Surface and Wastewater Management Plan

CONTRACT: **NPO1301 – 55468 Const. of Nanisivik Naval Facility**

Location: **Nanisivik, Nunavut**

Client: **Defence Construction Canada**

Company: **Almiq Contracting Ltd.**

Prepared by: **Richard Martin**

Title/Function: **Project Manager**

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1 GENERAL

This plan is made in compliance with regulations, guidelines and policies of Nunavut, as required in the project's water license issued by the Nunavut Water Board (No. 8BC-NNF1418). It is also part of Almiq's commitment to protect the environment from contaminants resulting from its construction activities.

1.1 Environmental Policy of the Company

Almiq Contracting Ltd. is committed to protect the environment, protect the health, safety and welfare of its employees and the communities in which it operates. The Company is committed to comply with all the applicable regulations, guidelines and policies to the protection of the environment, to assess the risks related to its business and to take measures to ensure continuous improvement.

Our vision is based on our core values of commitment, integrity, respect, trust, health, safety and environment, teamwork and openness to different cultures.

Guidelines for health, safety and environmental protection

- We work together to identify, analyze, eliminate or control the risks associated with OHSE for our employees, communities and the environment in which we operate in order to meet the minimum HSE legislation.
- We fulfill our duties with respect to OHSE and we ensure that our employees are equipped, trained and motivated to achieve our goal of zero incidents, injury and disease.
- However, if an accident were to occur, we favor a return to work as quickly as possible using the temporary assignment.
- We encourage on a regular basis, through safety breaks, our employees to adopt a healthy lifestyle, to be careful and respect the environment at work and at home.
- We check each shipment of hazardous materials (WHMIS).
- We strive to prevent and minimize the adverse effects of our activities on the environment.
- We actively participate into LEED projects.
- We collect harmful materials disposed of in accordance with the rules and policies.
- We develop, when required, an environmental response plan tailored to our projects.

To support this policy, Almiq Contracting Ltd. is committed to:

- Ensure that all those who work for the company understand their responsibilities with regard to the OHSE and demonstrate through concrete action their commitment to achieving the goal of zero incidents.
- Favour an open and transparent communication to build lasting relationships with our stakeholders and to make long-term improvements in HSE.
- Encourage, recognize and reward positive contributions to HSE performance.
- Maintain the employment relationship with temporary assignment for any injured employee to facilitate return to work as soon as possible.

To support this policy, the employee as obligations:

- Timely completion of the appropriate documents for reporting of an incident, accident, or other problems.
- Follow all guidelines and instructions provided by their immediate supervisor.
- Collaborate with the company during OHSE investigations.
- Remember that the OHSE is everyone's responsibility.

Charles Deslauriers, *General Director* **Lynda Noël, *Assistant General Director***

1.2 Goal

The goal of this plan is to prevent water pollution and to make sure water and wastewater are managed in a safe way for the environment in accordance with the provisions of our water license.

- To ensure the impact on the environment and human health and safety is minimized;
- To ensure that wastewater resulting from construction are managed correctly;
- To prevent potential pollutants from entering fresh waters and sea waters;
- To prevent erosion.

1.3 Content

The plan contains wastewater management measures for the following activities:

