Appendix 17

Meadowbank and Whale Tail Bulk Fuel Storage Facility: Environmental Performance Monitoring Plan Version 6

AGNICO EAGLE

MEADOWBANK DIVISION

Meadowbank and Whale Tail Bulk Fuel Storage Facility:

Environmental Performance Monitoring Plan

MARCH 2021

VERSION 6

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is currently operating the Whale Tail Pit and Haul Road (Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at the Meadowbank Mine.
The Amaruq property is a 408 square kilometer (km^2) site located on Inuit Owned Land approximately 150 kilometers (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposits are mined as an open pit (i.e., Whale Tail Pit and IVR Pit), and ore is hauled to the approved infrastructure at Meadowbank Mine for milling. The project includes an underground development ramp/portal including equipment and associate facilities.

As part of the project, one - 5.6 million liters bulk fuel storage tank was constructed to store diesel fuel for routine operations at the mine site, one - 1.5 million liters bulk fuel storage tank was built at the Whale Tail Pit site, and an additional 500,000 L tank is to be built. This document provides the details for the Meadowbank and Whale Tail Pit Bulk Fuel Storage Facility Environmental Performance Monitoring Plan required by Water License 2AM-MEA1530 Part B, Item 13(m) and 2AM-WTP1830 Part B, Item 14 (f).

To adequately assess the environmental performance of the bulk fuel storage tank at Meadowbank and Whale Tail Pit, and the construction and operation of the planned additional tank farm, this report provides: a summary of the design, installation, operation and maintenance that follows the CCME (2003) Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products; a summary of the location and environmental setting; a summary of the NWB Type A water license requirements; and an environmental assessment to support the recommended environmental monitoring for the ongoing evaluation of the secondary containment.

IMPLEMENTATION SCHEDULE

As required by Water License 2AM-MEA1530 and 2AM-WTP1830, the proposed implementation schedule for this Plan is effective upon approval and subject to any modifications proposed by the NIRB and NWB as a result of the review and approval process.

DISTRIBUTION LIST

Agnico Eagle – General Mine Manager

Agnico Eagle – Environment Superintendent

Agnico Eagle – General Supervisor

Agnico Eagle – Environmental Coordinator

Agnico Eagle – Environmental Technician

Agnico Eagle – Energy and Infrastructures Superintendent

Agnico Eagle – Field Services Supervisor

Agnico Eagle – Warehouse Supervisor

Agnico Eagle – Whale Tail Open Pit Manager

DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Revision
1	09/12/22			Comprehensive plan for Meadowbank Bulk Fuel Storage Facility
2	14/06/30			Comprehensive review of the plan
3	16/06/02			Addition of the Whale Tail Pit site and Whale Tail Pit haul road to the Plan
4	19/03/31	All	All	Update to reflect current Whale Tail Operations and storage capacity
5	20/07/03	Throughout	Throughout	Updated following issuance of Type A Water Licence Amendments 2AM-MEA1530 and 2AM-WTP1830 for one comprehensive management plan
6	21/03/13	All	All	Update to reflect current Whale Tail Operations and storage capacity

Prepared By: Environmental Department
Agnico Eagle Mines Limited – Meadowbank Complex

Approved by: 

Alexandre Lavallee
Superintendent – Environment (Interim)

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Section 1 INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is operating the Meadowbank Gold Project and Whale Tail Pit (a Meadowbank satellite deposit located on the Amaruq property). The Meadowbank Project includes the Baker Lake Marshalling Area, the All-weather Access Road (AWAR), the Meadowbank Mine site, the Whale Tail and IVR pits and the Whale Tail Haul Road.

One 5.6 million liters bulk fuel storage tank was constructed to provide diesel fuel for routine operations at the Meadowbank mine site, and one 1.5 ML tank was built at the Whale Tail Pit Project. In addition, Agnico Eagle is planning to add 500,000 L to the Whale Tail bulk fuel storage tank and a total of 700,000 L in different locations for a total site capacity of 2,125,000 L (i.e., Vent raises, Underground Powerplant, Cement Rockfill Plant).

To adequately assess the environmental performance of the bulk fuel storage tanks at Meadowbank and Whale Tail this report provides:

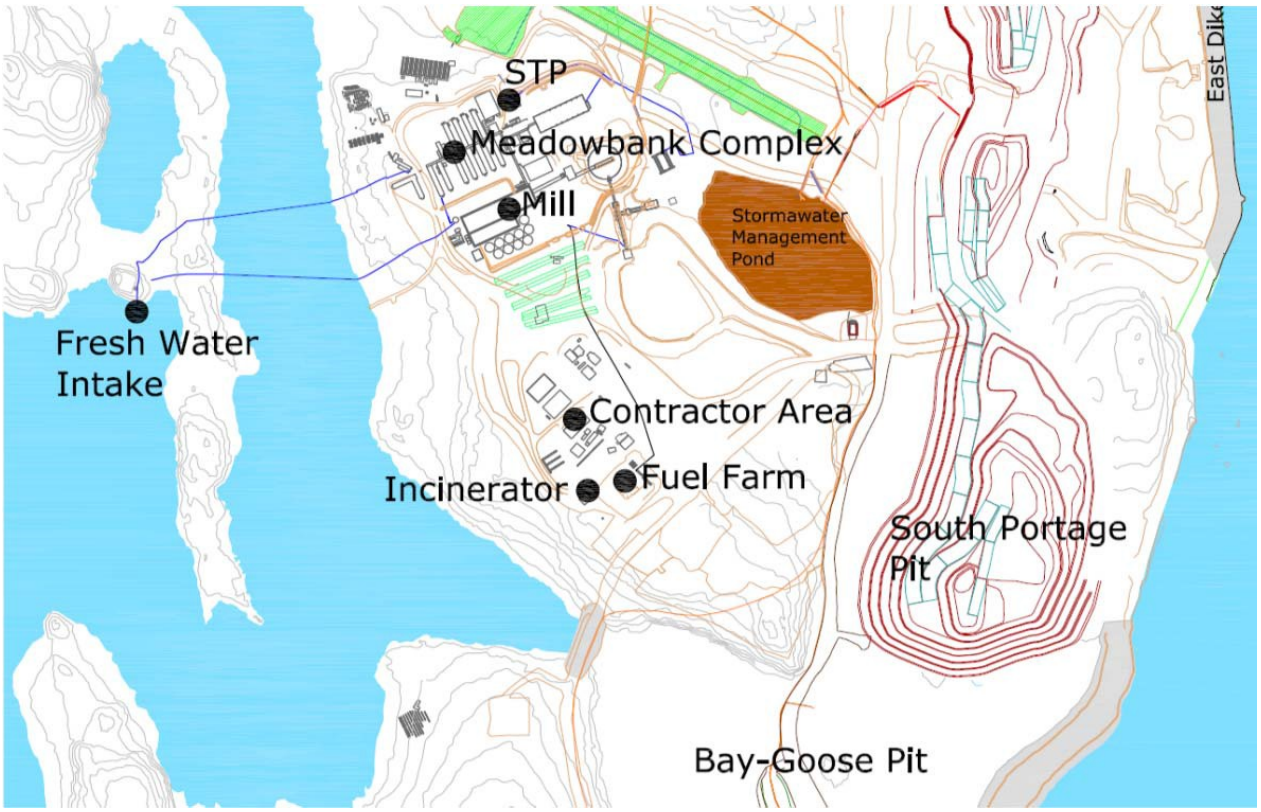
- a summary of the design, installation, operation and maintenance that follows the CCME (2003) Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products;
- a summary of the location and environmental setting;
- a summary of the NWB Type A water license 2AM-MEA1530 and 2AM-WTP1830 requirements; and
- an environmental assessment to support the recommended environmental monitoring for the ongoing evaluation of the secondary containment.

Section 2 SITE LOCATION, CONSTRUCTION AND OPERATION

2.1 SITE LOCATION

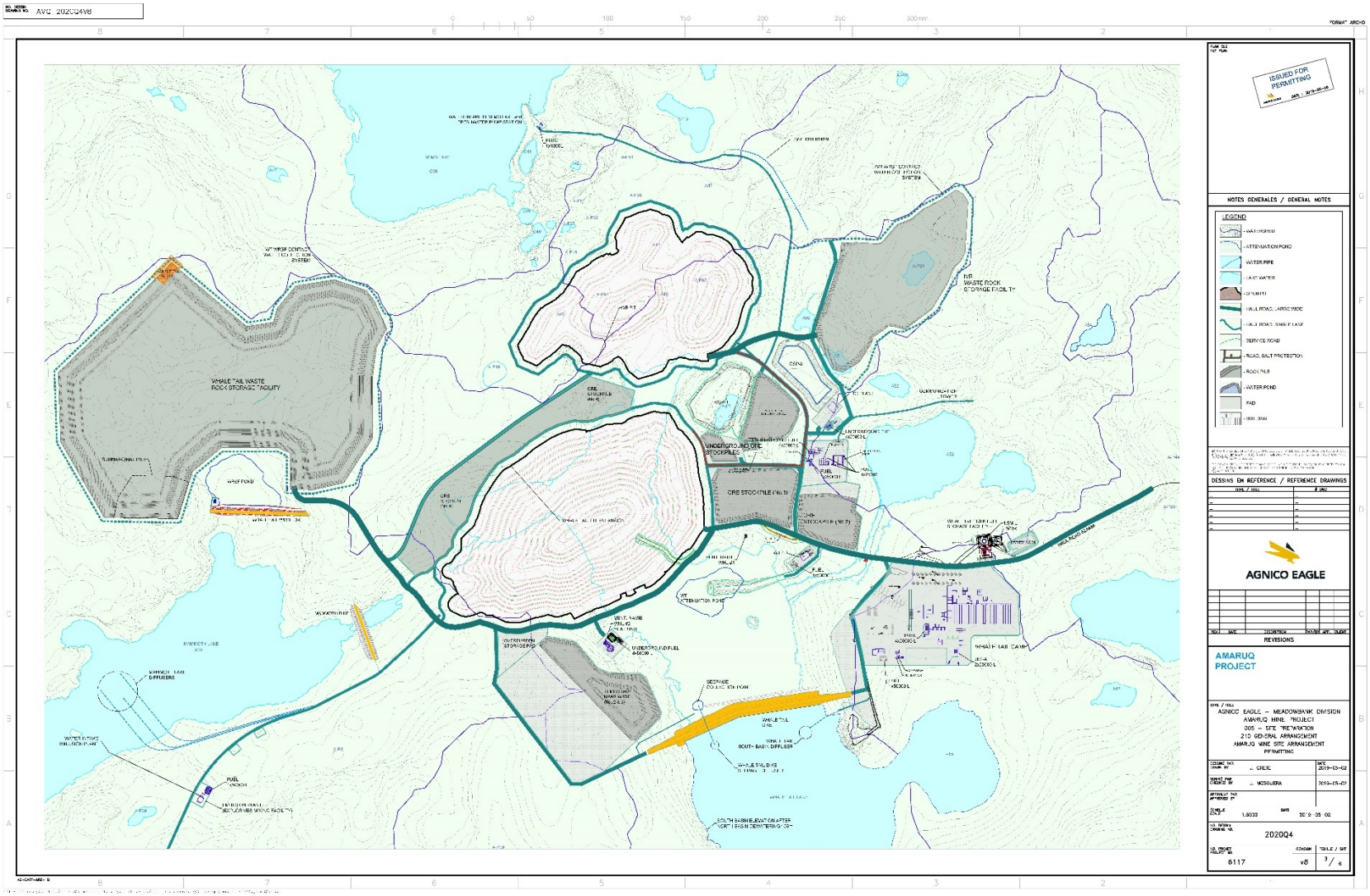
The Meadowbank Bulk Fuel Storage Facility is located at Meadowbank, east of the main camp facilities adjacent to the mine operations haul road. There is one (1) above ground storage tank with approximately 5.6 million liters capacity. The GPS coordinates of the facility is NAD83 14W E 0638083 N 7214288. The general location of the tank farm is provided in Figure 2-1 below.

Figure 2-1. Location Meadowbank Tank Farm



The Whale Tail Fuel Storage Facility is located at the Whale Tail satellite open pit, approximately 50 km west of the Meadowbank site. One 1.5 ML tank was built. The tank will be in a berm and lined area and its location is shown in Figure 2-2.

Figure 2-2. Location of Whale Tail Fuel Storage



2.2 DESIGN AND INSTALLATION SUMMARY

Following regulatory approval, during the summer of 2008 Agnico Eagle built the bulk fuel tank and respective secondary containment with a capacity of 5.6 million liters (AEM, 2009). The secondary containment enclosure and HDPE liner was installed in accordance with CCME (2003) specifications. The aboveground storage tanks were field erected. Construction activity was supervised by Hatch Engineering and Stavibel Engineering and included qualified steel fabricators and membrane installers. The diesel fuel tank is single-walled and constructed of welded steel. In addition, aviation fuel is stored in two 50,000 L double-walled steel tanks adjacent to the airstrip. Additionally, in the summer of 2015, an aboveground pipe was installed in accordance with CEPA (2008) specifications to supply fuel from the bulk fuel tank to the main Meadowbank power plant.

Similarly, for the Whale Tail Pit site, diesel fuel originating from the Baker Lake Tank Farm is stored in one 1,500,000 L tank with secondary containment. An additional above ground 500,000 L storage tank will be built in the current Whale Tail Pit Bulk Fuel Storage Facility. Fuel from this storage tank will be delivered to the power plants by above ground pipes or redistributed to different on-site storage tanks by an on-site tanker. Tanks were/will also be installed at the following locations as part of the Whale Tail Pit Project:

Whale Tail Storage Tanks	
In place	**To be built**
- 1 x 50,000L at the Emulsion Plant	- 1 x 50,000 L at the Water Treatment Plant
- 4 x 50,000 L at the Permanent Camp Genset	- 1 x 50,000L at the CRF Plant/Vent Raise IVR2
- 1 x 50,000 L at the Sana Garage	- 4 x 50,000L at the underground powerplant
- 2 x 25,000 L at the Maintenance shop	- 4 x 50,000L at the Saline Water Treatment Plant
- 1 x 25,000 L at the Service Building	- 1 x 50,000L at the Whale Tail Vent Raise #1/Cement Rockfill Plant
- 4 x 25,000 L at the Current genset	- 4 x 50,000L at the Whale Tail Vent Raise #2
- 2 x 50,000 L (Jet-A) at the Industrial Pad	

A total of 3,325,000 L was/will be installed as part of the Whale Tail Pit Project.

All tanks will be built/installed in accordance with the CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (2003).

The Whale Tail Bulk Fuel Storage Facility and additional storage tanks are shown in Figure 2-2.

2.3 OPERATION AND MAINTENANCE SUMMARY

Inventory control of transfer and monthly volume inspections using manual or electronic dip reconciliation are conducted at Meadowbank and at the Whale Tail Pit by operations staff at the respective sites. Weekly inspections are logged and reported by Agnico Eagle. Weekly visual inspections and inventory reconciliation are used to evaluate and determine bulk fuel tank leakage at Meadowbank and Whale Tail.

The bulk fuel storage facilities are maintained in accordance with best management practices. The bulk fuel tanks at Meadowbank and Whale Tail Pit are re-filled by a fuel truck on a regular basis throughout the year. During the period of re-filling, there is the greatest risk of over-filling. Through regular visual inspections, inventory control and monitoring fuel transfer, the risk of over-filling is significantly reduced. In the case of a spill, the Spill Contingency Plan will be implemented.

