As Built Report
Potable Water Treatment Plant (PTP)

In Accordance with Licence 2AM DOH 1335, Part D, item 1

Prepared by:

Agnico Eagle Mines Limited – Hope Bay Division

DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Revision
R0	08/06/2026			As Built report

Prepared By: _____

Thomas Genty
Water Treatment Eng.
NAPEG L4751

Member No.L5013
06/19/2026

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Raphael Lachance
Mechanical Resident Engineer – Construction
NAPEG L5013

Approved by: _____

Olga Tsui
Compliance Counselor - Environment

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

1.1 SITE LOCATION AND ACCESS

The Hope Bay Mine is a gold mining and milling undertaking of Agnico Eagle. The Project is located 705 km northeast of Yellowknife and 153 km southwest of Cambridge Bay in Nunavut Territory and is situated east of Bathurst Inlet. Agnico Eagle is currently operating the Doris Project under an existing water license.

1.2 SITE FACILITIES

Current mining facilities to support the mine include a camp for accommodations, tailings storage facility, rock storage facilities, ore pads, process plant, power plant, maintenance facilities, water management treatment plants and supporting water management infrastructure. To accommodate the current site infrastructure, and due to aging of the current water potable treatment plant, a new potable water treatment plant (PTP) upgrade is required.

1.3 PURPOSE OF DOCUMENT

This report includes the final design and drawings for the Potable Water Treatment Plant (PTP) aiming to produce potable water to support several essential activities at site.

A general location plan for the project of PTP is shown in Figure 1.

1.4 SCOPE OF WORK

As required by the Water License, this report summarizes the construction and commissioning work associated with the potable water treatment plant (PTP). Included in this report are:

- A description of the Process;
- Documentation on-field decisions that deviate from the original plans;
- Building location;
- Photographs; and
- Safety Data sheets of chemicals used in the PTP.

Construction drawings of the listed infrastructure are presented in appendices of this report. Appendix A and B present as built drawing including P&ID and Appendix C, Pictures of the PTP.

A general location plan for the project of PTP is shown in Figure 1.

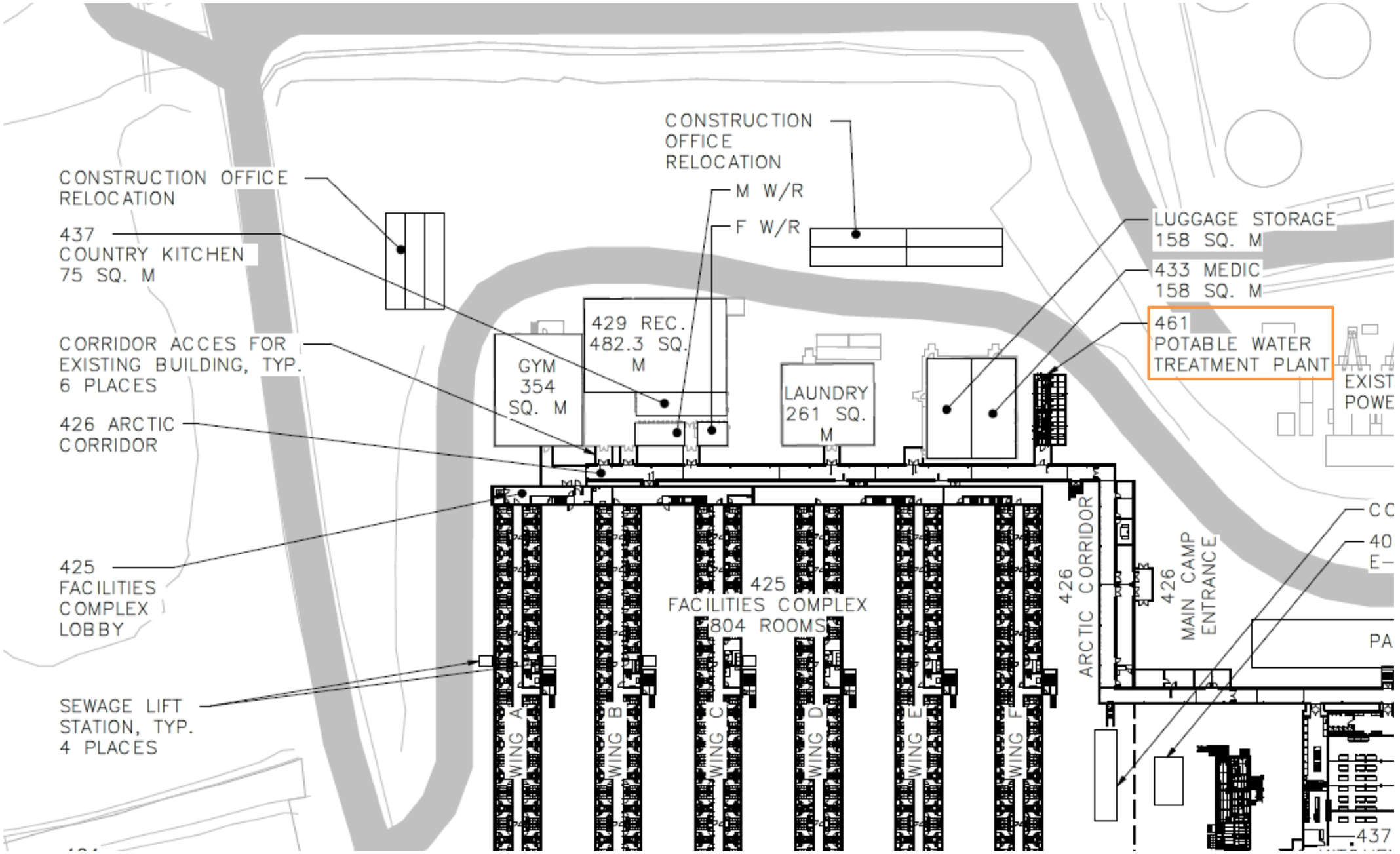


Figure 1 : General location plan

2 PROCESS DESCRIPTION

The PTP is designed to treat a maximum of 209 m^3/d.

2.1 PTP PROCESS DESCRIPTION AND CONTROL SUMMARY

The PTP system is designed to provide safe, reliable, and continuous potable water for distribution. The system includes key components such as the raw water storage tank, water treatment equipment, treated water storage tanks, and distribution pumps. The water treatment equipment includes a clarifier, multimedia filters, cartridge filters, UV disinfection units, and chlorine disinfection. The water production rate is 8.7 m3/h. The treated water is stored in two treated reservoir tanks. The water is distributed from the treated water reservoir via distribution pumps. The treatment concept is presented in Figure 2. The P&ID can be found in Appendix B.

Raw Water Tank Fill
The Raw Water Tank level is monitored by a level transmitter and will send a signal to fill the tank. In case where the tank is manually filled, the operator will receive a Fill Required warning. For future operations, provisions are provided for automatic fill with strainers and a motorized valve.

Transfer Tank Fill and Clarifier
When the transfer tank level is low, it will call on the feed pumps to feed water through the clarifier. Due to the clarifier being at a lower elevation to the raw water tanks, a motorized valve is used to stop gravity flow when the fill is stopped. Coagulant (PAC or alternative) is dosed before the contact tank and flow to the clarifier. Periodically, sludge collected at the bottom of the clarifier is manually purged and send to the sewage network or at an appropriate location (such as TIA) as per the Hope Bay Waste Management Plan.

Treated Water Tank and Water Treatment
There are two treated water storage tanks. Each tank can be enabled or disabled for maintenance. When enabled, the tank levels are averaged. This average level is used to start filtration when the tank level gets low. On filtration start, the UVs are started and allowed to warm up before calling for water from the transfer tank. When filtration is stopped, the UVs stay on for an idle delay to prevent short cycling. There are two multimedia filters operating in parallel. They are automatically backwashed based on one of filtration time, pressure differential, filtration volume, or manual trigger. Only one filter will backwash at a time. When in backwash, a backwash pump is started. Cartridge filters will be monitored by pressure differential with a warning to change out the filters. Chlorine is dosed after the UVs.

Distribution
There are two distribution pumps running as duty / standby. The pump is VFD (variable-frequency drive) controlled to maintain a set pressure, 345 kPa (80 psi) in the network. The pump will stop if flow drops below a minimum value. The pump will restart when pressure drops below a set point.

Recirculation
In the event that the free chlorine levels in the distribution system drop below a set point (0.3 mg/L for example), the recirculation system is activated to add a small amount of chlorine to gradually raise the chlorine level.

2.2 CHEMICAL USAGE

The following chemical are planned to be used in the PTP:

- Coagulant: PAC or alternative
- Sodium hypochlorite solution

SDS of typical chemicals are presented in appendix D.

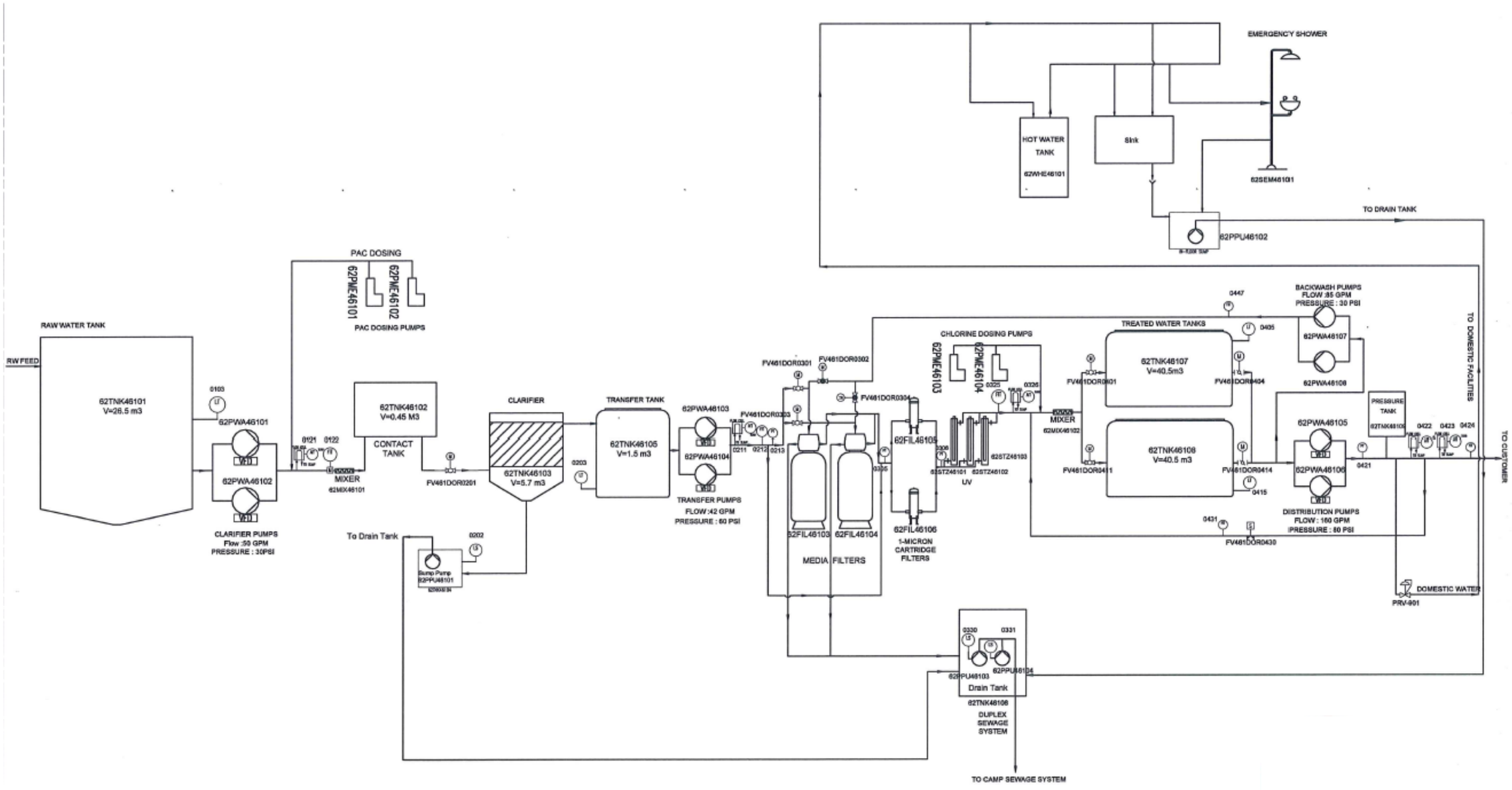


Figure 2 : PTP Flowsheet

3 CONSTRUCTION AND COMMISSIONING SUMMARY

3.1 CONSTRUCTION SCHEDULE

The construction of the PTP was conducted between October 2025 and March 2026. The commissioning was completed in March 2026. Construction and commissioning were completed according to the milestone dates shown in Table 1.

Table 1: Construction and Commissioning Milestone

Activities	**Timeline**
Beginning of Construction	October 10th, 2025
End of Commissioning (process commissioning, complete minor piping modifications)	March 14th, 2026
End of Construction	March 14th, 2026

3.2 FIELD DECISIONS THAT DEVIATE FROM ORIGINAL DESIGN

No major variation from the original design was noted during the construction of the building. Minor piping modification occurred to adjust to the field situation. Modifications are included in documentation on Appendix A & B.

