Meliadine Project
Landfarm Oil Separator

As-Built Report and Drawings
(Construction Summary)
6515-696-163-REP-001

In Accordance with Water License 2AM-MEL1631 (Part D, item 3)

Prepared by:
Agnico Eagle Mines Limited – Meliadine Division

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1 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Project (the Project), a gold mine located approximately 25 km north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1’23.8’’ N, 92°13’6.42"W) on Inuit Owned Land. The area is accessible from the all-weather gravel road linking the existing exploration camp with Rankin Inlet.

As required by Water License A No. 2AM-MEL1631 – Agnico Eagle Mines Limited for the Meliadine Gold Project (Part D, Item 3), this report summarizes the construction work of the landfarm oil separator. The landfarm’s construction summary is presented in a separate report (6515-E-132-007-132-REP-016).

Included in this report:

- Summary of the construction
- Field decisions and mitigation measures
- Photographs of the infrastructure
- Drawings

2 SUMMARY OF THE CONSTRUCTION

2.1 Site Location Plan

The landfarm oil separator installation is located near the industrial pad on the left shore of CP1 pond. Figure 1 shows the location of the landfarm including the oil separator. The complete site's general arrangement is presented at Appendix A.

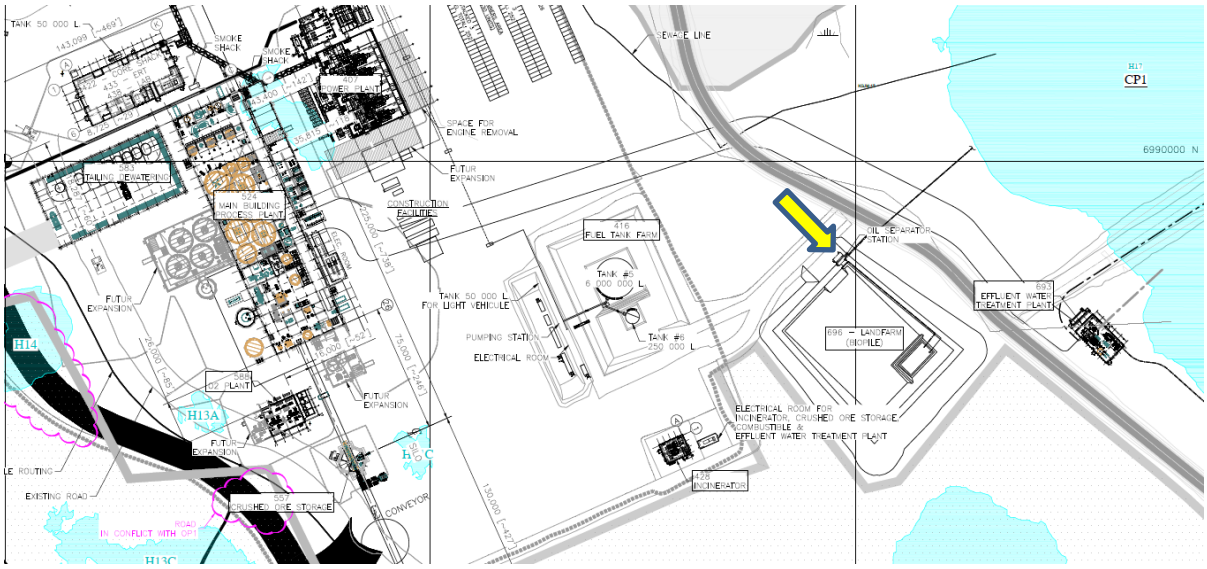

Figure 1 **–Location of the Meliadine Landfarm Oil Separator**

2.2 Landfarm Oil Separator Description

2.2.1 Process

Water from the thawing of contaminated ice and snow stored on the landfarm's pad, as well as surface water runoff drains by gravity to a sump located in a low point of the landfarm. From there the contaminated water is pumped to the oil separator system located within the landfarm. The contaminated water in the sump is pumped to the oil separator with an electrical diaphragm pump which minimizes emulsion of the oil-water solution. The oil separator removes the light petroleum hydrocarbons (non-emulsified with specific gravity less than water) and the treated water is released to CP1.