Section 3 ENVIRONMENTAL SETTING

3.1 TOPOGRAPHY

The surrounding area of the Meadowbank site and Whale Tail site consists of low, rolling hills with many small lakes; Third Portage Lake is located to the south and Second Portage Lake to the north. The bulk fuel storage tank at Meadowbank is bound to the north by the mine site, a haul road to the east, and the incinerator and waste management area to the south. The surface water drainage at the bulk fuel storage facility is towards the storm water management pond to the north.

The topography of the Whale Tail area differs a little from that of Meadowbank. The tank farm is located northeast of the camp as shown in Figure 2-2. The water drainage at the Whale Tail Pit bulk fuel storage facility is towards pond A53, which during operations drains through the east channel and into Whale Tail Lake (South Basin). The IVR Attenuation Pond at Lake A53 will be developed as part of the Whale Tail Pit Project between the camp and the waste rock storage facility to support surface water management at the Whale Tail site.

3.2 GEOLOGY

The two fuel storage sites have a thin, discontinuous cover of topsoil with minimal organic material. Soil thickness is typically between 1 and 5 m below which bedrock is encountered. In the area near the Meadowbank and Whale Tail Pit bulk fuel farm, bedrock is encountered within 2m of existing ground surface or is exposed with weathered fractures extending 1 to 2 m into the rock.

3.3 FLORA AND FAUNA

There are no trees and few shrubs in the area surrounding the Meadowbank and Whale Tail sites. The sites are covered by low-lying vegetation; predominated by grassy hummocks, dwarf willow, sedge, green moss, and lichen.

Arctic ground squirrels, ptarmigan and songbirds are inhabitants in the area surrounding the fuel storage areas. Lake trout, arctic char, lake whitefish, round whitefish, slimy sculpin, and stickleback are predominant fish species found in local lakes.

3.4 SUBSURFACE CONDITIONS

At the two sites, soil is characterized by lateral deposits of glacial till. Bedrock is exposed at shallow depths throughout the sites. There is high site drainage due to limited soil depth, high presence of fractured bedrock and glacial till.

3.5 WATER QUALITY

Water quality closely resembles distilled water as many conventional water chemistry parameters are at or below detection limits. The water column is generally well mixed and the water chemistry homogenous. During the open water season there is limited vertical stratification in temperature

and dissolved oxygen.

Section 4 NWB TYPE A WATER LICENSE CONDITIONS

Agnico Eagle will continue to adhere and will apply the conditions of the Nunavut Water Board (NWB) Type A water license 2AM-MEA1530 and 2AM-WTP1830 requirements, related to the Meadowbank mine site bulk fuel storage facility and the Whale Tail Pit Bulk Fuel Storage Facility. Agnico Eagle is committed to achieving all these requirements at Meadowbank, and at Whale Tail.

Section 5 ENVIRONMENTAL PERFORMANCE ASSESSMENT

To adequately assess the environmental performance of the Meadowbank bulk fuel storage tanks and facilities, a desktop review of the Meadowbank Fuel Storage Installations: Final Report (Agnico Eagle, 2009) was completed. In addition, on October 26, 2009 Agnico Eagle environmental personnel completed a site inspection to visually evaluate the site drainage, tank construction, and secondary containment and performed an environmental assessment of the bulk fuel storage facility. A geotechnical inspection is also conducted annually by an external qualified engineer at the bulk fuel storage facilities. The report included observations, photos, and recommendations.

A similar level of assessment was carried out at Whale Tail Pit once the fuel storage facilities were in place and will be re-done once the facility expansion for the Whale Tail Pit Project is implemented.

5.1 DESK-TOP REPORT REVIEW OF THE MEADOWBANK BULK FUEL STORAGE FACILITY

The Meadowbank bulk fuel storage facility was commissioned in January 2009. The installation report (Agnico Eagle, 2009; attached in Appendix A) indicated the use of best management practices during the installation of the aboveground fuel storage tank. Following the tank construction, X- Ray testing of horizontal and vertical welds was completed. All the welds met the specifications outlined in the API Standard 650 (Agnico Eagle, 2009). A similar approach was used at the Whale Tail tank farm see in attached appendix B.

Under the supervision of Hatch Engineering and Stavibel Engineering, the construction of the secondary containment berm was completed for the tank. Enviroline Services Inc. was hired in October 2008 to install the HDPE membrane liner in accordance with CCME (2003) specifications; this liner was subsequently covered with a surface layer of crushed stone.

A secondary containment volume calculation using AutoCAD Civil 3D was completed to provide verification on the liquid storage capacity of the storage tank system. The CCME Environmental Code of Practice for Aboveground Storage Tanks (2003) states:

> *a storage tank system that consists of more than one storage tank which should have a volumetric capacity of not less than the sum of the capacity of the largest storage tank located in the contained space and 10% of the capacity of the largest tank or the aggregate capacity of all other storage tanks located in the contained space.*

In accordance with the CCME (2003) code of practice, the Meadowbank bulk fuel storage tank meets the volumetric requirements for a storage tank system (Agnico Eagle, 2009). The Whale Tail bulk fuel storage tanks are also constructed to meet CCME (2003) code of practice, as will the expansion of the facility.

In the summer of 2009, a 4-inch below-ground pipe was installed to supply fuel from the Bulk Fuel storage tank to the Meadowbank main power plant. The pipe was installed according to the

CEPA (2008) regulations.

5.2 SECONDARY CONTAINMENT VISUAL INSPECTIONS

A consultant performs a geotechnical inspection annually and inspects the bulk fuel secondary containment structures at the Meadowbank and Whale Tail Bulk Fuel Storage Facilities, the report is sent to NWB annually.

5.3 ENVIRONMENTAL ASSESSMENT

The management at the site drainage, surface water collection, and water/fuel removal within the secondary containment area is an important measure in the protection of the terrestrial environment, surface water, and ground water from potential sources of contamination. The environmental protection objectives, strategy, and an evaluation of the potential of leaks or seepage that could contaminate the terrestrial environment, surface water and ground water are provided in the following sections. Much of the environmental protection strategies focus on the control of contact water. In this report contact water is defined as any water that may be physically or chemically affected by the nearby operational activities.

At Meadowbank and Whale Tail Pit, the bermed and lined tank farm provides secondary containment. If fuel escapes from the tanks holding the fuel, the bermed and lined area will not allow the fuel to escape to the receiving terrestrial and aquatic environment. As there is expected to be a high volume of fuel transfer and activity around the modular fuel dispenser and refueling station, inadvertent fuel spills during refueling are expected but will be retained on the impermeable, lined pad. The liner is sloped such that any fuel spilled on the pad would flow to a sump where it collects and can be recovered.

5.3.1 Terrestrial Environment

The primary objective of the terrestrial management plan is to minimize any adverse impacts to the terrestrial (soil, flora, and fauna) environment. To meet this objective, the Meadowbank and Whale Tail Pit bulk fuel storage facility structures have been constructed, to minimize the operational footprint and control contact run-off water within the secondary containment area. Due to the site grading, all water that comes into contact with the bulk fuel storage facility (including the modular fuel dispenser) is intercepted and directed into the impermeable HDPE lined secondary containment area.

The ground beneath the secondary containment area has been graded to ensure berm stability.

5.3.2 Surface Water

The objective of water management around the Meadowbank and Whale Tail bulk fuel storage facilities is to minimize impacts on the quantity and quality of surface water and groundwater. To meet this objective, the bulk fuel storage facility structures have been constructed to intercept and direct

contact run-off water to the impermeable HDPE lined secondary containment area. As there is a high volume of fuel transfer and activity around the modular fuel dispenser, the pad below the modular fuel dispenser and refueling station is lined and sloped toward the secondary containment berm.

Due to the high compaction of the surrounding mine site pad, natural topography of the site, shallow top soil and predominate bedrock, should contact water reach the natural environment at Meadowbank, the ultimate fate of the contaminants is to the stormwater management pond.

5.3.3 Groundwater

It is not expected that groundwater would be impacted as there is no direct pathway for contaminated water to seep from the Meadowbank and Whale Tail bulk fuel storage facilities. Due to the site grading, all contact water from the bulk fuel storage facility is directed inside the HDPE lined secondary containment area. Should the integrity of the liner become compromised, there could be leakage into the below grade soil, which is within a zone of continuous permafrost.

Section 6 PERFORMANCE MONITORING PLAN

The environmental performance monitoring plan is a tiered approach with an emphasis on visual and operational inspections; routine surface water sampling to control and monitor the quality of the contact water; and event monitoring (in the case of a spill emergency or occurrence). Management of the Meadowbank and Whale Tail fuel storage facilities will be guided by the monitoring results.

6.1 VISUAL AND OPERATIONAL INSPECTIONS

Visual and operational inspections are a central component of the environmental performance monitoring plan. Visual inspections of the Meadowbank and Whale Tail secondary containment structures are important because if the integrity of the berm walls or liner is compromised, this presents the greatest potential for leaks or seepage.

Visual inspections are conducted by the environmental department once per week and monthly manual or electronic dip tests are conducted for inventory reconciliation by Procurement Department. Staff will inspect the bulk fuel storage facilities pad for: tank and piping condition, secondary containment berm structure and integrity, indicators of liner damage, precipitation/ run-off accumulation, evidence of tampering or misuse, any structural abnormalities and visible sheens on contact water pools and crush material inside the secondary containment.

The Environment staff will follow-up with the Energy and Infrastructures Department if any non-compliances are observed. A weekly written inspection sheet will continue to be completed and signed by the E&I supervisor and available upon request.

6.2 ROUTINE CONTACT WATER MONITORING

Due to snow accumulation, melting and precipitation, contact water is unavoidably collected inside the secondary containment area of the Bulk Fuel Storage Facilities. Contact water from inside the secondary containment area is sampled as described below before being discharged. The water accumulated in the Meadowbank and Whale Tail secondary containment will be released in accordance with the Type A Water License 2AM-MEA1530, Part F Item 9 to 12, and 2AM-WTP1830, Part F Item 8 to 12 conditions.

During visual inspections the quantity of contact water collected inside the secondary containment area and sump will be evaluated. If water withdrawal to the environment is deemed necessary at the Bulk Fuel Storage Facilities, water samples will be collected and analyzed for the following parameters as per Water License 2AM-MEA1530 Part F Item 9 and 2AM-WTP1830 Part F Item 8): Benzene, Toluene, Ethylbenzene, Lead, and Oil and Grease. Prior to withdrawal, samples will be analyzed at a certified laboratory and the 10-day notice will be sent to the inspector (as per 2AM-MEA1530 Part F Item 13 and 2AM-WTP1830 Part F, Item 14).

In addition, water samples from lakes near the Meadowbank and Whale Tail Pit site are collected as part of the Core Receiving Environmental Monitoring Plan (CREMP) and Aquatic Environmental

Management Plan. The results of these analyzes will continue to be included in the annual report. These samples are used to evaluate the performance of the overall water management plan for the Meadowbank and Whale Tail sites.

6.3 EVENT MONITORING

In the event of a spill occurrence at fuel storage facilities, the Spill Contingency Plan will be followed. As a follow-up to the spill response, the environmental staff will conduct an environmental assessment to determine the extent of impacts of the spill occurrence on the nearby environment. This will include the identification of the potential environmental pathways of concern that may result in impacts to surface water (i.e. Third Portage Lake near-shore surface water or east channel that drains into Whale Tail Lake (South Basin)), soil or groundwater.

6.3.1 Soil Sampling

Following the unlikely event where a spill is not contained within the secondary containment area or on the lined pad, soil sampling may be required to locate and prevent further impact to the terrestrial and aquatic receiving environment. Depending on the quantity of the spill, the organic surface soils and shallow till are a likely sink for hydrocarbons, thus soil samples will be taken at selected locations to horizontally and vertically delineate the impacted areas. Furthermore, the soil samples will provide valuable information used to determine the necessity of installing groundwater wells (see Section 6.3.3 below).

6.3.2 Water Sampling

Following a spill event escaping secondary containment, an environmental assessment will be conducted. Similar to routine contact water sampling (inside the secondary containment area or on the lined pad), water samples will be collected and analyzed as per Water License 2AM-MEA1530 Part F Item 9 and 2AM-WTP1830 Part F Item 8 for the following parameters: Benzene, Toluene, Ethylbenzene, Lead, and Oil and Grease. Prior to withdrawal, samples will be analyzed at a certified laboratory. As part of the CREMP, receiving environment surface and at-depth water samples will be taken from Third Portage Lake or Whale Tail Lake, and analyzed for the same parameters as listed above.

6.3.3 Assessment of the Need for Groundwater Well Installation

Following a spill event escaping secondary containment, if soil sample results identify elevated concentrations of contaminants (i.e., exceeding the CCME Canada-Wide Standard (CWS) for Petroleum Hydrocarbons (PHC) in Soil) and/or if water samples identify elevated receiving environment water samples (i.e., exceeding licensed limits caused as a result of the spill event), an assessment of the need for groundwater wells will be conducted. The assessment, and if required, design for installation, monitoring and maintenance of vertical ground water monitoring wells will be in accordance with CCME (2003) procedures.

Section 7 REFERENCES

Agnico Eagle (2009). Meadowbank Fuel Storage Installations: Final Report Following Construction. April 2009.

Agnico Eagle (2016). Meadowbank Gold Project: Spill Contingency Plan. June 2016

Azimuth (2016). Core Receiving Environmental Monitoring Program: Whale Tail Pit Addendum. May 2016

BAER (2005). Meadowbank Gold Project Baseline Aquatic Ecosystem Report. October 2005. CCME (2008). Canadian Council of Ministers of the Environment: Canada Wide Standards for Petroleum Hydrocarbons in Soil. PN 1398. January 2008.

CCME (2008). Canadian Council of Ministers of the Environment: Canada Wide Standards for Petroleum Hydrocarbons in Soil. PN 1398. January 2008.

CCME (2003). Canadian Council of Ministers of the Environment: Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. ISBN 1-896997-33-3.

CEPA (2008). Canadian Environmental Protection Act. Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations. June 12, 2008.

Golder Associates Ltd. (2004). Geotechnical Input to Infrastructure Design. Meadowbank Gold Project. Nunavut. Report submitted to Cumberland Resources Ltd, March 2004.

Golder Associates Ltd (2014). 2014 Annual Geotechnical Inspection Meadowbank Gold Mine, Nunavut.

Appendix A

Meadowbank Fuel Storage Installations – Final Report

AGNICO-EAGLE MINES LTD
MEADOWBANK DIVISION

MEADOWBANK FUEL STORAGE INSTALLATIONS

FINAL REPORT
FOLLOWING THE CONSTRUCTION

AGNICO-EAGLE MINES LTD
MEADOWBANK DIVISION

MEADOWBANK FUEL STORAGE INSTALLATIONS

FINAL REPORT
FOLLOWING THE CONSTRUCTION

PREPARED BY :

Patrick Giard, P.Eng., CCE
Supervisor, Construction Department
AGNICO-EAGLE MINES LTD, *Meadowbank Division*

AGNICO-EAGLE MINES LTD
MEADOWBANK DIVISION

MEADOWBANK FUEL STORAGE INSTALLATIONS

FINAL REPORT
FOLLOWING THE CONSTRUCTION

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DESCRIPTION OF THE MANDATE

Agnico-Eagle Mines has given a mandate to the undersigned in order to verify the compliance with applicable regulations of its fuel storage installations at the Meadowbank gold mining site, in Nunavut.

According to the terms of reference, the mandate consists summarily in the following activities.

