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Sault Ste. Marie Canal National Historic Site

Northern Ontario Field Unit
Parks Canada Agency

511 SSM POWERHOUSE STRUCTURAL STABILIZATION PROJECT

PENSTOCK BULKHEAD PROJECT

PROJECT DESIGN DRAWINGS

Issued For Tender

Date: December 2020

Prepared For:

Northern Ontario Field Unit



Parks Canada
Parcs Canada

Canada

LIST OF DRAWINGS

PROJECT DRAWINGS

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CONSULTANT:



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GENERAL

- 1. DRAWINGS TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS.
2. NOTIFY DEPARTMENTAL REPRESENTATIVE IF ANY DISCREPANCIES ARE FOUND BETWEEN THESE NOTES AND THE SPECIFICATIONS.
3. IN CASE OF CONFLICTING INFORMATION BETWEEN CONTRACT DRAWINGS AND SPECIFICATIONS, THE MORE STRINGENT SHALL GOVERN OR CONTRACTOR MUST SEEK CLARIFICATION IN WRITING FROM DEPARTMENTAL REPRESENTATIVE.
...
27. ALL WORK SHALL CONFORM TO THE ENVIRONMENTAL BASIC IMPACT ANALYSIS (BIA). REFER TO CONTRACT SPECIFICATION

REMOVALS

- 1. ALL REMOVALS ARE TO BE CARRIED OUT WITH PRECAUTIONS FOR THE SAFETY OF THE PUBLIC AND PARKS CANADA'S EMPLOYEES.
2. DEMOLITION WORK SHALL BE CARRIED OUT WITHOUT CAUSING OVERSTRESS OR EXCESSIVE DEFLECTION TO ANY PART OF THE EXISTING WORK WHICH IS TO REMAIN.

EROSION CONTROL

- 1. INSTALL EFFECTIVE EROSION AND SEDIMENT CONTROL MEASURES BEFORE STARTING WORK TO PREVENT SEDIMENT FROM ENTERING THE WATER COURSE.
2. TURBIDITY CURTAINS SHOULD BE INSTALLED IN ACCORDANCE WITH OPSD 219.260/219.261 T THE AREA OF BULKHEAD #2 TO ISOLATE WORK AREA FROM THE REST OF THE LAKE.
...
9. REMOVE NON-BIODEGRADABLE EROSION AND SEDIMENT CONTROL MATERIALS ONCE SITE IS STABILIZED.

CONTAMINANT CONTROL

- 1. TEMPORARILY STORE, HANDLE AND DISPOSE OF ALL MATERIALS USED OR GENERATED (E.G. ORGANICS, SOILS, WOODY DEBRIS, TEMPORARY STOCKPILES, CONSTRUCTION DEBRIS) DURING SITE PREPARATION, CONSTRUCTION AND CLEAN-UP IN A MANNER THAT PREVENTS THEIR ENTRY INTO NATURALIZED AREAS IN THE VICINITY OF THE EXCAVATION SITE.
2. ENSURE A SPILLS MANAGEMENT PLAN (INCLUDING MATERIALS, INSTRUCTIONS REGARDING THEIR USE, EDUCATION OF CONTRACT PERSONNEL, EMERGENCY CONTACT NUMBERS) IS ONSITE AT ALL TIMES FOR IMPLEMENTATION IN EVENT OF ACCIDENTAL SPILL DURING CONSTRUCTION.
...
6. BEST MANAGEMENT PRACTICES SHOULD BE EMPLOYED IN THE DEVELOPMENT OF ANY STORMWATER, SEDIMENT AND EROSION CONTROL PLANS TO MINIMIZE SEDIMENT AND EROSION ASSOCIATED IMPACTS.

FISH PROTECTION

- 1. THE IN- WATER WORK AREA SHALL BE ISOLATED WITH A SILT BOOM OR CURTAIN PRIOR TO INITIATING CONSTRUCTION.

MATERIALS

- 1. ALL PROPOSED WORKS SHALL BE CONSTRUCTED WITH NEW MATERIAL ONLY. MATERIALS IDENTIFIED FOR DEMOLITION ARE TO BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF IN STRICT ACCORDANCE WITH APPLICABLE STANDARDS AND LAWS.
2. MATERIAL USED FOR CONSTRUCTION SHALL BE FREE OF ANY DEFECTS.
3. THE CONTRACTOR SHALL REPAIR, AT THEIR COST, ANY DAMAGES AS A RESULT OF CONSTRUCTION THAT IS NOT SPECIFIED FOR REMOVAL.
...
7. NO PATCHING, PLUGGING, SHIMMING, OR OTHER SUCH MEANS TO OVERCOME DEFECTS, DISCREPANCIES OR ERRORS SHALL BE EMPLOYED WITHOUT PRIOR WRITTEN AGREEMENT OF OWNER'S REPRESENTATIVE OR OWNER'S DESIGNATED DELEGATE.

WELDING

- 1. ALL WELDING SHALL COMPLY WITH CSA W59 REQUIREMENTS, EXCEPT AS MODIFIED AS PER THE PROJECT SPECIFICATIONS, AND CARRIED OUT AT SHOP UNLESS OTHERWISE INDICATED ON DRAWINGS.
2. WELDERS SHALL BE QUALIFIED WORKERS AND WELDING PROCESSES SHALL BE APPROVED BY CANADIAN WELDING BUREAU TO MINIMUM REQUIREMENTS OF CSA W47.1, DIVISION 2.
3. NO WELDING OPERATION SHALL BE UNDERTAKEN BEFORE OWNER HAS ACCEPTED ALL WELDING PROCEDURES, WELDING MACHINE OPERATORS, AND WELDERS.
...
18. WELDED CONSTRUCTION ELEMENTS SUCH AS GATE GUIDES AND SILLS WITH SURFACES MACHINED FOR PRECISE ALIGNMENT SHALL UNDERGO THERMAL OR VIBRATION STRESS RELIEF TREATMENT BEFORE MACHINING.

TREMIE CONCRETE

- 1. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO CSA G30.12M. FY=400MPA (GRADE400).
2. ANCHOR BARS SHALL BE 20M DOWELS EMBEDDED A MINIMUM 200mm. SET DOWELS AND FILL HOLES WITH SHRINKAGE COMPENSATING GROUT.

EQUIPMENT

- 1. THE TREMIE PIPE SHALL CONSIST OF A TUBE, HAVING A DIAMETER OF NOT LESS THAN 250 MM, CONSTRUCTED WITH SECTIONS HAVING FLANGE COUPLINGS FITTED WITH GASKETS.
2. THE DISCHARGE ENDS ON BOTH THE TREMIE PIPE AND THE TREMIE BUCKET SHALL BE FABRICATED TO ALLOW FOR THE FULL OPENING OF THE DISCHARGE ENDS OF THE PIPE OR BUCKET, BY SLIGHTLY RAISING THE PIPE OR BUCKET.
3. SET DOWELS AND FILL HOLES WITH SHRINKAGE COMPENSATING GROUT CONSTRUCTION METHODS
...
6. CONCRETE DEPOSITING UNDER WATER SHALL BE CARRIED OUT CONTINUOUSLY FROM START TO FINISH.

DEPOSITING TREMIE CONCRETE

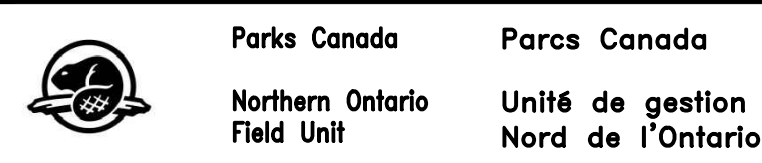
- 1. PERFORM ALL CAST-IN-PLACE CONCRETE WORK IN ACCORDANCE WITH CAN/CSA-A23.1-04.
2. FORMWORK AND FALSEWORK TO CLAUSE 6.5 OF CAN/CSA-A23.1-04 AND CSA S269.1 - 1975 (R2003) AND CAN/CSA - S269.3 - M92 (R2003).
3. CONSTRUCTION TOLERANCES FOR CAST-IN-PLACE CONCRETE TO CAN/CSA-A23.1-04.
4. FABRICATION AND PLACEMENT OF REINFORCEMENT TO CLAUSE 6 OF CAN/CSA-A23.1-04.
5. TO PREVENT SEGREGATION, CONCRETE DEPOSITED UNDER WATER SHALL BE CAREFULLY DEPOSITED IN A COMPACT MASS IN ITS FINAL POSITION BY MEANS OF A TREMIE PIPE, OR OTHER APPROVED METHOD.
...
13. THE CONTRACTOR SHALL DEPOSIT TREMIE CONCRETE TO SUCH ELEVATIONS THAT AFTER ALL UNSOUND CONCRETE HAS BEEN REMOVED FROM THE SURFACE, THE FINISHED ELEVATIONS SHALL BE THOSE WHICH ARE SHOWN ON THE PLANS.

REMOVAL OF FORMWORK

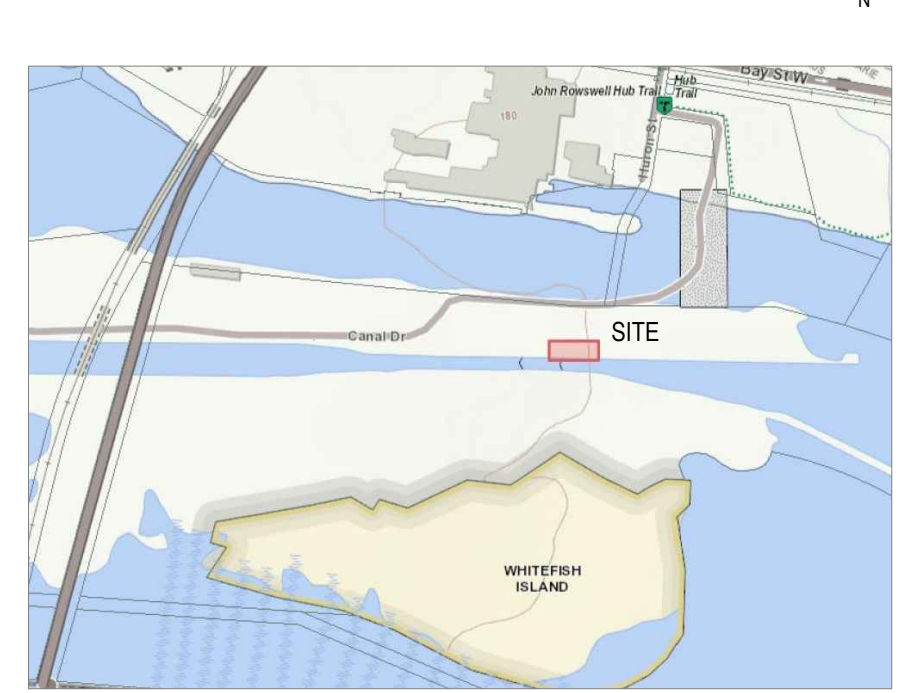
- 1. THE CONTRACTOR SHALL OBTAIN THE INSPECTOR'S APPROVAL BEFORE REMOVING ANY FORMWORK. ALL WORK SHALL COMPLY WITH THE REQUIREMENTS OF CLAUSE 11.3.5 OF CSA A23.1-09/A23.2-09 (R2014). FORMS SHALL NOT BE DISTURBED UNTIL THE CONCRETE HAS ATTAINED ADEQUATE STRENGTH TO SUPPORT ITS OWN WEIGHT AND ANY SUPERIMPOSED LOADING APPLIED TO IT.

PAINTING

REFERENCE TO SPECIFICATIONS FOR PAINTING NOTES.



KEY PLAN:



SAULT STE. MARIE, ONTARIO

Table with 5 columns: No., Date, Description, Drawn by, Approved. Contains revision history for sheets 1, 2, 3, and 4.

Revision table with columns: Detail number, A Numéro de détail, Sheet number, B Numéro de la feuille.

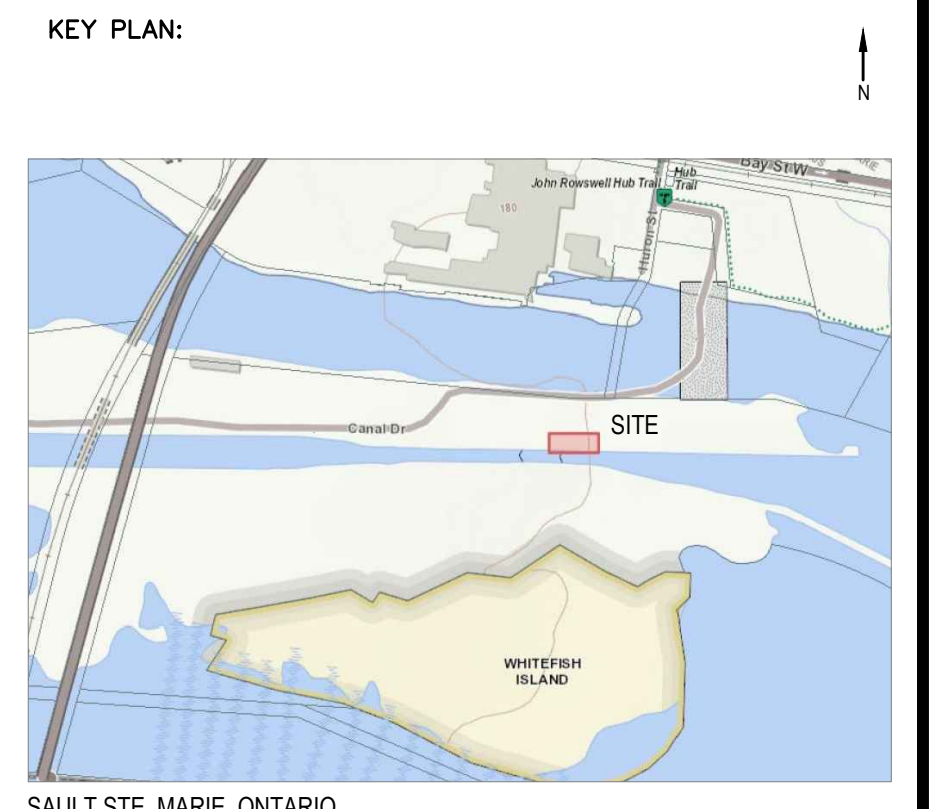
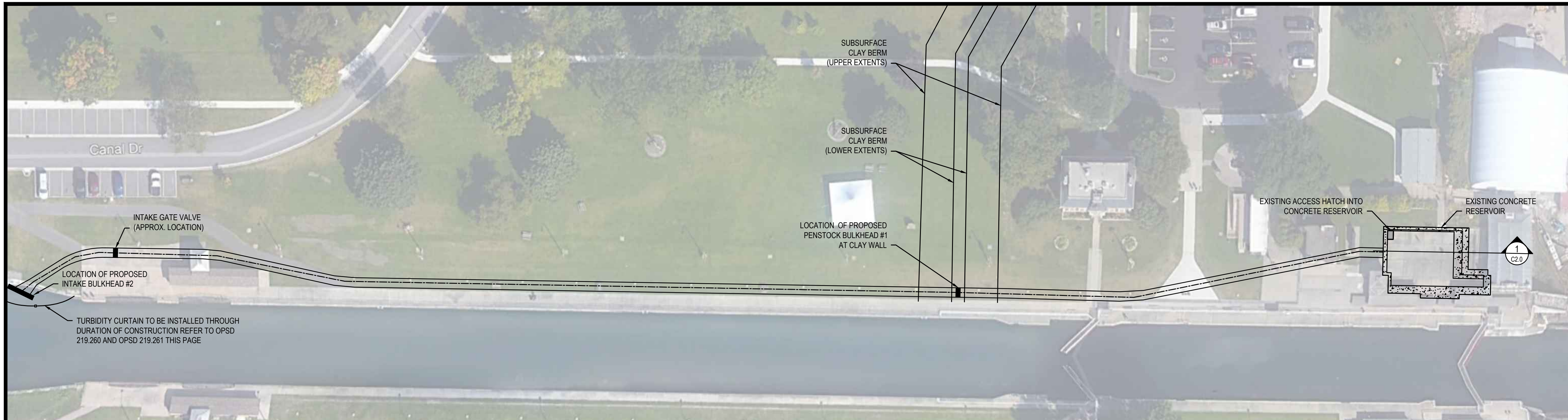
Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name: wsp. Eng. Stamp: D. M. SPACEK. Includes company address and contact information.

Project title/Titre du projet: BULKHEAD INSTALLATION SAULT STE. MARIE CANAL

Drawing title/Titre du deS.in: GENERAL NOTES

Table with 2 columns: Designed by/Concept par, Drawn by/Designé par, Checked by/Vérifié par, Approved by/Approuvé par, Project No./N° du projet, Drawing Set No./N° de série du deS.in. Includes dates and sheet number C1.1.



NOTE TO CONTRACTOR:
 PROVIDE STAGING AREA SKETCHES FOR REVIEW AND ACCEPTANCE BY DEPARTMENTAL REPRESENTATIVE.
 PROVIDE EQUIPMENT STAGING LOCATIONS WHICH PROTECT CONFINED SPACES FROM EXHAUST, FUMES, OR ANY OTHER POLLUTANT SOURCE AND /OR OXYGEN DISPLACEMENT OR CONTAMINATION FOR QUALITY REQUIREMENTS NEAR OR AFFECTING THE CONFINED SPACES. DELINEATE OR ADJUST EXISTING STAGING AREA PERIMETERS AND MAINTAIN IN A MANNER WHICH BEST PROTECTS THE PUBLIC SAFETY AND THE JOB SITE(S) FROM UNWARRANTED ENTRY.
 PROVIDE RESERVOIR ACCESS AND EGRESS SKETCHES SHOWING THE PROVISIONS TO ENTER AND EXIT THE RESERVOIR AS CONTROL POINT SAND BARRIERS USED TO ENSURE CONTROL OF ENTRY AND EXIT AS WELL AS PREVENTING SLIP, FALL AND / OR FALLING FROM HEIGHTS AS APPLICABLE. AIR MONITORING IS REQUIRED AT BOTH THE RESERVOIR INTERIOR AND FOR THE ENTRY, EXIT, AND WORK SPACE AT THE BULKHEAD INSTALLATION LOCATION IN THE PENSTOCK PIPE STRUCTURE, CONTINUALLY AND SIMULTANEOUSLY.