The oil separator unit is designed as a horizontal honeycomb coalescer gravity pack fabricated as a single wall steel 350 US gallon tank. The oil separator is able to treat up to 25 USgpm (maximum peak at 45 USgpm). From spring to fall, approximately 136 m³/day of contaminated water with a specific gravity of contaminants ranging from 0.82 to 0.94 is expected to be treated through the oil separator which removes hydrocarbons from the water prior to being released to CP1 at a concentration as low as 5 ppm. The oil separator unit is designed with two (2) outlets, one for the treated water and a second one for petroleum hydrocarbon wastes. Treated water is transferred by gravity to a treated water tank

from where it will be pumped to CP1 with a centrifugal pump. With a transfer pump, petroleum hydrocarbon wastes is pumped to a 1000 L tote tank. The tote tank is made of semi-transparent plastic with a lid at the top to allow the operator to see when the tote is full and needs to be replaced by an empty tote. The full tote is managed accordingly to the Hazardous Materials Management Plan (Agnico Eagle, 2015a).

A secondary containment is integrated in the oil separator system to accommodate up to 110% of the total capacity of the oil separator tanks. Piping and flange adapters are made of 50 mm Victaulic Schedule 40 black pipe. All material used in the composition of the oil separator system is considered as health, safety and environmental hazard free.

An electrical sea container is installed next to the oil separator container.

2.2.2 Operation

The oil separator system is self-operating after manual start up at the beginning of spring melt. All pumps are protected from dry run and containers are protected from overfill. A flow meter has been installed at the discharge of the treated water tank to monitor the quantity of water transferred to CP1. Oil separator operator manually monitors the level of waste oil in the tote tank. The filling rate of waste tote tank depends of the concentration of oil, and a level switch automatically stops all the system if the level reaches its maximum level. Once full, the tote tank is removed with a loader and stored in the Hazmat container until it is shipped south to a determined site location. Retrieved oil is reused where applicable.

2.3 Installation

2.3.1 Oil Separator System

The oil separator was delivered to site as a turnkey package. All internal equipment was pre-built, installed in the container and tested prior to shipment to site.

In the spring of 2018, prior to installation at the landfarm, the oil separator system, including the electrical room, was installed temporarily next to P1 pond in order to treat water from contaminated snow stored within a lined snow cell following a hydrocarbon fuel spill that occurred the winter before. The treated water from the snow cell was discharged to P1 pond.

Once water at the snow cell was treated, the oil separator system container as well as the electrical room was installed inside the landfarm on a prepared and compacted surface in order to treat water collected in the landfarm's sump.

The oil separator system was moved back to the snow cell prior to freeze-up in 2018 in order to provide treatment upon 2019 freshet. Once treatment is over at the snow cell, the system will be moved back to the Landfarm. If required in the future, the oil separator will be re-mobilized to the snow cell until all water has been treated.

2.3.2 Suction and Discharge Pipelines

The suction pipeline running from the landfarm sump to the oil separator container (approximately 80 m) is located along the north dyke of the landfarm. The discharge pipeline (approximately 100m) runs

straight to CP1, crossing the service road through a culvert) to reach the discharge location of the CP1 shore.

During commissioning, service testing were conducted to detect any leaks on the pipeline. Service tests were as well conducted at the Pumping Station.

After start up, visual inspections are done on a weekly basis during freshet and monthly thereafter.

2.4 Construction Schedule

In Spring 2018, prior to installation at the landfarm, the oil separator system, including the electrical room, was installed temporarily next to P1 in order to treat water from hydrocarbon contaminated snow stored within a lined snow. Once this water was treated, the oil separator system container as well as the electrical room was installed inside the landfarm to treat the water accumulated in the landfarm sump. The oil separator system was moved back to the snow cell prior to freeze-up in 2018 in order to provide treatment upon 2019 freshet. Once treatment is over at the snow cell, the system will be moved back to the Landfarm. If required in the future, the oil separator will be re-mobilized to the snow cell until all water has been treated.

The main milestones for 2018 are listed below:

- Installation of oil separator in temporary location at P1 snow cell (early June 2018)
- Operation of oil separator in temporary location (June 26 – July 7, 2018)
- Re-location of oil separator at landfarm (mid-July 2018)
- Operation of oil separator at landfarm (August 1-12, 2018)
- Re-location of oil separator at temporary location at P1 snow cell in order to treat upon freshet 2019 (October 2018)
  Re-mobilization of oil separator at landfarm after water in snow cell is complete.

