



Water Licence Application Questionnaire
for
Municipal Undertakings

'To provide for the conservation, development and utilization of waters in a manner that will provide the optimum benefit for all Canadians and in particular, for the residents of the Inuvialuit Settlement Region.'

October 2014

The purpose of this questionnaire is to solicit supplemental information from an applicant to support his/her application for a water license (or its renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Inuvialuit Water Board having to solicit additional information after an application has been submitted. This information will also be useful during the review of your application, which must be undertaken prior to development and approval of a water license.

The applicant should complete the questionnaire to the best of his/her ability, recognizing that some questions may not be relevant to the project under consideration. For questions that do not relate to the operation undertaking, the applicant is requested to indicate "N/A" (Not Applicable).

NOTE: If space is insufficient for any of the responses on this questionnaire, use the back of the sheet or an attachment.

If any questions arise while completing the questionnaire, the applicant may wish to contact the Inuvialuit Water Board at (867) 678-2942.

This questionnaire can be sent with the application for a new licence or the renewal of an existing licence to the following contact information:

Executive Director
Inuvialuit Water Board
P.O. 2531
Inuvik, NT, Canada
X0E 0T0
Email: info@inuvwb.ca

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SECTION 1: GENERAL

Date:

Applicant:

(Company, Corporation, Hamlet, Town)

(Person to contact and its position)

(Postal address)

(Telephone number)

(Facsimile number)

Community Status

City _____ Village _____ Town _____ Camp _____
Other _____

Population (according to most recent census results), and the Estimated Growth Rate over next five years or Camp Maximum Capacity:

Indicate the status of the municipality's license on the date of application.

New Application: Yes No

If No, please submit your Water Licence Number and the date the licence was issued.

Renewal of Water License Number:

Date of Issuance:

Has any baseline data been collected for the main water bodies in the area?

Yes No Unknown

If yes, please attach:

- All data gathered on the physical, biological and chemical characteristics at each sampling location;
- A summary or program details indicating sampling locations, description of waste at each location, sampling frequency, and parameters analyzed;
- An outline of Quality Assurance/Quality Control methods being applied to sampling, preservation and analysis within the program.

Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project (e.g., wildlife, soils, air quality) in addition to water related information requested in this questionnaire?

Yes No Unknown

If yes, please attach copies of reports or cite titles, authors and dates (prepared by, title and completion date).

If no, do you plan on doing such studies? If you do plan on doing such studies, please describe the proposals.

Attach detailed maps which show the relative locations of the:

- raw water intake;
- water treatment facilities;
- fuel & chemical storage;
- sewage treatment facilities;
- wastewater treatment area and discharge outlets;
- solid waste disposal areas and drainage patterns;
- hazardous waste disposal area;
- transportation access routes; and
- existing waterbodies/courses and any changes to these water bodies/courses which have or may occur as a result of water use of waste disposal facilities, locations of environmental monitoring sites.

Attach detailed scale plan drawing(s) of the proposed (or present) sewage treatment system. The drawing(s) must be stamped by an engineer registered in NWT and include the following:

- details of pond size and elevation;
- precise details of all retaining structures (dimensions, materials of construction, etc.);
- details of the drainage basin, and existing and proposed drainage modifications;
- details of all decant, siphon mechanisms etc, including sewage treatment facilities;
- details regarding direction and route followed by wastewater flow from the area;
- indications of the distance to nearby major watercourses, and fish bearing waters;
- location and construction of liners;
- leachate and groundwater collection systems; and
- control structures.

Attach detailed scale plan drawings of the proposed (or present) solid waste disposal area. The drawings must include the following:

- precise details of all retaining structures (dimensions, materials of construction, etc.);
- details of the drainage basin, and existing and proposed drainage modifications;
- details regarding direction and route followed by wastewater flow from the area;
- indications of the distance to nearby major watercourses, and fish bearing waters;
- all sources of seepage presently encountered in the vicinity of these areas;
- the volume of each seepage flow (m³/day); and
- the direction of each flow.

Attach the present or proposed contingency plan which will be used for each portion of the waste control system in the event it fails to operate properly.

Attach the present or proposed spill contingency plan which will be employed in case a spill of hazardous materials occurs. Describe courses of action, mitigative methods and equipment available for use.

NOTE: Individual detailed large scale drawings of all facilities (dam, decant system, ditch, dike, water treatment plant, etc) constructed or proposed must be attached. Specific details with regard to the methods of construction, materials used, etc. are required.

SECTION 2: WATER SUPPLY

Volume of water use (m³/day)

Type of source

Lake: _____ River: _____ Well: _____ Other: _____

Name of raw water source and alternative, if any

Usual break-up & freeze-up months

Break-up: _____ Freeze-up: _____

Please provide short descriptions for the following

Freshwater intake facility:

Operating capacity of the pumps used:

Type of water storage facility (ie: Reservoir, storage, tank, none. For other, please provide a description)

What is the capacity of the water storage facility? m³

What is the rate of withdrawal from the source? (m³/day)

Is water drawn from the source?

If yes, during what month(s) is it drawn? And for what period of time is it drawn (days/weeks/months)?

What is the rate of flow of source (if river) or size (if lake)?

At the intended rate of water usage, describe the effects on the river or lake from which water will be drawn.

General condition of

Water supply facility: Satisfactory Unsatisfactory

If unsatisfactory, explain:

Storage facility: Satisfactory Unsatisfactory

If unsatisfactory, explain:

Distribution system: Satisfactory Unsatisfactory

If unsatisfactory, explain:

Are there any changes planned in the water supply system?

Yes No

If yes, please attach a copy of the plan, or describe changes.

SECTION 3: WATER TREATMENT

Indicate the quality of the raw water prior to treatment & distribution and give a description

Good

Fair

Poor

Description:

Indicate the capacity of the treatment facility (L/minute)

Type of water treatment facility (ie: Filtration & Chlorination, Chlorination only, UV, None. If other, please describe)

Describe in detail the method of water treatment (ie: backwash, flocculation, sedimentation, chemicals used) and provide the results of the most recent bacteriological and chemical analysis. Attach a diagram if possible.

Have there been any problems or health and environmental concerns with the water treatment facilities?

Yes

No

If yes, please describe:

Are there any changes planned in the water treatment facilities?

Yes No

If yes, please attach a copy of the plan or indicate change

SECTION 4: SEWAGE DISPOSAL

Indicate the level of treatment the sewage will be receiving (primary, secondary or tertiary. If other, please describe)

Pre-treatment (if applicable)

Screening Maceration

Lagoons (if applicable)

Anaerobic aerobic facultative

Indicate the capacity of the sewage treatment facility (m³)

Indicate the retention time of the sewage while in the treatment facility (days)

Indicate the estimated rate of discharge of wastewater

Indicate the location of the discharge point

Will the discharge be seasonal or continuous?

If seasonal, during what month(s) will it occur?

What is the duration of the discharge (days/weeks/months)

Comment on the general condition of the:

Sewage collection system

Discharge control system

Dams, diversion, dykes or berms

Have there been any problems or health and environmental concerns with the sewage disposal facilities?

Yes No

If yes, please describe:

The average depth of the wastewater lagoon is (meters)

What is the design freeboard? (meters)

Is there any harvesting of fish or shellfish in the waters where waste is discharged?

Yes No

If yes, please indicate species harvested, and estimate amounts.

Will the municipality be using a honey bag pit?

Yes No

If yes, describe its location, drainage and operation & maintenance

Are there any sources of commercial or industrial liquid waste being discharged or deposited to the municipal system which may affect the quality of the effluent or leachate produced?

Yes No

If yes, please describe:

Have any spills occurred in the past five years?

Yes No

If yes, please submit a list of all spills with the date of the spill, the type of spill, the quantity spilled, the location of the spill, the method used to clean the spill and the results of the clean-up.

Have there been any operating problems with the lagoon?

Yes No

If yes, please describe:

Are there any changes planned in the sewage disposal facilities?

Yes No

If yes, please describe and if possible, attach a copy of the plan:

SECTION 5: SOLID WASTE DISPOSAL

Indicate the capacity of the disposal area (m³)

The average depth of the solid waste disposal site is (meters)

Are there any sources of commercial or industrial solid waste being deposited in the municipal system which may affect the quality of the effluent or leachate produced?

Yes No

If yes, please describe:

Briefly describe how the solid waste will be picked up & delivered to the disposal area

Is the solid waste site fenced?

Yes No

Will the municipality be using a dead animal pit?

Yes No

If yes, please describe its location, drainage and operation & maintenance:

Will the municipality be using a bulky metal waste disposal area?

Yes No

If yes, please describe its location and operation & maintenance:

Will the municipality be using a hazardous waste disposal area?

Yes No

If yes, please describe its location, structure and operation & maintenance:

Are there any hazardous commercial wastes entering the solid waste disposal system?

Yes No

If yes, please describe (source, volume, special handling and disposal methods for these wastes):

If any natural watercourse may gain access to the proposed solid waste disposal area, what methods will be used to decrease the amount of runoff water entering these areas? Indicate the volume of water which may enter these areas from the source(s) in question and attach all pertinent details of proposed diversions

Please describe the nature of any diversions of watercourses

Have there been any problems or health and environmental concerns with the solid waste disposal facilities?

Yes No

If yes, please describe:

Are any changes planned in the solid waste disposal system?

Yes No

If yes, please describe and, if possible, attach a copy of the plan:

SECTION 6: ABANDONMENT AND RESTORATION PROGRAM

List and describe the locations of abandoned or restored water treatment facilities.

List and describe the locations of abandoned or restored sewage treatment facilities.

List and describe the locations of abandoned or restored solid waste disposal facilities.

Do you have an abandonment and restoration plan?

Yes

No

If yes, please attach a copy of the plan.

SECTION 7: WATER QUALITY MONITORING PROGRAM

Briefly describe the methodology that is presently used to sample the raw water supply

Briefly describe any monitoring that is done on wastewater effluent and leachate

Recognized laboratory performing analysis of samples

Name of the laboratory:

Contact name:

Postal address:

Telephone number:

Facsimile number:

Are any changes planned in the water quality monitoring program?

Yes

No

If yes, please describe

SECTION 8: ENVIRONMENTAL ASSESSMENT AND SCREENING

Has this project ever undergone an initial environmental review, including previous owners?

Yes No Unknown

If yes, by whom and when?

[Redacted]

Has approval been obtained or sought from the Department of Fisheries and Oceans for using any fish bearing water bodies for containment or disposal of waste?

Yes No

Are there any environmental studies ongoing or planned?

Yes No

If yes, please provide a list of these studies.

[Redacted]

Prepared by:	<input type="text" value="John Holland"/>	<input type="text" value="Senior Administrative Officer"/>
	Printed Name	Title
	<input type="text" value="John Holland"/>	<input type="text" value="June 5, 2020"/>
	Signature	Completion Date

**Appendix A: Water Chemistry Raw Intake
2019 Results**



Cash Clients
106 VETERANS WAY
PO BOX 1480
INUVIK NT X0E 0T0
ATTN: SHAWN HARDY

Date: 27-MAR-19

PO No.:

WO No.: L2244092

Project Ref:

Sample ID: PAULATUK WTP-HAMLET OFFICE TAP

Sampled By:

Date Collected: 12-MAR-19

Lab Sample ID: L2244092-1

Matrix: WATER

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Alkalinity Species by Titration						
Alkalinity Species by Titration						
Alkalinity, Bicarbonate (as CaCO3)	177		mg/L			19-MAR-19
Alkalinity, Carbonate (as CaCO3)	<1.0		mg/L			19-MAR-19
Alkalinity, Hydroxide (as CaCO3)	<1.0		mg/L			19-MAR-19
Alkalinity, Total (as CaCO3)	177		mg/L			19-MAR-19
Anions by Ion Chromatography						
Sulfate in Water by IC						
Sulfate (SO4)	152		mg/L		500	19-MAR-19
Nitrite in Water by IC (Low Level)						
*Nitrite (as N)	<0.0010		mg/L	1		19-MAR-19
Nitrate in Water by IC (Low Level)						
*Nitrate (as N)	0.0561		mg/L	10		19-MAR-19
Fluoride in Water by IC						
Fluoride (F)	0.051		mg/L	1.5		19-MAR-19
Chloride in Water by IC						
Chloride (Cl)	9.06		mg/L		250	19-MAR-19
Bromide in Water by IC (Low Level)						
Bromide (Br)	<0.050		mg/L			19-MAR-19
BTEX+VPH+MTBE & F1 in Water						
F1-BTEX	<0.10		mg/L			25-MAR-19
Xylenes	<0.00075		mg/L	0.09	0.02	25-MAR-19
Surr: 3,4-Dichlorotoluene (SS)	109.8		%			25-MAR-19
VPH (C6-C10)	<0.10		mg/L			25-MAR-19
VOC7 and/or VOC Surrogates for Waters						
Surr: 1,4-Difluorobenzene (SS)	101.3		%			25-MAR-19
Surr: 4-Bromofluorobenzene (SS)	97.0		%			25-MAR-19
VH in Water by Headspace GCFID						
Volatile Hydrocarbons (VH6-10)	<0.10		mg/L			25-MAR-19
CCME F1 By Headspace with GCFID						
F1 (C6-C10)	<0.10		mg/L			25-MAR-19
BTEX/MTBE/Styrene by Headspace GCMS						
Benzene	<0.00050		mg/L	0.005		25-MAR-19
Ethylbenzene	<0.00050		mg/L	0.14	0.0016	25-MAR-19
Methyl t-butyl ether (MTBE)	<0.00050		mg/L		0.015	25-MAR-19

ADDRESS: 314 Old Airport Road, Unit 116, Yellowknife, NT X1A 3T3 Canada | Phone: +1 867 873 5593 |

ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company



Date: 27-MAR-19

PO No.:

WO No.: L2244092

Project Ref:

Sample ID: PAULATUK WTP-HAMLET OFFICE TAP

Sampled By:

Date Collected: 12-MAR-19

Lab Sample ID: L2244092-1

Matrix: WATER

Cash Clients
 106 VETERANS WAY
 PO BOX 1480
 INUVIK NT X0E 0T0
 ATTN: SHAWN HARDY

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
BTEX+VPH+MTBE & F1 in Water						
BTEX/MTBE/Styrene by Headspace GCMS						
Styrene	<0.00050		mg/L			25-MAR-19
Toluene	<0.00045		mg/L	0.06	0.024	25-MAR-19
meta- & para-Xylene	<0.00050		mg/L			25-MAR-19
ortho-Xylene	<0.00050		mg/L			25-MAR-19
Colour, True	<5.0		CU		15	19-MAR-19
Dissolved Organic Carbon	3.66		mg/L			20-MAR-19
Hardness (as CaCO3)	357	HTC	mg/L		500	20-MAR-19
Cyanide, Total	<0.0050	HTP	mg/L	0.2		21-MAR-19
Total Dissolved Solids	419		mg/L		500	19-MAR-19
Mercury (Hg)-Total	<0.0000050		mg/L	0.001		20-MAR-19
Total Suspended Solids	<3.0		mg/L			18-MAR-19
Total THMs	0.0117		mg/L	0.1		26-MAR-19
Total Organic Carbon	3.16		mg/L			19-MAR-19
*Turbidity	0.99		NTU			19-MAR-19
pH	8.27		pH		7-10.5	19-MAR-19
VOC (THM) by Headspace GCMS						
Chloroform	0.0081		mg/L			26-MAR-19
Bromodichloromethane	0.0036		mg/L			26-MAR-19
Bromoform	<0.0010		mg/L			26-MAR-19
Dibromochloromethane	<0.0010		mg/L			26-MAR-19
Total Metals in Water by CRC ICPMS						
Aluminum (Al)-Total	0.0047		mg/L		0.1	19-MAR-19
Antimony (Sb)-Total	<0.00010		mg/L	0.006		19-MAR-19
Arsenic (As)-Total	0.00040		mg/L	0.01		19-MAR-19
Barium (Ba)-Total	0.0597		mg/L	1		19-MAR-19
Beryllium (Be)-Total	<0.00010		mg/L			19-MAR-19
Bismuth (Bi)-Total	<0.000050		mg/L			19-MAR-19
Boron (B)-Total	0.011		mg/L	5		19-MAR-19
Cadmium (Cd)-Total	0.0000213		mg/L	0.005		19-MAR-19
Calcium (Ca)-Total	73.4		mg/L			19-MAR-19
Cesium (Cs)-Total	<0.000010		mg/L			19-MAR-19
Chromium (Cr)-Total	0.00013		mg/L	0.05		19-MAR-19
Cobalt (Co)-Total	0.00023		mg/L			19-MAR-19
Copper (Cu)-Total	0.695		mg/L	2.0	1.0	19-MAR-19
Iron (Fe)-Total	0.078		mg/L		0.3	19-MAR-19
Lead (Pb)-Total	0.00140		mg/L	0.01		19-MAR-19
Lithium (Li)-Total	0.0036		mg/L			19-MAR-19