SITE PLAN
 SCALE: NTS

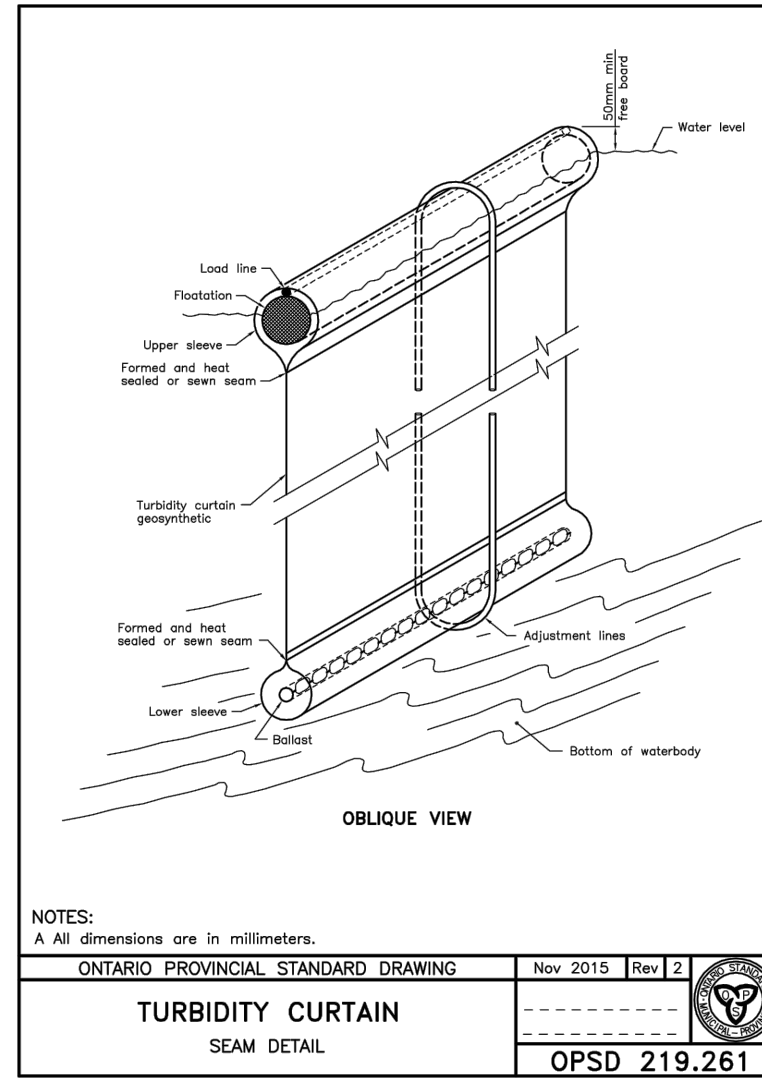
BULKHEAD #2: INLET (LAKE SUPERIOR)

- NOTE: BULKHEAD #2 MUST BE COMPLETED PRIOR TO ENTRY INTO THE PENSTOCK FOR THE INSTALLATION OF BULKHEAD #1**
- 1) PREPARE AND SUBMIT SITE SPECIFIC HEALTH AND SAFETY PLANS, INCLUDING
 - a. SAFE DIVING PROCEDURES FOR THE WORK
 - b. SAFE WORKING PROCEDURES FOR WORKING NEAR WATER
 - c. SAFE WORKING PROCEDURES FOR THE OPERATION OF THE CRANE (REQUIRED FOR THE PLACEMENT OF BULKHEAD #2). NOTE: THE CRANE OUTRIGGERS ARE NOT PERMITTED WITHIN SIX (6) METRES FROM THE CANAL WALL
 - d. OTHER ITEMS AS REQUIRED BY PROVINCIAL LEGISLATION UNDER THE OHSA
 - 2) FABRICATE BULKHEAD #2 AS PER THE DRAWINGS AND SPECIFICATIONS
 - 3) MOBILIZE TO SITE
 - 4) SETUP A TURBIDITY CURTAIN AROUND THE WORK AREA (IN THE WATER) - REFER TO THE DRAWINGS FOR DETAILS
 - 5) REMOVE THE STONES AT THE BASE OF THE INLET SCREEN AND PREPARE THE AREA FOR A NEW CAST-IN-PLACE CONCRETE SILL BEAM
 - 6) INSTALL THE NEW CAST-IN-PLACE TREMIE CONCRETE SILL BEAM AS SHOWN ON THE DRAWINGS, COMPLETE WITH ANCHORS INTO THE CANAL WALL
 - 7) CONFIRM THE LOCATIONS OF THE ANCHOR-BOLTS AND DRILL THE HOLES INTO THE CANAL WALL
 - 8) INSTALL EPOXY ANCHORS INTO CANAL WALLS AND LET SET
 - 9) LOWER BULKHEAD #2 INTO POSITION
 - 10) SECURE THE WATERSTOPS AROUND THE PERIMETER OF THE BULKHEAD AS SHOWN ON THE DRAWINGS
 - 11) SECURE THE BULKHEAD TO THE CANAL WALL WITH ANCHOR-BOLTS AS SHOWN ON THE DRAWINGS
 - 12) REMOVE CONSTRUCTION MATERIALS AND CONSTRUCTION DEBRIS FROM THE SITE
 - 13) DEMOBILIZE FROM SITE

BULKHEAD #1: CLAY WALL

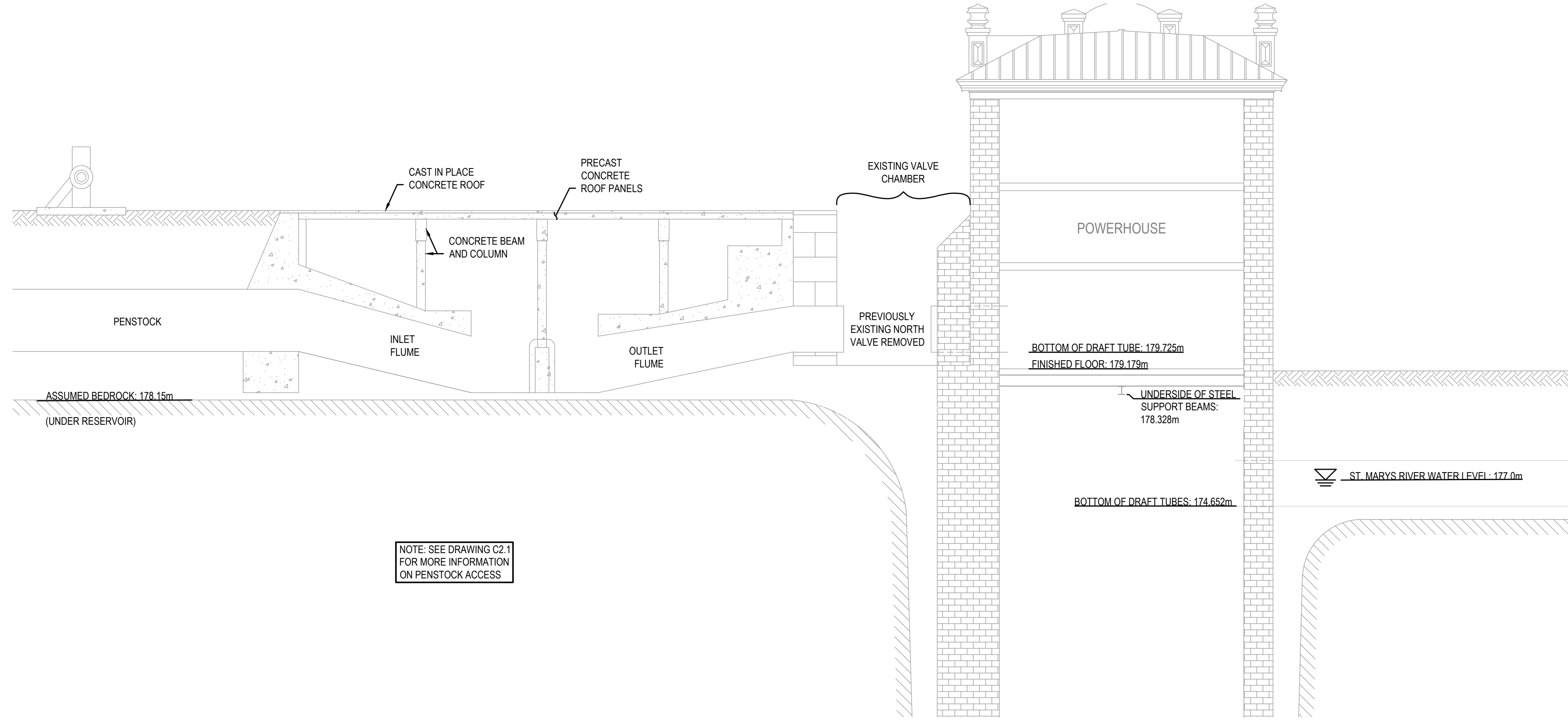
- 1) PREPARE AND SUBMIT SITE SPECIFIC HEALTH AND SAFETY PLANS, INCLUDING:
 - a. SAFE ENTRY PROCEDURES FOR ENTRY INTO THE CONCRETE RESERVOIR THROUGH EXISTING HATCH. THE SIZE OF THE OPENING IS APPROXIMATELY 1.12M X 1.22M (CONFINED SPACE)
 - b. SAFE ENTRY PROCEDURES FOR ENTRY FROM THE RESERVOIR INTO THE PENSTOCK (THROUGH CONCRETE FLUME) (CONFINED SPACE)
 - c. VENTILATION OF PENSTOCK INCLUDING FRESH-AIR DUCTING TO WORK AREA
 - d. OTHER ITEMS AS REQUIRED BY PROVINCIAL LEGISLATION UNDER THE OHSA INCLUDING CONFINED SPACE WORK ENVIRONMENT.
- 2) IMPLEMENT HEALTH AND SAFETY MEASURES IN ACCORDANCE WITH THE SUBMITTED PLANS
- 3) MOBILIZE TO SITE
- 4) DEWATER CONCRETE RESERVOIR
- 5) SETUP CONSTRUCTION LIGHTING INSIDE THE CONCRETE RESERVOIR
- 6) SETUP CONSTRUCTION LIGHTING AND POWER AT THE LOCATION OF BULKHEAD #1 (APPROXIMATE 92M UPSTREAM THE PENSTOCK PIPE FROM THE OUTLET WITHIN THE RESERVOIR)
- 7) SETUP TEMPORARY WATER-STOP AND TEMPORARY PUMPING TO ADDRESS INCOMING WATER DOWN THE PENSTOCK (WATER LEVEL IS APPROXIMATELY 150MM DEEP AND ESTIMATED TO BE APPROXIMATELY 960 USGPM). IT IS ADVISABLE TO INSTALL THE BOTTOM PORTION OF BULKHEAD #1 SO THAT IT CAN ACT AS A "DAM" TO CONTROL THE WATER FLOW BEYOND THE BULKHEAD DURING CONSTRUCTION.
- 8) CLEAN PENSTOCK WALLS (APPROXIMATELY 600MM WIDE) IN LOCATION OF BULKHEAD #1 WITH WIRE-BRUSH
- 9) BRING CONSTRUCTION MATERIALS AND TOOLS TO THE LOCATION OF BULKHEAD #1
- 10) FIELD ASSEMBLE AND INSTALL BULKHEAD #1 AS PER THE DRAWINGS AND SPECIFICATIONS (FIELD FITTING OF COMPONENTS MAY REQUIRE TEMPLATING, CUTTING AND/OR GRINDING - THIS CAN BE DONE AT THE BULKHEAD LOCATION, OR BY BRINGING THE COMPONENTS TO THE SURFACE TO MODIFY)
 - a. SOME FIELD WELDING WILL BE REQUIRED IN THE LOCATIONS WHERE BULKHEAD #1 IS TRIMMED TO FIT THE PENSTOCK SPLICE PLATES AS NOTED ON THE DRAWINGS
- 11) SEAL THE PERIMETER OF BULKHEAD #1 AND ENSURE WATER TIGHTNESS.
- 12) SUPPLY AND INSTALL THE BULKHEAD PLATING COMPLETE WITH VALVES AS INDICATED ON THE DRAWINGS
- 13) REMOVE CONSTRUCTION MATERIALS AND CONSTRUCTION DEBRIS FROM THE PENSTOCK
- 14) DEMOBILIZE FROM CONCRETE RESERVOIR

No.	Date	Description	Drawn by	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

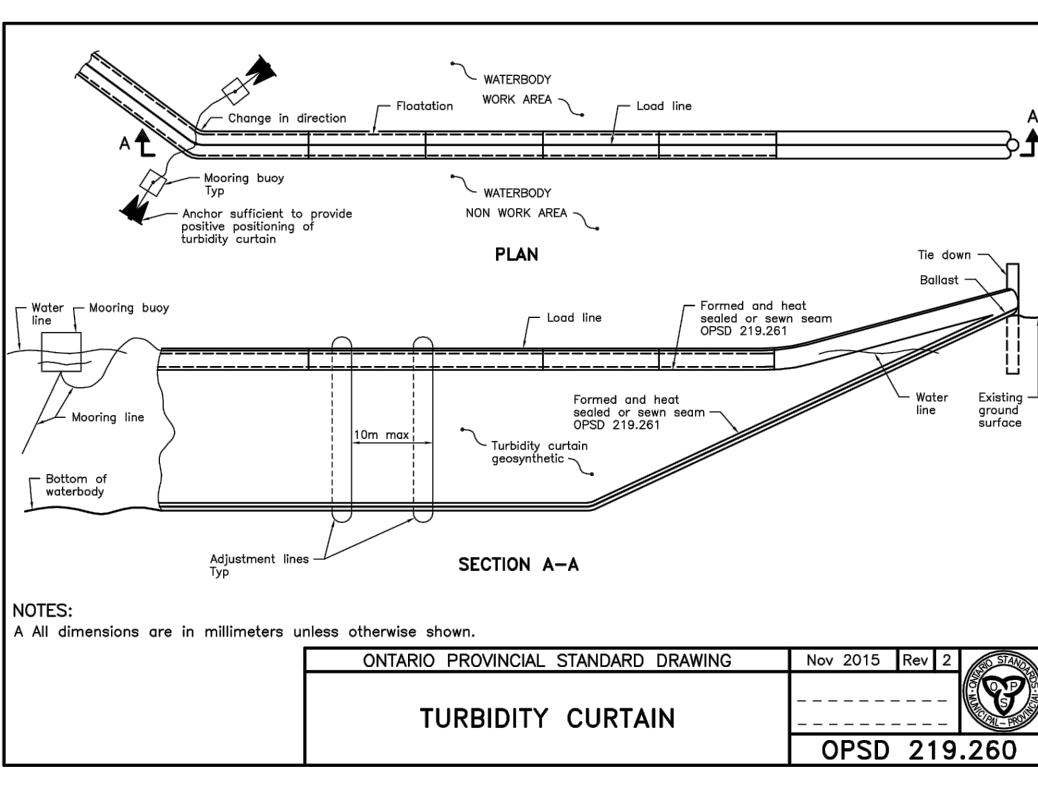


NOTES:
 A All dimensions are in millimeters.

ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 Rev 2
TURBIDITY CURTAIN
 SEAM DETAIL
 OPSD 219.261



NOTE: SEE DRAWING C2.1 FOR MORE INFORMATION ON PENSTOCK ACCESS



NOTES:
 A All dimensions are in millimeters unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 Rev 2
TURBIDITY CURTAIN
 OPSD 219.260

Revision / Revision	
A	Detail number
B	Sheet number
A Numéro de détail	
B Numéro de la feuille	
Linear dimensions in millimetres	
Dimensions linéaires en millimètres	

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 WSP-SP201-15-001-001 (WSP# 151 00105-14)

Eng. Stamp / Sceau de l'ingénieur
 D. M. SPACEK
 PROFESSIONAL ENGINEER
 PROVINCE OF ONTARIO

Project Title / Titre du projet
BULKHEAD INSTALLATION SAULT STE. MARIE CANAL

Drawing Title / Titre du deS.S.in
SITE PLAN AND TURBIDITY CURTAIN DETAILS

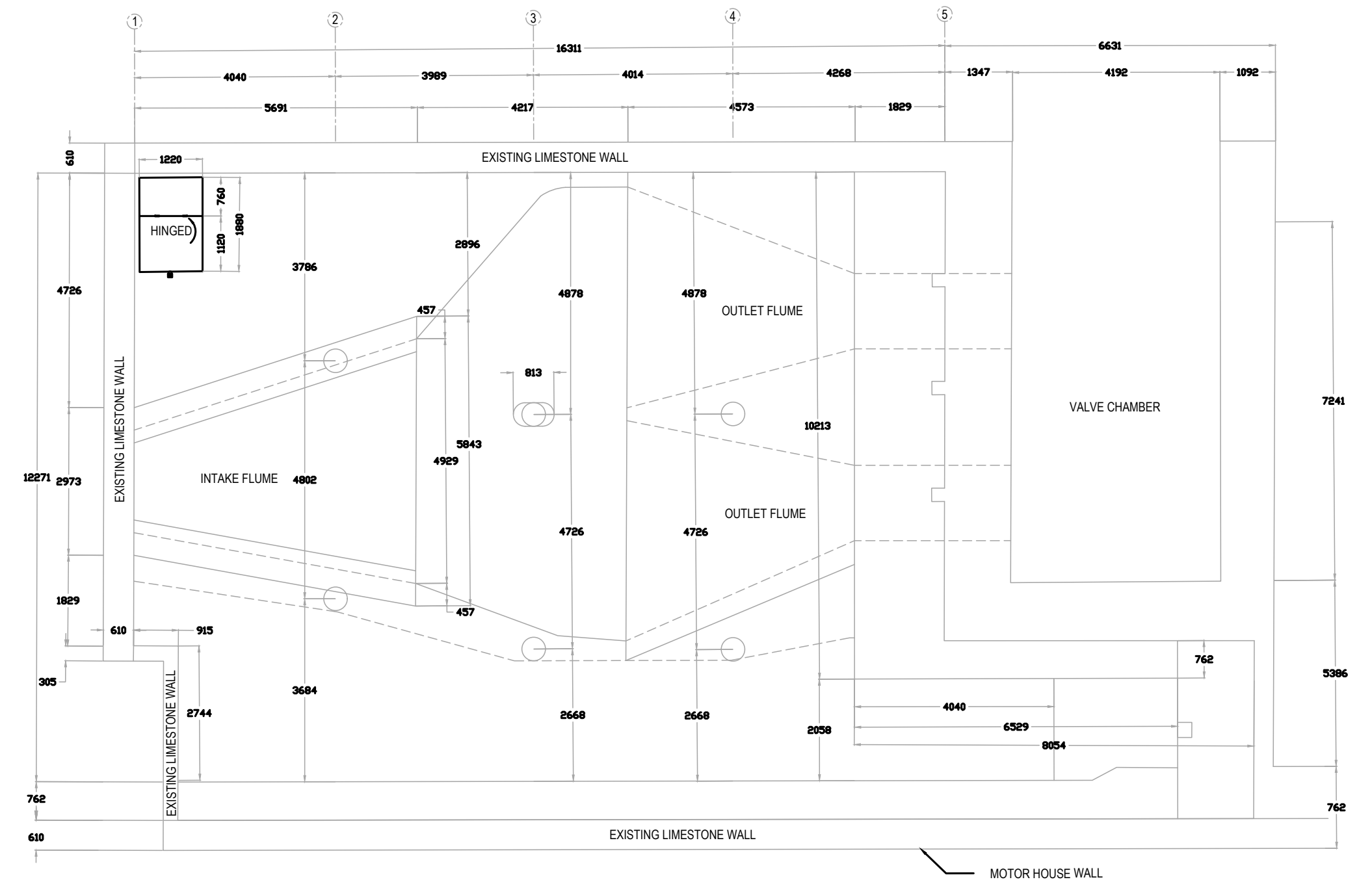
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Drawn by/Desiné par M.CARBONE	Date DEC 18, 2020
Checked by/Vérifié par J.DICERBO / D. SPACEK	Date DEC 18, 2020
Approved by/Approuvé par D.SPACEK	Date DEC 18, 2020
Project No./N° du projet 511S.S.M	Scale/Echelle NTS
Drawing Set No./N° de série du deS.S.in -	Sheet No./N° de la feuille C2.0

