

P 867.873.5263 F 867.669.5555 kblenv.com Address

17 Cameron Road Po Box 1895 Yellowknife, NT X1A 2P4

January 21, 2020

Mackenzie Valley Land and Water Board 4922 – 48<sup>th</sup> Street, 7<sup>th</sup> Floor YK Center Mall PO Box 2130, Yellowknife, NT X1A 2P6

### Attention: Dave Abernethy and Shannon Allerston

#### RE: Checkpoint Highway Maintenance Camp and Landfarm Closure and Reclamation Plan Groundwater Monitoring and Leachate Management Plan Water Licence MV2017L8-0004, File #19-032NT

Please find enclosed the revised Closure and Reclamation Plan and Groundwater Monitoring and Leachate Management Plan for Checkpoint Highway Maintenance Camp and Landfarm. The Closure and Reclamation Plan ("CRP") outlines the methodology for returning the former Checkpoint Highway Maintenance Camp ("CMC") and the associated Checkpoint Landfarm ("CL") to a suitable land use standard approved by the Government of the Northwest Territories, Department of Environment and Natural Resources ("GNWT-ENR"). The Groundwater Monitoring and Leachate Management Plan ("GMLMP") supports Class B Water Licence MV2017L8-0004 (the "Licence"), dated June 7, 2017, and details how the licencee, Government of the Northwest Territories ("GNWT") Environment and Natural Resources ("ENR"), and its contractors will monitor and manage groundwater and leachate at the former CMC, and the associated CL.

This submission addresses the comments received from the Mackenzie Valley Land and Water Board on December 3, 2019. An outline of the revisions requested and KBL's response to address these comments, is outlined below. A revisions history table, outlining summary of the revisions made, is included on Page 4 of each report.

#### Request #1

The Board directed GNWT-ENR to provide a discussion, like that found in the Phase III ESA regarding the elevated levels of Manganese, following Table 2.1 for instances where elevated Mn and other constituents above CCME Guidelines are documented.

a) In response, the updated CRP provides a short description of exceeded levels of Manganese (with quick reference to Iron). This description refers to the naturally high levels of manganese in muskeg and suggests that anoxic conditions as a result PHC contamination contribute to these levels. Nowhere in any previously submitted documentation have I been able to find a description of existing site conditions of the CMC as being muskeg, in fact, sections of the CRP state that the area is "generally coarse-grained and well-drained". If there are muskeg areas adjacent to the site that may be contributing to these conditions, more information



P 867.873.5263 F 867.669.5555 kblenv.com 17 Cameron Road Po Box 1895 Yellowknife, NT X1A 2P4

should be provided. There is also no description of what these high levels mean for the environment or for final site conditions which are to achieve GNWT or CCME Residential standards. Section 5 states that additional monitoring wells could be installed to monitor and assess background manganese conditions but no response framework or action levels are identified. This is a final closure plan. All responses to final site condition exceedances should be provided for the Board's review. If this information is all provided in the Groundwater Monitoring and Leachate Management Plan, a brief summary could be incorporated into section 2 with the references to that plan so it is clear that these considerations have been incorporated into the post-closure monitoring plan. Additionally, if Site Specific conditions are being proposed due to high background levels for some constituents that are not expected to meet GNWT or CCME guidelines, that should be explicit. I'm not sure after my review whether or not this is the case for some parameters. Some discussion about the significance of measured COPC values compared to Guideline values should be included if guideline values are not being proposed.

- b) The discussion in the ESA about Manganese explains to the reviewer that Mn is an aesthetic criteria, not a health-based value. Some discussion about these characteristics may facilitate the Board's understanding of the impacts of slightly elevated Mn conditions at final closure, if they persist. It also explains that Mn may be naturally elevated (though not as high as measured) in soils which could contribute to that measured in the groundwater. If results from the HHERA or ESA suggest no further action, they should be summarized with reference (I don't know if this is the case, I'm making an example).
- c) No discussion is provided for other constituents identified to be above CCME Guidelines. These include Nickel and Arsenic in soil and Aluminum, Arsenic, Barium, Iron and Zinc in groundwater. Discussion from the ESA identify these high concentrations in the surface dump area with some uncertainty about their origin. Further information should be provided about how these conditions will be addressed for final closure. If this information is all provided in the Groundwater Monitoring and Leachate Management Plan, a brief summary could be incorporated into section 2 with the specific references to that plan so it is clear that these considerations have been incorporated into the post-closure monitoring plan.

#### **Response:**

 a) Location of muskeg west of Checkpoint Maintenance Camp (CMC) has been noted on Figure 1 of Appendix B, in the Closure and Reclamation Plan (CRP) V1.1 and Groundwater Monitoring and Leachate Management Plan (GMLMP) V3.0.

Referenced discussion of groundwater velocity and flow direction is expanded in GMLMP V3.0 Section 1.4 (p.8).

CRP Section 2.1 (Background of Checkpoint Maintenance Camp Site; p.7) provides explanations from previous Phase IIIs (Columbia, 2012; BluMetric, 2017) regarding high Total Metals detections as a function of low volume groundwater samples, and high Dissolved Metals detections as a function of localized reducing conditions near petroleum hydrocarbon contamination.

Discussion of Human Health and Environmental Risk Assessment and relative toxicity of high Dissolved Metals, including manganese, is included in CRP V1.1 Section 2.1 (p.8)

CRP V1.1 has Target Closure Levels derived in Section 5.7 g). (p. 16) and listed in Appendix C.



kblenv.com

P 867.873.5263 F 867.669.5555 Address

17 Cameron Road Po Box 1895 Yellowknife, NT X1A 2P4

GMLMP V3.0 has Action Levels derived in Section 3.3 (p.19) and listed in Appendix C. Corrective Actions for GMLMP V3.0 are discussed in Section 3.4 (p.20).

Water Licence reporting of CL groundwater and leachate monitoring is discussed in GMLMP V3.0 Section 5.1 (Reporting; P.22).

Post-Closure Monitoring Program (PCMP) reporting of exceedances and program modifications are discussed in GMLMP V3.0 Section 5.1 (Reporting; P.22).

GMLMP V3.0 Section 3.1.2 (p.12) includes recommendation for re-assessment of background levels on the CMC site after the CMC site is remediated to avoid incorporating un-remediated contamination into background levels.

- b) Discussion of Human Health and Environmental Risk Assessment and relative toxicity of high Dissolved Metals, including manganese, is included in CRP V1.1 Section 2.1 (p.8) and GMLMP V3.0 Section 3.1.2 (p.12).
- c) Discussion of Human Health and Environmental Risk Assessment and relative toxicity of high Dissolved Metals, including manganese, is included in CRP V1.1 Section 2.1 (p.8)

#### Request #2

Table 5.1 identifies a bunch of recommendations for groundwater monitoring wells but there are no timeframes identified and no trigger action levels identified. It is not clear what the responses to monitoring will be if results are not achieving the goal (GNWT and CCME standards). Some discussion or analysis of COPC trends compared to closure criteria from the guidelines should be provided with mitigation measure in the event closure criteria are not being met. If this information is all provided in the Groundwater Monitoring and Leachate Management Plan, a brief summary could be incorporated into section 5.2.2 with the references to that plan so it is clear that these considerations have been incorporated into the post-closure monitoring plan. If existing trends have been identified or are reported elsewhere, such as in the Water Licence Annual Report, they should also be summarized with a specific reference for the reviewer so that existing conditions can be understood with reference to final closure conditions.

#### **Response:**

CMC well inventory has been moved to GMLMP V3.0 Section 3.1.2 Table 3.1-2 (p.14). Recommendations have been removed from the well inventory table and will be forwarded, as needed, in Remedial Action Plans through GNWT-ENR to MVLWB.

#### Request #3

The Groundwater Monitoring and Leachate Management Plan provides a lot of helpful information for closure goals and how they will be measured and demonstrated. It might be helpful at the very beginning to guide the reviewer to each report since they support each other determining final closure conditions. For the analysis and monitoring of COPCs, the GMLMP says that a minimum trend can be established with a best-fit line through concentration data from two consecutive years, so two values from the same seasons can be compared. If the best-fit two-year trend-line is increasing for any single target analyte over MCLs at a well, COC monitoring can continue at a semi-annual frequency. Board staff have some concern about the proposed monitoring duration. The comparison of only 2 seasons of data may not be enough to convince the Board that conditions are actually improving. If there is



P 867.873.5263

F 867.669.5555

kblenv.com

Address

17 Cameron Road Po Box 1895 Yellowknife, NT X1A 2P4

existing data to support those trends through active remediation or another argument to support this short timeframe, it should be provided.

#### **Response:**

In the GMLMP V3.0, Figure 3.1-1 and Section 3.2, Checkpoint Landfarm (CL) operations monitoring are governed by the Water Licence; while post-closure monitoring of both the CMC and CL will be conducted after remediation.

#### Request #4

Each COPC should be identified with the applicable Guideline value being proposed for closure with rationale. This an be done in the GMLMP and/or the CRP. This will also make clear the closure criteria for the Board's and reviewer's understanding for all soil and groundwater constituents. It will also provide an opportunity to discuss site specific values where background concentrations are above guideline values. It will also provide a clear and solid basis for comparing results reported in the Water Licence Annual Report. If values change over time, the plans can be updated or a discussion can be provided in the annual report(s).

#### **Response:**

CRP V1.1 has Target Closure Levels introduced and derived in Section 5.7 g). (p. 16) and listed in Appendix C.

In the GMLMP V3.0, Figure 3.1-1 and Section 3.2, Checkpoint Landfarm (CL) operations monitoring are governed by the Water Licence; while post-closure monitoring of both the CMC and CL will be conducted after remediation.

Modifications to PCMP will be reported in Interim Post-Closure Monitoring reports, and forwarded as needed, in Remedial Action Plans through GNWT-ENR to MVLWB.

Thank you for this opportunity to be of service. Should you require any further information or have any questions or concerns, please feel free to contact us at your earliest convenience.

Respectfully Submitted,

Katie Oliver – Project Director KBL Environmental Ltd.

# Checkpoint Highway Maintenance Camp and Landfarm Closure and Reclamation Plan

Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Section





# **Closure and Reclamation Plan**

Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Section Prepared by KBL Environmental Ltd. KBL Project Number: 19-032NT V1.1

November 29, 2019

# **Table of Contents**

Plain I	Language Summary	. 4
1.0	Introduction	. 6
2.0	Background	. 7
2.1.	Checkpoint Highway Maintenance Camp	. 7
2.2.	Checkpoint Landfarm	10
2	.2.1. Water Retention Pond	10
2	.2.2. Overflow Cell	10
3.0	Applicable Licences and Regulations	11
4.0	Purpose and Scope	12
5.0	Methodology	13
5.1.	a). Closure and reclamation of the Landfarm:	13
5	.1.1. i). Final removal and disposal of treated soil	13
5	.1.2. ii). Removal of synthetic liner system, surface water retention pond / structures and berms	13
5	.1.3. iii). Underlying soil concentrations	13
5.2.	b). Closure and reclamation of the Maintenance Camp	14
5	.2.1. i). Any excavated areas	14
5	.2.2. ii). Groundwater wells	14
5	.2.3. iii). Waste disposal areas	14
5.3.	c). Closure and reclamation of any site affected by waste spills	14
5.4.	d). Target petroleum hydrocarbon concentrations for final land use	15
5.5.	e). Management of natural runoff Waters from the Project area	15
5.6.	f). Restoration of natural drainage and the restoration of stream banks at the Project	16
5.7.	g). Any potential for groundwater contamination	16
5.8. poll	h). Any facilities or areas which may have been affected by development such that potential ution problems exist	17
5.9. impl	i). A description of the phased approach to closure and reclamation and an associated lementation schedule	17
5.10	). j). Maps delineating all disturbed areas and site facilities;	18
5.11	1. k). Future land use of the site	18
5.12	2. I). A proposal identifying measures by which restoration costs will be financed by the Licence	Э
upo	n closure	18
6.0	Notice to Readers/Closure	19
7.0	References	21

# LIST OF TABLES

Table 1.0-1: Project Locations	6
Table 2.1-1: Status Summary of AECs/APECs at the Checkpoint Highway Maintenance Camp	9
Table 3.0-1: Historical Licences and Permits	11
Table 3.0-2: Literature Applicable to the Closure and Reclamation of the Checkpoint Highway Mainten         Camp and Landfarm	ance 11
Table 5.9-1: Approximate Schedule of Closure Activities for the Checkpoint Highway Maintenance Car	np 17
Table 5.9-2: Approximate Schedule of Closure Activities for the Checkpoint Landfarm	18

# **APPENDICES**

Appendix A	Maps and Drawings
Appendix B	Mackenzie Valley Land and Water Board Type A Land Use Permit (MV2017X0020) Type B Water Licence (MW2017L8-0004)
Appendix C	Checkpoint Highway Maintenance Camp Post-Closure Guidelines for Soil and Groundwater Remediation
Appendix D	Checkpoint Highway Maintenance Camp and Landfarm 2019 Remediation Work Plan

# PLAIN LANGUAGE SUMMARY

This Closure and Reclamation Plan (CRP) outlines the methodology for returning the former Checkpoint Highway Maintenance Camp (CMC) and the associated Checkpoint Landfarm (CL) to a suitable land use standard approved by the Government of the Northwest Territories, Department of Environment and Natural Resources (GNWT-ENR).

The CMC had been previously assessed for hydrocarbon contamination. Current CMC activities include phased excavation and removal of hydrocarbon-impacted soil for remediation at the CL, where the soil is treated by aeration, monitoring, and selective return or removal. Monitored soil that meets the GNWT 2003 Guideline for Contaminated Site Remediation (Guidelines) will be returned from the CL to the CMC. Soil that does respond to treatment and does not meet GNWT 2003 Guidelines will be removed to a Class II landfill for disposal.

The CRP encompasses the closure and reclamation of both the CMC and CL. The CRP addresses post closure conditions of landfarm-treated soil backfilled at the CMC, as well as ensuring no impacts remain at the CL as a result of landfarm operations.

### **Plan Revisions**

The CRP will be reviewed annually and revised when there is an operational change at either the CL or former CMC, changes to contact personnel, or as otherwise required by the Mackenzie Valley Land and Water Board (MVLWB).

### Conformity Table

Date of Revision	Document Version	Title, Section#, Page#, or Revised Sections	Summary of Changes
August 2019	V1		Draft Version
November 2019	V1.1	Section 2.1. Checkpoint Highway Maintenance Camp, (pp 6-7).	Discussion added to address total and dissolved metals in groundwater that have not met applicable guidelines at the CMC. Naturally occurring manganese, barium and arsenic discussed in terms of toxicity risk assessment from BluMetric 2017b HHERA.
		Section 5.1.1. a). i) (p. 13)	Soil Target Closure Levels introduced and discussed
		Section 5.2.2. b). ii) (p. 14)	Closure and decommissioning process for groundwater wells explained with conditions required for recommending well decommissioning
		Section 5.5 e). (p. 15)	Previous findings and natural run-off management discussed
		Section 5.6 f). (p.16)	Assessment of drainage and stream bank restoration discussed
		Section 5.7 g). (p. 16)	Groundwater Target Closure Levels derivation and discussion
		Section 5.8 h). (p.17)	Discussion of potential receptors and monitoring approach
		Section 5.9 i). (p. 17)	Closure Schedule table updated with start of closure contingent on pending remediation progress.
		Appendix C	Soil, Groundwater, and Surface Water Target Closure Levels for Post-Closure conditions

# 1.0 INTRODUCTION

The GNWT-ENR retained KBL Environmental Ltd. (KBL) to prepare a CRP for the CMC and CL (collectively referred to as the 'Sites'). This CRP outlines the conditions applying to closure and reclamation as outlined in the current water licence (MW2017L8-0004) issued by the MVLWB. The goal of closure is to return the Sites to pre-activity conditions with no impacts deemed harmful to human or environmental health as per the applicable land use definition.

This CRP has been compiled according to the KBL Technical Proposal, dated 5 March 2019, and approved by GNWT-ENR. The effective date of the CRP will be the approval date specified by the MVLWB.

The locations of the Sites are shown in Figure 1, Appendix A and listed below in Table 1-1.

Table	1.0-1:	Project	Locations

	Faci	ility
Location	Checkpoint Highway Maintenance Camp	Checkpoint Landfarm
Nearest Crossroads	0.75-kilometer (km) southwest of Highway (Hwy) 1/7 junction on Hwy 7	2.5 km northwest of Hwy 1/7 junction on Hwy 1
Latitude, Longitude	61° 26' 30" N 121° 14' 50"	61° 27' 59" N 121° 16' 12" W

The Sites are located approximately 60 kilometers south by Mackenzie Highway 1 (Hwy 1) from the Village of Fort Simpson, NT. The CMC site is approximately 12 hectares in size, bound on the northwest side by the Liard Highway (Hwy 7), and on the east side by the Jean Marie River. The CL site is located on Hwy 1, just north of the Hwy 7 junction, and within a GNWT Department of Infrastructure gravel quarry.

Government of the Northwest Territories Department of Environment and Natural Resources

# 2.0 BACKGROUND

#### 2.1. Checkpoint Highway Maintenance Camp

The CMC was originally developed as a highway maintenance camp in the 1970s by Yukon Construction Co. and Figure 2 of Appendix A displays the land use from approximately 1977, superposed with investigation data to 2012. The CMC site was later used for logging and milling operations from 1990 until 2000.

A Phase II ESA (Jacques Whitford Environmental Ltd., 2003) of the CMC concluded that petroleum hydrocarbon (PHC) and trace metal contamination were present along with scattered debris and abandoned structures. In 2003, a new Land Use Permit was issued by MVLWB for further environmental assessment and to initiate remedial activities of the CMC. Numerous historical environmental investigations have identified elevated concentrations of hydrocarbons and metals in soil and groundwater at the CMC as summarized in the *Records Review Summary Historical Environmental Investigations* (BluMetric, 2016).

A remediation plan for the CMC (EBA, 2008) outlined the landfarm (CL), which was constructed (Dillon Consulting Ltd., 2009) approximately 3 kilometers northwest of the CMC. Approximately 5900 cubic meters (m<sup>3</sup>) of soil were removed from parcel 7, approximately 300 m<sup>3</sup> from parcels 10 and 11 to the CL in 2010. As of March 2019, the GNWT-ENR estimates approximately 6200 m<sup>3</sup> of soil was contained within the CL.

Areas of Potential Environmental Concern (APECs) or Areas of Environmental Concern (AECs) at the CMC are shown on Figure 2 of Appendix A (Columbia Environmental, 2012). A Supplemental Phase III Environmental Site Assessment (ESA) of the CMC (BluMetric Environmental Inc., 2017a) characterized 10 APECs and one AEC. The current status of AECs/APECs was summarized from *Records Review Summary Historical Environmental Investigations* (BluMetric, 2016), and provided in Table 2-1 below. A Human Health and Ecological Risk Assessment (HHERA; BluMetric, 2017b) concluded there were potential surface receptors for PHC and PAH contaminants, and no current receptors for dissolved metals in groundwater. A Remediation Action Plan (RAP; BluMetric, 2017c) for the CMC identified scrap metal waste piles, remaining debris and structures as requiring risk mitigation.

As of November 2019, there are approximately 746 m<sup>3</sup> of soil remaining to be remediated in the CMC, as shown in Table 2-1. A more specific discussion of the AECs/APECs to be remediated is provided in the Remediation Work Plan (Appendix C).

The groundwater issues remaining in Table 2-1 require qualification on two bases:

<u>COCs with Total metals that do not meet applicable guidelines</u>. Previously reported (Columbia, 2012; BluMetric, 2017) total metals concentrations in groundwater include many metals that do not meet applicable guidelines and are higher than dissolved metals concentrations in groundwater. Total metals in groundwater includes metals sorbed to suspended solids with dissolved metals. High suspended solids and associated total metals have been attributed (BluMetric, 2017) to low productivity wells CPS-1, MW-2, and CPS-9, where insufficient water sample volumes required total metals analyses on unfiltered samples. High suspended solids do not indicate natural groundwater flow conditions and may indicate well construction compromised by cold-weather installation, silted up wells, or the non-natural agitated state for groundwater during purging and sampling.

Post-closure monitoring of the CMC monitoring wells will include provisions for decommissioning or replacing dry and low-productivity wells, as described further in Section 5.2.2. The Groundwater Monitoring and Leachate Management Plan (GMLMP) V3.0 outlines responses to guideline exceedances and reporting requirements.

<u>Dissolved Phase metals do not meet guidelines</u>. Previous reporting on the CMC (Columbia, 2012; BluMetric 2017) had explained that dissolved phase metals may not meet guidelines near areas of PHC contamination due to the reducing conditions created by PHC contamination. Naturally occurring metals, such as arsenic, barium, manganese, and selenium in saturated soils, will solubilize locally with the reducing anoxic conditions created where PHC contamination occurs in groundwater (Golder, 2013). As PHCs are removed and treated in the remediation program at CMC, the reducing conditions will be removed, and dissolved metals are expected to precipitate back to their natural state.

Manganese has been the most frequently observed (10 of 24 monitoring wells) dissolved constituent that does not meet applicable guidelines in CMC monitoring wells, however, the average historical dissolved manganese concentration of 0.0379 mg/L from three upgradient background monitoring wells: MW-3, MW-4, and MW16-4, met the 0.05 mg/L guideline. The Health Canada Drinking Water Guideline (2017) of 0.05 mg/L is an aesthetic objective based on taste and laundry staining considerations, as manganese does not have a maximum allowable contaminant level for humans. A Human Health and Environment Risk Assessment (HHERA; BluMetric 2017b) found that manganese and barium in groundwater on the CMC site presented a toxicity risk to plants and invertebrates that contacted the groundwater table. The net risk was deemed minimal and Site-Specific Target Levels (SSTLs) were not required for manganese and barium.

A Human Health and Environment Risk Assessment (HHERA; BluMetric 2017b) found that naturally occurring arsenic in groundwater may not meet applicable guidelines at the CMC and required a toxicity risk assessment. The HHERA (BluMetric, 2017b) found an SSTL of 0.0317 mg/L for arsenic vs. a residential parkland guideline of 0.005 mg/L (Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, 2012).

Closure levels for groundwater COC concentrations at the CMC are further discussed in Section 5.7.

### Table 2.1-1: Status Summary of AECs/APECs at the Checkpoint Highway Maintenance Camp

Parcel	AEC/APEC Identification	Issues of Environmental Concern	Current Status (as of latest version)
6	P6-APEC 1 Former portable sawmill trailer camp – diesel power units	Potential Contaminants of Concern (PCOCs) assessed included Petroleum Hydrocarbons (PHC); Benzene, Toluene, Ethylbenzene, total Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs)	PCOC in soil < CCME Residential Land Use guidelines (Guidelines); Mn in groundwater > CCME Guidelines
7	P7-APEC 1 Former Maintenance Garage / Fuel Storage & Distribution	PCOCs assessed included PHC, BTEX, PAHs	Ni, As in soil > CCME Guidelines; Mn in groundwater > CCME Guidelines
7	P7-APEC 2 Temporary Hazardous Waste Storage Area	PCOCs assessed included PHC, BTEX, PAHs, metals	PHC, BTEX, PAHs > CCME Guidelines; 40 m <sup>3</sup> soil to be excavated and treated
7	P7-APEC 3 Former Surface Dump	PCOCs assessed included PHC, BTEX, PAHs, metals, Volatile Organic Compounds (VOCs)	PCOC in soil < CCME Guidelines; Al, As, Ba, Fe, Mn, Zn in groundwater > CCME Guidelines
7	P7-APEC 4 Suspect MWP Fuel Storage Area	PCOCs assessed included PHC, BTEX, PAHs	PCOC in soil < CCME Guidelines
8	P8-APEC 1 Residential Trailer ASTs	PCOCs assessed included PHC, BTEX, PAHs	PCOC in soil < CCME Guidelines
8	P8-APEC 2 Camp Generator	PCOCs assessed included PHC, BTEX, PAHs	PCOC in soil < CCME Guidelines
8	P8-APEC 3 Camp Septic Pits	PCOCs assessed included PHC, BTEX, metals, VOCs	PHC, PAHs in soil > CCME Guidelines; <5 m <sup>3</sup> soil to be excavated and treated
8	P8-APEC 4 Fill of Unknown Source	PCOCs assessed included PHC, PAHs, metals	PCOC in soil < CCME Guidelines
9	P9-APEC 1 Former Camp Fuel Tanks	PCOCs assessed included PHC, BTEX, PAHs	PHC in soil > CCME Guidelines; <1 m <sup>3</sup> soil to be excavated and treated; toluene in groundwater > CCME Guidelines
10\11	P10/11-AEC1 Dump/Landfill	PCOCs assessed included PHC, BTEX, PAHs, metals	Soil to be excavated and treated: BH1/TP1 – PHC, PAH in soil > CCME Guidelines; 300 m <sup>3</sup> soil to be excavated and treated TP7/TP9 - PHC, PAH in soil < CCME Guidelines; 200 m <sup>3</sup> soil to be excavated and treated TP 23 - PHC, PAH in soil > CCME Guidelines; 200 m <sup>3</sup> soil to be excavated and treated TP 13 - PAH in soil > CCME Guidelines; Minimal

### 2.2. Checkpoint Landfarm

The CL was constructed (Dillon Consulting Ltd., 2009) at a GNWT Department of Infrastructure quarry and is designed for the biotreatment of soil impacted by petroleum hydrocarbons (PHC). Soil removed from the CMC has been treated at the CL for PHC aeration and oxidation.

The CL is shown in Figure 3 of Appendix A and includes:

- One constructed engineered cell (80 m x 112 m) to store and treat PHC contaminated soil;
- One engineered retention pond (22 m x 22 m) designed for the storage leachate and precipitation; and
- One engineered overflow cell that is designed to discharge liquid water to the receiving environment and receive water from the retention pond in the event of a 1 in 25-year rainfall event.

Prior to receipt on-site, contaminated soil must be profiled by sampling and analysis to assess landfill suitability and for treatment. Soil meeting acceptance criteria (Schedule 1 of MVLWB Water Licence MV2017L8-0004) is deposited into the biotreatment pad, which is then treated by tilling and fertilizer application, as necessary.

Once the bioremediation process has been given adequate time, soil is sampled to confirm if it meets discharge/beneficial re-use guidelines of the CMC. Soil not meeting beneficial re-use criteria would be hauled off site for disposal at an approved facility, such as a Class II landfill in Alberta.

The 2009 placement of approximately 6200 m<sup>3</sup> soil has been treated, met applicable guidelines and is currently stockpiled at the CMC for backfill, pending completion of further remedial excavation in the P10/11 area.

#### 2.2.1. Water Retention Pond

The general slope of the CL directs water runoff and snow melt to the water retention pond. Water samples are collected and submitted for laboratory analysis for parameters outlined in the water licence before it is discharged to the environment. Water not meeting discharge criteria (Effluent Quality Criteria; MV2017L8-0004, Appendix B) would be hauled off site for disposal at an appropriate facility.

#### 2.2.2. Overflow Cell

The overflow cell has been engineered and designed to store excess volumes of contaminated snow/water in the event the water retention pond becomes full or there is not enough freeboard to maintain safe storage of contaminated media. Prior to the discharge of any water that has been stored in the overflow cell or water retention pond, GNWT ENR ensures that the water is tested to meet applicable discharge requirements (Effluent Quality Criteria; MV2017L8-0004, Appendix B).

Semi-annual monitoring results of the Water Retention Pond, Overflow Cell, and associated monitoring wells have met MV2017L8-0004 Effluent Quality Criteria for PHC and total metals from 2017 through 2019. Post-closure monitoring of the CL will involve monitoring dissolved metals.

# 3.0 APPLICABLE LICENCES AND REGULATIONS

Historical licences and permits for the Sites are listed in Table 3-1. GNWT ENR has conducted activities in accordance with the various land use permits and water licences. The current land use permit, MV2017X0020, and water licence, MV2017L8-0004 (both provided in Appendix B), specify the operational requirements for the CL and CMC. The mitigation measures, monitoring plans, and quality assurance/quality control (QA/QC) planning for the Surveillance Network Program (SNP) are presented in the CMC and CL Operations and Maintenance Plans, Groundwater Monitoring and Leachate Plans, Waste Management Plan and Spill Contingency Plan.

#### Table 3.0-1: Historical Licences and Permits

Authorization	Permit or Licence No.
Land Use Permit (2003-2010)	MV2003X0031
Land Use Permit (2010-2017)	MV2010X0007
Water Licence (2010-2017)	MV2010L8-0003
Land Use Permit (2017-current)	MV2017X0020
Water Licence (2017-current)	MV2017L8-0004

Table 3-2 lists the applicable regulatory documents related to facility closure and reclamation.

# Table 3.0-2: Literature Applicable to the Closure and Reclamation of the Checkpoint Highway Maintenance Camp and Landfarm

Entity	Literature
Mackenzie Valley Land and Water Board (MVLWB)	Type A Land Use Permit, 7 June 2017 (Appendix B)
Mackenzie Valley Land and Water Board (MVLWB)	Type B Water Licence, 7 June 2017 (Appendix B)
	NWT Environmental Protection Act (EPA), 1988
Government of the Northwest Territories (GNWT)	NWT Waters Act, 2016
GNWT Ministry of Environment and Natural Resources	Environmental Guideline for Contaminated Site Remediation (CSR), 2003
Canadian Council for Ministers of the Environment	Canadian Environmental Quality Guidelines – Water Quality Guidelines for the Protection of Aquatic Life, 2014; Canadian Soil Quality Guidelines for Protection of Environmental and Human Health (downloaded as of 2019) Canadian Soil Quality Guidelines - Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs; 2010)
Federal Contaminated Sites Action Plan	Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils, 2013 (per Operations and Maintenance Manual of MVLWB Type B Water Licence); Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, 2012

# 4.0 PURPOSE AND SCOPE

The purpose of this CRP is to outline the methodology for closure and reclamation of the CMC and CL, and to return the sites to a suitable land use standard approved by the GNWT. The CRP addresses post closure conditions of landfarm-treated soil backfilled at the CMC, as well as ensuring no impacts remain at the CL as a result of landfarm operations.

While the CMC previously operated as a highway maintenance facility it is expected the land will be reclaimed to parkland condition, therefore GNWT 2003 Guideline for CSR Parkland/Residential guidelines apply. In the event COCs are not governed by the GNWT 2003 Guideline, CCME guidelines will be used as discussed in Table 3-2. The CL site is currently within a GNWT Department of Transportation quarry and will also be assessed and reclaimed to parkland condition (nearest receptor).

The information requirements for the CRP are arranged as per the water licence (MV2017L8-0004, Appendix B) Part H, item 1, as follows:

- a) Closure and reclamation of the Landfarm:
  - i. Final removal and disposal of treated soil;
  - ii. Removal of synthetic liner system, surface water retention pond / structures and berms;
  - iii. Underlying soil concentrations.
- b) Closure and reclamation of the CMC:
  - i. Any excavated areas
  - ii. Groundwater wells
  - iii. Waste disposal areas
- c) Closure and reclamation of any site affected by waste spills
- d) Target petroleum hydrocarbon concentrations for final land use;
- e) Management of natural runoff Waters from the Project area;
- f) Restoration of natural drainage and the restoration of stream banks at the Project;
- g) Any potential for groundwater contamination;
- h) Any facilities or areas which may have been affected by development such that potential pollution problems exist;
- i) A description of the phased approach to closure and reclamation and an associated implementation schedule;
- j) Maps delineating all disturbed areas and site facilities;
- k) Future land use of the site; and
- I) A proposal identifying measures by which restoration costs will be financed by the Licencee upon closure.

