) and manageable within the bermed treatment area. Topographic lows will be excavated as necessary to allow for accumulation of water to volumes that can be pumped to temporary storage for later treatment or disposal. In the winter months, the river level is expected to be relatively static and near seasonal lows. Depending on the depth of excavation, there may be no impact; however, should the depth of excavation extend below the anticipated river level, “summer construction” recommendations (see column to right) apply. There may be some infiltration in the winter (i.e., from unfrozen soils). However, these infiltration rates/quantities are expected to be low and do not present an issue.	Overland flow may be a factor to consider during freshet and the summer. The remedial footprint and surrounding area will be graded, as necessary, to promote flow of surface drainage around the area. Diversion berms and/or ditches may also be considered depending on the scale of the issue. During the summer months, the river level is expected to be dynamic and near seasonal highs, particularly at freshet/breakup. While the depth of the excavation is shallow, especially near the riverbank, the river level may be at or above the elevation of the excavation base. This could create an instability/failure of the excavation wall, particularly at the south end of the proposed remedial footprint. If this occurs, the excavation will be paused until river levels have decreased and adequate excavation stability is achieved. Infiltration rates may be high in the summer months due to thawed ground conditions, spring snow melt, and summer precipitation. Infiltrating water may flood the excavation and degrade the permafrost, as well as lead to unstable slopes within the excavation due to pore pressures and piping. Protection

Identified Concern	Winter Remediation Work	Summer Remediation Work
		measures referenced in Section 3.1 will be implemented to mitigate infiltrating water.
Backfill settlement and surface erosion Following remediation and backfilling, it is desirable that the excavation area maintain grade so that water does not pond. Ponded water is known to degrade permafrost.	Winter backfilling with frozen soil or soil that contains ice/water can be challenging from a compaction perspective, however the ETC process is expected to evaporate the water in the soil. Backfilled material will be mounded at surface to allow for future grading, as necessary, and post-settlement. Surface erosion protection measures may be considered (in accordance with the Sediment and Erosion Control Plan [Appendix G of the Project Description]) over the treated soil surface to facilitate natural revegetation.	Backfilling with unfrozen soils is standard practice and minimizes post-construction settlement. Mounding the replaced soil maintains the grade of the site should settlement occur. Surface erosion protection measures may be considered over the treated soil surface before the new vegetation cover is re-established (in accordance with the Sediment and Erosion Control Plan [Appendix G of the Project Description]).

A thermal monitoring system consisting of horizontally installed thermistor strings beneath the thermal break will be installed below the ETC treatment cells (Figure A3, Appendix A) to validate assumptions and monitor potential impacts on permafrost conditions. If the thermal monitoring system data do not support these assumptions, the treatment process will be temporarily suspended, the thermal break system will be reviewed and modified accordingly. Different combinations of thermal breaks may be implemented and may include rig matting, rigid insulation, locally purchased clean granular fill materials or the work may be suspended until cooler temperatures prevail.

3.1 Permafrost Preservation Measures

Several methods have been evaluated for preservation of the permafrost to conditions consistent with the baseline scenario (or better) during the remedial activities. The mitigation measures will be adjusted, as necessary. Permafrost preservation measures implemented during remedial activities include the following:

- Creating a thermal break beneath the ETC units to limit heat transfer to the underlying soil - this may involve placing polystyrene foam insulation (i.e., Blue Board), or an air gap (pipes buried in a gravel/fill pad or I-beams to create an elevated platform upon which the treatment units sit). The type of thermal break would be dependent on the results of baseline thermal data collected from thermistors installed prior to the onset of treatment.
- Protecting the excavation against water – depending on the season of construction this may include preventing surface water from entering the excavation, through grading, or construction of ditches or berms. It could also involve preventing precipitation from entering in the excavation, using tarps or other covers. Consistent dewatering is also anticipated given the propensity of ponded water to degrade permafrost. The remediation is expected to be completed in the winter months; however, it may extend into the summer, if needed. To mitigate concerns associated with potential base heave, excavations will be initiated in the southern portion of the Site, closest to Arvoknar Channel and proceed northward.
- Protecting the excavation against solar radiation and air temperatures – this is likely only applicable for summer construction due to different climatic conditions during that time compared to winter (cold and dark). Rigid insulation (and/or soil) will be applied to open areas of the excavation (bottom and sides), as necessary. The excavation will also be staged in segments to avoid exposing large areas of permafrost at any time.