A. Review and compilation of the available documentation ;

B. Collection of any information that may be missing ;

C. Preparation of an *AS BUILT* version of the construction drawings ;

D. Verifications to the storage capacity within the containment berms in regards to the applicable regulations.

A. DOCUMENTATION READILY AVAILABLE

HATCH - Vancouver Office

Only one (1) layout drawing showing the berm enclosure was issued from Hatch. No detailed design or cross-sections of containment berms was available prior to the construction phase. The original design of the fuel containment area is shown on revision 0B of drawing 325174-600-C-0135, which was issued **for information**.

NISHI-KHON / SNC-LAVALIN LTD - Vancouver Office

This firm was responsible for issuing the piping layout drawings and P&ID's for the Baker Lake fuel storage installations, which is a similar project located 100 km further South. During the construction and installation of piping for the Meadowbank bulk fuel storage tank, the *Process and Instrumentation Diagram* issued for construction was not readily available to the pipefitters.

GEM STEEL EDMONTON LTD

This vendor has submitted a set of drawings issued **for review**, consisting in three (3) structural drawings showing the details of a fuel tank of 5.6 million liters nominal capacity. The original design of this fuel tank is shown on revision A0 of drawings BL-2008-80-1, BL-2008-80-2, and BL-2008-80-3.

CHAMCO INDUSTRIES LTD

This vendor has submitted a set of preliminary drawings issued **for approval**, consisting in twenty-five (25) documents showing details of a fuel dispensing module. These documents have been reviewed by HATCH, and bear the following identification, which has been assigned by HATCH Document Control.

DRAWING NUMBER	H325174-M268-VD-0040	H325174-M268-VD-0041	H325174-M268-VD-0010
H325174-M268-VD-0011	H325174-M268-VD-0012	H325174-M268-VD-0013	H325174-M268-VD-0014
H325174-M268-VD-0015	H325174-M268-VD-0016	H325174-M268-VD-0017	H325174-M268-VD-0019
H325174-M268-VD-0020	H325174-M268-VD-0021	H325174-M268-VD-0029	H325174-M268-VD-0030
H325174-M268-VD-0031	H325174-M268-VD-0032	H325174-M268-VD-0033	H325174-M268-VD-0034
H325174-M268-VD-0035	H325174-M268-VD-0036	H325174-M268-VD-0037	H325174-M268-VD-0039

B. ADDITIONAL COLLECTION OF INFORMATION

HATCH - Vancouver Office

Role during construction phase : Design & Field Supervision during construction of berms.

Mr. Marlon Coakley and Jim Bonia, both of which were HATCH employees at the time, have supervised the construction of the fuel containment area. They have also hired a specialized crew from Saskatoon (Enviroline Service inc.) in October 2008 to install the HDPE membrane covering the berms. This HDPE membrane has since been covered with a layer of about 100 mm thickness of crushed stone.

NISHI-KHON / SNC-LAVALIN LTD - Vancouver Office

Role during construction phase : So far, I have never communicated with these people.

A research of all files provided by HATCH Document Control has permitted to find **Revision 0** of drawing 017202-2000-46D6-2001 from SNC-LAVALIN.

This document was not readily available to the construction team at the time when the crew from Mosher Engineering Ltd were installing the piping and commissioning the fuel dispensing module.

AGNICO-EAGLE MINES LTD, Meadowbank Surveying Team

Role during construction phase : Surveying of quantities & grades for berms, HDPE liner.

A surveying crew from AEM has monitored the quantities of granular materials and required berm elevations, as well as the installation of the HDPE membrane and grounding wire around the fuel tank. All of this work was done with the same specifications which were observed during the construction of the berms around the AEM bulk fuel storage tanks, which are located in Baker Lake.

GEM STEEL EDMONTON LTD

Role during construction phase : Fabrication and field assembly of the 5.6 M liters tank

A crew of ten (10) workers has started the construction of fuel tank 680-TK-042 on August 25, 2008 and the field erection was completed over a period of 16 days. Following this field work, a crew from ACUREN has proceeded to X-RAY testing of horizontal and vertical welds according to specifications described in the latest edition of API Standard 650. According to the report made by ACUREN, no repairs of defective welds were required, either on the tank shell or nozzles.

MOSHER ENGINEERING LTD

Role during construction phase : Welding of pipelines and support brackets between the 5.6 M liters tank and the fuel dispensing module.

In early November 2008, a crew of two (2) workers has welded the pipelines and installed the flanged connections and gate valves between fuel tank 680-TK-042 and the fuel dispensing module manufactured by CHAMCO INDUSTRIES LTD.

They have also installed check valves on the 100 mm diameter inlet and outlet nozzles on this tank, as well as a pressure relief valve set at 75 psi to bypass the check valve on the pipeline between the tank outlet and the fuel dispensing module. The grade of material that was used for this pipeline was A333 cold temperature rated steel.

CHAMCO INDUSTRIES LTD

Role during construction phase : Manufacturing of the fuel dispensing module.

This fuel dispensing module was manufactured in the summer of 2007 and sent to the Meadowbank site. No representatives of CHAMCO were present during the commissioning. Possibly due to vibrations during transport, there were many flanged connections that needed tightening, and it was found that this was not a turn-key installation. The air eliminator unit on the fuel tanker unloading area leaked fuel extensively during operation, as it was often locked in open position.

C. REVISION OF CONSTRUCTION DRAWINGS

AEM has hired STAVIBEL Engineering Services, a firm based in Val-d'Or, in order to complete the drawings that were used in producing this report.

Those four (4) drawings are enclosed in **Appendix 1** of this report.

Drawing VD2259-MDB-001 shows the general layout of the fuel tank 680-TK-042 and containment area. It has been compiled using surveying data collected by a crew from AEM. It also shows the location of pipelines, fuel dispensing module, and some three (3) additional fuel tanks.

Drawing VD2259-MDB-002 shows the cross-sections on both sides of the containment area. These cross-sections are derived from surfaces that were generated using the *Autocad Civil 3D* software, and are also based on information collected from AEM Construction Supervisors. This drawing file was also used to verify containment volumes, as it is described further in section D.

Drawing VD2259-MDB-003 is an as-built version of Vendor drawing BL-2008-80-1 which has been updated to reflect nozzle orientations that were noted during a site visit. No changes were noted except those made to the nozzle schedule.

The enclosed **Revision 1** of drawing 017202-2000-46D6-2001 from SNC-LAVALIN is also an as-built drawing. It shows a few items from the proposed piping layout for the Meadowbank bulk fuel storage that have not yet been put in place. These missing items consists in three (3) pressure relief loops around gate valves, and a 300 US gallon floor sump, which was to be located inside the fuel dispensing module. This floor sump has not been supplied by CHAMCO INDUSTRIES LTD.

Also enclosed is a vendor drawing from CHAMCO INDUSTRIES LTD, which shows the piping details inside the fuel dispensing module.

D. VERIFICATIONS TO STORAGE CAPACITY WITHIN BERMS

STAVIBEL Engineering Services has completed verifications on the liquid storage capacity inside the containment berms, which create an impermeable enclosure around tank 680-TK-042.

The method used was a volume calculation using *Autocad CIVIL 3D* software.

The maximum storage capacity of fuel tank 680-TK-042 is 5 675 700 litres of diesel fuel at a standard temperature of fifteen degrees Celcius (15 °C).

It has been verified using the above software that the impermeable enclosure around this fuel tank will effectively hold one hundred and ten percent (110 %) of its maximum storage capacity. This theoretical calculation does not include the volume inside the tank itself, as if the fuel was pumped outside the tank.

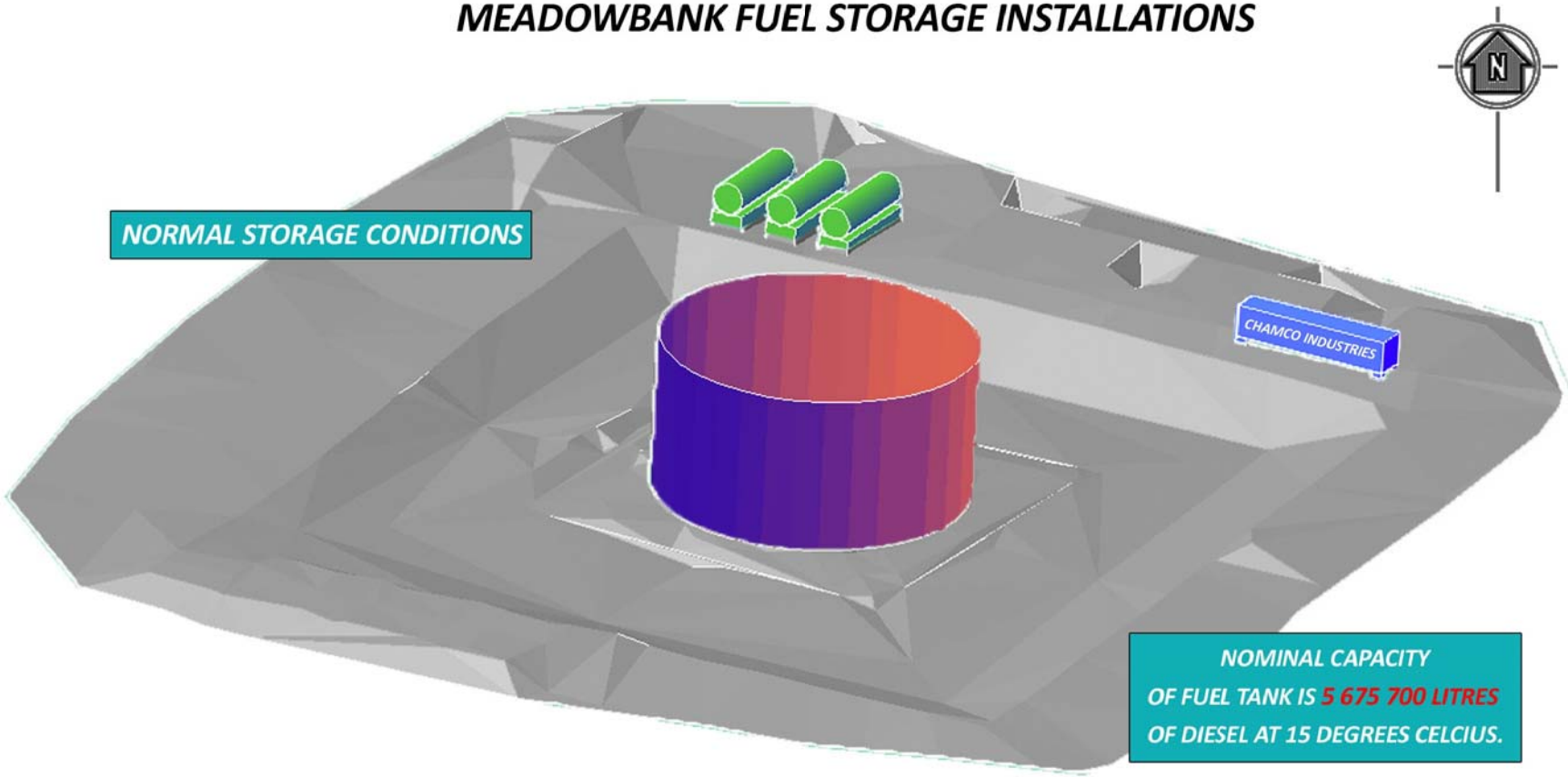
Thus, the lowest point of the HDPE membrane that sits atop the containment area is sufficiently high (at elevation 150.94 m) to meet the above criteria.

On the following pages are the results of a software simulation, which are showing a 3D view of the containment area in normal storage conditions, as well as another view showing the worst case scenario.

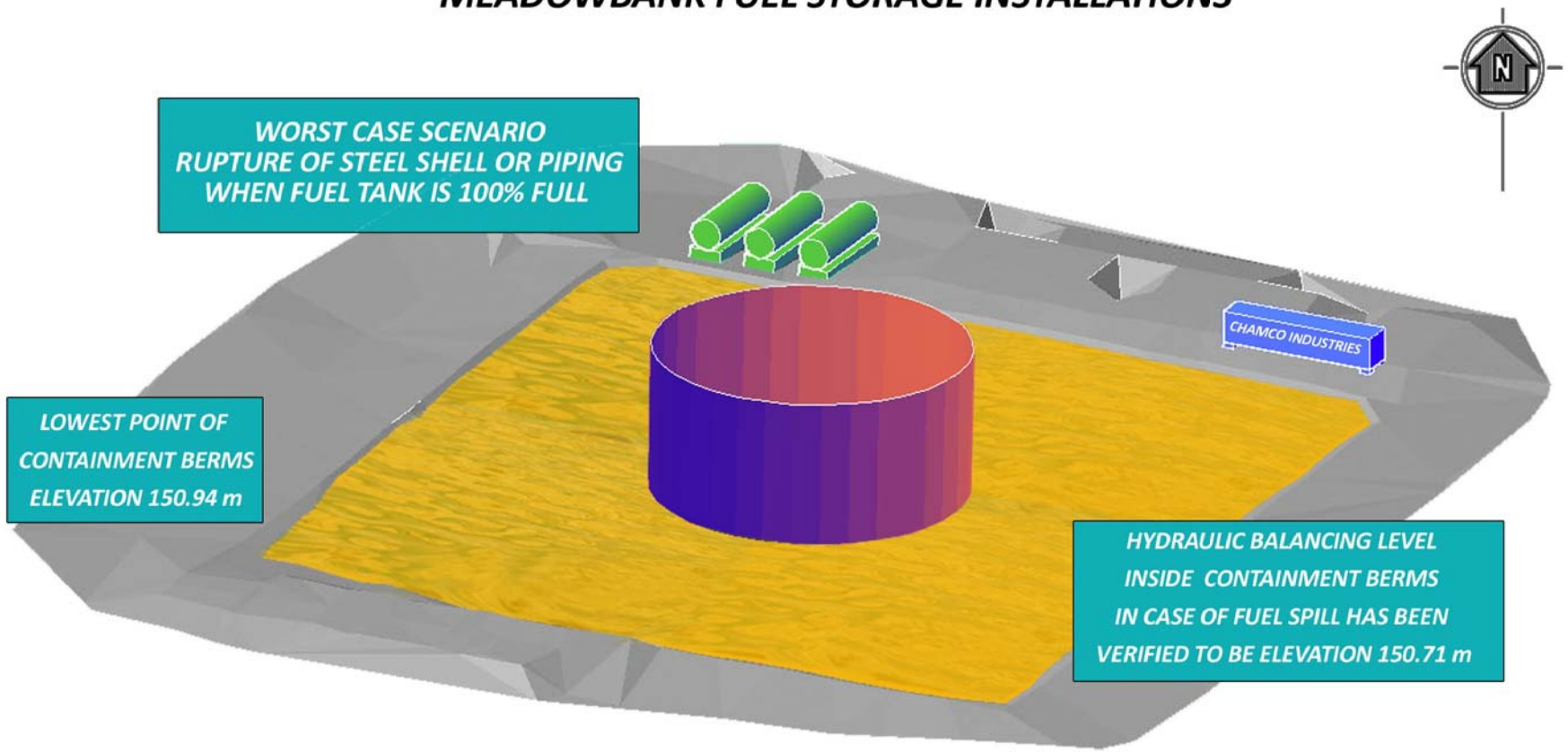
This worst case scenario would consist in either a rupture of the first course of side plates in the tank shell, or a failure in the outlet piping, when the tank is 100% full.

This simulation shows that, in such a worst case scenario, the hydraulic balancing level inside the containment area would not exceed the point with the lowest elevation on the surrounding berms. There is a safety margin of about 200 mm.