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Matrix: WATER

Cash Clients
 106 VETERANS WAY
 PO BOX 1480
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 ATTN: SHAWN HARDY

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Total Metals in Water by CRC ICPMS						
Magnesium (Mg)-Total	42.2		mg/L			19-MAR-19
Manganese (Mn)-Total	0.00897		mg/L		0.05	19-MAR-19
Molybdenum (Mo)-Total	0.000103		mg/L			19-MAR-19
Nickel (Ni)-Total	0.00311		mg/L			19-MAR-19
Phosphorus (P)-Total	<0.050		mg/L			19-MAR-19
Potassium (K)-Total	0.802		mg/L			19-MAR-19
Rubidium (Rb)-Total	0.00026		mg/L			19-MAR-19
Selenium (Se)-Total	<0.000050		mg/L	0.05		19-MAR-19
Silicon (Si)-Total	1.63		mg/L			19-MAR-19
Silver (Ag)-Total	0.000010		mg/L			19-MAR-19
Sodium (Na)-Total	5.78		mg/L		200	19-MAR-19
Strontium (Sr)-Total	0.0787		mg/L			19-MAR-19
Sulfur (S)-Total	54.6		mg/L			19-MAR-19
Tellurium (Te)-Total	<0.00020		mg/L			19-MAR-19
Thallium (Tl)-Total	<0.000010		mg/L			19-MAR-19
Thorium (Th)-Total	<0.00010		mg/L			19-MAR-19
Tin (Sn)-Total	<0.00010		mg/L			19-MAR-19
Titanium (Ti)-Total	<0.00030		mg/L			19-MAR-19
Tungsten (W)-Total	<0.00010		mg/L			19-MAR-19
Uranium (U)-Total	0.000104		mg/L	0.02		19-MAR-19
Vanadium (V)-Total	<0.00050		mg/L			19-MAR-19
Zinc (Zn)-Total	0.0635		mg/L		5.0	19-MAR-19
Zirconium (Zr)-Total	<0.000060		mg/L			19-MAR-19
CDWQG = Health Canada Guideline Limits updated		MAY 2018				
<p>* CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.</p>						
<p>Approved by  Oliver Gregg Account Manager</p>						

ADDRESS: 314 Old Airport Road, Unit 116, Yellowknife, NT X1A 3T3 Canada | Phone: +1 867 873 5593 |

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Guidelines & Objectives

Sample Parameter Qualifier key listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
HTP	Sample preparation or preservation hold time was exceeded.

Qualifiers for Individual Samples Listed:

Sample	Client ID	Qualifier	Description
L2244092-1	PAULATUK WTP-HAMLET C	THMP	Sample for THM analysis was preserved with sodium bisulfate. If sample is chlorinated, THM formation may have continued after time of sampling.

Health Canada MAC Health Related Criteria Limits

Nitrate/Nitrite-N*	Criteria limit is 10 mg/L (1.0 mg/L if present as all Nitrite-N). High concentrations may contribute to blue baby syndrome in infants.
Lead*	A cumulative body poison, uncommon in naturally occurring hard waters.
Fluoride*	Present in fluoridated water supplies at 0.8 mg/L to reduce dental caries. Elevated levels causes fluorosis (mottling of teeth).
Total Coliforms*	Criteria is 0 CFU/100mL. Adverse health effects.
E. Coli*	Criteria is 0 CFU/100 mL. Certain E. Coli bacteria can be life threatening.

*Health Canada Canadian Drinking Water Quality Guidelines (MAC limit)

Aesthetic Objective Concentration Levels

Alkalinity	Acid neutralizing capacity. Usually a measure of carbonate and bicarbonates and calculated and reported as calcium carbonate.
Balance	Quality control parameter ratiating cations to anions
Bicarbonate	See Alkalinity. Report as the anion HCO ₃ -1
Carbonate	See Alkalinity. Reported at the anion CO ₃ -2
Calcium	See Hardness. Common major cation of water chemistry.
Chloride	Common major anion of water chemistry.
Conductance	Physical test measuring water salinity (dissolved ions or solids)
Hardness	Classical measure or capacity of water to precipitate soap (chiefly calcium and magnesium ions). Causes scaling tendency in water if carbonates/bicarbonates are present (if >200 mg/L). For drinking water purposes waters with results <200 mg/L are considered acceptable, results >200 mg/L are considered poor but can be tolerated. Results >500 mg/L are unacceptable.
Hydroxide	See alkalinity
Magnesium	See hardness. Common major cation of water chemistry. Elevated levels (>125 mg/L) may exert a cathartic or diuretic action.
pH	Measure of water acidity/alkalinity. Normal range is 7.0-8.5.
Potassium	Common major cation of water chemistry.
Sodium	Common major cation of water chemistry. Measure of salinity (saltiness).The aesthetic objective (not related to health) for sodium in drinking water is 200 mg/L. However, where sodium concentration of the drinking water exceeds 20 mg/L, it is recommended that any person on a sodium restricted diet consult with his/her physician or Medical Officer of Health concerning the use of that water.
Sulphate	Common major anion of water chemistry. Elevated levels may exert a cathartic or diuretic action.
Total Dissolved Solids	A measure of water salinity.
Iron	Causes staining to laundry and porcelain and astringent taste. Oxidizes to red-brown precipitate on exposure to air.
Manganese	Elevated levels may cause staining of laundry and porcelain.
Heterotrophic Plate Count	Criteria is 500 cfu/mL Measure of heterotrophic bacteria present.

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Please also upload results to GNWT Water Trax

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To Contact and company name below will appear on the final report		Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)							
Company: <u>GNWT Department of Health & Social Services</u>		Select Report Format: <input checked="" type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply							
Contact: <u>Shawn Hardy</u>		Quality Control (QC) Report with Report <input type="checkbox"/> <input type="checkbox"/> NO		EMERGENCY							
Phone: <u>867-777-4840</u>		<input checked="" type="checkbox"/> Compare Results to Criteria of Report - provide details below if box checked		1 Business day [E - 100%] <input type="checkbox"/>							
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>							
Street: <u>106 Veteran's Way, P.O. Box 1980</u>		Email 1 or Fax		Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm							
City/Province: <u>Inuvik, NT X0E 0T0</u>		Email 2 <u>EnvironmentalHealth@gov.nt.ca</u>		For tests that can not be performed according to the service level selected, you will be contacted.							
Postal Code:		Email 3		Analysis Request							
Invoice To		Invoice Distribution		<table border="1"> <tr> <td colspan="2">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</td> </tr> <tr> <td colspan="2">28 chemical parameters (plus THMs) as per GNWT Water Supply System Regulation. (See previous email correspondence for details)</td> </tr> </table>		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below		28 chemical parameters (plus THMs) as per GNWT Water Supply System Regulation. (See previous email correspondence for details)			
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
28 chemical parameters (plus THMs) as per GNWT Water Supply System Regulation. (See previous email correspondence for details)											
Same as Report To <input type="checkbox"/> <input checked="" type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input checked="" type="checkbox"/> MAIL <input type="checkbox"/> FAX									
Copy of Invoice with Report <input type="checkbox"/> <input checked="" type="checkbox"/> NO		Email 1 or Fax <u>Please mail invoice to Hamlet office</u>									
Company: <u>Hamlet of Paulatuk</u>		Email 2									
Contact: <u>SAO: John Holland</u>											
Project Information		Oil and Gas Required Fields (client use)		<table border="1"> <tr> <td colspan="2">NUMBER OF CONTAINERS</td> <td colspan="2">SAMPLES ON HOLD</td> <td colspan="2">SUSPECTED HAZARD (see Special Instructions)</td> </tr> </table>		NUMBER OF CONTAINERS		SAMPLES ON HOLD		SUSPECTED HAZARD (see Special Instructions)	
NUMBER OF CONTAINERS		SAMPLES ON HOLD				SUSPECTED HAZARD (see Special Instructions)					
ALS Account # / Quote #: <u>P.O. Box 98</u>		AFE/Cost Center: PO#									
Job #: <u>Paulatuk, NT X0E 1N0</u>		Major/Minor Code: Routing Code:									
PO / AFE: <u>867-580-3531</u>		Requisitioner:									
LSD:		Location:									
ALS Lab Work Order # (lab use only): <u>L2244092</u>		ALS Contact:		Sampler:							
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type							
	<u>Paulatuk WTP - Hamlet office (treated water) tap</u>	<u>12 March 19</u>	<u>09:40am</u>	<u>Grab sample</u>							
Drinking Water (DW) Samples¹ (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)							
Are samples taken from a Regulated DW System? <input checked="" type="checkbox"/> <input type="checkbox"/> NO		<u>Compare with Guidelines for Canadian Drinking Water Quality.</u>		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>							
Are samples for human consumption/ use? <input checked="" type="checkbox"/> <input type="checkbox"/> NO				Ice Packs <input type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>							
				Cooling Initiated <input type="checkbox"/>							
				INITIAL COOLER TEMPERATURES °C							
				FINAL COOLER TEMPERATURES °C							
				2.0							
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)							
Released by: <u>Bobby Ruben Jr</u>		Received by: <u>WC</u>		Received by:							
Date: <u>March 12 2019</u>		Date: <u>03/14/19</u>		Date:							
Time: <u>9:40am</u>		Time: <u>0900</u>		Time:							



L2244092-COFC

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

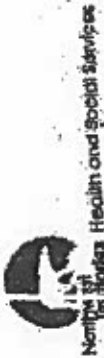
NOV 2018 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Q65485

**Appendix B: Most Recent Water Chemistry
and Bacteriological Results**



Member of Health and Social Services

Colliert Presence / Absence Bacteriological Water Sampling Records

ENVIRONMENTAL HEALTH SERVICES

Phone 867-767-9066 ext. 49262 / Fax (867) 669-7517

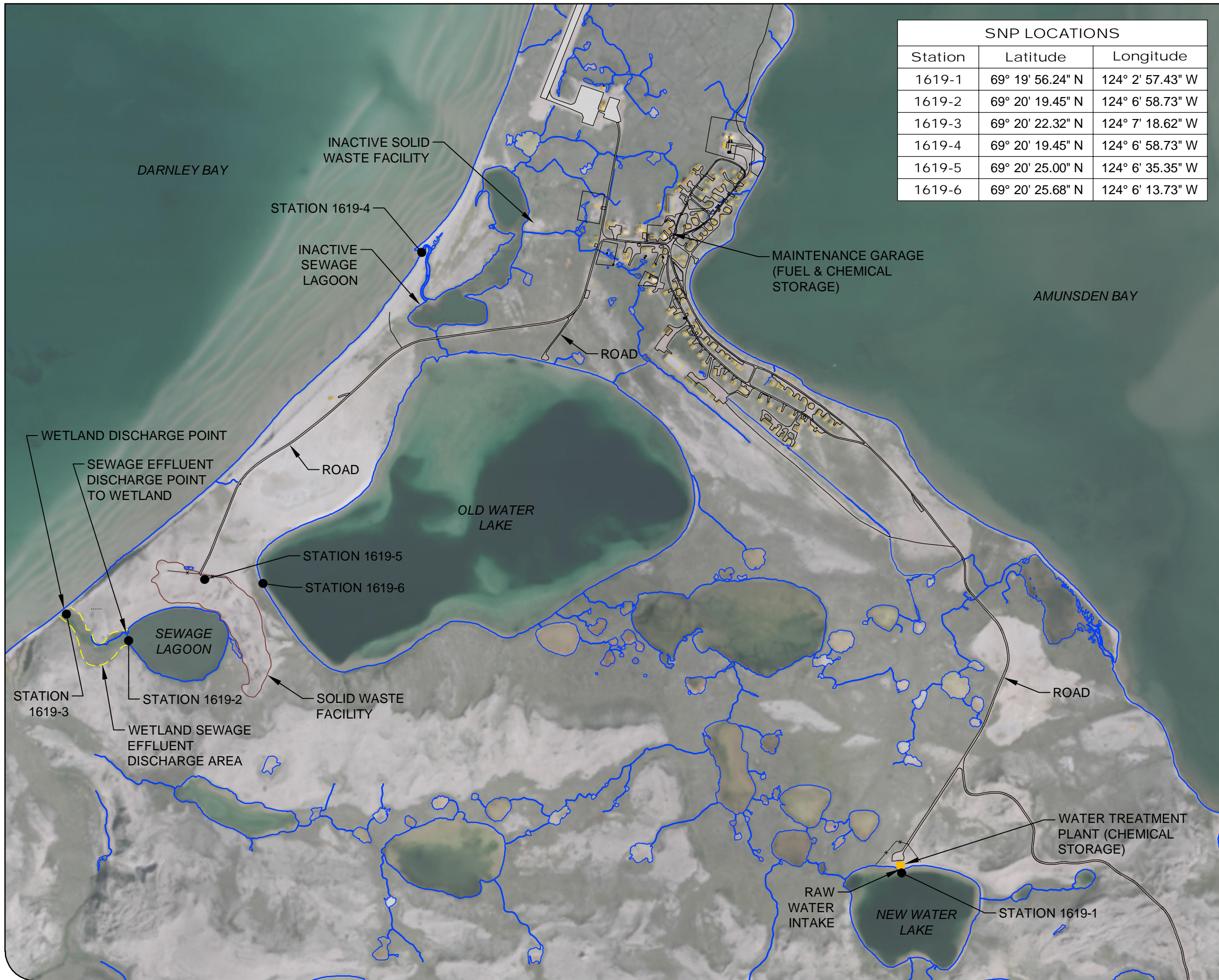
This Form Must Be Faxed to (867) 669-7517 or emailed to Environmental_Health@gov.nl.ca

Community Name Paulatuk Operator Name Betty Ruben Jr Phone: 867-580-3531

Location of Sample	Sampled by	Date/time Sample collected	Date/Time Sample read	Total Coli forms	E.coli	Comments
Treated or Raw						
Raw Water Tap	Bethmann	May 30/20 1:30pm	May 31/20 2:00pm	0	2	
Water Treatment Plant	"	May 30/20 1:45pm	May 31/20 2:01pm	2	2	
Water Truck Delivery Treated	"	May 30/20 1:50pm	May 31/20 2:02pm	2	2	
Health Center Kitchen Tap Treated	"	May 30/20 1:55pm	May 31/20 2:03pm	2	2	
Health Center Kitchen Tap Treated	"					

BTJN
John

**Appendix D: Figures - Site Overview,
Sewage Treatment Systems and Solid
Waste Disposal Area**



SNP LOCATIONS		
Station	Latitude	Longitude
1619-1	69° 19' 56.24" N	124° 2' 57.43" W
1619-2	69° 20' 19.45" N	124° 6' 58.73" W
1619-3	69° 20' 22.32" N	124° 7' 18.62" W
1619-4	69° 20' 19.45" N	124° 6' 58.73" W
1619-5	69° 20' 25.00" N	124° 6' 35.35" W
1619-6	69° 20' 25.68" N	124° 6' 13.73" W