# 5.0 METHODOLOGY

#### 5.1. a). Closure and reclamation of the Landfarm:

#### 5.1.1. i). Final removal and disposal of treated soil

According to the MV2017L8-0004 water licence for the CL, CMC soil re-use criteria (Part F item 21) are derived from GNWT, 2003, *Environmental Guidelines for Contaminated Site Remediation* and largely match the CCME Canadian Soil Quality Guidelines for Protection of Environmental and Human Health (downloaded as of 2019). For consistency with treatment criteria, the CMC Soil Closure Target Levels detailed in Appendix C, will be derived from the same Federal and GNWT soil re-use criteria. A background metals study (BluMetric, 2017) found elevated levels of manganese and arsenic, however, all metals in the study met Federal and GNWT soil quality guidelines. Using the maximum background level +25% for arsenic resulted in Soil Closure Target Level (14 mg/kg) that was higher than Federal and GNWT soil quality guidelines (12 mg/kg).

In the event soil cannot be treated to meet applicable criteria, it will be transported under federal manifest and disposed at an approved facility.

# 5.1.2. ii). Removal of synthetic liner system, surface water retention pond / structures and berms

Remaining water in the retention pond and overflow cells (SNP 2017-1a and 2a) will be sampled as per the water licence SNP. Water meeting water licence effluent quality criteria will be discharged to SNP 2017-1b and 2b and sampled during the discharge process as per SNP requirements. Water exceeding effluent quality criteria will be transported under federal manifest and disposed at an approved facility.

Once treated soil and water has been removed from the CL, liner material overlaying the geomembrane liner and berm material will be tested with 15 composite samples and compared to applicable guidelines (Table 3-2). Tested liner and berm material will then be segregated on the geomembrane into stockpiles of soil that can be re-used at the landfarm, and soil that needs to be disposed at an approved Class II facility.

Thereafter the geomembrane liner will be inspected for deficiencies. The location of deficiencies will be recorded using a global positioning system. The geomembrane liner will then be removed and transported for disposal at an approved facility. The underlying soil will be inspected for visual staining. Location of visual staining will be recorded using a global positioning system for further assessment.

# 5.1.3. iii). Underlying soil concentrations

Soil samples will be collected from areas identified (by staining and liner integrity) below the liner. A minimum of 15 samples were budgeted for post-closure CL soil assessment. Results will be compared to CMC Soil Closure Target Levels detailed in Appendix C. Soil underlying the landfarm that exceeds applicable criteria will be excavated and transported off-site for treatment or disposal at an approved facility. Sampling will be conducted at vertical and lateral extents of the excavated areas to confirm all impacted soil was removed.

### 5.2. b). Closure and reclamation of the Maintenance Camp

#### 5.2.1. i). Any excavated areas

Excavated areas will be backfilled with treated soil that meets CMC Soil Closure Target Levels (Appendix C) from the CL.

#### 5.2.2. ii). Groundwater wells

For closure and reclamation of groundwater wells, the known groundwater wells on the CMC are summarized in the most current version of the Groundwater Monitoring and Leachate Management Plan (GMLMP). Summary data in the GMLMP includes well specifications, approximate water levels, rationale of the monitoring location, and constituents of concern.

To address how wells will be decommissioned during post closure monitoring, the CMC well network will be evaluated for decommissioning or replacing wells, guided by the implementation of a long-term monitoring optimization (LTMO) flow chart in the latest version of the GMLMP.

New and functioning wells will be monitored during post-closure for a minimum of two (2) years or four (4) monitoring sessions, prior to LTMO evaluation. Wells that are not functional (dry), previously undocumented, damaged, or have monitored COCs that all meet guidelines will be recommended for decommissioning or replacement as they are found.

Recommendations for decommissioning or replacing wells from the post-closure monitoring programs of the CMC post-closure monitoring program will be discussed in Remedial Action Plans for the CMC site; while recommendations for the optimizing the licenced CL monitoring program will be included in Annual Water Licence Reports. Annual Water Licence Report or Remedial Action Plan recommendations will be carried out with MVLWB approval.

Decommissioning will be conducted by backfilling with bentonite (or similar) from bottom to surface and then the well casing will be removed to a depth of approximately one meter below ground surface with the resulting void filled with bentonite.

#### 5.2.3. iii). Waste disposal areas

Former Waste disposal areas have had approximately 6200 m<sup>3</sup> of soil reported as removed from the CMC for treatment at the CL, while approximately 746 m<sup>3</sup> of additional soil is estimated to require removal, as of November 2019 and summarized in Table 2-1. Closure and Reclamation will involve backfilling these areas with treated soil that meets Soil Closure Target Levels.

Any remaining industrial surface refuse will be transported for disposal to an approved facility off-site. Surface debris removals are discussed in detail in the Remedial Work Plan (Appendix C).

#### 5.3. c). Closure and reclamation of any site affected by waste spills

Areas of known waste spills at the CMC and CL will be addressed in the Remedial Work Plan (RWP) provided in Appendix C. New spills during site closure work will be inspected for visual staining and recorded using a global positioning system for immediate reporting to GNWT-ENR and further assessment. If staining is observed, a sample grid will be established, and a sampling plan will be developed, and soil samples will be collected from areas that are visibly stained for parameters as per water licence (MV2017L8-0004, Appendix B) Schedule 1. Samples will be submitted for laboratory analysis of COCs. If soil COCs at the CMC exceed Target Closure Levels (Appendix C), the impacted soil will be excavated and transported to the CL.

Spills that occur after the CL has been closed, and impact soil to the extent that it does not meet Soil Closure Target Levels (Appendix C) will be excavated and transported for treatment or disposal at an approved offsite facility. Sampling will be conducted at vertical and lateral extents of the excavated areas to confirm all impacted soil was removed.

### 5.4. d). Target concentrations for Constituents of Potential Concern in final land use

Soil Closure Target Levels are provided in Appendix C.

The target concentrations are derived from Federal and GNWT soil quality guidelines. The potential receptors at the CMC site include Ecological Contact with soil, Freshwater Aquatic Life in the Jean Marie River, and Residential land use. Unadjusted Tier 1 levels from Federal and GNWT soil quality guidelines were used to incorporate the lowest of all three potential receptors. A background metals study (BluMetric, 2017) found elevated levels of manganese and arsenic off-site, however, all metals in the study met Federal and GNWT soil quality guidelines. Using the maximum background level +25% for arsenic resulted in a Soil Closure Target Level (14 mg/kg) that was higher than Federal and GNWT soil quality guidelines (12 mg/kg). Maximum background baselines from the CMC site were not applied to PAH/PHC contamination.

Groundwater Closure Target Levels for the CMC are provided in Appendix C and discussed further in Section 5.7

#### 5.5. e). Management of natural runoff Waters from the Project area

The ground surfaces at the CMC are generally coarse-grained and well-drained. Ponded water has not been observed at the CMC site, except in the CMC P10/11 excavation, which currently extends below the groundwater table. The excavation is bermed to limit natural water inflows. Ponded water within the CMC P10/11 excavation will be sampled and analyzed in comparison to water license Effluent Quality Criteria (MV2017L8-0004, Appendix B) and reported to the Water Resource Officer prior to discharge.

Exposed soil on the Jean Marie River access paths near P8-APEC 2, was observed in 1980s historical aerial photographs of the CMC (BluMetric 2017a). Currently those access paths have 0.5 m to 1 m high vegetative cover and further natural run-off water management is not planned for the former paths.

Monitoring of the Jean Marie River surface water is summarized below:

- 1. Historical testing of surface water from Jean Marie River along the CMC shoreline in 2011 (Columbia, 2012) found that concentrations of BTEX and PHC in surface water were not detectable and the detection limits all met applicable guidelines. All metals, except and iron, mercury, and manganese met applicable guidelines in 2011.
- 2. Historical testing of surface water from Jean Marie River along the CMC shoreline in 2016 (BluMetric, 2017a) found that concentrations of BTEX, PHC, PAH in surface water were not detectable and the detection limits all met applicable guidelines. All metals, except iron met applicable guidelines in 2016.
- 3. Recent testing of surface water from Jean Marie River along the CMC shoreline in 2019 (KBL, 2019a)

found that concentrations of BTEX, PHC, PAH in surface water were not detectable and the detection limits all met applicable guidelines. All metals met applicable guidelines in 2019.

Monitoring surface water in the Jean Marie River upstream and downstream of the CMC will be located and conducted as per the locations listed in the latest version of the GMLMP.

If sampled/analyzed surface water COCs exceed specified closure levels (Appendix C), Corrective Actions may include:

- Report the discharge to the NWT 24-Hour Spill Report Line at (867) 920-8130;
- Take all reasonable measures to stop the discharge and repair any damage; and
- Make a reasonable effort to notify affected public.

#### 5.6. f). Restoration of natural drainage and the restoration of stream banks at the Project

The CMC is in a cleared area with a less than 1% easterly slope towards the Jean Marie River, where the embankment grades at 10% to 20% for a total of 3 metres (m) to 7 m over 30 m to the river level. Aerial photos of the Jean Marie River embankment (shown in Figures 3a, 3b, 3c of BluMetric, 2017a) show it is forested with faint arcuate scarping and slumping on both sides of the river. Comparing historical aerial photos from the BluMetric 2016 Records Review Summary with recent aerial photos, does not show consistent narrowing of the Jean-Marie River near the remedial excavation of the CMC.

Exposed and potential erosional surfaces at the CMC appeared on river access pathways in aerial photographs from 1977 through 1996 and may have raised concerns regarding potential erosion. Currently those access paths have 0.5 m to 1 m high vegetative cover and further stream bank restoration is not planned for the former paths.

Upon confirmation the CMC and CL meet remediation criteria, the sites will be re-graded to match the elevation of immediate neighboring general topography and approximately restore drainage patterns present prior to remediation and monitoring activities. Specifically, the CMC site will be regraded by backfilling remedial excavations to the original surrounding grade (approximately 1% eastwards) with treated soil.

Reclamation of the CL will depend on potential continued operation of the nearby Highway Maintenance quarry. During closure of the CL, if excavation of soil underlying the landfarm's current footprint is required, the excavation will be reclaimed back to surrounding grade

# 5.7. g). Any potential for groundwater contamination

Monitoring and sampling of the CMC monitoring wells and the CL site Surveillance Network Program (SNP) groundwater wells will occur biannually (summer and fall) for a minimum two years after closure, as per the latest version of the GMLMP.

Federal and GNWT guidelines have been chosen as Closure Levels and Target Concentrations as the CMC has two wells (MW-4 and MW-5) where all dissolved phase COCs meet Federal and GNWT guidelines. Where there are no applicable guidelines a maximum baseline + 25% was chosen. As discussed in Section 2.1, arsenic has a SSTL of 0.0317 mg/L, derived from a toxicity risk assessment (HHERA; BluMetric, 2017b)

of previous soil, groundwater, surface water, and sediment data from the CMC.

Manganese may not meet guidelines after remediation, as historical monitoring in 2011 and 2016 (BluMetric 2017) reported that dissolved manganese did not meet guidelines in 10 of 25 monitoring wells. As discussed in Section 2.1, the guidelines for manganese are based on aesthetic objectives rather than toxicity risk, so SSTLs were not developed (BluMetric, 2017b) for manganese.

# 5.8. h). Any facilities or areas which may have been affected by development such that potential pollution problems exist

The closest facility which may have been affected by the historical CMC, or the current CL, is the gas station and motel (Facility) at the Highway 7/1 junction. This facility is located approximately 800 m downstream of the CMC, along the Jean Marie River. Monitoring of the Jean Marie River surface water near the CMC is summarized in Section 5.5 e) of this plan. Historical constituents of concern include dissolved iron, manganese, and mercury. BTEX, PHC, and PAH have not been detected in previous surface water sampling during remediation (BluMetric, 2017b).

The CL is approximately 2500 m northwest of the CMC and the Jean Marie River.

Surface water monitoring in the Jean Marie River will be conducted upstream and downstream of the CMC as per the latest version of the GMLMP (KBL, 2019b) and help assess potential impacts to down-stream receptors.

# 5.9. i). A description of the phased approach to closure and reclamation and an associated implementation schedule

The approximate schedules provided in Tables 5-1 and 5-2 below assume soil treatment has been completed. The commencement of closure will depend on remedial treatment progress. The schedules also assume a minimum of two (2) years, or (4) sessions, of post-closure monitoring, with monitoring term extensions in the event that COCs keep increasing or remain above applicable guidelines.

# Table 5.9-1: Approximate Schedule of Closure Activities for the Checkpoint HighwayMaintenance Camp

Activity		Y	1			Y	2			Y	3	
Activity	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Water removal from excavated CMC areas												
Backfill of CMC with treated soil from CL												
Site grading												
Final Site Remediation report												
Post closure CMC groundwater well sampling												
Remedial Action Plan (with CMC well updates)												
Confirmation CMC groundwater sampling meets guidelines												
CMC groundwater well decommissioning												

## Table 5.9-2: Approximate Schedule of Closure Activities for the Checkpoint Landfarm

		Y	′1			Y	2			Y	3	
Activity	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Remove treated soil to CMC for backfill												
Inspect liners for defects												
Remove and dispose of liners and equipment												
Step out soil sampling												
Contaminated soil removal as needed												
CL backfilling and re-grading as necessary												
Final Site Remediation report												
SNP groundwater sampling												
Annual Water Licence Report (with CL-SNP updates)												
CL groundwater well decommissioning												

Note:

The vertical red bars in Tables 5-1 and 5-2 indicate an assumed time-closure boundary for remediation. CL soil treatment depends on remediation progress. Land Use permit expires 6 June 2022; while Water licence expires 6 June 2024, to be closed pending GNWT-ENR approval of remaining treatment progress and MVLWB approval of Closure and Reclamation report.

#### 5.10. j). Maps delineating all disturbed areas and site facilities;

At the completion of remedial activities, updated site drawings and figures will be completed showing all disturbed areas where soil or infrastructure were removed, with the as-built surface after final grading.

#### 5.11. k). Future land use of the site

The future land use of the CMC and CL is Residential/Parkland.

# 5.12. A proposal identifying measures by which restoration costs will be financed by the Licencee upon closure.

The Licencee is GNWT-ENR and restoration costs will be financed by the department as allocated by budget expenditure of the Government of the Northwest Territories. Final restoration costs will be contingent on remediation outcomes and final backfill volumes.

Some soil may not respond to treatment and require off-site disposal to an approved facility. Rip rap from the discharge points in the CL can be tested for re-use as aggregate in the gravel quarry on the same CL site. Topsoil previously salvaged at the CMC will be spread over the reclamation area with a mean thickness of at least 40% of that observed in undisturbed areas of the CL lease. If this is not attainable due to topsoil loss, a plan for monitoring restoration or salvaging additional topsoil will be developed. Revegetation of the site will rely on propagules from within the stockpiled topsoil and surrounding site. GNWT-ENR can provide a more suitably informed proposal for restoration costs upon closure of CL operations and backfill of the CMC and CL sites.

# 6.0 NOTICE TO READERS/CLOSURE

This work plan has been prepared and the work referred to in this work plan has been undertaken by KBL Environmental Ltd. (KBL) for the exclusive use of Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Sector who has been party to the development of the scope of work and understands its limitations. The methodology, findings, conclusions and recommendations in this work plan are based solely upon the scope of work and subject to the time and budgetary considerations derived in the documents which constitute the proposal and/or contract pursuant to which this work plan was issued.

The findings, conclusions and recommendations in this work plan have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area and reflect KBL's best judgement based on information available at the time of preparation of this work plan. No other warranties, either expressed or implied are made as to the professional services included in this work plan.

The findings and conclusions contained in this work plan are valid only as of the date of this work plan and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, the conditions of the Site or intended use of the Site change, or applicable standards are amended, modifications to this work plan may be necessary. KBL cannot be responsible for the use of this work plan or portions thereof unless KBL is requested to review and, if necessary, update the work plan. The results of the work herein should in no way be construed as a warranty that the subject Site is free from any and all contamination.

Any soil and rock descriptions in this work plan and associated logs, notes or drawings have been made with the intent of providing general information on the subsurface conditions of the Sites. This information should not be used as geotechnical data for any purpose unless specifically addressed in the text of this work plan. If referenced, groundwater, vapour or other subsurface conditions refer only to those observed at the location and time of observation noted in this work plan. This work plan must be read in whole, as sections taken out of context may be misleading. KBL cannot be responsible for the use of portions of the work plan without reference to the entire work plan. If discrepancies occur between the preliminary (draft) and final versions of this work plan, it is the final version that takes precedence. Nothing in this work plan is intended to constitute or provide a legal opinion.

The contents of this work plan are confidential and proprietary. Other than by the client, copying or distribution of this work plan or use of or reliance on the information contained herein in whole or in part, is not permitted without the express consent of the Client and KBL. Any use, reliance on, or decision made by a third party based on this work plan is the sole responsibility of such third party. KBL accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this work plan.

Government of the Northwest Territories Department of Environment and Natural Resources Checkpoint Highway Maintenance Camp and Landfarm Closure and Reclamation Plan

Prepared and Submitted by



Robert TerBerg, M.Sc., P.Geol. Project Manager KBL Environmental Ltd.

P	ERMIT TO PRACTICE	
Signati	re Prober Ver Berg	_
Date _	Jan 21 2020.	
PE	RMIT NUMBER: P 110 /NU Association of Professiona	7

# 7.0 REFERENCES

- BluMetric<sup>™</sup> Environmental Inc. (BluMetric), 2016, *Records Review Summary Historical Environmental Investigations at Checkpoint Remediation Site – Jean Marie River, Monitoring and Remedial Action Plan Update,* Project Number 160547.
- BluMetric, 2017a, Supplemental Phase III Environmental Site Assessment (ESA) at Checkpoint Highway Maintenance Site, Project Number 160547.
- BluMetric, 2017b, Human Health and Ecological Risk Assessment at Checkpoint Highway Maintenance Site, Project Number 160547.
- BluMetric, 2017c, Remediation Action Plan Checkpoint Highway Maintenance Site, Project Number 160547.
- Canadian Council for Ministers of the Environment (CCME), 2014, Canadian Environmental Quality Guidelines – Water Quality Guidelines for the Protection of Aquatic Life.
- CCME, 2010, Canadian Soil Quality Guidelines Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs).
- CCME, downloaded as of 2019, Canadian Soil Quality Guidelines for Protection of Environmental and Human Health, (<u>http://st-ts.ccme.ca/en/index.html</u>).
- Columbia Environmental, 2012, Supplemental Phase III Environmental Site Assessment Former Checkpoint Highway Camp (SM 049), Junction of Highways 1 And 7, Fort Simpson, Northwest Territories, Project No. 11-0394.
- Dillon Consulting Ltd., 2009, Checkpoint Landfarm Construction- Construction Summary 2009, file 08-9639-1010.
- EBA Consulting, 2008, Remedial Action Plan (RAP), Former Checkpoint Site, Junction of Highway 1 and 7.
- Federal Contaminated Sites Action Plan, 2012, *Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites*, November 2012.
- Federal Contaminated Sites Action Plan, 2013, *Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils*.
- Golder Associates, 2013, *Modelling Study of Iron and Manganese in Groundwater,* Society of Contaminated Sites Approved Professionals of BC, File No. 1214360089-001-R-Rev0.
- Government of the Northwest Territories (GNWT) Ministry of Environment and Natural Resources, 2003, *Guideline for Contaminated Site Remediation.*
- GNWT, 1988, NWT Environmental Protection Act (EPA).

GNWT, 2016, NWT Waters Act (EPA).

- Indigenous and Northern Affairs Canada, 2001, (Draft) Phase II ESA of *Former Checkpoint Highway* Maintenance Facility, Junction of Highways 1 and 7.
- Jacques Whitford Environmental Ltd., 2003, *Phase II Environmental Site Assessment Former Checkpoint Highway Maintenance Facility, Junction of Highways 1 and 7*, Project NTY71024.
- KBL Environmental, 2019a, Checkpoint Remediation and Landfarm Monitoring Jean Marie River Surface Water Assessment, November 20.
- KBL Environmental, 2019b, Groundwater Monitoring and Leachate Management Plan Checkpoint Highway Maintenance Camp, V.3.0.
- Kohl, P. M., and S. J. Medlar, 2006, *Occurrence of Manganese in Drinking Water and Manganese Control*, American Water Works Research Foundation.

# **APPENDIX A**

Maps and Drawings







# Date: File name:

21-AUG-19	LH	GNWT Environment and Natural Resources
me: 17-061_17LFM-B.dwg	Approved: DRAFT	CHECKPOINT LANDFARM, NT

Figure:

2





# Mackenzie Valley Land and Water Board

Type A Land Use Permit and Type B Water Licence



June 7, 2017

File: MV2017X0020

Mr. Dave Abernethy Government of the Northwest Territories Department of Environment and Natural Resources PO Box 1320 YELLOWKNIFE NT X1A 2L9

Email: Dave\_Abernethy@gov.nt.ca

Dear Mr. Abernethy:

### Issuance of Type A Land Use Permit Miscellaneous, Checkpoint Remediation Project

Attached is Type A Land Use Permit MV2017X0020 (Permit) granted by the Mackenzie Valley Land and Water Board (MVLWB or the Board) in accordance with the *Mackenzie Valley Resource Management Act* (MVRMA). The Permit has been approved for a period of five years commencing June 7, 2017 and expiring June 6, 2022.

Based on the evidence provided, the Board has also confirmed that the Application is exempt from preliminary screening as per Schedule 1, Paragraph 2 of the Exemption List Regulations of the MVRMA which states:

A development, or part thereof, for which renewal of a permit, licence or authorization is requested that

- a) Has not been modified; and
- b) Has fulfilled the requirements of the environmental assessment process established by the *Mackenzie Valley Resource Management Act, the Canadian Environmental Assessment Act* or the *Environmental Assessment Review Process Guidelines Order*.

Please read all conditions carefully. For the purpose of submitting plans in accordance with this Permit, the date of this letter, June 7, 2017 is the date of commencement.

The Board hereby approves the Spill Contingency Plan as submitted as an Environmental Health and Safety Plan and Emergency Response and Spill Contingency Plan on April 13, 2017.

The Board hereby approves the Engagement Plan as submitted, on an interim basis, and requires revisions and resubmission **by July 7, 2017**. as indicated. Revisions should be in accordance with the conditions of Permit MV2017X0020, with the Board's *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits,* and to reflect commitments made to reviewer comments and recommendations as outlined in the attached Review Summary Table (specifically GNWT-ENR), for written confirmation of conformity from Board staff.

The Board has denied the Waste Management Plan as submitted and requires a resubmission of a revised version of the Plan by **July 7**, **2017**, for Board approval, to conform with the Board's *Guidelines for Developing a Waste Management Plan*. The Waste Management Plan should be a stand-alone document providing a summary of the project, project location, site features, identification of the applicant, and a description of the project scope, goals, and objectives with regard to applicable regulatory, social and environmental considerations. The Board's *Guidelines for Developing a Waste Management Plan* (2011) require that a Waste Management Plan also include details on the following:

- Waste types requiring management including a description of waste characteristics, source of generation, volume/mass estimates, and potential environmental effects;
- Waste management planning for each waste type including the plans for handling, storing, processing, collecting, sorting, transporting, treatment and disposal as well as a rationale to support the chosen management method(s); and
- Details on waste management infrastructure. For this project, this would include or refer to details on the landfarm design, capacity, management, monitoring, operations, and any contingencies. Some of this information has been provided in other plans provided with the application.
- Please also consider additional details and any commitments identified in the Review Summary Table (attached).

All revised plans, programs, studies and manuals shall be accompanied by a brief summary of the changes made (i.e. a conformity table) as outlined in Part B, item 5 of the Licence.

Should you wish to discontinue your land-use operation at any time prior to the date of expiry set out in the Permit, a written notice of discontinuance is required as per section 37 of the Mackenzie Valley Land Use Regulations, in addition to the submission of a final plan.

A copy of this Permit and all related correspondence and documents have been filed on the Public Registry at the MVLWB office. Please be advised that this letter, with its attached procedures, inspection reports, and related correspondence form part of the Public Registry which is intended to keep all interested parties informed of the manner in which the Permit requirements are being met. All Public Registry material will be considered if an amendment to the Permit is requested. The full cooperation of Government of the Northwest Territories Department of Environment and Natural Resources is anticipated and appreciated. If you have any questions or concerns, please contact Shannon Allerston at (867) 766-7458 or email sallerston@mvlwb.com.

Yours sincerely,

PC Kau

Mavis Cli-Michaud MVLWB, Chair

Copied to: Distribution List Jarret Hardisty, Dehcho Region, Government of the Northwest Territories

Attached: Land Use Permit MV2017X0020 Review Summary Table Reasons for Decision

#### Land Use Permit



Permit Class	Permit No	Amendment No
А	MV2017X0020	

Subject to the Mackenzie Valley Land Use Regulations and the terms and conditions in this Permit, authority is hereby granted to:

Government of the Northwest Territories – Department of Environment and Natural Resources

Permittee

to proceed with the land use operation described in the Application of:

Signature	Date			
Mr. Dave Abernathy	April 13, 2017			
Type of Land Use Operation				
Miscellaneous				
Location				
Checkpoint (1 km south and west of Hwy #1 and 7 intersection)				

This Permit may be assigned, extended, discontinued, suspended, or cancelled pursuant to the Mackenzie Valley Land Use Regulations.

Dated at	Yellowknife	this	7	day of	June	_ , _	2017	
Signature Chair		Sign	Signature Witness					
Mavis Cli-Michaud			Amanda Gauthier					
Commencement Date June 7, 2017			Exp Jun	oiry Date ne 6, 2022				

#### ATTENTION

It is a condition of this Permit that the Permittee comply with the provisions of the *Mackenzie Valley Resource Management Act* and Regulations and the terms and conditions set out herein. A failure to comply may result in suspension or cancellation of this Permit.

#### Conditions Annexed to and Forming Part of Land Use Permit # MV2017X0020

#### Part A: Scope of Permit

- 1. This Permit entitles the Permittee to conduct the following land-use operation:
  - a) Care and maintenance, remediation, monitoring, and decommissioning activities at the former Checkpoint Highway Maintenance Facility and Landfarm including:
    - a. Installation of groundwater monitoring wells; and
    - b. Use of equipment;
- 2. This Permit is issued subject to the conditions contained herein with respect to the use of land for the activities and area identified in Part A, item 1 of this Permit.
- 3. Compliance with the terms and conditions of this Permit does not excuse the Permittee from its obligation to comply with the requirements of any applicable Federal, Territorial, Tłįchǫ, or Municipal laws.

Part B: Definitions (defined terms are capitalized throughout the Permit)

Act - the Mackenzie Valley Resource Management Act.

Board - the Mackenzie Valley Land and Water Board established under Part 4 of the Act.

Borehole - a hole that is made in the surface of the ground by drilling or boring.

**Engagement Plan** - a document, developed in accordance with the Board's *Engagement and Consultation Policy* and the *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, that clearly describes how, when, and which engagement activities will occur with an affected party during the life of the project.

#### Flowing Artesian Well - a well in which water:

- a) Naturally rises above the ground surface or the top of any casing; and
- b) Flows naturally, either intermittently or continuously.
- **Fuel Storage Container** a container for the storage of petroleum or allied petroleum products with a capacity of less than 230 litres.
- **Fuel Storage Tank** a closed container for the storage of petroleum or allied petroleum products with a capacity of more than 230 litres.
- **Greywater** all liquid wastes from showers, baths, sinks, kitchens, and domestic washing facilities but not including toilet wastes.
- Habitat the area or type of site where a species or an individual of a species of wildlife naturally occurs or on which it depends, directly or indirectly, to carry out its life processes.

**Inspector** - an Inspector designated by the Minister under the Act.

**Minister** - the Minister of Indian Affairs and Northern Development Canada or the Minister of the Government of the Northwest Territories – Department of Lands, as the case may be.
**Ordinary High Water Mark** - the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands, or marine environments, it refers to those parts of the Watercourse bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs, this refers to normal high operating levels (full supply level).

Permittee - the holder of this permit.

**Secondary Containment** - containment that prevents liquids that leak from Fuel Storage Tanks or containers from reaching outside the containment area and includes double-walled Tanks, piping, liners, and impermeable barriers.

Sewage - all toilet wastes and Greywater.

- **Spill Contingency Plan** a document, developed in accordance with Aboriginal Affairs and Northern Development Canada's *Guidelines for Spill Contingency Planning* (April 2007, that describes the set of procedures to be implemented to minimize the effects of a spill.
- **Sump** a man-made pit or natural depression in the earth's surface used for the purpose of depositing Waste that does not contain Toxic Material, such as non-toxic Drilling Waste or Sewage, therein.
- **Toxic Material** any substance that enters or may enter the environment in a quantity or concentration or under conditions such that it:
  - a) Has or may have an immediate or long-term harmful effect on the environment or its biological diversity;
  - b) Constitutes or may constitute a danger to the environment on which life depends; or
  - c) Constitutes or may constitute a danger in Canada to human life or health.
- **Waste** any garbage, debris, chemical, or Toxic Material to be used, stored, disposed of, or handled on land, and also as defined in section 51 of the Act.
- **Waste Management Plan** a document, developed in accordance with the Board's *Guidelines for Developing a Waste Management Plan*, that describes the methods of Waste management from Waste generation to final disposal.
- **Watercourse** a natural body of flowing or standing water or an area occupied by water during part of the year, and includes streams, springs, swamps and gulches but does not include groundwater.