The following minor modifications were done:

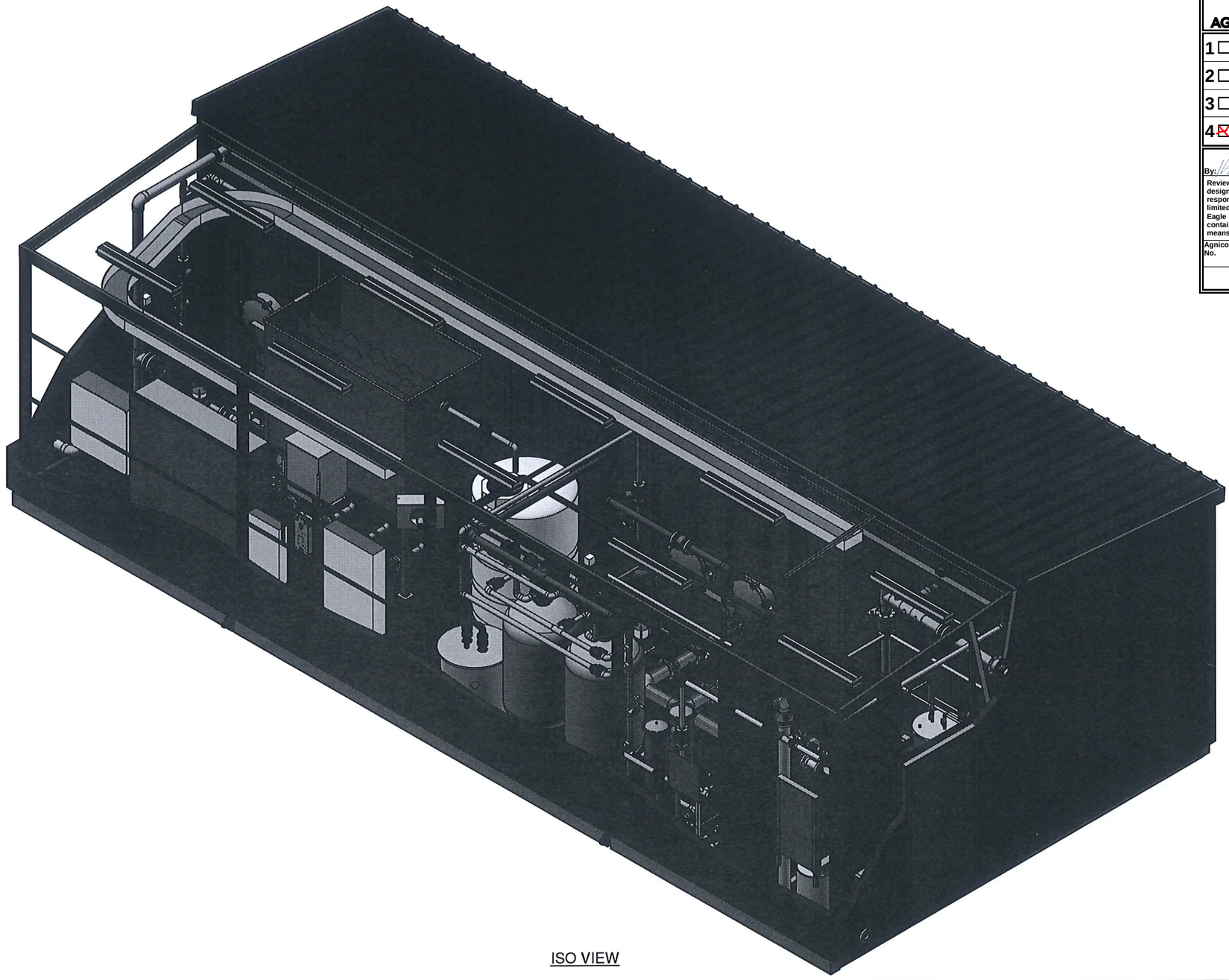
- Routing of all analyzers to the Raw Water Tank
- Moving the Safety shower out of the Chlorine cabinet
- Installation of a Flow Switch Sensor on the Safety Shower
- Replacement of a plywood shelf to a stainless steel one.
- Modify program of the filter backwash to happen only during nighttime.

3.3 AS BUILT DRAWINGS AND PHOTOGRAPHS

As-built documentation is presented in Appendices A, B and C:

- As Built Drawings;
- PID
- Photographs.

Appendix A



ISO VIEW

Vendor Document Status

AGNICO EAGLE

1 ☐	Proceed to next submission and status.
2 ☐	Proceed with exceptions as noted to next submission and status.
3 ☐	Do not proceed. Revise as noted and resubmit next submission and status.
4 ☒	Complete, no further submission required.

By: Raphaël Lachance 05/12/2026 Date:

Review and authorization to fabricate are only for general conformance with the design concept of the Project as expressed in the Contract Documents. Sole responsibility for the accuracy and completeness of this document, including but not limited to dimensions and quantities, remains with the Supplier/Contractor. Agnico Eagle does not warrant the accuracy or completeness of any of the information contained herein, nor does Agnico Eagle authorize or approve any construction means, methods, techniques, sequences or any safety precautions or procedures.

Agnico Eagle No. 2.01 6219-S-291-002 rev 0 General Arrangement R:

DOCUMENT FOR INFORMATION

REGISTERED PROFESSIONAL ENGINEER H. JI P.ENG NT/NU

May 07, 2026

BI Pure Water (Canada) Inc.
PTP : 1003436
#2, 9790 - 190th Street
Surrey, BC V4N 3M9
Phone: (604) 882-6650
Fax: (604) 882-6659
http://www.bipurewater.com

Issue	Date	Drawn	Checked	App'd	Revision Description
01	2026-05-06	PM	AJ	CA	RECORD
00	2025-05-20	PM	AJ	CA	ISSUED FOR CONSTRUCTION

Client: AGNICO EAGLE

Title: GENERAL ARRANGEMENT DRAWING

Project: HOPE BAY PWTP 6209-S-291-002

Drawing #: 4078-G-100-GA

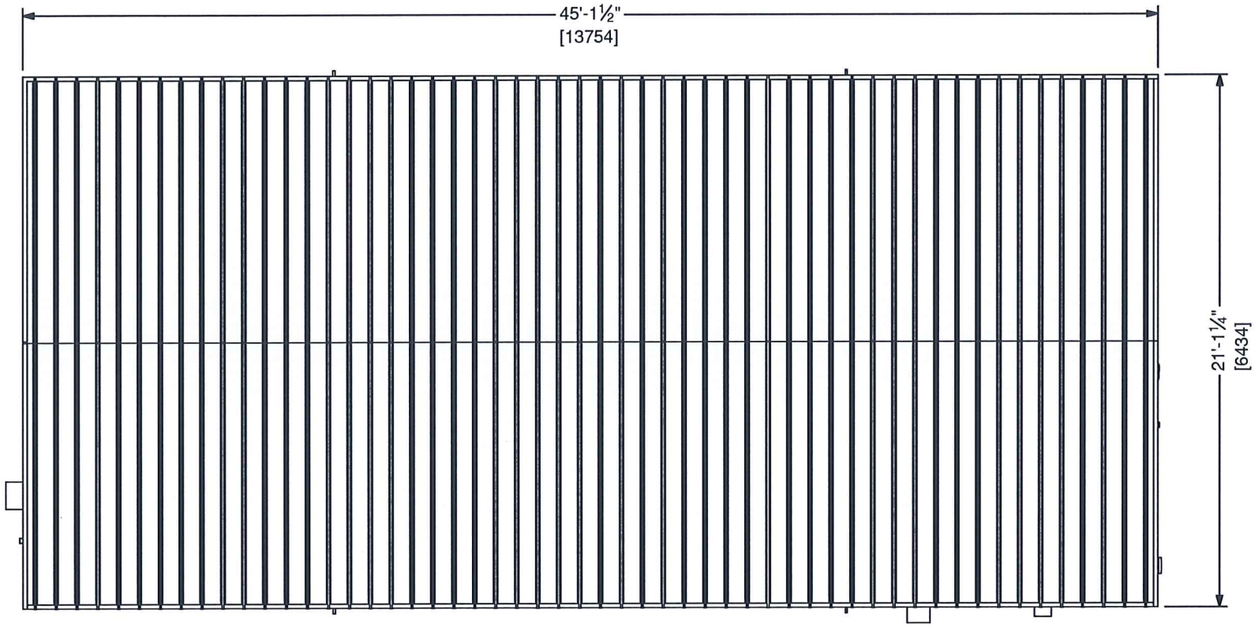
Size ANSI B (11 x 17)

U.N.O. ft-in [mm]

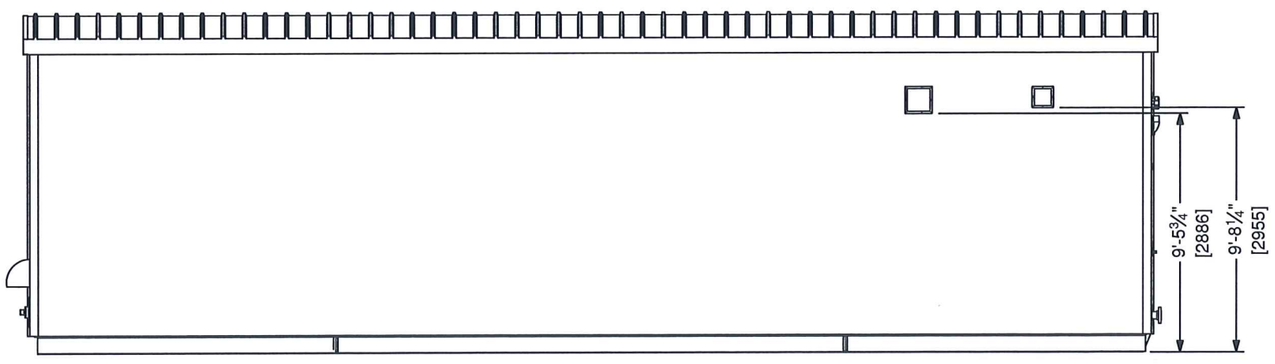
Sheet 1 of 6

Projection

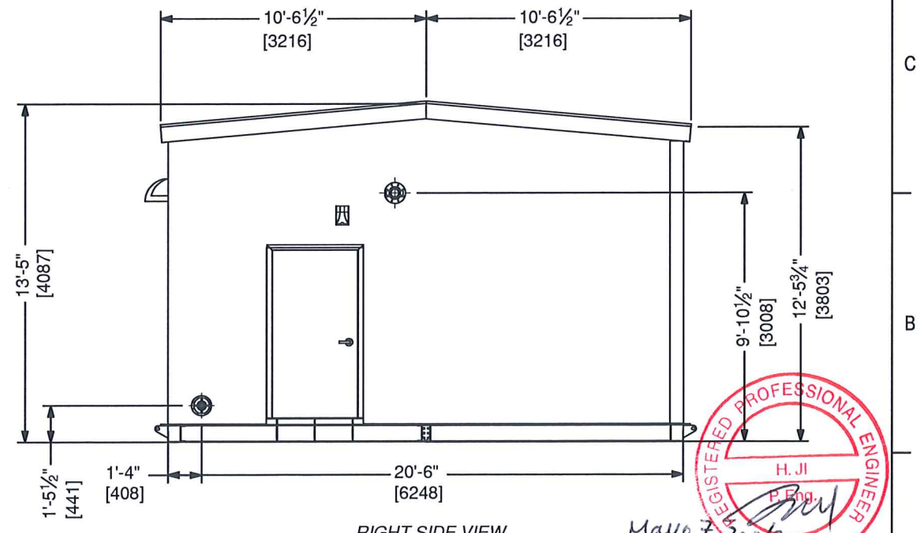
Rev 01



PLAN VIEW



FRONT VIEW



RIGHT SIDE VIEW

REGISTERED PROFESSIONAL ENGINEER
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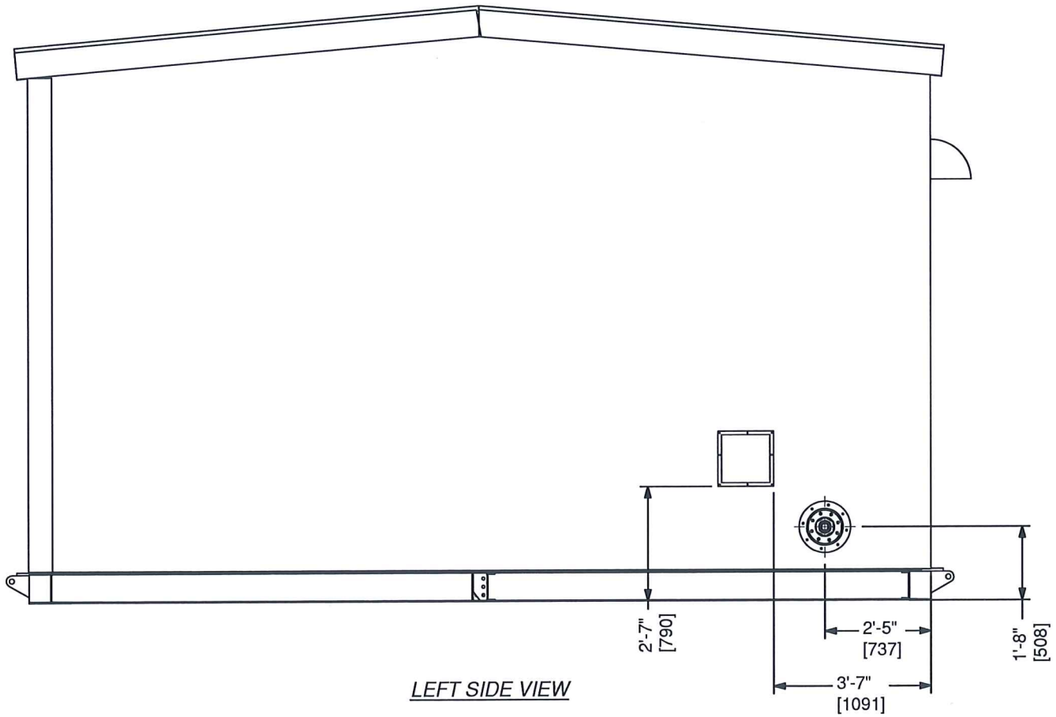
Size: ANSI B (11 x 17)

U.N.O.: ft-in [mm]