2.5 Field Decisions and Mitigation Measures

The items listed below are deviations from the design and occurred during the commissioning phase of the oil separator. If immediate corrective measures could not be implemented, mitigation measures are planned.

2.5.1 Location

As described in section 2.3 of this report, the oil separator is not yet permanently installed at its final location, the landfarm, as intended in the design report. The oil separator is a mobile unit and thus is used to respond to the temporary need to treat hydrocarbon contaminated water stored in the P1 snow cell. This does not preclude the capacity to treat the water at the landfarm as per design.

2.5.2 Pumping System and Piping

The original pump was drawing air and burnt out. It was replaced and automated with a level sensor.

It has been evaluated that anchoring or the suction pipeline running from the landfarm sump to the oil separator container located along the north dyke of the landfarm is not required.

As all piping is Victaulic steel pipe (not HDPE), hydrostatic tests were replaced by service tests.

2.5.3 Effluent quality

Total oil and grease concentrations at the outlet of the oil separator did not reach the specifications provided by the manufacturer. An assessment of the situation was conducted and the observations listed below led to mitigation measures which will be implemented.

- The system is designed to lower non-dissolved, non-emulsified hydrocarbons to 5 mg/L.
- Based on results, the system failed to lower the concentration to 5 mg/L (resulting in 10 mg/L after treatment).
- The system is not removing BTEX, F1-F4 and has been causing an increase in F2 (C16-C34) and F3 (C34-C50) constituents.
- Proper maintenance of the system will be conducted as described in the Operation and Maintenance Manual (OMM) to prevent contamination of water with F2 and F3 during treatment.
- Evaluate the necessity of a secondary treatment for BTEX, F1 – F4 prior to discharge to CP1.

Occurrences when the system fails to lower oil and grease below 5 mg/L (upwards of 10 mg/L) will not have an adverse impact on site water management. This is based on the volume of water which entered CP1 during 2018 of approximately 350,000 m^3 (runoff and treated CP5 water), the average concentration of oil and grease in CP1 effluent to Meliadine Lake during 2018 of 0.84 mg/L, and the maximum expected volume of water requiring treatment at Landfarm A of 500 m^3. Water balance and water quality predictions conducted within the overall water management plan suggest that CP1 volumes and oil and grease concentrations will remain at levels that will prevent adverse impacts to water management if the system continues to produce oil and grease effluent concentrations upwards of 10 mg/L.

3 PHOTOGRAPHS AND DRAWINGS

Pictures or the landfarm oil Separator are available in Appendix A.

Drawings are available at Appendix B.

Appendix A
Photographs of Landfarm Oil Separator

Photo 1 Oil Separator (blue container) with electrical room (yellow container)

Photo 2 View inside the oil separator container (waste oil tote (forefront), oil separator (middle) and treated water tank (back))

Photo 3 View inside the oil separator container (treated water tank and flow meter (forefront), oil separator (middle) and waste oil tote (back))