**Part C: Conditions Applying to All Activities** (headings correspond to subsection 26(1) of the Mackenzie Valley Land Use Regulations)

	Condition 26(1)( <i>a</i> ) Location and Area	Category
1.	The Permittee shall not conduct any part of the land-use operation within 300 metres of any privately owned or leased land or structure, unless otherwise authorized in writing by the Board.	PRIVATE PROPERTY
2.	Prior to the commencement of drilling, the Permittee shall submit the drill target locations on a 1:50,000-scale map with coordinates and map datum to the Board and an Inspector.	DRILL LOCATIONS
3.	The Permittee shall not conduct this land-use operation on any lands not designated in the complete application.	LOCATION OF ACTIVITIES
4.	Prior to the commencement of the land-use operation, the Permittee shall accompany an Inspector during an inspection of the proposed land use area.	INSPECT LOCATIONS
	26(1)( <i>b</i> ) Time	
5.	At least 48 hours prior to the commencement of the land-use operation, the Permittee's Field Supervisor shall contact an Inspector at (867) 695-2626.	CONTACT INSPECTOR
6.	At least 48 hours prior to commencement of the land-use operation, the Permittee shall provide the following information, in writing, to the Board and an Inspector:	IDENTIFY AGENT
	<ul> <li>a) the name(s) of the person(s) in charge of the field operation;</li> <li>b) alternates; and</li> <li>c) all methods for contacting the above person(s).</li> </ul>	
7.	At least ten days prior to the completion of the land-use operation, the Permittee shall advise an Inspector of:	REPORTS BEFORE REMOVAL
	<ul><li>a) the plan for removal or storage of equipment and materials; and</li><li>b) when final cleanup and reclamation of the land used will be completed.</li></ul>	
8.	The Board, for the purpose of this operation, designates March 31, as spring break-up.	SPRING BREAK-UP
	26(1)( <i>c</i> ) Type and Size of Equipment	
9.	The Permittee shall not use any equipment except of a similar type, size, and number to that listed in the complete application.	ONLY APPROVED EQUIPMENT
	26(1)( <i>d</i> ) Methods and Techniques	
10.	Prior to the expiry date of this Permit, the Permittee shall replace all excavated material, unless otherwise authorized in writing by an Inspector.	EXCAVATED MATERIAL
	26(1)( <i>e</i> ) Type, Location, Capacity, and Operation of All Facilities	
11.	The Permittee shall ensure that the land use area is kept clean at all times.	CLEAN WORK AREA

12.	The Permittee shall not locate any Sump within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector.	SUMPS FROM WATER
	26(1)(f) Control or Prevention of Ponding of Water, Flooding, Erosion, Slides, and Subsidence of Land	
13.	The land-use operation shall not cause obstruction to any natural drainage.	NATURAL DRAINAGE
14.	The Permittee shall minimize erosion by installing erosion control structures as the land-use operation progresses.	PROGRESSIVE EROSION CONTROL
15.	The Permittee shall, where flowing water from a Borehole is encountered:	FLOWING ARTESIAN
	<ul><li>a) plug the Borehole in such a manner as to permanently prevent any further outflow of water; and</li><li>b) immediately report the occurrence to the Board and an Inspector.</li></ul>	WELL
16.	The Permittee shall not conduct off-road vehicle travel in areas without snow-covered surfaces.	OFF-ROAD VEHICLE TRAVEL
17.	The Permittee shall prepare the site in such a manner as to prevent rutting of the ground surface.	PREVENTION OF RUTTING
18.	The Permittee shall suspend overland travel of equipment or vehicles at the first sign of rutting.	SUSPEND OVERLAND TRAVEL
19.	The Permittee shall not ford wet streams.	NO FORDING OF STREAMS
20.	The Permittee shall slope the sides of Waste material piles, excavations, and embankments — except in solid rock — to a minimum ratio of 2:1 vertical, unless otherwise authorized in writing by an Inspector.	EXCAVATION AND EMBANKMENTS
21.	The Permittee shall not remove vegetation or operate heavy equipment within 100 metres of the Ordinary High Water Mark of any Watercourse.	WATERCOURSE BUFFER
22.	The Permittee shall not excavate land within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector.	EXCAVATE NEAR WATERCOURSE
	26(1)(g) Use, Storage, Handling, and Ultimate Disposal of Any Chemical or Toxic Material	
23.	The Permittee shall maintain a record of all spills. For all reportable spills, in accordance with the GNWT <i>Spill Contingency Planning and Reporting Regulations</i> , the Permittee shall:	REPORT SPILLS
	<ul> <li>a) immediately report each spill to the 24-hour Spill Report Line (867) 920-8130;</li> <li>b) report each spill to an Inspector within 24 hours; and</li> <li>c) submit, to the Board and an Inspector, a detailed report on each spill within 30 days.</li> </ul>	
24.	The Permittee shall dispose of all Toxic Material as described in the approved Waste Management Plan.	WASTE CHEMICAL DISPOSAL

25.	The Permittee shall dispose of all combustible Waste petroleum products by removal to an approved disposal facility.	WASTE PETROLEUM DISPOSAL
26.	When drilling within 100 metres of the Ordinary High Water Mark of any Watercourse, and when drilling on ice, the Permittee shall contain all drill water and Drilling Waste in a closed circuit system for reuse, off-site disposal, or deposit into a land-based Sump or natural depression.	DRILLING NEAR WATER OR ON ICE
27.	The Permittee may deposit Drilling Waste that does not contain Toxic Material in a Sump or natural depression. Any Sumps or natural depressions used to deposit Drilling Waste must be located at least 100 metres from the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector.	DRILLING WASTE
28.	The Permittee shall not allow any Drilling Waste to spread to the surrounding lands or Watercourses.	DRILLING WASTE CONTAINMENT
	26(1)( <i>h</i> ) Wildlife and Fish Habitat	
29.	The Permittee shall take all reasonable measures to prevent damage to wildlife and fish Habitat during this land-use operation.	HABITAT DAMAGE
	26(1)(i) Storage, Handling, and Disposal of Refuse or Sewage	
30.	The Permittee shall adhere to the <b>Waste Management Plan</b> , once approved, and shall annually review the plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval.	WASTE MANAGEMENT
31.	The Permittee shall keep all garbage and debris in a secure container until disposal.	GARBAGE CONTAINER
32.	The Permittee shall dispose of all garbage, Waste, and debris as described in the approved Waste Management Plan, unless otherwise authorized in writing by an Inspector.	REMOVE GARBAGE
33.	The Permittee shall dispose of all Sewage and Greywater as described in the approved Waste Management Plan.	SEWAGE DISPOSAL – PLAN
	26(1)(j) Protection of Historical, Archaeological, and Burial Sites	
34.	The Permittee shall not operate any vehicle or equipment within 150 metres of a known or suspected historical or archaeological site or burial ground.	ARCHAEOLOGICAL BUFFER
35.	The Permittee shall not knowingly remove, disturb, or displace any archaeological specimen or site.	SITE DISTURBANCE
36.	The Permittee shall, where a suspected archaeological or historical site, or burial ground is discovered:	SITE DISCOVERY AND NOTIFICATION
	<ul> <li>a) immediately suspend operations on the site; and</li> <li>b) notify the Board at (867) 669-0506 or an Inspector at (867) 695-2626, and the Prince of Wales Northern Heritage Centre at 767-9347 ext. 71250 or ext. 71251.</li> </ul>	

# 26(1)(k) Objects and Places of Recreational, Scenic, and Ecological Value

# Intentionally left blank

# 26(1)(/) Security Deposit

RESPONSIBILITY FOR REMEDIATION COSTS	All costs to remediate the area under this Permit are the responsibility of the Permittee.	37.
	26(1)(m) Fuel Storage	
FUEL NEAR WATER	The Permittee shall not place any Fuel Storage Containers or Tanks within 100 metres of the Ordinary High Water Mark of any Watercourse, unless otherwise authorized in writing by an Inspector.	38.
SECONDARY CONTAINMENT – REFUELING	The Permittee shall set up all refueling points with Secondary Containment.	39.
FUEL CONTAINMENT	The Permittee shall not allow petroleum products to spread to surrounding lands or Watercourses.	40.
MAXIMUM FUEL ON SITE	The Permittee shall have a maximum of 500 litres of fuel stored on the land use site at any time, unless otherwise authorized in writing by the Board.	41.
SPILL CONTINGENCY PLAN	The Permittee shall adhere to the <b>Spill Contingency Plan</b> , once approved, and shall annually review the plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval.	42.
SPILL RESPONSE	Prior to commencement of the land-use operation the Permittee shall ensure that spill-response equipment is in place to respond to any potential spills.	43.
DRIP TRAYS	All equipment that may be parked for two hours or more, shall have a haz-mat/drip tray under it or be sufficiently diapered. Leaky equipment shall be repaired immediately.	44.
CLEAN UP SPILLS	The Permittee shall clean up all leaks, spills, and contaminated material.	45.
	26(1)(n) Methods and Techniques for Debris and Brush Disposal	
BRUSH DISPOSAL/ TIME	Prior to the expiry date of this Permit, the Permittee shall progressively dispose of all brush and trees and shall complete all brush disposal.	46.
MINIMIZE AREA CLEARED	The Permittee shall not clear areas larger than identified in the complete application.	47.
	26(1)( <i>o</i> ) Restoration of the Lands	
PRE-CONSTRUCTION PROFILES	All areas affected by construction or removal activities shall be stabilized and landscaped to their pre-construction profiles, unless otherwise authorized in writing by	48.

an Inspector.

49.	The Permittee shall dispose of all overburden as instructed by an Inspector.	DISPOSAL OF OVERBURDEN
50.	The Permittee shall store overburden and use it to recontour the site after operations are complete, unless otherwise authorized in writing by an Inspector.	SAVE AND PLACE ORGANIC SOIL
51.	Prior to the expiry date of this Permit, the Permittee shall level all stockpiles of granular material located within the land use area.	NO STOCKPILES
52.	Prior to the expiry date of this Permit, the Permittee shall complete all cleanup and restoration of the lands used.	FINAL CLEANUP AND RESTORATION
53.	Prior to the expiry date of this Permit, the Permittee shall prepare the site in such a manner as to facilitate natural revegetation.	NATURAL VEGETATION
54.	The Permittee shall carry out progressive reclamation of disturbed areas as soon as it is practical to do so.	PROGRESSIVE RECLAMATION
	26(1)( <i>p</i> ) Display of Permits and Permit Numbers	
55.	The Permittee shall keep a copy of this Permit on hand at all times during this land-use operation.	COPY OF PERMIT
	26(1)(q) Biological and Physical Protection of the Land	
56.	Within 30 days of issuance, the Permittee shall submit a revised Waste Management Plan in accordance with MVLWB's 2011 <i>"Guidelines for Developing a Waste Management Plan"</i> to the Board for approval.	SUBMIT REVISED PLAN
57.	If any plan is not approved by the Board, the Permittee shall revise the plan according to the Board's direction and re-submit it to the Board for approval.	RESUBMIT PLAN
58.	The Permittee shall adhere to the <b>Engagement Plan</b> , once approved, and shall annually review the plan and make any necessary revisions to reflect changes in operations or as directed by the Board. Revisions to the plan shall be submitted to the Board for approval.	ENGAGEMENT PLAN
59.	All revised plans submitted to the Board shall include a brief summary of the changes made to the plan.	SUMMARY OF CHANGES



# **Reasons for Decision**

Issued pursuant to paragraph 40(2)(c) of the *Mackenzie Valley Land Use Regulations* (MVLUR) and section 72.25 of the *Mackenzie Valley Resource Management Act* (MVRMA)

Type A Lan Use Permit and Type B Water Licence Application			
Preliminary Screener MVLWB			
Reference/File Number MV2017X0020 and MV2017L8-0004			
Applicant         Government of the Northwest Territories – Department of			
Environment and Natural Resources			
Project Checkpoint Remediation Project – Checkpoint, NT			

## Decision from Mackenzie Valley Land and Water Board Meeting of

June 7, 2017

With respect to Applications MV2017X0020 and MV2017L8-0004, notice was given in accordance with sections 63 and 64 of the *Mackenzie Valley Resource Management Act* (MVRMA) and section 43 of the *Waters Act*. There was no public hearing held in association with these applications.

### 1.0 <u>Background</u>

The Checkpoint Remediation Project consists of the following activities:

- 1) Removal of the remaining surficial non-hazardous waste debris and hydrocarbon impacted contaminated soils at the former Checkpoint Highway Maintenance Camp (Checkpoint); and
- 2) Treatment of hydrocarbon contaminated soils, monitoring, and decommissioning of the Checkpoint Landfarm Treatment Facility (Checkpoint Landfarm).

The Checkpoint site is located approximately 1 km south of the Highway 1 and Highway 7 intersection in the Dehcho Area. The Checkpoint Landfarm is located at KM 414 of Highway 1.

### Checkpoint Highway Maintenance Camp

In 2002, a Phase II Environmental Site Assessment (ESA) was completed at Checkpoint and concluded the site was contaminated with petroleum hydrocarbons and metals. In 2003, Land Use Permit MV2003X0031 was issued by the Board to initiate remediation of the site. Under previous authorizations, buried waste and debris from Checkpoint was excavated, sorted, and stored on-site. This waste had been determined to be non-hazardous and non-leaching.

In October 2016, a Supplemental Phase III ESA was conducted to delineate the impacts and determine the current environmental conditions at Checkpoint. A draft version of this report was included with the Applications; this also includes recommendations for site remediation.

The following land-based activities are proposed to be carried out at the Checkpoint site:

- Installation of environmental groundwater monitoring wells to delineate contaminant plumes and re-test groundwater, and to monitor groundwater quality and flow towards the Jean Marie River;
- Removal of remaining surficial debris and stockpiled metals left by GNWT Department of Transportation to an approved off-site location (to be determined);
- Removal of contaminated soils identified during the 2016 Supplemental Phase III ESA and transportation to the Checkpoint Landfarm;
- Backfilling of excavations with approved material; and
- Soil and surface water monitoring to ensure site conditions have stabilized or are improving.

A draft Remedial Action Plan provides more information on remediation and monitoring activities.

#### Checkpoint Landfarm Treatment Facility

The Checkpoint Landfarm was constructed in 2009 and construction drawings and specifications were included with the Applications. Soils will be sifted to remove rocks and tilled to promote remediation to meet the residential/parkland criteria in the Canada Wide Standards for Petroleum Hydrocarbons. Currently, there are no completed guidelines for the development of land treatment facilities in the NWT. Federal guidelines have been referenced to help identify and assess potential impacts, risks and mitigations associated with the construction and operation of this proposed facility. Nutrients may be added to facilitate remediation, if required. Approved materials will be used to backfill excavations at the Checkpoint site or used at other approved locations.

The GNWT-ENR has constructed a lined retention pond in one corner of the Landfarm that has the capacity to retain precipitation from a 1 in 25 year, 24-hour duration rainfall event. If enough runoff accumulates, it will be tested based on requirements in the Water Licence and discharged to a sump approximately 30 metres north of the facility. The sump is composed of a non-woven geotextile overlain with boulder rip rap for erosion control and velocity reduction that gently slopes towards adjacent vegetation. If the Licence parameters are not met, the water will be pumped into an on-site tank and reapplied to the landfarm during dry periods. The retention pond will be annually discharged in the fall, if required, to prepare for the subsequent spring melt. Snow will be managed to minimize the effects of spring freshet.

A Landfarm Operations and Maintenance Manual and a Groundwater Monitoring and Leachate Management Plan were included in the Applications. Four groundwater monitoring wells are planned, one upgradient and three downgradient of the Landfarm. The Landfarm will be monitored on an annual basis from June until November, and after freshet and major precipitation events. Precise locations of the groundwater monitoring wells will be reflected in the Surveillance Network Program (SNP).

Once all contaminated soils are remediated the Landfarm will be decommissioned. A Final Remediation Report, including a Record of Site Condition, will be submitted to the Board. This will include removal of Landfarm berms, liners and ponds and grading to blend the topography with adjacent land.

Other infrastructure and equipment include:

- Two tracked dozers;
- Backhoe;
- Loader;
- Tandem truck;
- Tanker truck;
- Water pump; and.
- Drill.

Equipment re-fueling activities will utilize a 500 L portable tidy tank.

There is no camp associated with this operation.

## 2.0 <u>Public Review</u>

On April 13, 2017, Land Use Permit and Water Licence Applications were received by the Board and distributed for review. An extension to the initial reviewer comment deadline of May 4, 2017 was provided to May 19, 2017 in response to an extension request from Liidlii Kue First Nation. Comments and recommendations on the Applications were received from six reviewers:

- Dehcho First Nation;
- Environment and Climate Change Canada;
- GNWT ENR (no comments);
- GNWT Lands Department;
- GNWT Lands Inspector; and
- Board staff.

GNWT-ENR responded on May 24, 2017.

### 3.0 <u>Decision</u>

The Board is satisfied that:

- the project has been screened pursuant to the MVRMA;
- any potential adverse environmental effects are insignificant or mitigable with known technology; and
- the project is not likely to be a source of public concern.

After reviewing the submission of the Applicant, the written comments received by the Board and the June 7, 2017 Staff report prepared for the Board, the Board, having due regard to the facts and circumstances, the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA and the *Waters Act* and Regulations made thereunder, has determined that Land Use Permit MV2017X0020 and Water Licence MV2017L8-0004 be issued subject to the terms and conditions contained therein. The Board's reasons for this decision are as follows:

- The use of water and/or deposit of waste proposed by the Applicant is of a nature contemplated by the MVRMA and the *Waters Act*.
- The use of land proposed by the Applicant is of a nature contemplated by the MVRMA.

- The Board is satisfied that adequate consultation has been conducted and that advice has been sought and considered in accordance with sections 63 and 64 of the MVRMA.
- There are no existing Land Use Permits or Water Licences overlapping the project area in accordance with paragraph 26(5)(*a*) of the *Waters Act*.
- There were no claims for compensation in accordance with paragraph 26(5)(*b*) of the *Waters Act* and no significant or unmitigable public concern was made known to the Board.
- It is the opinion of the Board that the conditions attached to MV2017X0020 and MV2017L8-0004, pursuant to the MVRMA and the *Waters Act*, will prevent or mitigate any potential environmental impacts which might result from the project, from water use and/or deposit of waste.
- The Board is satisfied that compliance with the Licence conditions and effluent quality standards set in the Licence are consistent and will ensure that waste produced by DIAND-CARD will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's Water and Effluent Quality Management Policy in accordance with paragraph 26(5)(c).
- The Board is satisfied that the Licensee (the Government of the Northwest Territories) is able to meet any, or all, financial obligations set out in the MVRMA and the Licence in accordance with paragraph 26(5)(*d*).
- The Board has notified the Applicant, through a statement included in the scope of this Licence, that compliance with the term and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of any other legislation.

The scope of the Permit and Licence ensures the Proponent is entitled to conduct activities which have been applied for. In setting out the scope of the Permit and Licence, the Board endeavoured to provide enough detail to describe the authorized activities, but not so much detail that GNWT-ENR's activities would be unduly restricted. The Board included a list of defined terms used in the Permit and Licence in order to ensure a common understanding of conditions and to avoid future differences in interpretation. Where appropriate, the definitions use wording similar to that found in Permits and Licences recently issued by the Board.

Land Use Permit MV2017X0020 has been updated based on the Application, reviewer comments, previous authorizations for the proposed project, and to reflect the appropriate conditions from the Board's standard list.

Water Licence MV2017L8-0004 has been updated to better reflect standard requirements for landfarming activities required in more recent authorizations for similar projects in the region. Details on the Water Licence requirements are provided below.

Part B of the Licence applies to matters regarding compliance and conformity with the MVRMA and *Waters Act*, and, with the exception of references to project-specific plans, is consistent with standard conditions found in previous Licences issued by the Board. This section addresses conformity and compliance with plans, submission timelines, revisions, and format of the SNP and the Schedules which are annexed to and form part of the Licence. This section also addresses signage, measuring devices, public engagement requirements, and annual water licence reporting. The Board has been informed by GNWT-ENR that updates to the ESA and Remedial Action Plan are forthcoming and that a Human Health and Ecological Risk Assessment is planned.

Part B, item 5 requires GNWT-ENR to make all necessary updates to plans, programs, studies and manuals affected by the updates. All revised plans, programs, studies and manuals shall be submitted to the Board, for approval, at least 60 days, unless otherwise specified, prior to implementing any proposed updates or changes in the approved plan, program, study or manual, and shall be accompanied by a brief summary of the changes made.

Part B, item 10 outlines the requirements for the Annual Water Licence Report. The purpose of the Annual Water Licence Report is to provide the Board and reviewers with a summary of activities that have occurred on-site during the previous year. These summaries include volumes of soil and water (moved, treated and deposited), engagement activities, summary of works/maintenance completed onsite, summaries of all monitoring data, and anticipated activities for the following year. Any updates to the Remedial Action Plan should also be included. Annual Water Licence Report requirements are intended to provide clarity for the submission of information summaries already being captured through existing plans and programs and are not meant to be onerous.

Part B, item 13 requires the submission of a Human Health and Ecological Risk Assessment to be submitted during the term of the Licence; once submitted, GNWT-ENR should act as per the Assessment. Similarly, Part B, item 15 requires the submission of the Remedial Action Plan, once it is completed. Any updates to the Assessment or Remedial Action Plan should be provided in the Annual Water Licence Report required by Part B, item 11; such updates may affect other management plans required by the Licence and would therein also require updates. The Human Health and Ecological Risk Assessment and Remedial Action Plan are submissions committed to by the GNWT-ENR in their Applications and are not for Board approval.

Part C of the Licence applies to water use. As indicated in the application, water use is not required for this project.

Part D of the Licence contains conditions related to construction activities at the site. These conditions ensure that engineered structures are built to appropriate standards, and require the submission of design and engineering reports.

Part E of the Licence contains conditions applying to modification of structures and facilities associated with the Project. All conditions in Part E are standard conditions consistent with recently issued Licences. These conditions are in place to ensure changes to the project are within the scope of the applications and with the notification and approval, as appropriate, of the Inspector and/or the Board.

Part F, items 1 and 2 describe the overall objectives of the Licence as they apply to the management of waste and water for the Project. Part F, items 3, 4, 5, and 6 outline the requirements for resubmission of the Waste Management Plan and Groundwater Monitoring and Leachate Management Plan. Part F, items 7-12 pertain to the operation and maintenance of the Landfarm facility as well as the requirements for resubmission of the Operations and Maintenance Manual. Manual requirements are based on applicable guidelines, where available, requirements from similar operations, and have been developed in response to reviewer comments and recommendations.

Part F, items 13-15 and Schedule 1 outline the conditions and criteria for soil acceptance to the Landfarm. The acceptance criteria were reviewed during the Application review process and are similar to other authorizations recently issued for Landfarm operations by the Board (i.e. Water Licence MV2016L8-0007 issued to Carter Industries Ltd.).

Part F, item 16 is a condition from the previous Licence MV2010L8-0003 that outlines the steps to be taken prior to discharging water from the Landfarm. Part F, item 17 outlines the effluent quality criteria (EQC) that must be met prior to discharging any water from the Landfarm. EQC for the discharge of Water were proposed in the Licence Application and were derived from the *CCME Water Quality Guidelines for Protection of Aquatic Life*. During the review of the Water Licence Application, GNWT-ENR stipulated that discharge criteria for nutrients be included in the EQC. EQC for nitrate and nitrite and some metals and hydrocarbons were derived from the *Guidance Document of Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites* (November 2012). These discharge criteria are similar to other authorizations issued by the Board (e.g. MV2014L1-0005, MV2016L8-0007) for other soil treatment operations. EQC set out in the Licence are consistent with the Board's *Water and Effluent Quality Management Policy* and will protect the receiving waters and environment.

Part F, item 18 requires notification of the Inspector upon exceedance of any EQC. Part F, items 19-20 stipulate the volume of Waste that may be discharged from the Landfarm (1,000 m<sup>3</sup>/day and 3,000 m<sup>3</sup>/year). These volumes were extrapolated from previous project annual reports to reflect the maximum volumes of discharge that could be expected.

Soil reuse criteria (Part F, item 21) are derived from the *Environmental Guidelines for Contaminated Site Remediation, Government of the Northwest Territories (November 2003).* Soil sampling requirements (Part F, items 22 and 23) were proposed in the review of the draft water licence and are similar to other authorizations recently issued for Landfarm operations by the Board (i.e. Water Licence MV2016L8-0007 issued to Carter Industries Ltd.).

Part G of the Licence contains conditions applying to spills, unauthorized discharges, and emergency response actions for the Project. The purpose of this part is to ensure that the Licensee is fully prepared to respond to spills and unauthorized discharges. This will ensure that any spills or unauthorized discharges are effectively controlled and cleaned up, with the goal of preventing or limiting damage to the receiving environment. All conditions in Part H are standard conditions consistent with recently issued Licences.

Part H of the Licence requires the submission of a Closure and Reclamation Plan to address the aspects of site reclamation and a Final Remediation Report if the facility is closed and remediated.

Annex A of the Licence contains conditions applying to the SNP. SNP locations monitor groundwater around the perimeter of the Landfarm and water meant for discharge from the Landfarm. Stations include:

SNP Station	Description
2009-1	MW1 – Northern corner of the Landfarm near the retaining
	pond/Sump at 61° 28' 02" N and 121° 16' 12" W
2009-2	MW2 – Northeastern corner of the retaining pond/Sump at 61° 28' 00"
	N and 121° 16' 10" W
2009-3	MW3 – Western edge of the Landfarm at 61° 27′ 58″ N and 121° 16′
	17" W
2009-4	MW4 – Eastern corner of the Landfarm 61° 27' 59" N and 121° 16' 09"
	W
2017-1a	Monitors retention Waters in the Retention Pond prior to discharge.

2017-1b	Monitors retention Waters from the Retention Pond at the point of discharge.
2017-2a	Monitors retention Waters in the Overflow Pond prior to discharge.
2017-2b Monitors retention Waters from the Overflow Pond at the point	
	discharge.

The Board is satisfied that compliance with the Licence conditions will ensure that waste produced by GNWT-ENR will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's *Water and Effluent Quality Management Policy*.

A term of five years was specifically identified by the GNWT-ENR in its Application. Based on the above, the Board has decided to approve a term of seven years for Water Licence MV2016L8-0007 to align with the maximum term allowed for the Land Use Permit.

Land Use Permit MV2017X0020 and Water Licence MV2016L8-0007 contain provisions that the Board feels necessary to ensure and monitor compliance with the MVRMA and the *Waters Act* and the Regulations made thereunder and to provide appropriate safeguards in respect of the Applicant's use of the waters and/or deposit of waste affected by the Licence.

SIGNATURE

Mackenzie Valley Land and Water Board

June 7, 2017

Date

Mavis Cli-Michaud, Chair

## **Review Comment Table**

Board:	MVLWB		
Review Item:	GNWT-ENR - Checkpoint Highway Maintenance Camp and Landfarm - MV2017X0020 and MV2017L8-0004		
File(s):	MV2017l8-0004 MV2017X0020		
Proponent:	GNWT - ENR		
Document(s):	Checkpoint LUP & WL Application Cover Page (334.6 kB) Checkpoint Land Use Permit Application (2 MB) Checkpoint Water Licence Application (612.7 kB) Checkpoint Project Summary (402.7 kB) Checkpoint Spill Contingency Plan (10.5 MB) Checkpoint Waste Management Plan (192.5 kB) Checkpoint Engagement Plan (182.3 kB) Checkpoint Engagement Log (1.9 MB) Checkpoint O&M Manual (Landfarm) (2.2 MB) Checkpoint Landfarm Drawings (734.1 kB) Checkpoint Landfarm Technical Specifications (2.9 MB) Checkpoint Groundwater Monitoring and Leachate Management Plan (1.7 MB) Checkpoint DRAFT Phase III ESA (31.9 MB) Checkpoint DRAFT Remedial Action Plan (1.6 MB) DRAFT Type B Water Licence (200 kB) DRAFT Land Use Permit Conditions (183.2 kB)		
Item For Review Distributed On:	Apr 13 at 16:40 Distribution List		
Reviewer Comments Due By:	May 19, 2017		
Proponent Responses Due By:	May 24, 2017		
	<ul> <li>**UPDATE: May 5, 2017: Extension request to the reviewer comment deadline received on May 4, 2017 from the Liidlii Kue First Nation. Extension granted, as requested to May 19, 2017. All reviewers are granted this same extension, if required.</li> <li>**UPDATE: April 28, 2017: Any notices of application of water compensation should be submitted to the ORS by the comment deadline (May 4, 2017).</li> <li>**UPDATE April 19, 2017 - DRAFT Type B Water Licence available for Review**</li> <li>The Government of the Northwest Territories Department of Environment and Natural Resources (GNWT-ENR) has submitted an Application for a Type A Land Use Permit and a Type B Water Licence to the Mackenzie Valley Land and Water Board (MVLWB). The purpose of the Application is to continue care and maintenance, remediation, monitoring and decommissioning activities at the former Checkpoint Highway Maintenance Camp and Landfarm located approximately 1 km south of the HWY #1 and HWY #7 intersections, near Fort Simpson. Previous operations were authorized under permits MV2003X0031 and</li> </ul>		

	MV2010X0007 and licence MV2010L8-0003. The proponent is requesting a five year term.
	Reviewers are invited to submit questions, comments, and recommendations using the Online Review System (ORS) by the review comment deadline specified below. Please provide comments and recommendations on the:
	<ul> <li>Application Forms;</li> <li>Project Summary;</li> <li>Engagement Plan and Record;</li> <li>Waste Management Plan;</li> <li>Landfarm O&amp;M Manual;</li> <li>Spill Contingency Plan;</li> <li>Groundwater Monitoring and Leachate Management Plan;</li> <li>Draft Phase III ESA Report;</li> <li>Draft Remedial Action Plan;</li> <li>Preliminary Screening considerations; and</li> <li>Draft Land Use Permit (please clearly indicate which condition(s) you are commenting on).</li> </ul>
	Please note that the draft Permit has been developed using the MVLWB's current Standard Land Use Permit Conditions Template. The purpose of this draft is to allow parties to comment on Board staff's suggested conditions. These draft materials are not intended to limit in any way the scope of parties' comments. The Board is not bound by the contents of the draft Permit and will make its decision at the close of the proceeding on the basis of all evidence filed by all parties. All documents that have been uploaded to this review are also available on our public registry. If you have any questions or comments about the ORS or this
	In addition to the email distribution list, the following organizations received
General Reviewer Information:	<ul> <li>Fort Liard Metis Local #67 - Ernie McLeod, President (867)770-4573;</li> <li>Fort Simpson Métis Local #52 - Marie Lafferty, President (867)695-2040;</li> <li>Hay River Metis Council - Karen Lafferty, President (867)874-4472;</li> <li>NWT Metis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586;</li> </ul>
Contact Information:	Jen Potten 867-766-7468 Shannon Allerston 867-766-7458

## **Comment Summary**

Deho	Dehcho First Nations: Carrie Breneman					
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis		
1	Extension Request	<b>Comment (doc)</b> See letter. <b>Recommendation</b> See letter.	May 23: (doc) GNWT, ENR and the Contaminated Sites Section has reviewed the letter and has no concerns.	Noted.		
2	Elevated arsenic levels	Comment Slightly elevated arsenic samples were found at the site (14 mbgs) as opposed to the CCME standard of (12 mbgs). Recommendation DFN requests that soil with elevated arsenic be transported to the Tervita Disposal site in Fort Nelson and not be used in landfarming operation as this soil does not meet CCME Guidelines.	May 24: The groundwater data collected in the fall of 2016 is not the greatest quality because at the time the water table was very low and there was difficulty getting sufficient volumes for full samples. There was a lot of turbidity in the samples and many could not be filtered in the field due to low volumes. Thus the reported concentrations are total metals (higher concentrations) and are not directly comparable to the CCME/FCSAP groundwater guidelines which are for dissolved concentrations. There were recommendations throughout Phase III Environmental Site Assessment and DRAFT Remedial Action Plan suggesting that another round of GW sampling be completed in the spring when water tables are higher, at which time we can properly develop and sample all the wells on site. Additional monitoring would be incorporated into a future monitoring program and remedial activities at the site. With respect to arsenic in soil: A detailed HHERA we completed for the site, in 2017, including exposure to arsenic and is presently under	Adequate response. Board staff recommend that GNWT-ENR should make it clear what, if any, remedial activities are proposed to deal with the high arsenic concentrations in soil if future sampling provides the same or similar results in an update to the Waste Management Plan. Schedule 1, item 1 of the Draft Water Licence does not allow for the acceptance of soils with arsenic concentrations greater than 12 mg/kg. Updates to the Risk Management Plan are required to be reported in each Annual Report, where applicable.		

			internal GNWT review. ENR anticipates making this information available as soon as the review is complete, hopefully by the end of June, 2017. The one arsenic exceedance from TP31 is not within the proposed hydrocarbon excavation zones at the site and thus would not be moved to the landfarm anyways.	
3	Engagement Plan	Comment DFN has reviewed the Engagement Plan for the Checkpoint Highway Maintenance Camp and Landfarm. Recommendation In the engagement plan, DFN requests that GNWT-DOT add the following: If there is a spill that requires reporting to the spill hotline, the GNWT-ENR will contact local communities (Jean Marie River and Fort Simpson) and DFN. The GNWT-ENR will follow-up annually with JMRFN, LKFN and DFN regarding the progress made at the site. GNWT-ENR will provide a summer site visit with JMRFN, LKFN and DFN regarding work being completed at the site.	May 23: GNWT-ENR, Contaminated Sites agrees to the recommendatioins noted. ENR will advise the JMRFN, LKFN and the DFN regarding dates and times that Contaminated Sites staff visit the site to coordinate efforts for a site visit sometime this summer.	Adequate response. Board staff recommend that GNWT-ENR should submit an updated Engagement Plan to reflect these commitments.
4	Remediation time and determination that remediation is complete	<b>Comment</b> DFN has reviewed the LUP and the overall purpose of the landfarm is to remediate hydrocarbon contaminated soils. <b>Recommendation</b> How many years will it take to remediate soils at the site? How does GNWT-ENR determine that the site is no longer contaminated? How many samples are taken per volume of soil to make that determination?	May 24: The number of years expected to remediate soils at the site will depend on the effectiveness of the landfarm management. Increased efforts have been applied since ENR acquired the original LUP and WL from the (then) GNWT, Department of Transportation. The hydrocarbon sample results from soils in the landfarm, to date, are close to industrial guidelines. It's anticipated additional treatment will have most of the soils ready for	Adequate response. Board staff recommend that GNWT-ENR should outline sampling requirements prior to soil disposal or re-use in an updated Waste Management Plan.

	disposition within the next year. The amount of soils to be excavated at the Checkpoint Remediation Site are relatively small, being <1000 cubic meters and should not take too long to process. A new LUP and WL term is 5 years with possibility of a 2 year extension and should allow enough time to complete this project. GNWT- ENR will determine that the Landfarm Site is no longer contaminated once guideline numbers are achieved. The number of samples to be taken per volume of soil to determine if the remedial activities are complete will be based on work completed during the 2016/17 field season which was extensive. Future sampling may not have to be as intense. During the sampling at the landfarm last year 55 composite samples were taken (including 5 duplicate samples). Each of the ten windrows was split into 5 sections. In each section 5 test pits were advanced. One composite sample was collected from the five test pits in each section. There was a total of 250 test pits advanced. Test pits were dug to a depth ranging from 0.8- 1.5 m into the center of the piles. Every effort was made to collect representative soil samples from the surface and core of each stockpile to ensure the best characterization possible.	