GOVERNMENT OF THE NWT
PAULATUK WATER LICENCE RENEWAL



SITE OVERVIEW
Figure 1

- BUILDING FOOTPRINT

- AIRPORT

- SOLID WASTE FACILITY

- ROADS

- FENCE

- DRAINAGE PATHS

- WETLAND AREA

- SNP LOCATIONS



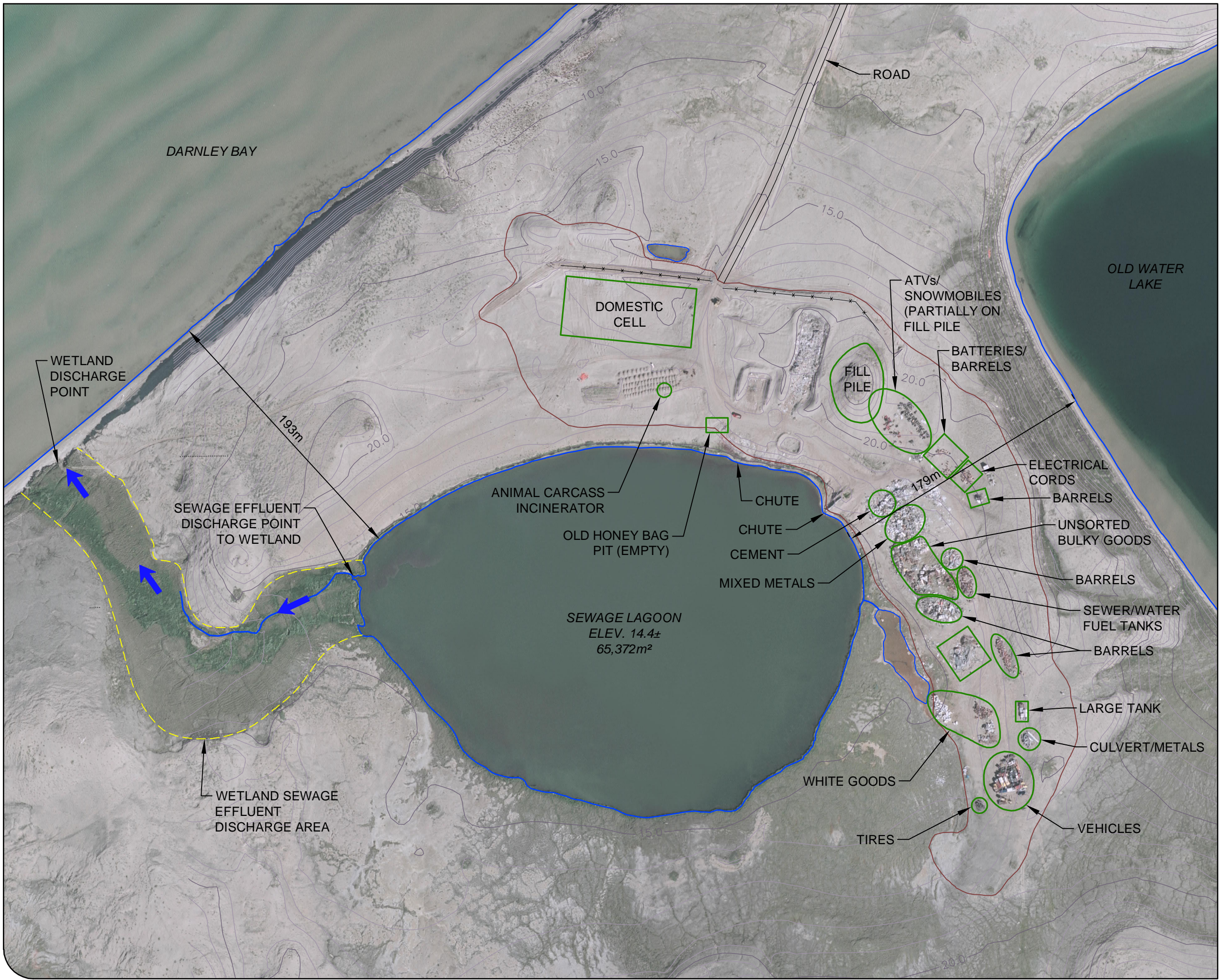
MAP/DRAWING INFORMATION
2009 Cadastral information supplied by Commissioners Land Administration, ATLAS online. Paulatuk (2007) photo came from the Department of Municipal and Community Affairs. Locations and Features are Approximate.

CREATED BY: CLB
CHECKED BY: TLR
MAP PROJECTION: NAD83 UTM Zone 10N

File Location:
c:\projectsw\working directory\projects 2020\5011r\dms31306\202937 figs .dwg
June, 03, 2020 3:02 PM



PROJECT: 202937
STATUS: Issued for Review
DATE: June 2020

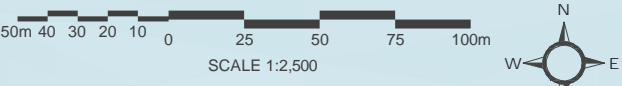


GOVERNMENT OF THE NWT
PAULATUK WATER LICENCE RENEWAL



SEWAGE TREATMENT SYSTEM AND
SOLID WASTE DISPOSAL AREA
Figure 2

- SOLID WASTE FACILITY
- ROADS
- FENCE
- DRAINAGE PATHS
- WETLAND AREA
- LANDFILL FEATURES
- ← FLOW DIRECTION



MAP/DRAWING INFORMATION
2009 Cadastral information supplied by Commissioners Land Administration, ATLAS online. Paulatuk (2007) photo came from the Department of Municipal and Community Affairs. Locations and Features are Approximate.

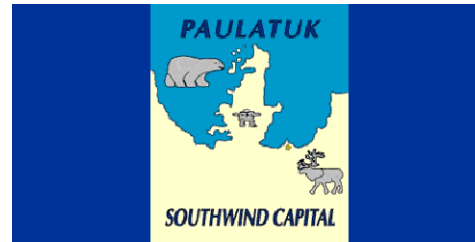
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CHECKED BY: TLR
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PROJECT: 202937
STATUS: Issued for Review
DATE: June 2020

**Appendix H: Sewage Lagoon
Upgrade Details**



HAMLET OF PAULATUK

PAULATUK SEWAGE LAGOON UPGRADES

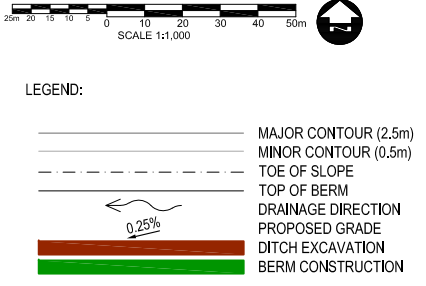
**ISSUED FOR CONSTRUCTION
AUGUST 2018**

DILLON PROJECT NO. 17-6028

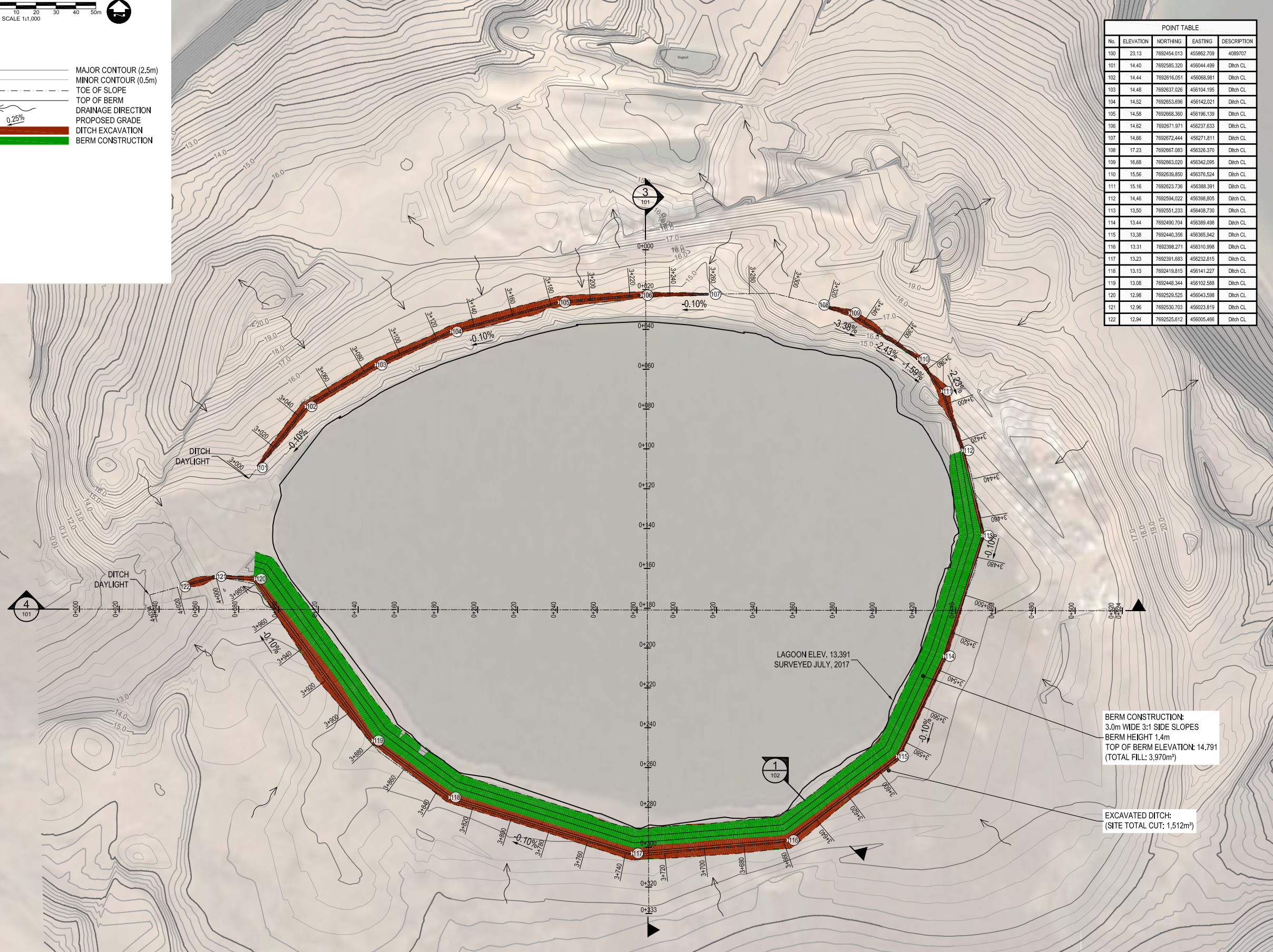
SHEET LIST	
SHEET NUMBER	SHEET TITLE
	COVER
100	SEWAGE LAGOON BERM AND DRAINAGE DITCH
101	DITCH PROFILE AND SITE SECTIONS
102	DETAILS AND SITE SECTIONS 1 OF 2
103	SITE SECTIONS 2 OF 2



- GENERAL NOTES:
1. ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED OTHERWISE.
 2. ALL DIMENSIONS TO BE CHECKED AND VERIFIED IN THE FIELD PRIOR TO ANY CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER BEFORE PROCEEDING.
 3. QUANTITIES SHOWN ARE APPROXIMATE AND FOR TENDERING PURPOSES ONLY.
 4. ALL CONSTRUCTION WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
 5. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENTIRE DRAWING SET AND CONTRACT DOCUMENTS.
 6. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS AS WELL AS ANY APPLICABLE TERRITORIAL STANDARD SPECIFICATIONS AND STANDARD DRAWINGS.
 7. ANY SURVEY FOR THE PURPOSE OF LAYOUT, QUANTITY CALCULATIONS, OR RECORD DRAWING TO BE CONDUCTED WITH REFERENCE TO A CANADA LANDS AND SURVEY MONUMENT.
 8. DESIGN CONTOURS SHOWN ARE FINAL GRADE AND REPRESENT BERM MATERIAL OR EXCAVATED SURFACE.
 9. TOPOGRAPHY SHOWN IS BASED ON CADASTRAL AND CONTOUR INFORMATION PROVIDED BY MACA AND IS APPROXIMATE.
 10. A SURVEY OF THE IMMEDIATE LAGOON AREA WAS CONDUCTED BY DILLON CONSULTING, LTD. 2017 FOR THE PURPOSES OF DESIGN: CLSR PLAN 80643, CCM4089707, NAD83, ZONE10, GSD95 GEOID.



POINT TABLE				
No.	ELEVATION	NORTHINGS	EASTING	DESCRIPTION
100	23.13	7892454.013	456862.709	4089707
101	14.40	7892585.320	456904.499	Ditch CL
102	14.44	7892616.051	456968.981	Ditch CL
103	14.48	7892637.026	456104.195	Ditch CL
104	14.52	7892653.696	456142.021	Ditch CL
105	14.58	7892668.360	456196.139	Ditch CL
106	14.62	7892671.971	456237.633	Ditch CL
107	14.66	7892672.444	456271.811	Ditch CL
108	17.23	7892667.083	456326.370	Ditch CL
109	16.68	7892663.020	456342.095	Ditch CL
110	15.56	7892638.850	456376.524	Ditch CL
111	15.16	7892623.736	456388.391	Ditch CL
112	14.46	7892594.022	456398.805	Ditch CL
113	13.50	7892551.233	456408.730	Ditch CL
114	13.44	7892490.704	456389.498	Ditch CL
115	13.38	7892440.356	456365.942	Ditch CL
116	13.31	7892398.271	456310.988	Ditch CL
117	13.23	7892391.683	456232.815	Ditch CL
118	13.13	7892419.815	456141.227	Ditch CL
119	13.08	7892448.344	456102.588	Ditch CL
120	12.98	7892529.525	456043.598	Ditch CL
121	12.96	7892530.703	456023.819	Ditch CL
122	12.94	7892525.612	456005.466	Ditch CL



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PERMIT NUMBER P 010
DILLON CONSULTING LIMITED



ISSUED FOR CONSTRUCTION



DESIGN	REVIEWED BY	DATE	BY
GS	GS		
TPW	GS		
AUGUST 2018			
SCALE 1:1000			
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1	ISSUED FOR INTERNAL REVIEW	08/24/18	GS
No.	ISSUED FOR	DATE	BY

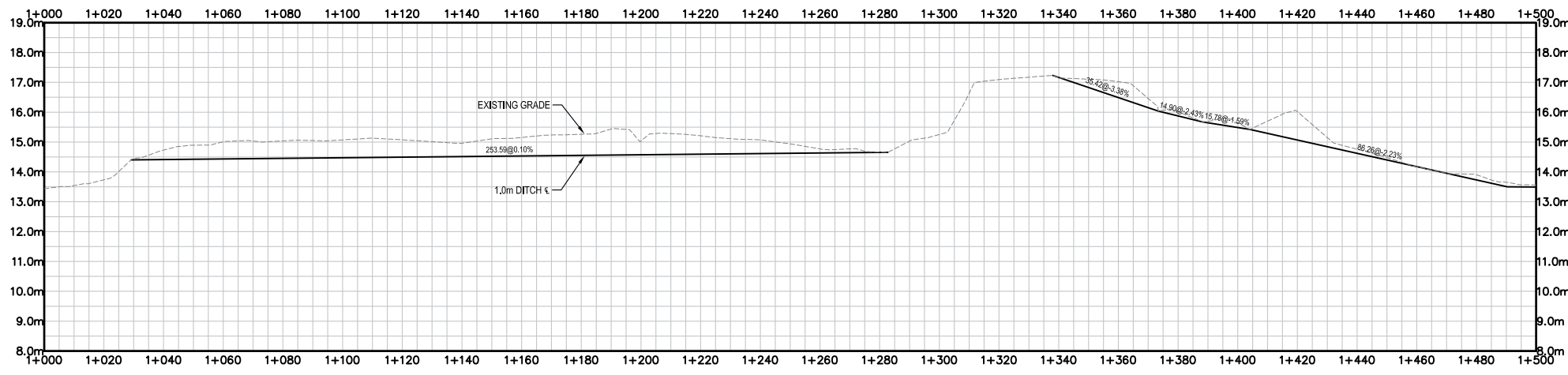
**PAULATUK SEWAGE LAGOON UPGRADES
HAMLET OF PAULATUK, NORTHWEST TERRITORIES**

**ISSUED FOR CONSTRUCTION
SEWAGE LAGOON BERM AND DRAINAGE DITCH**

PROJECT NO. 17-6028
SHEET NO. **100**

DILLON CONSULTING LIMITED 4020 47TH STREET, YELLOWKNIFE, NORTHWEST TERRITORIES, X1A 2P1, PHONE (867) 920-4655, FAX (867) 874-3328
 PLOT DATE: 2018-08-27 2:59:50 PM PLOT SCALE: 1:500 PLOT STYLE: DILLON HALF SCALE YK.GTB