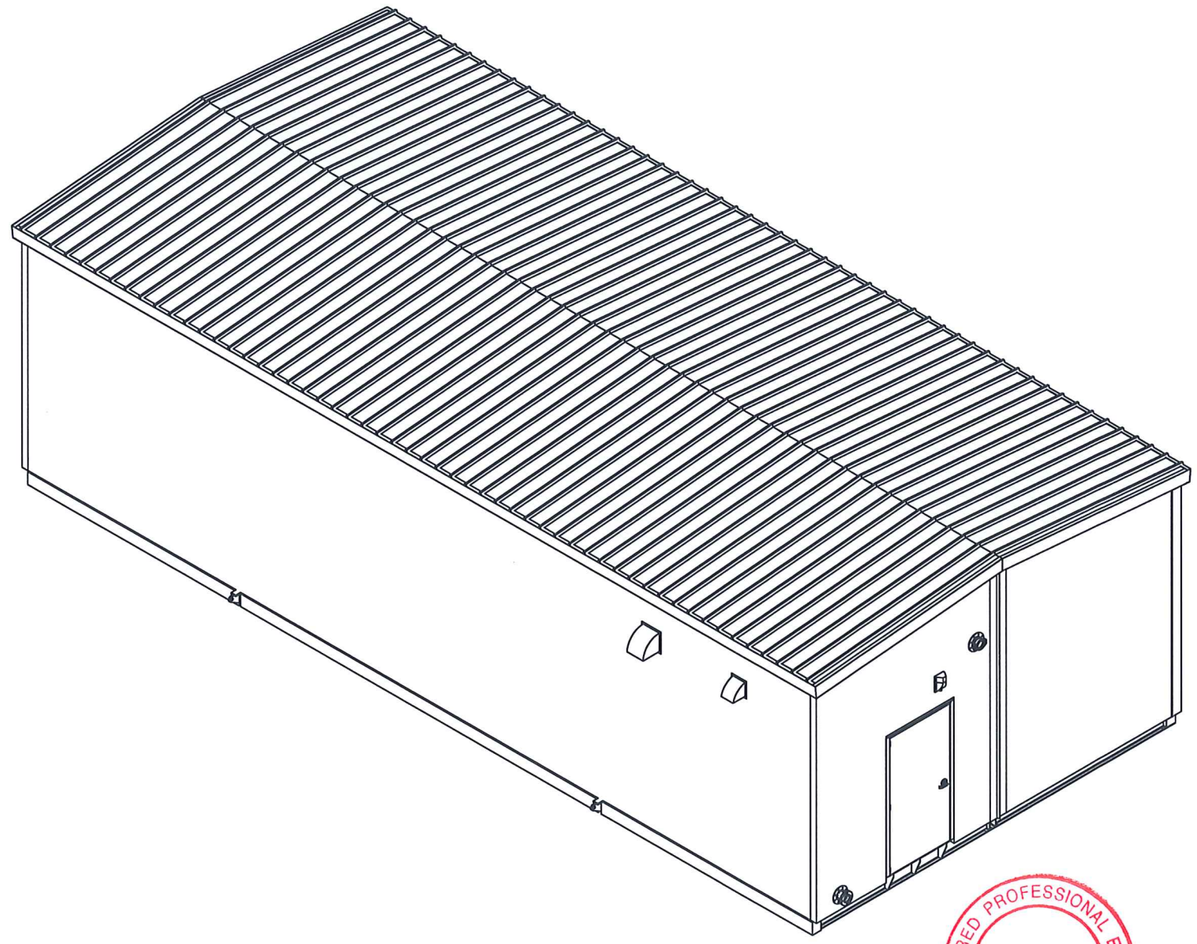
Sheet: 2 of 6

Projection:

Rev: 01



LEFT SIDE VIEW



ISO VIEW

REGISTERED PROFESSIONAL ENGINEER
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Project: HOPE BAY PWTP
6209-S-291-002

Drawing #: 4078-G-100-GA

Size ANSI B (11 x 17)
U.N.O. ft-in [mm]
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Projection
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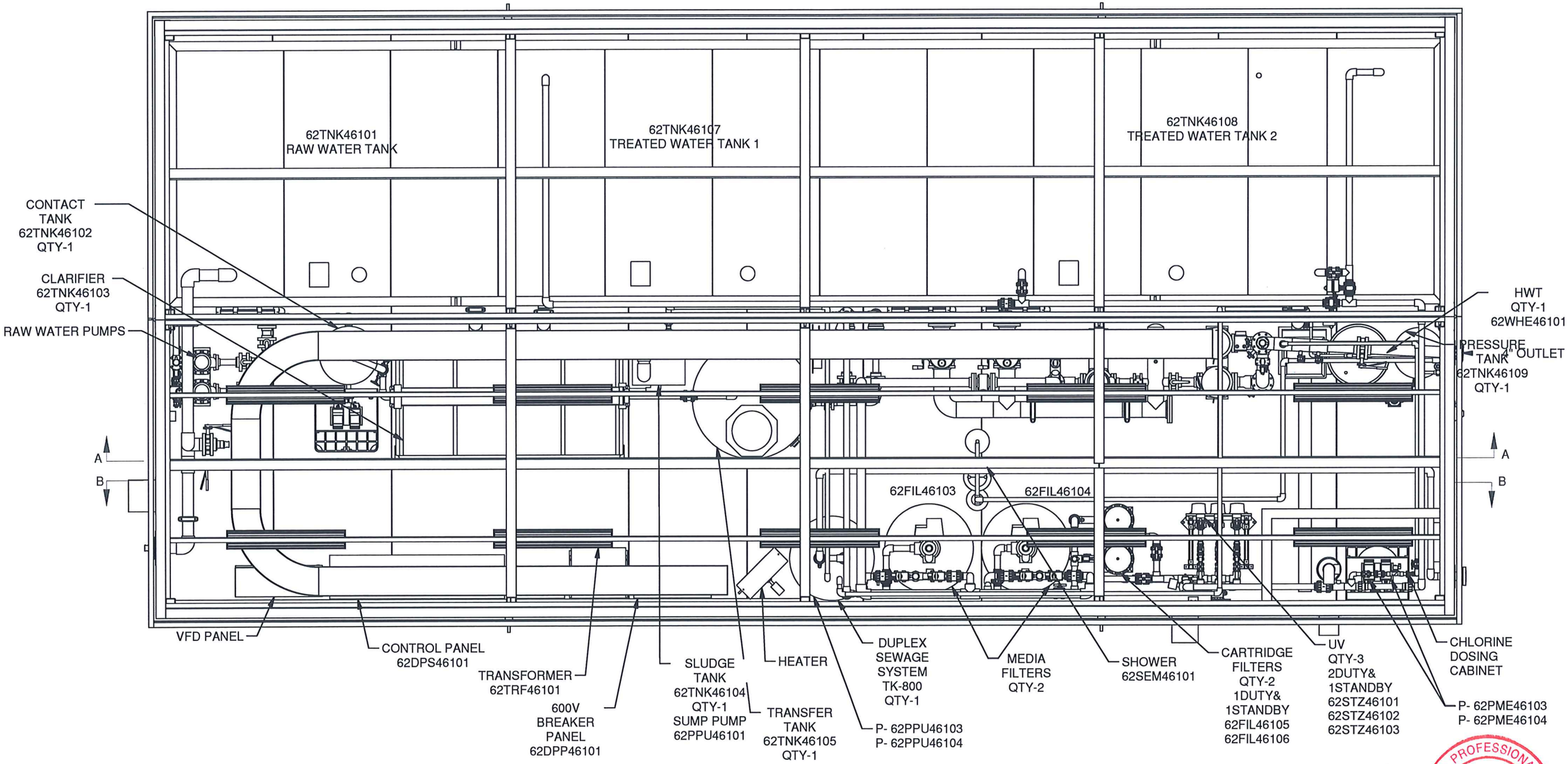

PLAN VIEW

REGISTERED PROFESSIONAL ENGINEER
H. JI
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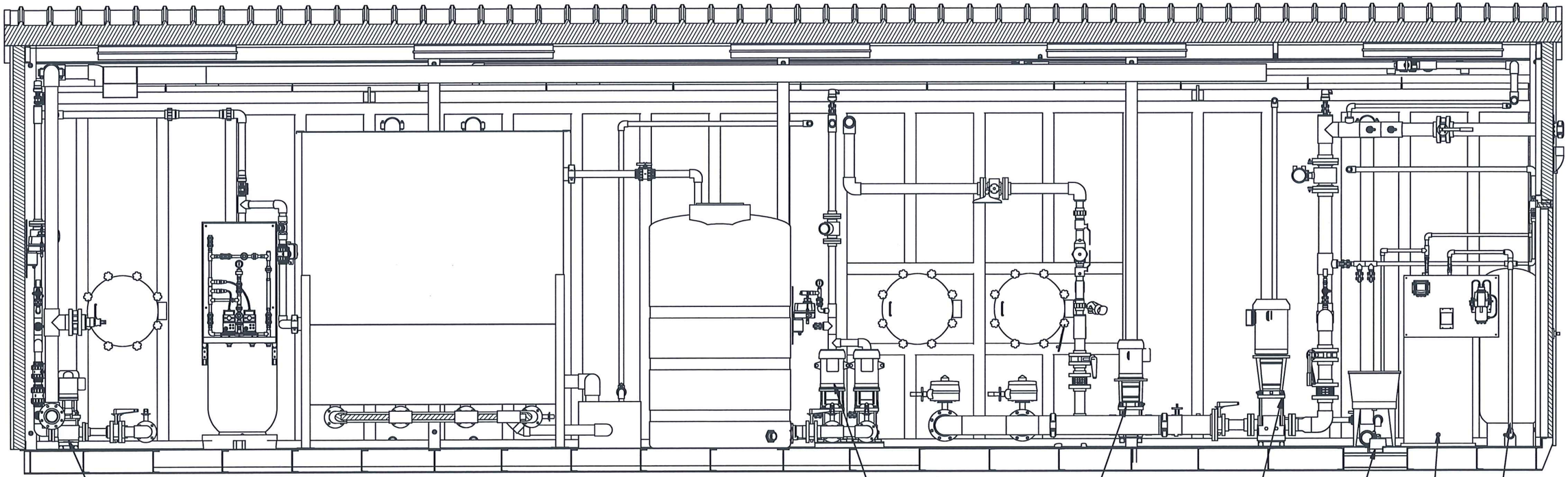

SECTION A-A

REGISTERED PROFESSIONAL ENGINEER
H. Jl
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Mayo 7, 2026

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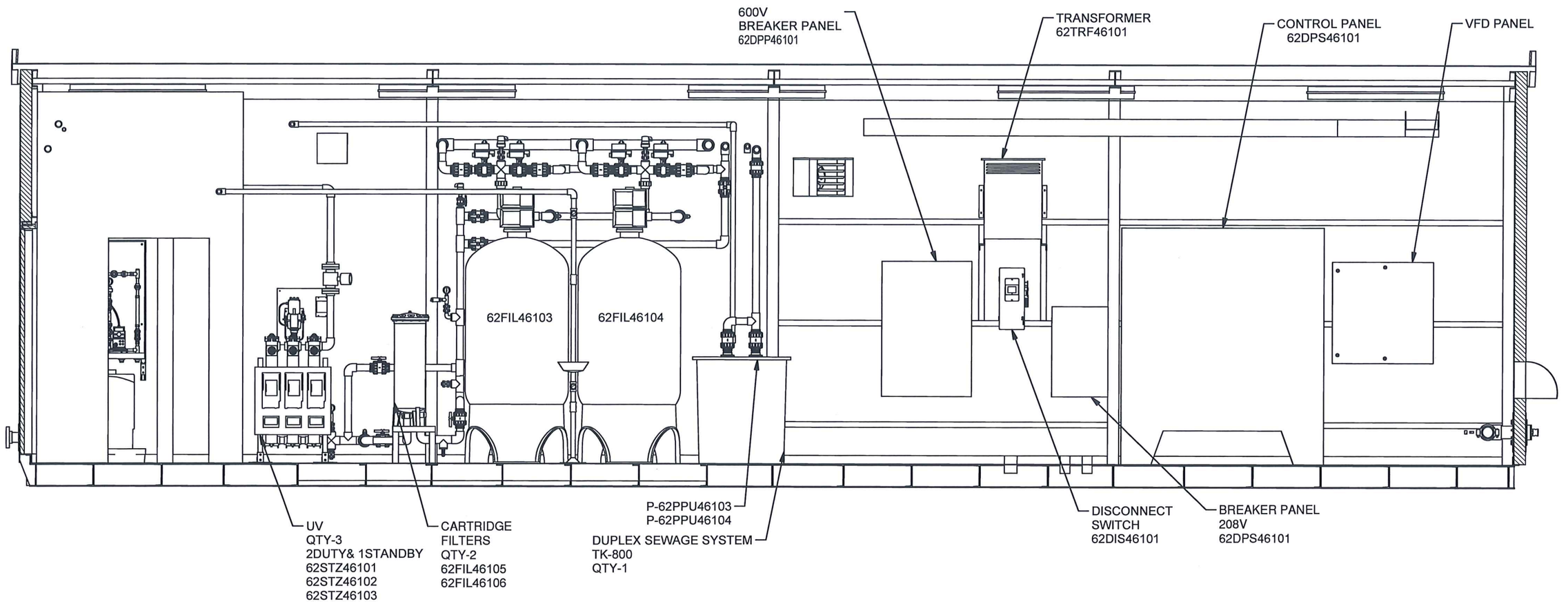
Size: ANSI B (11 x 17)
U.N.O. ft-in [mm]
Project: HOPE BAY PWTP 6209-S-291-002
Sheet 5 of 6
Projection
Drawing #: 4078-G-100-GA
Rev 01



SECTION B-B

REGISTERED PROFESSIONAL ENGINEER
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May 07, 2026

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00	2025-05-20	PM	AJ	CA	ISSUED FOR CONSTRUCTION

Client: AGNICO EAGLE

Title: GENERAL ARRANGEMENT DRAWING
Project: HOPE BAY PWTP 6209-S-291-002
Drawing #: 4078-G-100-GA

Size: ANSI B (11 x 17)
U.N.O.: ft-in [mm]
Sheet: 6 of 6
Projection:
Rev: 01

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DRAWING NO. 62-DOR-461-210-000-003