Appendix B
As-Built Drawings of Meliadine's Landfarm Oil Separator

ASSEMBLY - PARTS LIST							
ITEM	TAG #	QTY	SIZE (SI)	MATERIAL	DESCRIPTION	MANUFACTURER	MODEL #
1	65PDI40001	1	50 X 38mm	CAST IRON	PUMP - ELECTROMECHANICAL DIAPHRAGM	ABEL	EM-040Z-SG
2	65PWA0001	1	50 X 25mm	SS	PUMP - CENTRIFUGAL	GOULDS	10SH4F75A0
3	65PDI40002	1	19mm	CAST IRON	PUMP - OIL TRANSFER	HAIGHT	Z56RO
4		1	1000 L	HDPE	IBC TOTE C/W STEEL CAGE	N/A	N/A
5	65TNK40001	1	1155 L	HDPE	VERTICAL STORAGE TANK	NORWESCO	40213
6	65SOI40001	1	1325 L	STEEL	OIL SEPARATOR	SOUTHERN TANK	N/A
7		3	13mm	SS	BALL VALVE	M.A. STEWART	N/A
8		4	25mm	SS	BALL VALVE	NVC	N/A
9		1	25mm	SS	CHECK VALVE - THREADED	NVC	N/A
10		4	50mm	CAST IRON	BALL VALVE	VICTAULIC	#726
11	CH-X	1	50mm	CAST IRON	CHECK VALVE	VICTAULIC	#716H
12		2	25mm	NYLON	COMBINATION AIR VALVE	VICTAULIC	9C3
13		1	75mm	STEEL	PULSATION DAMPENER	ABEL	015 TO 040
14	65LSHH6960114	1	50mm	SS	LEVEL SWITCH - OIL SEPARATOR	MORRISON BROS.	925S-W20030AS
15	65FI6960119	1	50mm	STEEL	MAGNETIC FLOW TUBE	ROSEMOUNT	8705
16	65FIT6960119	1		N/A	FLOW TRANSMITTER	ROMEMOUNT	8712
17	65LSLL6960116 65LSHH6960116	2	25mm	SS	LEVEL SWITCH - WATER	ROSEMOUNT	2120
18	65LSHH6960112	1	25mm	SS	LEVEL SWITCH - OIL	ROSEMOUNT	2120
19	65PS6960111	1	6mm	SS	PRESSURE TRANSMITTER	UNITED ELECTRIC	H100-702-M540
20		1	610 X X 914 X 203 mm	STEEL	CONTROL PANEL	N/A	N/A
21		1	2000W	STEEL	HEATER	OXFORD	RUH3TCHAR
22	65PI6960111 65PI6960121	2	13mm	SS 316	PRESSURE GAUGE	WINTERS	PPC5063-G

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Agnico Eagle No. 6515-S-265-094-265-AED-0013 R: Sub003

DOCUMENT FOR INFORMATION

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Status: AS BUILT

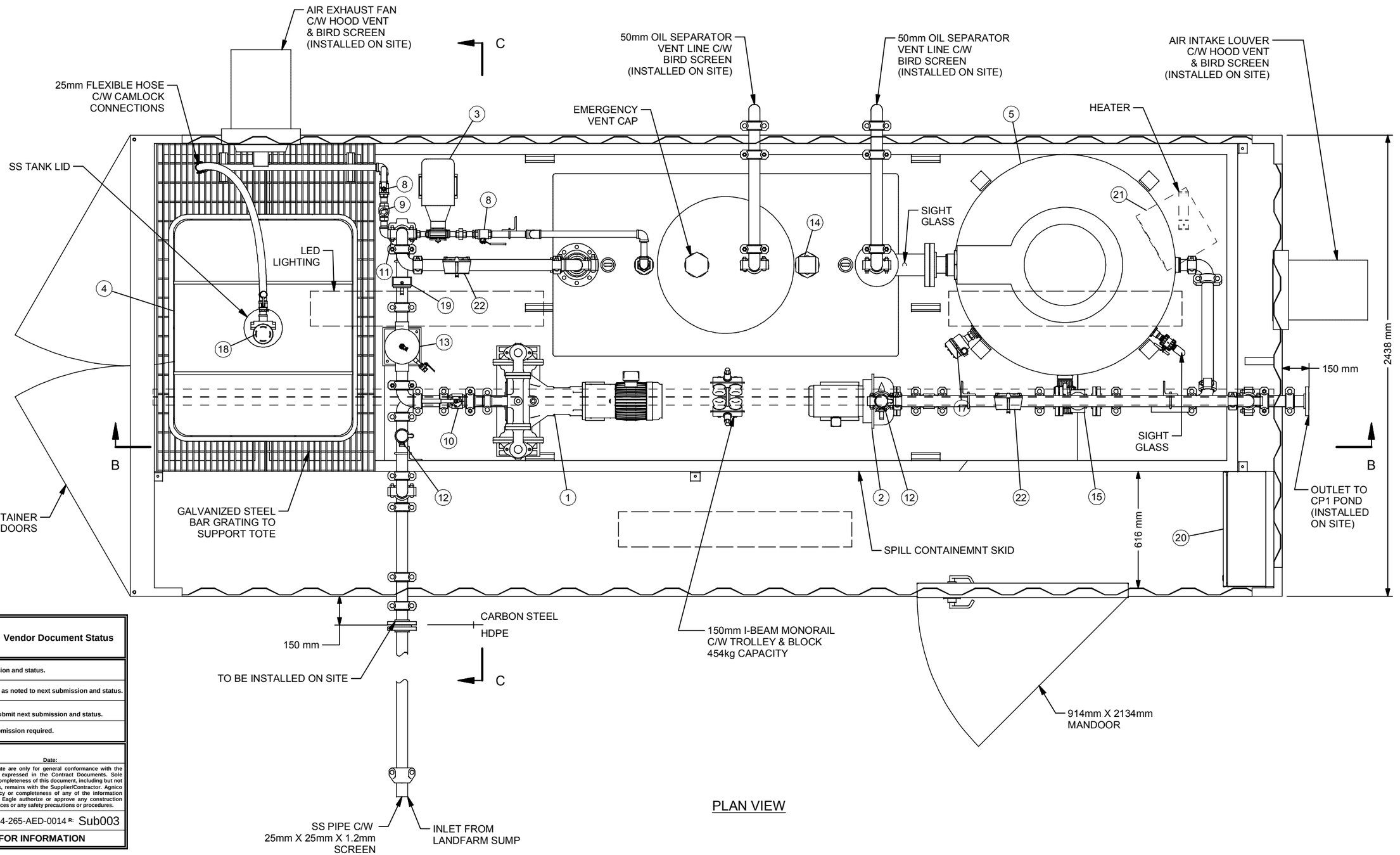
Issue	Date	App'd	Revision Description
04	8/25/2017		AS BUILT
03	7/19/2017		ISSUED FOR CONSTRUCTION
02	7/7/2017		REVISED AS PER COMENTS ON 07-05-2017
01	6/21/2017		ISSUED FOR APPROVAL