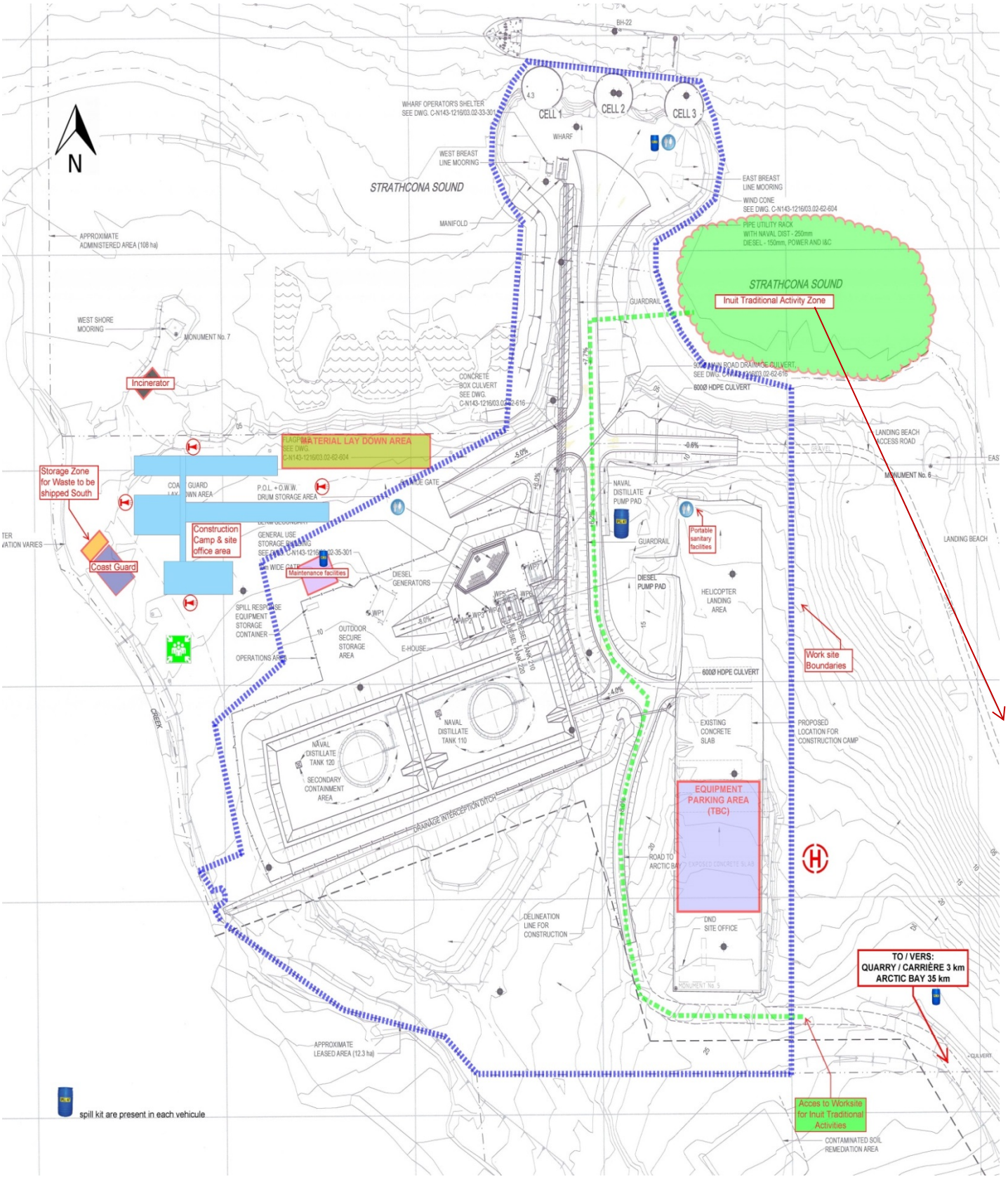
- Concrete curing water;
- Clean-up water;
- Dewatering of ground water;
- Disinfection water;
- Hydrostatic test water;
- Domestic sewage water;
- Water used in flushing of lines.

1.4 Commitment

By the present, Almiq commits to manage surface and wastewater with due diligence, as per rules and regulations of Nunavut and in conformity with the requirements dictated in water licence No. 8BC-NNF1418 – B TYPE.

1.5 General site layout and specific areas

Note that the camp and site office area as well as the temporary waste storage zone are both located at least 31 metres away from respectively the high water mark and the creek.



1.6 Fresh water supply

The table below indicates the volume of water Almiq plans to use. Even though the license allows us to use East Twin Lake, we have planned to use Twin Lakes Creek, for compaction water and water from the Hamlet of Arctic Bay, for domestic and industrial (concrete production, dust control and tank rinsing) purposes during the construction phase of the project:

	Industrial Use (cubic metres)/year	Domestic Use (cubic metres)/year	Combined Volume (cubic metres)/year
2015	500	1017	1517
2016	500	1356	1856
2017	100	1243	1343
2018	200	848	1048

- The total daily volume of water for all purposes will not exceed 299 cubic metres. Volumes of water will be calculated with the Hamlet's water truck.
- Almiq will submit to the NWB for approval in writing, at least thirty (30) days prior to the use of Water of a sufficient volume, the following information: water body (source) to be drawn down, volume required, an hydrological overview of the Water body, details of impacts, and proposed mitigation measures.
- Almiq has equipped Water intake hose with a screen of an appropriate mesh size to ensure that fish are not entrained and shall withdraw Water at a rate such that fish do not become impinged on the screen.
- We will not remove any material from below the ordinary High Water Mark of any Water body unless authorized.
- We will not cause erosion to the banks of any body of water and we will provide necessary controls to prevent such erosion.
- We will implement sediment and erosion control measure prior to and maintain those measures during the undertaking to prevent entry of sediment into water.