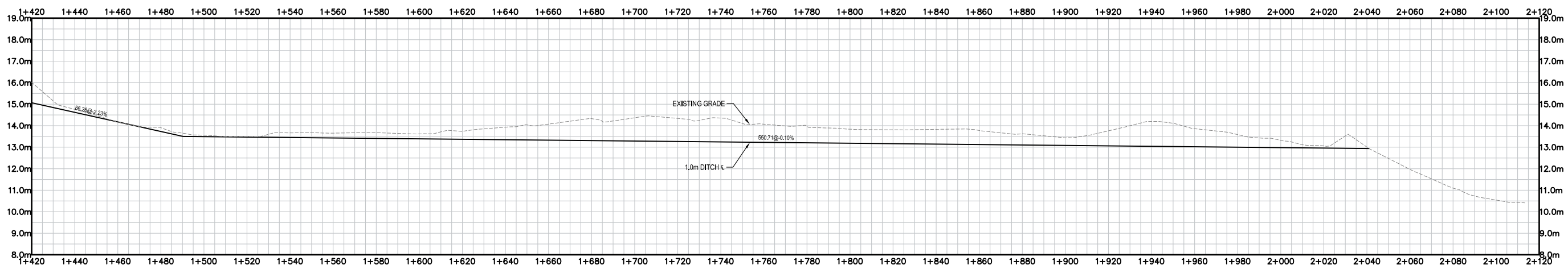
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 PLOT DATE: 2018-08-27 2:54:58 PM PLOT STYLE: 1500.PLOT SCALE: 1/1000
 DILLON CONSULTING LIMITED 4920 47TH STREET, YELLOWKNIFE, NORTHWEST TERRITORIES, X1A 2P1, PHONE (867) 920-4655, FAX (867) 873-3328



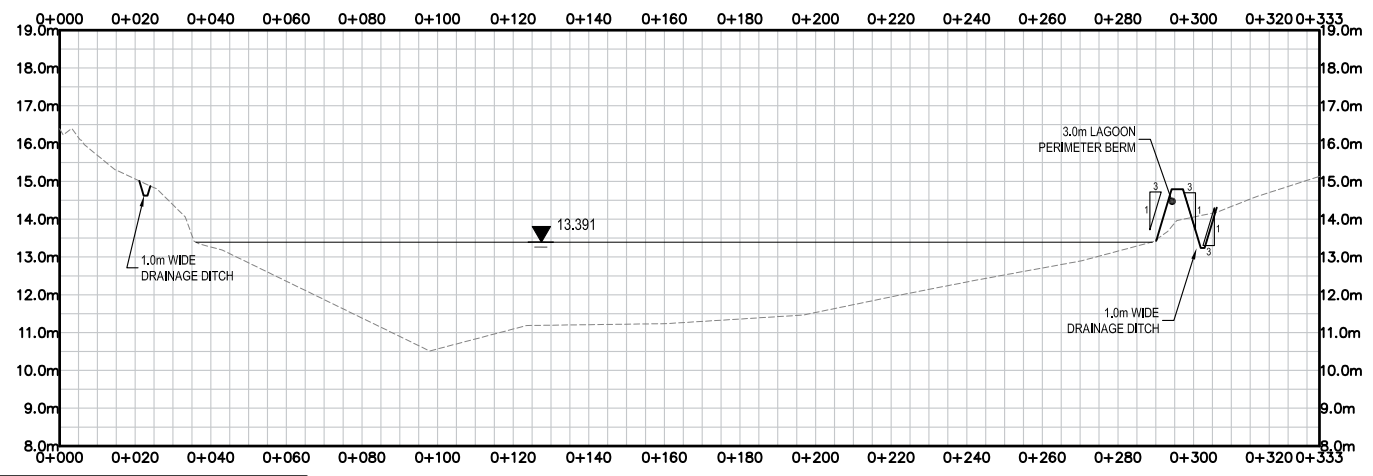
DITCH PROFILE 1
SCALE: 1:1000H 1:100V

LEGEND:
 - - - - - EXISTING GROUND
 _____ PROPOSED DITCH/BERM CONSTRUCTION
 _____ LAGOON LEVEL

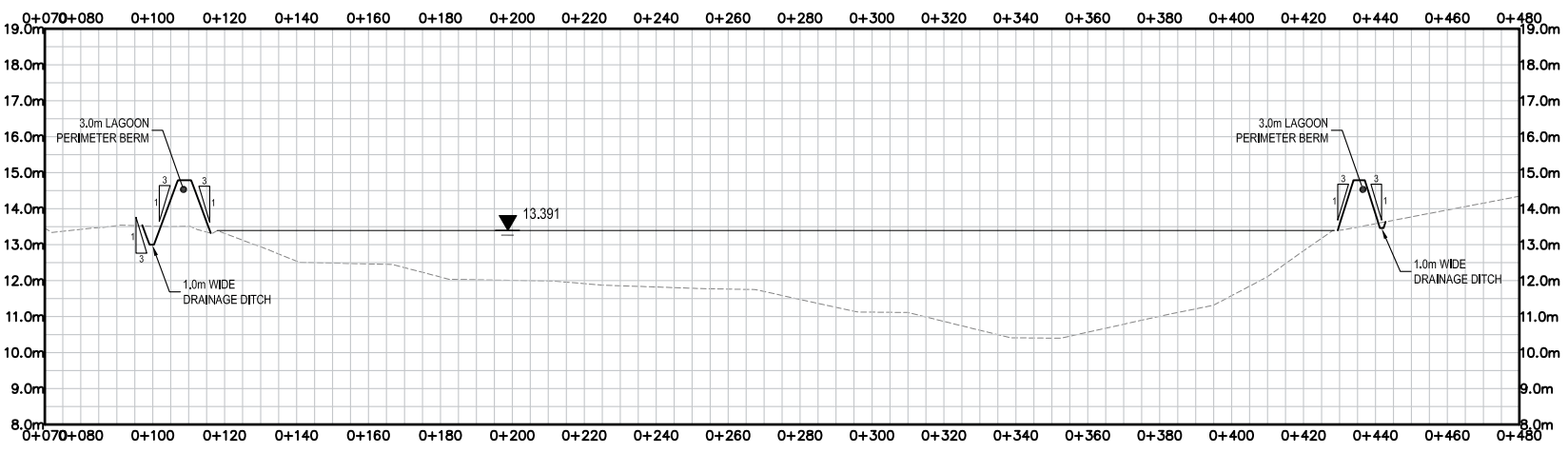
GENERAL NOTES:
 1. SEE DITCH/BERM CL STATIONING ON DRAWING 100.
 2. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENTIRE DRAWING SET AND CONTRACT DOCUMENTS.



DITCH PROFILE 2
SCALE: 1:1000H 1:100V



Section 1
SCALE: 1:1000H 1:100V



SECTION 2
SCALE: 1:1000H 1:100V

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ISSUED FOR CONSTRUCTION



NO.	ISSUED FOR	DATE	BY
2	ISSUED FOR CONSTRUCTION	08/27/18	GS
1	ISSUED FOR INTERNAL REVIEW	08/24/18	GS

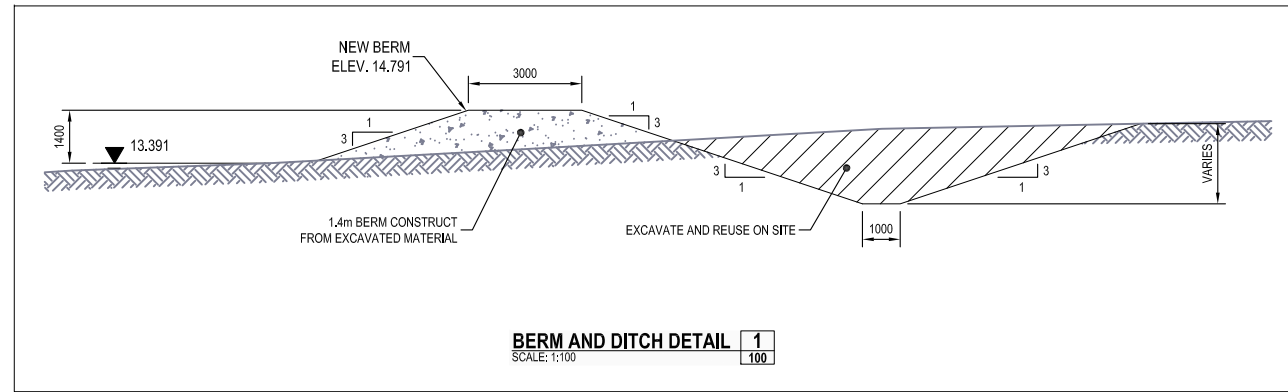
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GS	GS
DRAWN	CHECKED BY
TPW	GS
DATE	AUGUST 2018
SCALE	AS SHOWN

**PAULATUK SEWAGE LAGOON UPGRADES
 HAMLET OF PAULATUK, NORTHWEST TERRITORIES**

**ISSUED FOR CONSTRUCTION
 DITCH PROFILE AND SITE SECTIONS**

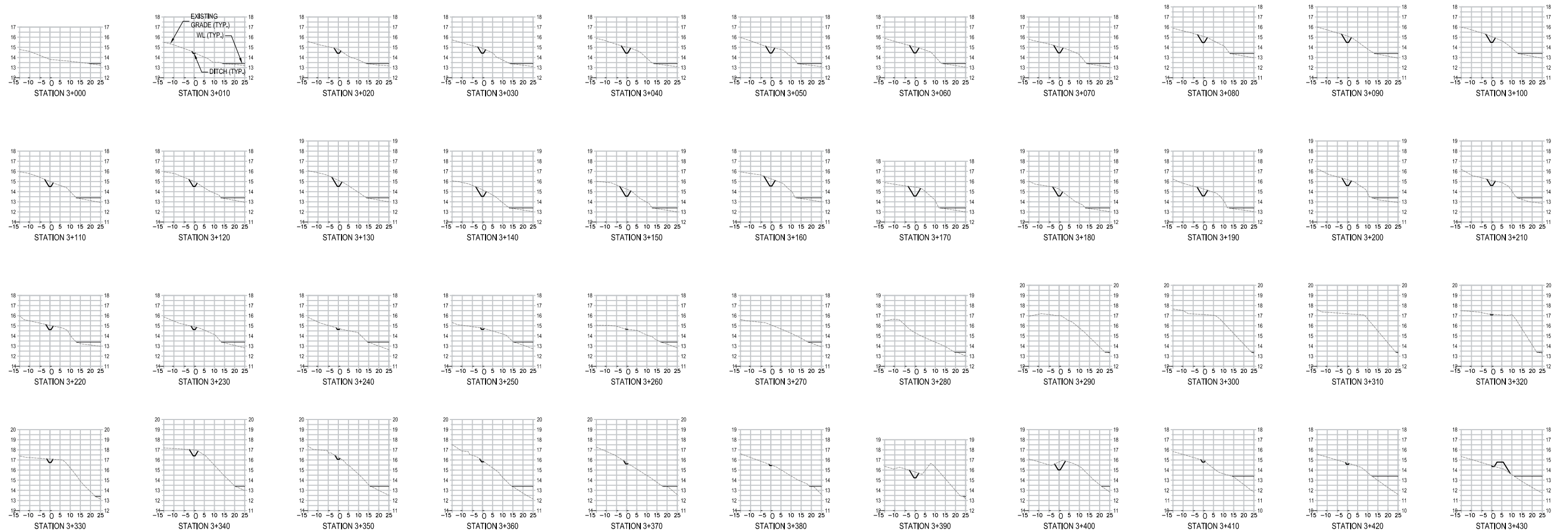
PROJECT NO.
17-6028

SHEET NO.
101



LEGEND:
 - - - - - EXISTING GROUND / ROCK OUTCROP
 _____ PROPOSED DITCH/BERM CONSTRUCTION
 _____ LAGOON LEVEL

GENERAL NOTES:
 1. SEE DITCH CL STATIONING ON DRAWING 100.
 2. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENTIRE DRAWING SET AND CONTRACT DOCUMENTS.