Design By: CA
Drawn By: RS
Checked By:
Submitted
Approved

Client: AGNICO EAGLE MINES

Title: GENERAL ASSMEBLY
Project: 6515-S-265-094 LANDFARM TO CP1 OIL SEPARATOR STATION
Drawing #: 2898A-G-101

Scale
Date 6/21/2017
Sheet 1 of 4
Job#
Rev: 04



PLAN VIEW

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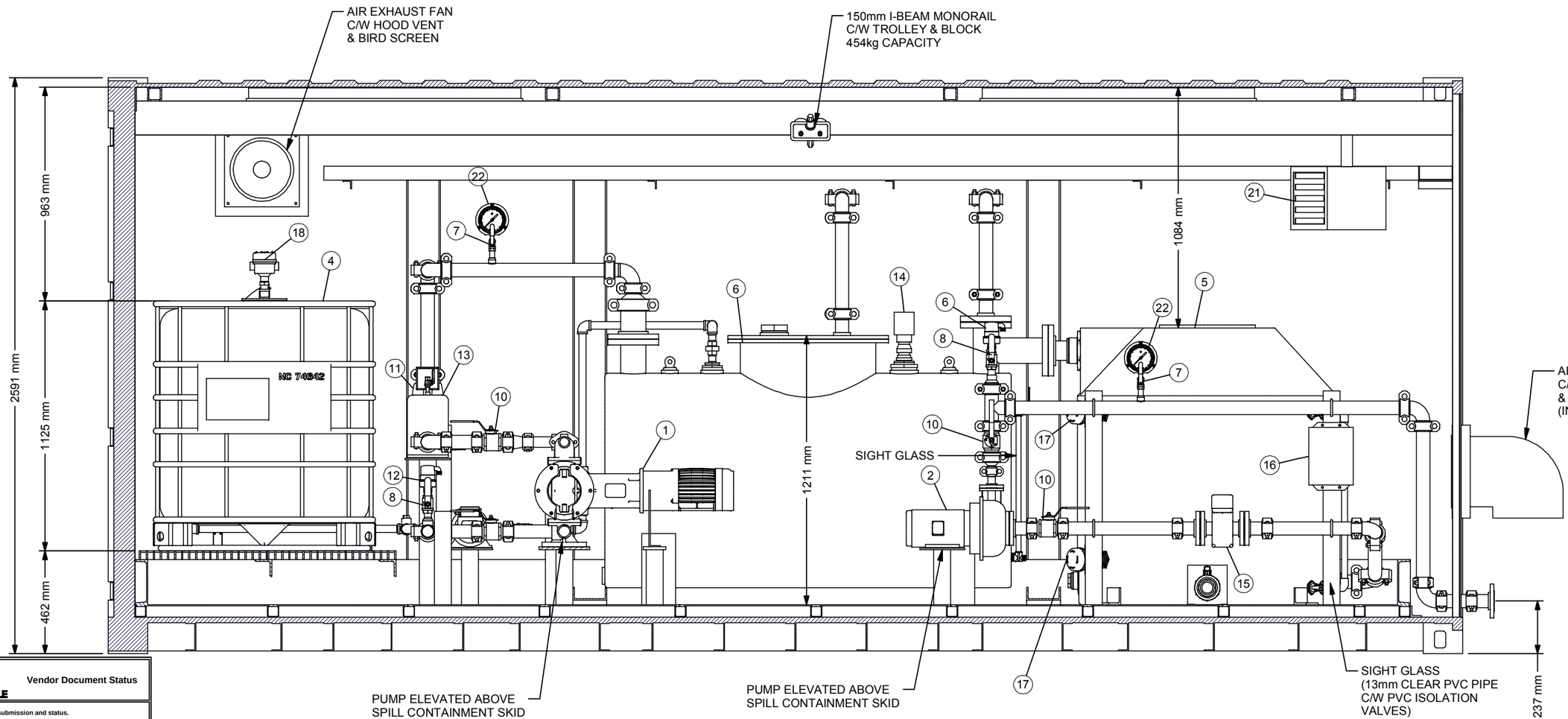