KEY PLAN:

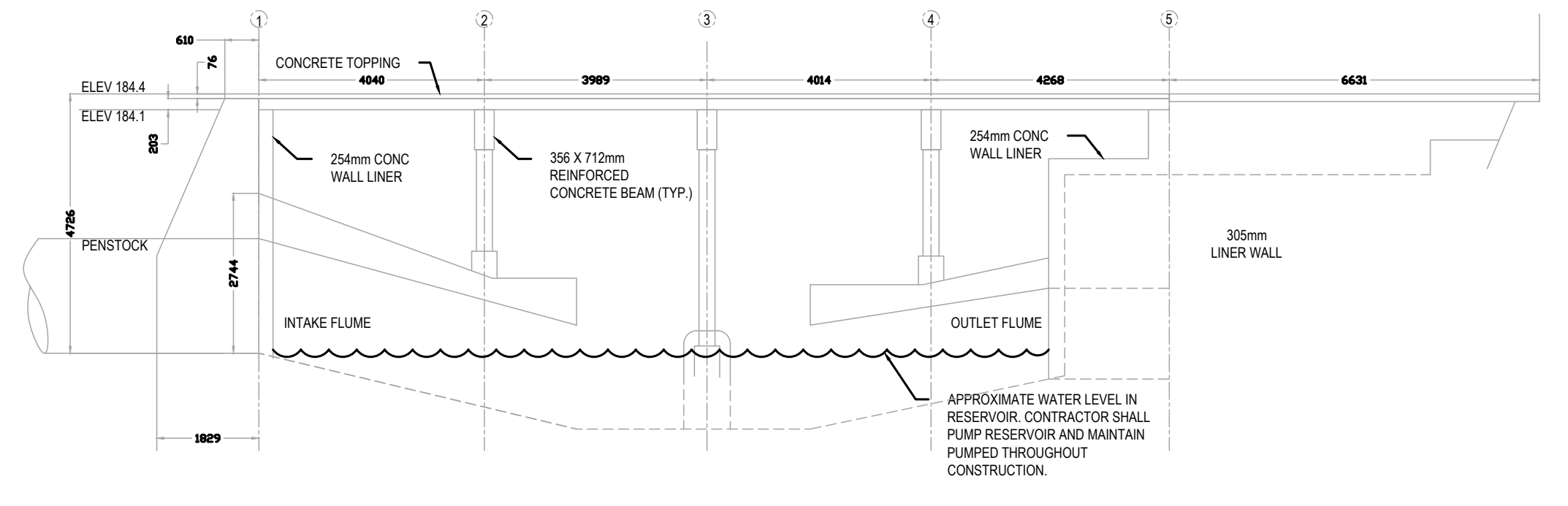


SAULT STE. MARIE, ONTARIO

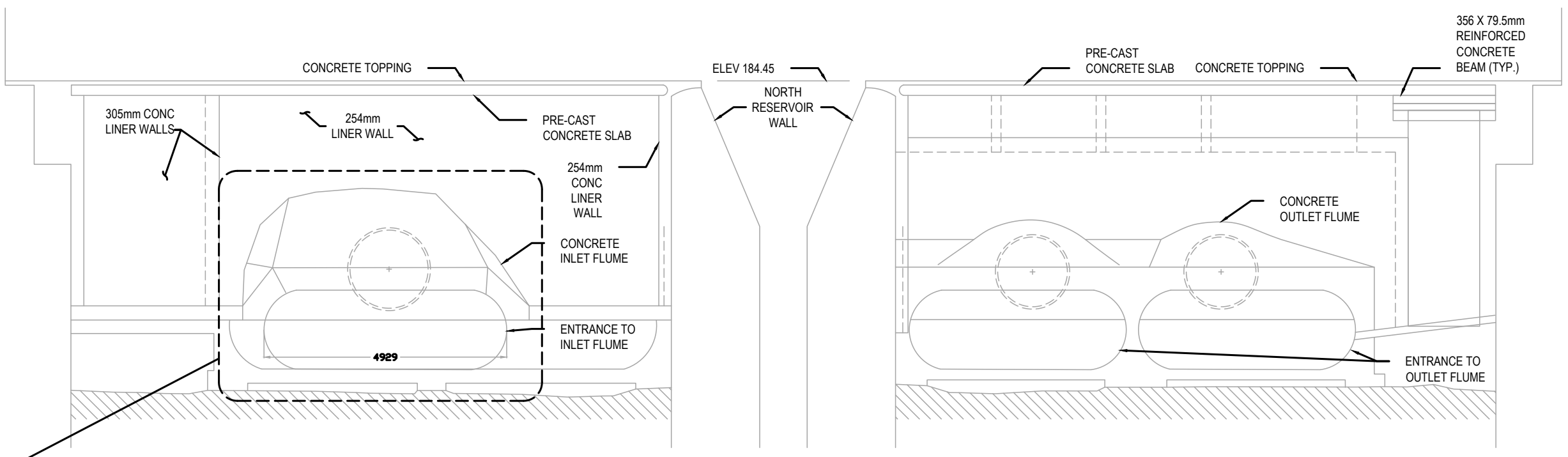
NOTE TO CONTRACTOR:
 ITEM #1-THE CONTRACTOR WILL NEED TO DEWATER THE RESERVOIR FROM COMMENCEMENT OF WORK UNTIL BULKHEAD IS INSTALLED AND WATER TIGHT. THE EXPECTED CONTRACTUAL VOLUME OF WATER FOR THIS PROCEDURE WILL BE 2,300 TO 3,400 LPM OR 600 TO 900 GPM ACCORDINGLY. DEWATERING TO FOLLOW SPECIFICATION REQUIREMENTS AND ENVIRONMENTAL STANDARDS.
 ITEM #2-THE CONTRACTOR WILL NEED ALLOW TIME AND LABOUR OF AT LEAST 3 MEN AND 12 HOURS TO CLEAR THE RESERVOIR CONTENTS, SAND BAGS, EXISTING DRAINAGE PIPES, PREPARE THE HATCH ACCESS AND, PREPARE THE NORTH TUBE ACCESS AS MAY BE REQUIRED.
 ITEM #3-THE CONTRACTOR WILL NEED TO DETERMINE AND PROVIDE FOR THE CLEANING OF THE ACCUMULATED SILT IN THE BOTTOM OF THE RESERVOIR TO CONTRIBUTE TO A SAFE WORKING SPACE AND JOB SITE ACCESS. THERE IS CURRENTLY APPROXIMATELY 200mm OF SILT IN THE BOTTOM OF THE RESERVOIR.



PLAN VIEW-EXISTING RESERVOIR
SCALE: NTS



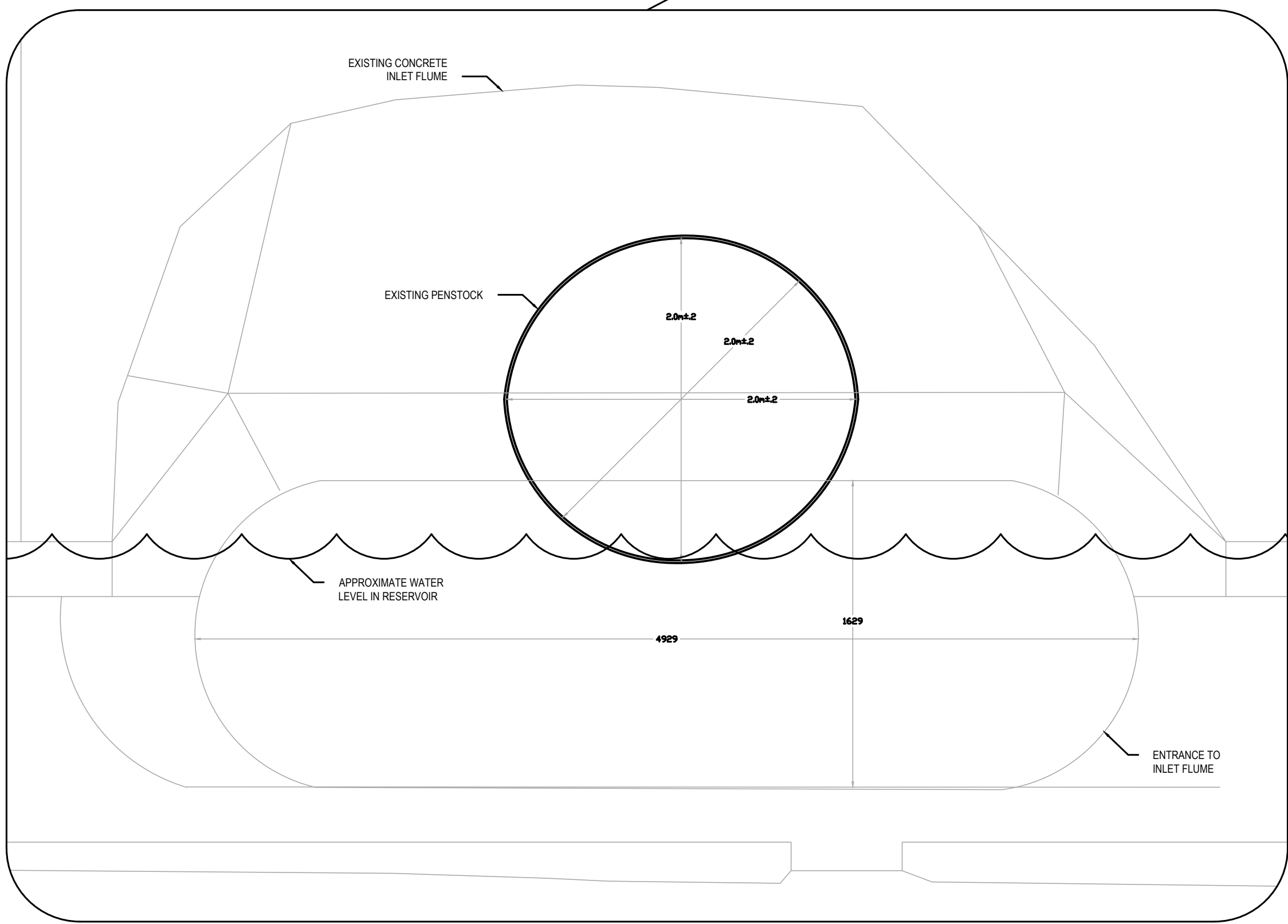
LATERAL SECTION-EXISTING RESERVOIR
SCALE: NTS



SECTION-RESERVOIR INTAKE FLUME-WEST WALL
SCALE: NTS

SECTION-RESERVOIR OUTLET FLUME-EAST WALL
SCALE: NTS

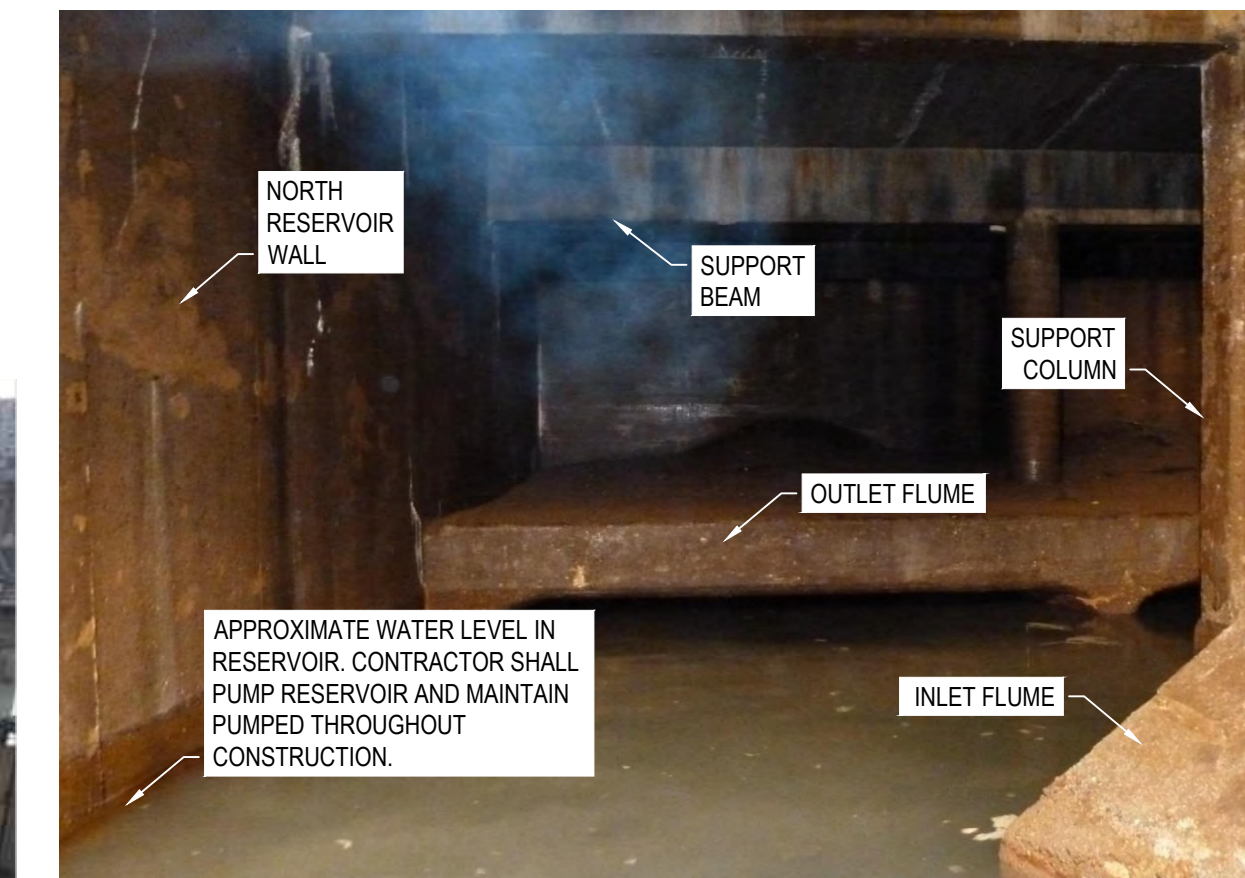
NOTE: ACCESS TO PENSTOCK GAINED THROUGH EXISTING CONCRETE INTAKE FLUME



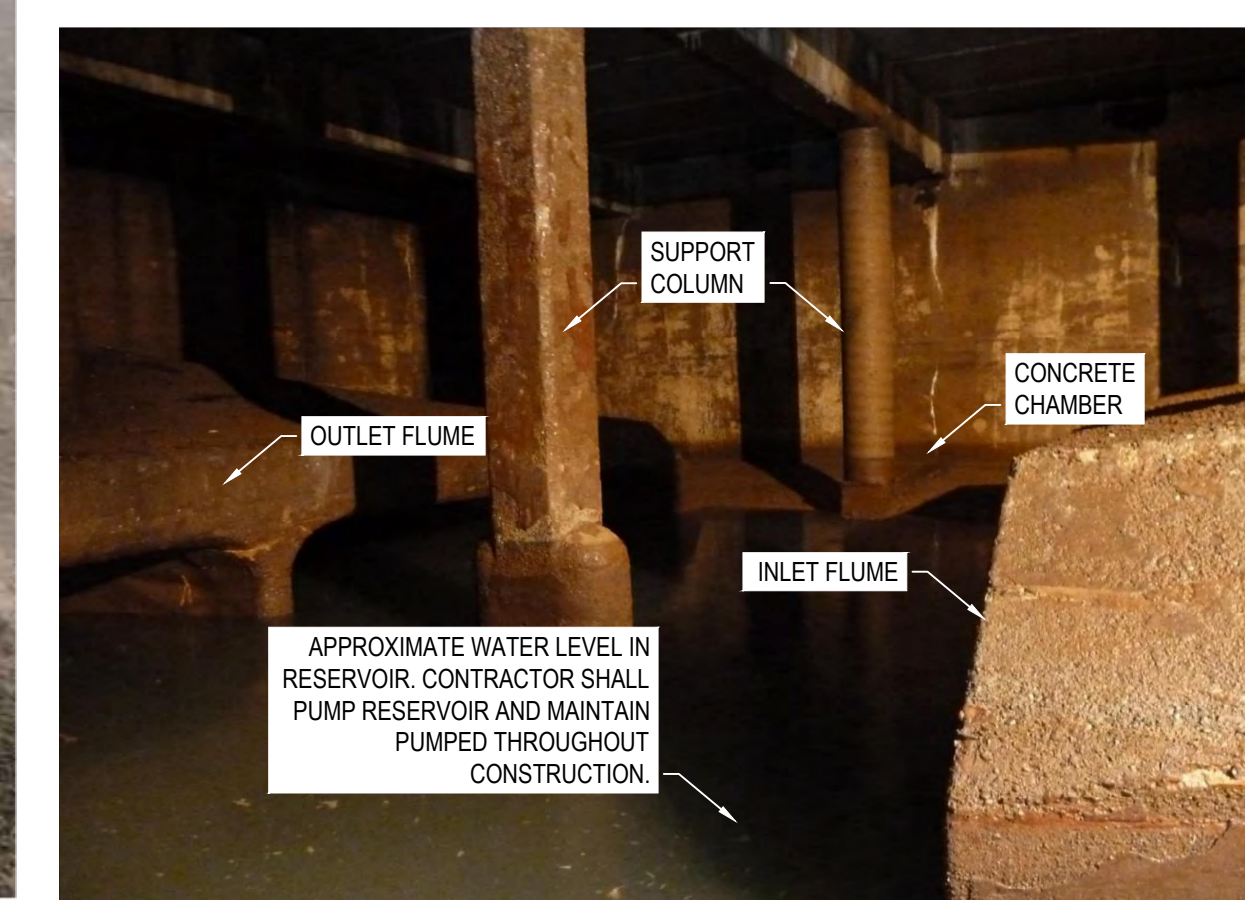
APPROXIMATE DIMENSIONS AT PENSTOCK ACCESS
SCALE: NTS



RESERVOIR ACCESS
SCALE: NTS



EXISTING OUTLET FLUME
SCALE: NTS



EXISTING INLET/OUTLET FLUME
SCALE: NTS

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Revision / Revision	
A	Detail number
B	Sheet number
A	A Numéro de détail
B	B Numéro de la feuille

Linear dimensions in millimetres	Dimensions linéaires en millimètres
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Consultant's Name / Nom de l'expert-conseil: **wsp**
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 TEL: 613-833-8822 | FAX: 755-638-0335 | WWW.WSP.COM | WSP-SP201-15-001-001 (WSP# 151-00185-14)
 Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACEK**
 LICENSED PROFESSIONAL ENGINEER / INGÉNIEUR PROFESSIONNEL
 PROVINCE OF ONTARIO