MEADOWBANK FUEL STORAGE INSTALLATIONS



MEADOWBANK FUEL STORAGE INSTALLATIONS



APPENDIX 1

AS BUILT DRAWINGS

VD2259-MDB-001
VD2259-MDB-002
VD2259-MDB-003

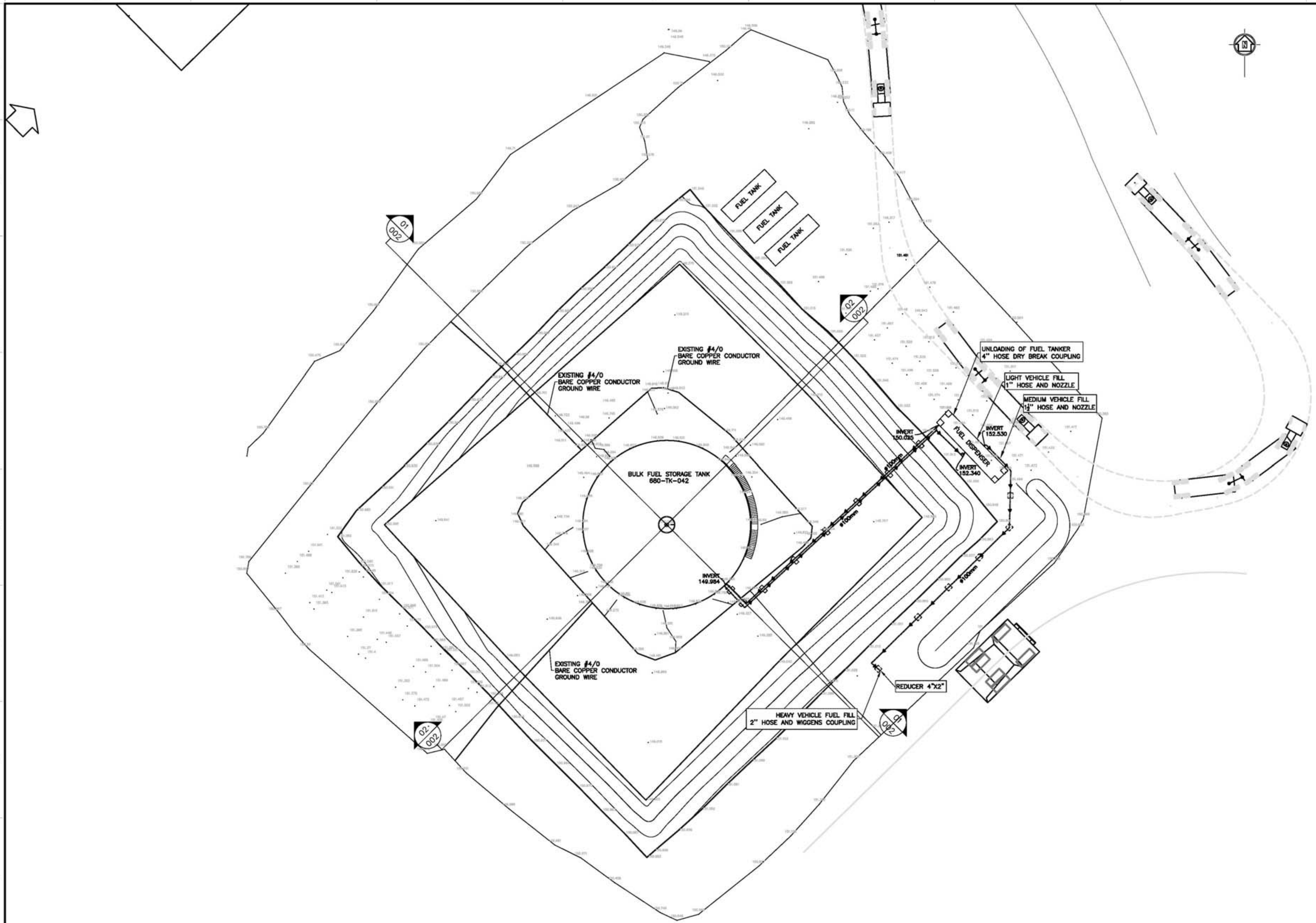
017202-2000-46D6-2001 IFC DRAWING from SNC-LAVALIN

Plus one (1) drawing from CHAMCO INDUSTRIES LTD

Vendor ref. # CUP1014938-21

DRAWING NO.

FORMAT ARCHD-LANDSCAPE



KEY PLAN

GENERAL NOTES

Groupe STAVIBEL
Consultants en Ingénierie
1271, 7e Rue
Val-d'Or (Québec) J9P 3S1
Tél: (819) 825-2233 Téléc: (819) 825-1322
Courriel : stavibel-vd@stavibel.qc.ca
Site internet : www.stavibel.qc.ca

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	BY	APP.	CLIENT
1	09-03-31	AS-BUILT (ADD GROUNDWIRE)	F.R.	P.G.	
0	09-03-12	AS-BUILT	F.R.	P.G.	

REVISIONS

AGNICO-EAGLE
MEADOWBANK DIVISION

TITLE
AGNICO-EAGLE – MEADOWBANK DIVISION

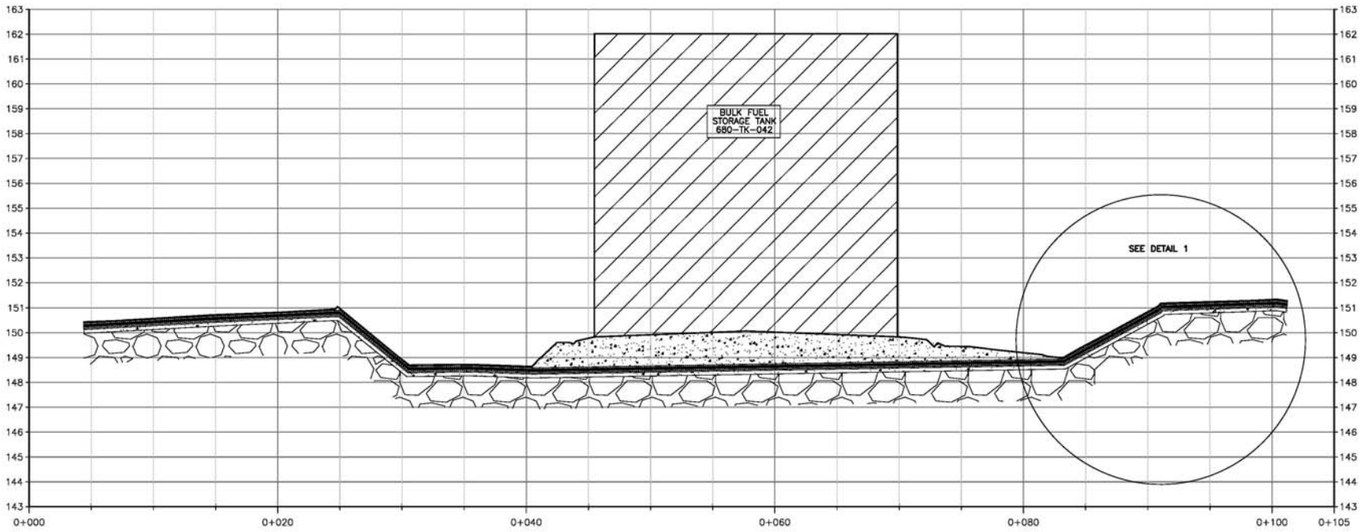
GENERAL LAYOUT

DRAWN BY	CHRISTIAN DÉRY	DATE 2009-02-25
CHECKED BY	FRANCIS ROSE	2009-03-31
APPROVED BY	PATRICK GIARD, P.ENG	2009-03-31
SCALE 1:250	DATE 2009-03-31	
DRAWING NO.	VD2259-MDB-001	
PROJECT NO. VD2259-1	REVISION 1	SHEET 1/4

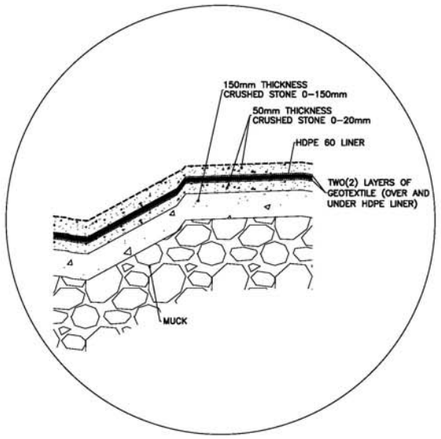
FILE NO. .DWG

DRAWING NO.

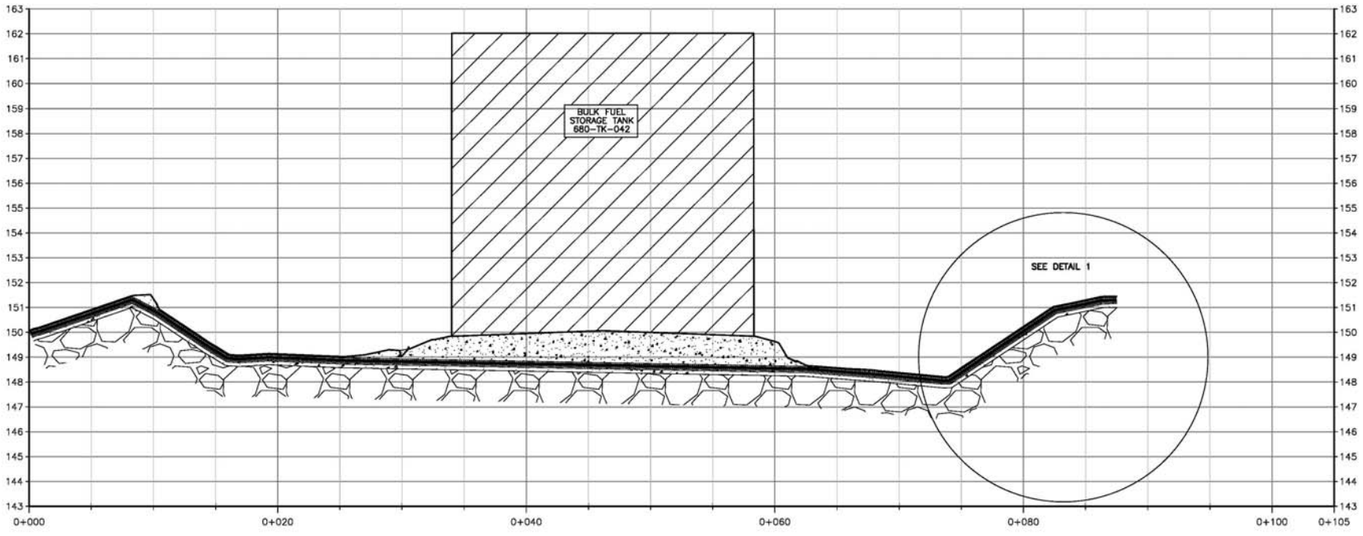
FORMAT ARCH-D-LANDSCAPE



CROSS-SECTION 01/001



DETAIL 1
NOT TO SCALE



CROSS-SECTION 02/001

Property Specifications for High Density Polyethylene (HDPE 60):

Style	ASTM	Qualifier	Unit	Specified Value	Minimum Test Frequency
Average Thickness	D5994	minimum	mm	1.5	1 per 50,000 kg
Density (Untextured)	D792	minimum		0.94	1 per 50,000 kg
Tensile Strength	D638	minimum	kN/m	23.1	1 per 4,000 m^2
Tear Resistance	D1004	minimum	N	200	1 per 4,000 m^2
Low Temperature	D746	minimum	°C	-60	1 per 4,000 m^2
Dimension Stability	D1204	maximum	%	+/- 1.5	1 per 4,000 m^2
Notched Constant Load	D5397	minimum	hours	200	1 per 4,000 m^2
Puncture Resistance	2065	minimum	N	347	1 per 4,000 m^2
Carbon Black Content	D1603	minimum	%	2.0	1 per 4,000 m^2

Property Specifications for Geotextile:

Material Property	Qualifier	Unit	Specified Value	Test Method	Minimum Frequency	Test
Mass / Unit Area	minimum	g/m	270	ASTM D5261	1 per 10,000 m^2	
Grab Tensile Strength	minimum	N	975	ASTM D4632	1 per 10,000 m^2	
Grab Elongation	minimum	%	50	ASTM D4632	1 per 10,000 m^2	
Puncture Strength	minimum	N	525	ASTM D4833	1 per 10,000 m^2	
Apparent Opening Size	maximum	mm	0.180	ASTM D4751	1 per 60,000 m^2	
Permeability	minimum	cm/sec	0.30	ASTM D4491	1 per 60,000 m^2	
Water Flow Rate	minimum	L/min/m^2	4,480	ASTM D4491	1 per 60,000 m^2	
UV Resistance	minimum	%	70	ASTM D355	1 per 60,000 m^2	

SPECIFICATIONS FOR
GEOTEXTILE AND HDPE LINER

KEY PLAN

GENERAL NOTES

Groupe STAVIBEL
Consultants en ingénierie
1271, 7e Rue
Val-d'Or (Québec) J9P 3S1
Tél: (819) 825-2233 Télécopieur: (819) 825-1322
Courriel : stavibel-vd@stavibel.qc.ca
Site Internet : www.stavibel.qc.ca

REFERENCE DRAWINGS

REV.	DATE	DESCRIPTION	BY	APP.	CLIENT
1	09-03-31	AS-BUILT	F.R.	P.G.	
0	09-03-13	AS-BUILT	F.R.	P.G.	

REVISIONS

AGNICO-EAGLE
MEADOWBANK DIVISION

TITLE
AGNICO-EAGLE - MEADOWBANK DIVISION

CROSS-SECTION AND DETAILS

DRAWN BY	FRANCIS ROSE	DATE 2009-03-31
CHECKED BY	PATRICK GIARD, P.ENG	2009-03-31
APPROVED BY		

SCALE HOR:1:200 VER:1:100 DATE 2009-03-31

DRAWING NO.
VD2259-MDB-002

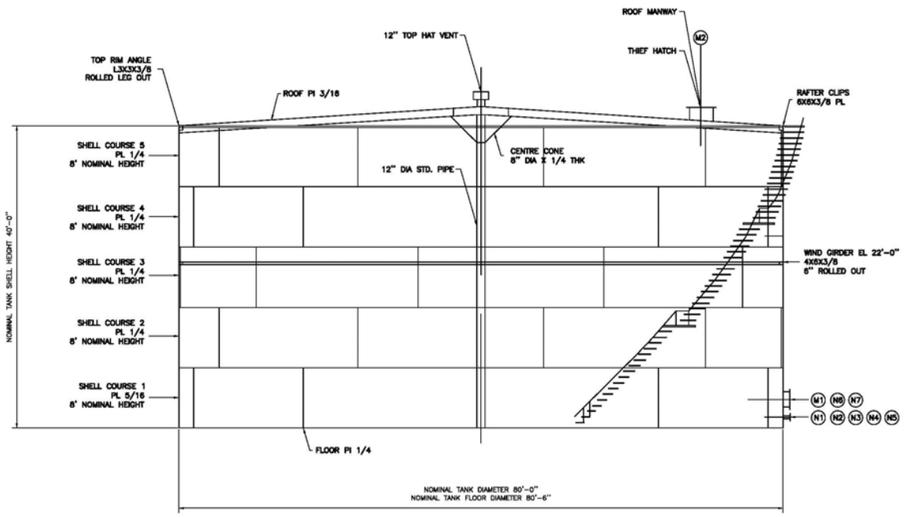
PROJECT NO.	REVISION	SHEET
VD2259-1	1	2/4

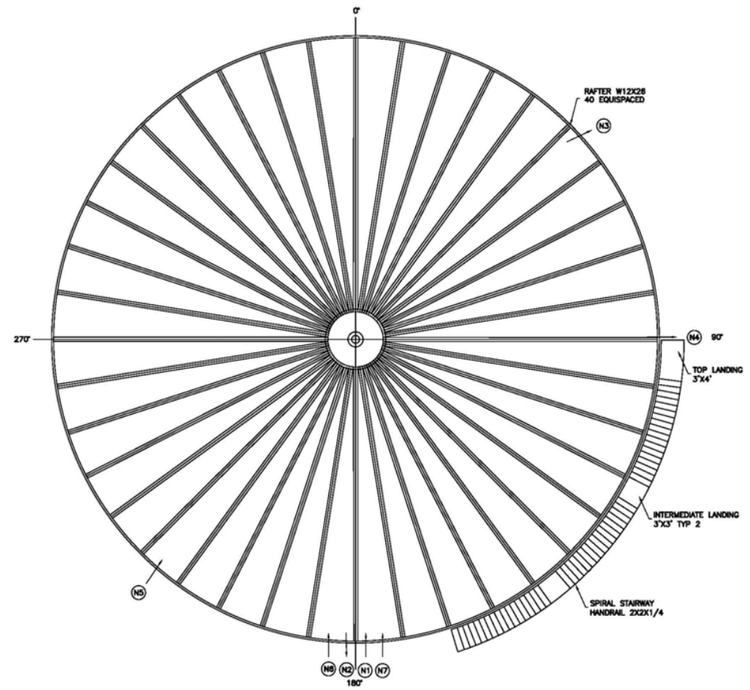
P:\VD2259 - AGNICO-MEADOWBANK\VD2259-1\FUEL DISPENSER\Mandataire fuel models\DWG\VD2259-1 AS BUILT FUEL TANK MEADOWBANK 2009-03-12 (REV 1).DWG, 31 Mar 2009

FILE NO. .DWG

DRAWING NO.