5	Location of the land farm	Comment DFN notes that the landfarm is situated further away from the Jean Marie River than the Checkpoint Highway camp. Recommendation How far is the landfarm site from Jean Marie River? How will GNWT- DOT prevent run-off from the landfarm from entering the Jean Marie River? What ongoing monitoring is happening at the Jean Marie River post excavation and freshet? Is the GNWT concerned about soil mobilization during excavation?	May 23: The Landfarm facility is approx. 2.7 km from the Jean Marie River. No run-off from the landfarm can access the Jean Marie River. A Phase III ESA was completed March 31, 2017 wherein sampling was done. Remedial plan is presently being created that will address monitoring if required at the post excavation site. No soil mobilization is expected at the excavation site. It is a relatively small amount, estimated at less than 1000 cubic meters, set back approx. 400 meters from the river. May 24: Please refer to the Checkpoint Landfarm Drawings and the Operations and Maintenance Manual provided in the application package. These documents will answer concerns regarding how will the GNWT prevent run-off from the landfarm from entering the	Adequate response. Board staff recommend that GNWT-ENR should outline all monitoring efforts, including sediment and erosion control plans for excavations and confirmatory sampling plans in an updated Waste Management Plan.
6	Staffing location	<b>Comment</b> N/A <b>Recommendation</b> How many people will be staffed during the summer and where will people be staying?	May 23: Minimal staff will be on site throughout the summer and fall at various times. Crews will be expected to consist of about 3 to 5 persons. Site visits are expected to last 3 to 14 days. Crews will be staying at the Checkpoint Bed and Breakfast or similar facility in Ft. Simpson.	Adequate response.
7	Fencing of the land farm	<b>Comment</b> N/A <b>Recommendation</b> Will the landfarm be fenced to prevent animals from encountering or encroaching on the landfarm?	May 23: There are no plans for a fence to be erected at this landfarm. The landfarm has existed since 2011 without a fence in place. No negative wildlife encounters have been observed or recorded.	Adequate response. Federal Guidelines require: At a minimum, staking and identification at the landfarm site and fencing if public or wildlife access is expected to be a

				concern.	
8	Testing of plants at the site	Comment N/A Recommendation Are plants found to be growing at the site? Were they tested for heavy metals such as barium or arsenic?	May 23: Vegetation is growing at the site. No testing of the vegetation has been done to date.	Board staff recommend that GNWT-ENR should assess the health and risk of site vegetation in the final risk assessment, required in Part H, item 5 of the Draft Water Licence.	
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis	
1	General	<b>Comment</b> ECCC has reviewed in accordance with its mandate and has no comments at this time. <b>Recommendation</b> Not applicable.	May 23: Noted	Noted.	
GNV	GNWT - ENR: Central Email GNWT				
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis	
1	General File	<b>Comment</b> <u>(doc)</u> ENR Letter - No Comments or Recommendations <b>Recommendation</b>		Noted.	
GNV	VT - Lands: Jarre	t Hardisty			
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis	
1	Draft Permit Conditions	<b>Comment</b> Spring Break Up <b>Recommendation</b> Add Condition #19 on from the MVLWB Standard List of Conditions " The board, for the purpose of this operation, designates March 31, as spring break up.	<b>May 23:</b> GNWT-ENR agrees to the Recommendations.	Condition has been added to the draft Permit.	
2	Draft Permit Conditions	<b>Comment</b> 26(1)(g) Use, Storage, handling, and Ultimate Disposal of Any Chemical or Toxic Material <b>Recommendation</b> Add Conditions #63, 64, 66 from the MVLWB standard list of conditions #63. Drilling Near	<b>May 23:</b> GNWT-ENR agrees to the recommendations.	Condition has been added to the draft Permit.	

		water or on Ice - When drilling within 100 meters of the Oridnary High Water Mark of any watercourse, and when drilling on ice, the permittee shall contain all drill water and drilling wate in a closed circuit system for reuse, offsite disposal, or deposit into a land absed sump or natural depression. #64. Drilling Waste - The epermittee may deposit drilling waste that does not contain toxic material in a sump or natural depression. any sumps or natural depressions used to deposit drilling waste must be located at least 100 meters from the ordinary high water mark of any watercourse, unless authorized in writing by an inspector. #66. Drilling Waste Containment - The permittee shall not allow any drilling waste to spread to the surrounding lands or watercourse.		
GNW	/T - Lands: Pat K	Inutson		
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	MV2017X0020 LUPA Comment	Comment (doc) Mining and Lands have reviewed the LUPA. Recommendation Please see the attached letter for specific comments.	May 23: <u>(doc)</u> GNWT-ENR has reviewed the attached letter and agrees to the noted recommendations.	Noted.
Liidli	i Kue First Natio	on (Ft Simpson): Dean Holman		
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Comment Extension Request	<b>Comment</b> <u>(doc)</u> See Attached Letter <b>Recommendation</b> See Attached Letter	May 23: (doc) Attempts have been made to engage the Liidlii Kue First Nation through Dean Holman. GNWT-ENR are more than happy to present to the Liidlii Kue First Nation upon invitation.	Noted. No other comments provided by the LKFN prior to extended deadline.

MVL	MVLWB: Heather Scott			
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Issued for Construction Drawings	Comment It is noted that the Drawings Issued for Construction that were submitted with the application do not match the facility photos contained in more recent reports (Operation and Maintenance Summary Report, April 12, 2017). Recommendation Does ENR have as-built drawings of the facilities? Generally, water licences require that these drawings are submitted to the Board after construction is complete.	May 23: See three attachments regarding Engineer letter and Design Drawings. May 23: Second attachment. May 23: Third attachment. May 23: Additional Attachments. May 23: Additional Attachments. May 23: Additional attachment. Landfarm Diagrams.	Adequate. Re-submission of these drawings are required under Part D, item 8 of the Draft Water Licence.
2	Operation and Maintenance Plan	<b>Comment</b> The Plan indicates that there is one retention pond for water that accumulates in the facility. <b>Recommendation</b> Please confirm the presence of an additional retention pond adjacent to the landfarm and indicate the procedure for water management at the landfarm facility.	May 23: See responses noted in Response ID 1 and 4 for clarification.	Adequate. This information should be reflected in an update to the Operations and Maintenance Manual. Updates to the Operations and Maintenance Manual are required to be reported in each Annual Report, where applicable, and should be included as part of the Waste Management Plan updates.
3	Operation and Maintenance Plan	<b>Comment</b> The Plan indicates that water from the pooling area should be pumped into temporary holding tanks. <b>Recommendation</b> Are holding tanks employed on site? Are they within the lined landfarm footprint or equipped with	May 23: There are no holding tanks presently employed at the site. Tanks will mobilized to the location if required and considerations will be given to secondary containment. Tanks, if required, will not be placed within the landfarm	Adequate. This information should be reflected in an update to the Operations and Maintenance Manual.

		secondary containment?	simply to avoid risking damage to the facilities liner.	Updates to the Operations and Maintenance Manual are required to be reported in each Annual Report, where applicable, and should be included as part of the Waste Management Plan updates.
4	Operation and Maintenance Plan	Comment The Plan notes that the retention pond is discharged but not the exact area to which it is discharged or flow to. Recommendation Please indicate where the retention pond water is discharged to, the direction of flow and where the nearest water body is.	May 23: A diagram of the retention pond discharge plan is attached. The direction of flow during decant is localized to the quarry adjacent the landfarm. The nearest water body is the Jean Marie River approximately 2.7 km South, South East.	Adequate. This information including a written description of the area (soil, vegetation, topography, drainage direction, etc.) should be reflected in an update to the Operations and Maintenance Manual. Updates to the Operations and Maintenance Manual are required to be reported in each Annual Report, where applicable, and should be included as part of the Waste Management Plan updates.
5	Groundwater Monitoring Plan and Leachate Management Plan	<b>Comment</b> The submitted Plan is from 2009 and does not indicate the current groundwater monitoring practices on site. <b>Recommendation</b> Please indicate if the information in the Plan is accurate and up-to- date, or if these practices	May 23: The information contained within the application package is current and supported by supplied documents within the application and by the additional documents / attachments noted in Response ID 1. The	Adequate.

		have evolved over the operational time of the facility.	groundwater sampling plan was a result of project evolution and was added to subsequent years post 2009.	
6	None	<b>Comment</b> None <b>Recommendation</b> Please indicate the exact coordinates of all existing groundwater monitoring wells.	May 23: The following are coordinates for the SNP groundwater monitoring wells adjacent the landfarm. MW1 - 61° 28' 02" x 121° 16' 12" MW2 - 61° 28' 00" x 121° 16' 10" MW3 - 61° 27' 58" x 121° 16' 17" MW4 - 61° 27' 59" x 121° 16' 09"	Adequate.
7	Highway Maintenance Facility - Phase III ESA and RAP	<b>Comment</b> The application indicates that the GNWT expects to complete a Phase III ESA and RAP in the future. <b>Recommendation</b> When will these be completed? Based on their results what existing Plans will require updates and what new Plans will be drafted? What Plans will guide the activities required by the results of the Phase III ESA and RAP?	<b>May 23:</b> Both the Phase III ESA and RAP are currently under review by the GNWT-ENR, Contaminated Sites Section. These documents should be finalized no later than June 30, 2017. All future plans and activities will be provided to the MVLWB for their review and approval.	Adequate.

From:	Amanda Gauthier
То:	dave_abernethy@gov.nt.ca
Cc:	Shannon Allerston; brad_Mcinnes@gov.nt.ca; Jarret_Hardisty@gov.nt.ca;
	achodenekoe.kdeneron@northwestel.net; alexfanni@adkfirstnation.ca; Alexis_Campbell@gov.nt.ca;
	<u>baptiste.metchooyeah@denetha.ca; Carl_Lafferty@gov.nt.ca; carrie.breneman@outlook.com;</u>
	Charlene_Coe@gov.nt.ca; chief@dehgahgotie.ca; chief@jmrfn.com; chief@liidliikue.com;
	<u>chief@sambaakefn.com; chief_nahadeh@yahoo.ca; christian.bertelsen@cannor.gc.ca;</u>
	Christopher.Aguirre@tc.gc.ca; Clayton_Lloyd@gov.nt.ca; Colin_merz@gov.nt.ca; dahti_tsetso@dehcho.org;
	<u>darren_campbell@gov.nt.ca; david.alexander@cannor.gc.ca; DMorris@kaska.ca; doug_carr@gov.nt.ca;</u>
	<u>ec.ea.nwt.ec@canada.ca; environment@sambaakefn.com; exec@slema.ca; executivedirector@dehcho.org;</u>
	fisheriesprotection@dfo-mpo.gc.ca; fpmcpres@northwestel.net; Glen_Mackay@gov.nt.ca; gnwt_ea@gov.nt.ca;
	<u>hrmc@northwestel.net; Iqbal_Arshad@gov.nt.ca; Jarret_Hardisty@gov.nt.ca; Jeremy_Roberts@gov.nt.ca;</u>
	joachimb@dehcholands.org; joe.pastion@denetha.ca; joe_heron@gov.nt.ca; Jon_Posynick@gov.nt.ca; Jen
	<u>Potten; kaageetu_chief@northwestel.net; Kate_Witherly@gov.nt.ca; katie_rozestraten@gov.nt.ca;</u>
	land@wpfn.ca; lands@denenation.com; landsnresources@katlodeeche.com; laurie_mcgregor@gov.nt.ca;
	<u>Laurie_Nadia@gov.nt.ca; Lindsay_Armer@gov.nt.ca; Matthew.Spence@cannor.gc.ca;</u>
	<u>Melanie.Murphy@wscc.nt.ca; metisnation52@northwestel.net; monica_wendt@gov.nt.ca; mws@fortliard.com;</u>
	<u>Nathen_Richea@gov.nt.ca; Norman_McCowan@gov.nt.ca; NTCard@aandc.gc.ca; Olivia_Lee@gov.nt.ca;</u>
	<u>pat_knutson@gov.nt.ca; patrick_clancy@gov.nt.ca; Paul_Green@gov.nt.ca; Permits; Peter_Fast@gov.nt.ca;</u>
	pklands@northwestel.net; preliminaryscreening@reviewboard.ca; president.nwtmn@northwestel.net;
	Rebecca.Leighfield@aandc.gc.ca; resources@liidliikue.com; Rick_Walbourne@gov.nt.ca; rm@dehgahgotie.ca;
	Robert_Jenkins@gov.nt.ca; rrobillard@pagc.sk.ca; Russell_Leed@gov.nt.ca; sao@tortprovidence.ca;
	sao@hayriver.com; sao@vols.ca; Scott_Stewart@gov.nt.ca; Sarah Elsasser; shin.shiga@nsma.net;
	sophieb@dehcholands.org; Steven_Shen@gov.nt.ca; stu_niven@gov.nt.ca; Tamika_Mulders@gov.nt.ca;
	<u>Tara Naugler@gov.nt.ca; tim.morton@aandc.gc.ca; Wendy Bidwell@gov.nt.ca</u>
Subject:	MV2017L8-0004 & MV2017X0020 - GNWT - ENR - Checkpoint - Issuance - Type B Water Licence & Type A Land
	Use Permit
Date:	Monday, June 12, 2017 4:39:14 PM
Attachments:	<u>MV2017L8-0004 - GNWT - ENR - Checkpoint - Issuance - Type B Water Licence.pdf</u>
	MV2017X0020 - GNWT - ENR - Checkpoint - Issuance - Type A Land Use Permit.pdf

## Good day,

Please see the attached documents. if you have any questions, please contact Shannon Allerston at (867) 766-7458 or email <u>sallerston@mvlwb.com</u>.

Regards, Amanda Gauthier Executive Coordinator Mackenzie Valley Land and Water Board 7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P6 ph 867.766.7460 | cell 867.688.0895 | fax 867.873.6610 agauthier@mvlwb.com | www.mvlwb.com

Please note: All correspondence to the Board, including emails, letters, faxes and attachments are public documents and may be posted to the public registry.





June 7, 2017

File: MV2017L8-0004

Mr. Dave Abernethy Government of the Northwest Territories Department of Environment and Natural Resources PO Box 1320 YELLOWKNIFE NT X1A 2L9

Email: Dave\_Abernethy@gov.nt.ca

Dear Mr. Abernethy:

## Issuance of Type B Water Licence Miscellaneous, Checkpoint Remediation Project

Attached is Type B Water Licence MV2017L8-0004 (Licence) granted by the Mackenzie Valley Land and Water Board (MVLWB or the Board) in accordance with the *Mackenzie Valley Resource Management Act* (MVRMA) and *Waters Act*. The Licence has been approved for a period of seven years commencing June 7, 2017 and expiring June 6, 2024.

Based on the evidence provided, the Board has also confirmed that the Application is exempt from preliminary screening as per Schedule 1, Paragraph 2 of the Exemption List Regulations of the MVRMA which states:

A development, or part thereof, for which renewal of a permit, licence or authorization is requested that

- a) Has not been modified; and
- b) Has fulfilled the requirements of the environmental assessment process established by the *Mackenzie Valley Resource Management Act, the Canadian Environmental Assessment Act* or the *Environmental Assessment Review Process Guidelines Order*.

Please read all conditions carefully. For the purpose of submitting plans in accordance with this Licence, the date of this letter, June 7, 2017 is the date of commencement.

The Board hereby approves the Spill Contingency Plan as submitted as an Environmental Health and Safety Plan and Emergency Response and Spill Contingency Plan on April 13, 2017.

The Board hereby approves the Plans in Table 1, on an interim basis, and requires their resubmission as indicated.

Condition	Title of Plan	Resubmission	Lindates required
Number		Date Due	
Part F, item 6	Groundwater	July 7, 2017	To be in accordance with the
	Monitoring and		conditions of Licence MV2017L8-
	Leachate		0004, for written confirmation of
	Management Plan		conformity from Board staff.
Part F, item 9	Landfarm Operations	August 4,	To be in accordance with reviewer
	and Maintenance	2017	comments and recommendations
	Manual		and conditions of Licence
			MV2017L8-0004, for written
			confirmation of conformity from
			Board staff.
Part F, item 11	Engagement Plan	July 7, 2017	To be in accordance with the
			conditions of Licence MV2017L8-
			0004, with the Board's Engagement
			Guidelines for Applicants and Holders
			of Water Licences and Land Use
			Permits and to reflect commitments
			made to reviewer comments and
			recommendations (Specifically
			GNWT-ENR), for written
			confirmation of conformity from
			Board staff.

Table 1: Plans that require resubmission

\*Review Summary and Attachments (attached).

Requirements for the resubmission of the Groundwater Monitoring and Leachate Management Plan and Landfarm Operations and Maintenance Manual are identified in the Licence. When updating the Waste Management Plan, Groundwater Monitoring and Leachate Management Plan, and Landfarm Operations and Maintenance Manual, please also consider additional details and any commitments identified in the Review Summary Table (attached).

The Board has denied the Waste Management Plan as submitted and requires a resubmission of a revised version of the Plan by **July 7, 2017**, for Board approval, to conform with the Board's *Guidelines for Developing a Waste Management Plan*. The Waste Management Plan should be a stand-alone document providing a summary of the project, project location, site features, identification of the applicant, and a description of the project scope, goals, and objectives with regard to applicable regulatory, social and environmental considerations. The Board's *Guidelines for Developing a Waste Management Plan* (2011) require that a Waste Management Plan also include details on the following:

- Waste types requiring management including a description of waste characteristics, source of generation, volume/mass estimates, and potential environmental effects;
- Waste management planning for each waste type including the plans for handling, storing, processing, collecting, sorting, transporting, treatment and disposal as well as a rationale to support the chosen management method(s); and

• Details on waste management infrastructure. For this project, this would include or refer to details on the landfarm design, capacity, management, monitoring, operations, and any contingencies. Some of this information has been provided in other plans provided with the application.

All revised plans, programs, studies and manuals shall be accompanied by a brief summary of the changes made (i.e. a conformity table) as outlined in Part B, item 5 of the Licence.

The Board notes that an updated Environmental Site Assessment and Remedial Action Plan are expected to be completed by June 30, 2017. In accordance with Part B, item 5 of the Licence, GNWT-ENR will be required to make all necessary updates to plans, programs, studies and manuals affected by the updates. All revised plans, programs, studies and manuals shall be submitted to the Board, for approval, at least 60 days, unless otherwise specified, prior to implementing any proposed updates or changes in the approved plan, program, study or manual, and shall be accompanied by a brief summary of the changes made.

Also attached is a copy of the *General Procedures for the Administration of Licences in the Northwest Territories*. The MVLWB requests that you review this and address any questions to the Board's office.

A copy of this Licence and all related correspondence and documents have been filed on the Public Registry at the MVLWB office. Please be advised that this letter, with its attached procedures, inspection reports, and related correspondence form part of the Public Registry which is intended to keep all interested parties informed of the manner in which the Permit requirements are being met. All Public Registry material will be considered if an amendment to the Permit is requested.

The full cooperation of Government of the Northwest Territories Department of Environment and Natural Resources is anticipated and appreciated. If you have any questions or concerns, please contact Shannon Allerston at (867) 766-7458 or email sallerston@mvlwb.com.

Yours sincerely,

Mavis Cli-Michaud MVLWB, Chair

- Copied to: Distribution List Brad McInnes, Dehcho Region, Government of the Northwest Territories
- Attached: Water Licence MV2017L8-0004 Review Summary and Attachments Reasons for Decision General Procedures for the Administration of Licences in the Northwest Territories



Pursuant to the *Mackenzie Valley Resource Management Act* and Regulations, the Mackenzie Valley Land and Water Board, hereinafter referred to as the Board, hereby grants to:

	Government of the Northwest Territories – Environment and Natural Resources		
	(Licensee)		
of	PO Box 1320, Yellowknife, NT X1A 2L9		
	(Mailing Address)		

hereinafter called the Licensee, the right to alter, divert, or otherwise use water subject to the restrictions and conditions contained in the *Waters Act* and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number:	MV2017L8-0004
Licence Type:	В
Water Management Area:	Mackenzie River
Location:	61 27' 59'' N and 121 16' 12'' W
Purpose:	To dispose of waste and associated uses
Description:	Miscellaneous
Quantity of Water not to be exceeded:	0 cubic metres (m³)
Effective date of licence:	June 7, 2017
Expiry date of licence:	June 6, 2024

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

Mackenzie Valley Land and Water Board

for Macouth

Mavis Cli-Michaud, Chair

Amanda Gauthier, Witness

## Type B Water Licence MV2017L8-0004 Government of the Northwest Territories – Environment and Natural Resources

#### Part A: Scope and Definitions

#### Scope

- 1. This Licence entitles the Licensee to dispose of Waste associated with the care and maintenance, remediation, monitoring, and decommissioning activities at the former Checkpoint Highway Maintenance Facility and Landfarm, NT as described in the Accepted Application dated April 13, 2017.
- 2. This Licence is issued subject to the conditions contained herein with respect to the taking of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposit of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations.
- 3. The Licensee shall take every reasonable precaution to protect the environment.
- 4. Compliance with the term and conditions of this Licence does not relieve the Licensee from responsibility for compliance with the requirements of any applicable federal, territorial or municipal legislation.

#### Definitions

In this Licence, MV2017L8-0004,

- Accepted Application the Type B Water Licence application as submitted to the Board on April 13, 2017 for care and maintenance, remediation, monitoring, and decommissioning activities at the former Checkpoint Highway Maintenance Facility and Landfarm, NT.
- Act the Waters Act, S.N.W.T. 2014, c.18.
- Analyst an Analyst designated by the Minister under subsection 65(1) of the Act.
- **Board** the Mackenzie Valley Land and Water Board established by subsection 99(1) of the *Mackenzie Valley Resource Management Act*.
- **Construction** any activities undertaken to construct or build any components of, or associated with, the development of the Project.
- **Engagement Plan** a document, developed in accordance with the Board's June 2013 *Engagement and Consultation Policy and the Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits,* that describes proposed engagement activities during the life of the undertaking.
- **Engineered Structure** means any structure or facility related to Water Use or the deposit of Waste that is normally designed and approved by a Professional Engineer, that are associated with the Construction, Operation, closure and Reclamation of the Project.
- **Freeboard** the vertical distance between the Water line and the lowest elevation of the effective Water containment crest on a dam or dyke's upstream slope.

**Inspector** - an Inspector designated by the Minister under subsection 65(1) of the Act.

- Landfarm means the engineered infrastructure designed to contain and treat hydrocarbon contaminated soil as described in the Accepted Application.
- **Licensee** the holder of this Licence.
- Maximum Grab Concentration a concentration of a parameter listed in the Licence that cannot be exceeded in any one grab sample.
- **Minister** a duly appointed member of the Executive Council who is responsible for the *Waters Act* or the department responsible for administering that Act.
- Modification a change, other than an expansion, that does not alter the purpose or function of a structure.

**Overflow Pond -** the engineered pond designed to hold Water pumped from the Retention Pond.

- Professional Engineer a person who is registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists in accordance with the Engineering and Geoscience Professions Act.
   S.N.W.T. 2006, V.16, or subsequent editions, as a Professional Engineer, and whose principal field of specialization is appropriate to address the components of the Project at hand.
- **Progressive Reclamation -** those activities conducted to reclaim the land and Water to the satisfaction of the Board and an Inspector.
- **Project** the care and maintenance, remediation, monitoring, and decommissioning activities at the former Checkpoint Highway Maintenance Facility and Landfarm, NT, as described in the Accepted Application.

**Retention Pond -** the engineered pond designed to contain run-off Water from the Landfarm.

- **Regulations -** Regulations proclaimed pursuant to section 63 of the Act.
- **Spill Contingency Plan** a document, developed in accordance with Indian and Northern Affairs Canada's April 2007 *Guidelines for Spill Contingency Planning*, that describes the set of procedures to be implemented to minimize the effects of a spill.
- **Surveillance Network Program** a series or network of devices or sampling points designed to test environmental conditions for comparison against baseline data obtained from a point or area designated as a control. This is a method of tracking and identifying the spread of deleterious substances in the environment.
- **Unauthorized Discharge** is the release or Discharge or spill of any Water or Waste not authorized under this Licence.
- Waste(s) Waste as defined by section 1 of the Act.
- **Waste Management Plan** a document, developed in accordance with the Board's March 2011 *Guidelines for the Development of a Waste Management Plan,* which describes the methods of Waste management from Waste generation to final disposal.
- Water(s) means any Waters as defined by section 1 of the Act.

Water Use - a use of Water as defined by section 1 of the Act.

#### Part B: General Conditions

- 1. The Licensee shall ensure a copy of this Licence is maintained on site at all times.
- 2. All references to policies, guidelines, codes of practice, statutes, regulations or other authorities shall be read as a reference to the most recent versions, unless otherwise denoted.
- 3. All information submitted to the Board, as required by this Licence, shall:
  - a) Be submitted in a form acceptable to the Board;
  - b) Be in accordance with the Board's March 2012 Document Submission Standards; and
  - c) Include a section within each submission which identifies wherein the pertinent requirements of this Licence are addressed.
- 4. The Licensee shall operate in accordance with approved plans, programs, studies and manuals referred to in this Licence, including such revisions as may be made pursuant to the conditions of this Licence and as approved by the Board.
- 5. The Licensee shall review the plans, programs, studies and manuals annually, or as directed by the Board, and make any necessary revisions to reflect changes in operations. All revised plans, programs, studies and manuals shall be submitted to the Board, for approval, at least sixty (60) days, unless otherwise specified, prior to implementing any proposed updates or changes in the approved plan, program, study or manual, and shall be accompanied by a brief summary of the changes made. All revised plans, programs, studies, and manuals shall be presented in a format consistent with the Board's *Standard Outline for Management Plans*.
- 6. The Licensee shall comply with the **Surveillance Network Program**, which is annexed to and forms part of this Licence, and any changes to the Surveillance Network Program as may be made from time to time by the Board.
- 7. The Surveillance Network Program and any compliance dates specified in this Licence may be changed at the discretion of the Board. If any date for any submission falls on a weekend or holiday, the item shall be submitted on the following business day.
- 8. Within 60 days of the issuance of this Licence, the Licensee shall post the necessary signs, where possible, to identify the Landfarm and the station(s) of the Surveillance Network Program. All postings shall be located and maintained to the satisfaction of an Inspector.
- 9. Meters, devices, or other such methods used for measuring the volumes of Water used and Waste Discharged shall be installed, operated, and maintained by the Licensee to the satisfaction of an Inspector.
- 10. The Licensee shall file an **Annual Water Licence Report** with the Board not later than March 31, 2018 and each year thereafter for the life of the Water Licence which shall contain, but not be limited to, the following information:
  - a) Updates or revisions to the Engagement Plan referred to in Part B;
  - b) Updates or revisions to the Environmental Site Assessment referred to in Part B;
  - c) Updates or revisions to the Human Health and Ecological Risk Assessment referred to in Part B;
  - d) Updates or revisions to the Remedial Action Plan referred to in Part B;
  - e) A summary of Construction, Modifications and/or maintenance activities at the Landfarm referred to in Parts D and E;
  - f) Updates or revisions to the Waste Management Plan referred to in Part F;
  - g) Updates or revisions to the Landfarm Operations and Maintenance Manual referred to in Part F;
  - h) Details and results of the Groundwater Monitoring and Leachate Management Plan, referred to in Part F, including, but not limited to: monitoring location (GPS coordinates); inspection results, depths, frequency of monitoring events, flow direction, chemical parameters tested, and data analysis;

- i) Reporting of Action Levels exceedances and actions taken during the year as identified in the Groundwater Monitoring and Leachate Management Plan;
- j) Monthly and annual quantities in cubic metres of all effluent discharged from the Landfarm;
- k) Source, volume, and analytical results of soils accepted into the Landfarm;
- Volume and analytical results of soil, including soil chemistry and soil particle size, removed from the Landfarm, the locations of the receiving sites, and the land use activity occurring at each receiving site location.
- m) A description of how the contaminated soil was managed during the previous calendar year, including relevant operational details and methods and dates of soil tilling;
- n) Contravention reports, if applicable;
- o) Tabular summaries of all data generated under the Surveillance Network Program;
- p) A sampling and analysis plan for the forthcoming year;
- q) Record of inspections of the Landfarm;
- r) Updates or revisions to the Spill Contingency Plan referred to in Part G;
- s) A list of spills or Unauthorized Discharges;
- t) Updates or revisions to the Closure and Reclamation Plan referred to in Part H;
- u) Details of any Progressive Reclamation undertaken; and
- v) Any other details on Waste disposal requested by the as Board by November 1 of the year being reported.
- 11. The Licensee shall act in accordance with the **Engagement Plan** submitted with the Accepted Application, once approved.
- 12. Within 30 days of Licence issuance, the Licensee shall submit to the Board, for approval, a revised Engagement Plan in accordance with the Board's 2013 *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*. The Licensee shall adhere to the Engagement Plan, most recently approved.
- 13. The Licensee shall act in accordance with the **Environmental Site Assessment** submitted with the Accepted Application.
- 14. The Licensee shall submit to the Board and act in accordance with the **Human Health and Ecological Risk Assessment** once complete.
- 15. The Licensee shall submit to the Board and act in accordance with the **Remedial Action Plan** once complete.

# Part C: Conditions Applying to Water Use

Intentionally left blank

#### Part D: Conditions Applying to Construction

- 1. The Licensee shall ensure that all structures intended to contain, withhold, divert, or retain Water or Wastes are designed, constructed, and maintained to minimize the escape of Waste to the Receiving Environment.
- 2. The Licensee shall ensure that all Engineered Structures intended to contain, withhold, divert, or retain Water or Wastes and which meet the definition of a dam under the *Dam Safety Guidelines* are designed, constructed, and maintained to meet or exceed the *Dam Safety Guidelines*.
- 3. The Licensee shall ensure that all Engineered Structures are constructed and maintained following the recommendations of the Professional Engineer responsible for the design, including but not limited to, recommendations regarding field supervision and inspection requirements.
- 4. The Licensee shall maintain Construction records of Construction materials for all Engineered Structures and make them available at the request of the Board or an Inspector.
- 5. Within 60 days prior to the commencement of Construction of any Engineered Structures intended to contain, withhold, divert, or retain Water or Waste, the Licensee shall submit to the Board, the **Final Detailed Construction Design Drawings and Specifications,** stamped by a Professional Engineer, which note "issued for Construction" or similar phrase. The Licensee shall ensure that these Engineered Structures are constructed in accordance with this submission.
- 6. A minimum of 10 days prior to the commencement of Construction of the Engineered Structures, the Licensee shall provide written notification to the Board and an Inspector. Notification shall include the name and contact information for the site manager.
- 7. Within 90 days of the completion of the Construction of each Engineered Structure, the Licensee shall submit to the Board an **As-built Report** which shall include as-built drawings of the Engineered Structures, documentation of field decisions that deviate from the Final Detailed Construction Design Drawings and Specifications referred to in Part D, item 5, and any data used to support these decisions.
- 8. Within 30 days of Licence issuance, the Licensee shall provide the Board with a detailed sketch and photos of the layout of the Checkpoint Highway Maintenance Facility and Landfarm that shows where the holding tanks, sump (surface run-off Retention Pond), containment berms, surface and groundwater monitoring stations, and spill kits are/will be located, noting the size and capacity of each and any other relevant information.