SECTION B-B

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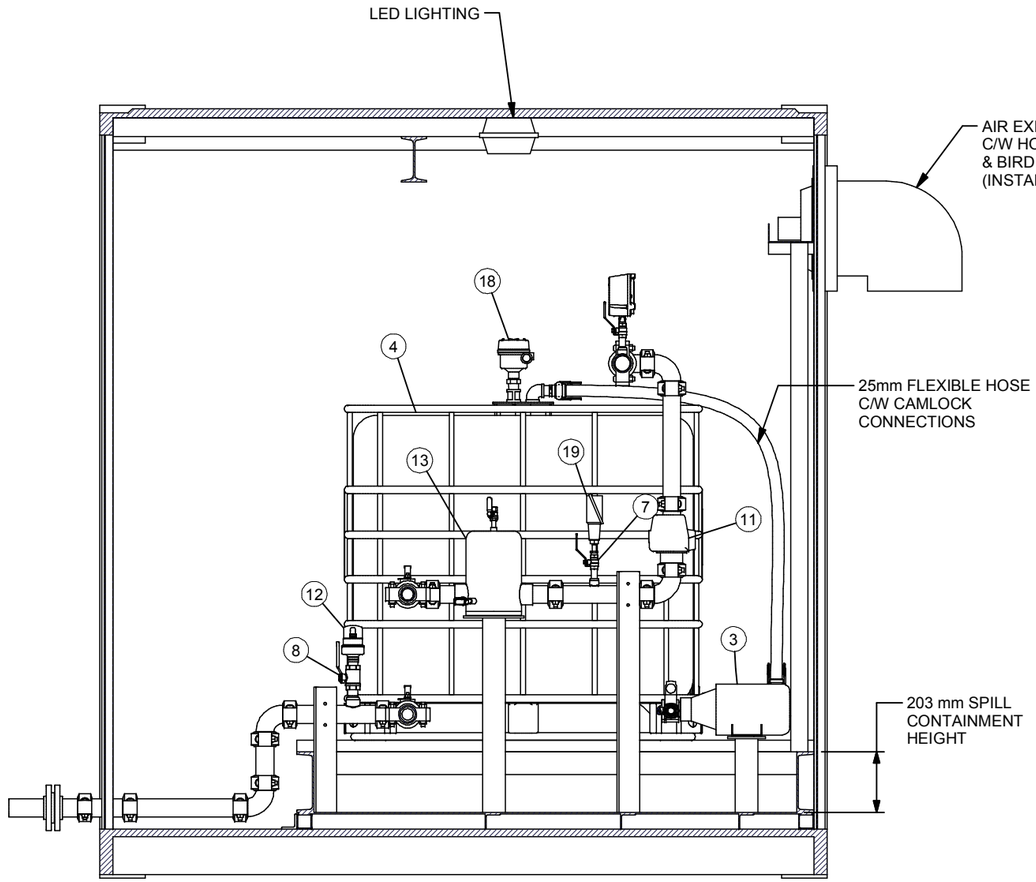

SECTION C-C

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