FORMAT ARCH-D-LANDSCAPE





* ALL NOZZLE ORIENTATIONS ARE APPROXIMATE

GENERAL NOTES

DESIGN

1. CODE OF CONSTRUCTION: API-650, LATEST EDITION
2. ALL DIMENSIONS ARE IN IMPERIAL UNLESS NOTED OTHERWISE
3. PRODUCT STORED: DIESEL
4. DIAMETER 80'-0"
5. HEIGHT: 40'-0"
6. NOMINAL CAPACITY: 5.6 MILLION LITRES.
7. OPERATING TEMPERATURE RANGE: -45/+100°C
8. PRODUCT SPECIFIC GRAVITY: 0.9
9. VENTING: PRESSURE: ATMOSPHERIC

INSPECTION

1. VACUUM TESTING: FLOOR
2. LIQUID PENETRANT INSPECTION: SHELL TO FLOOR WELD
3. RADIOGRAPHY: VERTICAL SHELL WELDS-SPOT AS PER API 650
4. RADIOGRAPHY: HORIZONTAL SHELL WELDS-SPOT AS PER API 650

MATERIALS

1. STRUCTURAL BOLTS: A-325
2. REGULAR BOLTS: A-193 GR.B7
3. NUTS: A-194 GR.2H
4. PIPE NOZZLES: A106 GR.B SCH.80
5. FORGED FLAMINGS AND COUPLINGS:LF2
6. PIPE FITTINGS: A234 GR.WPB
7. STRUCTURAL STEEL: G40.21 44W
8. STEEL PLATE: G40.21M-260WT
9. GASKETS: NA60
10. ROOF SUPPORT COLUMN: 12" STD PIPE STRUCTURAL GRADE OR BETTER

NOZZLE SCHEDULE (ALL NOZZLE ORIENTATIONS ARE APPROXIMATE)

MARK	DESCRIPTION	SIZE	INT.PROJ.	PROJ.	TYPE	RATING	NOTES
M1	SHELL MANWAY	24"					180°
M2	ROOF MANWAY	24"					
N1	RE-SUPPLY	4"			RFSO	150#	175°
N2	SUCTION FOR FUEL DISPENSING	4"			RFSO	150#	185°
N3	DRAW-OFF	3"	152		RFSO	150#	40°
N4	SUCTION FOR FUEL TRANSFER	4"	152		RFSO	150#	90°
N5	SPARE	4"			RFSO	150#	220°
N6	PRESSURE RELIEF FOR N2	2"			RFSO	150#	
N7	SPARE	2"					190°
TH	THIEF HATCH (ON M2)	8"					170°

KEY PLAN

GENERAL NOTES

GEM STEEL
9060-24 STREET
EDMONTON, ALBERTA
CANADA T6P 1X8
PH. (780) 449-0000
FAX. (780) 449-0001

TITLE	# DWG
GENERAL TANK ELEVATION	SL3008-80-01
ROOF AND NOZZLE PLAN	SL3008-80-01
GENERAL TANK DETAILS	SL3008-80-01

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	BY	APP.	CLIENT
1	12/03/09	AS-BUILT DRAWING	PR		P.G.
A	10/09/09	ISSUED FOR REVIEW	JGC	BNB	

REVISIONS

AGNICO-EAGLE
MEADOWBANK DIVISION

TITLE
AGNICO-EAGLE - MEADOWBANK DIVISION
GENERAL TANK LAYOUT
80' DIAX40' HIGH
DIESEL FUEL STORAGE TANKS

DRAWN BY	GEM STEEL EDMONTON LTD	DATE 2008-08-08
CHECKED BY	PATRICK GIARD, P.ENG	2009-03-31
APPROVED BY		
SCALE	N.T.S.	DATE

DRAWING NO.
VD2259-MDB-003

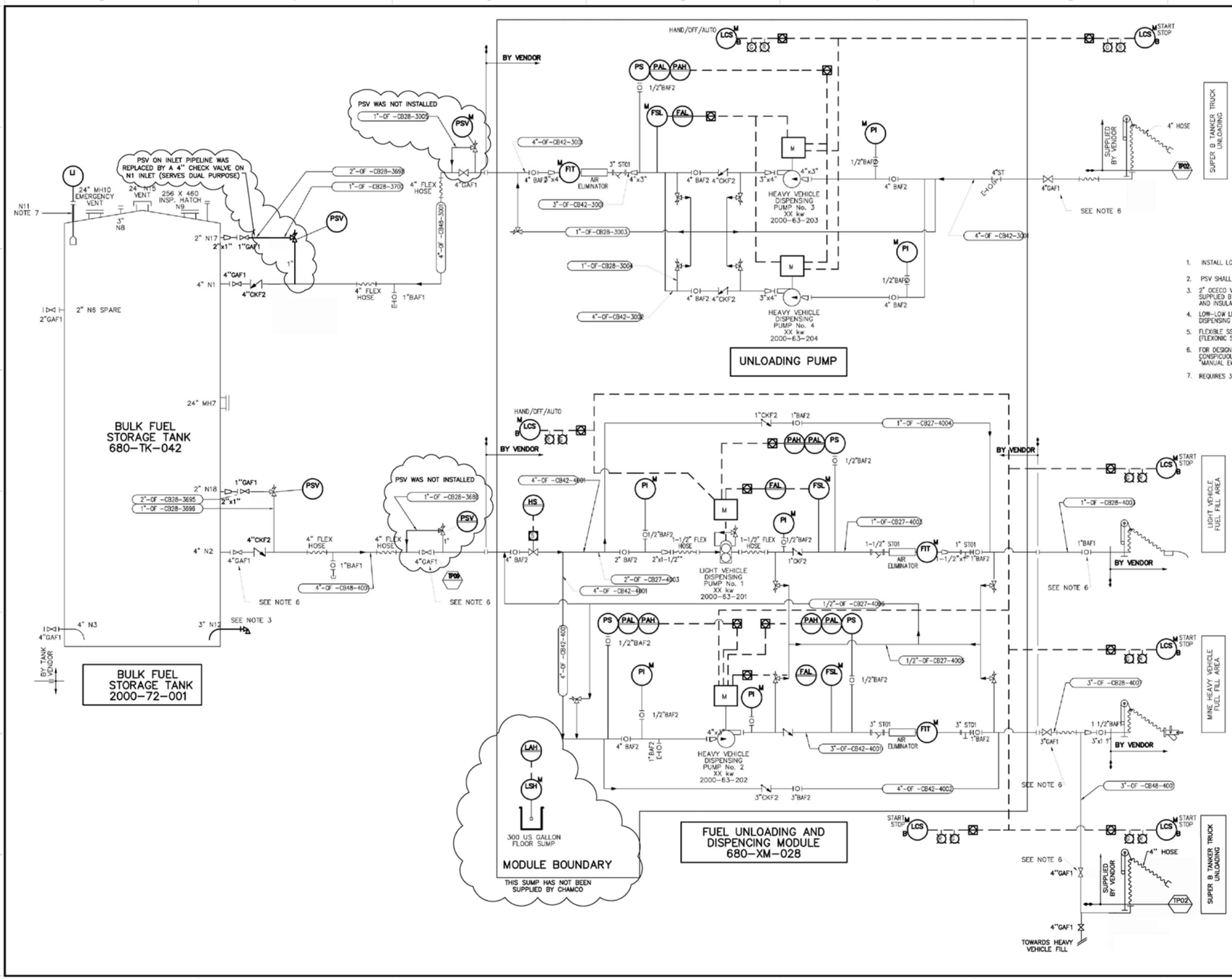
PROJECT NO.	REVISION	SHEET
VD2259-1	1	3/4

P:\VD2259 - AGNICO-MEADOWBANK\VD2259-7\FUEL DISPENSER\Meadowbank fuel models\DRAWINGS\REV 1\VD2259-1 AS BUILT FUEL TANK MEDOWBANK 2009-03-12 (REV 1).DWG, 31 Mar 2009

FILE NO. .DWG

DRAWING NO.

FORMAT ARCH-D-LANDSCAPE



KEY PLAN

GENERAL NOTES

1. INSTALL LOW POINT DRAINS
2. PSV SHALL BE SUITABLE FOR FLUID AT -54 ℃.
3. 2" OCECO V-144 WATER DRAWOFF VALVE (3" ANSI 150# FLG. SUPPLIED BY TANK VENDOR. VALVE TO BE HEAT TRACED AND INSULATED.
4. LOW-LOW LEVEL IN TANK STOPS DISTRIBUTION AND DISPENSING PUMPS.
5. FLEXIBLE SS BRAIDED HOSE, 750mm LG. (FLEXONIC SENIOR, OR EQUAL).
6. FOR DESIGNATED VALVES, POST SIGNS NEARBY IN CONSPICUOUS LOCATIONS READING "MANUAL EMERGENCY SHUTOFF VALVE".
7. REQUIRES 3-NOZZLES, 2 x 1-1/4" & 1 x 1-1/2".

TITLE	# DWG

REFERENCE DRAWINGS

REVISIONS

REV.	DATE	DESCRIPTION	BY	APP.	CLIENT
1	31/03/09	AS-BUILT DRAWING	FR		P.G.
0	03/08/07	ISSUED FOR CONSTRUCTION	RU	ARW	

AGNICO-EAGLE
MEADOWBANK DIVISION

TITLE
AGNICO-EAGLE – MEADOWBANK DIVISION

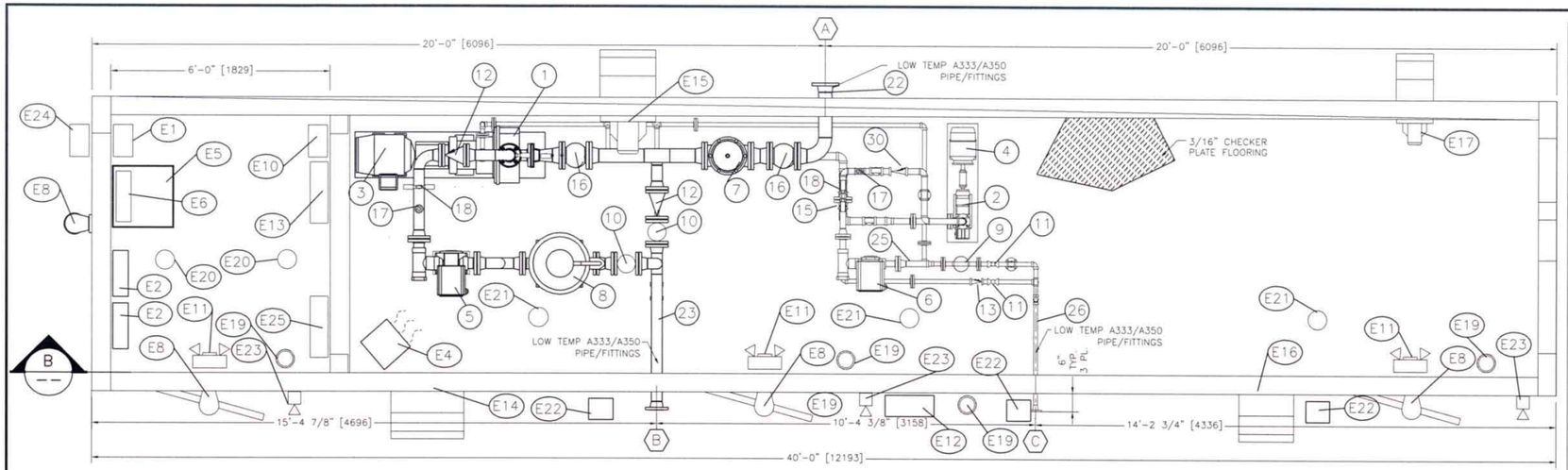
PROCESS AND INSTRUMENTATION DIAGRAM

DRAWN BY F.REYES/CHL	DATE MARCH 2006
CHECKED BY PATRICK GIARD, P.ENG	2009-03-31
APPROVED BY A.R. WACHMANN, P.ENG	2007-08-03
SCALE N.T.S.	DATE 2009-03-31