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ISSUED FOR CONSTRUCTION



NO.	ISSUED FOR	DATE	BY
2	ISSUED FOR CONSTRUCTION	08/27/18	GS
1	ISSUED FOR INTERNAL REVIEW	08/24/18	GS

DESIGN	REVIEWED BY
GS	GS
DRAWN	CHECKED BY
TPW	GS
DATE	AUGUST 2018
SCALE	1:500 1:100

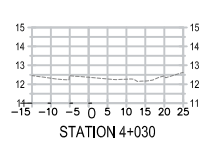
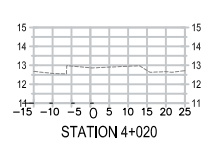
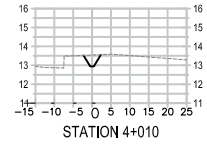
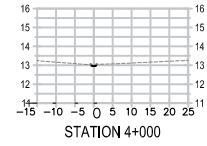
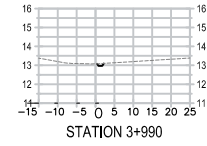
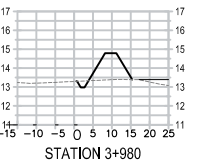
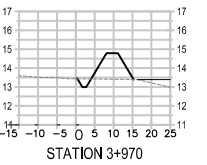
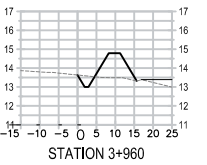
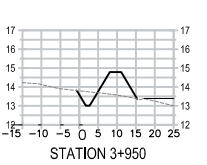
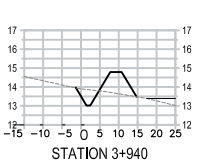
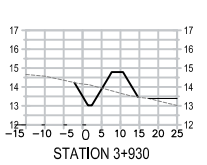
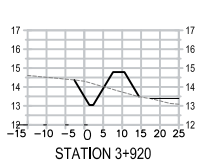
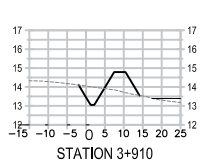
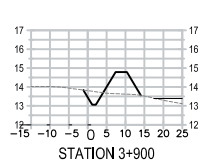
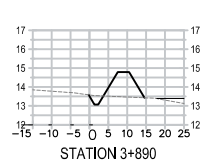
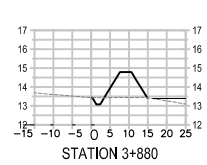
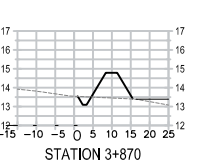
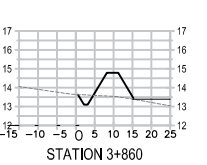
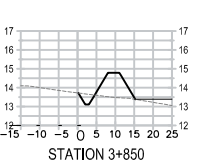
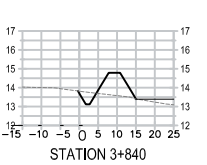
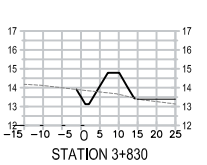
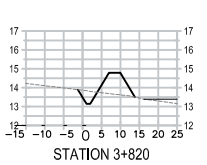
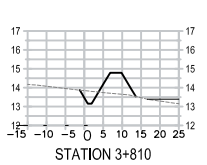
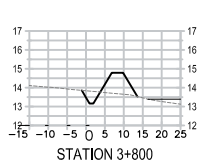
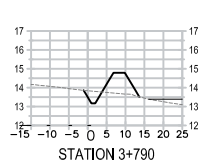
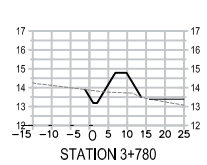
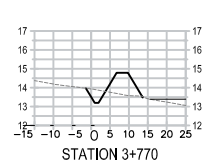
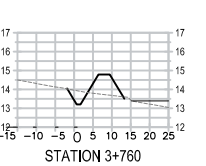
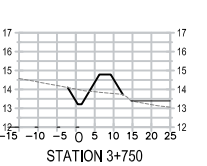
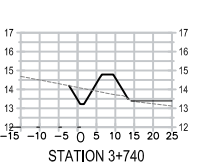
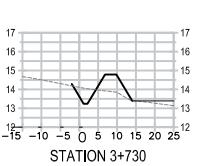
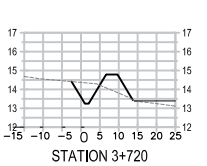
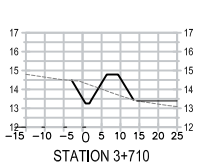
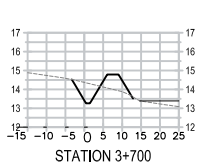
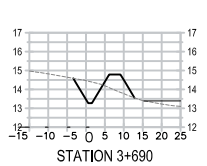
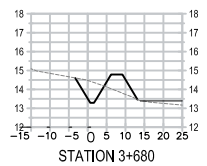
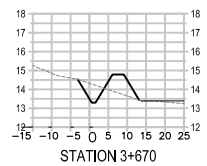
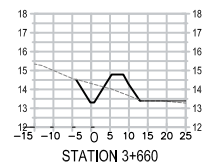
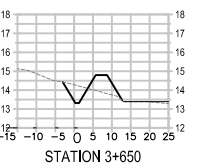
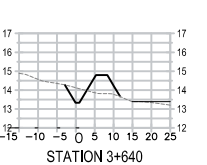
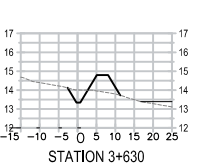
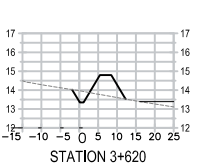
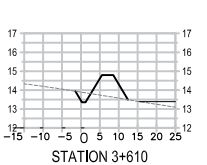
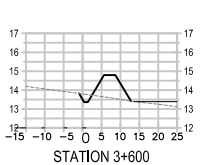
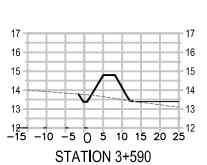
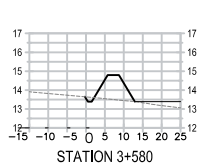
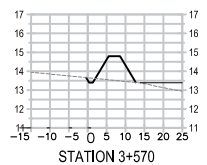
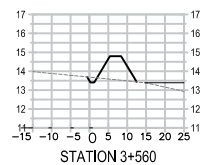
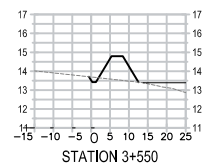
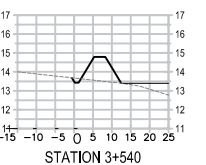
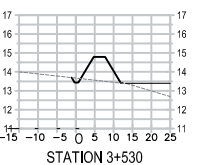
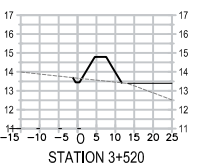
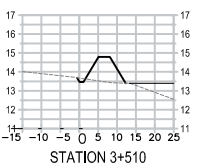
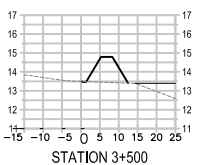
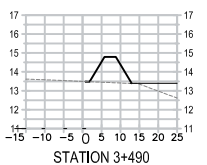
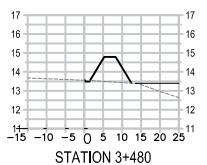
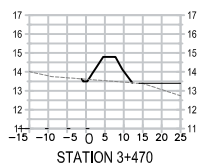
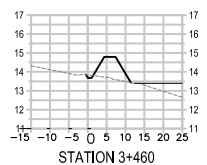
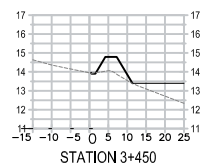
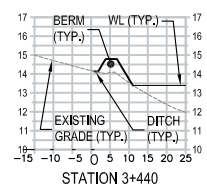
**PAULATUK SEWAGE LAGOON UPGRADES
 HAMLET OF PAULATUK, NORTHWEST TERRITORIES**
ISSUED FOR CONSTRUCTION
DETAILS AND SITE SECTIONS 1 OF 2

PROJECT NO.
17-6028
 SHEET NO.
102

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LEGEND:
 - - - - - EXISTING GROUND / ROCK OUTCROP
 _____ PROPOSED DITCH/BERM CONSTRUCTION
 _____ LAGOON LEVEL

- GENERAL NOTES:
 1. SEE DITCH CL STATIONING ON DRAWING 100.
 2. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENTIRE DRAWING SET AND CONTRACT DOCUMENTS.



**DRAWING REDUCED
NOT TO SCALE**

Conditions of Use
 Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.
 Do not scale dimensions from drawing.
 Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER P 010
 DILLON CONSULTING LIMITED



ISSUED FOR CONSTRUCTION



DESIGN	GS	REVIEWED BY	GS
DRAWN	TPW	CHECKED BY	GS
DATE	AUGUST 2018		
SCALE	1:500 1:100		
2	ISSUED FOR CONSTRUCTION	08/27/18	GS
1	ISSUED FOR INTERNAL REVIEW	08/24/18	GS
NO.	ISSUED FOR	DATE	BY

**PAULATUK SEWAGE LAGOON UPGRADES
HAMLET OF PAULATUK, NORTHWEST TERRITORIES**

PROJECT NO.
17-6028

**ISSUED FOR CONSTRUCTION
SITE SECTIONS 2 OF 2**

SHEET NO.
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**Appendix J: Sewage and Solid Waste Disposal
Facilities Abandonment and Restoration Plan**



DILLON
CONSULTING

HAMLET OF PAULATUK

Sewage and Solid Waste Disposal Facilities

Abandonment and Restoration Plan

November 29, 2017

Hamlet of Paulatuk
Box 98
Paulatuk, NT XOE 1N0



Attention: Mr. John Holland
Senior Administrative Officer

Suite 303
4920 47th Street
Yellowknife
Northwest Territories
Canada
X1A 2P1
Telephone
(867) 920-4555
Fax
(876) 873-3328

Re: Sewage and Solid Waste Disposal Facilities Abandonment and Restoration Plan

Dear Mr. Holland

Please find attached a copy of the final Abandonment and Restoration Plan for the Hamlet of Paulatuk's sewage and solid waste disposal facilities. This plan outlines the work required to close the landfill cells as they become full, maintain the bulky waste area and wastewater lagoon to extend their useable lifetimes and establishes guidelines for monitoring and inspecting the site during closure and post-closure.

Following your review and comments, we will update the plan and submit it on your behalf to the Inuvialuit Water Board (IWB). Please provide us a letter of acceptance to issue with this report to verify support of this document if this satisfies your requirements.

Should you have any questions or concerns, please contact me at gstrong@dillon.ca or by phone at 867.920.4555 ext. 4111.

Sincerely,

DILLON CONSULTING LIMITED

A handwritten signature in black ink, appearing to read "Gary Strong", with a long horizontal stroke extending to the right.

Gary Strong, P.Eng.
Partner

GS:cj
Attachment:

Our file: 17-6028

**Dillon Consulting
Limited**

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B	Map and Detailed Site Plan

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1.0 Introduction

The Hamlet of Paulatuk's (Paulatuk) current water licence expires on November 20, 2020. The Inuvialuit Water Board (IWB) issued Paulatuk's current water licence renewal, #N7L3-1619, on November 15, 2015. The following Abandonment and Restoration (A&R) Plan is an update to the draft report prepared in 2015, and has been prepared to outline the work required to close the landfill cells as they become full, maintain the bulky waste area and wastewater lagoon to extend their useable lifetimes, and establish guidelines for monitoring and inspecting the site during closure and post-closure. In addition, procedures for the monitoring and upkeep of the health of the wastewater lagoon are described. This A&R Plan has been completed in accordance with the *Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories* (Kent, Marshall, & Hawke, 2003).

2.0 Site Description

2.1 Location

Paulatuk is located in the Northwest Territories approximately 400 km east of the Town of Inuvik and 855 km northwest of Yellowknife. The community is situated at the south end of Darnley Bay on the Arctic Coast as shown in Figure 1. The 2016 population of Paulatuk was 327, the highest population in the community since annual tracking began in 2001. This represents a 1.9% increase since 2015, or an average annual growth of 0.6% (2005-2016). The population has fluctuated up and down over the past 15 years reaching a low of 303 individuals in 2006 (Bureau of Statistics, 2017a). The community is located in an area underlain by continuous permafrost and is dominated by glacial till in addition to marine sands and silt. The mean daily temperature in July is 10.8 °C and the mean daily temperature in January is -25.0 °C (Bureau of Statistics, 2017b). The Hamlet is not serviced by road access and supplies are only available via annual barges or by plane.

Paulatuk receives its drinking water from New Water Lake, which is trucked to residents' homes after being disinfected by sodium hypochlorite. The Hamlet has two water delivery trucks which run throughout the week providing the community with approximately 12,000 m³ of drinking water per year (Hamlet of Paulatuk, 2017). The current water licence details a maximum annual withdrawal limit of 17,000 m³ (IWB, 2015).

There is an abandoned solid waste disposal facility and wastewater discharge lagoon approximately 350 m west from the existing municipal area as shown in Figure 2. Odour issues and the construction of a new airport in 1993 led to the landfill and wastewater discharge being relocated to a site 2 km south of the abandoned site (Dillon Consulting Limited, 2009). The abandoned and active facilities both fall within the municipal boundaries of the Hamlet of Paulatuk. The abandoned facilities are not included in this plan, which focuses on the abandonment and restoration of the currently active facilities.

2.1.1 White Goods

In addition to the white goods that are in the unsorted bulky waste area, some have been sorted and are stored in a designated area to the west of the unsorted bulky waste area (Figure 6). White goods typically include large household appliances such as washing machines, dryers, freezers, fridges, stoves and hot water tanks. These products often have hazardous components such as mercury switches and refrigerants which must be removed and properly disposed of before the metal and other components can be recovered. Many of the white goods currently stored in the designated areas have not been adequately stripped of hazardous components, something that should be completed promptly for all white goods stored in the solid waste disposal facility.

2.1.2 End-of-Life Vehicles and Tires

There are currently numerous end-of-life vehicles (ELVs) and used tires stored in a designated area to the west of the mixed bulky waste area. As discussed in the SWDF O&M Plan, the ELVs should have all hazardous components stripped including batteries, refrigerants, fuel, oils, antifreeze, windshield washer fluid, and other lubricants. Procedures for stockpiling and disposing of these hazardous materials are detailed in the SWDF O&M Plan. Once all hazardous materials are adequately recovered, ELVs should be stored in a manner that allows for parts recovery by community residents in order to reuse components as required and available. Once adequate storage space is no longer available for stockpiling ELVs, Hamlet staff should arrange to have vehicles shipped to a proper recycling facility for further dismantling and disposal. In addition to passenger vehicles, there are several graders and tanker/vacuum trucks stored in the ELV area of the solid waste disposal facility. The Hamlet should contact the manufacturer of the various vehicles or metal recyclers that specialize in large equipment recycling to determine how best to dismantle them to ship south.

As discussed in the SWDF O&M Plan, used vehicle tires are not considered hazardous and can be stored above ground in a manner allowing for recovery by community residents as required and available. However, tires are susceptible to fire, which produces hazardous fumes so care must be taken to store tires far from ignition sources. Tires should also be stored to limit the amount of water collected in the tires. Standing water in tires can provide a breeding ground for insects. Once the quantity of tires surpasses available storage space, arrangements should be made to ship stockpiled tires south for recycling at a properly equipped facility. Photographs of the ELV and tire storage areas are shown in Figure 7 and Figure 8.

2.2 Solid Waste Disposal Facilities

There are currently no mining or other industrial activities in Paulatuk that would contribute industrial waste to the solid waste facility. Additionally there is not significant commercial activity in the community and the majority of the waste is from general municipal sources. Waste is collected twice per week by truck or more frequently as required such as during holidays. During a site visit on May 27, 2015, the solid waste disposal facility was found to contain the following categories of material:

- General municipal waste;
- Unsorted bulky waste;
- White goods;
- End-of-life vehicles (ELVs) and tires;
- Mixed metal (barrels, culverts, mixed metal, etc.); and
- Hazardous waste.

All materials are currently being stored and sorted above ground as shown in Figure 3. Several landfill cells within the current facility boundaries have been developed for general household waste to the west of the access road and have been filled in and covered. Final cover of these cells was completed in 2014. The specific design for the cap and cover of these completed cells on site could not be determined. It is known that neither cell was constructed with an engineered leachate collection system. Based on the May 27, 2015 site visit, the ground surface over these capped cells is flat to grade.

Historical site photos have shown the presence of standing water in the areas of old, capped cells. The same areas did not show any evidence of standing water during the July 2017 site visit, however, it is not known if this is due to seasonal variations in surface water or if the standing water issue has been effectively addressed. If standing water remains an issue, it may infiltrate the landfill caps and get into the waste below causing leachate issues from the landfill cells into the wastewater lagoon. Since the site is very close to sea level and underlain by permafrost it is not expected that this leachate will contaminate groundwater supplies, but the potential to contaminate the sewage lagoon as it drains into the Darnley Bay is a concern. It is recommended that the old landfill cell areas to the west of the access road be monitored for standing water throughout the year. If water is detected, these areas should be tested, drained to an appropriate location (if contaminated, drained to a holding pond for further treatment) and the low lying areas filled and graded to ensure proper drainage away from the landfill cells and the sewage lagoon.

There is a chain link fence around part of the site perimeter to catch any windblown waste material. The fence has been damaged and is falling down to the east of the facility entrance, where the fencing was installed in sand. This section is currently undergoing reconstruction, and should be monitored once completed to ensure it remains upright and functional. Future damage should be addressed promptly to manage windblown litter.

2.2.1 General Municipal Waste Storage Area

The general municipal waste storage area includes a variety of different types of waste including household waste, beverage containers, paper/cardboard, miscellaneous plastics, as well as smaller pieces of scrap metal, rubber and scrap wood, as shown in Figure 4. Since the closure of the landfill cells originally designed for the facility in 2014, general municipal waste has been disposed of in a cell to the east side of the access road which has an estimated capacity of 800 m³. The community currently produces approximately 550 m³ of non-compacted solid waste each year (200 m³ of compacted waste), based on generation rates specific to the Hamlet. The municipal solid waste cell is surrounded by a berm to help mitigate wind sweeping waste out of the cell.

This cell is covered by overburden periodically to prevent odour, wind, and pest issues. Overburden should be applied on a regular basis when waste is collected, delivered, and compacted into the cell as per the *Hamlet of Paulatuk Solid Waste Disposal Facilities Operations and Maintenance Plan* (SWDF O&M Plan). The lack of regular overburden application presents many hazards including attracting nuisance animals. Current management practices may also lead to a potential fire hazard. Piling waste in excess of the 2 m recommended by the *Guidelines for the Planning, Design, Operation and Maintenance of Modified Solid Waste Sites* may lead to increased temperatures within the waste pile which can cause smoldering and burning of waste. If the general municipal waste were to catch fire, the fumes would be hazardous to community members downwind. Waste should be managed as per the SWDF O&M Manual to lessen the chance for fire.