Project title / Titre du projet: **BULKHEAD INSTALLATION SAULT STE. MARIE CANAL**

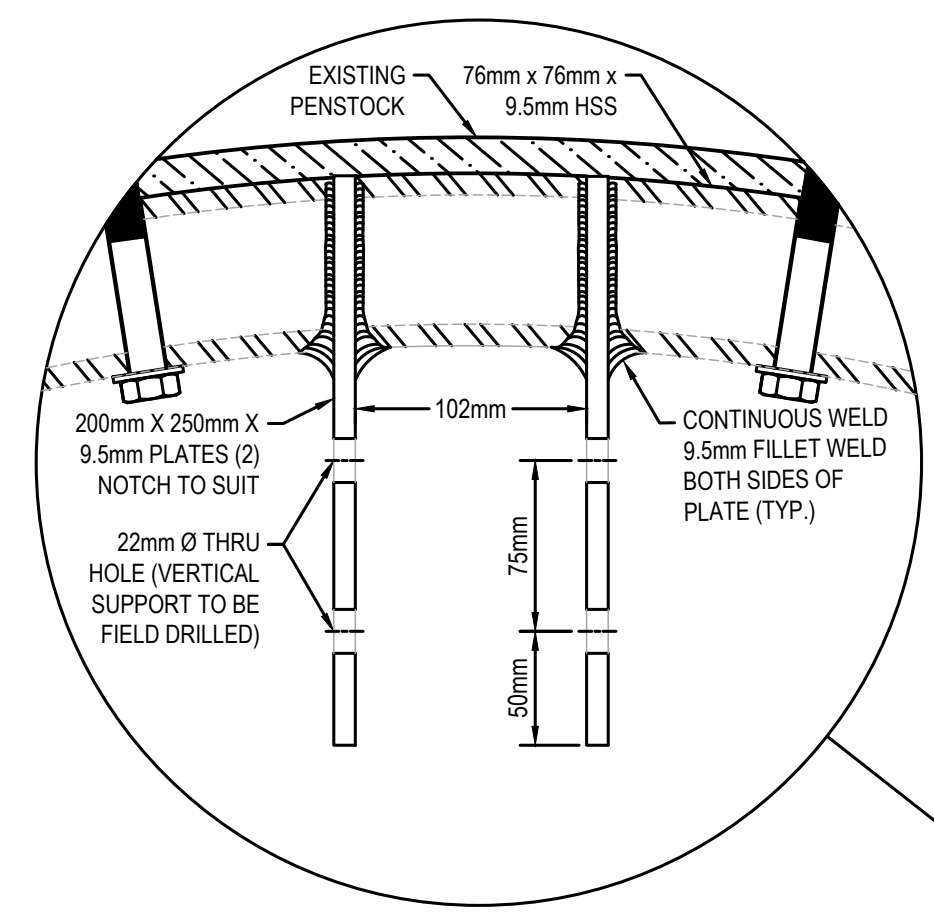
Drawing title / Titre de la feuille: **PENSTOCK ACCESS INFORMATION**

Designed by / Conçue par: M.CARBONE / J.DICERBO / D.SPACEK	Date: DEC 18, 2020
Drawn by / Dessiné par: M.CARBONE	Date: DEC 18, 2020
Checked by / Vérifié par: J.DICERBO / D. SPACEK	Date: DEC 18, 2020
Approved by / Approuvé par: D.SPACEK	Date: DEC 18, 2020
Project No. / N° du projet: 511S.S.M	Scale / Echelle: NTS
Drawing Set No. / N° de série du deS.S.in: -	Sheet No. / N° de la feuille: C2.1

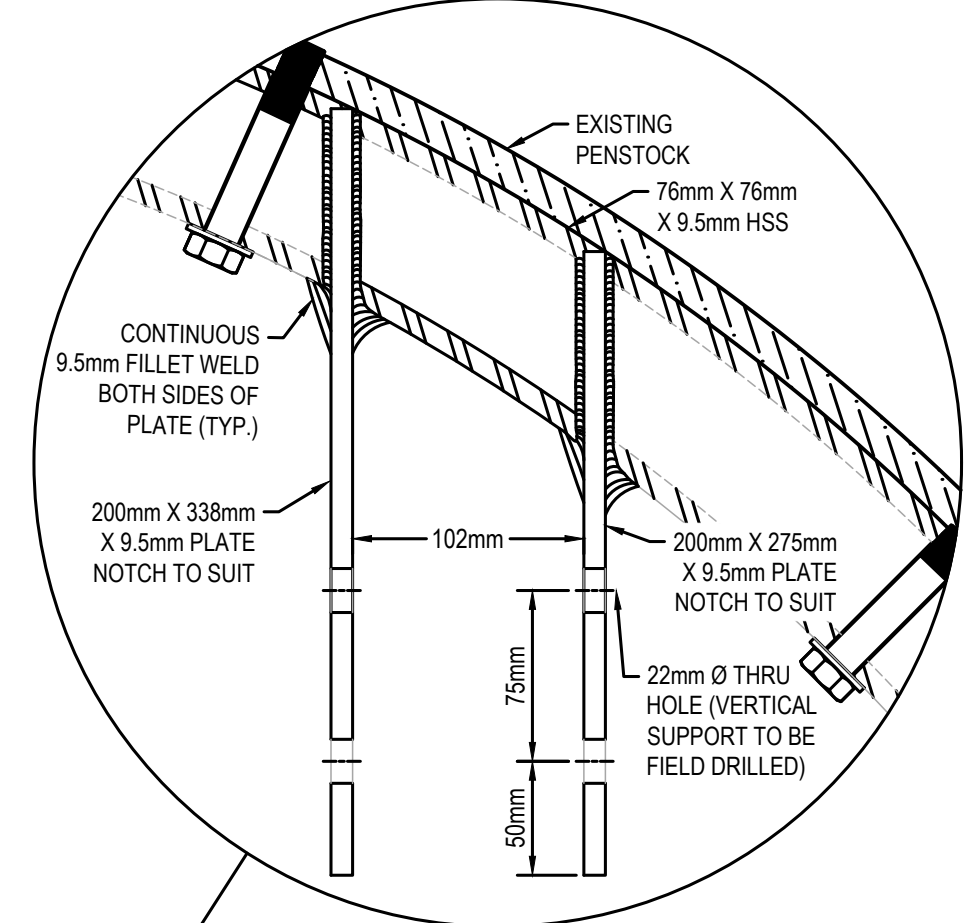
KEY PLAN:



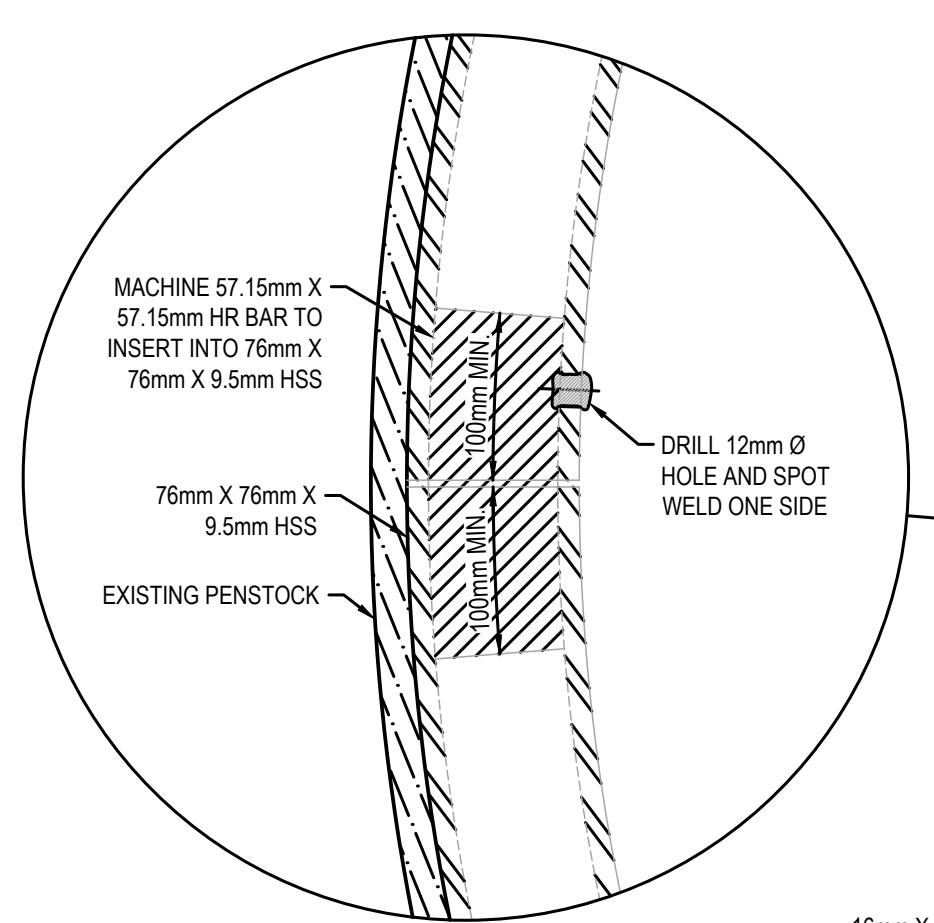
SAULT STE. MARIE, ONTARIO



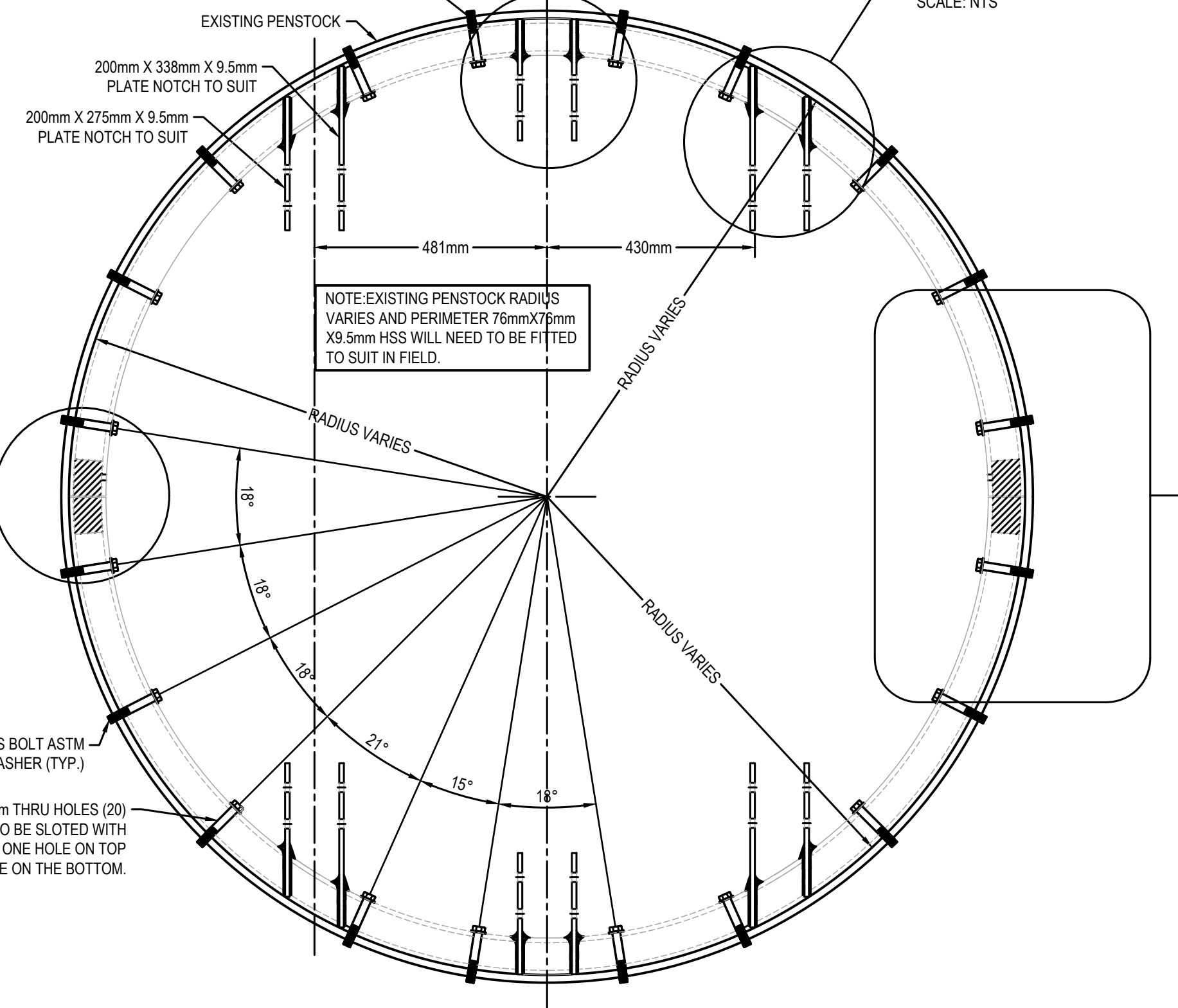
SUPPORT PLATE DETAIL
SCALE: NTS



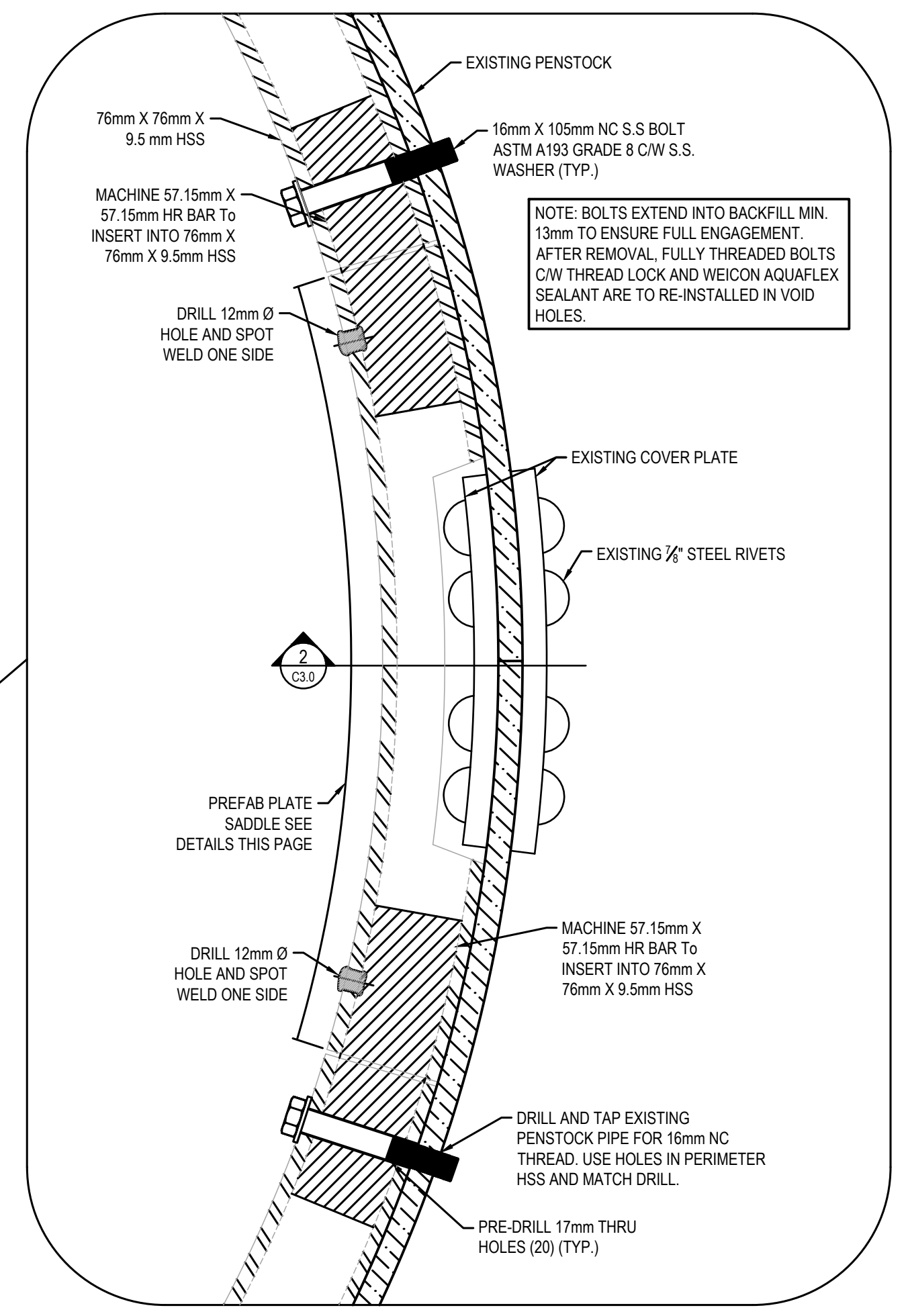
SUPPORT PLATE DETAIL
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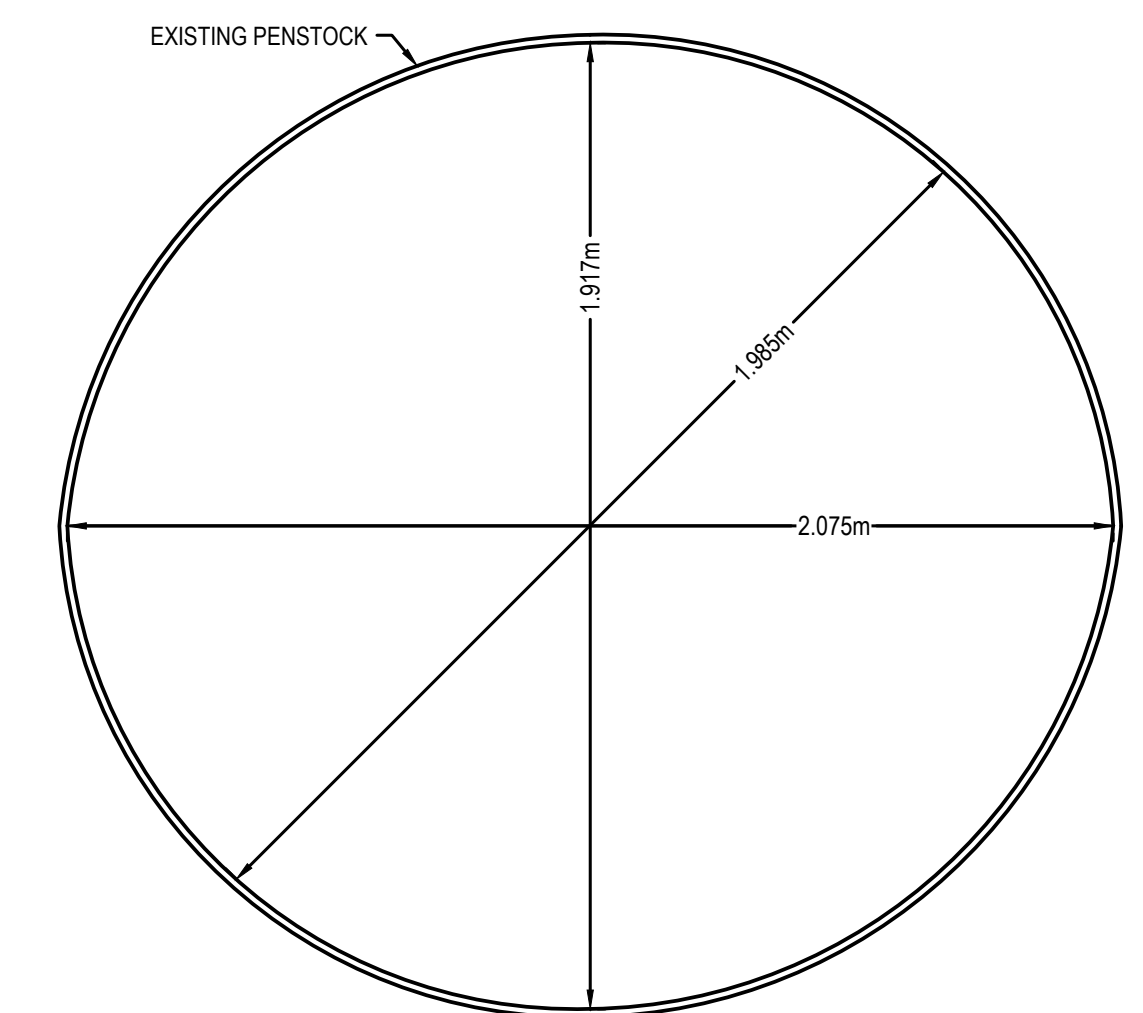
HSS COUPLING DETAIL
SCALE: NTS