DRAWING NO.
2000-46D6-2001

PROJECT NO.	REVISION	SHEET
017202	1	4/4

FILE NO. .DWG

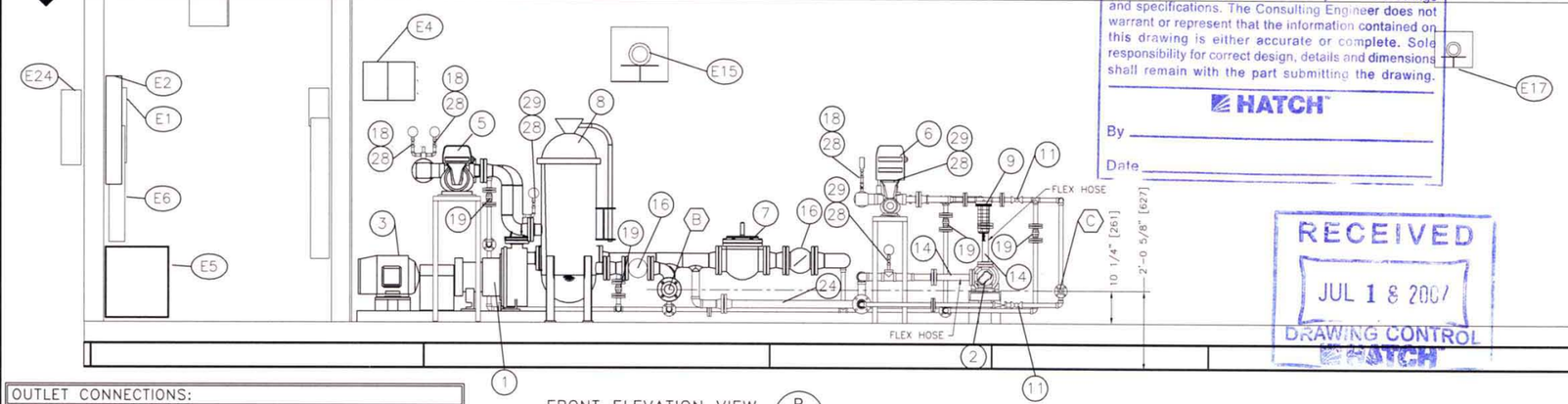


PLAN VIEW A

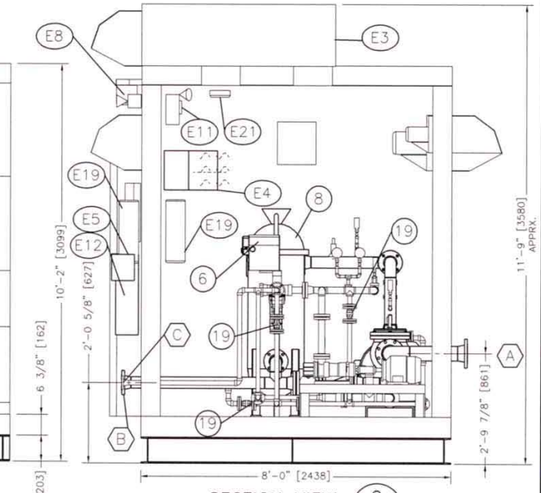
LEGEND

1. PEERLESS – 3"X3" 13 MTP 8796 PUMP
2. GORMAN RUPP GHS 1.5 GC 32–B PUMP
3. ELECTRIC MOTOR 15HP
4. ELECTRIC MOTOR 1.5HP
5. TCS 700–30 3" AIR FLOW METER
6. TCS 700–15 1–1/2" FLOW METER
7. 4" 120VAC SOLENOID FIRE SAFE VALVE
8. 3" BASKET FILTER
9. 1" BASKET FILTER
10. 3" BALL VALVE
11. 1" BALL VALVE
12. 3" CHECK VALVE
13. 1" CHECK VALVE
14. 1–1/2" FLEX HOSE
15. 2" BALL VALVE
16. 4" BALL VALVE
17. FLOW SWITCH
18. PRESSURE SWITCH
19. 1" PSV SET AT 75PSI
20. 3" API DRY BREAK (HEAVY FILL)
21. 1" NOZZLE (LIGHT FILL)
22. 4" LOW TEMP PIPE AND FITTINGS
23. 3" LOW TEMP PIPE AND FITTINGS
24. 2" LOW TEMP PIPE AND FITTINGS
25. 1–1/2" LOW TEMP PIPE AND FITTINGS
26. 1" LOW TEMP PIPE AND FITTINGS
27. HIGH HOSE RETRIEVER AND BUN
28. 1/2" BALL VALVE
29. PRESSURE GAUGE
30. 1–1/2" CHECK VALVE

E1. DISTRIBUTION PANEL
E2. FUEL PUMP CONTROLLER
E3. AIR MAKE UP UNIT
E4. 10 kW HEATER
E5. 15 KVA TRANSFORMER
E6. LIGHTING PANEL
E7. INTERIOR LIGHT (NOT SHOWN)
E8. EXTERIOR LIGHT
E9. DUPLEX RECEPTACLE (NOT SHOWN)
E10. VENT CONTROL J.B.
E11. EXIT LIGHT/EMRGENCY LIGHT
E12. SCULLY SYSTEM
E13. FIRE ALARM PANEL
E14. 24" ARCTIC LOUVRE
E15. 18" EXHAUST FAN
E16. 18" ARCTIC LOUVRE
E17. 12" EXHAUST FAN
E18. LIGHT SWITCH (NOT SHOWN)
E19. FIRE EXTINGUISHER
E20. SMOKE/HEAT DETECTOR (ELEC. ROOM)
E21. SMOKE/HEAT DETECTOR (MECH. ROOM)
E22. EXTERIOR PULL STATION
E23. RED STROBE
E24. EXTERIOR JUNCTION BOX
E25. ALARM JUNCTION BOX



FRONT ELEVATION VIEW B



SECTION VIEW C

OUTLET CONNECTIONS:

- (A) 4"–150 LB. RF SUCTION
- (B) 3"–API DRY BREAK DISCHARGE CONNECTION (HEAVY FILL)
- (C) 1"–DRY FILL DISCHARGE CONNECTION (LIGHT FILL)

CONDITIONS:

PEERLESS 8796 CENTRIFUGAL PUMP AT DISCHARGE HEAD IS RATED FOR 220 USGPM [50M3/HR] AT 100' [30M] TDH.

GORMAN RUPP GHS 1.5 GC 32–B GEAR PUMP AT DISCHARGE HEAD IS RATED FOR 10 USGPM [2.27M3/HR] AT 110' [33.53M] TDH.

GENERAL NOTES:

– ALL DIMENSIONS ARE + OR – 1/2" [13 mm].

HATCH
- ☐ Code 1" Proceed, No Exception Taken"
- ☐ Code 2 "Proceed, with Exceptions as Noted and **Re-submit**"
- ☐ Code 3 "Do not Proceed, Revise as Noted and **Re-submit**"
- ☐ Code 4 "Information Only"

Reviewed only for general conformity with the drawings and specifications. The Consulting Engineer does not warrant or represent that the information contained on this drawing is either accurate or complete. Sole responsibility for correct design, details and dimensions shall remain with the part submitting the drawing.

HATCH

By _____

Date _____

RECEIVED
JUL 18 2007
DRAWING CONTROL
HATCH

PRELIMINARY
FOR APPROVAL
CHAMCO INDUSTRIES LTD.

REV.	DATE	BY	DESCRIPTION

CHAMCO
CHAMCO INDUSTRIES LTD.
VANCOUVER – CALGARY – EDMONTON – PRINCE GEORGE

H325179-M268-VD-0011

CUMBERLAND RESOURCES
BAKER LAKE, NUNAVUT
.
P.O. No. M268

BAKER LAKE DISPENSING FUEL TRANSFER MODULE
PEERLESS 8796, 3x3x13MTP CENTRIFUGAL PUMP (1)
GORMAN RUPP GHS 1.5 GC 32–B GEAR PUMP (1)
PLAN VIEW & SECTIONS GENERAL ARRANGEMENT

DESIGNED BY	D.J.C.
DRAWN BY	G.R.M.
CHECKED BY	.
JOB No.	1014938ABS

DATE	SCALE	DWG No.	REV.
25–APRIL–07	N.T.S.	CUP1014938–21	0

APPENDIX 2

SAFE FILL LEVEL FOR FUEL TANK 680-TK-042

The safe fill level of fuel tank 680-TK-042 depends on the temperature of the fuel inside the tanker, as well as outside temperature. In order to allow room for thermal expansion of diesel fuel, some care must be taken not to exceed the safe fill levels stated hereunder. The VAREC float gives imperial readings.

safe fill for fuel tank 680-TK-042			
TEMPERATURE of fuel unloaded	MAXIMUM FUEL LEVEL		
	feet	**inches**	**fraction**
- 40°C	38	1	9/16
- 35°C	38	3	3/8
- 30°C	38	5	3/16
- 25°C	38	7	1/16
- 20°C	38	8	7/8
- 15°C	38	10	3/4
- 10°C	39	0	5/8
- 5°C	39	2	9/16
0°C	39	4	9/16
+ 5°C	39	6	1/2
+10°C	39	8	1/2
+15°C	39	10	1/2

Appendix B

2AM-WTP1826 FUEL STORAGE FACILITY

CONSTRUCTION SUMMARY REPORT

SNC·LAVALIN
Building what matters

CONSTRUCTION SUMMARY REPORT
Whale Tail Fuel Storage Tank and Containment Facilities

Agnico Eagle Mines Ltd

Report

653281-0004-40ER-0005_0

November 8, 2019

Authorized Signatory:

Israël Gagnon, P.Eng., MBA
Mechanical engineer

EXECUTIVE SUMMARY

SNC Lavalin Stavibel inc. was retained by Agnico Eagle Mines Limited to prepare a construction summary (as-built) report for the fuel storage tank and containment facilities of the Whale Tail Gold Project, Nunavut. SNC Lavalin Stavibel inc. previously prepared the construction drawings and specifications as well as the design report for the fuel storage tank and containment facilities.

SNC Lavalin Stavibel inc. wasn't involved in the construction of the fuel storage tank and containment facilities, the information presented in this report was provided in part by Agnico Eagle.

The construction of the fuel storage tank and containment facilities was completed in July 2019. The construction monitoring and quality assurance was managed by Agnico Eagle.

This report summarizes the construction as-built information for the fuel storage tank and containment facilities.

Table of Contents

1. Introduction

This document presents the fuel storage tank and containment facilities construction summary report required by the Water Licence 2AM-WTP1826 Part D Item 15. As required by Water Licence Schedule D, this report contains the final design and construction drawings, a summary of construction activities including photographic recorded before, during and after construction. The as-built drawings, detailed explanation of field decision to reflect any deviations from the original construction drawings/plans and how such deviations may affect performance of engineered structures, a discussion of the mitigation measures implemented during construction and its effectiveness are also presented.

2. Construction Summary

2.1 Site location plan

Agnico Eagle is developing the Whale Tail Project in the Kivalliq Region of Nunavut (65°24'25" N, 96°41'50" W). The 99,878-hectare Amaruq property is located on Inuit-owned and federal crown land, approximately 55 km north of the Meadowbank mine. The Meadowbank mine is accessible from Baker Lake, located 70 kilometers to the south.

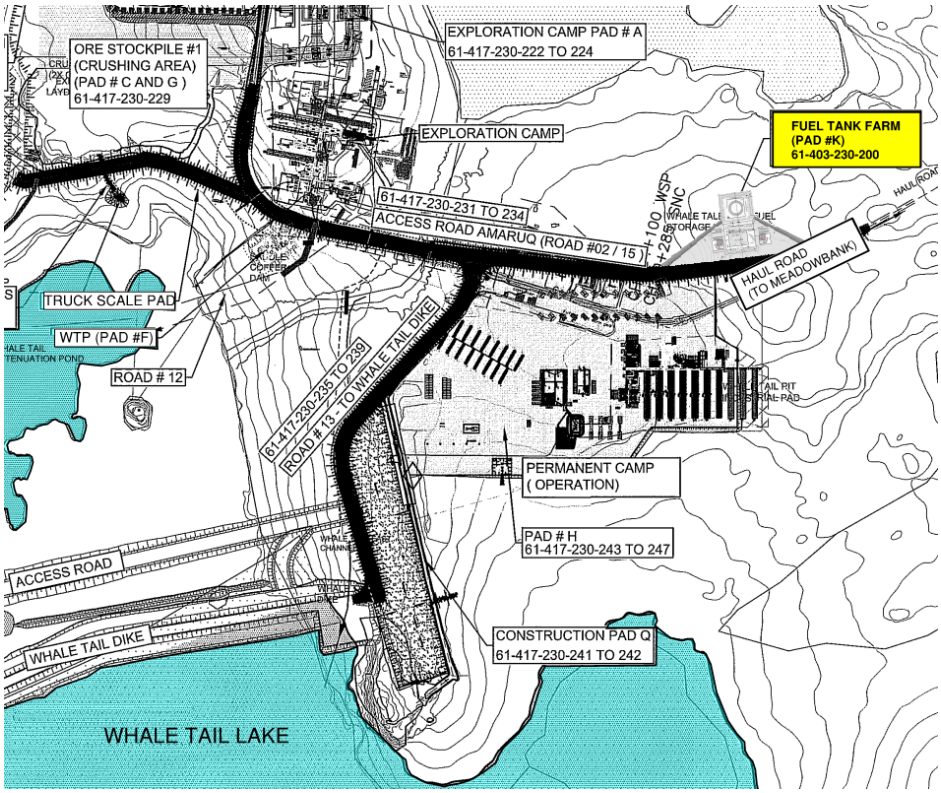


Figure 1 – Whale Tail Fuel Farm Site Overview (extract from drawing 61-403-230-205)

2.2 Fuel tank size

Fuel farm includes one (1) fuel storage tank on the Whale Tail mine site.

The Table 1 below presents the tank main dimensions.

Table 1 – Description of the fuel farm

Fuel farm Description	Mine site fuel farm (Whale Tail)
Product	Diesel
Volume (liter)	1.5 M
Diameter (m)	17.37
Height (m)	7.24

The detailed design of the Fuel Farm is presented in drawings in Appendix A.

2.3 Tank Foundations Design

The tank foundation pad is built 400 mm higher than the surrounding ground with a minimum total thickness of 900 mm of compacted material which includes the liner system. A 1.2 m shoulder surround the tank with a slope of 1V:1.5H away from the tank. The embankments of the foundation pad are no steeper than 1V:2H.

The Table 2 below presents the design parameters for the tank foundations.

Table 2 – Design parameters for the tank foundations

Tank Foundation Pad	
Tank Diameter (m)	17.37
Tank foundation pad top (m)	28.0 x 28.0
Tank foundation pad average thickness, above surrounding ground (m)	1.8
Slope on shoulder	1V:1.5H
Embankment slope	1V:2H

2.4 Berms Design

The storage tank is enclosed inside berms to contain accidental spillage of fuel product. The berms are made of granular material and are made impervious with a geomembrane.

The design parameters for the berms surrounding the fuel Tank are presented in the table below.

Table 3 - Design parameters for fuel farm Berms

Tank Farm Berms	
Berms length (distance between the outer sides of the Berms) (m)	48
Berms width (distance between the outer sides of the Berms) (m)	28
Berms height (min) (m)	1.3
Containment height (m)	1.0
Berms flat top width (m)	2.5
Berms embankment slope	1V:2H
Impervious area (m²)	± 5 000*

* This includes the base membrane that covers the bottom inside the Berms, the area under the maneuvering area for filling the machinery and the additional waterproof surfaces placed 0.5 m below the stopping perimeters for heavy machinery (double protection for operations).

2.5 Secondary Containment Capacity

The required capacity of the fuel farms was calculated based on the following codes and regulations:

- National Fire Code of Canada (NFCC);
- National Fire Protection Association (NFPA); and
- Design Rationale for Fuel Storage and Distribution Facility (DRFS).

As per the latest edition of NFCC, art. 4.3.7.3, the required secondary containment capacity for a fuel farm must have a volumetric capacity of not less than the sum of:

- A) The capacity of the largest storage tank located in the contained space, and;
- B) 10% of the greater of:
    i. The capacity specified in Clause (A), or;
    ii. The aggregate capacity of all other storage Tanks located in the contained space.

The volume occupied by the Tank foundation is considered in the total secondary containment capacity. The height of the secondary containment capacity is 300 mm lower than the berms' maximum elevation. Based on the above mentioned, the secondary containment capacity requirements and the available capacity for fuel farms are summarized in the Table 4.

Table 4 – Fuel farm containment capacity

Fuel farm	
Volume (liter)	1.5 M

Required Containment Capacity (liter)	1.65 M
Available Containment Capacity* (liter)	1.79 M
Is Available containment > Required containment	YES

2.6 Secondary Containment Imperviousness

As per NFCC art. 4.3.7.2, the base and walls of the fuel farms secondary containment are designed, constructed and maintained to withstand full hydrostatic head and provide a permeability of not more than 10^{-6} cm/s to the flammable liquids or combustible liquids contained in the storage tank. The berm is impervious to avoid any seepage into the environment. A 5.10 mm ES-2 Coletanche geomembrane provide adequate imperviousness.

2.7 Secondary Containment Drainage

The finished grade of the secondary containment is sloped away from the Tank to drain the runoff water. The bottom of the berms surface is built with slopes that will allow accidental spills to be concentrated at a low point. A drainage basin located at the low point allows the recovery by pumping accumulations of rainwater and accidental spills.