2.2.2 Unsorted Bulky Waste

The majority of the area to the northeast of the sewage lagoon is occupied by unsorted bulky waste that has not been properly processed into its component categories (Figure 5). This area contains white goods (fridges, freezers, washing machines, furnaces, hot water tanks, etc.), construction waste, mixed metal, household furniture, vehicle components, and other large waste items. Many of the white goods and other products have not been properly processed to remove hazardous components such as mercury temperature switches and hazardous refrigerants.

Construction waste products should be sorted by Hamlet staff and recoverable materials made available for reuse by community residents. Particularly wood products and metal fixtures should be stored in a manner that protects them from further damage and avoids safety hazards to residents when combing through the materials.

Clean, non-recoverable wood products that have not been painted, stained or otherwise treated should be sorted for burning. Any disposal by burning is subject to the conditions of the Municipal Solid Wastes Suitable for Open Burning guidelines from the Department of Environment and Natural Resources (Environmental Protection Division, 1993). Conditions for burning include, but are not limited to, applying the principles of reduce, reuse, recycle, burning in a controlled manner when conditions are favourable (no or low wind blowing away from the community), receiving applicable permits and abiding by permit conditions, removal of all non-burnable material, and compliance with any other site specific conditions. Treated wood products can be broken down and included in the general municipal waste disposal. Metal products should be sorted to remove any hazardous materials and stockpiled to ship south for recycling and recovery.

The scrap metal content in the unsorted bulky waste area should be sorted and stockpiled with the construction scrap metal to ship south for recycling and recovery. Household furniture and other large, non-hazardous, non-recoverable items removed from the unsorted bulky waste area should be broken down to increase compaction and disposed of in the general household waste area.

2.2.3 Mixed Metal

In addition to the metal found in the unsorted bulky waste area, some metals have been sorted and stored separately in an area to the west of the bulky waste area. Materials stored in this area include scrap construction metal, old corrugated steel pipe culverts and old fuel tanks (Figure 9). There are also several locations throughout the bulky waste area where used metal barrels are stored (Figure 10). It is not known if all of these barrels have been properly cleaned or if they are still contaminated by hazardous waste. If they have not been properly cleaned out, the Hamlet should make arrangements to have an environmental contractor clean them out, as described in the SWDF O&M Plan, so that they can be properly crushed and shipped south for material recovery. This should be completed promptly to prevent any residual fluids in the barrels from contaminating the surrounding site. Barrels that need to be cleaned should be stored upright in a lined area to prevent the migration of any leaking fluids into soils and water on site. Once cleaned, barrels should be crushed and transported off site promptly.

2.2.4 Hazardous Waste Storage

There is not a significant quantity of hazardous wastes on site in the bulky storage area. The primary hazardous waste source on site consists of vehicle batteries, several buckets of waste oil and any residual substances in the barrels on site which are awaiting proper cleaning. Hazardous wastes should be stored in a way that prevents the potential for contamination of the surrounding soils, waterways, and air. They should be shipped out promptly on the annual barge to prevent contamination of the surrounding area. All materials should be stored as per the Solid Waste Disposal Facilities Operations and Maintenance Manual.

It is recommended that the Hamlet develop a dedicated hazardous waste storage facility within the bulky waste area for storing these materials in addition to the uncleaned metal barrels, ELV fluids, and white good hazardous components. A hazardous waste storage area would need to be lined with a chemically stable, impermeable material overlain with a layer of backfill to prevent damage to the liner. It would also need to be surrounded by an impermeable berm to prevent the migration of any fluids out of the storage area. This hazardous waste storage area would not be intended for long term storage of materials and hazardous waste should still be shipped south promptly to avoid containment degradation and excess contamination.

2.2.5 Contaminated Soils

In the 2009 water licence renewal application (Dillon Consulting Limited, 2009), two mounds of soil were identified within the solid waste facility, one that had been remediated and one that was contaminated. The soil mounds were shown on a drawing in a designated area for contaminated soils to the south of the two capped landfill cells and to the west of the access road turn-around pad. This material consisted of 550 m³ of soil placed at the landfill site following remediation activities in 2005 and 2007. The soil was reportedly treated with nutrient addition in 2008 and samples were collected for analysis. Records could not be located for the final testing and fate of this soil but it is no longer in the location that it occupied in site photos from 2009. Based on site observations and communications with Hamlet staff, it is believed that this material was utilized as overburden in the capping of previous cells however its fate could not be determined with certainty based on the materials available.

2.3 Sewage Disposal Facilities

2.3.1 Background Review

The current wastewater management system consists of a truck haul disposal system which collects wastewater from residences by a sewage collection truck with an older vacuum truck providing emergency support as required. All homes in the community have septic holding tanks and no homes rely on honey bags. Sewage is discharged into the wastewater lagoon down a metal chute located at the end of the access road for the wastewater and solid waste disposal facilities (Figure 11). The community does not have significant industrial or commercial wastewater sources and the wastewater is assumed to be entirely of domestic household origin.

Sewage is discharged into the sewage lagoon, a natural lake that has been used for sewage disposal since the early 1990s. Solids are allowed to settle out and the sewage is naturally attenuated in the sewage lagoon. The sewage lagoon discharges to the west through a natural wetland approximately 300 m long which provides additional polishing before effluent discharges into Darnley Bay (Figure 12 and Figure 13). The sewage lagoon continuously drains through the wetland during the summer months.

The 2009 water licence renewal application (Dillon Consulting, 2009) reported that the overflowing of the lagoon occurs periodically, particularly in the spring during runoff and periods of heavy precipitation. It was reported that there are holes/tunnels along the perimeter of the lagoon that cause particular overflowing issues. This concern was highlighted again during the 2017 site visit. The lagoon does not have an engineered berm surrounding the perimeter. The truck discharge area is built up upon a mound but it does not offer any overflow containment since the mound does not extend past the discharge.

2.3.2 Surveillance Network Program

The most recent Environment and Natural Resources inspection was performed in October 2015, and reported that samples collected at SNP station 1619-2 (lagoon to wetland) returned parameters under criteria (ENR, 2015). Total suspended solids (TSS) at SNP station 1619-3 (wetland to Darnley Bay) were measured at 388 mg/L, which exceeds the 120 mg/L limit (ENR, 2015). Samples were taken in July 2017, and sites 1619-3 and 1619-4 were found to exceed the TSS limit, while 1619-2 exceeded the pH limit (too alkaline). The Hamlet has established plans and protocols to begin sampling the discharged water on a regular basis.

2.3.3 Lagoon Volume and Sludge Thickness

Sludge build-up in the base of the lagoon due to sediment deposition is not routinely measured though this is also a component that the Hamlet has integrated into their routine operations and maintenance manual. During the July 2017 site visit conducted by Dillon, the sludge and effluent depths in the lagoon were measured. The volume of 'Lake A' was determined to be approximately 128,000 m³. Approximately 15,000 m³ of this volume is occupied by accumulated sludge. The average depth of the lagoon is 1.81 m, with a maximum depth exceeding 4.36 m.

Excessive sludge build-up decreases the available volume of the lagoon for sewage storage and treatment and increases the risk of lagoon overflow or inadequate treatment. As outlined in the Sewage Disposal Facilities Operation and Maintenance Plan, the sludge level should be measured once a year and appropriate steps taken if the sludge build-up level is excessively high. Sludge dredging procedures are discussed in the Closure section below.

3.0 Site Closure Considerations

The time horizon for closure of the currently active sewage disposal facility is not known exactly since the area still contains considerable useable life. The closure of the municipal solid waste cell is anticipated in the next 12 months. The use of the area method is expected to increase the lifespan of the facility until 2036.

This section outlines the procedures to be followed when closing and capping an individual landfill cell, for maintaining the health and efficacy of the wastewater treatment lagoon, and for the ultimate closure of the landfill, bulky waste sorting area, and wastewater lagoon when that time arrives. The services of an engineer should be enlisted to develop a specific closure plan and design for both facilities when they are to be closed. The remaining usable life of the facility is discussed further in the 2017 Sewage and Solid Waste Facility Site Assessment. Factors that will impact the remaining usable life for each facility include population rates, sewage and solid waste generation rates, materials recovery efforts including reducing, reusing and recycling of solid waste, and the efficient sorting and shipping of bulky wastes. The existing sewage and solid waste facility will be closed in an environmentally responsible manner in order to mitigate health and safety risks to the community, scavenging by wildlife and birds, and impacts on the surrounding environment and waterways. As per Paulatuk Municipal Water Licence #N7L3-1619 Part I, Item 1, the following items are addressed in this closure plan:

- Contaminated site remediation (Section 3.4);
- Hazardous waste removal, transportation, and disposal (Section 3.5);
- Groundwater contamination by leachate prevention (Section 3.6);
- Consideration of altered drainage patterns (Section 3.7);
- Type and source of cover materials (Section 0);
- Future area use (Section 4.3);
- Implementation schedule (Section 3.13);
- Maps delineating all disturbed areas, borrow material locations, and site facilities (Appendix B); and
- A restoration monitoring plan (Section 4.2).

3.1 Solid Waste Area Ponded Water Removal and Treatment

Pools of standing water have been observed at the capped general municipal waste cells in historical satellite imagery in addition to the bulky waste storage areas during the site visit on May 27, 2015. This standing water presents several potential hazards including infiltrating the landfilled material causing leachate, making access to the site more difficult, making transportation of materials more difficult, and causing corrosion and degradation of potentially recoverable materials.

This water should be sampled when it is noted on site during periods of run-off, and tested by an approved laboratory to determine if it is contaminated by heavy metals or other contaminants of concern. If the standing water on site is found to be contaminated it should be pumped into a lined detention pond and treated according to the level and nature of the contaminants. If the water is safe to discharge, it should be pumped into the sewage lagoon for treatment of any organic or solids loading and discharge into Darnley Bay. Low spots where water previously pooled should be backfilled compacted and graded to provide adequate drainage and avoid standing water in the future.

Pooled water to the east of 'Lake A' Sewage Lagoon, near the white goods area at the solid waste disposal facility was sampled in July 2017 for SNP station 1619-5. Laboratory results will be appended to the Hamlet of Paulatuk Annual Report for 2017.

3.2 Infrastructure Removal

The current facility does not contain any permanent storage or maintenance buildings on site that will need to be removed. Items to be shipped to southern recycling/disposal facilities will be properly stored on site until arrangements for shipping have been determined.

3.3 Site Fencing

The existing chain link fence to the west of the access road is in disrepair, and is currently undergoing repairs. Proper fencing fulfils many roles at a site such as stopping any windblown material from leaving the property, preventing wildlife from getting into the solid waste and becoming a nuisance or safety hazard, and controlling access to the site to prevent illegal dumping and safety hazards.

3.4 Contaminated Site Remediation

There are not any expected sources of contamination that will result from the closure of the solid waste management facility. If contaminated soils are identified prior to the facility being closed, an engineer should be engaged to develop a plan for the proper treatment and disposal of those contaminated soils. This may include land farming, enhanced bioremediation, landfilling, or chemical treatment.

3.5 Hazardous/Bulky Waste Removal, Transportation, and Disposal

Once the bulky waste storage and sorting area reaches the end of its useable life, all remaining materials should be sorted, salvaged, and shipped south for further materials recovery or disposed as described in the SWDF O&M Plan. The bulky waste storage area was not used to store or dispose of any significant amounts of hazardous material, however the materials that are stored there require proper treatment and the development of a more appropriate storage area to prevent the contamination of the surrounding area.

A hazardous waste storage and processing area within the bulky waste sorting area of the solid waste management facility should be developed. This area should be lined with an impermeable liner and surrounded by a berm. Hazardous materials should be stored as per the SWDF O&M Plan until they can be shipped to a proper disposal facility.

3.6 Leachate Management, Ground and Surface Water Monitoring

This site closure plan has been developed to limit the infiltration of surface water into the buried waste mass. This site has not been lined with an engineered retention layer nor a leachate collection and treatment system. The exact depth of the waste is unknown. All depressions or other areas where surface water may pool within the site should be backfilled to ensure proper drainage. Surface drainage works (ie. ditches) will be constructed to direct surface water away from waste disposal areas to further minimize the potential for infiltration of surface water through to the buried waste cells.

Due to the wastewater and solid waste management facilities being close to sea level and underlain by an area of continuous permafrost, it is not anticipated that groundwater contamination will be a significant concern for either the wastewater lagoon or the landfill cells. There has been concern expressed in the community that leachate from the solid waste management facility is entering Old Water Lake to the east and impacting the water quality there. SNP Station 1619-6 is in place to sample run-off from the existing solid waste disposal facility before entering Old Water Lake.

3.7 Altered Drainage Patterns

Surface drainage patterns may be altered by the placement of the cap material which may change elevations, infiltration of water and directions of surface water flow. Once the site has been capped, a final survey and inspection of the site and surrounding area should be conducted to determine any changes in elevations, potential infiltration areas and surface water drainage patterns. As discussed in the above sections, the site should be graded to ensure drainage of surface water off the site and to minimize water ponding. Based on the results of the final survey, construction of drainage ditches around the capped waste cell to direct water off site may be required.

3.8 Grading and Capping

Once each cell has been filled to capacity it should be capped with 600 mm of cover material with a maximum hydraulic conductivity of 10^{-7} m/s or an acceptable alternative (Alberta Environment, 2010). Typically landfill cells should be covered with 200 mm of organic material after the cell has been capped to allow for seeding of vegetation native to the area. In the Paulatuk solid waste management facility, the surrounding ecosystem consists primarily of sandy, glacial till soil with small brush growth. Given the observed sandy nature of the surrounding soil, it is recommended that when a landfill cell is being capped an engineer be engaged in the design and hydraulic conductivity measurements be taken of the surrounding soil to determine its suitability as a capping material. If the surrounding soil does not possess a high enough hydraulic conductivity, a chemically stable, impermeable liner should be installed to prevent precipitation infiltrating the landfill cell and causing the generation of leachate. Vegetation growth will likely be slow to take hold. Additional monitoring of the cell cover material should be performed and remedial action taken while vegetation is being established. The final cover should be graded to ensure proper drainage of precipitation away from the buried waste pile. Monitoring of the site will continue for 25 years or as directed by the Inuvialuit Water Board.

3.9 Survey

Upon completion of the closure and capping of each cell, a survey of the site should be performed to map out the exact area of the facility extents. The mapping will show areas of the landfill cells, potential contamination or disturbed areas, borrow material, site topography and monitoring locations. The survey should also include final capping, berms and drainage details.

3.10 Registration

Upon final closure of the facility, the site will be identified and registered as a former solid waste disposal facility on the subsequent land title documents associated with the property.

3.11 Signage

New signs should be erected to provide instructions to community residents looking to salvage recoverable materials from the bulky waste storage areas. When the entire site is closed, new signage will be required to inform residents and direct them to the new solid waste disposal facility.

3.12 Sludge Management

The capacity of the sewage lagoon to store and treat wastewater will be reduced over time as suspended solids settle out of the sewage and form a sludge blanket on the base of the lagoon. This reduced capacity can be restored by dredging the base of the lagoon to remove the built up sludge layer. As noted in Section 2.3.1, overflowing of the lagoon has been observed in the past.

As detailed in the *Sewage and Solid Waste Disposal Facilities Assessment* report produced by Dillon (2017), it is not believed that inadequate capacity is the cause of this overflow, however manual decanting is recommended in place of current continuous natural flow. Additionally, the construction of a berm around the lagoon is recommended to reduce surface run-off from entering the lagoon. When sludge layers reach 0.5 m in depth, dredging is recommended as an effective option to increase lagoon capacity. Once the sludge is removed, it is treated typically by dewatering using a freeze/thaw detention system and then either landfilled or composted depending on its level of contamination. Dewatered sludge should be stockpiled on site and tested for heavy metals and other contaminants. Pending the results of the tests the dewatered sludge may be used as overburden for the active landfill cells. Prior to initiating lagoon desludging operations, the Hamlet should enlist an engineer to assist with the design and oversight of the desludging and sludge dewatering plan. Further, within 60 days prior to the removal of sludge from the lagoon, a Sludge Removal Plan must be submitted to the IWB for approval, as per Part D, Item 14 of the water licence. It is understood that the Hamlet has sufficient capacity to undertake desludging and dewatering by their own forces but if this is not the case then a qualified contractor should be enlisted to undertake the desludging activities.