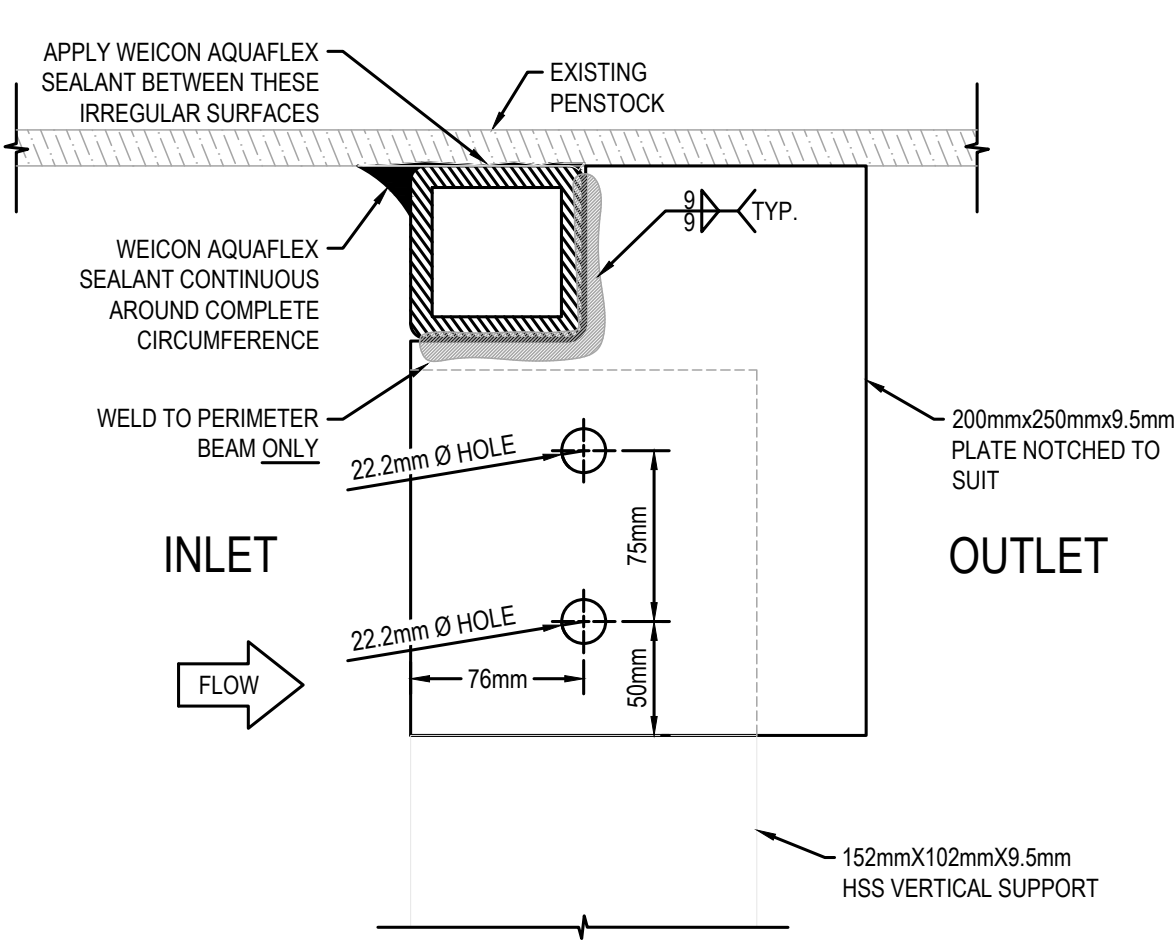
STEP 1-BULKHEAD CIRCUMFERENCE RING
SCALE: 1:10



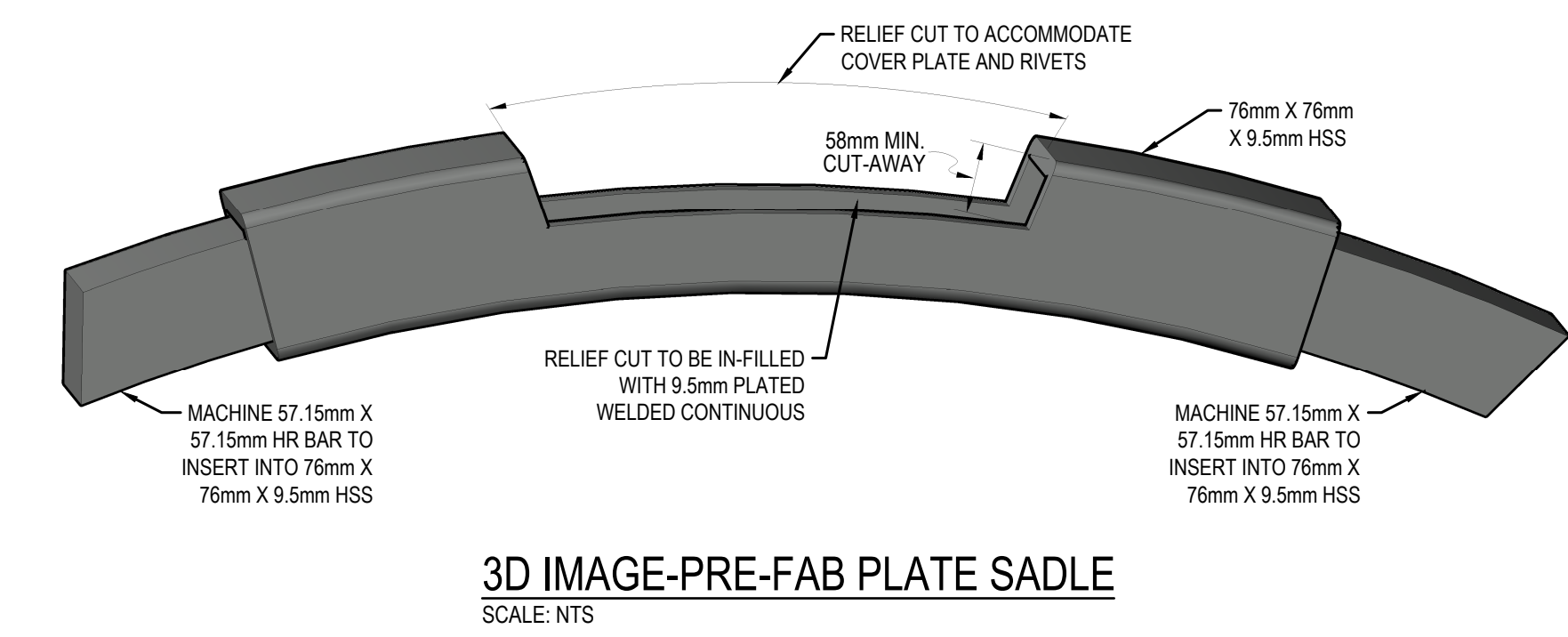
PRE-FAB PLATE SADDLE DETAILS
SCALE: NTS



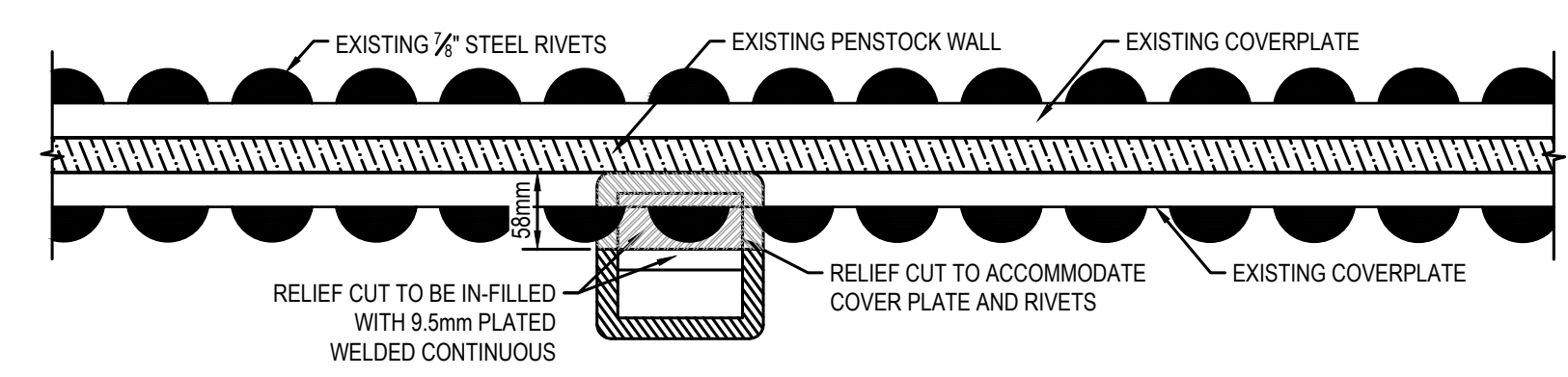
APPROXIMATE DIMENSIONS AT 86 METER CHAINAGE
SCALE: NTS



1 CIRCUMFERENCE PIPE CONNECTION DETAIL
SCALE: NTS



2 PRE-FAB PLATE SADDLE W/RELIEF CUT DETAIL
SCALE: NTS



No.	Date	Description	Drawn by	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACAK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACAK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACAK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACAK

Revision / Revision

A	Detail number	A Numéro de détail
B	Sheet number	B Numéro de la feuille

Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name / Nom de l'expert-conseil: **wsp**

Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACAK**

Project title / Titre du projet: **BULKHEAD INSTALLATION SAULT STE. MARIE CANAL**

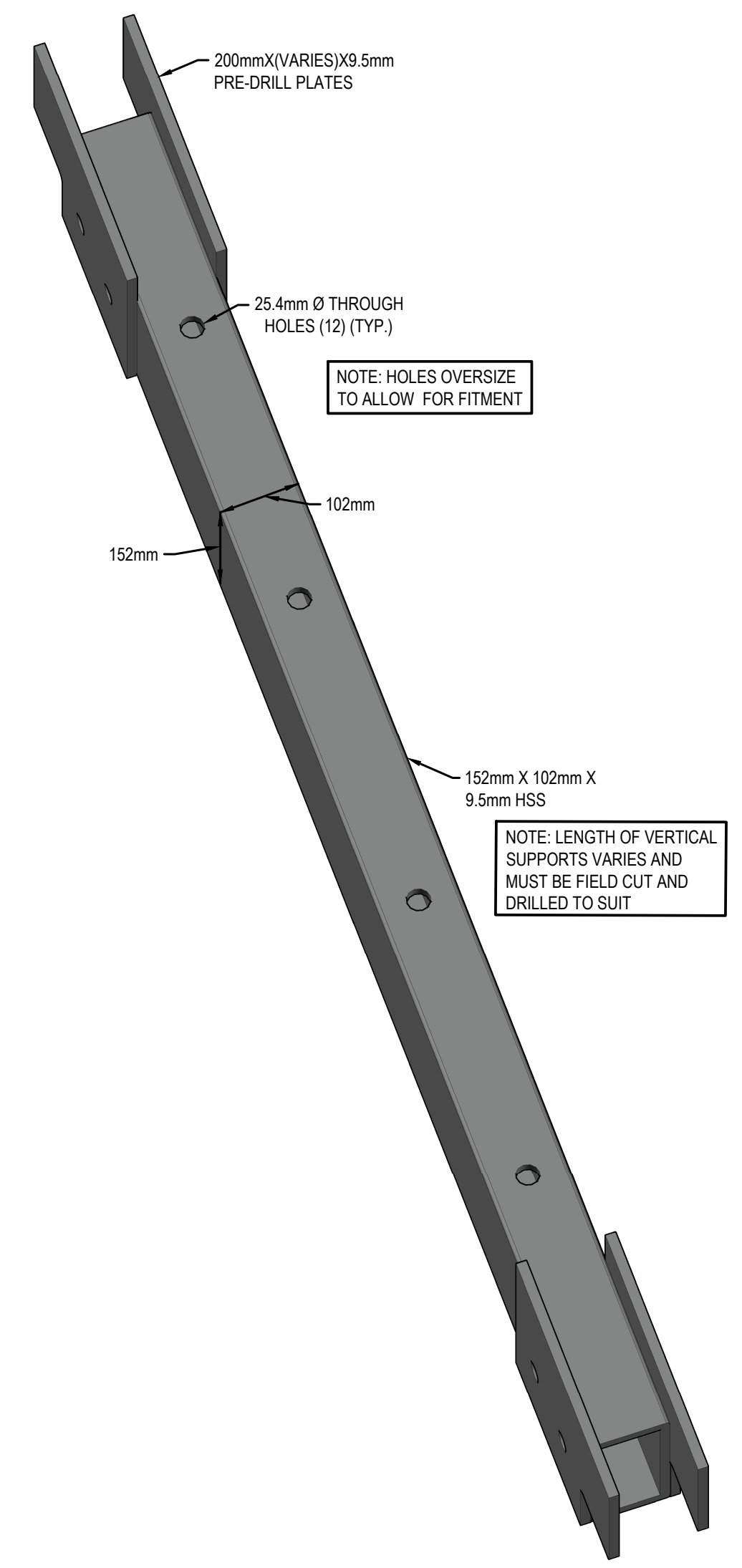
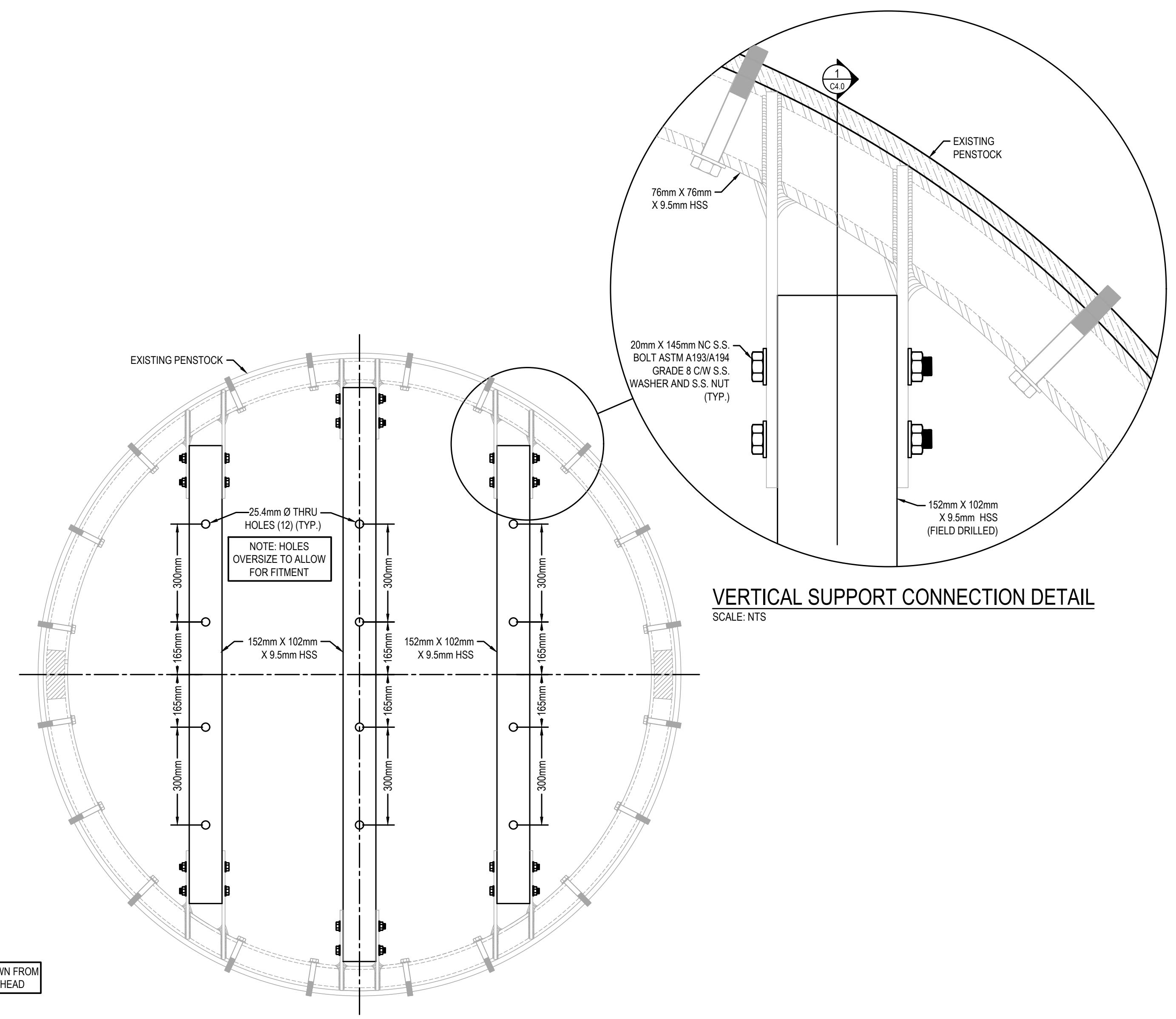
Drawing title / Titre du deS.S.in: **BULKHEAD #1 DESIGN AND INSTALLATION STEP 1- CIRCUMFERENCE RING INSTALLATION**

Designed by / Concept par: M.CARBONE / J.DICERBO / D.SPACAK	Date: DEC 18, 2020
Drawn by / Dessiné par: M.CARBONE	Date: DEC 18, 2020
Checked by / Vérifié par: J.DICERBO / D. SPACAK	Date: DEC 18, 2020
Approved by / Approuvé par: D.SPACAK	Date: DEC 18, 2020
Project No. / N° du projet: 511S.S.M	Scale / Echelle: AS NOTED
Drawing Set No. / N° de série du deS.S.in: -	Sheet No. / N° de la feuille: C3.0