### Part E: Conditions Applying to Modifications

- 1. The Licensee may, without written approval from the Board, carry out Modifications to the Landfarm provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:
  - a) The Licensee has notified the Board and an Inspector in writing of such proposed Modifications at least 60 days prior to beginning the Modifications;
  - b) The Modifications do not place the Licensee in contravention of either the Licence or the Act;
  - c) The Board has not, during the 60 days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than 60 days;
  - d) An Inspector has authorized the proposed Modifications and provided a letter of notification to the Board; and
  - e) The Board has not rejected the proposed Modifications.
- 2. Modifications for which all of the conditions referred to in Part E, item 1 have not been met, may be carried out only with written approval from the Board.
- 3. Within 90 days of the completion of Modifications referred to in Part E, item 1, the Licensee shall provide asbuilt drawings stamped by a Professional Engineer to the Board.
### Part F: Conditions Applying to Waste and Water Management

- 1. The Licensee shall ensure that any unauthorized Wastes associated with this Licence do not enter any Waters.
- 2. The Licensee shall manage Waste and Water with the objectives of minimizing the impacts of the Project on the quantity and quality of Water in the Receiving Environment through the use of appropriate mitigation measures, monitoring, and follow-up action.

### **Management Plans and Monitoring Programs**

- 3. The Licensee shall act in accordance with the Waste Management Plan submitted with the Accepted Application, until a revised version is approved by the Board.
- 4. Within 30 days of Licence issuance, the Licensee shall submit to the Board, for approval, a revised **Waste Management Plan** that is in accordance with the Board's 2011 *Guidelines for Developing a Waste Management Plan*. The Plan shall also address the collection and disposal of petroleum hydrocarbon or metal contaminated soils from the Checkpoint Highway Maintenance Facility, including the quantity to be collected, the location of disposal, and confirmatory sampling plans. The Licensee shall act in accordance with the Waste Management Plan, once approved.
- 5. The Licensee shall act in accordance with the Groundwater Monitoring and Leachate Management Plan submitted with the Accepted Application, until a revised version is approved by the Board.
- 6. Within 30 days of Licence issuance, the Licensee shall submit to the Board, for approval, a revised **Groundwater Monitoring and Leachate Management Plan**. The Licensee shall act in accordance with the Plan, once approved. The Plan should include, but not be limited to, the following:
  - a) A description of the hydrogeology underlying and surrounding the Checkpoint Highway Maintenance Facility and Landfarm as assessed by a Professional Engineer, hydrologist; hydrogeologist or equivalent professional;
  - b) A description of the location, operation, and discharge procedures for the Retention Pond and Overflow Pond;
  - c) A description of how leachate is monitored and managed at the Landfarm with appropriate maps or diagrams;
  - d) The location of all existing and proposed groundwater monitoring stations, with a purpose and rationale, as provided by a Professional Engineer, hydrologist; hydrogeologist or equivalent professional including a map and attached table or detailed legend illustrating monitoring and sampling locations;
  - e) The timing and frequency of groundwater monitoring events, including at least two monitoring events per year;
  - f) A description and rationale for the parameters to be tested and measured;
  - g) A description of monitoring protocols, methodologies, parameters, and frequency specific to each type of monitoring;
  - h) Definitions, with rationale, for Action Levels for parameters of concern that will be monitored under the Groundwater Monitoring Program;
  - i) For each Action Level, a description of actions taken in response to any Action Level exceedances under the Groundwater Monitoring Program;
  - j) Reporting of Action Level exceedances and actions taken during the year in the Annual Water Licence Report as per Part B of this Licence;
  - k) A quality assurance/quality control plan for sample management; and
  - I) An explanation of any actions to be taken in response to any exceedances of the effluent quality criteria specified in Part F of this Licence.

## **Operations and Maintenance**

- 7. The Licensee shall ensure that the operation of the Landfarm is consistent with Environment and Climate Change Canada's 2013 Federal Contaminated Sites Action Plan, Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils.
- 8. The Licensee shall act in accordance with the Landfarm Operations and Maintenance Manual submitted with the Accepted Application.
- 9. Within 60 days of issuance of this Licence, the Licensee shall submit to the Board, for approval, an updated **Landfarm Operations and Maintenance Manual**. The Licensee shall act in accordance with the Manual, once approved. The Manual should include, but not be limited to, the following:
  - a) Acceptable soil types that can be treated in the Landfarm;
  - b) Details of on-site processing and treatment of soils, including the dimensions of soil piles that will be managed;
  - c) Water management and treatment systems operations and maintenance;
  - d) Remediation standards, methods, and frequency of any soil manipulation to promote remediation;
  - e) An identification and tracking system for soil stockpiles and holding tanks;
  - f) Routine facility inspection;
  - g) Monitoring of annual volume/mass of soil entering and leaving the facility;
  - h) Anticipated frequency, volumes and location of annual Water discharge;
  - i) Leachate management and monitoring strategy;
  - j) Facility maintenance, including response to major storm or catastrophic events;
  - k) Reference to any other Plans for the Landfarm that describe any of the above.
- 10. A Freeboard limit of one metre shall be maintained at all times in the Retention Pond and Overflow Pond, or as recommended by Professional Engineer and approved by the Inspector.
- 11. The Licensee shall maintain the Landfarm to the satisfaction of an Inspector.
- 12. Weekly, during Landfarm operations, and immediately after a major storm or catastrophic event, the Licensee shall carry out inspections on the:
  - a) drainage control systems for evidence of deterioration, malfunction, leaks or improper operation; and
  - b) leachate collection systems to ensure proper functioning and to determine if leachate is being generated or is accumulating.

## Acceptance Criteria

- 13. The Licencee shall only accept soil to the Landfarm that meets the acceptance criteria outlined in Schedule 1, item 1.
- 14. Prior to accepting soil to the Landfarm, the Licensee shall submit the analytical results from the soils to an Inspector.
- 15. The Licensee shall obtain representative samples of soil entering the Landfarm as per Part F, item 21, or as authorized by an Inspector.

## **Effluent Quality Criteria**

- 16. In the event that decanting Waste or Water from the Retention Pond (SNP 2017-1a) or Overflow Pond (SNP 2017-2a) is planned or required by an unanticipated event, the Licensee shall:
  - a) Advise an Inspector;
  - b) Obtain a representative sample from the Rentention Pond (SNP 32017-1a) or Overflow Pond (2017-2a) using the best methods available and describe in detail the prevailing conditions and how the sample was obtained. This sample should contain a minimum of 5 litres;
  - c) Conduct the analysis in accordance with Groundwater Monitoring Plan and Leachate Management Plan for the Checkpoint Landfarm;
  - d) Submit the results of the sampling and analysis to the Inspector and the Board at least ten days prior to the requested date of commencing decant, or in the case of an unanticipated event, as soon as possible; and
  - e) Indicate in writing to the Inspector and the Board;
  - f) The method of decant;
  - g) The direction of flow;
  - h) The location of fresh Water bodies where the decanted effluent is expected to go; and
  - i) Any treatment that will be applied.
- 17. Wastewater discharged from the Landfarm at Surveillance Network Program (SNP) SNP 2017-1a, 1b, 2a, and 2b shall meet the following effluent quality criteria:

Parameter	Maximum Grab Concentration
рН	6.5-8.5
Aluminum	0.1 mg/L
Antimony	0.006 mg/L
Arsenic	0.005 mg/L
Barium	1 mg/L
Beryllium	0.0053 mg/L
Boron	1.5 mg/L
Cadmium	0.001 mg/L
Chromium (VI)	0.001 mg/L
Chromium (III)	0.0089 mg/L
Cobalt	0.05 mg/L
Copper	0.002 mg/L <sup>1</sup>
Iron	0.3 mg/L 0.
Lead	0.001 mg/L <sup>2</sup>
Manganese	0.05 mg/L
Mercury (inorganic)	0.000026 mg/L
Methylmercury	0.000004 mg/L
Molybdenum	0.073 mg/L
Nickel	0.025 mg/L <sup>3</sup>
Selenium	0.001 mg/L
Silver	0.00025 mg/L
Zinc	0.03 mg/L
Uranium	0.02 mg/L
Vanadium	0.1 mg/L

 $<sup>^1\,\</sup>rm If$  water hardness is >180 mg/L the Maximum Grab Concentration is 0.004 mg/L

<sup>&</sup>lt;sup>2</sup> If water hardness is >180 mg/L the Maximum Grab Concentration is 0.007 mg/L

<sup>&</sup>lt;sup>3</sup> If water hardness is >180 mg/L the Maximum Grab Concentration is 0.007 mg/L

Benzene	0.37 mg/L
Toluene	0.002 mg/L
Ethylbenzene	0.09 mg/L
Xylenes	3.9 mg/L
Styrene	0.072 mg/L
F1	0.81 mg/L
F2	1.3 mg/L
Acenapthene	0.0058 mg/L
Acenaphthylene	0.046 mg/L
Anthracene	0.000012 mg/L
Fluoranthene	0.00004 mg/L
Fluorene	0.003 mg/L
Naphthalene	0.0011 mg/L
Phenanthrene	0.0004 mg/L
Pyrene	0.000025 mg/L
Carcinogenic PAHs (as B(a)P TPE)	0.00001 mg/L
Benz[a]anthracene	0.000018 mg/L
Benzo[b+j]fluoranthene	0.00048 mg/L
Benzo[k]fluoranthene	0.00048 mg/L
Benzo[a]pyrene	0.000017 mg/L
Chrysene	0.0014 mg/L
Dibenz[a,h]anthracene	0.00028 mg/L
Indeno[1,2,3-c,d]pyrene	0.00023 mg/L
Phenol	0.004 mg/L
Polychlorinated biphenyls	0.0094 mg/L
Ammonia	0.0094-73.3 mg/L <sup>a</sup>
Total Nitrate	13 mg/L
Nitrite (as nitrogen)	0.06 mg/L
Nitrate + Nitrite (as nitrogen)	100 mg/L

<sup>a</sup> The Maximum Grab Sample Concentration of Ammonia is dependent on the temperature and pH of the sample, at the time of sampling, as per the following table:

	рН					
	6.5	6.5 7 7.5 8 8.5				
Temperature (°C)	Maximum Grab Sample Concentration of Ammonia (mg/L)					
0	73.3	23.1	7.32	2.33	0.749	
5	48.3	15.3	4.84	1.54	0.502	
10	32.4	10.3	3.26	1.04	0.343	
15	22.0	6.98	2.22	0.715	0.239	
20	15.2	4.82	1.54	0.499	0.171	
25	10.6	3.37	1.08	0.354	0.125	
30	7.50	2.39	0.767	0.256	0.094	

- 18. The Licensee shall immediately notify an Inspector of the exceedance of any effluent quality criterion outlined in Part F, item 16.
- 19. The volume of Waste discharged at SNP 2017-1 b and 2b must not exceed 1000 m<sup>3</sup>/day, or as authorized by an Inspector.

20. The volume of Waste discharged at to SNP 2017-1 b and 2b must not exceed 3000 m<sup>3</sup>/year or as authorized by an Inspector.

## Soil Criteria

- 21. The Licensee shall ensure all treated soil from the Landfarm meets the remediation criteria in the most current version of the *Government of the Northwest Territories' Environmental Guideline for Contaminated Site Remediation*.
- 22. The Licensee shall obtain representative samples of treated soil as follows, or as authorized by an Inspector:

Volume of Soil (m <sup>3</sup> )	Number of Composite Samples Required
1 - 50	1
51 - 500	2
501 - 1000	3
1001 - 2000	4
2001 - 4000	5
Each additional 1000	1 additional

23. Prior to removing soil from the Landfarm, the Licensee shall submit the analytical results from the soils to the Inspector.

## Part G: Conditions Applying to Contingency Planning

- 1. The Licensee shall act in accordance with the **Environmental Health and Safety Plan and Emergency Response** and Spill Contingency Plan submitted with the Accepted Application.
- 2. The Licensee shall ensure that petroleum products, hazardous material and other waste(s) associated with the Project do not enter any Waters.
- 3. If, during the period of this Licence, a spill or Unauthorized Discharge of Waste occurs, or is foreseeable, the Licensee shall:
  - a) Implement the Environmental Health and Safety Plan and Emergency Response and Spill Contingency Plan referred to in Part G, item 1;
  - b) Report the incident immediately via the 24-Hour Spill Report Line at (867) 920-8130 in accordance with the instructions contained in the Spill Report Form NWT 1752/0593;
  - c) Report each spill and Unauthorized Discharge to the Board and an Inspector within 24 hours; and
  - d) Submit a detailed report on each spill and Unauthorized Discharge, including descriptions of root causes, response actions and any changes to procedures to prevent similar occurrences in the future, to the Board and an Inspector within 30 days.
- 4. All spills and Unauthorized Discharges of Water or Waste shall be reclaimed to the satisfaction of an Inspector.

### Part H: Conditions Applying to Closure and Reclamation

- 1. Within six months of issuance of this Licence, the Licensee shall submit to the Board, for approval, a **Closure and Reclamation Plan** which shall include, but is not limited to, the following information:
  - a) Closure and reclamation of the Landfarm, including:
    - i. Final removal and disposal of treated soil;
    - ii. Removal of synthetic liner system, surface water Retention Pond/structures and berms;
    - iii. Underlying soil concentrations;
  - b) Closure and reclamation of the Checkpoint Highway Maintenance Facility, including:
    - i. Any excavated areas;
    - ii. Groundwater wells;
    - iii. Waste disposal areas;
  - c) Closure and reclamation of any site affected by Waste spills;
  - d) Target petroleum hydrocarbon concentrations for final land use;
  - e) Management of natural runoff Waters from the Project area;
  - f) Restoration of natural drainage and the restoration of stream banks at the Project;
  - g) Any potential for groundwater contamination;
  - h) Any facilities or areas which may have been affected by development such that potential pollution problems exist;
  - i) A description of the phased approach to closure and reclamation and an associated implementation schedule;
  - j) Maps delineating all disturbed areas and site facilities;
  - k) Future land use of the site; and
  - I) A proposal identifying measures by which restoration costs will be financed by the Licensee upon closure.
- 2. The Licensee shall act in accordance with the Closure and Reclamation Plan, once approved.
- 3. Notwithstanding the time schedule referred to in the Closure and Restoration Plan as per part H, item 1(g), the Licensee shall endeavour to carry out Progressive Reclamation prior to the closure of operations.
- 4. The Licensee shall complete the reclamation and restoration work within the time schedule specified in the Closure and Reclamation Plan or as subsequently revised and approved by the Board.
- 5. Prior to Licence expiry, the Licensee shall submit to the Board a **Final Remediation Report**, including a record of site condition and final risk assessment results.

#### Signed on behalf of the Mackenzie Valley Land and Water Board

An Maut

Amanda Gauthier, Witness

Mavis Cli-Michaud, Chair

## Schedule 1 Attached to Water Licence MV2017L8-0004 Government of the Northwest Territories – Environment and Natural Resources Checkpoint Remediation Project

## Part F: Conditions Applying to Waste and Water Management – Acceptance Criteria

1. As per Part F, item 13 of this Licence, all soil entering the Landfarm shall meet the following acceptance criteria:

Parameter	Total (mg/kg) or Coarse Grained Soils	Leachable (mg/L) or Fined Grained Soils
Metals		
Aluminum	_	-
Arsenic	12	2.5
Barium	2,000	100
Beryllium	-	-
Boron	_	-
Cadmium	22	0.5
Chromium	87	5
Cobalt	-	-
Copper	91	n/a
Lead	600	5
Mercury	n/a	0.1
Molybdenum	-	-
Nickel	50	n/a
Selenium	n/a	1
Silver	n/a	5
Uranium	-	-
Vanadium	-	-
Zinc	360	500
Petroleum Hydrocarbons		
F1-F4		
F1-F4	< 3% dw	-
Polyaromatic Hydrocarbo	ns	
Naphthalene	2,500	-
Acenaphthylene	2,000	-
Acenaphthene	2,000	-
Fluorene	1,000	-
Phenanthrene	330	-
Anthracene	660	-
Total: 2 & 3 rings	8,490	-
Fluoranthene	660	-
Pyrene	400	-
Benzo(a)anthracene	40	-
Chrysene	40	-
Total: 4 rings	1,140	-
Benzo(b,j,k)fluoranthene	25	-
Benzo(a)pyrene	25	-
Indeno(1,2,3-c,d)pyrene	20	-
Dibenzo(a,h)anthracene	20	-

Parameter	Total (mg/kg) or Coarse Grained Soils	Leachable (mg/L) or Fined Grained Soils
Benzo(g,h,i)perylene	20	-
Total: 5 & 6 rings	110	-
Total: PAHs	9,740	-
Pentachlorophenols	<100	-
OTHER		
Nitrite	-	-
Nitrite & Nitrate	-	-
рН		

## Annex A Annexed to Water Licence MV2017L8-0004 Government of the Northwest Territories – Environment and Natural Resources Checkpoint Remediation Project

## **Table of Contents**

Annex A: Surveillance Network Program Part A: Reporting Requirements Part B: Site Descriptions and Monitoring Requirements

Annex B: Concordance Table of Items Requiring Submission

Annex C: Table of Revision History

### Part A: Reporting Requirements

- 1. The effective date of this Surveillance Network Program (SNP) is June 7, 2017.
- 2. Beginning March 31, 2018, and for every year thereafter, the Licensee shall submit to the Board and an Inspector, a **Surveillance Network Program Report**, which shall include, but not be limited to the following:
  - a) Electronic and tabular summaries of all data and information generated under Part B of this Annex for the month being reported, including rationale for SNP stations where samples were not collected and results and interpretation of quality assurance/quality control procedures;
  - b) Graphical summaries and interpretation of the analytical results from the SNP samples collected at the points of compliance compared to the effluent quality criteria identified in Part F of this Licence, for the previous two (2) consecutive years;
  - c) An explanation of any actions taken in response to any exceedances of the effluent quality criteria;
  - d) Information regarding the calibration and status of the meters and devices referred to in Part B of this Licence;
  - e) The exact coordinates of all SNP stations which were established within the year being reported, including an updated map identifying the locations of all the SNP stations; and,
  - f) A tabular summary of all Water discharged from the Landfarm.
- 3. More frequent sample collection may be required at the request of an Inspector.
- 4. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of American Public Health Association's (APHA) *Standard Methods for the Examination of Water and Wastewater* at the time of analysis, or by other such methods approved by an Analyst.
- 5. All analyses shall be performed in a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) for the specific analyses to be performed or as approved by an Analyst.
- 6. Monitoring stations shall be sampled as outlined in the approved Groundwater Monitoring and Leachate Management Plan referred to in Part F of this Licence, and analysed for the parameters identified in the Plan.
- 7. A quality assurance/quality control plan which includes both field and laboratory requirements shall be submitted to an Analyst for approval not less than 20 days in advance of any sampling conducted.
- 8. The quantities of Water pumped from the Retention and/or Overflow Pond shall be measured and recorded in cubic metres.

## Part B: Site Descriptions and Monitoring Requirements

- 1. The location of sampling sites is subject to approval of an Inspector.
- 2. Coordinates of the SNP stations shall be submitted to the Board within 60 days of issuance of this Licence.
- 3. The sampling station locations are as follows:

SNP Station #	Description	Status
2009-1	MW1 – Northern corner of the Landfarm near the retaining pond/Sump at 61° 28' 02" N and 121° 16' 12" W	Active
2009-2	MW2 – Northeastern corner of the retaining pond/Sump at 61° 28' 00" N and 121° 16' 10" W	Active
2009-3	MW3 – Western edge of the Landfarm at 61° 27' 58" N and 121° 16' 17" W	Active
2009-4	MW4 – Eastern corner of the Landfarm 61° 27' 59" N and 121° 16' 09" W	Active
2017-1a	Monitors retention Waters in the Retention Pond prior to discharge.	Active prior to proposed retention Water discharge
2017-1b	Monitors retention Waters from the Retention Pond at the point of discharge.	Active upon discharge and weekly during discharge
2017-2a	Monitors retention Waters in the Overflow Pond prior to discharge.	Active prior to discharge of proposed Retention Pond
2017-2b	Monitors retention Waters from the Overflow Pond at the point of discharge.	Active upon discharge and weekly during discharge

#### **SNP Station Quick Reference Table**

## SNP Station 2009-1

Description	Monitoring well at northern corner of the Landfarm near the Retention
	Pond/Sump
Location	61° 28' 02" N and 121° 16' 12" W
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total)
	Field parameters
	Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions)
	Benzene, Toluene, Ethylbenzene, and Xylene
	Chemical Oxygen Demand (COD)
	Extractable Petroleum Hydrocarbons (EPH)
	Total Suspended Solids (TSS)
	Oil and Grease
	рН
Rationale	To ensure leachate Waters are not impacting surrounding environment via
	groundwater.
Status	Active following spring freshet and before freeze-up

## SNP Station 2009-2

Description	Monitoring well at northeastern corner of the Retention Pond/Sump
Location	61° 28' 00" N and 121° 16' 10" W
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total)
	Field parameters
	Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions)
	Benzene, Toluene, Ethylbenzene, and Xylene
	Chemical Oxygen Demand (COD)
	Extractable Petroleum Hydrocarbons (EPH)
	Total Suspended Solids (TSS)
	Oil and Grease
	рН
Rationale	To ensure leachate Waters are not impacting surrounding environment via
	groundwater.
Status	Active following spring freshet and before freeze-up

#### SNP Station 2009-3

Description	Monitoring well at western edge of the Landfarm
Location	61° 27' 58" N and 121° 16' 17" W
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total)
	Field parameters
	Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions)
	Benzene, Toluene, Ethylbenzene, and Xylene
	Chemical Oxygen Demand (COD)
	Extractable Petroleum Hydrocarbons (EPH)
	Total Suspended Solids (TSS)
	Oil and Grease
	рН
Rationale	To ensure leachate Waters are not impacting surrounding environment via
	groundwater.
Status	Active following spring freshet and before freeze-up

## SNP Station 2009-4

Description	Monitoring well at eastern corner of the Landfarm
Location	61° 27' 59" N and 121° 16' 09" W
Sampling Frequency	Following spring freshet and prior to freeze-up
Sampling Parameters	ICP-MS Metal Scan (Total)
	Field parameters
	Total Petroleum Hydrocarbons (F1, F2, F3, F4 CCME Fractions)
	Benzene, Toluene, Ethylbenzene, and Xylene
	Chemical Oxygen Demand (COD)
	Extractable Petroleum Hydrocarbons (EPH)
	Total Suspended Solids (TSS)
	Oil and Grease
	рН
Rationale	To ensure leachate Waters are not impacting surrounding environment via
	groundwater.
Status	Active following spring freshet and before freeze-up

### SNP Station 2017-1a

Description	Monitors retention waters in the Retention Pond prior to a proposed
	discharge.
Location	Within the Retention Pond
Sampling Frequency	As required prior to discharge
Sampling Parameters	As identified in Part F, item 16, phosphorus, hardness and temperature at the
	time of sampling.
Rationale	To ensure discharge Water meets Part F, item 16.
Status	Active prior to proposed retention Water discharge.

### SNP Station 2017-1b

<b>Description</b> Monitors retention waters from the Retention Pond during discharge		
Location	Outflow of Retention Pond	
Sampling Frequency	Upon discharge and weekly following discharge events	
Sampling Parameters	As identified in Part F, item 16, phosphorus, hardness and temperature at the	
	time of sampling.	
RationaleTo ensure discharge Water meets Part F, item 16.		
Status	Active upon discharge and weekly during discharge.	

### SNP Station 2017-2a

Description	Monitors retention waters in the Overflow Pond prior to a proposed		
	discharge.		
Location	Within the Overflow Pond		
Sampling Frequency	As required prior to discharge		
Sampling Parameters	As identified in Part F, item 16, phosphorus, hardness and temperature at the		
	time of sampling.		
Rationale	To ensure discharge Water meets Part F, item 16.		
Status	Active prior to proposed retention Water discharge.		

#### SNP Station 2017-2b

Description	Monitors retention waters from the Overflow Pond during discharge.
Location Outflow of Overflow Pond	
Sampling Frequency	Upon discharge and weekly following discharge events
Sampling Parameters	As identified in Part F, item 16, phosphorus, hardness and temperature at the
	time of sampling.
Rationale	To ensure discharge Water meets Part F, item 16.
Status Active upon discharge and weekly during discharge.	

Signed on behalf of the Mackenzie Valley Land and Water Board

Mavis Cli-Michaud, Chair

An Haut

Amanda Gauthier, Witness

## Annex B Annexed to Water Licence MV2017L8-0004 Government of the Northwest Territories – Environment and Natural Resources Checkpoint Remediation Project

### Annex B: Concordance Table of Items Requiring Submission

This table summarizes the information the Licensee is required to submit as per the Water Licence conditions.

### Table 1: Water Licence Submission Requirements

Part of Licence	ltem	Date

## Annex C Annexed to Water Licence MV2017L8-0004 Government of the Northwest Territories – Environment and Natural Resources Checkpoint Remediation Project

## Annex C: Table of Revision History

## Table 1: Updates and changes that have been made to the Water Licence since issuance

Date	Location of Change	Description of Change

## General Procedures for the Administration of Licences Issued Under the *Waters Act* in the Northwest Territories

- 1. At the time of issuance, a copy of the Licence is placed on the Public Registry in the office of the Mackenzie Valley Land and Water Board (MVLWB or the Board) in Yellowknife and is then available to the public.
- 2. To enforce the terms and conditions of the Licence, the Minister of Environment and Natural Resources has appointed Inspectors in accordance with subsection 65(1) of the *Waters Act*. The Inspectors coordinate their activities with staff of the MVLWB. The Inspector responsible for Licence MV2017L8-0004 is located in the Deh Cho office.
- 3. To keep the MVLWB and members of the public informed of the Licensee's conformity to the Licence's conditions, the inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating which action, if any, should be taken. The inspection reports and cover letters are placed on the Public Registry, as are any responses received from the Licensee pertaining to the inspection reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.
- 4. Licence MV2017L8-0004 will expire on June 6, 2024, if required; it is the responsibility of the Licensee to apply to the MVLWB for a new licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any new licence. Please note that if the Licence expires and another has not been issued, then water and waste disposal must cease, or you, the Licensee, would be in contravention of the *Waters Act*. For a Type A Licence, an application for a new licence shall be made at least one year in advance of the Licence's expiry date. In the case of a Type B Licence, an application shall be made at least six months in advance of the Licence's expiry date.
- 5. If, for some reason, Licence MV2017L8-0004 requires amendment, a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the MVLWB ample time to complete the amendment process. The process may take up to six months or more depending on the scope of the amendment requested.

.../2

6. Specific clauses of your Licence make reference to the Board, Analyst, or Inspector. The contact person, address, phone, and fax number of each is:

### Mackenzie Valley Land and Water Board:

Public Registry Clerk Mackenzie Valley Land and Water Board 7th Floor - 4922 48 Street, P.O. Box 2130 YELLOWKNIFE NT XIA 2P6 Phone: (867) 669-0506 Fax: (867) 873-6610

#### Analyst:

Analyst Water Laboratory Government of the Northwest Territories P.O. Box 1320 YELLOWKNIFE NT X1A 2L9 Phone: (867) 765-6644

#### Inspector:

Water Resources Inspector – Dehcho Region Department of Environment and Natural Resources Government of the Northwest Territories P.O. Box 240 FORT SIMPSON, NT X0E 0N0 Phone: (867) 695-7451 Fax: (867) 695-2381

7. Specific clauses of your licence may reference security. The contact person, address, and phone and fax numbers of the individual administering security deposits is:

Director, Water Resources Department of Environment and Natural Resources Government of the Northwest Territories P.O. Box 1320 YELLOWKNIFE NT X1A 2L9 Phone: (867) 873-7401 Fax: (867) 669-2716



# **Reasons for Decision**

Issued pursuant to paragraph 40(2)(c) of the *Mackenzie Valley Land Use Regulations* (MVLUR) and section 72.25 of the *Mackenzie Valley Resource Management Act* (MVRMA)

Type A Lan Use Permit and Type B Water Licence Application		
Preliminary Screener MVLWB		
Reference/File Number MV2017X0020 and MV2017L8-0004		
Applicant Government of the Northwest Territories – Department of		
Environment and Natural Resources		
Project Checkpoint Remediation Project – Checkpoint, NT		

## Decision from Mackenzie Valley Land and Water Board Meeting of

June 7, 2017

With respect to Applications MV2017X0020 and MV2017L8-0004, notice was given in accordance with sections 63 and 64 of the *Mackenzie Valley Resource Management Act* (MVRMA) and section 43 of the *Waters Act*. There was no public hearing held in association with these applications.

## 1.0 <u>Background</u>

The Checkpoint Remediation Project consists of the following activities:

- 1) Removal of the remaining surficial non-hazardous waste debris and hydrocarbon impacted contaminated soils at the former Checkpoint Highway Maintenance Camp (Checkpoint); and
- 2) Treatment of hydrocarbon contaminated soils, monitoring, and decommissioning of the Checkpoint Landfarm Treatment Facility (Checkpoint Landfarm).

The Checkpoint site is located approximately 1 km south of the Highway 1 and Highway 7 intersection in the Dehcho Area. The Checkpoint Landfarm is located at KM 414 of Highway 1.

## Checkpoint Highway Maintenance Camp

In 2002, a Phase II Environmental Site Assessment (ESA) was completed at Checkpoint and concluded the site was contaminated with petroleum hydrocarbons and metals. In 2003, Land Use Permit MV2003X0031 was issued by the Board to initiate remediation of the site. Under previous authorizations, buried waste and debris from Checkpoint was excavated, sorted, and stored on-site. This waste had been determined to be non-hazardous and non-leaching.

In October 2016, a Supplemental Phase III ESA was conducted to delineate the impacts and determine the current environmental conditions at Checkpoint. A draft version of this report was included with the Applications; this also includes recommendations for site remediation.

The following land-based activities are proposed to be carried out at the Checkpoint site:

- Installation of environmental groundwater monitoring wells to delineate contaminant plumes and re-test groundwater, and to monitor groundwater quality and flow towards the Jean Marie River;
- Removal of remaining surficial debris and stockpiled metals left by GNWT Department of Transportation to an approved off-site location (to be determined);
- Removal of contaminated soils identified during the 2016 Supplemental Phase III ESA and transportation to the Checkpoint Landfarm;
- Backfilling of excavations with approved material; and
- Soil and surface water monitoring to ensure site conditions have stabilized or are improving.

A draft Remedial Action Plan provides more information on remediation and monitoring activities.

#### Checkpoint Landfarm Treatment Facility

The Checkpoint Landfarm was constructed in 2009 and construction drawings and specifications were included with the Applications. Soils will be sifted to remove rocks and tilled to promote remediation to meet the residential/parkland criteria in the Canada Wide Standards for Petroleum Hydrocarbons. Currently, there are no completed guidelines for the development of land treatment facilities in the NWT. Federal guidelines have been referenced to help identify and assess potential impacts, risks and mitigations associated with the construction and operation of this proposed facility. Nutrients may be added to facilitate remediation, if required. Approved materials will be used to backfill excavations at the Checkpoint site or used at other approved locations.