3.13 Implementation Schedule

Based on the approximate volumes that remain in the active landfill cells and fill rates, an approximate closure and post-closure plan has been generated below. With proper maintenance and operations, the bulky waste sorting area can be used for many years to come if materials are shipped south on the annual barge as their stockpiled quantity surpasses the available storage space. Proper dredging and maintenance of the sewage lagoon will also ensure that it will remain useable for many years into the future.

Item	Proposed Completion Date
Reconstruction of chain link fence*	Ongoing
Drainage of standing water on site and backfilling and grading of depressions	September 2016
Compaction of general municipal waste and placement of overburden	Daily when waste is being placed, at minimum weekly
Removal of stockpiled materials	Annually
Dredging of wastewater sludge	As Required
Surface water sampling	As per Hamlet's Water Licence Requirements
Final capping and closure of landfill cells	Once Full
Closure and Post-Closure Inspection	Annually
Final closure and abandonment of current solid waste disposal site	TBD
Final survey	TBD

* Perimeter fencing was discussed with the Hamlet of Paulatuk Council, Thursday July 27, 2017, and was deemed unnecessary for the facility due to the strong winds and community use of the site access road to reach hunting/fishing lands.

4.0 Post Closure

Following closure of the site, periodic inspection and monitoring will be required to ensure that there are no intentionally harmful impacts to the environment. To prevent or mitigate potential environmental impacts generated from the sewage and solid waste facility site, regular testing and reporting for parameters of concern will be required until the regulatory bodies deem the site has reached a point where no long term environmental impacts will likely occur. Following closure of the site, an engineer will determine the specific inspection and monitoring requirements for the post closure and will incorporate the requirements stated by the regulatory agencies.

4.1 Inspections

Inspections of the site will be implemented through a post closure inspection checklist (found in Appendix A). The inspection checklist will be completed and a report will be prepared and sent to the IWB annually. The report will include the following items:

- Time and date of inspection;
- Frequency of inspection;
- Items inspected including:
 - Erosion control: Visually is there any evidence the drainage patterns are causing erosion? If any problems are identified they will be addressed in the annual report and based on recommendations provided by the IWB appropriate measures will be taken; and
 - Surface Water: Must be draining into the drainage ditches provided, if problems exist, consult design engineer, find a solution and record in annual report.
- Regulatory compliance requirements such as SNP monitoring locations and test parameters; and,
- Any other noteworthy observations during inspection.

The IWB will provide direction as to what items will be inspected, what time of year and frequency of inspections.

4.2 Monitoring

Operational monitoring shall be continued into the post closure period until one or more of the following conditions apply:

- It can be demonstrated that the site is no longer releasing contaminants; or
- It can be demonstrated that the site has reached an equilibrium state in which contaminant release poses no unacceptable risk to the environment.

Proponents shall submit a report to the IWB that justifies termination of monitoring. A minimum of 25 years is typically required for monitoring of a closed solid waste site.

The monitoring program of the site shall consist of the following tasks:

- Cover material should be monitored for settling and re-graded or filled in as required to prevent pooling;
- Vegetation should be monitored to ensure sufficient growth and additional seed and growth media should be applied as required;
- Drainage pathways should be kept clear of obstructions;
- Water as well as leachate draining from the site should be tested for contaminants as per the Hamlet's water licence and Solid Waste Disposal Facilities Operations and Maintenance Plan;
- Wildlife levels within the area should be monitored; and
- Results of the above monitoring programs should be reported to the relevant authorities.

The monitoring program will include twice annual sampling of the sampling points identified in the SWDF O&M Plan.

4.3 Future Land Use

The solid waste site and sewage lagoon both lay within the municipal boundaries. Once closed, the land area of the former solid waste disposal site will continue to be part of the wastewater disposal site. The area of the solid waste disposal site will be seeded with naturally occurring vegetation. Because the area will continue to accommodate the sewage lagoon, there is no future plan for use of the land that the buried waste cells utilize.

4.4 Regulatory Requirements

This closure and reclamation plan has been completed in accordance with the *Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories* (Kent et al., 2003). The IWB will require updated reports on the monitoring of the site annually.

Figures



Figure 1: Paulatuk Location Plan (NWT Bureau of Statistics)



Figure 2: Active and abandoned Sewage and Solid Waste Facilities

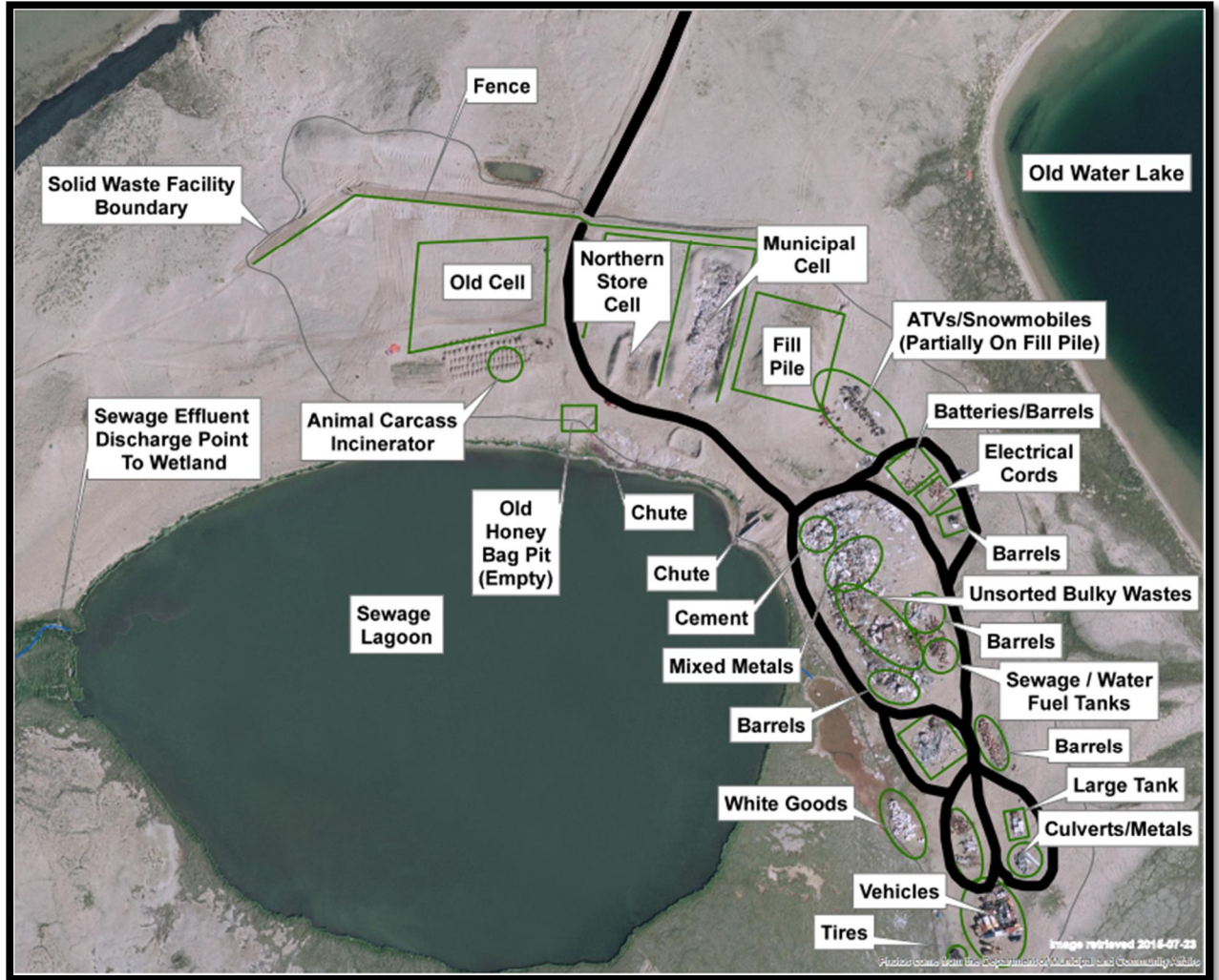


Figure 3: Active Sewage and Solid Waste Disposal Facilities Site Plan



Figure 4: Municipal Solid Waste Cell



Figure 5: Unsorted Bulky Waste



Figure 6: White Goods Storage and Sorting Area



Figure 7: End of Life Vehicle Storage Area



Figure 8: Used Tire Storage Area



Figure 9: Mixed Metals Pile



Figure 10: Used Barrels Storage



Figure 11: Sewage Disposal Facilities Discharge Chute



Figure 12: Sewage Lagoon Discharge to Wetland



Figure 13: Wetland Discharge to Darnley Bay

Appendix A

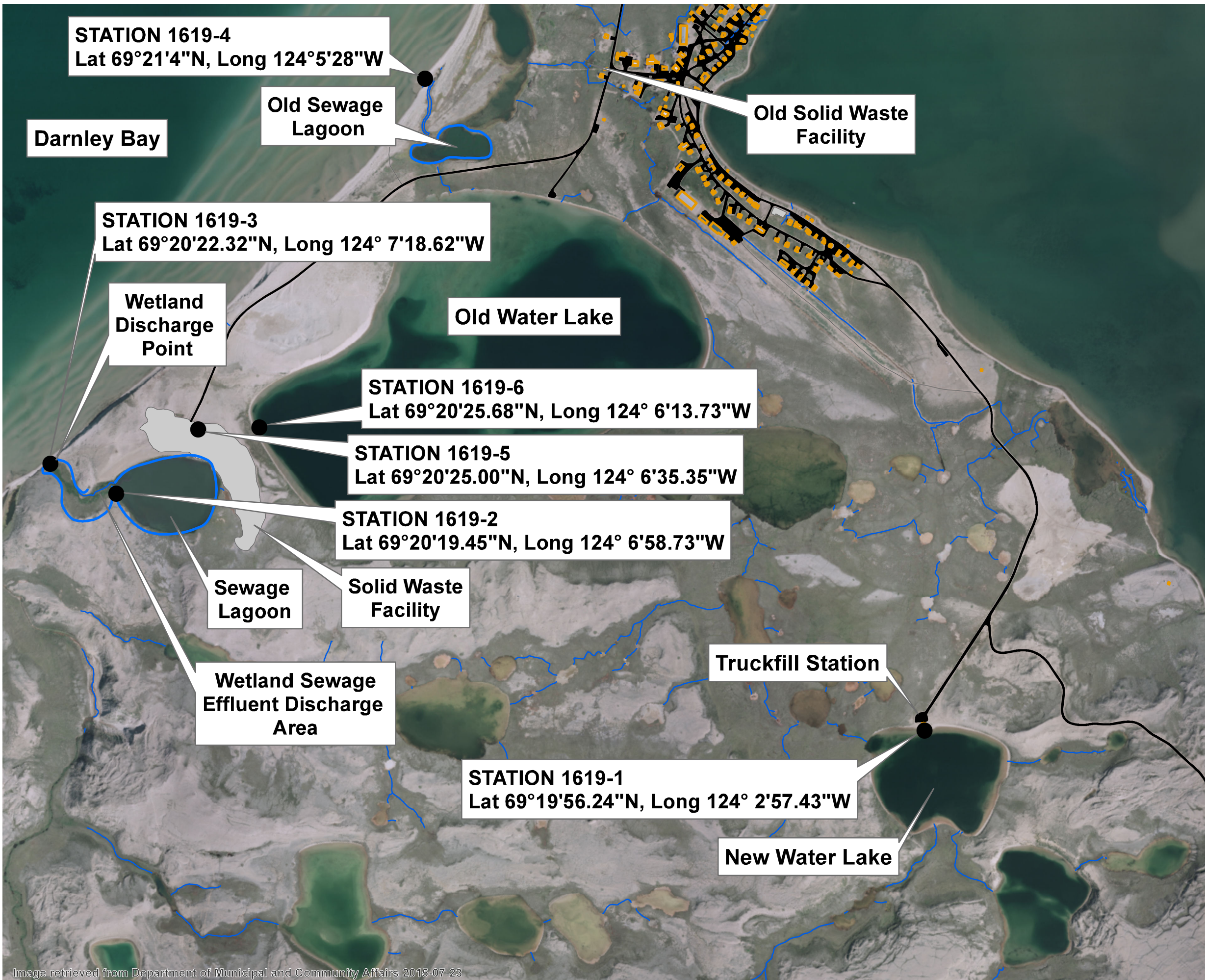
Closure/Post-Closure Inspection Checklist

Closure/Post-Closure Inspection Checklist

Result	Inspection Item
	Did closure commence no later than 30 days following the submission of the Final Landfill Closure Report?
	Was closure completed within 180 days following the initiation of closure?
	Was notification of closure posted at all of the facility access points, indicating where the new facility was?
	Was site properly engineered to prevent erosion and drainage problems?
	Was the final cover capped with 600 mm of material or approved alternative and properly graded? Was a final survey taken to mark the designated areas, locate monitoring wells and SNP locations and document the extent of the site? Should be tied to a permanent benchmark if available.
	Inspection frequency will be annually for 25 years and reports will be sent to the IWB after every inspection.
	Items to be inspected are the leachate monitoring, sewage lagoon adjacent to cell, surface water drainage, areas of on-site ponding, landfill cap and vegetative cover and other items as directed by the IWB.
	Was the site returned to post closure land use specified in the permit?
	Was the entire necessary infrastructure removed from site?
	Was all the necessary waste removed from site?
	Was a final landfill closure report submitted within 60 calendar days of completion of the final landfill closure?
	Was the post closure annual report submitted to the operating record by March 31 of this year?
	Was end of post-closure report submitted within 60 days following the end of post-closure?