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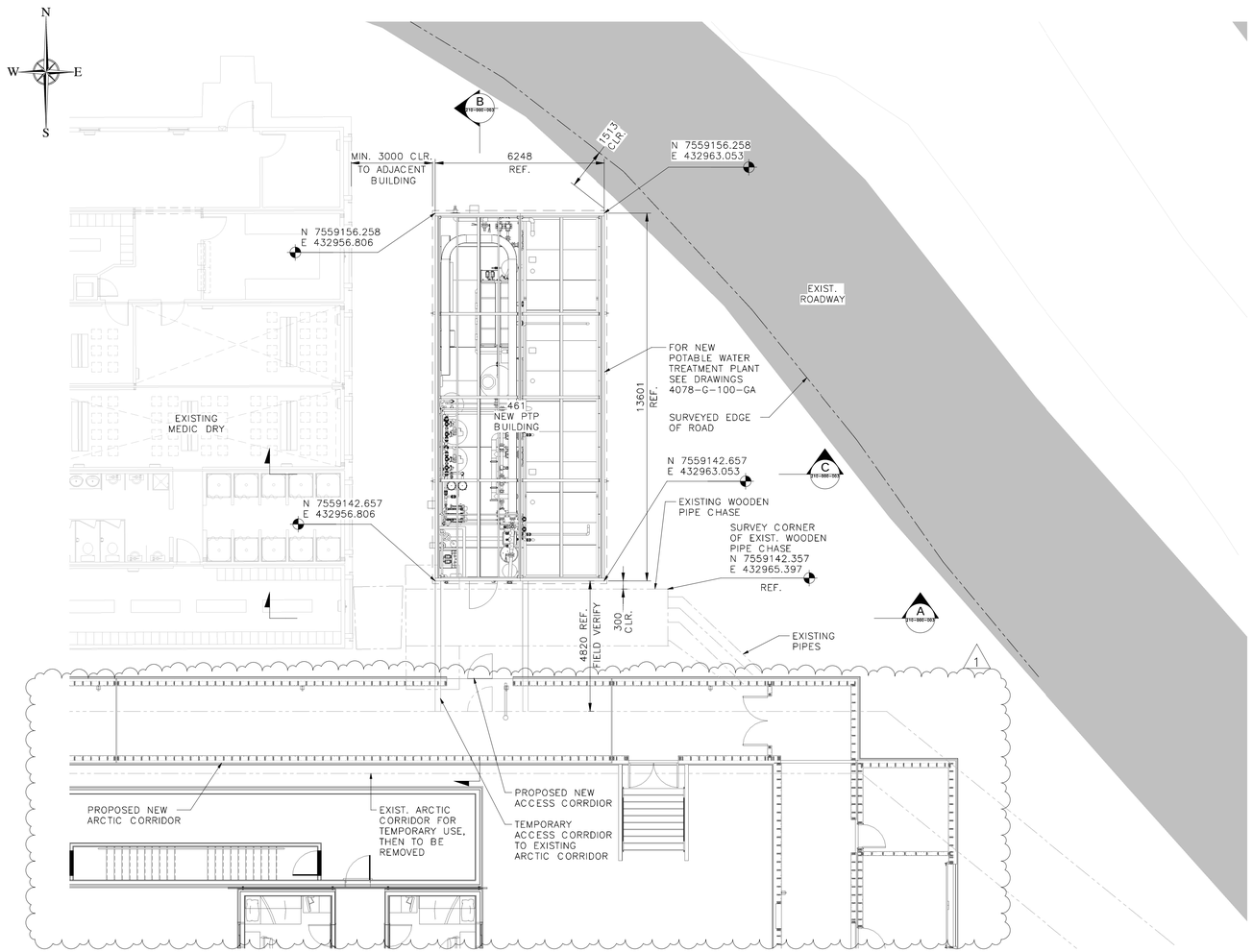
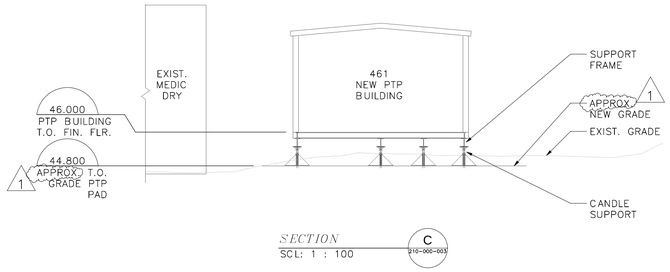


PLAN – DORIS PTP INSTALLATION
SCL: 1 : 100
NOTE: BUILDING COORDINATES TAKEN AT EXTERIOR CORNERS OF WALLS



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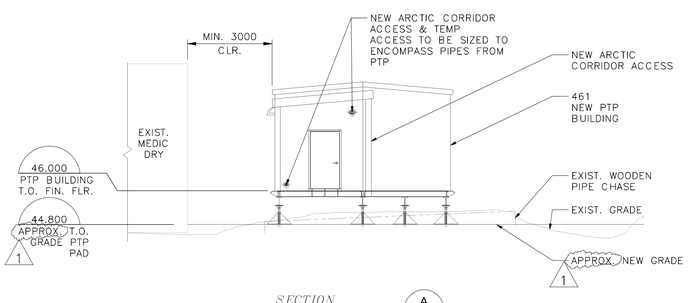

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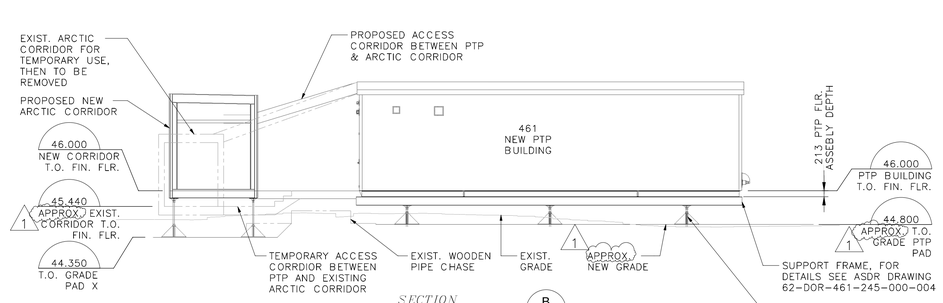
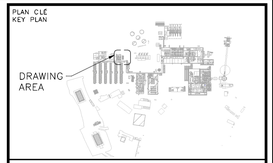


SECTION B 210-000-003
SCL: 1 : 100

TEL QUE CONSTRUIT
AS BUILT
AGNICO EAGLE
DATE : 2026-05-15

PLAN CLÉ
KEY PLAN



WSP Canada Inc.
1269 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-6700 | FAX: 807 623-4491 | WWW.WSP.COM
Ref. C.A0047291.7022

NOTES GÉNÉRALES / GENERAL NOTES

NOTES:

1. THE PURPOSE OF THIS DRAWING IS TO DOCUMENT THE LOCATION FOR PTP BUILDING INSTALLATION. OTHER BUILDINGS SHOWN ARE FOR ILLUSTRATION ONLY.
2. DIMENSIONS ON THIS DRAWING TO BE FIELD VERIFIED PRIOR TO INSTALLATION.
3. DIMENSIONS ARE SHOWN IN mm, U.N.O.
4. COORDINATES AND ELEVATIONS ARE IN METERS, U.N.O.
5. COORDINATES ARE REFERENCED TO THE EXTERIOR CORNERS OF THE NEW STRUCTURE, U.N.O.
6. ALL COORDINATES ARE BASED OFF OF THE SURVEYED COORDINATES PROVIDED BY AEM.
7. VERIFY THE SURVEYED COORDINATES SHOWN ON THE DRAWING PRIOR TO INSTALLATION. NOTIFY THE EOR OF ANY DISCREPANCY.
8. SEE 62-DOR-400-210-000-002 FOR SITE WORK POINT LOCATIONS.

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
HOPE BAY PTP GA	4078-G-100-GA
ASDR PTP SUPPORT FRAME	62-DOR-461-245-000-004
SNC LAVALIN SUPPORT CANDLE	65-444-245-006

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2026-05-15	AS BUILT	JAR	NKV	
0	2025-09-11	ISSUED FOR CONSTRUCTION	ALB	NKV	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
210 – GENERAL ARRANGEMENT
1 PLAN VIEW
PTP BUILDING
BUILDING INSTALLATION LAYOUT

DESSINÉ PAR DRAWN BY	A. BOWER	DATE 2025-08-12
REVU PAR REVIEWED BY	C. KUKKEE	2025-08-12
VÉRIFIÉ PAR VERIFIED BY	N. VISSER	2025-08-12
ÉCHELLE SCALE	INDICATED	DATE 2025-08-12

NO. DESSIN DRAWING NO.
62-DOR-461-210-000-003

NO. PROJET PROJECT NO.	REVISION	FEUILLE/SHT
6212	1	1 / 1

AE-CART-ARCH D

Autodesk Docs://AEM – Hope Bay Surface Infra/003DM-DOR-400-100-001.rvt

62-DOR-461-210-000-003_R1.DWG

NO. DESSIN
DRAWING NO. 62-DOR-461-270-000-002

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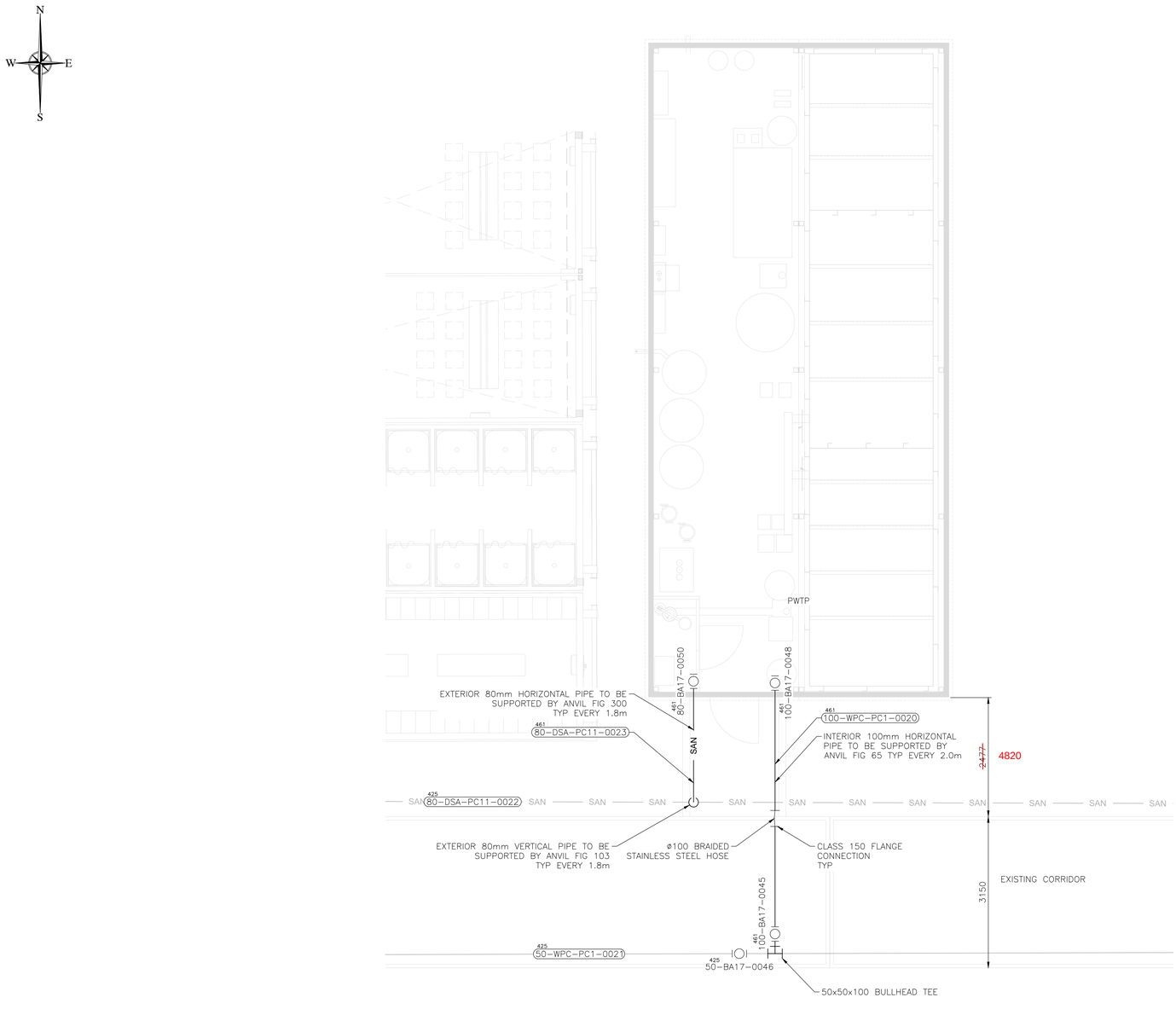

PLAN – DORIS POTABLE WATER TREATMENT PLANT SERVICE CONNECTION
SCL: 1:50

PLAN CLÉ
KEY PLAN

WSP Canada Inc.
1269 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-6700 | FAX: 807 623-4491 | WWW.WSP.COM

CA0047291.7022

NOTES GÉNÉRALES / GENERAL NOTES

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE
DATE : 03/07/2025

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
DORIS MAIN CAMP COMPLEX DORMITORY	62-DOR-425-210-000-001

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
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–	–	–	–	–	–
0	2025-07-03	ISSUED FOR CONSTRUCTION	JDK	SDL	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
270 – PIPING
PLAN AND SECTION
DORIS POTABLE WATER TREATMENT PLANT
PIPING DETAILS

DESSINÉ PAR / DRAWN BY	J. KAUKINEN	DATE 2025-07-03
VERIFIÉ PAR / CHECKED BY	S. GAMOR	2025-07-03
APPROUVÉ PAR / APPROVED BY	S. LINTUNEN, P. Eng	2025-07-03
ÉCHELLE / SCALE	INDICATED	DATE 2025-05-15

NO. DESSIN / DRAWING NO.
62-DOR-461-270-000-002

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6209	0	1 / 1

AE-CART-ARCH D

C:_AdskDocs\ACCDocs\WSP Canada projects (AMER)\AEM – Hope Bay Surface Infra\Project Files\03.0 WIP\N_PROC_P_PIP\Hope Bay_Surface Infra\Orthos\DWGs\62-DOR-461-270-000-002.dwg ; print 2025-07-03 4:41:05 PM