KEY PLAN:

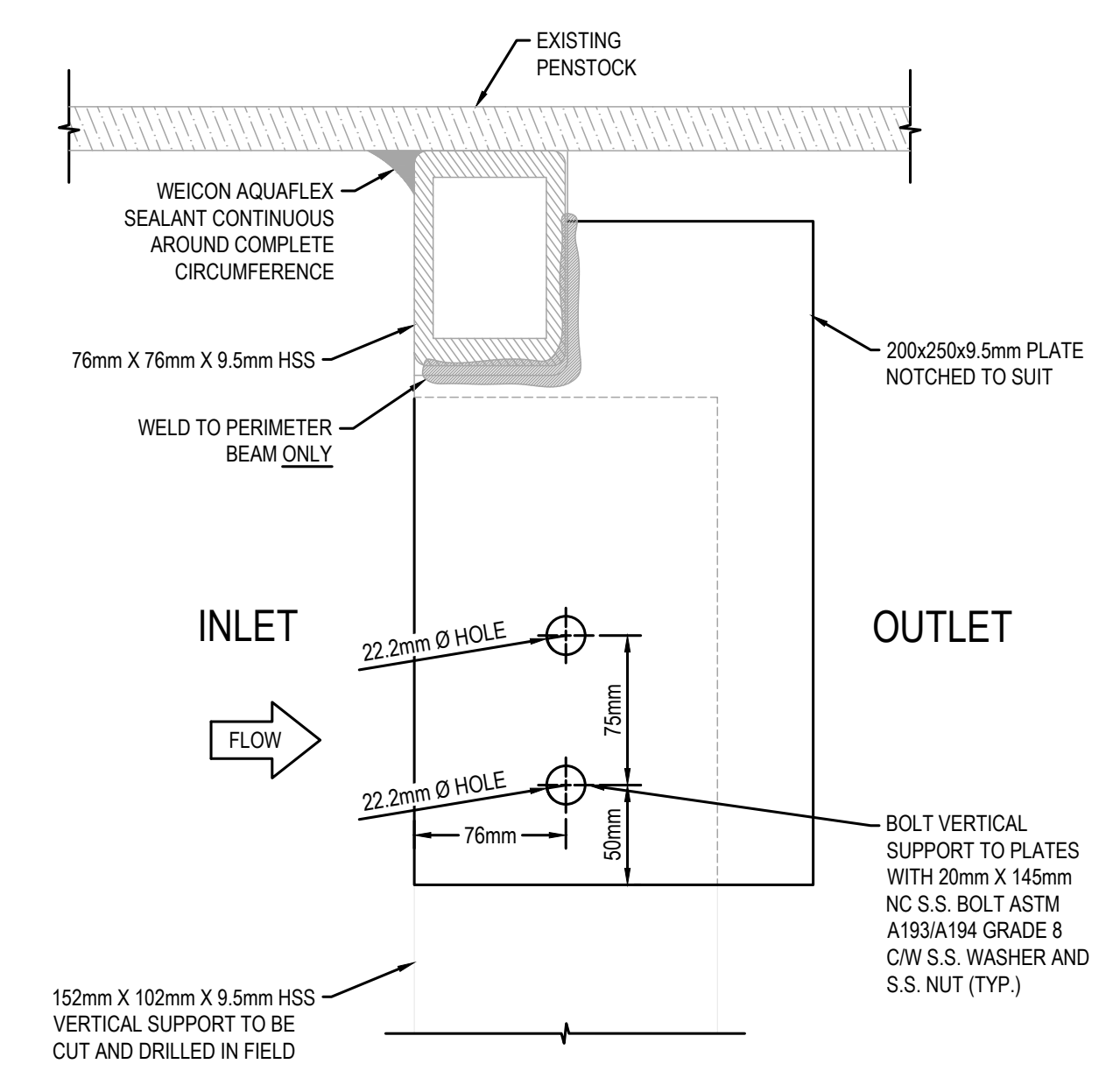


SAULT STE. MARIE, ONTARIO



NOTE: ILLUSTRATION SHOWN FROM THE OUTLET SIDE OF BULKHEAD

STEP 2-VERTICAL SUPPORT INSTALLATION
SCALE: 1:10



No.	Date	Description	Drawn by deS.S.ite pat	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

Revision / Revision	
A	Detail number / A Numéro de détail
B	Sheet number / B Numéro de la feuille

Consultant's Name / Nom de l'expert-conseil: **wsp**

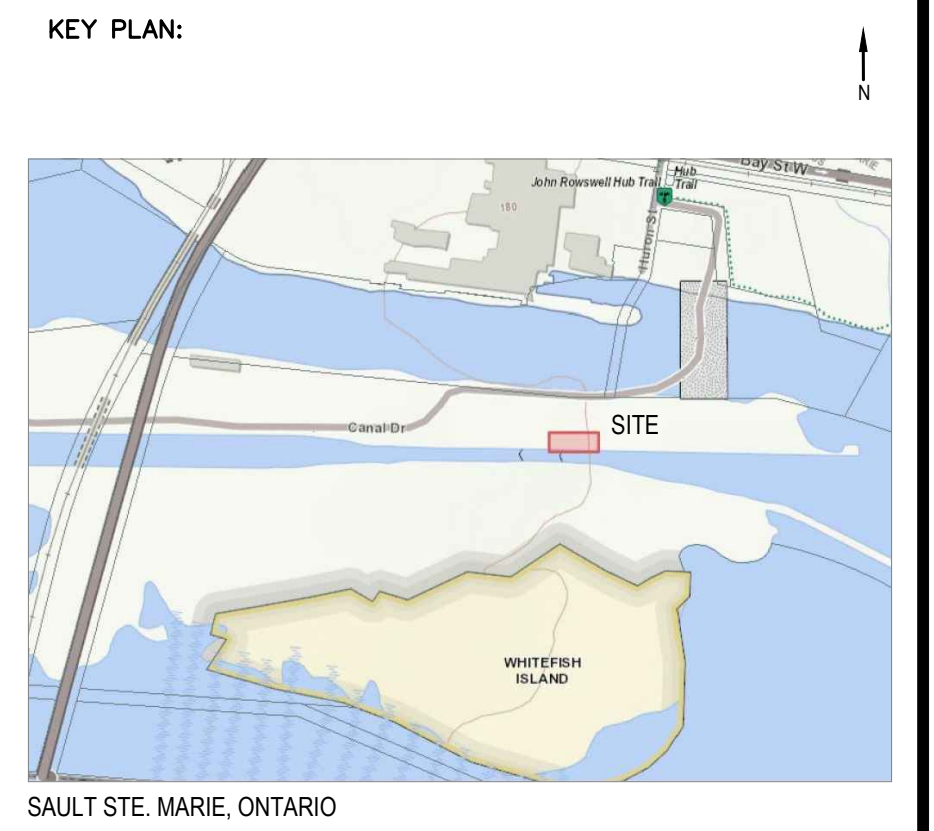
Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACEK**

1348 ROSEMOUNT AVENUE
CORNWALL, ONTARIO CANADA, K6J 3E5
TEL: 613-933-9602 | FAX: 705-638-4335 | WWW.WSP.COM
WSP-SP201-15-001-001 (WSP# 151-00185-14)

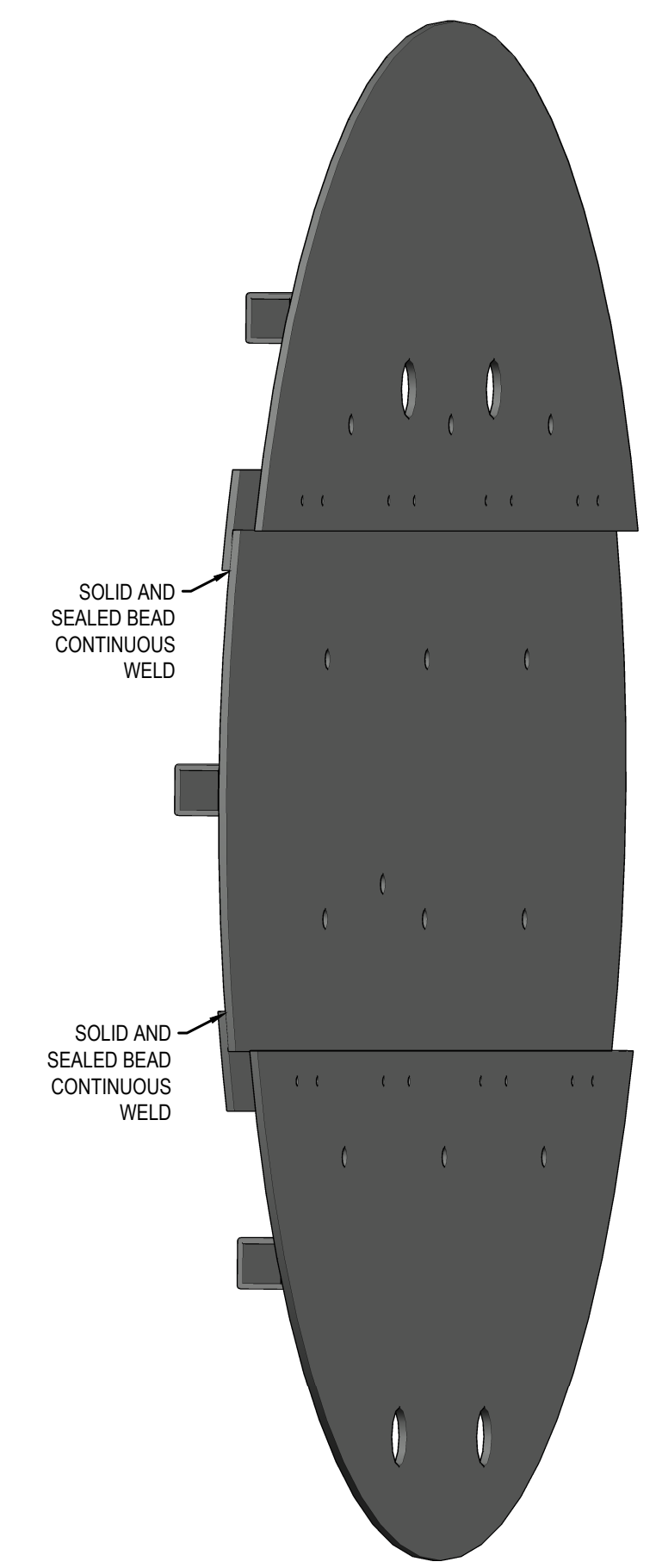
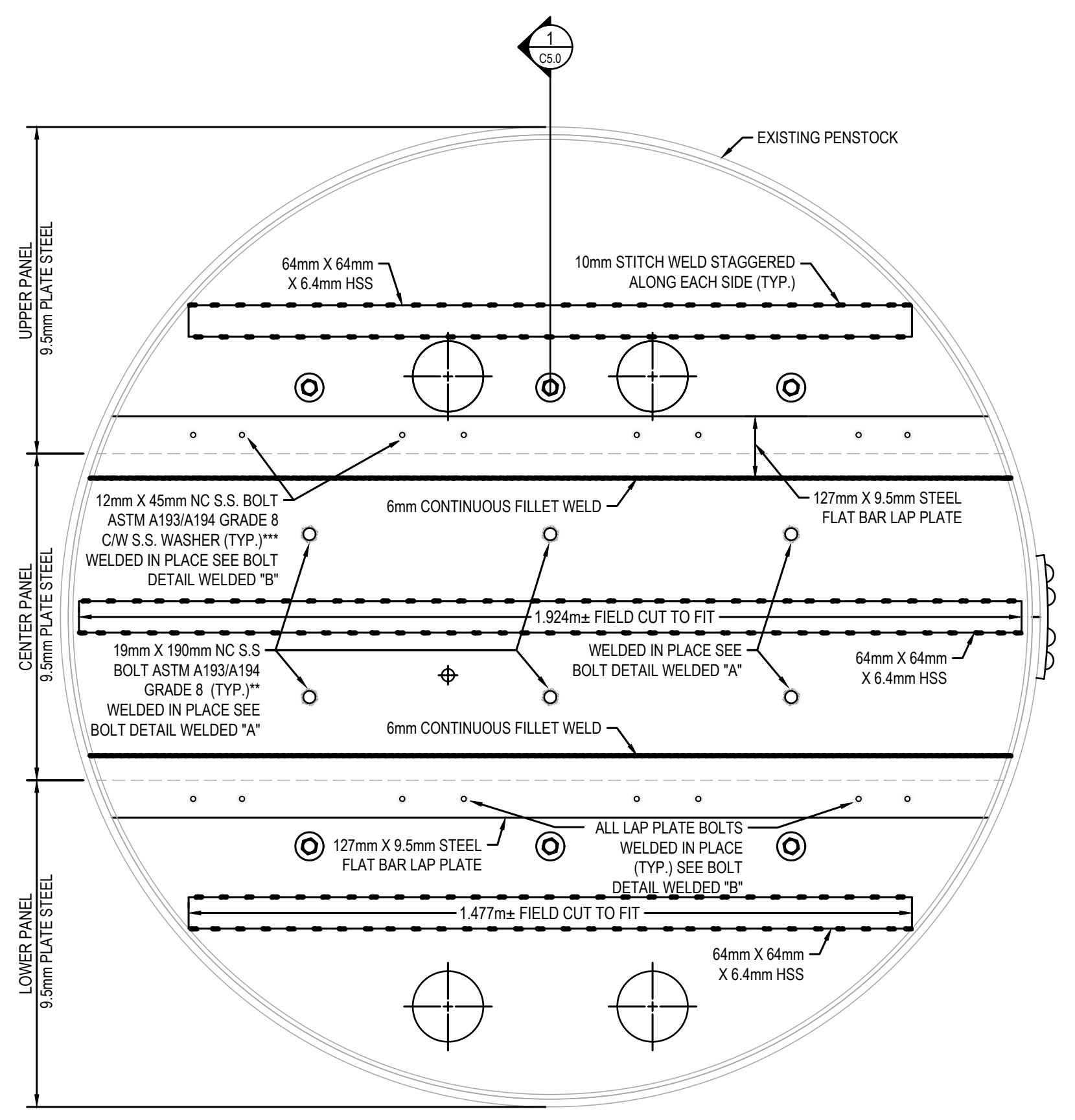
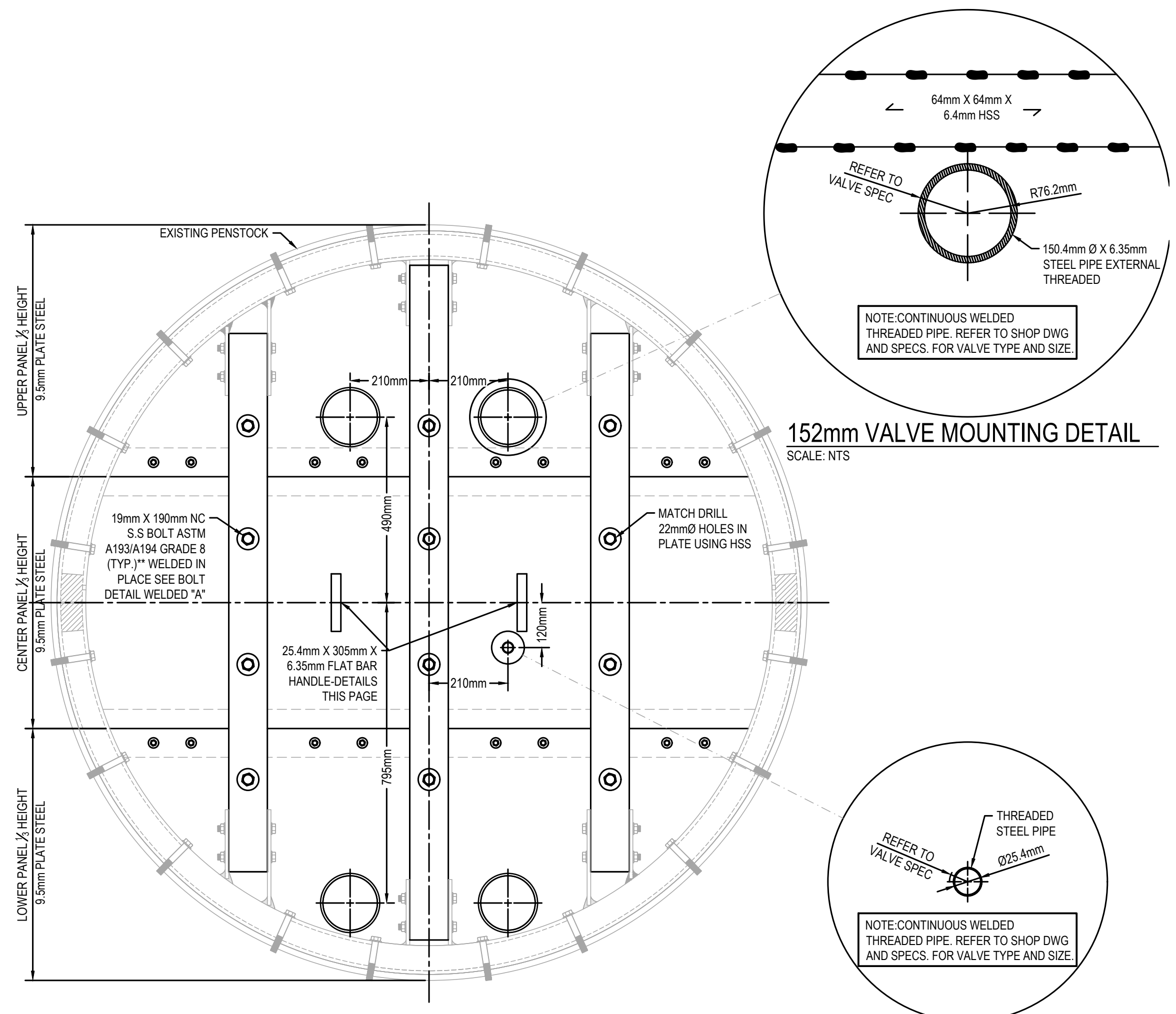
Project title / Titre du projet
BULKHEAD INSTALLATION
SAULT STE. MARIE CANAL

Drawing title / Titre du deS.S.in
BULKHEAD #1 DESIGN AND INSTALLATION
STEP 2- SUPPORT BRACE INSTALLATION

Designed by/Conçeut par M.CARBONE / J.DICERBO / D.SPACEK	Date DEC 18, 2020
Drawn by/Desiné par M.CARBONE	Date DEC 18, 2020
Checked by/Vérifié par J.DICERBO / D. SPACEK	Date DEC 18, 2020
Approved by/Approuvé par D.SPACEK	Date DEC 18, 2020
Project No./N° du projet 511S.S.M	Scale/Echelle AS NOTED
Drawing Set No./N° de série du deS.S.in -	Sheet No./N° de la feuille C4.0



T IN THE FIELD AS THERE WILL BE NO ACCESS ONCE PANEL IS LIFTED INTO PLACE. REFER TO SPECIFICATIONS FOR SUITABLE WELDING PROCEDURES FOR WELDING STAINLESS STEEL TO CARBON STEEL TO MAINTAIN BOLT INTEGRITY.