2 WASTEWATER MANAGEMENT

2.1 Concrete curing water

License / Background / Description info	**Water used for curing concrete poured on the cells**
Schedule of activity	2016
Qty of water to be used (approx.)	20 m^3 (20 000 L)
Source	Hamlet of Arctic Bay
Wastewater management / Mitigative Measures	Jute will be installed on concrete surfaces and a quantity of water will be poured on it. This system will keep surfaces moist for curing, maximum 7 days. Waste jute will be reused as much as possible and eventually thrown to waste and treated as regular waste. A quantity of water will be absorbed by concrete, the other by the jute fiber, and the rest will percolate as per contours of the structure. This water is not contaminated and will not cause any erosion.

2.2 Clean-up water

License / Background / Description info	**Water used for cleaning equipment, tools, etc.**
Schedule of activity	2015 to 2018
Qty of water to be used (approx.)	10 m^3 (10 000 L)
Source	Hamlet of Arctic Bay
Wastewater management / Mitigative Measures	Cleaning of equipment will take place in the laydown area. Cleaning station will be 31 metres away from any water body. Water will be use to clear away mud and dust. This installation is not a car wash. No cleaning products will be used. No oily pieces of equipment will be washed.

2.3 Dewatering of ground water

License / Background / Description info	**Dewatering will occur with excavation works for sheet pile salvage and wharf repair. This is sea water.**
Schedule of activity	2015-2016
Qty of water to be used (approx.)	150 m^3 (150 000 L)
Source	Underground water (sea water)
Wastewater management / Mitigative Measures	Water from dewatering operations will be pumped into a sediment pond. Water will be returned to sea in a manner that prevents erosion and sedimentation..

2.4 Disinfection water and flushing of lines

License / Background / Description info	**Disinfection water will come from seasonal camp opening activities.**
Schedule of activity	Each season (5 times)
Qty of water to be used (approx.)	30 m^3 (30 000 L)
Source	Hamlet of Arctic Bay
Wastewater management / Mitigative Measures	Quantities used will be kept at the minimum extent possible. Waste water from this activity will be managed as domestic sewage water i.e. collected by the Hamlet of Arctic Bay's sewage truck.

2.5 Hydrostatic test water

License / Background / Description info	We will conduct hydrostatic testing of pipelines and storage tanks in advance of commissioning the relevant facilities associated with the Project.
Schedule of activity	2017 season
Qty of water to be used (approx.)	1500 m^3 (1,500,000 L)
Source	Sea water
Wastewater management / Mitigative Measures	Waste water from this activity will be transferred into sediment pond before being tested as per CCME guidelines. Once the guidelines are met, waste water will be released into the sea. No wastewater generated from hydrostatic testing will be released onto land or in freshwater.
Monitoring and Testing	Water discharged from hydrostatic testing will meet CCME water quality guidelines prior to being released into the receiving environment. Release of test water, once water quality guidelines are met, shall be done in a fashion that ensures no erosion or sedimentation occurs.

2.6 Domestic water / sewage water

License / Background / Description info	To support the Project, we established a 50 - 60 person camp infrastructure for duration of project, 2015 through 2018.			
Schedule of activity	From the end of April to the end of September – 2015 to 2018.			
Qty of water to be used (approx.)	**2015**	**2016**	**2017**	**2018**
	1017m^3	1356 m^3	1243 m^3	848 m^3
Source	Hamlet of Arctic Bay delivered via truck. Hamlet has confirmed its ability to provide potable water to the project.			
Wastewater management / Mitigative Measures	Domestic wastewater generated during the construction phase will be backhauled to facilities within the Hamlet of Arctic Bay for treatment. Hamlet has confirmed by letter its intent to accept domestic waste water generated by the project.			