The GNWT-ENR has constructed a lined retention pond in one corner of the Landfarm that has the capacity to retain precipitation from a 1 in 25 year, 24-hour duration rainfall event. If enough runoff accumulates, it will be tested based on requirements in the Water Licence and discharged to a sump approximately 30 metres north of the facility. The sump is composed of a non-woven geotextile overlain with boulder rip rap for erosion control and velocity reduction that gently slopes towards adjacent vegetation. If the Licence parameters are not met, the water will be pumped into an on-site tank and reapplied to the landfarm during dry periods. The retention pond will be annually discharged in the fall, if required, to prepare for the subsequent spring melt. Snow will be managed to minimize the effects of spring freshet.

A Landfarm Operations and Maintenance Manual and a Groundwater Monitoring and Leachate Management Plan were included in the Applications. Four groundwater monitoring wells are planned, one upgradient and three downgradient of the Landfarm. The Landfarm will be monitored on an annual basis from June until November, and after freshet and major precipitation events. Precise locations of the groundwater monitoring wells will be reflected in the Surveillance Network Program (SNP).

Once all contaminated soils are remediated the Landfarm will be decommissioned. A Final Remediation Report, including a Record of Site Condition, will be submitted to the Board. This will include removal of Landfarm berms, liners and ponds and grading to blend the topography with adjacent land.

Other infrastructure and equipment include:

- Two tracked dozers;
- Backhoe;
- Loader;
- Tandem truck;
- Tanker truck;
- Water pump; and.
- Drill.

Equipment re-fueling activities will utilize a 500 L portable tidy tank.

There is no camp associated with this operation.

## 2.0 <u>Public Review</u>

On April 13, 2017, Land Use Permit and Water Licence Applications were received by the Board and distributed for review. An extension to the initial reviewer comment deadline of May 4, 2017 was provided to May 19, 2017 in response to an extension request from Liidlii Kue First Nation. Comments and recommendations on the Applications were received from six reviewers:

- Dehcho First Nation;
- Environment and Climate Change Canada;
- GNWT ENR (no comments);
- GNWT Lands Department;
- GNWT Lands Inspector; and
- Board staff.

GNWT-ENR responded on May 24, 2017.

## 3.0 <u>Decision</u>

The Board is satisfied that:

- the project has been screened pursuant to the MVRMA;
- any potential adverse environmental effects are insignificant or mitigable with known technology; and
- the project is not likely to be a source of public concern.

After reviewing the submission of the Applicant, the written comments received by the Board and the June 7, 2017 Staff report prepared for the Board, the Board, having due regard to the facts and circumstances, the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA and the *Waters Act* and Regulations made thereunder, has determined that Land Use Permit MV2017X0020 and Water Licence MV2017L8-0004 be issued subject to the terms and conditions contained therein. The Board's reasons for this decision are as follows:

- The use of water and/or deposit of waste proposed by the Applicant is of a nature contemplated by the MVRMA and the *Waters Act*.
- The use of land proposed by the Applicant is of a nature contemplated by the MVRMA.

- The Board is satisfied that adequate consultation has been conducted and that advice has been sought and considered in accordance with sections 63 and 64 of the MVRMA.
- There are no existing Land Use Permits or Water Licences overlapping the project area in accordance with paragraph 26(5)(*a*) of the *Waters Act*.
- There were no claims for compensation in accordance with paragraph 26(5)(*b*) of the *Waters Act* and no significant or unmitigable public concern was made known to the Board.
- It is the opinion of the Board that the conditions attached to MV2017X0020 and MV2017L8-0004, pursuant to the MVRMA and the *Waters Act*, will prevent or mitigate any potential environmental impacts which might result from the project, from water use and/or deposit of waste.
- The Board is satisfied that compliance with the Licence conditions and effluent quality standards set in the Licence are consistent and will ensure that waste produced by DIAND-CARD will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's Water and Effluent Quality Management Policy in accordance with paragraph 26(5)(c).
- The Board is satisfied that the Licensee (the Government of the Northwest Territories) is able to meet any, or all, financial obligations set out in the MVRMA and the Licence in accordance with paragraph 26(5)(*d*).
- The Board has notified the Applicant, through a statement included in the scope of this Licence, that compliance with the term and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of any other legislation.

The scope of the Permit and Licence ensures the Proponent is entitled to conduct activities which have been applied for. In setting out the scope of the Permit and Licence, the Board endeavoured to provide enough detail to describe the authorized activities, but not so much detail that GNWT-ENR's activities would be unduly restricted. The Board included a list of defined terms used in the Permit and Licence in order to ensure a common understanding of conditions and to avoid future differences in interpretation. Where appropriate, the definitions use wording similar to that found in Permits and Licences recently issued by the Board.

Land Use Permit MV2017X0020 has been updated based on the Application, reviewer comments, previous authorizations for the proposed project, and to reflect the appropriate conditions from the Board's standard list.

Water Licence MV2017L8-0004 has been updated to better reflect standard requirements for landfarming activities required in more recent authorizations for similar projects in the region. Details on the Water Licence requirements are provided below.

Part B of the Licence applies to matters regarding compliance and conformity with the MVRMA and *Waters Act*, and, with the exception of references to project-specific plans, is consistent with standard conditions found in previous Licences issued by the Board. This section addresses conformity and compliance with plans, submission timelines, revisions, and format of the SNP and the Schedules which are annexed to and form part of the Licence. This section also addresses signage, measuring devices, public engagement requirements, and annual water licence reporting. The Board has been informed by GNWT-ENR that updates to the ESA and Remedial Action Plan are forthcoming and that a Human Health and Ecological Risk Assessment is planned.

Part B, item 5 requires GNWT-ENR to make all necessary updates to plans, programs, studies and manuals affected by the updates. All revised plans, programs, studies and manuals shall be submitted to the Board, for approval, at least 60 days, unless otherwise specified, prior to implementing any proposed updates or changes in the approved plan, program, study or manual, and shall be accompanied by a brief summary of the changes made.

Part B, item 10 outlines the requirements for the Annual Water Licence Report. The purpose of the Annual Water Licence Report is to provide the Board and reviewers with a summary of activities that have occurred on-site during the previous year. These summaries include volumes of soil and water (moved, treated and deposited), engagement activities, summary of works/maintenance completed onsite, summaries of all monitoring data, and anticipated activities for the following year. Any updates to the Remedial Action Plan should also be included. Annual Water Licence Report requirements are intended to provide clarity for the submission of information summaries already being captured through existing plans and programs and are not meant to be onerous.

Part B, item 13 requires the submission of a Human Health and Ecological Risk Assessment to be submitted during the term of the Licence; once submitted, GNWT-ENR should act as per the Assessment. Similarly, Part B, item 15 requires the submission of the Remedial Action Plan, once it is completed. Any updates to the Assessment or Remedial Action Plan should be provided in the Annual Water Licence Report required by Part B, item 11; such updates may affect other management plans required by the Licence and would therein also require updates. The Human Health and Ecological Risk Assessment and Remedial Action Plan are submissions committed to by the GNWT-ENR in their Applications and are not for Board approval.

Part C of the Licence applies to water use. As indicated in the application, water use is not required for this project.

Part D of the Licence contains conditions related to construction activities at the site. These conditions ensure that engineered structures are built to appropriate standards, and require the submission of design and engineering reports.

Part E of the Licence contains conditions applying to modification of structures and facilities associated with the Project. All conditions in Part E are standard conditions consistent with recently issued Licences. These conditions are in place to ensure changes to the project are within the scope of the applications and with the notification and approval, as appropriate, of the Inspector and/or the Board.

Part F, items 1 and 2 describe the overall objectives of the Licence as they apply to the management of waste and water for the Project. Part F, items 3, 4, 5, and 6 outline the requirements for resubmission of the Waste Management Plan and Groundwater Monitoring and Leachate Management Plan. Part F, items 7-12 pertain to the operation and maintenance of the Landfarm facility as well as the requirements for resubmission of the Operations and Maintenance Manual. Manual requirements are based on applicable guidelines, where available, requirements from similar operations, and have been developed in response to reviewer comments and recommendations.

Part F, items 13-15 and Schedule 1 outline the conditions and criteria for soil acceptance to the Landfarm. The acceptance criteria were reviewed during the Application review process and are similar to other authorizations recently issued for Landfarm operations by the Board (i.e. Water Licence MV2016L8-0007 issued to Carter Industries Ltd.).

Part F, item 16 is a condition from the previous Licence MV2010L8-0003 that outlines the steps to be taken prior to discharging water from the Landfarm. Part F, item 17 outlines the effluent quality criteria (EQC) that must be met prior to discharging any water from the Landfarm. EQC for the discharge of Water were proposed in the Licence Application and were derived from the *CCME Water Quality Guidelines for Protection of Aquatic Life*. During the review of the Water Licence Application, GNWT-ENR stipulated that discharge criteria for nutrients be included in the EQC. EQC for nitrate and nitrite and some metals and hydrocarbons were derived from the *Guidance Document of Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites* (November 2012). These discharge criteria are similar to other authorizations issued by the Board (e.g. MV2014L1-0005, MV2016L8-0007) for other soil treatment operations. EQC set out in the Licence are consistent with the Board's *Water and Effluent Quality Management Policy* and will protect the receiving waters and environment.

Part F, item 18 requires notification of the Inspector upon exceedance of any EQC. Part F, items 19-20 stipulate the volume of Waste that may be discharged from the Landfarm (1,000 m<sup>3</sup>/day and 3,000 m<sup>3</sup>/year). These volumes were extrapolated from previous project annual reports to reflect the maximum volumes of discharge that could be expected.

Soil reuse criteria (Part F, item 21) are derived from the *Environmental Guidelines for Contaminated Site Remediation, Government of the Northwest Territories (November 2003).* Soil sampling requirements (Part F, items 22 and 23) were proposed in the review of the draft water licence and are similar to other authorizations recently issued for Landfarm operations by the Board (i.e. Water Licence MV2016L8-0007 issued to Carter Industries Ltd.).

Part G of the Licence contains conditions applying to spills, unauthorized discharges, and emergency response actions for the Project. The purpose of this part is to ensure that the Licensee is fully prepared to respond to spills and unauthorized discharges. This will ensure that any spills or unauthorized discharges are effectively controlled and cleaned up, with the goal of preventing or limiting damage to the receiving environment. All conditions in Part H are standard conditions consistent with recently issued Licences.

Part H of the Licence requires the submission of a Closure and Reclamation Plan to address the aspects of site reclamation and a Final Remediation Report if the facility is closed and remediated.

Annex A of the Licence contains conditions applying to the SNP. SNP locations monitor groundwater around the perimeter of the Landfarm and water meant for discharge from the Landfarm. Stations include:

SNP Station	Description	
2009-1	MW1 – Northern corner of the Landfarm near the retaining	
	pond/Sump at 61° 28' 02" N and 121° 16' 12" W	
2009-2	MW2 – Northeastern corner of the retaining pond/Sump at 61° 28' 00"	
	N and 121° 16' 10" W	
2009-3	MW3 – Western edge of the Landfarm at 61° 27' 58" N and 121° 16'	
	17" W	
2009-4	MW4 – Eastern corner of the Landfarm 61° 27' 59" N and 121° 16' 09"	
	W	
2017-1a	Monitors retention Waters in the Retention Pond prior to discharge.	

2017-1b	Monitors retention Waters from the Retention Pond at the point of discharge.	
2017-2a	Monitors retention Waters in the Overflow Pond prior to discharge.	
2017-2b Monitors retention Waters from the Overflow Pond at the pol		
	discharge.	

The Board is satisfied that compliance with the Licence conditions will ensure that waste produced by GNWT-ENR will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's *Water and Effluent Quality Management Policy*.

A term of five years was specifically identified by the GNWT-ENR in its Application. Based on the above, the Board has decided to approve a term of seven years for Water Licence MV2016L8-0007 to align with the maximum term allowed for the Land Use Permit.

Land Use Permit MV2017X0020 and Water Licence MV2016L8-0007 contain provisions that the Board feels necessary to ensure and monitor compliance with the MVRMA and the *Waters Act* and the Regulations made thereunder and to provide appropriate safeguards in respect of the Applicant's use of the waters and/or deposit of waste affected by the Licence.

SIGNATURE

Mackenzie Valley Land and Water Board

June 7, 2017

Date

Mavis Cli-Michaud, Chair

## **Review Comment Table**

Board:	MVLWB		
Review Item:	GNWT-ENR - Checkpoint Highway Maintenance Camp and Landfarm - MV2017X0020 and MV2017L8-0004		
File(s):	MV2017I8-0004 MV2017X0020		
Proponent:	GNWT - ENR		
Document(s):	Checkpoint LUP & WL Application Cover Page (334.6 kB) Checkpoint Land Use Permit Application (2 MB) Checkpoint Water Licence Application (612.7 kB) Checkpoint Project Summary (402.7 kB) Checkpoint Spill Contingency Plan (10.5 MB) Checkpoint Waste Management Plan (192.5 kB) Checkpoint Engagement Plan (182.3 kB) Checkpoint Engagement Log (1.9 MB) Checkpoint Colored (1.9 MB) Checkpoint O&M Manual (Landfarm) (2.2 MB) Checkpoint Landfarm Drawings (734.1 kB) Checkpoint Landfarm Technical Specifications (2.9 MB) Checkpoint Groundwater Monitoring and Leachate Management Plan (1.7 MB) Checkpoint DRAFT Phase III ESA (31.9 MB) Checkpoint DRAFT Remedial Action Plan (1.6 MB) DRAFT Type B Water Licence (200 kB) DRAFT Land Use Permit Conditions (183.2 kB)		
Item For Review Distributed On:	Apr 13 at 16:40 Distribution List		
Reviewer Comments Due By:	May 19, 2017		
Proponent Responses Due By:	May 24, 2017		
	<ul> <li>**UPDATE: May 5, 2017: Extension request to the reviewer comment deadline received on May 4, 2017 from the Liidlii Kue First Nation. Extension granted, as requested to May 19, 2017. All reviewers are granted this same extension, if required.</li> <li>**UPDATE: April 28, 2017: Any notices of application of water compensation should be submitted to the ORS by the comment deadline (May 4, 2017).</li> <li>**UPDATE April 19, 2017 - DRAFT Type B Water Licence available for Review**</li> <li>The Government of the Northwest Territories Department of Environment and Natural Resources (GNWT-ENR) has submitted an Application for a Type A Land Use Permit and a Type B Water Licence to the Mackenzie Valley Land and Water Board (MVLWB). The purpose of the Application is to continue care and maintenance, remediation, monitoring and decommissioning activities at the former Checkpoint Highway Maintenance Camp and Landfarm located approximately 1 km south of the HWY #1 and HWY #7 intersections, near Fort Simpson. Previous operations were authorized under permits MV2003X0031 and</li> </ul>		

	MV2010X0007 and licence MV2010L8-0003. The proponent is requesting a five year term.
	Reviewers are invited to submit questions, comments, and recommendations using the Online Review System (ORS) by the review comment deadline specified below. Please provide comments and recommendations on the:
	<ul> <li>Application Forms;</li> <li>Project Summary;</li> <li>Engagement Plan and Record;</li> <li>Waste Management Plan;</li> <li>Landfarm O&amp;M Manual;</li> <li>Spill Contingency Plan;</li> <li>Groundwater Monitoring and Leachate Management Plan;</li> <li>Draft Phase III ESA Report;</li> <li>Draft Remedial Action Plan;</li> <li>Preliminary Screening considerations; and</li> <li>Draft Land Use Permit (please clearly indicate which condition(s) you are commenting on).</li> </ul>
	Please note that the draft Permit has been developed using the MVLWB's current Standard Land Use Permit Conditions Template. The purpose of this draft is to allow parties to comment on Board staff's suggested conditions. These draft materials are not intended to limit in any way the scope of parties' comments. The Board is not bound by the contents of the draft Permit and will make its decision at the close of the proceeding on the basis of all evidence filed by all parties. All documents that have been uploaded to this review are also available on our public registry. If you have any questions or comments about the ORS or this
	In addition to the email distribution list, the following organizations received
General Reviewer Information:	<ul> <li>Fort Liard Metis Local #67 - Ernie McLeod, President (867)770-4573;</li> <li>Fort Simpson Métis Local #52 - Marie Lafferty, President (867)695-2040;</li> <li>Hay River Metis Council - Karen Lafferty, President (867)874-4472;</li> <li>NWT Metis Nation - Tim Heron, NWTMN IMA Coordinator (867)872-3586;</li> </ul>
Contact Information:	Jen Potten 867-766-7468 Shannon Allerston 867-766-7458

## **Comment Summary**

Deho	Dehcho First Nations: Carrie Breneman					
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis		
1	Extension Request	<b>Comment (doc)</b> See letter. <b>Recommendation</b> See letter.	May 23: (doc) GNWT, ENR and the Contaminated Sites Section has reviewed the letter and has no concerns.	Noted.		
2	Elevated arsenic levels	Comment Slightly elevated arsenic samples were found at the site (14 mbgs) as opposed to the CCME standard of (12 mbgs). Recommendation DFN requests that soil with elevated arsenic be transported to the Tervita Disposal site in Fort Nelson and not be used in landfarming operation as this soil does not meet CCME Guidelines.	May 24: The groundwater data collected in the fall of 2016 is not the greatest quality because at the time the water table was very low and there was difficulty getting sufficient volumes for full samples. There was a lot of turbidity in the samples and many could not be filtered in the field due to low volumes. Thus the reported concentrations are total metals (higher concentrations) and are not directly comparable to the CCME/FCSAP groundwater guidelines which are for dissolved concentrations. There were recommendations throughout Phase III Environmental Site Assessment and DRAFT Remedial Action Plan suggesting that another round of GW sampling be completed in the spring when water tables are higher, at which time we can properly develop and sample all the wells on site. Additional monitoring would be incorporated into a future monitoring program and remedial activities at the site. With respect to arsenic in soil: A detailed HHERA we completed for the site, in 2017, including exposure to arsenic and is presently under	Adequate response. Board staff recommend that GNWT-ENR should make it clear what, if any, remedial activities are proposed to deal with the high arsenic concentrations in soil if future sampling provides the same or similar results in an update to the Waste Management Plan. Schedule 1, item 1 of the Draft Water Licence does not allow for the acceptance of soils with arsenic concentrations greater than 12 mg/kg. Updates to the Risk Management Plan are required to be reported in each Annual Report, where applicable.		

			internal GNWT review. ENR anticipates making this information available as soon as the review is complete, hopefully by the end of June, 2017. The one arsenic exceedance from TP31 is not within the proposed hydrocarbon excavation zones at the site and thus would not be moved to the landfarm anyways.	
3	Engagement Plan	Comment DFN has reviewed the Engagement Plan for the Checkpoint Highway Maintenance Camp and Landfarm. Recommendation In the engagement plan, DFN requests that GNWT-DOT add the following: If there is a spill that requires reporting to the spill hotline, the GNWT-ENR will contact local communities (Jean Marie River and Fort Simpson) and DFN. The GNWT-ENR will follow-up annually with JMRFN, LKFN and DFN regarding the progress made at the site. GNWT-ENR will provide a summer site visit with JMRFN, LKFN and DFN regarding work being completed at the site.	May 23: GNWT-ENR, Contaminated Sites agrees to the recommendatioins noted. ENR will advise the JMRFN, LKFN and the DFN regarding dates and times that Contaminated Sites staff visit the site to coordinate efforts for a site visit sometime this summer.	Adequate response. Board staff recommend that GNWT-ENR should submit an updated Engagement Plan to reflect these commitments.
4	Remediation time and determination that remediation is complete	<b>Comment</b> DFN has reviewed the LUP and the overall purpose of the landfarm is to remediate hydrocarbon contaminated soils. <b>Recommendation</b> How many years will it take to remediate soils at the site? How does GNWT-ENR determine that the site is no longer contaminated? How many samples are taken per volume of soil to make that determination?	May 24: The number of years expected to remediate soils at the site will depend on the effectiveness of the landfarm management. Increased efforts have been applied since ENR acquired the original LUP and WL from the (then) GNWT, Department of Transportation. The hydrocarbon sample results from soils in the landfarm, to date, are close to industrial guidelines. It's anticipated additional treatment will have most of the soils ready for	Adequate response. Board staff recommend that GNWT-ENR should outline sampling requirements prior to soil disposal or re-use in an updated Waste Management Plan.

	disposition within the next year. The amount of soils to be excavated at the Checkpoint Remediation Site are relatively small, being <1000 cubic meters and should not take too long to process. A new LUP and WL term is 5 years with possibility of a 2 year extension and should allow enough time to complete this project. GNWT- ENR will determine that the Landfarm Site is no longer contaminated once guideline numbers are achieved. The number of samples to be taken per volume of soil to determine if the remedial activities are complete will be based on work completed during the 2016/17 field season which was extensive. Future sampling may not have to be as intense. During the sampling at the landfarm last year 55 composite samples were taken (including 5 duplicate samples). Each of the ten windrows was split into 5 sections. In each section 5 test pits were advanced. One composite sample was collected from the five test pits in each section. There was a total of 250 test pits advanced. Test pits were dug to a depth ranging from 0.8- 1.5 m into the center of the piles. Every effort was made to collect representative soil samples from the surface and core of each stockpile to ensure the best characterization possible.	

5	Location of the land farm	Comment DFN notes that the landfarm is situated further away from the Jean Marie River than the Checkpoint Highway camp. Recommendation How far is the landfarm site from Jean Marie River? How will GNWT- DOT prevent run-off from the landfarm from entering the Jean Marie River? What ongoing monitoring is happening at the Jean Marie River post excavation and freshet? Is the GNWT concerned about soil mobilization during excavation?	May 23: The Landfarm facility is approx. 2.7 km from the Jean Marie River. No run-off from the landfarm can access the Jean Marie River. A Phase III ESA was completed March 31, 2017 wherein sampling was done. Remedial plan is presently being created that will address monitoring if required at the post excavation site. No soil mobilization is expected at the excavation site. It is a relatively small amount, estimated at less than 1000 cubic meters, set back approx. 400 meters from the river. May 24: Please refer to the Checkpoint Landfarm Drawings and the Operations and Maintenance Manual provided in the application package. These documents will answer concerns regarding how will the GNWT prevent run-off from the landfarm from entering the	Adequate response. Board staff recommend that GNWT-ENR should outline all monitoring efforts, including sediment and erosion control plans for excavations and confirmatory sampling plans in an updated Waste Management Plan.
6	Staffing location	<b>Comment</b> N/A <b>Recommendation</b> How many people will be staffed during the summer and where will people be staying?	May 23: Minimal staff will be on site throughout the summer and fall at various times. Crews will be expected to consist of about 3 to 5 persons. Site visits are expected to last 3 to 14 days. Crews will be staying at the Checkpoint Bed and Breakfast or similar facility in Ft. Simpson.	Adequate response.
7	Fencing of the land farm	<b>Comment</b> N/A <b>Recommendation</b> Will the landfarm be fenced to prevent animals from encountering or encroaching on the landfarm?	May 23: There are no plans for a fence to be erected at this landfarm. The landfarm has existed since 2011 without a fence in place. No negative wildlife encounters have been observed or recorded.	Adequate response. Federal Guidelines require: At a minimum, staking and identification at the landfarm site and fencing if public or wildlife access is expected to be a

				concern.
8	Testing of plants at the site	Comment N/A Recommendation Are plants found to be growing at the site? Were they tested for heavy metals such as barium or arsenic?	May 23: Vegetation is growing at the site. No testing of the vegetation has been done to date.	Board staff recommend that GNWT-ENR should assess the health and risk of site vegetation in the final risk assessment, required in Part H, item 5 of the Draft Water Licence.
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	General	<b>Comment</b> ECCC has reviewed in accordance with its mandate and has no comments at this time. <b>Recommendation</b> Not applicable.	May 23: Noted	Noted.
GNV	VT - ENR: Centra	I Email GNWT		
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	General File	<b>Comment</b> <u>(doc)</u> ENR Letter - No Comments or Recommendations <b>Recommendation</b>		Noted.
GNV	VT - Lands: Jarre	t Hardisty		
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Draft Permit Conditions	<b>Comment</b> Spring Break Up <b>Recommendation</b> Add Condition #19 on from the MVLWB Standard List of Conditions " The board, for the purpose of this operation, designates March 31, as spring break up.	<b>May 23:</b> GNWT-ENR agrees to the Recommendations.	Condition has been added to the draft Permit.
2	Draft Permit Conditions	<b>Comment</b> 26(1)(g) Use, Storage, handling, and Ultimate Disposal of Any Chemical or Toxic Material <b>Recommendation</b> Add Conditions #63, 64, 66 from the MVLWB standard list of conditions #63. Drilling Near	<b>May 23:</b> GNWT-ENR agrees to the recommendations.	Condition has been added to the draft Permit.

		water or on Ice - When drilling within 100 meters of the Oridnary High Water Mark of any watercourse, and when drilling on ice, the permittee shall contain all drill water and drilling wate in a closed circuit system for reuse, offsite disposal, or deposit into a land absed sump or natural depression. #64. Drilling Waste - The epermittee may deposit drilling waste that does not contain toxic material in a sump or natural depression. any sumps or natural depressions used to deposit drilling waste must be located at least 100 meters from the ordinary high water mark of any watercourse, unless authorized in writing by an inspector. #66. Drilling Waste Containment - The permittee shall not allow any drilling waste to spread to the surrounding lands or watercourse.		
GNW	/T - Lands: Pat K	Inutson		
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	MV2017X0020 LUPA Comment	Comment (doc) Mining and Lands have reviewed the LUPA. Recommendation Please see the attached letter for specific comments.	May 23: <u>(doc)</u> GNWT-ENR has reviewed the attached letter and agrees to the noted recommendations.	Noted.
Liidli	i Kue First Natio	on (Ft Simpson): Dean Holman		
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis
1	Comment Extension Request	<b>Comment</b> <u>(doc)</u> See Attached Letter <b>Recommendation</b> See Attached Letter	May 23: (doc) Attempts have been made to engage the Liidlii Kue First Nation through Dean Holman. GNWT-ENR are more than happy to present to the Liidlii Kue First Nation upon invitation.	Noted. No other comments provided by the LKFN prior to extended deadline.

MVL	MVLWB: Heather Scott				
ID	Торіс	Reviewer Comment/Recommendation	Proponent Response	Board Staff Analysis	
1	Issued for Construction Drawings	Comment It is noted that the Drawings Issued for Construction that were submitted with the application do not match the facility photos contained in more recent reports (Operation and Maintenance Summary Report, April 12, 2017). Recommendation Does ENR have as-built drawings of the facilities? Generally, water licences require that these drawings are submitted to the Board after construction is complete.	May 23: See three attachments regarding Engineer letter and Design Drawings. May 23: Second attachment. May 23: Third attachment. May 23: Additional Attachments. May 23: Additional Attachments. May 23: Additional attachment. Landfarm Diagrams.	Adequate. Re-submission of these drawings are required under Part D, item 8 of the Draft Water Licence.	
2	Operation and Maintenance Plan	<b>Comment</b> The Plan indicates that there is one retention pond for water that accumulates in the facility. <b>Recommendation</b> Please confirm the presence of an additional retention pond adjacent to the landfarm and indicate the procedure for water management at the landfarm facility.	May 23: See responses noted in Response ID 1 and 4 for clarification.	Adequate. This information should be reflected in an update to the Operations and Maintenance Manual. Updates to the Operations and Maintenance Manual are required to be reported in each Annual Report, where applicable, and should be included as part of the Waste Management Plan updates.	
3	Operation and Maintenance Plan	<b>Comment</b> The Plan indicates that water from the pooling area should be pumped into temporary holding tanks. <b>Recommendation</b> Are holding tanks employed on site? Are they within the lined landfarm footprint or equipped with	May 23: There are no holding tanks presently employed at the site. Tanks will mobilized to the location if required and considerations will be given to secondary containment. Tanks, if required, will not be placed within the landfarm	Adequate. This information should be reflected in an update to the Operations and Maintenance Manual.	

		secondary containment?	simply to avoid risking damage to the facilities liner.	Updates to the Operations and Maintenance Manual are required to be reported in each Annual Report, where applicable, and should be included as part of the Waste Management Plan updates.
4	Operation and Maintenance Plan	Comment The Plan notes that the retention pond is discharged but not the exact area to which it is discharged or flow to. Recommendation Please indicate where the retention pond water is discharged to, the direction of flow and where the nearest water body is.	May 23: A diagram of the retention pond discharge plan is attached. The direction of flow during decant is localized to the quarry adjacent the landfarm. The nearest water body is the Jean Marie River approximately 2.7 km South, South East.	Adequate. This information including a written description of the area (soil, vegetation, topography, drainage direction, etc.) should be reflected in an update to the Operations and Maintenance Manual. Updates to the Operations and Maintenance Manual are required to be reported in each Annual Report, where applicable, and should be included as part of the Waste Management Plan updates.
5	Groundwater Monitoring Plan and Leachate Management Plan	<b>Comment</b> The submitted Plan is from 2009 and does not indicate the current groundwater monitoring practices on site. <b>Recommendation</b> Please indicate if the information in the Plan is accurate and up-to- date, or if these practices	May 23: The information contained within the application package is current and supported by supplied documents within the application and by the additional documents / attachments noted in Response ID 1. The	Adequate.

		have evolved over the operational time of the facility.	groundwater sampling plan was a result of project evolution and was added to subsequent years post 2009.	
6	None	<b>Comment</b> None <b>Recommendation</b> Please indicate the exact coordinates of all existing groundwater monitoring wells.	May 23: The following are coordinates for the SNP groundwater monitoring wells adjacent the landfarm. MW1 - 61° 28' 02" x 121° 16' 12" MW2 - 61° 28' 00" x 121° 16' 10" MW3 - 61° 27' 58" x 121° 16' 17" MW4 - 61° 27' 59" x 121° 16' 09"	Adequate.
7	Highway Maintenance Facility - Phase III ESA and RAP	<b>Comment</b> The application indicates that the GNWT expects to complete a Phase III ESA and RAP in the future. <b>Recommendation</b> When will these be completed? Based on their results what existing Plans will require updates and what new Plans will be drafted? What Plans will guide the activities required by the results of the Phase III ESA and RAP?	<b>May 23:</b> Both the Phase III ESA and RAP are currently under review by the GNWT-ENR, Contaminated Sites Section. These documents should be finalized no later than June 30, 2017. All future plans and activities will be provided to the MVLWB for their review and approval.	Adequate.
From:	Amanda Gauthier			
--------------	--			
То:	dave_abernethy@gov.nt.ca			
Cc:	Shannon Allerston; brad_Mcinnes@gov.nt.ca; Jarret_Hardisty@gov.nt.ca;			
	achodenekoe.kdeneron@northwestel.net; alexfanni@adkfirstnation.ca; Alexis_Campbell@gov.nt.ca;			
	<u>baptiste.metchooyeah@denetha.ca; Carl_Lafferty@gov.nt.ca; carrie.breneman@outlook.com;</u>			
	Charlene_Coe@gov.nt.ca; chief@dehgahgotie.ca; chief@jmrfn.com; chief@liidliikue.com;			
	<u>chief@sambaakefn.com; chief_nahadeh@yahoo.ca; christian.bertelsen@cannor.gc.ca;</u>			
	Christopher.Aguirre@tc.gc.ca; Clayton_Lloyd@gov.nt.ca; Colin_merz@gov.nt.ca; dahti_tsetso@dehcho.org;			
	<u>darren_campbell@gov.nt.ca; david.alexander@cannor.gc.ca; DMorris@kaska.ca; doug_carr@gov.nt.ca;</u>			
	<u>ec.ea.nwt.ec@canada.ca; environment@sambaakefn.com; exec@slema.ca; executivedirector@dehcho.org;</u>			
	fisheriesprotection@dfo-mpo.gc.ca; fpmcpres@northwestel.net; Glen_Mackay@gov.nt.ca; gnwt_ea@gov.nt.ca;			
	<u>hrmc@northwestel.net; Iqbal_Arshad@gov.nt.ca; Jarret_Hardisty@gov.nt.ca; Jeremy_Roberts@gov.nt.ca;</u>			
	joachimb@dehcholands.org; joe.pastion@denetha.ca; joe_heron@gov.nt.ca; Jon_Posynick@gov.nt.ca; Jen			
	<u>Potten; kaageetu_chief@northwestel.net; Kate_Witherly@gov.nt.ca; katie_rozestraten@gov.nt.ca;</u>			
	land@wpfn.ca; lands@denenation.com; landsnresources@katlodeeche.com; laurie_mcgregor@gov.nt.ca;			
	<u>Laurie_Nadia@gov.nt.ca; Lindsay_Armer@gov.nt.ca; Matthew.Spence@cannor.gc.ca;</u>			
	<u>Melanie.Murphy@wscc.nt.ca; metisnation52@northwestel.net; monica_wendt@gov.nt.ca; mws@fortliard.com;</u>			
	<u>Nathen_Richea@gov.nt.ca; Norman_McCowan@gov.nt.ca; NTCard@aandc.gc.ca; Olivia_Lee@gov.nt.ca;</u>			
	<u>pat_knutson@gov.nt.ca; patrick_clancy@gov.nt.ca; Paul_Green@gov.nt.ca; Permits; Peter_Fast@gov.nt.ca;</u>			
	pklands@northwestel.net; preliminaryscreening@reviewboard.ca; president.nwtmn@northwestel.net;			
	Rebecca.Leighfield@aandc.gc.ca; resources@liidliikue.com; Rick_Walbourne@gov.nt.ca; rm@dehgahgotie.ca;			
	Robert_Jenkins@gov.nt.ca; rrobillard@pagc.sk.ca; Russell_Leed@gov.nt.ca; sao@tortprovidence.ca;			
	sao@hayriver.com; sao@vols.ca; Scott_Stewart@gov.nt.ca; Sarah Elsasser; shin.shiga@nsma.net;			
	sophieb@dehcholands.org; Steven_Shen@gov.nt.ca; stu_niven@gov.nt.ca; Tamika_Mulders@gov.nt.ca;			
	<u>Tara Naugler@gov.nt.ca; tim.morton@aandc.gc.ca; Wendy Bidwell@gov.nt.ca</u>			
Subject:	MV2017L8-0004 & MV2017X0020 - GNWT - ENR - Checkpoint - Issuance - Type B Water Licence & Type A Land			
	Use Permit			
Date:	Monday, June 12, 2017 4:39:14 PM			
Attachments:	<u>MV2017L8-0004 - GNWT - ENR - Checkpoint - Issuance - Type B Water Licence.pdf</u>			
	MV2017X0020 - GNWT - ENR - Checkpoint - Issuance - Type A Land Use Permit.pdf			

#### Good day,

Please see the attached documents. if you have any questions, please contact Shannon Allerston at (867) 766-7458 or email <u>sallerston@mvlwb.com</u>.