FILE NO.: 62-DOR-461-270-000-002.dwg

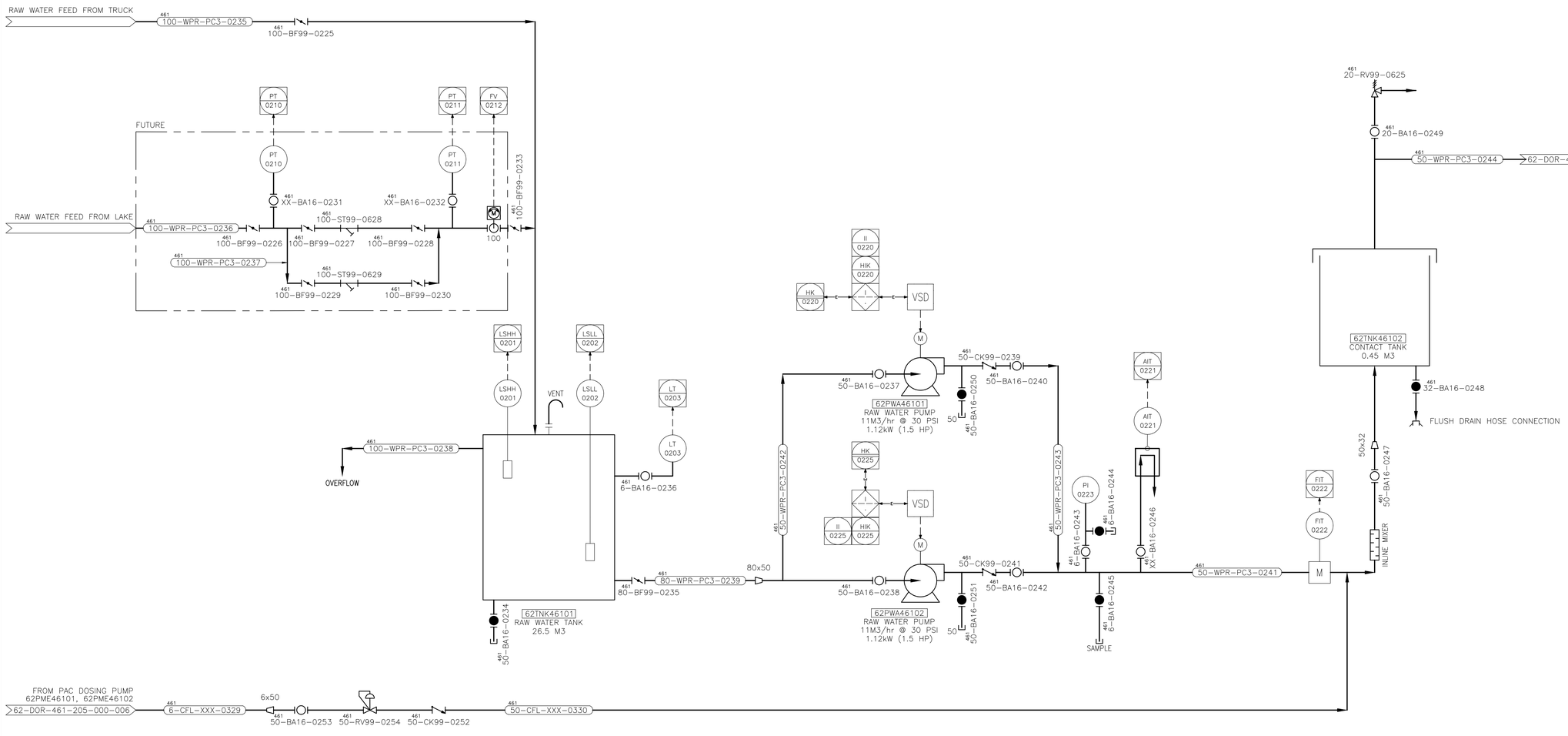
Appendix B

NO. DESSIN
DRAWING NO. 62-DOR-461-205-000-002

FORMAT ARCHD

TEL QUE CONSTRUIT
AS BUILT
AGNICO EAGLE
DATE : 2026-05-08

TT 0230 — PROCESS ROOM TEMPERATURE
YA 0236 — POWER OK (FAULT-1)
HSS 0233 — EMERGENCY STOP FOR CONTROL PANEL
YS 0234 — ALARM RESET PB CONTROL PANEL
YS 0235 — FILTRATION ENABLE SW CONTROL PANEL
TT 0230 — CRITICAL ALARM OUTPUT



PLAN CLÉ
KEY PLAN

WSP Canada Inc.
1269 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-6700 | FAX: 807 623-4491 | WWW.WSP.COM

CA0047291-7022

NOTES GÉNÉRALES / GENERAL NOTES

1. CONNECTOR NUMBERS TO BE PROVIDED BY AEM's HT NETWORK DRAWING

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
SURFACE FACILITIES LEGEND – 1	62-400-205-001
SURFACE FACILITIES LEGEND – 2	62-400-205-002

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	VER.	CLIENT
1	2026-05-08	ISSUED AS BUILT	MMS	RSS	
0	2025-12-15	ISSUED FOR CONSTRUCTION	MMS	LR	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
205 – PIPING & INSTRUMENTATION DIAGRAM
RAW WATER PUMPING & PAC DOSING SYSTEM
DORIS POTABLE WATER TREATMENT PLANT

DESSINÉ PAR / DRAWN BY	V. ABLAO	DATE 2025-04-24
REVU PAR / REVIEWED BY	M. FENG	2025-04-24
VÉRIFIÉ PAR / VERIFIED BY	L. REN	2025-04-24
ÉCHELLE / SCALE	N.T.S.	DATE 2025-04-24

NO. DESSIN / DRAWING NO. 62-DOR-461-205-000-002

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
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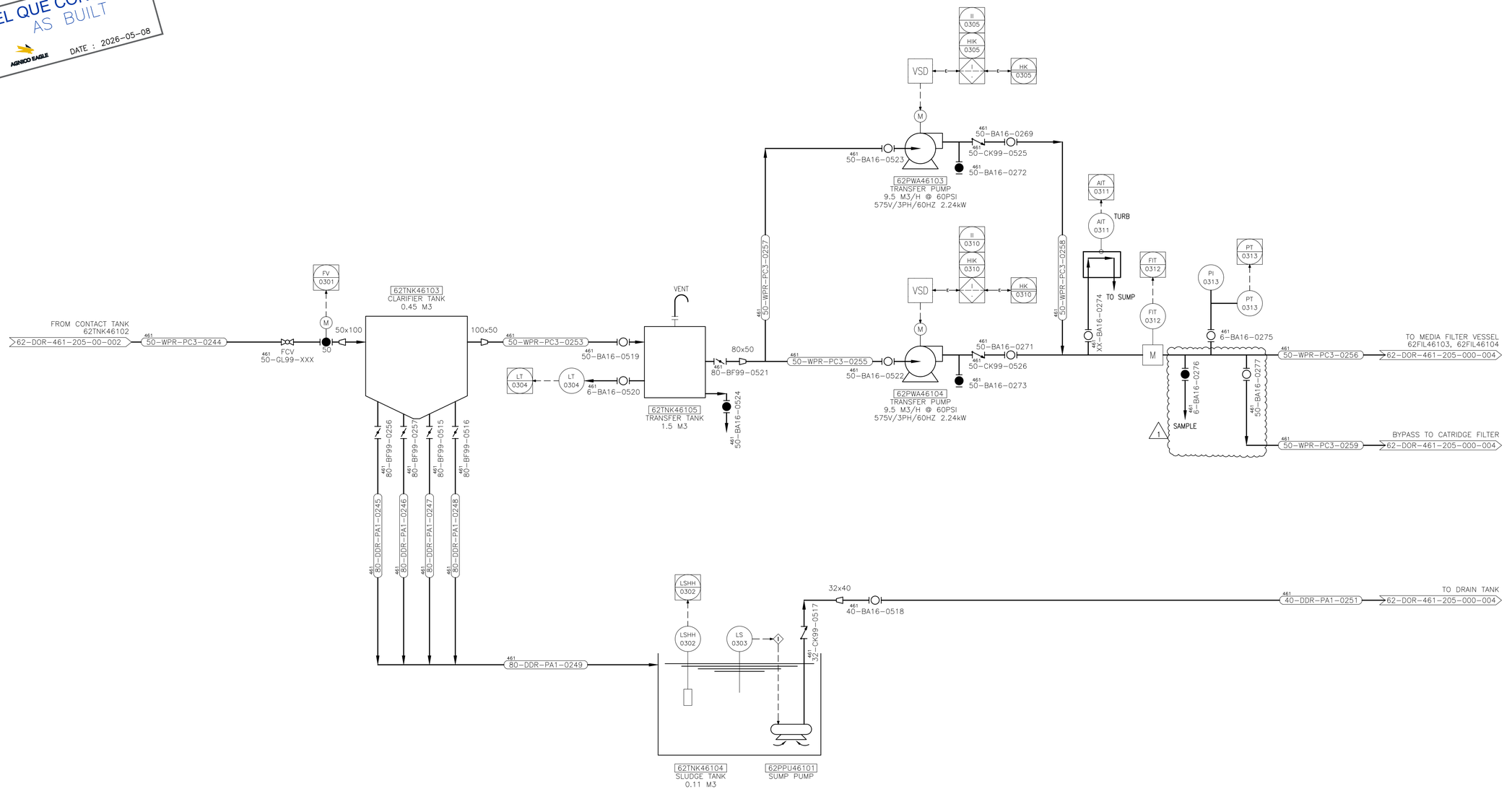
AGNICO EAGLE DATE : 2026-05-08



PLAN CLÉ
KEY PLAN

WSP Canada Inc.
1269 PREMIER WAY
THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-6700 | FAX: 807 623-4491 | WWW.WSP.COM

CA0047291-7022

NOTES GÉNÉRALES / GENERAL NOTES

1. CONNECTOR NUMBERS TO BE PROVIDED BY AEM's HT NETWORK DRAWING

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
SURFACE FACILITIES LEGEND – 1	62-400-205-001
SURFACE FACILITIES LEGEND – 2	62-400-205-002

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	VER.	CLIENT
1	2026-05-08	ISSUED AS BUILT	MMS	RSS	
0	2025-12-15	ISSUED FOR CONSTRUCTION	MMS	LR	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
205 – PIPING & INSTRUMENTATION DIAGRAM
CLARIFIER AND TRANSFER PUMPS
DORIS POTABLE WATER TREATMENT PLANT

DESSINÉ PAR / DRAWN BY	V. ABLAO	DATE 2025-07-18
REVU PAR / REVIEWED BY	M. FENG	2025-07-18
VÉRIFIÉ PAR / VERIFIED BY	L. REN	2025-07-18
ÉCHELLE / SCALE	N.T.S.	DATE 2025-04-24

NO. DESSIN / DRAWING NO.
62-DOR-461-205-000-003

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
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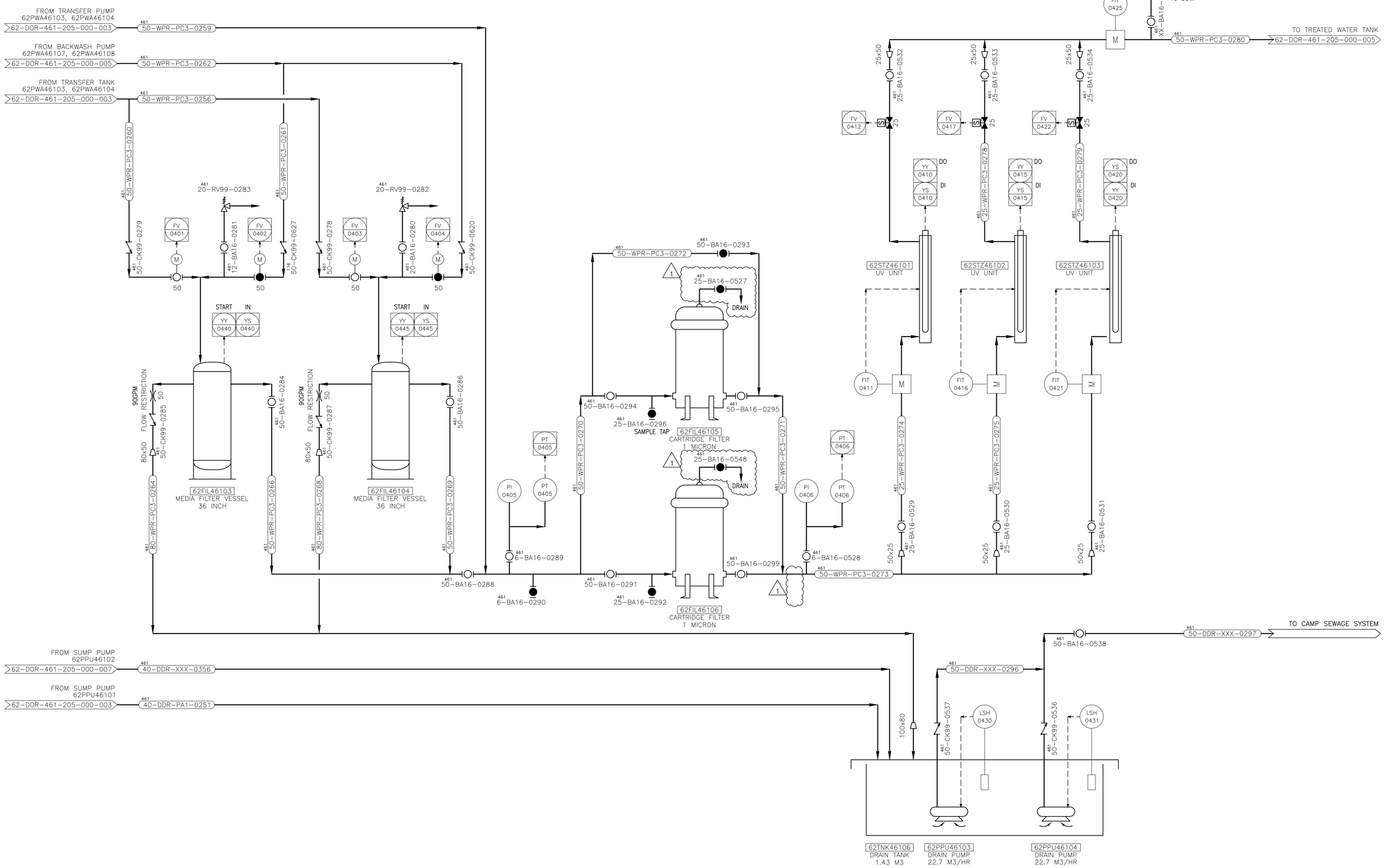