NOTE: ILLUSTRATION SHOWN FROM THE OUTLET SIDE OF BULKHEAD

NOTE: ALL STEEL PLATES AND MEMBERS ARE TO BE PRIMED AND EPOXY PAINT TOP COAT

NOTE: CONTINUOUS WELDED THREADED PIPE. REFER TO SHOP DWG AND SPECS. FOR VALVE TYPE AND SIZE

NOTE: ILLUSTRATION SHOWN FROM THE INLET SIDE OF BULKHEAD WITH COVER PLATES SHOWN AT AN ASSUMED 3 O'CLOCK POSITION

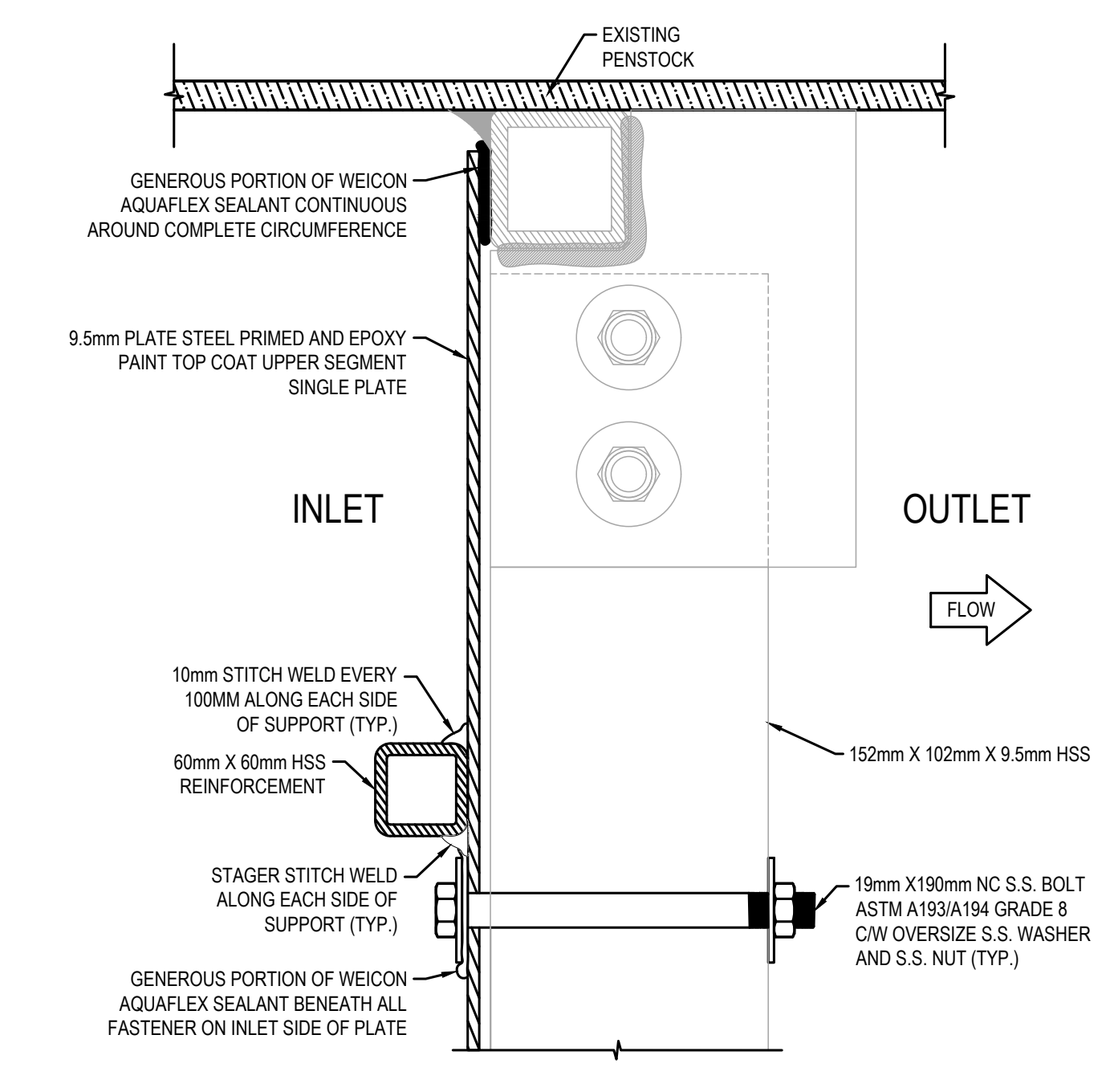
NOTE: BOLTS ON CENTER PANEL WILL NEED TO BE WELDED IN PLACE AFTER FITMENT IN THE FIELD AS THERE WILL BE NO ACCESS ONCE PANEL IS LIFTED INTO PLACE. REFER TO SPECIFICATIONS FOR SUITABLE WELDING PROCEDURES FOR WELDING STAINLESS STEEL TO CARBON STEEL TO MAINTAIN BOLT INTEGRITY.

NOTE: BOLTS ON LAP PLATES WILL NEED TO BE SPACED EVENLY BETWEEN VERTICAL SUPPORTS WELDED IN PLACE AFTER FITMENT IN THE FIELD AS THERE WILL BE NO ACCESS ONCE PANEL IS LIFTED INTO PLACE WEICON AQUAFLEX SEALANT TO BE APPLIED TO ALL FASTENERS AND BETWEEN LAP PLATE AND MATING SURFACE (TYP.)

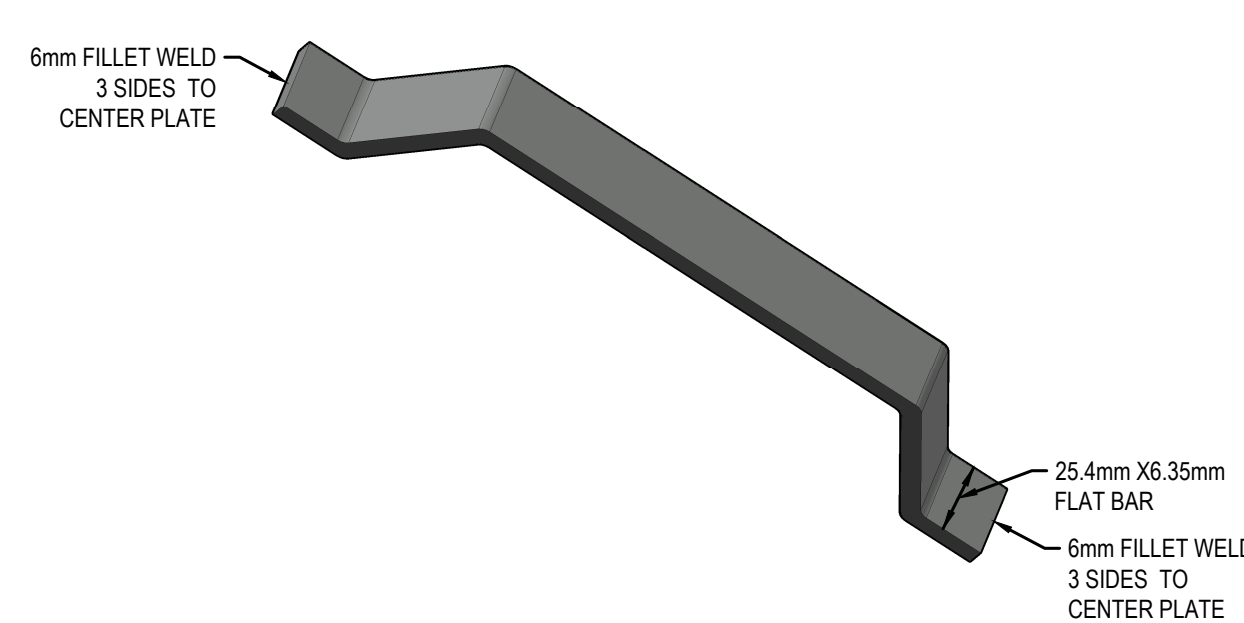
STEP 3- FLAT PLATE INSTALLATION
SCALE: 1:10

STEP 3- FLAT PLATE INSTALLATION
SCALE: 1:10

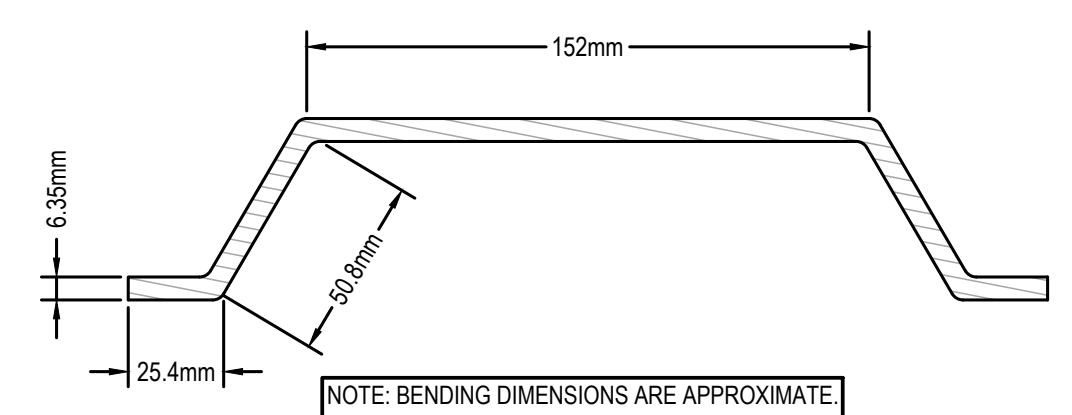
3D IMAGE-FLAT PLATES
SCALE: NTS



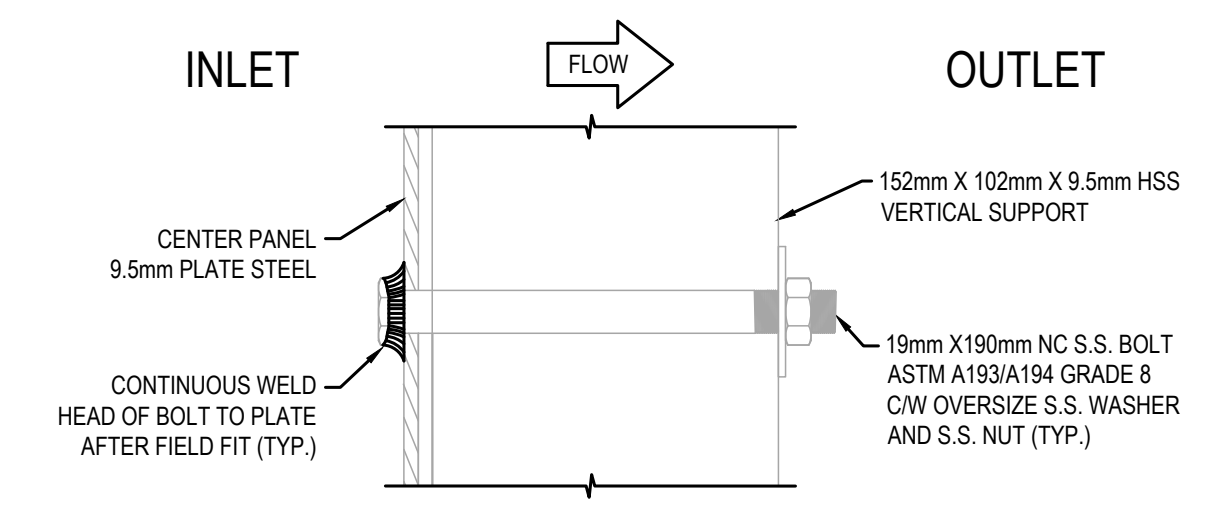
1 SUPPORT BRACE CONNECTION DETAILS
SCALE: NTS



3D FLAT BAR HANDLE
SCALE: NTS

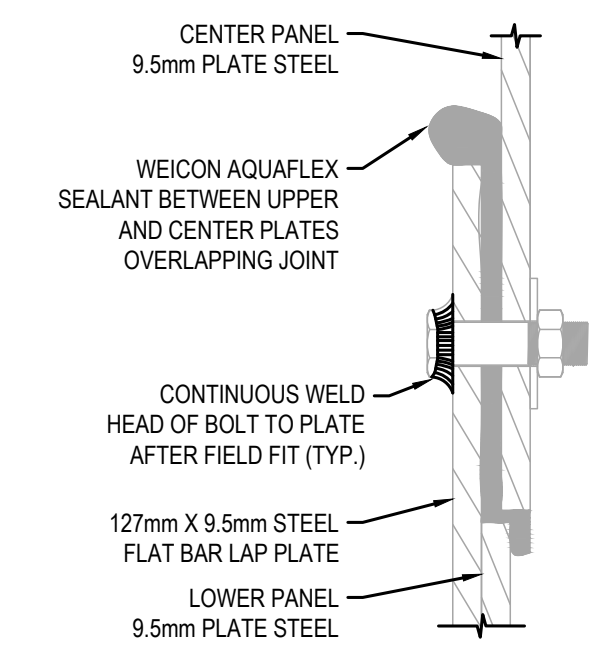


FLAT BAR HANDLE DETAILS
SCALE: NTS



NOTE: ALL 6 BOLTS ON CENTER PANEL WILL NEED TO BE CONTINUOUS WELDED IN PLACE AFTER FITMENT IN THE FIELD AS THERE WILL BE NO ACCESS ONCE PANEL IS LIFTED INTO PLACE. REFER TO SPECIFICATIONS FOR SUITABLE WELDING PROCEDURES FOR WELDING STAINLESS STEEL TO CARBON STEEL TO MAINTAIN BOLT INTEGRITY.

BOLT DETAIL WELDED "A"
SCALE: NTS



NOTE: ALL BOLTS ON LAP PLATES WILL NEED TO BE SPACED EVENLY BETWEEN VERTICAL SUPPORTS AND CONTINUOUS WELDED IN PLACE AFTER FITMENT IN THE FIELD AS THERE WILL BE NO ACCESS ONCE PANEL IS LIFTED INTO PLACE WEICON AQUAFLEX SEALANT TO BE APPLIED TO ALL FASTENERS AND BETWEEN LAP PLATE AND MATING SURFACE (TYP.)

BOLT DETAIL WELDED "B"
SCALE: NTS

No.	Date	Description	Drawn by	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

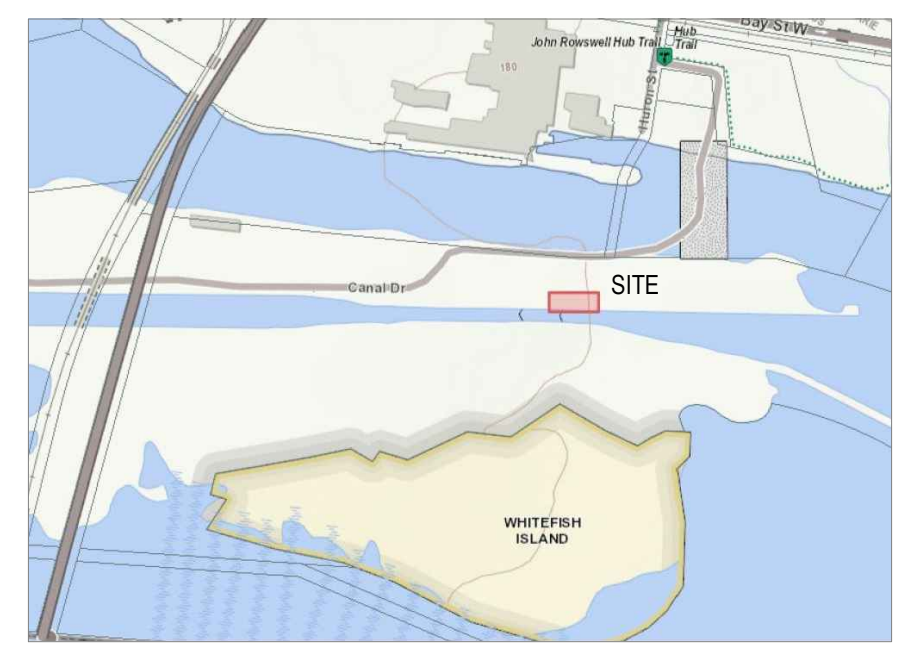
Revision / Révision	
A	Detail number / A Numéro de détail
B	Sheet number / B Numéro de la feuille
Linear dimensions in millimetres / Dimensions linéaires en millimètres	
Consultant's Name / Nom de l'expert-consultant	
wsp	
1348 ROSEMOUNT AVENUE CORNWALL, ONTARIO CANADA N6L 3E5 TEL: 613-933-9802 FAX: 705-638-0335 WWW.WSP.COM WSP-SP201-15-001-001 (WSP# 15100185-14)	
Eng. Stamp / Sceau de l'ingénieur	
D. M. SPACEK PROFESSIONAL ENGINEER PROVINCE OF ONTARIO	