- Snow management – during the winter, snow will be removed from the Site to encourage refreezing. Snow acts as a natural insulator preventing the cold winter air temperatures from freezing the ground.
- Vegetation clearing – vegetation acts as natural insulation and shade for the native ground. While the majority of the Site remains free of vegetation, care will be taken to minimize unnecessary Site clearing and cleared areas will be kept to a minimum. Upon completion of construction, brushed vegetation will be spread over the Site to provide some ground cover and encourage natural revegetation.
- Minimizing cuts – during the summer months, care will be taken to minimize soil cuts which reduce the effective depth to permafrost.
- Monitoring – regardless of the mitigation methods employed, a robust monitoring program will be implemented for the Site to confirm thermal assumptions and monitor construction impact(s), as outlined in Section 4 of this report and in the Reclamation, Closure and Monitoring Plan.

4.0 INSPECTION, MONITORING AND REPORTING

During and following the remediation activities, regular inspections of the permafrost protection measures will be completed to assess placement and function. Protection measures will be repaired or replaced as necessary. Additional protection measures may be required and will be documented.

Following remediation, additional post-remedial thermistors are planned to be installed within the backfilled excavations. Thermistors will monitor permafrost in the remedial footprint in comparison with the data collected from the pre-remedial thermistors as well as thermal data collected during the remedial activities. This information will be used as a comparison for post-remedial thermistor data, to confirm that the permafrost is returning towards baseline conditions, accounting for any potential natural degradation due to the proximity to the Arvoknar Channel. The location of the proposed pre- and post remedial thermistors is shown in Figure A3 (Appendix A). The thermal monitoring details will be further developed in collaboration with the regulators and based on the permits and licences. It will be adjusted (as part of the regularly updated Remediation, Closure and Monitoring Plan [Appendix I of the Project Description]) throughout the Project based on the findings on Site conditions. All results will be reported annually as required (e.g., in the annual reports submitted to the Inuvialuit Water Board).

5.0 REFERENCES

ECG (Ecosystem Classification Group). 2012. Ecological Regions of the Northwest Territories – Southern Arctic. Department of Environmental and Natural Resources, Government of the Northwest Territories, Yellowknife, NT.

Natali, A.M., Schuur, E.A.G., Webb, E.E., Pries, C.E.H, and K.G. Crummer. 2014. Permafrost degradation stimulates carbon loss from experimentally warmed tundra. Ecology, 95(3), 2014, pp. 602-608.

Heginbottom, J.A. 1998. Permafrost Distribution and Ground Ice in Surficial Materials. In the Physical Environment of the Mackenzie Valley: Baseline for the Assessment of Environmental Change. Geological Survey of Canada, (eds) L.D. Dyke and G.R. Brooks.

6.0 STATEMENT OF LIMITATIONS

WSP Canada Inc. (WSP) has prepared this document in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this document. No warranty, express or implied, is made.