2.7 Water used for Compaction and Dust Suppression

License / Background / Description info	Aggregate material is to be placed and compacted for the project. Water will be pumped from Twin Lakes Creek with a hose equipped with a mesh. Water is contained in a 1000 L tank and then sprayed for compaction works as and where needed.
Schedule of activity	2015-2016
Qty of water to be used (approx.)	500 m^3 per year
Source	Twin Lakes Creek
Wastewater management	Water is used to increase ground humidity up to 8% and will not exceed this percentage. Ground will not be saturated and no erosion will be created.

3 SURFACE WATER MANAGEMENT PLAN

- Almiq will conduct all activities in such a manner as to minimize impacts on surface drainage and will immediately undertake corrective measures in the event of any impacts on surface drainage.
- Almiq understands that with respect to access road, pad construction or other earthworks, the deposition of debris or sediment into or onto any water body is prohibited. These materials will be disposed of at a distance of at least thirty one (31) metres from the ordinary High Water Mark in such a fashion that they do not enter the water.
- Almiq will not mobilize heavy equipment or vehicles for trenching or other activities unless the ground surface is capable of fully supporting the equipment or vehicles without rutting or gouging. Overland travel of equipment or vehicles will be suspended if rutting occurs.

3.1 Access Roads

Existing roads located within the vicinity of the project will be upgraded and new roads will be developed to provide access to various components of the Project. All roads will be constructed of fill and will incorporate, where needed, corrugated steel culverts at a minimum of one metre below the road surface. Upgrades to roads may include modifications for pipeline crossing and relevant culverts as needed. The primary access roads related to the Project include the Main Access Road, Landing Beach Access Road, Cargo Staging Road, Bulk Liquids Storage Facility access roads (two roads), and the Helicopter Landing Area Access Road.

Almiq will not construct any winter lake and stream crossings. All roads will be re-graded to match natural contour to reduce erosion.

Almiq will remove any culverts and restore the drainage to match the natural channel. Measures will be implemented to minimize erosion and sedimentation.

3.2 Cargo Staging and Marshalling Area & Camp Area

An area of approximately 8000 m2, located southwest of the wharf, has been graded and aggregate material has been used to establish the Cargo and Marshalling area.

Almiq will not store material on the surface of frozen streams or lakes, including the immediate banks, except what is for immediate use. Camp has been located 31 meters away from any water body and installed such a way to avoid or minimize drainage.

3.3 Wharf

Work to be undertaken in or near water does not include dredging.

4 MONITORING AND TESTING

Monitoring Program Station ID[1]	Description	Status
NNF-1	Raw Water Supply Intake at East Twin Lake	Active - Will not be used (Volume)
NNF-1b	Raw Water Supply Intake at Twin Lakes Creek	Active (Volume)
NNF-2	Final Discharge Point from the Sewage Treatment Facility	Inactive until facility is constructed and commissioned (Operation phase only) (Volume & Quality)
NNF-3	Final Discharge Point for Effluent from the Bulk Liquids Storage Facility	Inactive until facility is constructed and commissioned (Operation Phase only) (Volume & Quality)
NNF-4	**Final Discharge Point for Effluent from Hydrostatic testing**	**Inactive until activity is conducted (Volume & Quality)**

- Almiq will provide the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where sources of Water are utilized for all purposes.
- All sampling, sample preservation and analyses will be conducted in accordance with methods prescribed in the current edition of Standard Methods for the Examination of Water and Wastewater, or by such other methods approved by the NWB in writing.
- All analyses will be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation will be current and in good standing.
- All Effluent discharged from Monitoring Station NNF-4 into receiving environment on land or into water will not exceed the following Effluent quality criteria:

Parameter	Maximum Concentration of Any Grab Sample
pH	Between 6.0 and 9.0
Total Suspended Solids	35 mg/L
Oil and Grease	15 mg/L and no sheen
Total Lead	0.001 mg/L
Benzene	0.370 mg/L
Toluene	0.002 mg/L
Ethyl-benzene	0.090 mg/L

[1] Each discharge point will have 3 associated sampling locations: one upgradient to monitor/assess the baseline condition; one that the point source of the release to compare against regulatory limits; one downgradient to assess/ensure dilution is complete and regulatory limits continue to be met. Therefore; there will be stations NNF-2a, 2b, 2c; NNF-3a, 3b, 3c; NNF-4a, 4b, 4c.