2.8 Drawings and photographs

Fuel farm tank and containment final design and construction drawings are available in the Appendix A, construction pictures are available in Appendix D.

3. Field decisions

3.1 Equipment and controls

Equipment where build in containers and installed without modification on site document 6115-C-230-002-REP-001 Fuel Storage Tank and Containment Facilities Design Report, present the rational and decisions that leaded to its construction. No modification was performed and the Fuel storage tank and containment facilities are operational as they were designed.

On the fuel tank, some piping neck were relocated not to interfere with roof structure.

3.2 Piping

Piping between filling and distributing container and the fuel tank respect the point to point design. The piping isn't exactly as per drawing (can be seen on photos in Appendix D) but respect the P&ID. Modifications made were from site constrains unforeseeable during the design stage. As built drawings can be consult in Appendix B.

4. Mitigation measure

Quarrying activities to build the berm and the containment wasn't near fish bearing waters. During the fuel storage tank and containment facilities construction, no sediment where released in water from construction areas and no water where used to manage dust emissions from construction activity.

5. Construction monitoring and inspection test plan

5.1 Membrane

The manufacture and supply of the liner system for the fuel farm comply with ASTM standard. The manufacturer provided a certification stating that the material proposed has physical properties that meet the required values. The rolls of liner were labelled, packaged, shipped, off-loaded, stored and handled by appropriate means to prevent damage to the material.

The subgrade surface was inspected by an Engineer to verify suitability prior to installation of the liner system. A minimum thickness of fill covering the liner is maintained for operating equipment over the liner to prevent any damage. The installation of the liner system was performed by a qualified technician. All seaming, patching, welding operations, and testing were performed by a qualified technician. Joints/seams between liners panels were welded using the manufacturer's recommended procedures and equipment. The backfill material was placed in accordance with the drawings and specifications for the maximum lift thickness, compaction requirements and final grade levels.

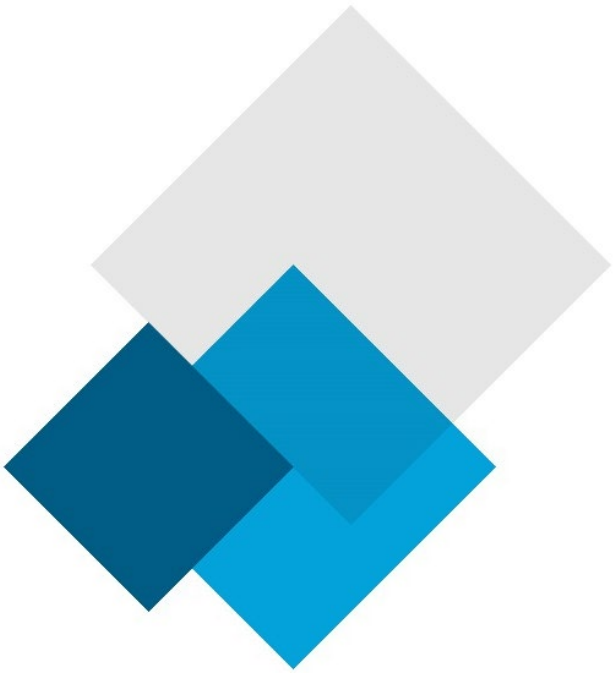
During membrane installation, visual testing by a qualified worker were carried. Those tests were done on cooled bitumen. Joints were tested with a round-tipped trowel to ensure that the weld were not separating. All defects were clearly marked for repair.

5.2 Tank weld

During the tank construction, a testing protocol was followed based on the construction team procedure. This procedure ensure that the tank meet API Standard 650. In it, the contractor registers welder's qualifications, confirm construction material quality and outline is testing procedure. The results from weld tests are also registered. Testing on weld took place during the whole construction process. To review those results, the procedure materials quality and weld inspection results can be consulted in Appendix C.

Appendix A

Final construction drawing

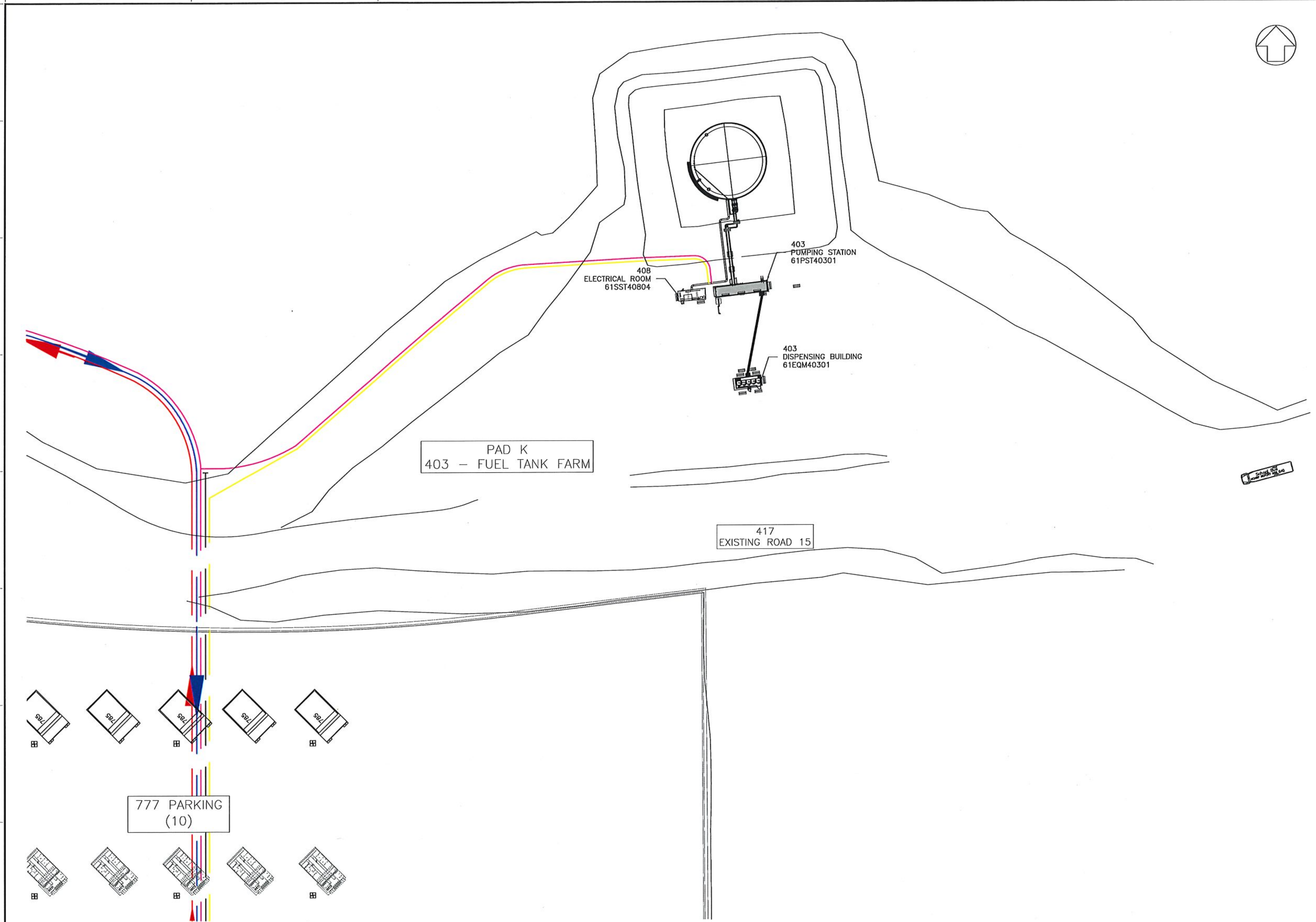


Appendix B

Final P&ID / As built

NO. DESSIN DRAWING NO. 61-400-210-002_R3

FORMAT ARCHD



PLAN CLÉ KEY PLAN

NOTES GÉNÉRALES / GENERAL NOTES

- EXISTANT
- NEW
- FUTUR INFRASTRUCTURES FOR UNDERGROUND
- CONSTRUCTION SEQUENCE
- BUILDING NUMBER

POUR CONSTRUCTION
FOR CONSTRUCTION
DATE : 2018-07-16

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
–	–
–	–
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-07-16	ISSUED FOR CONSTRUCTION	L.R.F.	D.L.	D.L.

REVISIONS

AMARUQ PROJECT

TITRE / TITLE
AGNICO EAGLE – MEADOWBANK DIVISION
400 – SURFACE FACILITIES – AMARUQ
210 – G.A.
PLAN
INDUSTRIAL SITE ACCOMMODATION CAMP DETAIL
WHALE TAIL PIT

DESSINÉ PAR DRAWN BY	L. R. FRENETTE	DATE 2018-07-16
VERIFIÉ PAR CHECKED BY	D.LAFLAMME	2018-07-16
APPROUVÉ PAR APPROVED BY	D.LAFLAMME	2018-07-162
ÉCHELLE SCALE	N/A	DATE 2017-09-20

NO. DESSIN DRAWING NO. 6115-400-210-002

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6115	0	-/-

AE-CART-ARCH D

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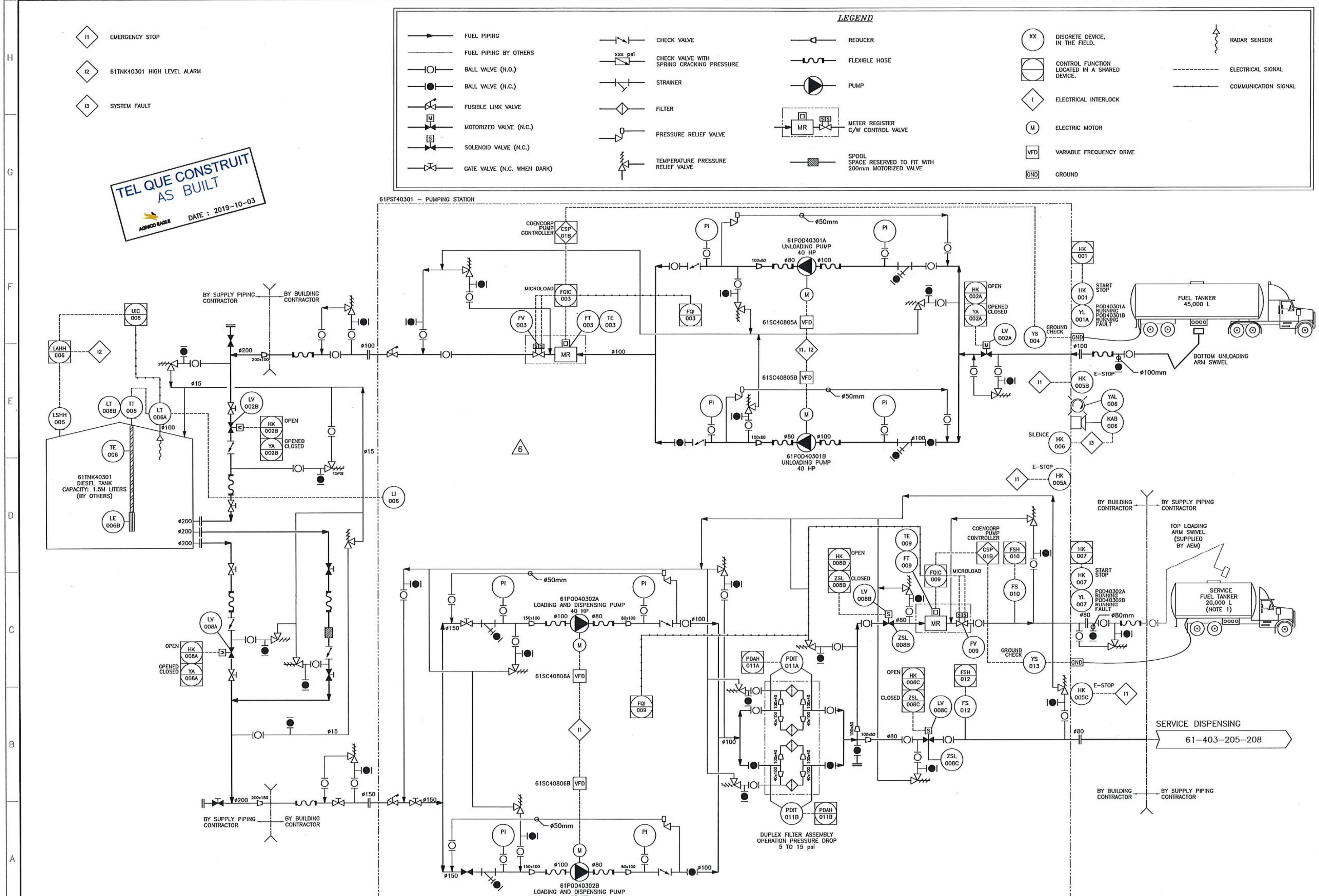
NO. DESSIN DRAWING NO. 61-403-205-207_R6



LEGEND
FUEL PIPING
FUEL PIPING BY OTHERS
BALL VALVE (N.O.)
BALL VALVE (N.C.)
FUSIBLE LINK VALVE
MOTORIZED VALVE (N.C.)
SOLENOID VALVE (N.C.)
GATE VALVE (N.C. WHEN DARK)
CHECK VALVE
CHECK VALVE WITH SPRING CRACKING PRESSURE
STRAINER
FILTER
PRESSURE RELIEF VALVE
TEMPERATURE PRESSURE RELIEF VALVE
REDUCER
FLEXIBLE HOSE
PUMP
METER REGISTER C/W CONTROL VALVE
SPOOL SPACE RESERVED TO FIT WITH 200mm MOTORIZED VALVE
DISCRETE DEVICE, IN THE FIELD.
CONTROL FUNCTION LOCATED IN A SHARED DEVICE.
ELECTRICAL INTERLOCK
ELECTRIC MOTOR
VARIABLE FREQUENCY DRIVE
GROUND
RADAR SENSOR
ELECTRICAL SIGNAL
COMMUNICATION SIGNAL
EMERGENCY STOP
61TNK40301 HIGH LEVEL ALARM
SYSTEM FAULT
TEL QUE CONSTRUIT AS BUILT
DATE : 2019-10-03
61PST40301 – PUMPING STATION
61TNK40301 DIESEL TANK CAPACITY: 1.5M LITERS (BY OTHERS)
61P0040301A UNLOADING PUMP 40 HP
61P0040301B UNLOADING PUMP 40 HP
61P0040302A LOADING AND DISPENSING PUMP 40 HP
61P0040302B LOADING AND DISPENSING PUMP 40 HP
COENCORP PUMP CONTROLLER
MICROLOAD
BY SUPPLY PIPING CONTRACTOR
BY BUILDING CONTRACTOR
FUEL TANKER 45,000 L
BOTTOM UNLOADING ARM SWIVEL
TOP LOADING ARM SWIVEL (SUPPLIED BY AEM)
SERVICE FUEL TANKER 20,000 L (NOTE 1)
START STOP
RUNNING
FAULT
E-STOP
SILENCE
GROUND CHECK
DUPLEX FILTER ASSEMBLY OPERATION PRESSURE DROP 5 TO 15 psi
SERVICE DISPENSING 61-403-205-208

NOTES GÉNÉRALES / GENERAL NOTES

NOTE FOR SUPPLY PIPING CONTRACTOR
(LOT # 6115-S-270-004-SOW-001)

1– INDOOR PIPING, SOLENOID VALVES AND INSTRUMENTS ARE EXCLUDED.

2– PROVIDE ALL OUTSIDE PIPING (ABOVE AND UNDERGROUND), VALVES, FITTING AND OTHER ACCESSORIES.