Regards, Amanda Gauthier Executive Coordinator Mackenzie Valley Land and Water Board 7th Floor, 4922 48th St, PO Box 2130 | Yellowknife, NT | X1A 2P6 ph 867.766.7460 | cell 867.688.0895 | fax 867.873.6610 agauthier@mvlwb.com | www.mvlwb.com

Please note: All correspondence to the Board, including emails, letters, faxes and attachments are public documents and may be posted to the public registry.



# **APPENDIX C**

Checkpoint Highway Maintenance Camp Post-Closure Guidelines for Soil and Groundwater Remediation

#### SOIL CLOSURE LEVELS - ORGANICS

		Soil Gui	idelines	Closure Level						
Constituent	Units	GNWT <sup>1</sup> Residential / Parkland Coarse soil	CCME² Soil Quality – Residential / Parkland	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis		
Volatile Petroleum Hydrocarbons										
Benzene	mg/kg	0.5	0.03 <sup>3</sup>	< 0.0004	< 0.005	-	0.03	CCME Guideline		
Toluene	mg/kg	0.8	0.37	< 0.0004	< 0.05	-	0.37	CCME Guideline		
Ethylbenzene	mg/kg	1.2	0.082	< 0.0004	<0.015	-	0.082	CCME Guideline		
Xylenes (Total)	mg/kg	1	11	<0.0008	<0.1	-	1	GNWT Guideline		
Petroleum Hydrocarbons										
F1 - BTEX (C6-C10)	mg/kg	30	30	<0.1	128	-	30	GNWT/CCME Guideline		
F2 (C10-C16 Hydrocarbons)	mg/kg	150 <sup>4</sup>	150	<0.1	372	-	150	GNWT/CCME Guideline		
F3 (C16-C34 Hydrocarbons)	mg/kg	400	300	<0.1	274	-	300	CCME Guideline		
F4 (C34-C50 Hydrocarbons)	mg/kg	2800	2800	<0.2	60	-	2800	GNWT/CCME Guideline		
Polycyclic Aromatic Hydrocarbons										
Carcinogenic PAH (B[a]P as TPE	mg/kg	-	0.6	<0.0071	< 0.02	-	0.6	CCME Guideline		
Acenaphthene	mg/kg	-	0.28	< 0.005	0.117	-	0.28	CCME Guideline		
Acenaphthylene	mg/kg	-	320	< 0.005	< 0.02	-	320	CCME Guideline		
Acridine	mg/kg	-	-	<0.01	-	-	-	-		
Anthracene	mg/kg	-	2.5	< 0.004	<0.061	-	2.5	CCME Guideline		
Benz(a)anthracene	mg/kg	1	6.2	< 0.005	<0.01	-	1	GNWT Guideline		
Benzo(b+j)fluoranthene	mg/kg	1	6.2	< 0.005	<0.01	-	1	GNWT Guideline		
Benzo(k)fluoranthene	mg/kg	1	6.2	< 0.005	<0.01	-	1	GNWT Guideline		
Benzo(g,h,i)perylene	mg/kg	-	-	< 0.005	0.012	-	-	-		
Benzo(c)phenanthrene	mg/kg	-	-	< 0.005	-	-	-	-		
Benzo(a)pyrene	mg/kg	0.7	0.6	< 0.005	<0.01	-	0.6	CCME Guideline		
Benzo[e]pyrene	mg/kg	-	-	< 0.005	-	-	-	-		
Chrysene	mg/kg	-	6.2	< 0.005	0.023	-	6.2	CCME Guideline		
Dibenz(a,h)anthracene	mg/kg	1	-	< 0.005	0.0072	-	1	GNWT Guideline		
Fluoranthene	mg/kg	-	15.4	< 0.005	<0.01	-	15.4	CCME Guideline		
Fluorene	mg/kg	-	0.25	< 0.005	0.355	-	0.25	CCME Guideline		
Indeno(1,2,3-c,d)pyrene	mg/kg	1	-	< 0.005	<0.01	-	1	GNWT Guideline		
1-Methylnaphthalene	mg/kg	-	-	< 0.005	-	-	-	-		
2-Methylnaphthalene	mg/kg	-	-	< 0.005	< 0.03	-	-	-		
Naphthalene	mg/kg	0.6	0.013	< 0.005	<0.07	-	0.013	CCME Guideline		
Phenanthrene	mg/kg	5	0.046	< 0.005	0.216	-	0.046	CCME Guideline		
Perylene	mg/kg	-	-	< 0.005	-	-	-	-		
Pyrene	mg/kg	10	7.7	< 0.005	0.029	-	7.7	CCME Guideline		
Quinoline	mg/kg	-	-	< 0.01	<0.11	-	-	-		

#### Notes

<sup>1</sup> GNWT – Government of Northwest Territories, 2003, Environmental Guideline for Contaminated Site Remediation

<sup>2</sup> Canadian Council of Ministries of Environment, 2019, Canadian Soil Quality Guidelines for Protection of Environmental and Human Health

<sup>3</sup> Benzene guidelines based on  $10^{-5}$  incremental risk in coarse-grained soil. <sup>4</sup> <u>150 mg/kg</u> for PHC F2 = Site Specific Target Level in Human Health and Environment Risk Assessment (BluMetric 2017b)

**BOLD** Does not meet applicable guidelines

### SOIL CLOSURE LEVELS - TOTAL METALS

		Soil Gu	Closure Level					
Constituent (ICP-MS Metals)	Units	GNWT <sup>1</sup> Residential / Parkland Coarse soil	CCME <sup>2</sup> Soil Quality – Residential / Parkland	Min. <sup>3</sup> Baseline Concentration	Max. <sup>3</sup> Baseline Concentration	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis
Aluminum (Al)	mg/kg	-	-	-	-	-	-	-
Antimony	mg/kg	20	20	<0.1	0.45	0.5625	20	GNWT/CCME Guideline
Arsenic (As)	mg/kg	12	12	0.74	11.2	14	14	Baseline + 25%
Barium	mg/kg	500	500	56.2	222	277.5	500	GNWT/CCME Guideline
Beryllium (Be)	mg/kg	4	4	<0.4	0.74	0.925	4	GNWT/CCME Guideline
Boron (B) Hot Water Soluble	mg/kg	-	-	-	-	-	-	-
Cadmium (Cd)	mg/kg	10	10	0.053	0.454	0.5675	10	GNWT/CCME Guideline
Chromium (Cr) Total	mg/kg	64	64	2.46	24.9	31.125	64	GNWT/CCME Guideline
Cobalt (Co)	mg/kg	50	50	1.11	8.55	10.6875	50	GNWT/CCME Guideline
Copper (Cu)	mg/kg	63	63	1.32	37.3	46.625	63	GNWT/CCME Guideline
Iron (Fe)	mg/kg	-	-	-	-	-	-	-
Lead (Pb)	mg/kg	140	140	0.0015	14.5	18.125	140	GNWT/CCME Guideline
Lithium (Li)	mg/kg	-	-	-	-	-	-	-
Magnesium (Mg)	mg/kg	-	-	-	-	-	-	-
Manganese (Mn)	mg/kg	-	-	-	-	-	-	-
Mercury (Hg) inorganic	mg/kg	6.6	6.6	0.0068	0.0531	0.066375	6.6	GNWT/CCME Guideline
Molybdenum (Mo)	mg/kg	10	10	0.26	1.61	2.0125	10	GNWT/CCME Guideline
Nickel (Ni)	mg/kg	50	45	2.38	23.6	29.5	45	CCME Guideline
Phosphorous (P)	mg/kg	-	-	-	-	-	-	-
Potassium	mg/kg	-	-	-	-	-	-	-
Selenium (Se)	mg/kg	1	1	<0.2	0.64	0.8	1	GNWT/CCME Guideline
Silicon (Si)	mg/kg	-	-	-	-	-	-	-
Silver (Ag)	mg/kg	20	20	<0.1	<0.1	0.125	20	GNWT/CCME Guideline
Sodium (Na)	mg/kg	-	-	-	-	-	-	-
Strontium (Sr)	mg/kg	-	-	-	-	-	-	-
Sulphur (S) elemental	mg/kg	-	-	-	-	-	-	-
Thallium (TI)	mg/kg	1	1	< 0.05	0.137	0.17125	1	GNWT/CCME Guideline
Tin (Sn)	mg/kg	50	50	<2	<2	2.5	50	GNWT/CCME Guideline
Titanium (Ti)	mg/kg	-	-	-	-	-	-	-
Uranium (U)	mg/kg	-	23	0.145	1.61	2.0125	23	CCME Guideline
Vanadium (V)	mg/kg	130	130	5.6	42.2	52.75	130	GNWT/CCME Guideline
Zinc (Zn)	mg/kg	200	250	6.9	62	77.5	200	GNWT Guideline

Notes <sup>1</sup> GNWT – Government of Northwest Territories, 2003, Environmental Guideline for Contaminated Site Remediation <sup>1</sup> GNWT – Government of Northwest Territories, 2010, Consider Soil Quality Guidelines for Protection of Environment

<sup>2</sup> Canadian Council of Ministries of Environment, 2019, Canadian Soil Quality Guidelines for Protection of Environmental and Human Health

**BOLD** Does not meet applicable guidelines

#### **GROUNDWATER CLOSURE LEVELS – ORGANICS AND GENERAL CHEMISTRY**

		Groundwater Guidelines		Closure Level				
Constituent	Units	FIGQG <sup>1</sup>	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis	
Volatiles								
Benzene	mg/L	0.014	< 0.0004	0.0029	-	0.014	FIGQG Guideline	
Toluene	mg/L	0.083	< 0.0004	1.39	-	0.083	FIGQG Guideline	
Ethylbenzene	mg/L	11	< 0.0004	0.0024	-	11	FIGQG Guideline	
Xylene (Total)	mg/L	3.9	<0.0008	0.0087	-	3.9	FIGQG Guideline	
Hydrocarbon								
F1 - BTEX (C6-C10)	mg/L	0.81	<0.1	<5	-	0.81	FIGQG Guideline	
F2 (C10-C16 Hydrocarbons)	mg/L	1.3	<0.1	2.77	-	1.3	FIGQG Guideline	
F3 (C16-C34 Hydrocarbons)	mg/L	-	<0.1	3.88	-	-	-	
F4 (C34-C50 Hydrocarbons)	mg/L	-	<0.2	<3	-	-	-	
Free Product 0 LNAPL								
LNAPL Thickness	mm	-	0	0	-	0	No measurable LNAPL	
General Chemistry								
Total Suspended Solids	mg/L	3,000	100	3,000	3,750	3,750	Baseline + 25%	
Chemical Oxygen Demand	mg/L	-	52	76	95	95	Baseline + 25%	
рН	рН	6.5 - 9	7.66	8.33	N/A <sup>2</sup>	9	FIGQG Guideline	

Notes <sup>1</sup> Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012, for coarse-grained soil in Residential/Parkland Land Uses – Tier 1 Lowest Guideline <sup>2</sup> Not Applicable BOLD Does not meet applicable guidelines

#### **GROUNDWATER CLOSURE LEVELS – POLYCYCLIC AROMATIC HYDROCARBONS**

		Groundwater Guidelines	Closure Level						
Constituent	Units	FIGQG <sup>1</sup>	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis		
Polycyclic Aromatic Hydrocarbons									
Carcinogenic PAH (B[a]P as TPE	mg/L	0.00001	< 0.00001	<0.00001	-	0.00001	FIGQG Guideline		
Acenaphthene	mg/L	0.0058	<0.0001	0.000827	-	0.0058	FIGQG Guideline		
Acenaphthylene	mg/L	0.046	<0.0001	<0.0002	-	0.046	FIGQG Guideline		
Acridine	mg/L	-	< 0.00005	<0.000099	0.00012	0.00012	Max. Baseline + 25%		
Anthracene	mg/L	0.000012	< 0.00001	<0.00001	-	0.000012	FIGQG Guideline		
Benz(a)anthracene	mg/L	0.000018	< 0.000085	<0.00001	-	0.000018	FIGQG Guideline		
Benzo(b+j)fluoranthene	mg/L	0.00048	< 0.000085	< 0.00005	-	0.00048	FIGQG Guideline		
Benzo(k)fluoranthene	mg/L	0.00048	< 0.000085	< 0.00005	-	0.00048	FIGQG Guideline		
Benzo(g,h,i)perylene	mg/L	0.00017	< 0.000085	< 0.00005	-	0.00017	FIGQG Guideline		
Benzo(c)phenanthrene	mg/L	-	< 0.00005	< 0.00005	0.0000625	0.0000625	Max. Baseline + 25%		
Benzo(a)pyrene	mg/L	0.00001	< 0.000075	<0.00009	-	0.00001	FIGQG Guideline		
Benzo[e]pyrene	mg/L	-	< 0.00005	< 0.00005	0.0000625	0.0000625	Max. Baseline + 25%		
Chrysene	mg/L	0.0001	< 0.000085	< 0.00005	-	0.0001	FIGQG Guideline		
Dibenz(a,h)anthracene	mg/L	0.00026	< 0.000075	<0.000075	-	0.00026	FIGQG Guideline		
Fluoranthene	mg/L	0.00004	< 0.00001	<0.00001	-	0.00004	FIGQG Guideline		
Fluorene	mg/L	0.003	< 0.00005	< 0.00005	-	0.003	FIGQG Guideline		
Indeno(1,2,3-c,d)pyrene	mg/L	0.00021	< 0.000085	<0.000085	-	0.00021	FIGQG Guideline		
1-Methylnaphthalene	mg/L	0.18	< 0.0001	<0.0001	-	0.18	FIGQG Guideline		
2-Methylnaphthalene	mg/L	0.18	<0.0001	<0.0001	-	0.18	FIGQG Guideline		
Naphthalene	mg/L	0.0011	<0.0001	<0.0001	-	0.0011	FIGQG Guideline		
Phenanthrene	mm	0.0004	< 0.00005	<0.00005	-	0.0004	FIGQG Guideline		
Perylene	mg/L	-	< 0.00005	< 0.00005	0.0000625	0.0000625	Max. Baseline + 25%		
Pyrene	mg/L	0.000025	< 0.00002	< 0.00002	-	0.000025	FIGQG Guideline		
Quinoline	mg/L	3.4	< 0.0002	<0.0051	-	3.4	FIGQG Guideline		

Notes <u>Federal Interim</u> Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012, for coarse-grained soil in Residential/Parkland Land Uses – Tier 1 Lowest Guideline **BOLD** Does not meet applicable guidelines

# **GROUNDWATER CLOSURE LEVELS – DISSOLVED METALS**

		Groundwater Guidelines	Closure Level						
Constituent (ICP-MS Metals)	Units	FIGQ61	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis		
Aluminum (Al)	mg/L	0.005 (0.1) <sup>2</sup>	<0.001	0.015	0.01875	0.005 (0.1) <sup>2</sup>	FIGQG Guideline		
Antimony	mg/L	2.0	< 0.0001	<0.0006	0.00075	2.0	FIGQG Guideline		
Arsenic (As)	mg/L	0.005	0.0001	0.0052	0.0065	0.0317	Site Specific Target Level (BluMetric, 2017b)		
Barium	mg/L	0.5	0.186	0.96	1.19	0.5	FIGQG Guideline		
Beryllium (Be)	mg/L	0.0053	<0.0001	<0.001	0.00125	0.0053	FIGQG Guideline		
Boron (B)	mg/L	5	<0.01	0.19	0.2375	5	FIGQG Guideline		
Cadmium (Cd)	mg/L	0.000017	< 0.000005	0.000075	0.000094	0.000017	FIGQG Guideline		
Chromium (Cr)	mg/L	0.0089	<0.0001	<0.001	0.00125	0.0089	FIGQG Guideline		
Cobalt (Co)	mg/L	0.05	<0.0001	<0.005	0.00625	0.05	FIGQG Guideline		
Copper (Cu)	mg/L	0.002 (0.004) <sup>2</sup>	0.0002	0.00297	0.00371	0.002 (0.004) <sup>2</sup>	FIGQG Guideline		
Iron (Fe)	mg/L	0.3	<0.01	9.2	11.5	0.3	FIGQG Guideline		
Lead (Pb)	mg/L	0.001 (0.007) <sup>2</sup>	< 0.00005	0.000483	0.000604	0.001 (0.007) <sup>2</sup>	FIGQG Guideline		
Lithium (Li)	mg/L	-	< 0.005	0.0251	0.0313	0.0313	Baseline + 25%		
Magnesium (Mg)	mg/L	-	14	38.4	48	48	Baseline + 25%		
Manganese (Mn)	mg/L	0.2	0.00031	3.06	3.825	0.2	FIGQG Guideline		
Mercury (Hg)	mg/L	0.000016	< 0.000005	<0.00002	0.000025	0.000016	FIGQG Guideline		
Molybdenum (Mo)	mg/L	0.073	0.0011	0.00437	0.00546	0.073	FIGQG Guideline		
Nickel (Ni)	mg/L	0.025 (0.150) <sup>2</sup>	0.0047	0.0096	0.012	0.025 (0.150) <sup>2</sup>	FIGQG Guideline		
Potassium	mg/L	-	4.6	17.2	21.5	21.5	Baseline + 25%		
Selenium (Se)	mg/L	0.001	< 0.0002	0.00111	0.00139	0.001	FIGQG Guideline		
Silver (Ag)	mg/L	0.0001	<0.00001	<0.0001	0.000125	0.0001	FIGQG Guideline		
Sodium (Na)	mg/L	-	3.0	112	140	140	Baseline + 25%		
Thallium (TI)	mg/L	0.0008	< 0.0002	<0.0002	0.00025	0.0008	FIGQG Guideline		
Tin (Sn)	mg/L	-	<0.0001	<0.005	0.00625	0.00625	Baseline + 25%		
Titanium (Ti)	mg/L	0.1	< 0.0003	<0.005	0.00625	0.1	FIGQG Guideline		
Uranium (U)	mg/L	0.015	0.000088	0.00426	0.0044	0.015	FIGQG Guideline		
Vanadium (V)	mg/L	0.1	< 0.0005	< 0.005	0.00625	0.1	FIGQG Guideline		
Zinc (Zn)	mg/L	0.01	< 0.0005	0.0134	0.0167	0.01	FIGQG Guideline		

Notes <sup>1</sup>Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012, for coarse-grained soil in Residential/Parkland Land Uses – Tier 1 Lowest Guideline

<sup>2</sup> Guideline depends on water quality parameter (e.g. hardness), first value shown is lowest acceptable concentration, value in brackets is highest acceptable concentration.

**BOLD** Does not meet applicable guidelines

#### SURFACE WATER CLOSURE LEVELS – ORGANICS AND GENERAL CHEMISTRY

		Groundwater Guidelines		Closure Level					
Constituent	Units	FIGQG <sup>1</sup>	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis		
Volatiles									
Benzene	mg/L	0.69	< 0.0005	<0.0005	-	0.69	FIGQG Guideline		
Toluene	mg/L	0.083	< 0.0005	<0.0005	-	0.083	FIGQG Guideline		
Ethylbenzene	mg/L	41	< 0.0005	<0.0005	-	41	FIGQG Guideline		
Xylene (Total)	mg/L	18	<0.00071	<0.00071	-	18	FIGQG Guideline		
Hydrocarbon									
F1 - BTEX (C6-C10)	mg/L	9.8	<0.1	<0.1	-	9.8	FIGQG Guideline		
F2 (C10-C16 Hydrocarbons)	mg/L	1.3	<0.1	<0.1	-	1.3	FIGQG Guideline		
F3 (C16-C34 Hydrocarbons)	mg/L	-	<0.25	<0.25	-	-	-		
F4 (C34-C50 Hydrocarbons)	mg/L	-	<0.25	<0.25	-	-	-		
Free Product 0 LNAPL									
LNAPL Thickness	mm	-	0	0	-	0	No measurable LNAPL		
General Chemistry									
Total Suspended Solids	mg/L	3,000	100	3,000	3,750	3,750	Baseline + 25%		
Chemical Oxygen Demand	mg/L	-	52	76	95	95	Baseline + 25%		
pH	pН	6.5 - 9	7.94	8.04	N/A <sup>2</sup>	9	FIGQG Guideline		

Notes 1 Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012, for coarse-grained soil in Residential/Parkland Land Uses – Tier 1 Lowest Guideline <sup>2</sup> Not Applicable BOLD Does not meet applicable guidelines

#### SURFACE WATER CLOSURE LEVELS – POLYCYCLIC AROMATIC HYDROCARBONS

		Groundwater Guidelines	Closure Level						
Constituent	Units	FIGQG1	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis		
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	mg/L	0.0058	< 0.00002	< 0.00002	-	0.0058	FIGQG Guideline		
Acenaphthylene	mg/L	0.046	<0.0001	<0.0002	-	0.046	FIGQG Guideline		
Anthracene	mg/L	0.000012	< 0.00001	< 0.00001	-	0.000012	FIGQG Guideline		
Benz(a)anthracene	mg/L	0.000018	< 0.00001	< 0.00001	-	0.000018	FIGQG Guideline		
Benzo(b+j)fluoranthene	mg/L	0.00048	< 0.00001	<0.00001	-	0.00048	FIGQG Guideline		
Benzo(k)fluoranthene	mg/L	0.00048	< 0.00001	< 0.00001	-	0.00048	FIGQG Guideline		
Benzo(g,h,i)perylene	mg/L	0.00017	< 0.00002	< 0.00002	-	0.00017	FIGQG Guideline		
Benzo(a)pyrene	mg/L	0.000015	< 0.000005	<0.000005	-	0.00001	FIGQG Guideline		
Chrysene	mg/L	0.0014	< 0.00002	< 0.00002	-	0.0001	FIGQG Guideline		
Dibenz(a,h)anthracene	mg/L	0.00026	< 0.000005	< 0.000005	-	0.00026	FIGQG Guideline		
Fluoranthene	mg/L	0.00004	< 0.00002	< 0.00002	-	0.00004	FIGQG Guideline		
Fluorene	mg/L	0.003	< 0.00002	< 0.00002	-	0.003	FIGQG Guideline		
Indeno(1,2,3-c,d)pyrene	mg/L	0.00021	< 0.00001	<0.00001	-	0.00021	FIGQG Guideline		
1-Methylnaphthalene	mg/L	0.18	<0.0001	<0.0001	-	0.18	FIGQG Guideline		
2-Methylnaphthalene	mg/L	0.18	<0.0001	<0.0001	-	0.18	FIGQG Guideline		
Naphthalene	mg/L	0.0011	< 0.00005	< 0.00005	-	0.0011	FIGQG Guideline		
Phenanthrene	mm	0.0004	< 0.00005	< 0.00005	-	0.0004	FIGQG Guideline		
Pyrene	mg/L	0.000025	< 0.00001	< 0.00001	-	0.000025	FIGQG Guideline		

#### Notes

<sup>1</sup>Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012, for coarse-grained soil in Residential/Parkland Land Uses – Freshwater Aquatic Life **BOLD** Does not meet applicable guidelines

# SURFACE WATER CLOSURE LEVELS - TOTAL METALS

		Groundwater Guidelines	Closure Level						
Constituent (ICP-MS Metals)	Units	FIGQ61	Min. Baseline Concentration	Max. Baseline Concentration (BluMetric, 2017)	Max. Baseline Concentration + 25%	Closure Level	Closure Level Basis		
Aluminum (Al)	mg/L	0.1 <sup>2</sup>	0.0078	0.151	0.1875	0.1875	Baseline + 25%		
Antimony	mg/L	2.0	<0.0001	<0.0001	0.000125	2.0	FIGQG Guideline		
Arsenic (As)	mg/L	0.005	0.00042	0.00107	0.0065	0.005	FIGQG Guideline		
Barium	mg/L	2.9	0.0665	0.432	0.54	2.9	FIGQG Guideline		
Beryllium (Be)	mg/L	0.0053	< 0.0001	<0.0001	0.000125	0.0053	FIGQG Guideline		
Boron (B)	mg/L	-	0.026	0.28	0.35	0.35	Baseline + 25%		
Cadmium (Cd)	mg/L	0.000017	<0.000005	0.0000119	0.0000148	0.000017	FIGQG Guideline		
Chromium (Cr)	mg/L	0.0089	<0.0001	0.00413	0.00516	0.0089	FIGQG Guideline		
Cobalt (Co)	mg/L	-	<0.0001	0.00019	0.00024	0.00024	Baseline + 25%		
Copper (Cu)	mg/L	0.004 <sup>2</sup>	< 0.0005	0.00133	0.00166	0.004 <sup>2</sup>	FIGQG Guideline		
Iron (Fe)	mg/L	0.3	0.118	0.418	0.522	0.522	Baseline + 25%		
Lead (Pb)	mg/L	0.007 <sup>2</sup>	< 0.00005	0.000182	0.000227	0.007 <sup>2</sup>	FIGQG Guideline		
Lithium (Li)	mg/L	-	0.0027	0.0047	0.0059	0.0059	Baseline + 25%		
Magnesium (Mg)	mg/L	-	9.65	21.7	27.1	27.1	Baseline + 25%		
Manganese (Mn)	mg/L	-	0.0104	0.0193	0.0241	0.0241	Baseline + 25%		
Mercury (Hg)	mg/L	0.000026	< 0.000005	< 0.0000072	0.000009	0.000026	FIGQG Guideline		
Molybdenum (Mo)	mg/L	0.073	0.0011	0.00437	0.00546	0.073	FIGQG Guideline		
Nickel (Ni)	mg/L	0.15 <sup>2</sup>	0.00054	0.00189	0.00236	0.15 <sup>2</sup>	FIGQG Guideline		
Potassium	mg/L	-	0.639	3.62	4.52	4.52	Baseline + 25%		
Selenium (Se)	mg/L	0.001	0.000066	0.000117	0.000146	0.001	FIGQG Guideline		
Silver (Ag)	mg/L	0.0001	< 0.000001	<0.00001	0.0000125	0.0001	FIGQG Guideline		
Sodium (Na)	mg/L	-	6.77	7.8	9.7	9.7	Baseline + 25%		
Thallium (TI)	mg/L	0.0008	<0.00001	<0.00001	0.000012	0.0008	FIGQG Guideline		
Tin (Sn)	mg/L	-	< 0.0001	<0.0001	0.00012	0.00012	Baseline + 25%		
Titanium (Ti)	mg/L	0.1	< 0.0003	0.00329	0.00411	0.1	FIGQG Guideline		
Uranium (U)	mg/L	0.015	0.000139	0.000172	0.000215	0.015	FIGQG Guideline		
Vanadium (V)	mg/L	-	< 0.0005	0.00088	0.0011	0.0011	Baseline + 25%		
Zinc (Zn)	mg/L	0.03	< 0.003	0.0041	0.0051	0.03	FIGQG Guideline		

Notes <sup>1</sup>Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, November 2012, for coarse-grained soil in Residential/Parkland Land Uses – Freshwater Aquatic Life

<sup>2</sup> Guideline depends on water quality parameter (e.g. hardness), first value shown is lowest acceptable concentration, value in brackets is highest acceptable concentration.