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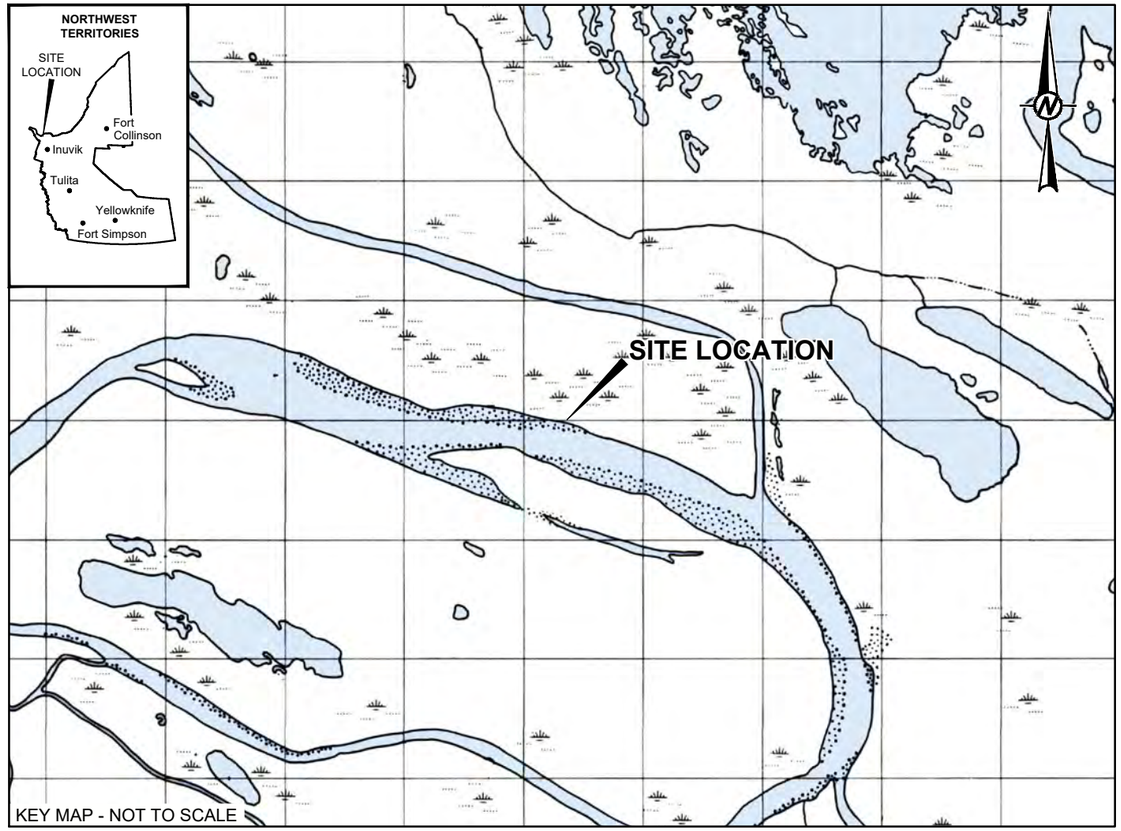
The factual data, interpretations, suggestions, recommendations, and opinions expressed in this document pertain to the specific project, site conditions, and are not applicable to any other project or site location. In order to properly understand the factual data, interpretations, suggestions, recommendations and opinions expressed in this document, reference must be made to the entire document.

APPENDIX A

Figures



LEGEND

2024 SHORELINE

REFERENCE

IMAGE OBTAINED FROM GOOGLE EARTH © 2024 GOOGLE INC. USED WITH PERMISSION. GOOGLE AND GOOGLE LOGO ARE REGISTERED TRADEMARKS OF GOOGLE INC.
IMAGERY DATE: 4 JUNE 2019. GOOGLE EARTH IMAGE IS NOT TO SCALE. DATUM: NAD83, PROJECTION: UTM ZONE 8.

TOPOGRAPHIC MAP 107C/04OBTAINED FROM Canmatrix. © 1958 THE ARMY SURVEY ESTABLISHMENT, R.C.E. PROJECTION: TRANSVERSE MERCATOR; DATUM: NAD27;
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CLIENT
SHELL CANADA LIMITED

CONSULTANT
wsp

YYYY-MM-DD	2025-05-07
DESIGNED	SVilleneuve
PREPARED	APaull
REVIEWED	JKrizan
APPROVED	PKalita

PROJECT
SOIL REMEDIATION
FORMER UNIPKAT I-22 WELLSITE
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE
SITE LOCATION PLAN