3–OUTDOOR MOTORIZED VALVES ARE EXCLUDED.

NOTE FOR BUILDING CONTRACTOR
(LOT # 6115-S-265-011-SOW-001)

SNC·LAVALIN

Project # : 644819-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
FUEL DISTRIBUTION DIAGRAM	61-403-200-202
FUEL DISPENSING BUILDINGS	61-403-205-208
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–	–
–	–

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
5	2019-05-31	ISSUED FOR CONSTRUCTION	P.O.C.	B.C.	M.A.B.
4	2018-08-14	ISSUED FOR CONSTRUCTION	D.L.L.	A.O./J.B.	D.L.
3	2018-06-20	ISSUED FOR CONSTRUCTION	D.L.L.	A.O.	D.L.
2	2018-06-06	ISSUED FOR CONSTRUCTION	D.L.L.	A.O.	D.L.
1	2018-05-23	ISSUED FOR CONSTRUCTION	ST.M.	A.O.	D.L.
6	2019-10-03	AS BUILT	S.M.	S.A.	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – WHALE TAIL (AMARUQ)
403 – COMBUSTIBLE
205 – P&ID
P&ID
FUEL TANK FARM
PUMPING STATION

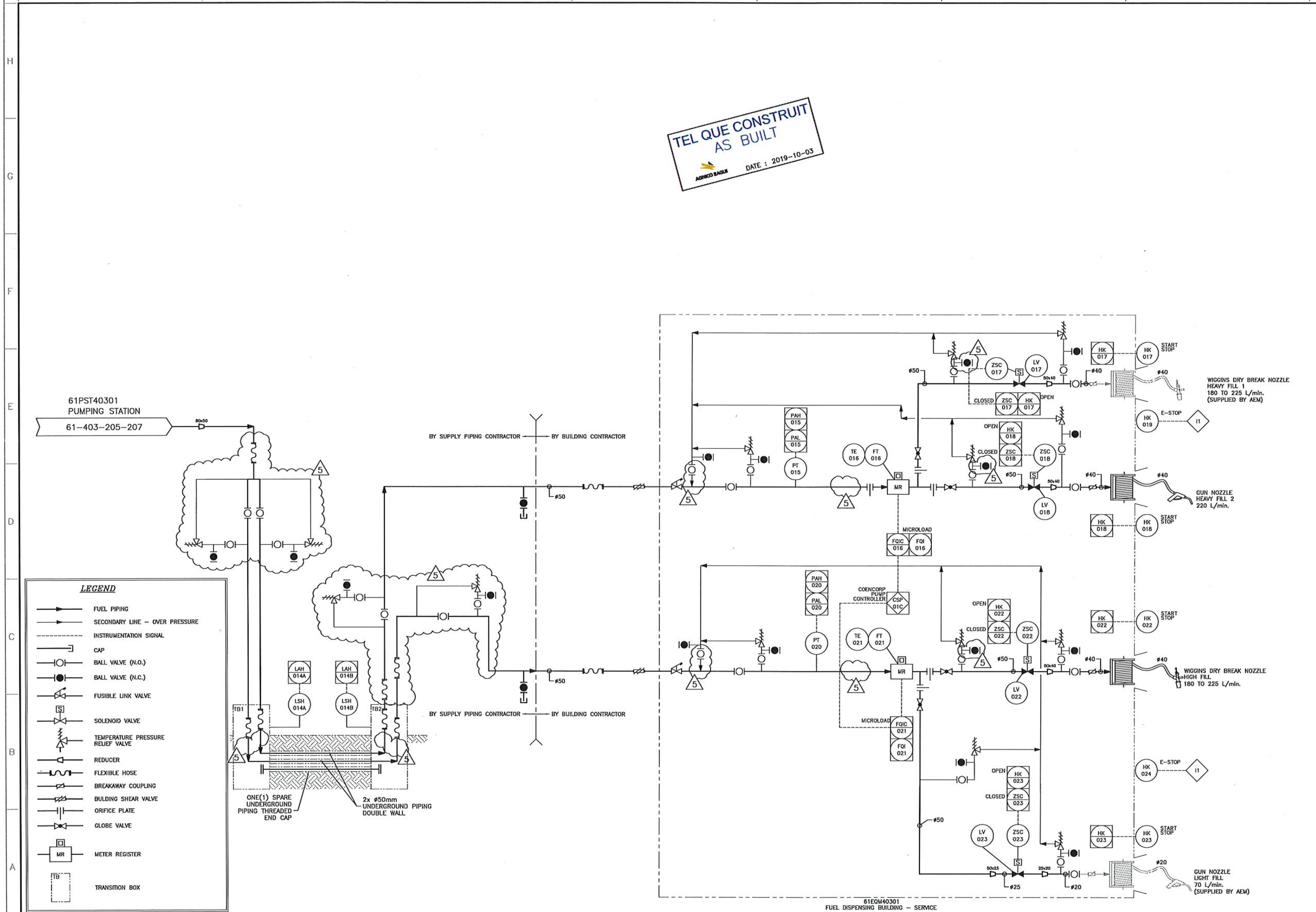
DESSINÉ PAR / DRAWN BY	STÉPHANE MARCOTTE, TECH. DONALD PELLERIN, TECH.	DATE 2018-05-14
VÉRIFIÉ PAR / CHECKED BY	MICHEL FOURNIER, TECH. BENOIT CHARTRAND, P.ENG.	2018-05-17
APPROUVÉ PAR / APPROVED BY	ALAIN OUELLET, P.ENG. BENOIT CHARTRAND, P.ENG.	2018-05-17
ÉCHELLE / SCALE	N/A	DATE 2018-02-08

NO. DESSIN / DRAWING NO. 61-403-205-207

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6115	6	1 / 1

FILE NO. 61-403-205-207_R6.dwg

NO. DESSIN DRAWING NO. 61-403-205-208_R5


TEL QUE CONSTRUIT
AS BUILT
DATE : 2019-10-03
61PST40301
PUMPING STATION
61-403-205-207
BY SUPPLY PIPING CONTRACTOR
BY BUILDING CONTRACTOR
ONE(1) SPARE UNDERGROUND PIPING THREADED END CAP
2x ø50mm UNDERGROUND PIPING DOUBLE WALL
WIGGINS DRY BREAK NOZZLE HEAVY FILL 1 180 TO 225 L/min. (SUPPLIED BY AEM)
GUN NOZZLE HEAVY FILL 2 220 L/min.
WIGGINS DRY BREAK NOZZLE HIGH FILL 180 TO 225 L/min.
GUN NOZZLE LIGHT FILL 70 L/min. (SUPPLIED BY AEM)
E-STOP
START STOP
MICROLOAD
COENCORP PUMP CONTROLLER
61EQM40301
FUEL DISPENSING BUILDING – SERVICE
LEGEND
FUEL PIPING
SECONDARY LINE – OVER PRESSURE
INSTRUMENTATION SIGNAL
CAP
BALL VALVE (N.O.)
BALL VALVE (N.C.)
FUSIBLE LINK VALVE
SOLENOID VALVE
TEMPERATURE PRESSURE RELIEF VALVE
REDUCER
FLEXIBLE HOSE
BREAKAWAY COUPLING
BUILDING SHEAR VALVE
ORIFICE PLATE
GLOBE VALVE
METER REGISTER
TRANSITION BOX

PLAN CLÉ
KEY PLAN

THIS DRAWING 61EQM40302

NOTES GÉNÉRALES / GENERAL NOTES

NOTE FOR SUPPLY PIPING CONTRACTOR (LOT # 6115-S-270-004-SOW-001)

1-INSTRUMENTS ARE EXCLUDED.

NOTE FOR BUILDING CONTRACTOR (LOT # 6115-S-265-011-SOW-001)

1-LOCALISATIONS OF ORIFICE PLATES SHOULD BE COORDINATED WITH CONTRACTOR.

SNC·LAVALIN

SNC-Lavalin Stavibel Inc.
150, rue Gamble Ouest
Rouyn-Noranda (Québec) J9X 2R7
Tel.: 819 764-5181 Fax: 819 797-0153
www.sncavalin.com

Project # : 644819-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
FUEL DISTRIBUTION DIAGRAM	61-403-200-202
PUMPING STATION	61-403-205-207
–	–
–	–
–	–
–	–

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
5	2019-10-03	AS BUILT	S.M.	S.A.	
4	2019-05-31	ISSUED FOR CONSTRUCTION	P.O.C	A.O.	M.A.B
3	2018-06-20	ISSUED FOR CONSTRUCTION	D.L.L	A.O.	D.L.
2	2018-06-06	ISSUED FOR CONSTRUCTION	D.L.L	A.O.	D.L.
1	2018-05-23	ISSUED FOR CONSTRUCTION	ST.M.	A.O.	D.L.
0	2018-05-17	ISSUED FOR CONSTRUCTION	ST.M./D.P.	A.O./B.C.	D.L.

REVISIONS

TITRE / TITLE
AGNICO EAGLE – WHALE TAIL (AMARUQ)
403 – COMBUSTIBLE
205 – P&ID
P&ID
FUEL TANK FARM
FUEL DISPENSING BUILDINGS

DESSINÉ PAR / DRAWN BY	STÉPHANE MARCOTTE, TECH. DONALD PELLERIN, TECH.	DATE 2018-05-11
VÉRIFIÉ PAR / CHECKED BY	MICHEL FOURNIER, TECH. BENOIT CHARTRAND, P.ENG.	2018-05-17
APPROUVÉ PAR / APPROVED BY	ALAIN OUELLET, P.ENG. BENOIT CHARTRAND, P.ENG.	2018-05-17
ÉCHELLE / SCALE	N/A	DATE 2018-05-11

NO. DESSIN DRAWING NO. 61-403-205-208

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6115	5	1/1

FILE NO. 61-403-205-208_R5.dwg

Appendix C

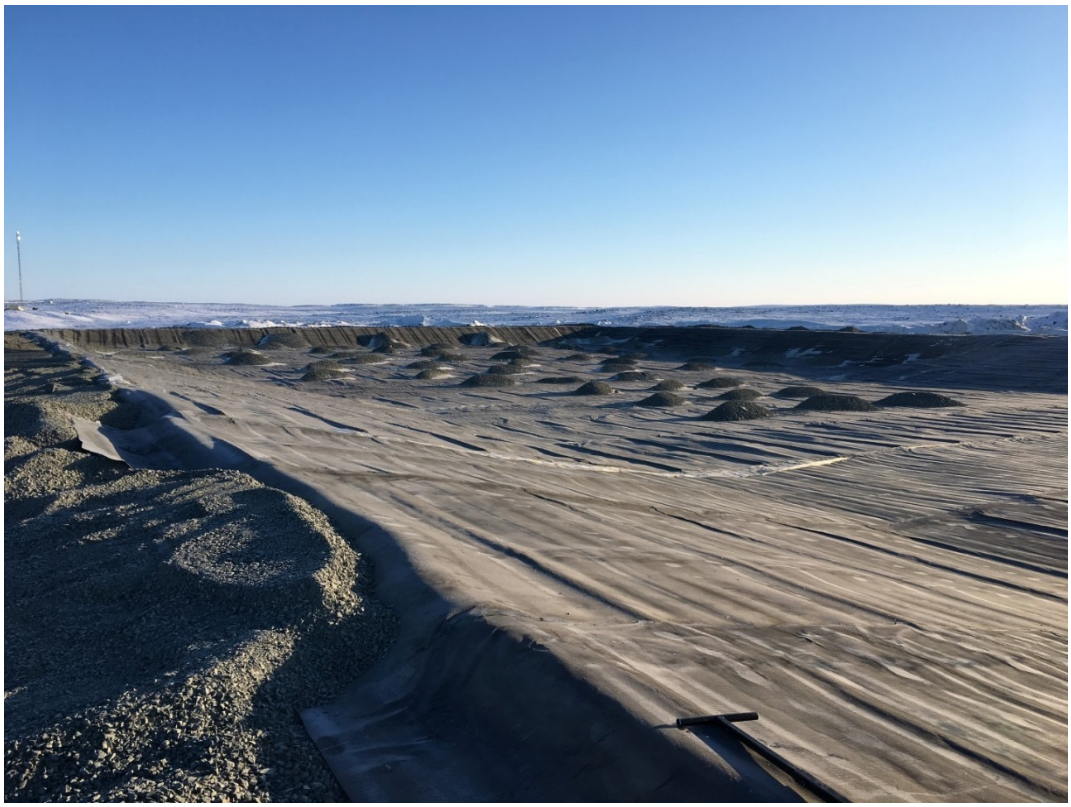
Fuel tank handover package

Appendix D

Photographs

General site view showing tank location (red mark)

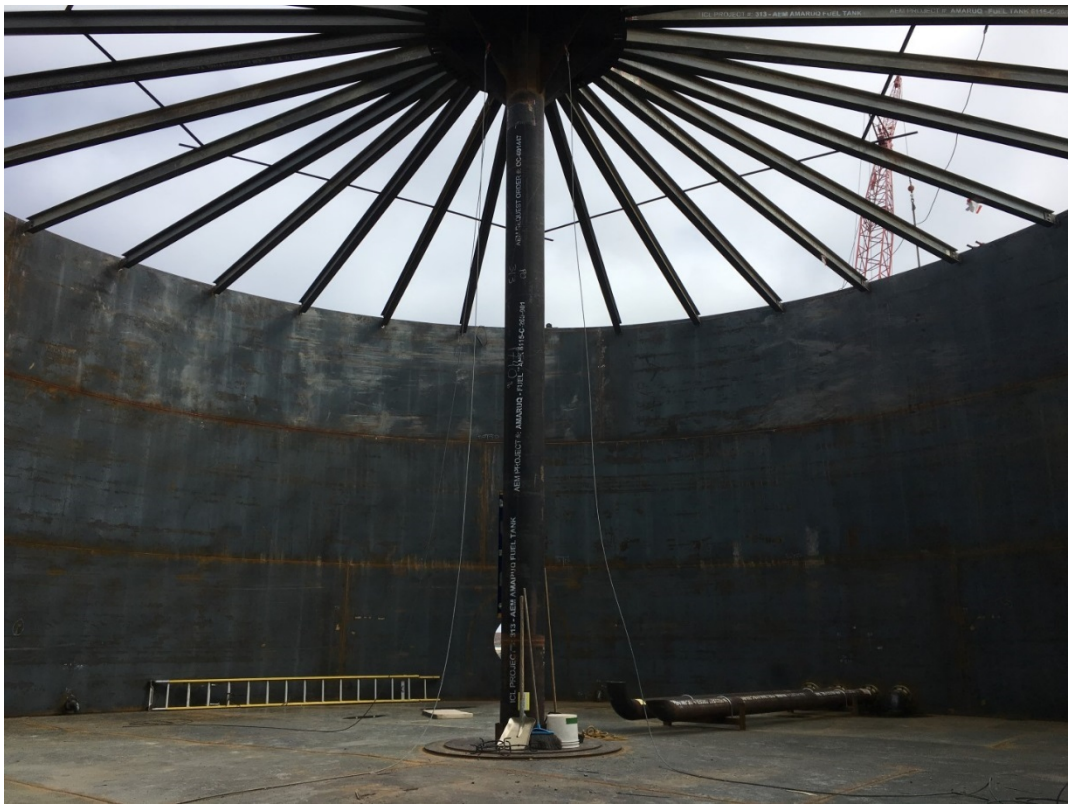
Pad and Berm construction



Containment membrane installation

Tank floor construction

Tank wall welding



Tank roof structure

Piping to and from fuel tank

Final tank and containment layout