Appendix B

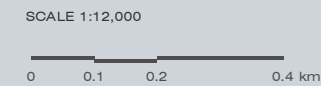
Map and Detailed Site Plan



PAULATUK
SEWAGE AND SOLID WASTE SITE ASSESSMENT

SOLID WASTE FACILITY
SURVEILLANCE NETWORK PROGRAM
LOCATIONS

-  BUILDING FOOTPRINT
-  ROADS
-  SOLID WASTE FACILITY
-  DRAINAGE PATHS
-  SNP LOCATIONS

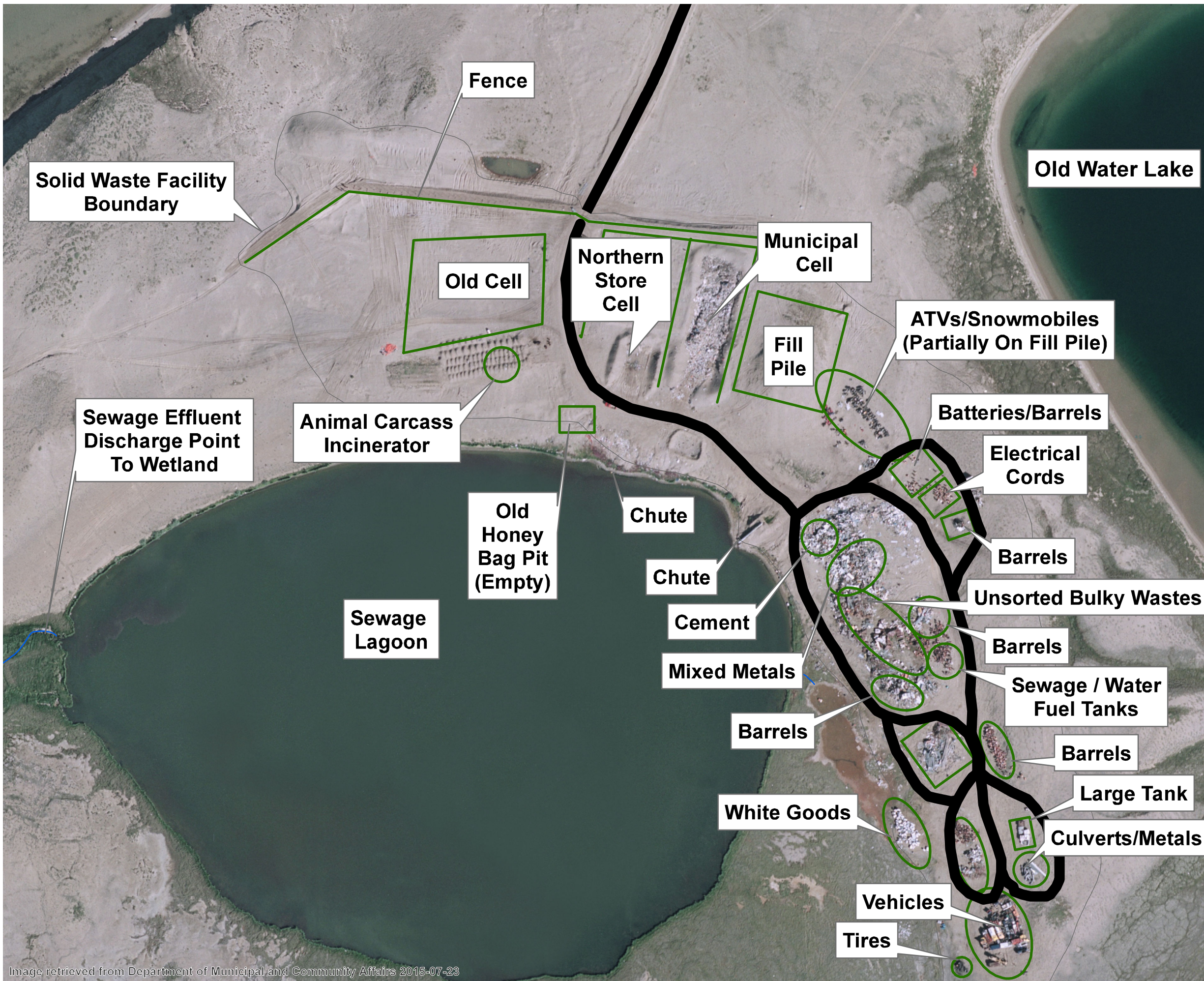


MAP DRAWING INFORMATION:
DATA PROVIDED BY GNWT AND DILLON CONSULTING

MAP CREATED BY: PH
MAP CHECKED BY: MH
MAP PROJECTION: NAD 1983 UTM Zone 10N



PROJECT: 176028
STATUS: DRAFT
DATE: 2017-09-06



PAULATUK
SEWAGE AND SOLID WASTE SITE ASSESSMENT

SOLID WASTE FACILITY
DETAILED SITE PLAN

- BUILDING FOOTPRINT
- ROADS
- DRAINAGE PATHS
- LANDFILL FEATURES

SCALE 1:1,750
0 12.5 25 50 Meters



MAP DRAWING INFORMATION:
DATA PROVIDED BY GNWT AND DILLON CONSULTING

MAP CREATED BY: PH
MAP CHECKED BY: MH
MAP PROJECTION: NAD 1983 UTM Zone 10N



PROJECT: 176028
STATUS: DRAFT
DATE: 2017-09-06

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http://www.enr.gov.nt.ca/sites/default/files/guidelines/solidwaste_guidelines.pdf

**Appendix K: Inuvialuit Water Board Correspondence
and Water Treatment Plant Drawings**



December 11, 2018

Mayor Ray Ruben
Hamlet of Paulatuk
P.O. Box 98
Paulatuk, NT X0E 1N0

Dear Mayor Ruben:

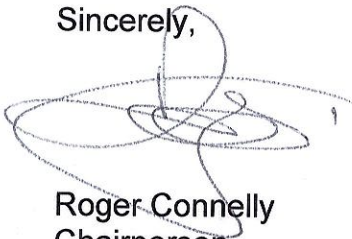
Re: Water Licence (WL) N7L3-1619 - Hamlet of Paulatuk – Water Treatment Plant Improvements - Modification

The Inuvialuit Water Board (IWB) acknowledges receipt of the proposed work and drawings submitted on October 22, 2018 for the installation of a prefabricated building housing a new municipal water treatment system. The IWB accepts the modifications as submitted subject to the following provision:

- WL N7L3-1619 - Part G: Conditions applying to Modifications - Item 3: The Licensee shall provide to the Board as built site plans referred to in Part G, Item 1 within ninety (90) days of completion of the modifications. If there are any changes to the drawings already submitted, please advise the IWB.

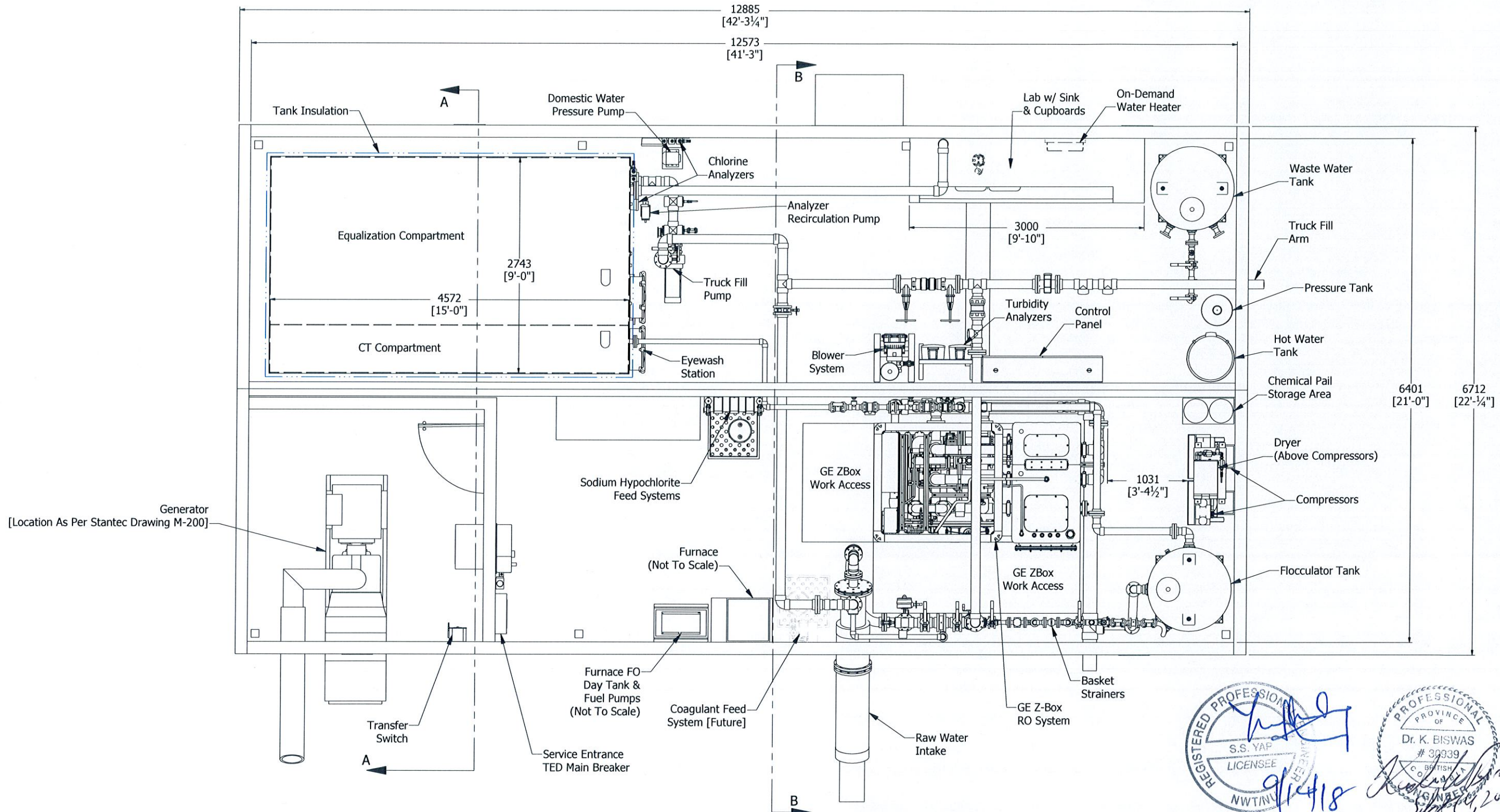
All documents, including IWB related correspondence, will be placed on the public register. Should you have any questions, please contact Mardy Semmler, IWB Executive Director, at 867-678-8609 or semmlerm@inuvwb.ca.

Sincerely,



Roger Connelly
Chairperson

cc: John Holland, Senior Administrative Officer - Hamlet of Paulatuk
Lloyd Gruben, Water Resources Officer – ENR, Inuvik



REGISTERED PROFESSIONAL ENGINEER
 PROVINCE OF BRITISH COLUMBIA
 S.S. YAP
 LICENSEE
 NWTIN/18
 9/14/18


PROFESSIONAL ENGINEER
 PROVINCE OF BRITISH COLUMBIA
 Dr. K. BISWAS
 # 30939
 1/24/18

REV	DESCRIPTION	BY	CHK'D	APP'D	DATE
D	OVERFLOW RAISED ON FLOCCULATOR TANK	RT	KB	JY	SEP-06-2018
C	UPDATE	RT	KB	JY	AUG-20-2018
B	100% SUBMITTAL	RT	KB	JY	JUL-13-2018
A	70% SUBMITTAL	RT	KB	JY	APR-06-2018
REV	DESCRIPTION	BY	CHK'D	APP'D	DATE

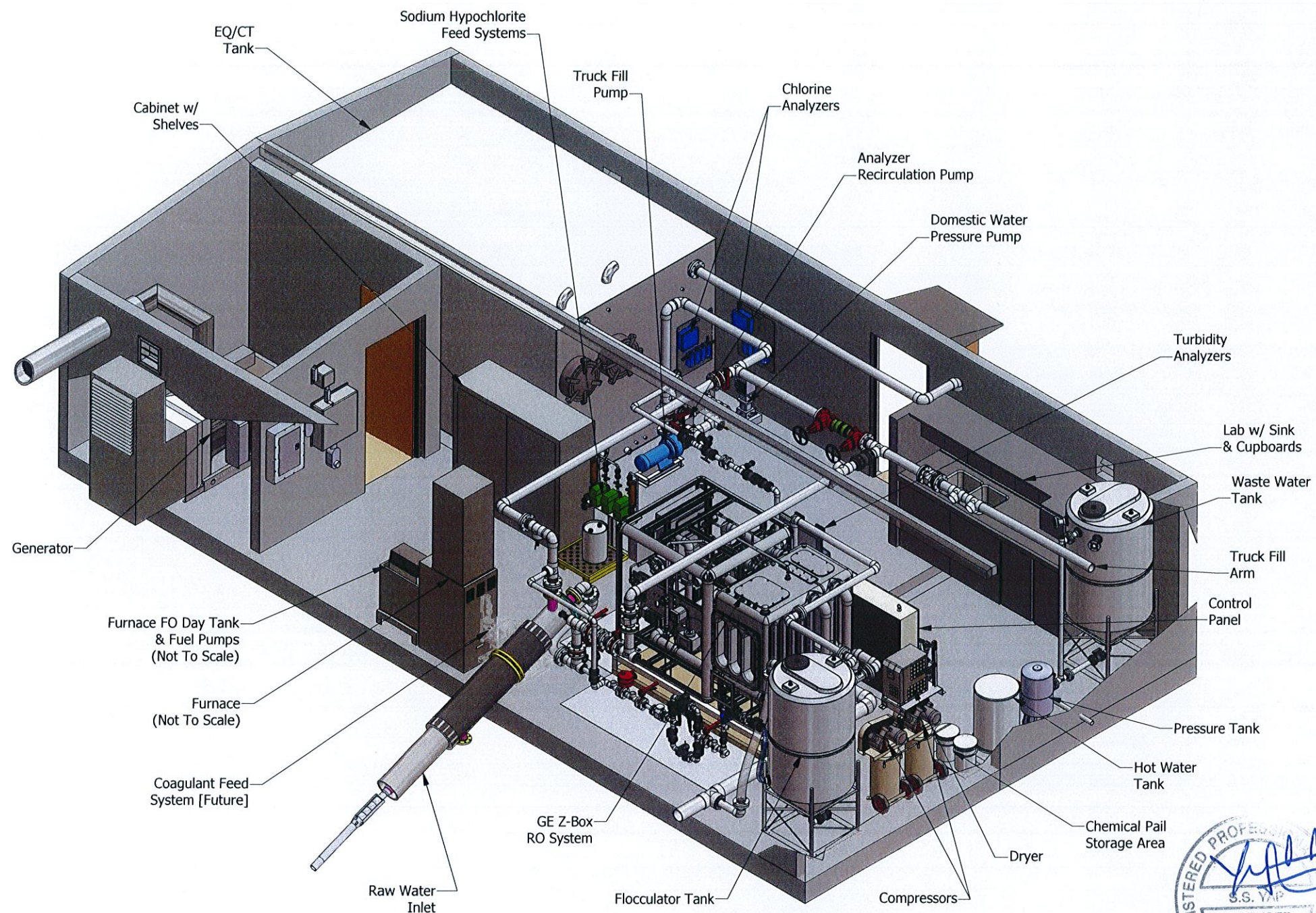
REVISIONS

NOTE

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AWC WATER SOLUTIONS LTD.
 #104-19074 22nd Avenue Surrey, BC Canada V3Z 3S6
 Phone : 604-638-0760 Fax: 604-638-0795
 www.awcwater.com

DRAWN	RT	GNWT3-PAULATUK WTP (REF #10338) AWC UF WTP GENERAL ARRANGEMENT SHEET 1 OF 3	
DESIGN	KB		
CHECKED	KB		
APPROVED	JY		
DATE	JAN-29-2018		
SCALE	NTS	DRAWING NO. 10338-P-01	REV D



REV	DESCRIPTION	BY	CHK'D	APP'D	DATE
D	OVERFLOW RAISED ON FLOCCULATOR TANK	RT	KB	JY	SEP-06-2018
C	UPDATE	RT	KB	JY	AUG-20-2018
B	100% SUBMITTAL	RT	KB	JY	JUL-13-2018
A	70% SUBMITTAL	RT	KB	JY	APR-06-2018
REVISIONS					

NOTE

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DRAWN	RT
DESIGN	KB
CHECKED	KB
APPROVED	JY
DATE	JAN-29-2018
SCALE	NTS

GNWT3-PAULATUK WTP (REF #10338) AWC UF WTP GENERAL ARRANGEMENT SHEET 3 OF 3	DRAWING NO. 10338-P-01	REV D
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Appendix C: Haz Mat Database

Spill	spill-2020110	spill-2019235	spill-2017175	spill-2017167
Occurance Date	23-Apr-20	06-Jun-19	16-May-17	
Spill Region	Inuvik	Inuvik	Inuvik	Inuvik
Location	Paulatuk	Paulatuk	Paulatuk	Paulatuk
Location Description	Northern Store Warehouse Paulatuk,NT	Paulatuk	Lot # 49 - Units 52 & 53 - AKA 'The White House'	Paulatuk
Product Spilled	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Petroleum - waste oil (slops, sludge)	Petroleum - fuel oil (jet A, diesel, turbo A, heat)	Petroleum - fuel oil (jet A, diesel, turbo A, heat)
Quantity	700	150	30	1
Measurement	Litres	Litres	Litres	Litres
Spill Cause	Unknown Cause		Tank Leak	Unknown Cause
Lead Agency	GNWT - Department of Environment and Natural Resources			

This reports contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has no occurred in that location.