PROJECT NO.	PHASE-TASK	REV.	FIGURE
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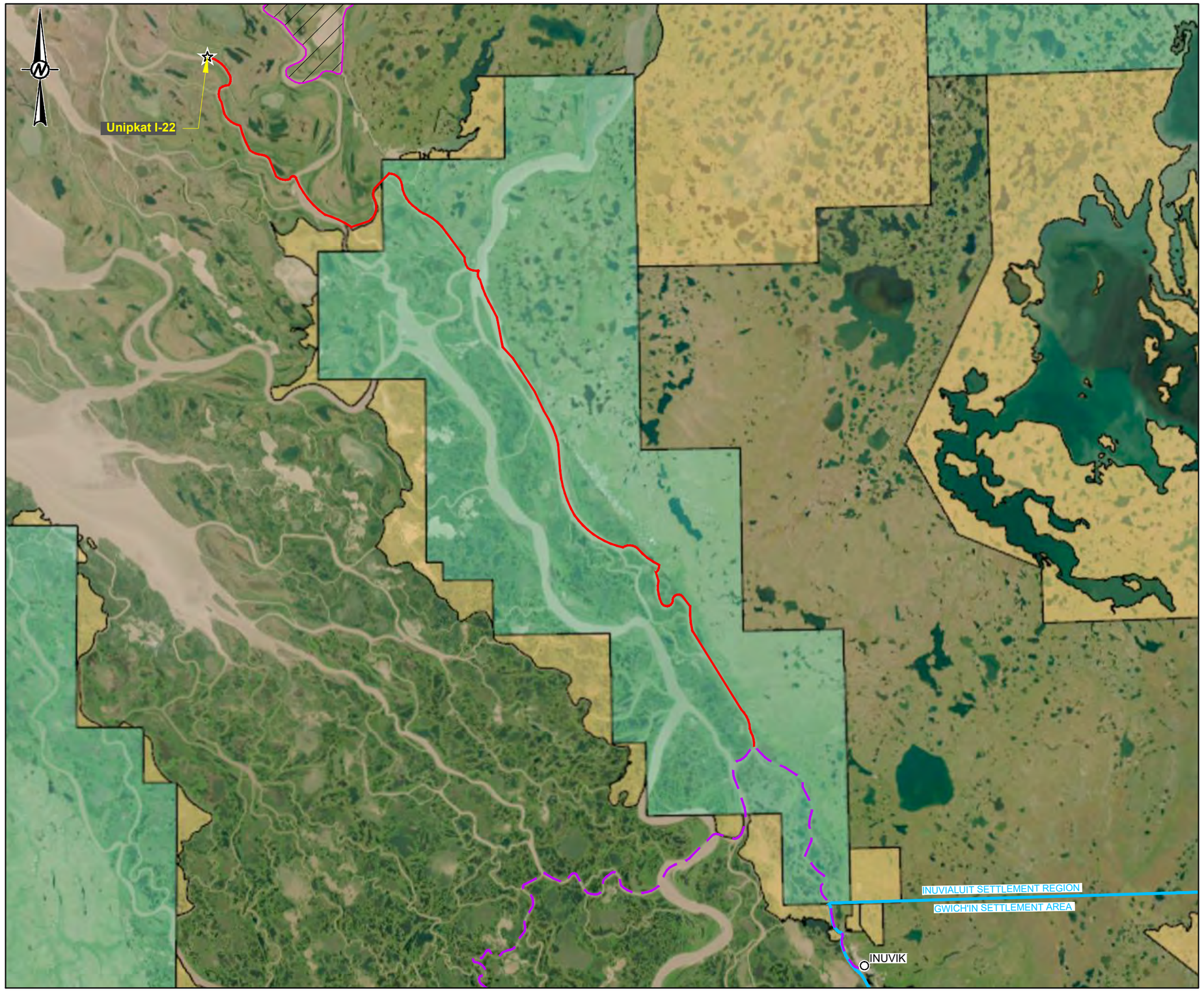

LEGEND

- SITE LOCATION
- CONSTRUCTED UNIPKAT I-22 ICE ROAD
- AKLAVIK ICE ROAD
- SETTLEMENT REGION BOUNDARY
- KENDALL ISLAND BIRD SANCTUARY

INUVIALUIT PRIVATE LANDS

- SURFACE TITLE
- SURFACE AND SUBSURFACE TITLE

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.