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DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

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SURFACE FACILITIES LEGEND – 2	62-400-205-002

AGNICO EAGLE

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0	2025-12-15	ISSUED FOR CONSTRUCTION	MMS	LR	

REVISIONS

TITRE / TITLE

AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
205 – PIPING & INSTRUMENTATION DIAGRAM
MEDIA FILTERS, UV AND TRANSFER PUMPS
DORIS POTABLE WATER TREATMENT PLANT

DESSINÉ PAR / DRAWN BY	V. ABLAO	DATE 2025-04-24
REVU PAR / REVIEWED BY	M. FENG	2025-04-24
VÉRIFIÉ PAR / VERIFIED BY	L. REN	2025-04-24
ÉCHELLE / SCALE	N.T.S.	DATE 2025-04-24

NO. DESSIN / DRAWING NO.
62-DOR-461-205-000-004

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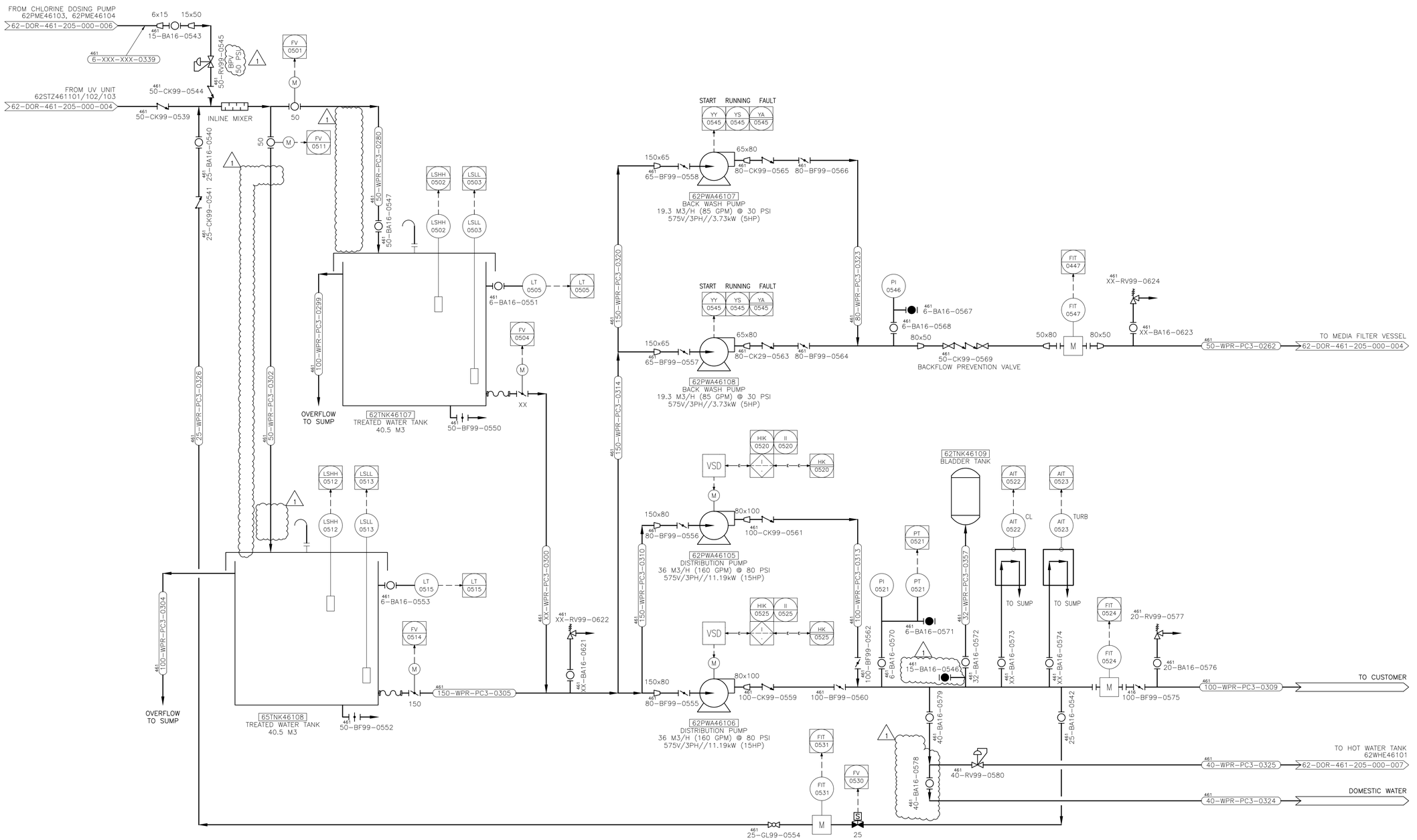

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THUNDER BAY (ONTARIO) CANADA P7B 0A3
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NOTES GÉNÉRALES / GENERAL NOTES

1. CONNECTOR NUMBERS TO BE PROVIDED BY AEM's HT NETWORK DRAWING

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SURFACE FACILITIES LEGEND – 2	62-400-205-002

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REV.	DATE	DESCRIPTION	PAR/BY	VER.	CLIENT
1	2026-05-08	ISSUED AS BUILT	MMS	RSS	
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REVISIONS

TITRE / TITLE
AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
205 – PIPING & INSTRUMENTATION DIAGRAM
MEDIA FILTER BACKWASH, TREATED WATER
STORAGE & DISTRIBUTION SYSTEM
DORIS POTABLE WATER TREATMENT PLANT

DESSINÉ PAR / DRAWN BY	V. ABLAO	DATE 2025-04-24
REVU PAR / REVIEWED BY	M. FENG	2025-04-24
VÉRIFIÉ PAR / VERIFIED BY	L. REN	2025-04-24
ÉCHELLE / SCALE	N.T.S.	DATE 2025-04-24

NO. DESSIN / DRAWING NO.
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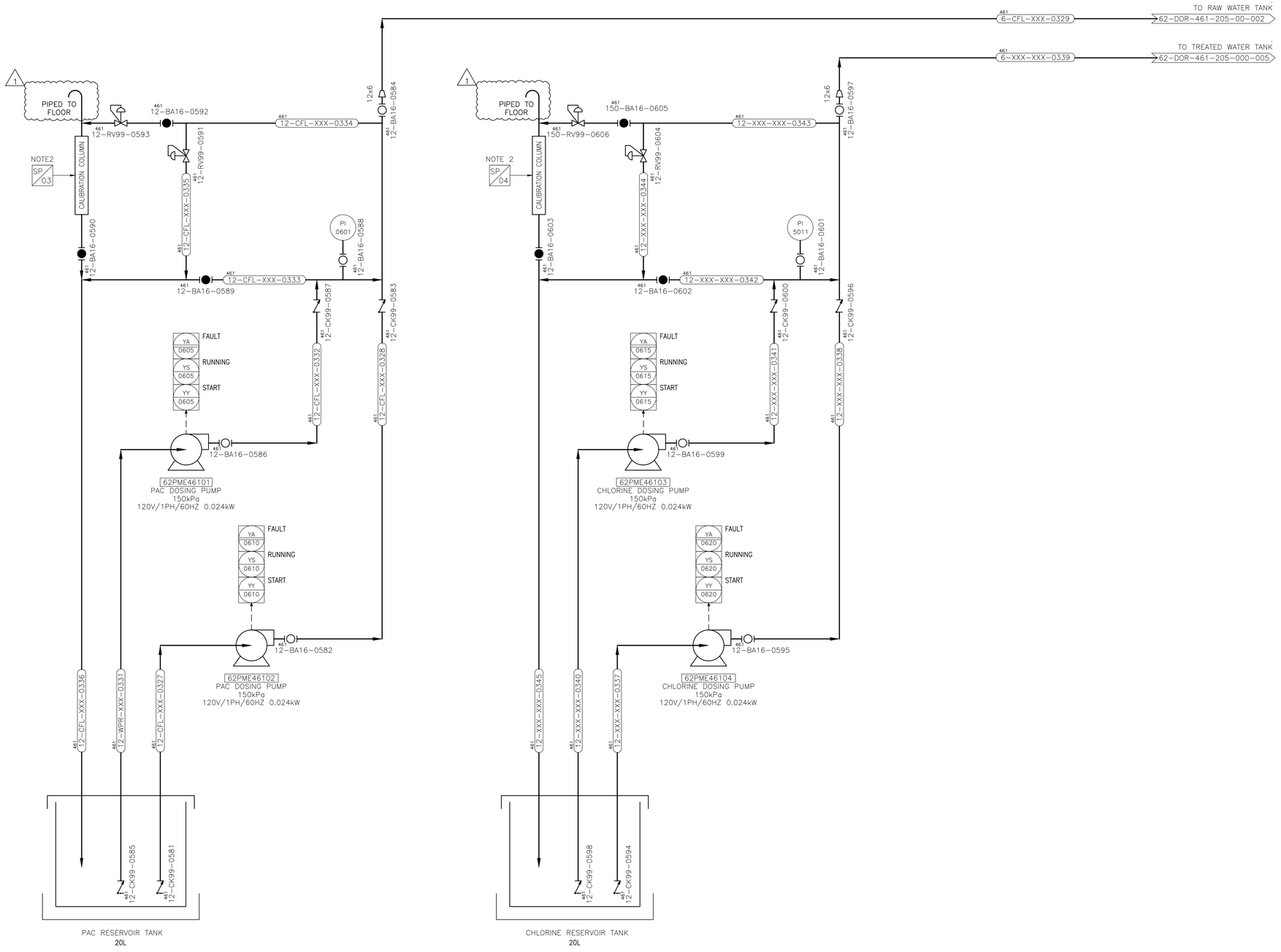
DATE : 2026-05-08



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NOTES GÉNÉRALES / GENERAL NOTES

1. CONNECTOR NUMBERS TO BE PROVIDED BY AEM's HT NETWORK DRAWING
2. SP-03 AND SP-04 ARE CALIBRATION COLUMNS.

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
SURFACE FACILITIES LEGEND – 1	62-400-205-001
SURFACE FACILITIES LEGEND – 2	62-400-205-002

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	VER.	CLIENT
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0	2025-12-15	ISSUED FOR CONSTRUCTION	MMS	LR	

REVISIONS

TITRE / TITLE

AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
205 – PIPING & INSTRUMENTATION DIAGRAM
PAC AND CHLORINE DOSING SYSTEMS
DORIS POTABLE WATER TREATMENT PLANT

DESSINÉ PAR / DRAWN BY	V. ABLAO	DATE 2025-04-24
REVU PAR / REVIEWED BY	M. FENG	2025-04-24
VÉRIFIÉ PAR / VERIFIED BY	L. REN	2025-04-24
ÉCHELLE / SCALE	N.T.S.	DATE 2025-04-24

NO. DESSIN / DRAWING NO. 62-DOR-461-205-000-006

NO. PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
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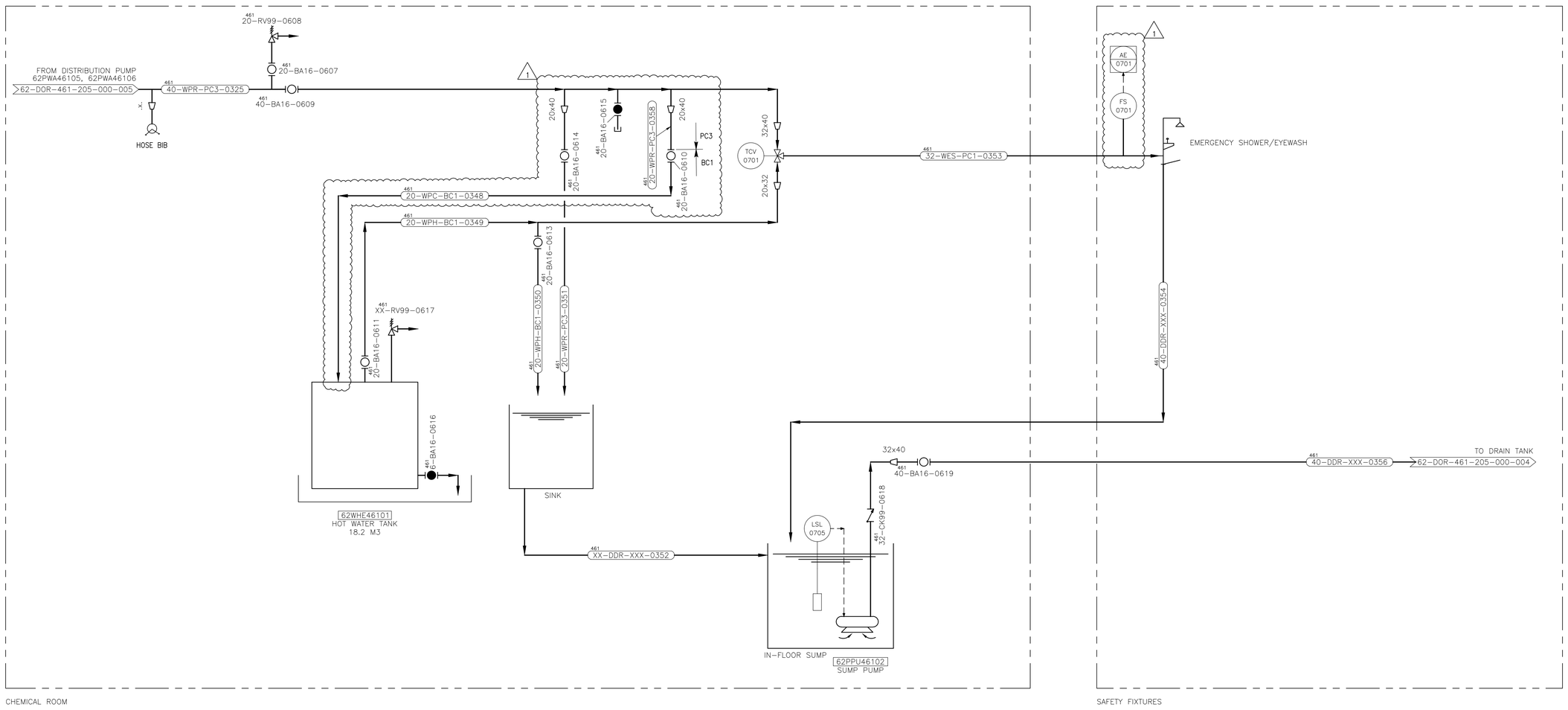