BOLD Does not meet applicable guidelines



Checkpoint Highway Maintenance Camp and Landfarm 2019 Remediation Work Plan

# Checkpoint Highway Maintenance Camp and Landfarm

Remediation Work Plan Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Section



**Remediation Work Plan** 

Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Section

KBL Project Number: 19-019NT

August 29, 2019

# **Table of Contents**

1.0	Introduction	4
2.0	Background	4
3.0	Regulatory Framework	5
3.1.	Land Use	.5
3.2.	Applicable Standards	.5
3.	2.1. Soil	.5
3.	2.2. Water	.5
4.0	Checkpoint Highway Maintenance Camp remedial work	6
4.1.	Transportation of Treated Soil to Checkpoint Highway Maintenance Camp	.6
4.2.	Excavation Backfilling	.6
4.3.	Hazardous and Non-Hazardous Debris Management	.9
4.4.	Onsite Sampling	.9
4.	4.1. Hazardous Materials Testing	.9
4.	4.2. Confirmatory Soil Sampling	.9
4.	4.3. Stockpiled Soil Sampling	10
4.5.	Former Sawmill Area	0
4.6.	Checkpoint Highway Maintenance Camp Monitoring Well Network Assessment	0
5.0	Checkpoint Landfarm Remedial Work1	1
5.1.	Checkpoint Landfarm Assessment	1
5.2.	Soil Treatment	2
5.3.	Confirmatory Sampling	2
6.0	Site Survey1	3
7.0	Groundwater Sampling Methodology 1	3
8.0	Quality Assurance & Quality Control (QA/QC) 1	3
8.1.	Sample Handling	4
8.2.	Field Decontamination	4
8.3.	Blind Field Duplicates	4
9.0	Inspector Approval 1	4
10.0	Schedule 1	5
11.0	Notice to Readers/Closure	6
12.0	References1	8

# LIST OF TABLES

- Table 3-1: Selected Environmental Soil Quality Guidelines
- Table 4-1: CMC Areas Requiring Remedial Excavation
- Table 4-2: CMC Monitoring Well Network

Table 9-1: Proposed Schedule

# **APPENDICES**

- Appendix A Site Drawings
- Appendix B BluMetric, 2017, Remedial Action Plan

# 1.0 INTRODUCTION

This Remediation Work Plan (RWP) outlines how KBL will complete remedial work at the Former Checkpoint Highway Maintenance Camp (CMC) and the Checkpoint Landfarm (CL) in 2019 (shown in Figure 1 of Appendix A). Specifically, this RWP outlines the activities in relation to the BluMetric 2017 Records Review Summary and Remedial Action Plan (RAP), and previous Phase III Environmental Site Assessments (ESAs) reported in 2017 and 2012 by BluMetric and Columbia Environmental, respectively. The CMC Areas of Environmental Concern (AECs) and Areas of Potential Environmental Concern (APECs) are shown on Figure 2 of Appendix A. 2019 activities include the further assessment of soil contained in the CL, the transportation of soil from the CL to the maintenance camp, transportation and disposal of any hazardous and nonhazardous debris from the maintenance camp, excavation and transportation of additional contaminated soil from the CMC to the CL, confirmatory sampling and groundwater well decommissioning. Ongoing work to be completed at the CL includes Surveillance Network Program (SNP) monitoring, retention pond and overflow cell decanting, treatment of newly deposited contaminated soil and confirmatory sampling. The SNP groundwater monitoring wells and most recent soil sampling locations are shown in Figure 3 of Appendix A. The proposed methodologies for determining excavation extents and soil treatment methods are also outlined along with proposed methods for handling onsite waste debris. This RWP also describes the steps that will be taken to ensure that activities meet the requirements set forth in the Land Use Permit and the Water Licence. Both the CMC and CL are permitted by the Mackenzie Valley Land and Water Board with an active Type A Land Use Permit (MV2017X0020) and Type B Water License (MW2017L8-0004). This RWP will be updated as necessary if any site changes occur.

# 2.0 BACKGROUND

The CL was constructed in 2009 to accept hydrocarbon impacted soil from the abandoned CMC. The CMC is located approximately 1 km southwest of the junction Highway 7 and Highway 1, while the CL is located at km 414 of Highway 1 (see Figure 1 in Appendix A).

The CMC was originally developed as a highway maintenance area in the 1970s by Yukon Construction Co. and was later used for logging and milling operations from 1990 until 2000. Hydrocarbon impacted soils primarily from a landfill (P10/11 AEC-1) in the CMC were transported to the CL in 2010 for treatment. BluMetric completed a Supplemental Phase III Environmental Site Assessment (ESA) in 2016 (BluMetric, 2017). The assessment identified soil in exceedance of applicable guidelines for petroleum hydrocarbons (PHC F1-F4), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), and metals. Previous assessments also identified multiple scrap waste metal piles as wells as hazardous and non-hazardous debris scattered around the CMC (see Figure 2 in Appendix A). The western edge of the CMC contains an abandoned wooden structure which requires assessment for hazardous materials prior to removal and disposal. The Supplemental Phase III ESA recommended a Human Health and Ecological Risk Assessment (HHERA) be completed for the CMC. Subsequently, a HHERA and RAP were completed for the CMC in 2016. The HHERA concluded there were potential surface receptors for PHC and PAH contaminants, and no current receptors for dissolved metals in groundwater.

The Government of the Northwest Territories (GNWT) Department of Environment and Natural Resources (ENR) Environmental Protection and Waste Management (EPWM) division has conducted groundwater and surface water monitoring and maintenance of the CL in accordance with the Water Licence. Water volume

within the retention pond and overflow cell are monitored and discharged as required.

# 3.0 REGULATORY FRAMEWORK

#### 3.1. Land Use

The CMC is currently inactive and gated. Based on the current use and the site setting, the applied land use for the CMC will be Residential/Parkland for coarse grained soil.

#### 3.2. Applicable Standards

#### 3.2.1. Soil

Contaminants of concerns are well documented in historical Phase III ESA reports and have been determined based on previous land use and operations that occurred at the CMC. The parameters to be analyzed in the soil are as follows:

- PHCs (petroleum hydrocarbons F1-F4);
- BTEX (benzene, toluene, ethylbenzene and xylenes);
- PAHs (polycyclic aromatic hydrocarbons); and
- Metals.

Historical activities at the CMC have used several environmental quality guidelines to assess sample results. To maintain continuity, territorial and federal guidelines will be utilized. Soil samples collected from the CMC will be analyzed for the contaminants of concern and will be compared to the guidelines listed in Table 2-1 below for coarse grain soil.

#### Table 3-1: Selected Environmental Soil Quality Guidelines

Sample Media	Guideline	Parameters
	Government of the Northwest Territories (GNWT), 2003, <i>Environmental Guideline for Contaminated Site Remediation.</i>	BTEX, PHCs, PAHs and Metals
Soil	Canadian Council of Ministers of the Environment (CCME), 2008, Canada Wide Standard for Petroleum Hydrocarbons in Soil.	PHCs
	CCME, 2010, Canadian soil quality guidelines for the protection of environmental and human health: Carcinogenic and Other PAHs	PAHs
	CCME, 2019, Canadian Soil Quality Guidelines for Protection of Environmental and Human Health (downloaded as of 2019)	BTEX, Metals

# 3.2.2. Water

As per the water licence (MV2017L8-0004), remediation treatment water accumulated in the retention pond

and overflow cell at the CL will be discharged to the surface in accordance with the Effluent Quality Criteria in Schedule 1 of MV2017L8-0004.

# 4.0 CHECKPOINT HIGHWAY MAINTENANCE CAMP REMEDIAL WORK

The CMC has multiple remedial objectives associated with historical impacts. These objectives are defined in the bid documents that were included as a part of the Request for Proposal (Event ID 0000002982). The objectives, along with items included in the 2017 and 2012 Phase III ESA investigation reports and through discussion with GNWT ENR EPWM division, are included in this section. Prior to site activities, KBL will complete a Health and Safety Plan and ensure that all KBL staff and sub-contractors are aware of site conditions and any health and safety considerations.

# 4.1. Transportation of Treated Soil to Checkpoint Highway Maintenance Camp

There is currently approximately 6200 cubic meters (m<sup>3</sup>) of soil in the CL. In 2018, soil met pH, BTEX and F1-F4 GNWT Tier 1 residential/parkland land use guidelines for coarse soil (Annual Report, 2018). The soil requires analysis of PAH content prior to re-use at the CMC for backfill purposes.

The retention pond (SNP 2017-1) and overflow cell (SNP 2017-2) will be sampled with intention to decant. The soil contained within the CL will be sampled for PAH content upon conclusion of decant, with the results provided to GNWT ENR EPWM division for review. Upon conclusion of decant, and the receipt of necessary approvals, removal of soil will be timed to occur to ensure conditions are as dry as possible. This will serve to allow better access for equipment and protection of the CL base materials. Trucks will enter the CL via the southern entrance ramp and be loaded with an excavator or loader. KBL personnel will supervise the removal of soil and visually inspect the CL base throughout the process. Soil removed from the CL will be tracked and documented under federal transport manifest. In the event moisture creates soft conditions in the CL, work will be notified, and conditions will be assessed to determine the potential steps to progress the work. One possible remedy that is contemplated in advance of such a potential condition is the use of soft tired machinery to relocate treated soil closer to the entrance. This would reduce the need for trucks and equipment to be operating throughout the CL.

Once loaded, trucks will transport soil to the CMC and either place soil as backfill directly into the currently open excavation, or in a stockpile location agreed upon with ENR. Loaded trucks will be inspected prior to departing the CL to ensure soil is not tracked out of the CL. During remedial activities, frequent inspections will be completed of Highways 1 and 7 to ensure that no soil accumulates from hauling activities. If required, the sub-contractor will be directed to complete cleanup of any soil tracked on the highways and return it to the CL. Any soil that is tracked out of the CL into the surrounding quarry will also be returned to the CL.

# 4.2. Excavation Backfilling

At the CMC, the only current open excavation is located at Parcels 10 and 11 area of environmental concern 1 (P10/11-AEC 1). Prior to backfilling, the following will be undertaken:

1) Visual observation for nesting birds, or signs of nesting locations, will be conducted. If any nesting locations are observed, discussions will occur with local ENR Biologists to determine a suitable time

of year to proceed with the backfill process.

- 2) A surface water sample will be collected from any standing water in P10/11-AEC 1 and analyzed for parameters of concern that were previously identified. Results will be compared to the *Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life*, and the results will be submitted to the GNWT Water Resource Officer (WRO) inspector in anticipation of a discharge to surface. The location of the discharge location will be approved by the WRO and will aim to ensure discharge water has sufficient area to flow overland prior to entering Jean Marie River, and care will be taken to ensure that surficial erosion does not occur.
- 3) Pending a change order, after draining the accumulated surface water from the 2010 P10/11-AEC 1 remedial excavation, additional samples from the base of P10/11-AEC 1 for metals, PHC, BTEX and PAHs content will be collected, and results provided to GNWT ENR EPWM with the intent to obtain approval to backfill.

Upon obtaining approval, backfilling will occur by depositing treated soil near the northern portion of the excavation and using heavy equipment to place the soil in even lifts across the entire excavation. As soil is placed in lifts (approximately one meter each) the soil will be track packed using the heavy equipment. Compaction specifications and confirmatory compaction testing have not been specified for the CMC or CL.

It is anticipated that the amount of soil available for backfill from the CL will exceed that which is required for use as backfill at this location. Any soil not required as backfill in this excavation will be stockpiled onsite at an agreed upon location for use as backfill in additional excavations that are completed as a part of this Remediation Work Plan.

The BluMetric Supplementary Phase III Environmental Site Assessment Report (2017) and Columbia Supplemental Phase III Environmental Site Assessment Report (2012) were reviewed to determine areas which require additional excavation. The areas requiring additional excavation are listed in Table 4-1.

Checkpoint Remediation and Landfarm Monitoring

Table 4-1: CMC	Areas	Requiring	Remedial	Excavation
----------------	-------	-----------	----------	------------

Parcel – APEC / AEC	Location Detail and Contaminants of Concern	Delineated	Estimated Volume of Soil
P7-APEC 2: Temporary Hazardous Waste Storage Area	SS1, 0.2-0.5 mbgs: PAH, F1, F2, F3, xylene	Appears to be limited to vicinity of original 80m <sup>2</sup> staining (Columbia 2012)	40 m <sup>3</sup>
P8-APEC 3: Camp Septic Pits	TP-19, 1.5-2.7 mbgs: PAH, F2	Area of TP19, impacted appears to not be delineated east	<5 m <sup>3</sup>
P9-APEC 1: Former Camp Tanks and Scattered Debris	SS4 location, 0.1-0.2 mbgs: F1, F2	Impacts appear to be limited to immediate vicinity of sample SS4 (Columbia, 2012)	<1 m <sup>3</sup>
P10/11-AEC 1: Dump/Landfill	Area 1 (BH1/TP1), 3.0-4.0 mbgs: PAH, F2	Test pits could not be advanced further east to delineate this direction due to tree growth and slope	300 m <sup>3</sup>
	Area 2 (TP7/TP9), 2.0-2.5 mbgs: F2	Delineated by 2016 (TP21, TP27, TP28 BluMetric and 2012 samples (MW2, edge of the excavation)	200 m <sup>3</sup>
	Area 3 (TP 23), <2.5 mbgs: F2, PAH	Appears limited to vicinity of TP23 as surrounding test pits clean (TP26, 27, 28, 30)	200 m <sup>3</sup>
	Area 4 (TP 13), 2.1-2.4 mbgs: PAH	Delineated by TP24 and 25	Minimal
	Excavation base	Not delineated	Sampling of base required to confirm clean limits

Remedial excavation will be undertaken by removing soil at the point of the source as identified in BluMetric 2017 and Columbia 2012 reports. Prior to excavating, soil results from previous investigations will be provided to the Inspector with intention of approval for acceptance. All soil entering the CL must meet the requirements listed in Schedule 1, Part F of the Water License.

Upon receiving approval, soil will be excavated and loaded into trucks for transport using an excavator. Excavations will be surveyed and measured with soil volumes recorded. All soil will be transported under transportation manifest.

Excavation extents will be determined by collecting interim wall and base samples and screening for the presence of vapours using an RKI Eagle. Vapour readings will be documented in the field and using a combination of readings and visual observation, samples will be submitted to the laboratory for analysis.

# 4.3. Hazardous and Non-Hazardous Debris Management

Pending the results of the hazardous material survey completed onsite, debris will be managed according to its status as either hazardous or non-hazardous. Any hazardous debris will be packaged and manifested by KBL personnel in accordance with Transportation of Dangerous Goods (TDG) procedures. It is anticipated that any hazardous material removed from the CMC or the CL will be transported to the KBL Environmental hazardous waste facility in Yellowknife, NT for consolidation and disposal.

It is planned that the current waste debris piles consist of mostly scrap steel and can be handled in a manner which poses no risk to environmental receptors or human health. Scrap steel will be loaded into trucks and transported for disposal at H-H Shearing and Salvage in High Level, AB who has confirmed acceptance of all metals contained in the debris piles. Any internal hazardous materials (i.e., mercury in thermostats) will be managed by the receiver.

Surficial debris which is predominantly located in Parcel 9 of the CMC will be collected and stockpiled at the former residence camp clearing. Surficial debris will be removed by hand (when possible) from treed areas, although some tree clearing may be required to allow for skid steer or backhoe access to remove debris. Any required tree clearing will be completed in accordance with the Land Use Permit requirements. Areas of surficial debris removal will be documented and include the type of debris removed to allow for determination of whether or not environmental testing is required in soil at the removal location. Removed debris will be stockpiled and then loaded into trucks for disposal. Surficial debris is anticipated to mainly consist of metal and disposal will occur in the same manner as the piled metal debris. Surficial debris will be documented and photographed prior to removal.

# 4.4. Onsite Sampling

# 4.4.1. Hazardous Materials Testing

The abandoned structure at the CMC will be assessed to determine the likelihood that any hazardous building materials are present within it. Suspected hazardous building materials will be bulk sampled for lead and asbestos (based on potential to exist) utilizing industry practiced methods and analyzed by a laboratory accredited by Canadian Associate for Laboratory Accreditation Inc. (CALA) or the American Industrial Hygiene Association (AIHA). Results of bulk sampling will dictate subsequent handling and transportation requirements. Based on the results of the assessment, the building will be demolished in a manner which protects both the environment and human health. If hazardous materials are suspected, KBL will create a plan for the safe demolition, loading and transport of the material to a final disposal location. At the same time as the abandoned structure is being assessed, KBL will also inspect the current waste debris piles and surficial debris at the CMC to determine if any hazardous debris is suspected.

# 4.4.2. Confirmatory Soil Sampling

Once it is believed that excavation extents have been achieved, confirmatory samples will be collected from walls and bases of remedial excavations to be analyzed for the contaminants of concern. A standard sample grid spacing (i.e., 4 meters by 4 meters) will be used to ensure that representative sampling occurs, and all sample locations will be recorded for future reference. Soil samples will be collected in accordance with KBL's SOP for *Soil Sampling during Remedial Excavations and Soil Treatment Operations*. As samples are

collected, headspace vapour samples will be analyzed in the field using an RKI Eagle 2 (or similar) to determine the likelihood that the sample will meet applicable guidelines. If it is suspected that a sample location will exceed the guideline based on the headspace vapour reading, additional soil may be removed prior to collecting a confirmatory sample.

Samples will be packed in laboratory supplied containers (methanol vials for BTEX and F1; sample jars for all other parameters) and kept cool and will be transported on a chain of custody to either the laboratory depot or a third-party cargo operator for transportation to the laboratory. Soil results will be tabulated compared to the applicable criteria in Table 2.1.

# 4.4.3. Stockpiled Soil Sampling

Onsite there are two soil stockpiles proposed for backfilling or surface spreading during remedial activities. The first stockpile is screened topsoil located in Parcel 7 and the second is a soil stockpile adjacent to the cement/rebar pile in Parcel 7. These stockpiles will be sampled and assessed for contaminants of concern discussed in Section 3.2.1. Soil results will be tabulated and compared to the applicable guidelines in Table 3-1.

# 4.5. Former Sawmill Area

Based on previous Phase III ESA work, no additional soil assessment at the location of the former sawmill is advised. KBL proposes to remove any remaining surficial debris, and then complete a tilling of any areas that consist of sawdust and wood fragments to a depth of approximately 0.5 meters. This tilling will serve to even out and level the woody remains. Following the tilling it is proposed that topsoil from the onsite stockpile be spread evenly over this area to encourage regrowth of natural vegetation.

# 4.6. Checkpoint Highway Maintenance Camp Monitoring Well Network Assessment

As part of remediation activities at the CMC, the current groundwater monitoring well network will be assessed to determine which wells are no longer required for post-remediation monitoring. Assessment of the well network was completed by reviewing historical reports to determine the quality of data available from each well. Any well which has historically been dry or unable to produce a water sample will be expected to be decommissioned. Along with the historical results, the onsite assessment will formulate the basis for which wells are to be decommissioned. Factors that will be used to assess the groundwater well locations include proximity to environmental receptors, proximity to areas with elevated contaminated soil concentrations, wells that have historically reported groundwater exceedances, well locations expected to be required for long term monitoring and well locations affecting ongoing remediation. Any wells that require decommissioning will be backfilled with bentonite (or similar) from bottom to surface and then the well casing will be removed to a depth of approximately one meter below ground surface with the resulting void filled with bentonite. This will serve to ensure that the well cannot serve as a conduit for contaminants from surface to the subsurface. Table 4-2 below displays the current monitoring well network and planned status. This will be assessed again during remedial activities and additional wells may be scheduled for decommissioning.

# Table 4-2: CMC Monitoring Well Network

Monitoring Well ID	Rationale	Status
CPS-1	Used to assess GW near soil exceedance at TP19	Active
CPS-2	Historically Dry	Decommission
CPS-3	Historical exceedance of Toluene	Active
CPS-4	Documented as destroyed.	Decommission
CPS-5	Documented as destroyed.	Decommission
CPS-6	Used to assess GW near landfill excavation	Active
CPS-7	Used to assess GW near landfill excavation	Active
CPS-8	Used to assess GW near landfill excavation	Active
CPS-9	Used to assess GW near landfill excavation	Active
MW1	Used to assess GW near landfill excavation	Active
MW2	Used to assess GW near landfill excavation	Active
MW3	Used to assess GW near landfill excavation	Active
MW4	Used to assess GW near landfill excavation	Active
MW5	Used to assess GW near soil exceedance at TP19	Active
MWR-C	Used to assess GW near landfill excavation	Active
DP-1	Historically dry	Active*
DP-2	Historically dry	Active*
CP-MW16-1	Installed in 2016	Active
CP-MW16-2	Installed in 2016	Active
CP-MW16-3	Installed in 2016	Active
CP-MW16-4	Installed in 2016	Active
CP-MW16-5	Installed in 2016	Active
CP-MW16-6	Installed in 2016	Active
CP-MW16-7	Installed in 2016	Active
CP-MW16-8	Installed in 2016	Active

\* Assess and remove if dry

# 5.0 CHECKPOINT LANDFARM REMEDIAL WORK

# 5.1. Checkpoint Landfarm Assessment

While soil is being loaded at the CL, ongoing observation will occur to ensure that operating equipment does not create ruts into the base of the CL. Upon completion of removing all treated soil, an inspection will be completed along the base of the CL to look for any areas where the geotextile cloth is visible. It is understood that this cloth was laid above the CL liner and serves as a protective layer and visual cue. If any required repairs are identified, they will be documented and communicated with the GNWT ENR Project Manager. No

new soil will enter the CL until a full inspection and any repairs have been completed.

### 5.2. Soil Treatment

Treatment will include aeration of the soil using a tracked excavator (CAT 320 or equivalent) to mix and blend the soil in windrows at the CL. This treatment method addresses PHC fraction F2 as the main contaminant of concern, which is considered degradable and expected to respond to treatment by aeration. Moisture amendments may be necessary to obtain optimal moisture levels for remediation. Moisture applications using water from the retention pond may be possible if required and pending chemical composition of the retention pond water. KBL will monitor treatment operations to ensure that project objectives are met in a safe and efficient manner.

Based on previous analytical results from soil treatment it is unlikely that the use/application of inorganic amendments will be necessary, but this will be re-assessed after the post-treatment sampling along with moisture content to determine the recommended treatment approach. Upon completion of initial soil treatment, soil sampling will be carried out to determine treatment progress.

At the conclusion of treatment operations, all treated soil will be left at the CL until consultation with ENR determines its need for relocation. Given the results previously obtained during soil treatment at Checkpoint, it is unlikely that any untreatable soil will be transported from the CMC to the CL. For the purposes of this plan it is assumed that 746 m<sup>3</sup> of material will require treatment consisting of two passes with the excavator and the potential application of moisture amendments. Soil will be considered treated once it meets the *GNWT 2003 Environmental Guideline for Contaminated Site Remediation – Residential/Parkland Land Use Guidelines* and CCME soil quality equivalents.

# 5.3. Confirmatory Sampling

Soil samples will be collected in accordance with KBL's SOP for *Soil Sampling during Remedial Excavations and Soil Treatment Operations* and in accordance with the requirements contained in Part F, Item 22 in the Water License. Sample locations will also be reviewed to determine the overall representative coverage of soil contained within the CL. During the site visit, KBL will inspect the CL's existing conditions including evidence of animal or human interactions, erosion, liner exposure and signs of disruption.

Composite soil samples will be created from discrete samples collected using shovels and hand augers at each sample location. Discrete samples will be collected at depths between 0.3 meters to 0.6 meters in each windrow and sample locations and depths will be recorded. Given that previous soil treatment initiatives were completed at the CL, localized homogenization will allow composite sampling to adequately characterize remaining soil impacts. Soil sampling will have defined sample collection intervals and locations which remains consistent with previous annual sampling to allow for repeatability, while also taking into account the requirements set forth in the Licence. A figure of the proposed aliquots of soil to be represented by subsamples will be created based on a sketch obtained during the field work.

All confirmatory samples will be submitted to Bureau Veritas (formerly Maxxam Analytics) in Edmonton, AB for analysis. Bureau Veritas is accredited by the Canadian Association for Laboratory Accreditation (CALA).

# 6.0 SITE SURVEY

An overall site survey will be completed at the CMC and the CL by a Canada Lands Surveyor. It is anticipated that two trips will be required by the Surveyor to collect data. At the CL, the survey will collect data on the volume of remediated soil to be moved back to the CMC, along with the collection of coordinates and elevations of all Surveillance Network Program sampling locations.

At the CMC, survey items will include control points, excavation extents, monitoring wells, topographical features, tree lines, roads and bodies of water. The survey will be referenced to the Canadian Spatial Reference System, NAD 83 and the respective UTM zone.

KBL will ensure that the surveyor captures all required data for the completion of remediated soil estimates, contaminated soil estimates, topographical figures, sample locations and all other pertinent site features. The survey data will be used to create scaled topographical site drawings.

# 7.0 GROUNDWATER SAMPLING METHODOLOGY

During each groundwater sampling event, the CL monitoring wells (Figure 3, Appendix A) will be assessed to determine overall condition. Any deficiencies will be noted and reported to the client. Where possible, minor or interim repairs will be completed in field during the sampling event; larger deficiencies will be documented and reported to the client.

Monitoring wells will be measured for depth to Light Non-Aqueous Phase Liquids (LNAPL - if present) and the depth to groundwater from the top of the well casing using an interface probe. Measurements will be taken prior to any purging or sampling and the interface probe will be cleaned with a disinfecting solution after measuring each well.

Prior to sample collection, wells will be purged to remove stagnant water. This will be completed by removing three well volumes of water from the well or by monitoring until field parameters stabilize to ensure that representative groundwater has entered the well casing. The volume of water purged will be recorded and reported in the annual report. Purging (and sample collection) will be completed using dedicated equipment such as bailers, polyethylene tubing or low flow bladder pumps with dedicated tubing.

# 8.0 QUALITY ASSURANCE & QUALITY CONTROL (QA/QC)

For both soil and remedial discharge water, field personnel will take care to avoid cross contamination between sampling locations and ensure to wear new, clean disposable gloves prior to collecting each sample.

Samples will be placed on ice and packaged for transportation and delivery to the laboratory for analysis. While in transportation the samples will be under a Chain of Custody that will be signed and received upon arrival at the laboratory. Samples will be submitted to Bureau Veritas, for the required analysis. The analyses will be performed in accordance with approved methods as recognized by CALA.

For QA/QC additional samples will be collected and submitted to the laboratory. A blind field duplicate from one of the sample locations will be submitted under a different name and completed for the full suite of parameters to evaluate the precision of the laboratory.

A laboratory QA/QC program consisting of method blanks, spiked blanks and matrix spike shall also be checked for remedial discharge water samples to ensure that appropriate QA/QC results are obtained.

# 8.1. Sample Handling

All samples will be collected in laboratory provided sample containers and handled while wearing disposable nitrile gloves. Once collected, the samples will be placed into coolers that are kept cool with ice or ice packs to ensure that samples stay chilled. Coolers will be packed as efficiently as possible, using bubble wrap to fill any voids. All coolers will be accompanied by a chain of custody (COC), that is placed in the cooler while in transport with any third-party carrier. Coolers will be sealed with a custody seal and tape to ensure that no access is possible until the samples arrive at the laboratory. Transportation options to the laboratory include truck and air.

# 8.2. Field Decontamination

All sampling will be conducted using disposable nitrile gloves which will be changed between sample locations to ensure that no cross contamination occurs. Decontamination of sampling equipment will be completed between samples using Alconox (or similar).

# 8.3. Blind Field Duplicates

A blind field duplicate from one of the sample locations will be submitted under a different name and completed for the full suite of parameters to evaluate the precision of the laboratory. Blind field duplicates will be collected at a rate of 1 for every 10 soil samples collected.

# 9.0 INSPECTOR APPROVAL

In this project, it is understood that the Water Licence has the overriding soil remediation criteria and a Water Resources officer approval must be acquired prior to transporting excavated soil from the CMC to the CL or treated soil from the CL to the CMC. KBL will work closely with the GNWT Project Manager to ensure applicable approvals are obtained.

# 10.0 SCHEDULE

# Table 9-1: Proposed Schedule

Date	Task	
July 31, 2019	<ul> <li>CL SNP sampling;</li> <li>CL decant;</li> <li>Survey; and</li> <li>CMC P10/11 - AEC 1 water sampling.</li> </ul>	
August 30, 2019	<ul> <li>Submission of excavation water to GNWT ENR Water Resource Office for approval to discharge P10/11 - AEC 1 water.</li> </ul>	
September 6, 2019	<ul> <li>CL PAH sampling;</li> <li>Pending change order approval, discharge P10/11 - AEC 1 excavation water, sample base of P10/11 - AEC 1 for contaminants of concern, including metals, PAHs, PHC, pH</li> </ul>	
September 16, 2019	<ul> <li>Submission of PAH soil results to GNWT ENR Project Manager for review.</li> </ul>	
September 26 - October 8, 2019	<ul> <li>Transport soil to CMC for stockpile;</li> <li>CL inspection;</li> <li>Debris inventory (P9-APEC 1, P7-APEC 4, P6-AEC 1, between P8-APEC 1 and P9-APEC 1); and</li> <li>CL SNP sampling.</li> </ul>	
October 21-25, 2019	<ul> <li>Debris removal;</li> <li>P10/11-AEC 1 excavation/sampling and transport to CL;</li> <li>Survey;</li> <li>Soil biotreatment and sampling; and</li> <li>CL decant (if required).</li> </ul>	

# 11.0 NOTICE TO READERS/CLOSURE

This work plan has been prepared and the work referred to in this work plan has been undertaken by KBL for the exclusive use of Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Sector who has been party to the development of the scope of work and understands its limitations. The methodology, findings, conclusions and recommendations in this work plan are based solely upon the scope of work and subject to the time and budgetary considerations derived in the documents which constitute the proposal and/or contract pursuant to which this work plan was issued.

The findings, conclusions and recommendations in this work plan have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area, and reflect KBL's best judgement based on information available at the time of preparation of this work plan. No other warranties, either expressed or implied are made as to the professional services included in this work plan.

The findings and conclusions contained in this work plan are valid only as of the date of this work plan and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, the conditions of the Site or intended use of the Site change, or applicable standards are amended, modifications to this work plan may be necessary. KBL cannot be responsible for the use of this work plan or portions thereof unless KBL is requested to review and, if necessary, update the work plan. The results of the work herein should in no way be construed as a warranty that the subject Site is free from any and all contamination.

Any soil and rock descriptions in this work plan and associated logs, notes or drawings have been made with the intent of providing general information on the subsurface conditions of the Site. This information should not be used as geotechnical data for any purpose unless specifically addressed in the text of this work plan. If referenced, groundwater, vapour or other subsurface conditions refer only to those observed at the location and time of observation noted in this work plan. This work plan must be read in whole, as sections taken out of context may be misleading. KBL cannot be responsible for the use of portions of the work plan without reference to the entire work plan. If discrepancies occur between the preliminary (draft) and final versions of this work plan, it is the final version that takes precedence. Nothing in this work plan is intended to constitute or provide a legal opinion.

The contents of this work plan are confidential and proprietary. Other than by the client, copying or distribution of this work plan or use of or reliance on the information contained herein in whole or in part, is not permitted without the express consent of the Client and KBL. Any use, reliance on, or decision made by a third party based on this work plan is the sole responsibility of such third party. KBL accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this work plan.

Prepared and Submitted by KBL Environmental Ltd.

A.rel

Andrew Wheeler, B.Sc. Project Manager

Technical Review by



Fraser Judd, M.Eng., P.Eng. Senior Technical Reviewer

P	ERMIT TO PRACTICE BL ENVIRONMENTAL LTD.
Signat	August 30, 2019
PE N	RMIT NUMBER: P 1107

# 12.0 REFERENCES

BluMetric Environmental Inc. (BluMetric). 2017. Supplemental Phase III Site Assessment Report at Checkpoint Highway Maintenance Site

BluMetric Environmental Inc. (BluMetric). 2016. *Records Review Summary Historical Environmental Investigations* 

BluMetric Environmental Inc. (BluMetric). 2017. Remedial Action Plan Checkpoint Highway Maintenance Site

Canadian Council for Ministers of the Environment (CCME), 2014, *Canadian Environmental Quality Guidelines – Water Quality Guidelines for the Protection of Aquatic Life* 

CCME, 2010, Canadian Soil Quality Guidelines - Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs)

CCME, downloaded as of 2019, Canadian Soil Quality Guidelines for Protection of Environmental and Human Health, (<u>http://st-ts.ccme.ca/en/index.html</u>)

Columbia Environmental Consulting Ltd. (Columbia). 2012. Supplemental Phase III Environmental Site Assessment Former Checkpoint Highway Camp

Federal Contaminated Sites Action Plan, 2013, *Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils*.

Government of the Northwest Territories (GNWT) Ministry of Environment and Natural Resources, 2003, *Guideline for Contaminated Site Remediation* 

KBL Environmental, 2017, Groundwater Monitoring and Leachate Management Plan Checkpoint Highway Maintenance Camp, V.2.1

KBL Environmental Ltd, 2018 Annual Report Checkpoint CL Government of the Northwest Territories Environment and Natural Resources Contaminated Sites Section (2019)



Site Drawings











	Date: 21-
t KBL	File name:
	17-061_

AUG-19 Drawn: LH Approved: 17LFM-B.dwg DRAFT

GNWT Environment and Natural Resources CHECKPOINT LANDFARM, NT Figure:

3



BluMetric, 2017, Remedial Action Plan