REFERENCE

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE - CANADA
2. BASE MAP: EARTHSTAR GEOGRAPHICS
3. COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 8N

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CLIENT
SHELL CANADA LIMITED

PROJECT
SOIL REMEDIATION
FORMER UNIPKAT I-22 WELLSITE
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE
SITE LOCATION WITH PROPOSED ICE ROAD

CONSULTANT

YYYY-MM-DD	2025-05-07
DESIGNED	SVilleneuve
PREPARED	APaull
REVIEWED	JKrizan
APPROVED	PKalita

PROJECT NO.	PHASE-TASK	REV.	FIGURE
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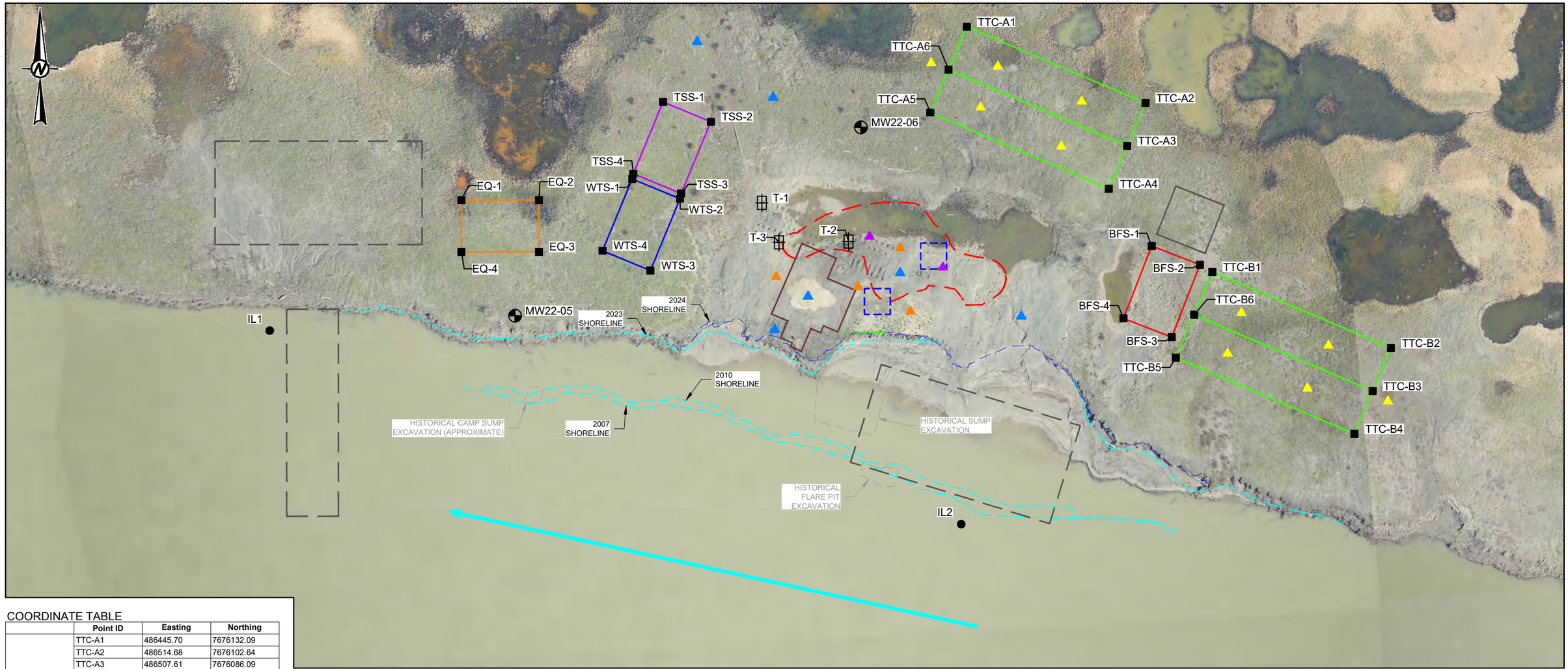