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THUNDER BAY (ONTARIO) CANADA P7B 0A3
TEL: 807 625-6700 | FAX: 807 623-4491 | WWW.WSP.COM

CA0047291-7022

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DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

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SURFACE FACILITIES LEGEND – 2	62-400-205-002

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0	2025-12-15	ISSUED FOR CONSTRUCTION	MMS	LR	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – HOPE BAY DIVISION
461 – POTABLE WATER TREATMENT PLANT
205 – PIPING & INSTRUMENTATION DIAGRAM
HOT WATER SUPPLY, SUMP, EMERGENCY SHOWER & EYEWASH
DORIS POTABLE WATER TREATMENT PLANT

DESSINÉ PAR / DRAWN BY	V. ABLAO	DATE 2025-07-18
REVU PAR / REVIEWED BY	M. FENG	2025-07-18
VÉRIFIÉ PAR / VERIFIED BY	L. REN	2025-07-18
ÉCHELLE / SCALE	N.T.S.	DATE 2025-04-24

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Appendix C

Foundation Preparation

Module Installation

Inside the PTP

Chlorine Cabinet

Filtration and Storage

Clarifier

Building installation completed

Appendix D

Safety Data Sheet

Section 01 Identification

Product Identifier	CTI 4900 Series CTI 4900 Coagulant NSF® - 60 CTI 4910 Coagulant NSF® - 60 CTI 4912 Coagulant NSF® - 60
Other Means of Identification	Not available
Product Use and Restrictions on Use	Liquid coagulant designed for potable or wastewater treatment applications This product is NSF certified for use in drinking water, see section 15 and the NSF website for further information.
Initial Supplier Identifier	ClearTech Industries Inc. 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7 Phone: 800.387.7503 Fax: 888.281.8109 www.cleartech.ca
Prepared By	ClearTech Industries Inc. technical writer
24-Hour Emergency Phone	306.664.2522

Section 02 Hazard Identification

Physical Hazards

This product does not qualify for any physical hazard class under WHMIS 2015

Health Hazards

Serious eye damage / eye irritation	Category 2

Signal Word

Warning

Hazard Statements

H319 Causes serious eye irritation.

Pictograms

Precautionary Statements

Prevention

P264 Wash affected body parts thoroughly after handling.

P280 Wear protective gloveseye protection, face protection.

Response

P305 P351 P338 P337 P313 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention.

Hazards Not Otherwise Classified

Not available

Supplemental Information

Not available

Section 03 Composition / Information on Ingredients

Hazardous Ingredients:

Chemical name	Common name(s)	CAS number	Concentration (w/w%)
Aluminum chloride, basic	ACH; Aluminum chlorohydrate	1327-41-9	30-60%*

*Exact concentration withheld as a trade secret.

Section 04 First-Aid Measures

Description of necessary first-aid measures

Inhalation Get medical advice / attention if you feel unwell or are concerned.

Ingestion Get medical advice / attention if you feel unwell or are concerned.

Skin contact Rinse skin with lukewarm, gently flowing water / shower for 5 minutes or until product is removed. If skin irritation occurs or if you feel unwell: Get medical advice / attention.

Eye contact Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for 15 to 20 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. If eye irritation persists: Get medical advice / attention.

Most important symptoms and effects, both acute and delayed

Inhalation May cause respiratory irritation.

Ingestion May cause discomfort or nausea.

Skin contact Not available

Eye contact Causes serious eye irritation.

Further information For further information see Section 11 Toxicological Information.

Section 05 Fire Fighting Measures

Suitable extinguishing media Extinguish fire using extinguishing agents suitable for the surrounding fire.

Unsuitable extinguishing media Water jets are not recommended in fires involving chemicals.

Specific hazards arising from the chemical In the event of a fire oxides of aluminum and hydrogen chloride may be released.

Special protective equipment for fire-fighters Wear NIOSH-approved self-contained breathing apparatus and chemical-protective clothing.

Section 06 Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Wear appropriate personal protective equipment (See Section 08 Exposure Controls and Personal Protection). Stay upwind, ventilate area.
Environmental Precautions	Prevent material from entering waterways, sewers or confined spaces. Notify local health and wildlife officials. Notify operators of nearby water intakes.
Methods and Materials for Containment and Cleaning Up	SMALL SPILLS: Stop or reduce leak if safe to do so. Clean up spill with non-reactive absorbent and place in suitable, covered, labeled containers. Flush area with water. Contaminated absorbent material may pose the same hazards as the spilled product. LARGE SPILLS: Contact fire and emergency services and supplier for advice.

Section 07 Handling and Storage

Precautions for Safe Handling	Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure. Inspect containers for damage or leaks before handling. If the original label is damaged or missing replace with a workplace label. Have suitable emergency equipment for fires, spills and leaks readily available.
Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, away from heat sources and incompatible materials. Always store in original labeled container. Keep containers tightly closed when not in use and when empty. Empty containers may contain hazardous residues. Protect label and keep it visible.
Incompatibilities	Strong acids, such as sulphuric, nitric, and hydrochloric. Strong bases, such as potassium hydroxide, and sodium hydroxide. Strong oxidizing agents, such as oxygen, hydrogen peroxide, hypochlorites and permanganates.

Section 08 Exposure Controls and Personal Protection

Exposure limits

There are no known exposure limits for this product.

Engineering controls

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	An eye wash bottle or eye wash station should be available, tested, and be in close proximity to the product being handled in accordance with provincial regulations.

Protective equipment

The following are recommendations only. It is the responsibility of the employer / user to conduct a hazard assessment of the process in which this product being used and determine the proper engineering controls and PPE for their process. Additional regulatory and safety information should be sought from local authorities and, if needed, a professional industrial hygienist.

Eye and face protection	Where there is potential eye or face exposure, tightly fitting chemical goggles are recommended. Contact lenses are not recommended; they may contribute to severe eye injury.
Hand and body protection	Where handling this product it is recommended that skin contact is avoided.
Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment.

Thermal hazards	Not available

Section 09 Physical and Chemical Properties

Appearance

Physical state	Liquid
Colour	Pale yellow
Odour	Odourless
Odour threshold	Not applicable

Property

pH	3.0-4.5
Melting point / freezing point	-15 °C to -1 °C
Initial boiling point and boiling range	Not available
Flash point	Not applicable
Evaporation rate	Not available
Flammability	Not applicable
Upper flammable limit	Not available
Lower flammable limit	Not available
Vapour pressure	Not available
Vapour density	Not available
Relative density	Not applicable
Solubility	Soluble in water
Partition coefficient: n-octanol/water	Not available
Auto-ignition temperature	Not applicable
Decomposition temperature	Not available
Viscosity	Not available
Specific gravity	1.25-1.35 g/ml
Particle characteristics	Not applicable

Section 10 Stability and Reactivity

Reactivity	Not available
Stability	This product is stable if stored according to the recommendations in Section 07.
Possibility of hazardous reactions	Hazardous polymerization is not known to occur.
Conditions to avoid	Avoid contact with incompatible materials. Do not freeze.
Incompatible materials	Strong acids, such as sulphuric, nitric, and hydrochloric. Strong bases, such as potassium hydroxide, and sodium hydroxide. Strong oxidizing agents, such as oxygen, hydrogen peroxide, hypochlorites and permanganates.
Hazardous decomposition products	Thermal decomposition may produce oxides of aluminum and hydrogen chloride.

Section 11 Toxicological Information

Acute Toxicity (LD50 / LC50 values)

Component	Route	Species	Value	Exposure time
Aluminum chloride, basic	Oral	Rat	>2000 mg/kg bw	
	Dermal	Rat	>2000 mg/kg bw	

Toxic Health Effect Summary

Chemical characteristics	Aluminum chlorhydrate compounds are not redily absorbed by biological processes as they precipitate at neutral pH.
Skin	Not available
Ingestion	May cause discomfort or nausea.
Inhalation	May cause respiratory irritation.
Eye contact	Causes serious eye irritation.
Sensitization	This product and its components at their listed concentration have no known sensitizing effects.
Mutagenicity	This product and its components at their listed concentration have no known mutagenic effects.
Carcinogenicity	This product and its components at their listed concentration have no known carcinogenic effects.
Reproductive toxicity	This product and its components at their listed concentration have no known reproductive effects.
Specific organ toxicity	This product and its components at their listed concentration have no known effects on specific organs.
Aspiration hazard	Not available
Synergistic materials	Not available

Section 12 Ecological Information

Ecotoxicity

there is no available toxicity data for this product.

Percentage of product with unknown environmental toxicity: 30-60%

Biodegradability	The domestic substance list categorizes aluminum chloride, basic as persistent.
Bioaccumulation	The domestic substance list categorizes aluminum chloride, basic as non-bioaccumulative.
Mobility	This product is water soluble, but is expected to adsorb to soil and is not expected to contaminate ground water.
Other adverse effects	The domestic substance list categorizes aluminum chloride, basic as inherently toxic to aquatic organisms.

Section 13 Disposal Considerations

Waste From Residues / Unused Products	Dispose in accordance with all federal, provincial, and local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Do not remove label, follow label warnings even after the container is empty. Empty containers should be recycled or disposed of at an approved waste handling facility.

Section 14 Transport Information

UN number	This product does not meet the definition of dangerous goods per Part 2 of Transport of Dangerous Goods Regulations
UN proper shipping name and description	Not available
Transport hazard class(es)	Not available
Packing group	Not available
Excepted quantities	Not available
Environmental hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special precautions	No special precautions
Transport in bulk	ERAP index: not available MARPOL 73/78 and IBC Code: This product is not listed in Chapter 17 of the IBC Code.
Additional information	Secure containers (full or empty) during shipment and ensure all caps, valves, or closures are secured in the closed position.

TDG PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and published test data regarding the classification of this product are listed in the references at section 16 of this SDS.

Section 15 Regulatory Information.

NOTE: THE PRODUCT LISTED ON THIS SAFETY DATA SHEET HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN HAZARDOUS PRODUCTS REGULATIONS. THIS SAFETY DATA SHEET CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

All components of this product appear on the domestic substance list.

NSF Certification: These products are certified under NSF / ANSI Standard 60 for coagulation & flocculation at a maximum dosage of: CTI 4900: 250 mg/L, CTI 4910: 278 mg/L, CTI 4912: 100 mg/L. NSF product use restrictions based on requirements obtained from the NSF website; consult NSF website for current requirements.

Section 16 Other Information

Date of latest revision: March 08, 2024

Note: The responsibility to provide a safe workplace remains with the buyer / user. The buyer / user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the buyer / user to comply with all applicable laws and regulations regarding handling, using, reselling and shipping this product.

Attention: Receiver of the chemical goods / SDS coordinator

As part of our commitment to the RDC Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service center.

References:

1) *NIOSH Pocket Guide to Chemical Hazards;* U.S. Department of Health and Human Services, https://www.cdc.gov/niosh/npg/default.html
2) *WorkSafe BC E-Limit;* Workers' Compensation Foard of British Columbia, https://elimit.online.worksafebc.com/
3) *ECHA - Registered Substance Dossier;* European Chemicals Agency, https://echa.europa.eu/registration-dossier/-/registered-dossier/16009
4) *Transportation of Dangerous Goods Regulations;* Transport Canada, https://laws-lois.justice.gc.ca/eng/regulations/SOR-2001-286/index.html
5) Globally Harmonized System of Classification and Labeling of Chemicals (GHS) *Seventh revised edition*
6) International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) 2007 Edition
7) The ACS Style Guide

Safety Data Sheet

Section 01 Identification

Product Identifier

Sodium Hypochlorite 12-16%

Hypochlor-12, PCP
Hypochlor 12, NSF® - 60
Hypochlor 15, NSF® - 60
Hypochlor 16, NSF® - 60
Sodium Hypochlorite 12%, NSF® - 60
Sodium Hypochlorite 12.5% With 1% Alkalinity
Sodium Hypochlorite 15%, NSF® - 60
Sodium Hypochlorite 16%, NSF® - 60

Other Means of Identification

Sodium hypochlorite, Bleach, Chlorox, Hypochlorous acid, sodium salt, Javel water, liquid bleach, CAS: 7681-52-9

Product Use and Restrictions on Use

Bleaching agent, source of available chlorine, deodorizer. This product is NSF certified for use in drinking water, see section 15 and the NSF website for further information.

Initial Supplier Identifier

ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon, SK. Canada
S7K 1V7

Phone: 800.387.7503
Fax: 888.281.8109
www.cleartech.ca

Prepared By

ClearTech Industries Inc. technical writer

24-Hour Emergency Phone

306.664.2522

Section 02 Hazard Identification

Physical Hazards

Corrosive to metals — Category 1

Health Hazards

Skin corrosion / irritation — Category 1B

Serious eye damage / eye irritation — Category 1

Signal Word

Danger

Hazard Statements

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Pictograms

Precautionary Statements

Prevention

P234 Keep only in original packaging.

P260 Do not breathe vapours, fumes, or mists.

P264 Wash affected body parts thoroughly after handling.

P273 Avoid release to the environment.

P280 Wear protective gloves, protective clothing, eye protection, face protection.

Response

P301 P330 P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 P361 P353 P363 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse.

P304 P340 P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor.

P305 P351 P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P390 Absorb spillage to prevent material damage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents / container in accordance with all federal, provincial and / or local regulations including the Canadian Environmental Protection Act.