COORDINATE TABLE

	Point ID	Easting	Northing
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	TTC-A2	486514.68	7676102.64
	TTC-A3	486507.61	7676086.09
	TTC-A4	486500.54	7676069.53
	TTC-A5	486431.57	7676098.98
	TTC-A6	486438.63	7676115.53
	TTC-B1	486540.52	7676037.38
	TTC-B2	486609.50	7676007.94
	TTC-B3	486602.43	7675991.38
	TTC-B4	486595.36	7675974.83
	TTC-B5	486526.39	7676004.27
	TTC-B6	486533.45	7676020.83
Bermed Fuel Storage Area	BFS-1	486517.07	7676047.41
	BFS-2	486535.71	7676040.15
	BFS-3	486524.81	7676012.20
	BFS-4	486506.18	7676019.46
Temporary Soil Storage	TSS-1	486328.31	7676103.05
	TSS-2	486346.79	7676095.40
	TSS-3	486335.31	7676067.68
	TSS-4	486316.83	7676075.34
Water Treatment System	WTS-1	486316.40	7676073.30
	WTS-2	486334.88	7676065.65
	WTS-3	486323.40	7676037.93
	WTS-4	486304.92	7676045.58
Equipment Lay Down Area	EQ-1	486250.42	7676065.12
	EQ-2	486280.42	7676065.12
	EQ-3	486280.42	7676045.12
	EQ-4	486250.42	7676045.12
Water Intake Locations	IL1	486176.36	7676014.73
	IL2	486443.46	7675939.95

LEGEND

- AREA OF REMAINING WOOD PILES
- EXCAVATION LIMITS (FORMER)
- SHORELINE
- OVERALL EXCAVATION EXTENTS FOR SOIL WITH PHC CONCENTRATIONS EXCEEDING SQOs FROM SURFACE TO 3.0 mbgs
- OVERALL EXCAVATION EXTENTS FOR SOIL WITH PHC CONCENTRATIONS EXCEEDING SQOs FROM SURFACE TO 1.5 mbgs
- POTENTIAL LOCATIONS OF LAND, ICE OR BARGE-BASED CAMP
- BERMED FUEL AND HAZARDOUS WASTE STORAGE
- EQUIPMENT PARKING / LAY DOWN AREA
- THERMAL TREATMENT CELLS
- WATER TREATMENT SYSTEM AND TEMPORARY WATER STORAGE
- TEMPORARY SOIL STORAGE AND SEGREGATION AREA
- THERMAL TREATMENT OFFICE / CONTROL CENTER
- MONITORING WELL (EXISTING)
- THERMISTOR LOCATION
- WATER INTAKE LOCATIONS
- THERMISTOR TO MONITOR ETC TREATMENT CELLS
- POST-REMEDIAL GROUNDWATER MONITORING WELL
- PRE-REMEDIAL THERMISTOR
- POST-REMEDIAL THERMISTOR
- DIRECTION OF WATER CHANNEL FLOW

0 25 50
1:1,500 METRES

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON ACTUAL FIELD CONDITIONS.
2. GPS COORDINATES PROJECTION: TRANSVERSE MERCATOR; DATUM: UTM83; COORDINATE SYSTEM: UTM ZONE 8.

REFERENCE

ORIGINAL DRAWING OBTAINED FROM CHALLENGER GEOMATICS LTD.; DWG No.: 22-35141-002; SCALE: 1:1,250; DATE: SEPTEMBER 12, 2022.

ADDITIONAL INFORMATION OBTAINED FROM IEG CONSULTANTS LTD.; PROJECT No.: A04025A02; SCALE 1:750; DATE: SEPTEMBER 20, 2011.

CLIENT
SHELL CANADA LIMITED

CONSULTANT
wsp

YYYY-MM-DD	2025-05-07
DESIGNED	SVilleneuve
PREPARED	APaull
REVIEWED	JKrizan
APPROVED	PKalita

PROJECT
SOIL REMEDIATION
FORMER UNIPKAT I-22 WELLSITE
INUVIALUIT SETTLEMENT REGION, NORTHWEST TERRITORIES

TITLE
PROPOSED SITE LAYOUT AND REMEDIAL EXTENTS FOR TYPE B PETROLEUM HYDROCARBONS AND BARITE (TRUE TOTAL BARIUM)

PROJECT NO.	PHASE-TASK	REV.	FIGURE
CA0042726.0037	1000-2403	0	A3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

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