Hazards Not Otherwise Classified

Contact with acids liberates toxic gas.

Supplemental Information

Not available

Section 03 Composition / Information on Ingredients

Hazardous Ingredients:

Chemical name	Common name(s)	CAS number	Concentration (w/w%)
Hypochlorous acid, sodium salt	Sodium hypochlorite	7681-52-9	10-16%

Section 04 First-Aid Measures

Description of necessary first-aid measures

Inhalation	Remove source of exposure or move person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor. If breathing has stopped, trained personnel should begin rescue breathing or if the heart has stopped, immediately start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth to mouth contact by using a barrier device. May release toxic chlorine gas.
Ingestion	Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor. If vomiting occurs naturally, lie on your side, in the recovery position.
Skin contact	Avoid direct contact. Wear chemical protective clothing, if necessary. Take off immediately contaminated clothing, shoes and leather goods. Rinse skin with lukewarm, gently flowing water / shower for 30 minutes. Immediately call a POISON CENTER or doctor. Wash contaminated clothing before re-use, or discard.
Eye contact	Avoid direct contact. Wear chemical protective gloves, if necessary. Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for 30 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately call a POISON CENTER or doctor.

Most important symptoms and effects, both acute and delayed

Inhalation	Causes severe burns to the mouth and throat (mist). May release toxic and irritating chlorine gas.
Ingestion	Causes burns to the mouth and throat.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Further information	For further information see Section 11 Toxicological Information.

Section 05 Fire Fighting Measures

Suitable extinguishing media	Extinguish fire using extinguishing agents suitable for the surrounding fire.
Unsuitable extinguishing media	Do NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents), since an explosive compound can be formed. Water jets are not recommended in fires involving chemicals.
Specific hazards arising from the chemical	Explosive decomposition may occur under fire conditions and closed containers may rupture violently due to a rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time.
Special protective equipment for fire-fighters	Wear NIOSH-approved self-contained breathing apparatus and chemical-protective clothing.

Section 06 Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Wear appropriate personal protective equipment (See Section 08 Exposure Controls and Personal Protection). Stay upwind, ventilate area. Do not breathe vapours, fumes, or mists. Do not use material handling equipment with exposed metal surfaces. Sodium hypochlorite solutions release chlorine when in contact with acids or oxidizable materials, such as oganic material or most metals. Chlorine is a respiratory irritant, so respiratory protection is advised.
Environmental Precautions	Do NOT let this chemical enter the environment. Prevent material from entering waterways, sewers or confined spaces. Notify local health and wildlife officials. Notify operators of nearby water intakes.
Methods and Materials for Containment and Cleaning Up	SMALL SPILLS: Stop or reduce leak if safe to do so. Clean up spill with non-reactive absorbent and place in suitable, covered, labeled containers. Flush area with water. Contaminated absorbent material may pose the same hazards as the spilled product. Use vented containers to avoid pressure buildup. LARGE SPILLS: Contact fire and emergency services and supplier for advice.

Section 07 Handling and Storage

Precautions for Safe Handling

Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure. Prevent the release of vapours, fumes, or mists into the workplace air.

Inspect containers for damage or leaks before handling. If the original label is damaged or missing replace with a workplace label. Have suitable emergency equipment for fires, spills and leaks readily available.

Never return contaminated material to its original container.

Conditions for Safe Storage

Store in a cool, dry, well-ventilated area, away from heat sources and incompatible materials. Always store in original labeled container. Keep containers tightly closed when not in use and when empty. Empty containers may contain hazardous residues. Protect label and keep it visible. Do not transfer to metal containers. Sodium hypochlorite solutions may slowly give off oxygen during storage. Vent caps are required to prevent a build-up of pressure that could cause containers to burst.

Incompatibilities

Acids, such as sulphuric, nitric, hydrochloric, phosphoric, flurosilicic (HFSA), sulphonic, acetic, citric, oxalic, and formic.

Oxidizing agents, such as oxygen, hydrogen peroxide, sulphuric and nitric acids and permanganates.

Reducing agents, such as hydrogen, sodium borohydride, sulphur dioxide, thiosulphates, hydrazine, phosphites, carbon, and oxalic, formic and ascorbic acid.

Organic material, such as wood, paper, gasoline, diesel, solvents and some glycol based heat transfer fluids

Metals, such as aluminum, steel, and brass.

Section 08 Exposure Controls and Personal Protection

Exposure limits

Component	Regulation	Type of listing	Value
Sodium Hypochlorite	NIOSH	REL	2 mg/m³
	OSHA	PEL	2 mg/m³
Chlorine	ACGIH	TWA	0.1 ppm

Engineering controls

Ventilation Requirements

Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other

An emergency shower and eyewash station should be available, tested, and be in close proximity to the product being handled in accordance with provincial regulations.

Protective equipment

The following are recommendations only. It is the responsibility of the employer / user to conduct a hazard assessment of the process in which this product being used and determine the proper engineering controls and PPE for their process. Additional regulatory and safety information should be sought from local authorities and, if needed, a professional industrial hygienist.

Eye and face protection

Where there is potential eye or face exposure, tightly fitting safety goggles and a face shield or a full face respirator or similar protective equipment which protects the wearer's face and eyes are recommended. Contact lenses are not recommended; they may contribute to severe eye injury.

Hand and body protection	Disposable latex or nitrile gloves are recommended to prevent incidental contact. Butyl rubber, neoprene, or PVC skin protection is recommended for extended contact. Leather gloves are not recommended for chemical protection. Refer to manufacturer's specifications for breakthrough times and permeability information; note that breakthrough times and permeability vary with temperature, application and age of material. Continued use of contaminated safety gear or clothing is not recommended; wash before reuse or discard.
Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment. **NIOSH respirator recommendations for: Chlorine** **Up to: 5 ppm** (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against Chlorine (APF = 10) Any supplied-air respirator **Up to: 10 ppm** (APF = 25) Any supplied-air respirator operated in a continuous-flow mode (APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against Chlorine (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against Chlorine (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against Chlorine (APF = 50) Any self-contained breathing apparatus with a full facepiece. (APF = 50) Any supplied-air respirator with a full facepiece **Emergency or planned entry into unknown concentrations or IDLH conditions:** (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus **Escape:** (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against Chlorine Any appropriate escape-type, self-contained breathing apparatus
Thermal hazards	Not available

Section 09 Physical and Chemical Properties

Appearance

Physical state	Liquid
Colour	Clear, greenish-yellow solution
Odour	Strong chlorine odour
Odour threshold	Not available

Property

pH	10.8-11.2
Melting point / freezing point	Not available

Initial boiling point and boiling range	Not available
Flash point	Not available
Evaporation rate	Not available
Flammability	Not applicable
Upper flammable limit	Not available
Lower flammable limit	Not available
Vapour pressure	Negligible
Vapour density	Not available
Relative density	Not applicable
Solubility	Completely soluble in water
Partition coefficient: n-octanol/water	Log POW = ~ -3.42
Auto-ignition temperature	Not available
Decomposition temperature	Sodium hypochlorite's decomposition rate is an exponential function of temperature. Each increase of 10 °C will increase the degredation rate by a factor of 2 to 4 (there is disagreement in the literature).
Viscosity	Not available
Specific gravity	1.1-1.2 g/mL
Particle characteristics	Not applicable
Formula	NaOCl
Molecular weight	74.44 g/mol

Section 10 Stability and Reactivity

Reactivity	May be corrosive to metals. Reacts violently with acids.
Stability	Sodium hypochlorite solutions are unstable and will decompose over time. Sodium hypochlorite's decomposition rate is an exponential function of temperature. Each increase of 10 °C will increase the degredation rate by a factor of 2 to 4 (there is disagreement in the literature). Exposure to ultraviolet light (sunlight) will accelerate the degredation of sodium hypochlorite.
Possibility of hazardous reactions	Hazardous polymerization is not known to occur. Reacts with acids to form hypochlorous acid, a powerful oxidizing agent, which degrades into toxic chlorine gas.
Conditions to avoid	Do not heat. Do not freeze.
Incompatible materials	Acids, such as sulphuric, nitric, hydrochloric, phosphoric, flurosilicic (HFSA), sulphonic, acetic, citric, oxalic, and formic. Oxidizing agents, such as oxygen, hydrogen peroxide, sulphuric and nitric acids and permanganates. Reducing agents, such as hydrogen, sodium borohydride, sulphur dioxide, thiosulphates, hydrazine, phosphites, carbon, and oxalic, formic and ascorbic acid. Organic material, such as wood, paper, gasoline, diesel, solvents and some glycol based heat transfer fluids Metals, such as aluminum, steel, and brass.
Hazardous decomposition products	Chlorine, sodium chlorate.

Section 11 Toxicological Information

Acute Toxicity (LD50 / LC50 values)

Component	Route	Species	Value	Exposure time
Sodium Hypochlorite	Oral	Rat	>5000 mg/kg bw	
Chlorine	Inhalation	Mouse	137 ppm	1 hour

Toxic Health Effect Summary

Chemical characteristics	Toxicity caused primarily by high pH and oxidative potential. Hypochlorites may react with organic molecules to form organochlorides which have unknown toxicology.
Skin	Very dilute solutions have caused negligible irritation, while more concentrated solutions have caused acute corrosive injury to skin. Prolonged exposure may lead to permanent scarring of skin.
Ingestion	Acute exposure may lead to burning of the mouth and throat, abdominal cramps, nausea, vomiting, diarrhea, shock. May lead to convulsions, coma, and even death.
Inhalation	Causes severe burns to the mouth and throat (mist). May release toxic and irritating chlorine gas. Chlorine, one of the primary decomposition products of sodium hypochlorite, is an irritant of the nose and throat, causing coughing, difficulty breathing, and pulmonary edema.
Eye contact	Causes irritation, redness, and pain. May cause burns and possible damage to vision.
Sensitization	This product and its components at their listed concentration have no known sensitizing effects.
Mutagenicity	This product and its components at their listed concentration have no known mutagenic effects.
Carcinogenicity	IARC has classified hypochlorite salts as group 3, not classifiable as to its carcinogenicity to humans.
Reproductive toxicity	This product and its components at their listed concentration have no known reproductive effects.
Specific organ toxicity	This product and its components at their listed concentration have no known effects on specific organs.
Aspiration hazard	Prolonged or repeated overexposure may cause lung damage.
Synergistic materials	Not available

Section 12 Ecological Information

Ecotoxicity

Component	Type	Species	Value	Exposure Time
Sodium Hypochlorite 12%	LC50	Marine fish	0.27 mg/L	96 hours
	EC50	Marine invertabrates	0.22 mg/L	48 hours
	EC50	Freshwater algea	0.42 mg/L	72 hours

Biodegradability	The domestic substance list categorizes sodium hypochlorite as non-persistent.
Bioaccumulation	The domestic substance list categorizes sodium hypochlorite as non-bioaccumulative.
Mobility	This product is water soluble, is not predicted to adsorb to soil and may contaminate ground water.
Other adverse effects	The domestic substance list categorizes sodium hypochlorite as inherently toxic to aquatic organisms.

Section 13 Disposal Considerations

Waste From Residues / Unused Products	Dispose in accordance with all federal, provincial, and local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Do not remove label, follow label warnings even after the container is empty. Empty containers should be recycled or disposed of at an approved waste handling facility.

Section 14 Transport Information

UN number	UN 1791
UN proper shipping name and description	HYPOCHLORITE SOLUTION with more than 7% available chlorine
Transport hazard class(es)	8
Packing group	III
Excepted quantities	5 L
Environmental hazards	Listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special precautions	No special precautions
Transport in bulk	ERAP index: not required

MARPOL 73/78 and IBC Code:

Product name:	Sodium hypochlorite solution (15% or less)	
Pollution category:	Y	
Hazards:	the product is included in the Code because of both its safety and pollution hazards.	
Ship type:	ship type 2	
Tank type:	integral gravity tank	
Tank vents:	controlled venting	
Tank environmental control:	no special requirements under this Code	
Electrical equipment:	Temperature classes	no requirements
	Apparatus group	no requirements
	Flash point	non-flammable product
Gauging:	restricted gauging	
Vapour detection:	no special requirements under this Code	
Fire protection:	no special requirements under this Code	
Emergency equipment	no special requirements under this Code	
Specific and operational requirements	15.19.6	

Additional information Secure containers (full or empty) during shipment and ensure all caps, valves, or closures are secured in the closed position.

TDG PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and published test data regarding the classification of this product are listed in the references at section 16 of this SDS.

Section 15 Regulatory Information.

NOTE: THE PRODUCT LISTED ON THIS SAFETY DATA SHEET HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN HAZARDOUS PRODUCTS REGULATIONS. THIS SAFETY DATA SHEET CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

All components of this product appear on the domestic substance list.

NSF Certification: Hypochlor 12 is certified under NSF / ANSI Standard 60 for disinfection & oxidation at a maximum dosage of: 103 mg/L. NSF product use restrictions based on requirements obtained from the NSF website; consult NSF website for current requirements.

Section 16 Other Information

Date of latest revision: July 19, 2023

Note: The responsibility to provide a safe workplace remains with the buyer / user. The buyer / user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the buyer / user to comply with all applicable laws and regulations regarding handling, using, reselling and shipping this product.

Attention: Receiver of the chemical goods / SDS coordinator

As part of our commitment to the RDC Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service center.

References:

1) *NIOSH Pocket Guide to Chemical Hazards;* U.S. Department of Health and Human Services, https://www.cdc.gov/niosh/npg/default.html
2) *WorkSafe BC E-Limit;* Workers' Compensation Foard of British Columbia, https://elimit.online.worksafebc.com/
3) *ECHA - Registered Substance Dossier;* European Chemicals Agency, https://echa.europa.eu/registration-dossier/-/registered-dossier/15516
4) *Transportation of Dangerous Goods Regulations;* Transport Canada, https://laws-lois.justice.gc.ca/eng/regulations/SOR-2001-286/index.html
5) Globally Harmonized System of Classification and Labeling of Chemicals (GHS) *Seventh revised edition*
6) International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) 2007 Edition
7) The ACS Style Guide