Project Title / Titre du projet
BULKHEAD INSTALLATION SAULT STE. MARIE CANAL

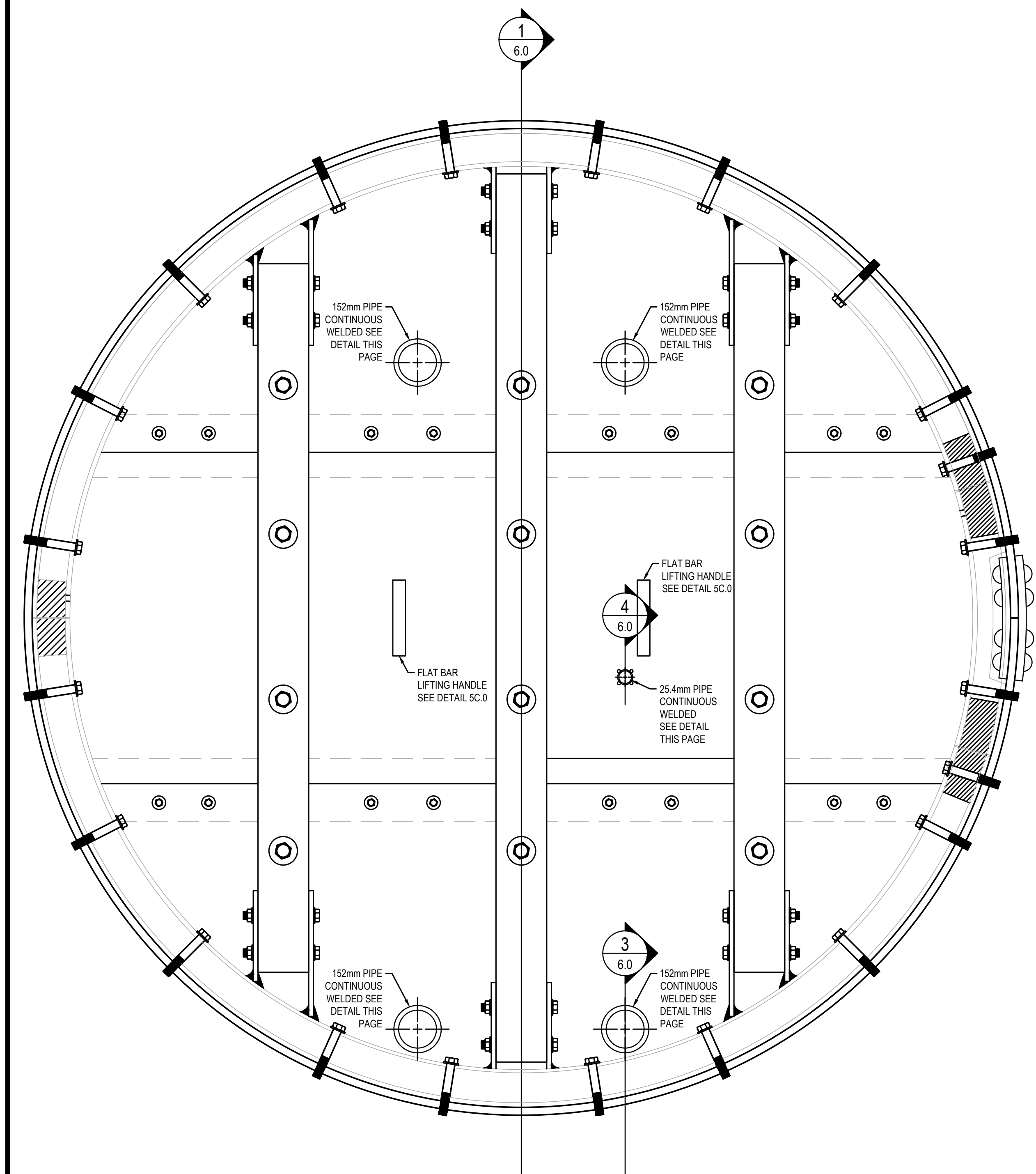
Drawing Title / Titre de la ds.S.in
BULKHEAD #1 DESIGN AND INSTALLATION STEP 3- FLAT PLATE INSTALLATION

Designed by / Conçue par M.CARBONE / J.DICERBO / D.SPACEK	Date DEC 18, 2020
Drawn by / Dessiné par M.CARBONE	Date DEC 18, 2020
Checked by / Vérifié par J.DICERBO / D. SPACEK	Date DEC 18, 2020
Approved by / Approuvé par D.SPACEK	Date DEC 18, 2020
Project No./N° du projet 511S.S.M	Scale/Echelle AS NOTED
Drawing Set No./N° de série du ds.S.in -	Sheet No./N° de la feuille C5.0

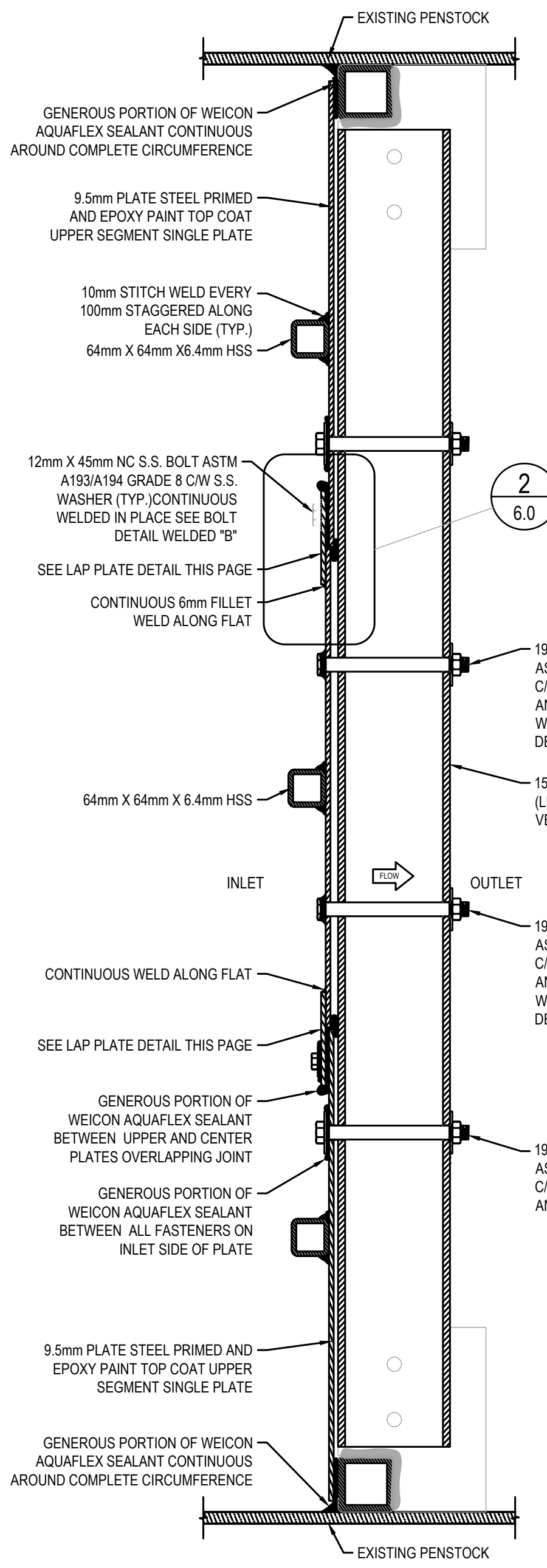
KEY PLAN:



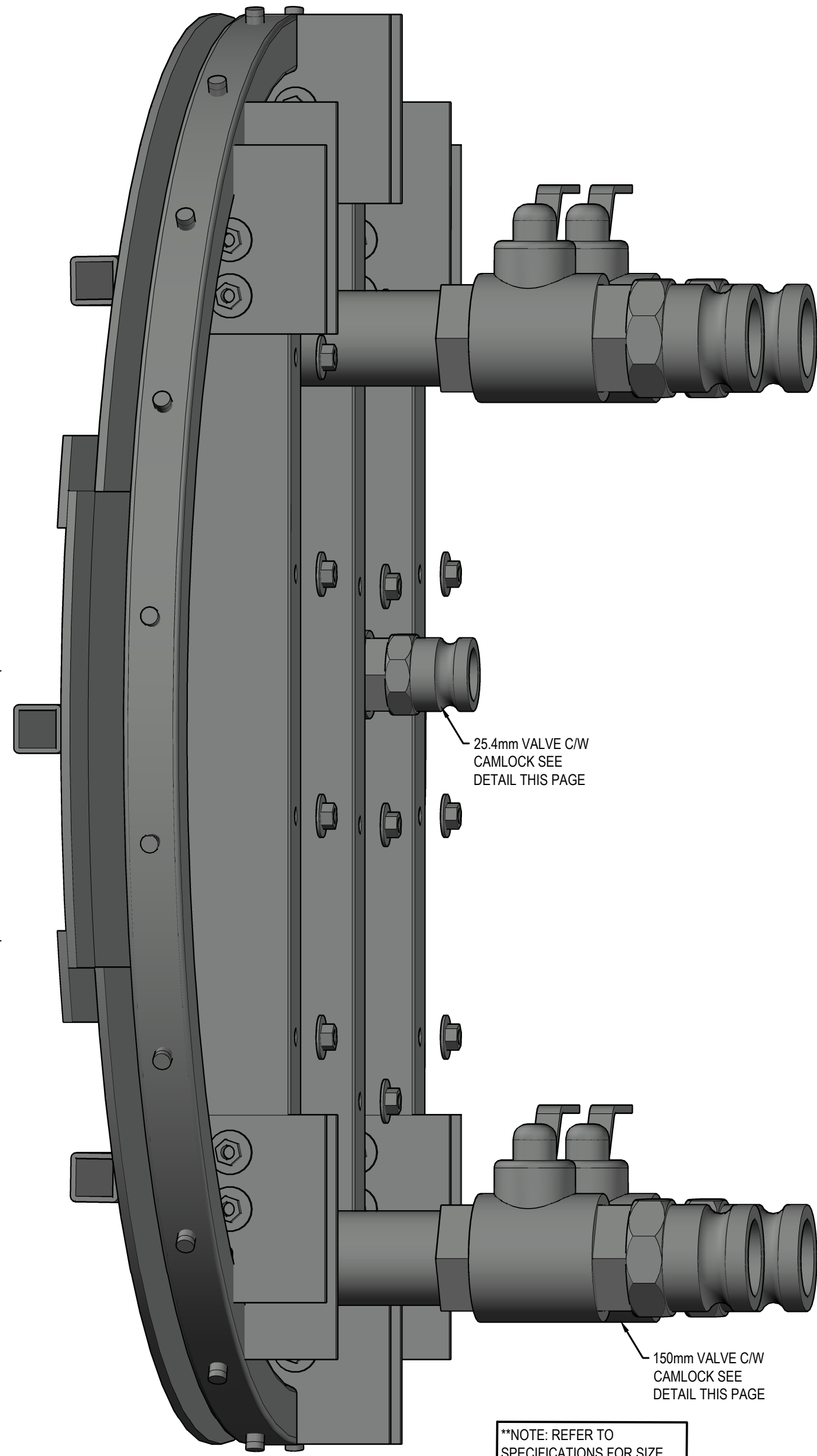
SAULT STE. MARIE, ONTARIO



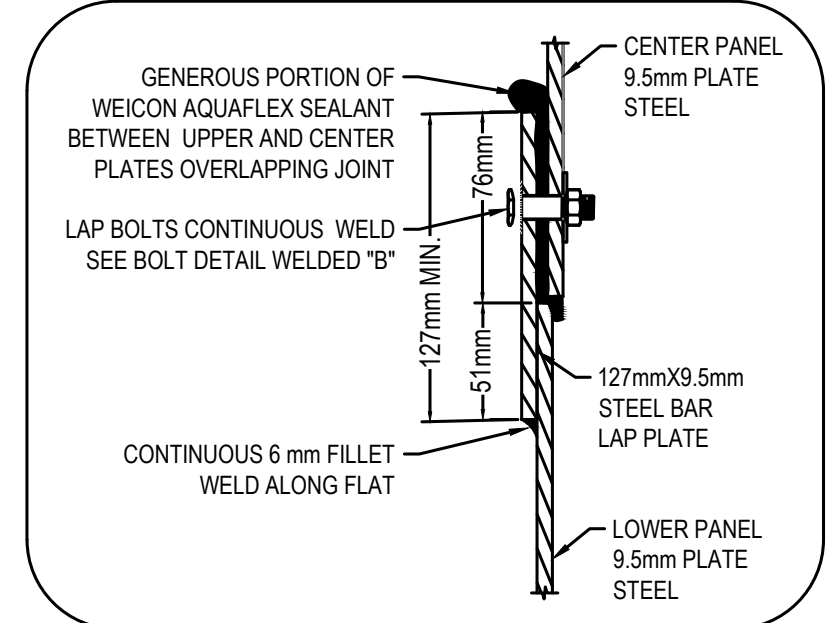
COMPLETE ASSEMBLY ELEVATION
SCALE: 1:10



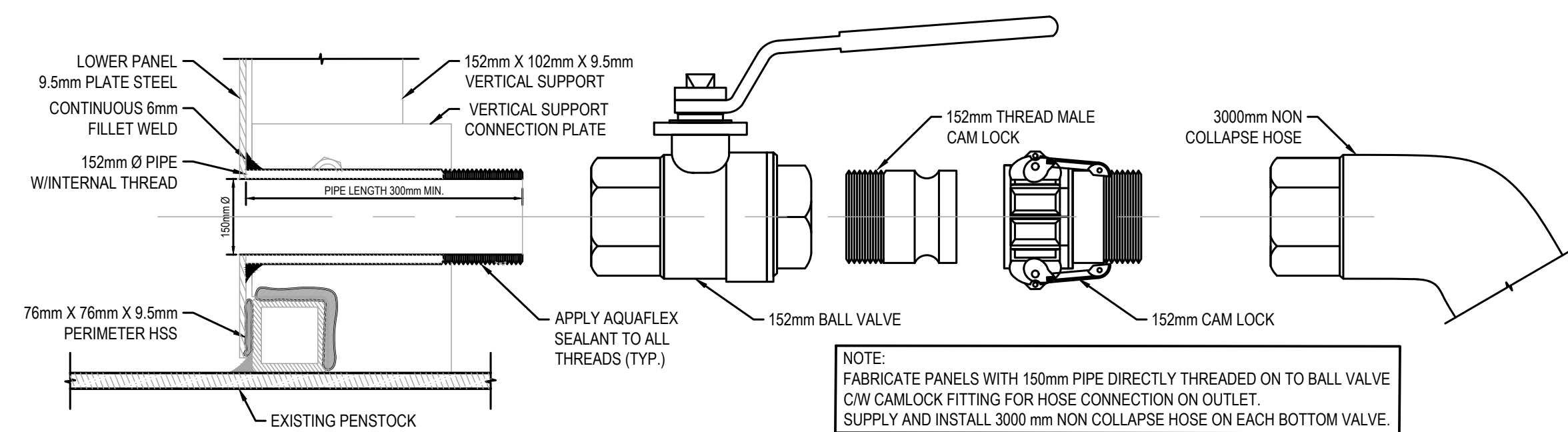
COMPLETE ASSEMBLY SECTION DETAILS
SCALE: NTS



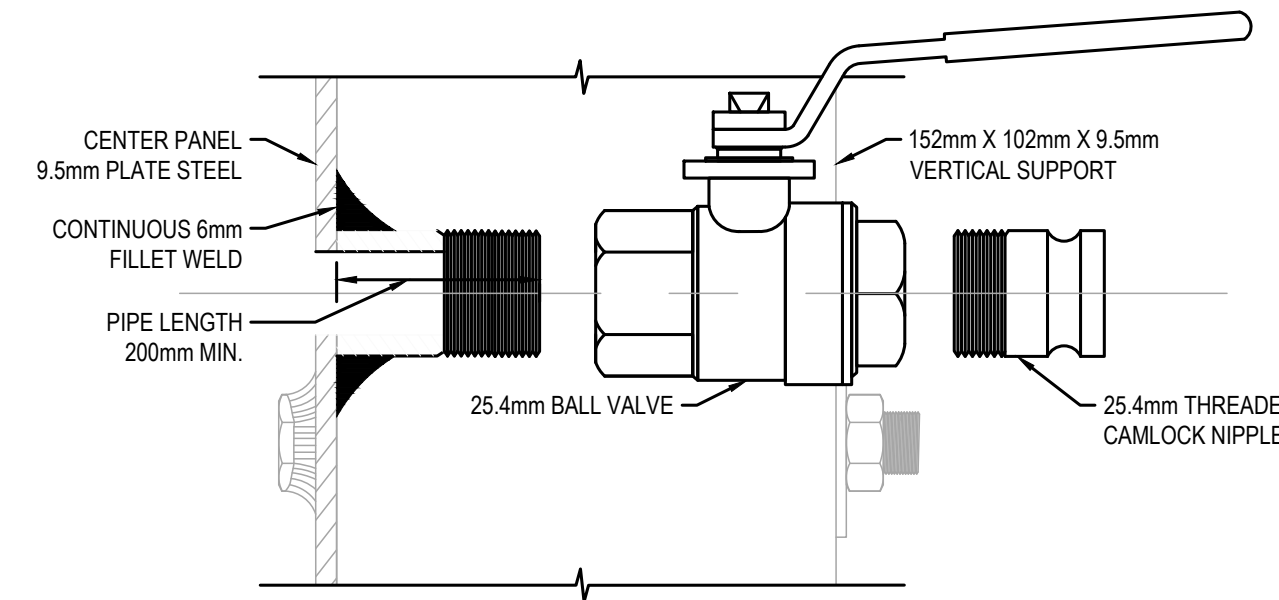
ISOMETRIC IMAGE-COMPLETE ASSEMBLY
SCALE: NTS



LAP PLATE DETAIL
SCALE: NTS



152mm VALVE TO PLATE CONNECTION DETAIL (TYP.)
SCALE: NTS



25.4mm VALVE TO PLATE CONNECTION DETAIL
SCALE: NTS

No.	Date	Description	Drawn by	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

Revision / Revision	
A	Detail number
B	Sheet number

Linear dimensions in millimetres	Dimensions linéaires en millimètres
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Consultant's Name / Nom de l'expert-consultant: **wsp**

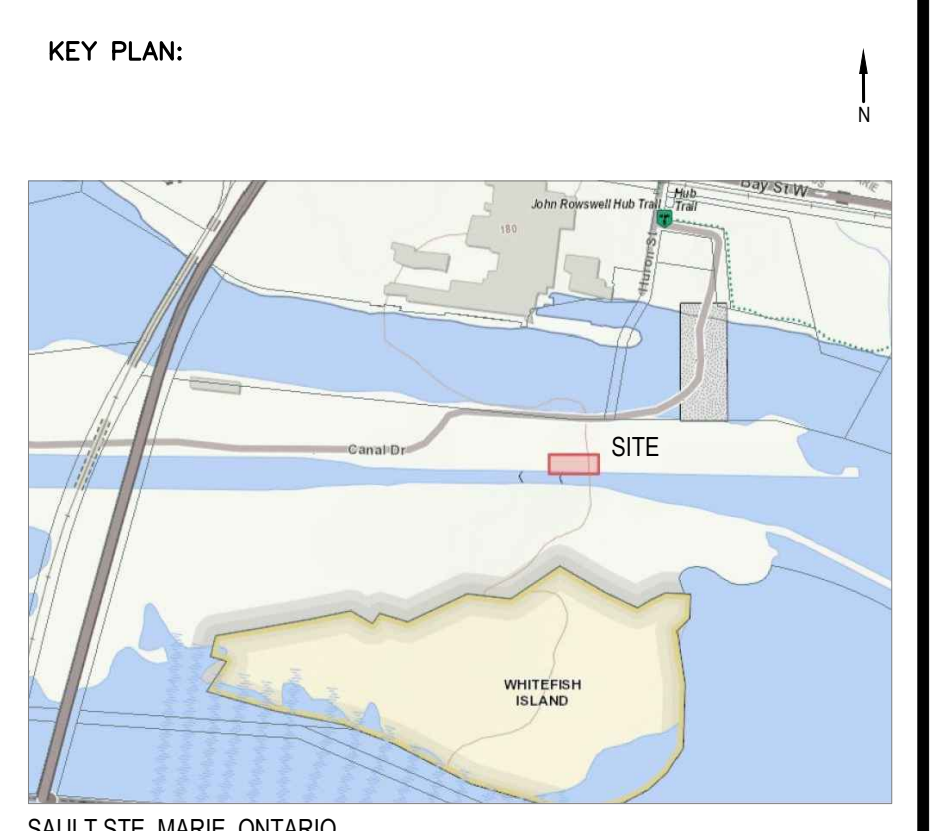
1348 ROSERACANT AVENUE
CORNWALL, ONTARIO CANADA N6L 3E5
TEL: 613-933-8802 | FAX: 705-638-0335 | WWW.WSP.COM
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Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACEK**

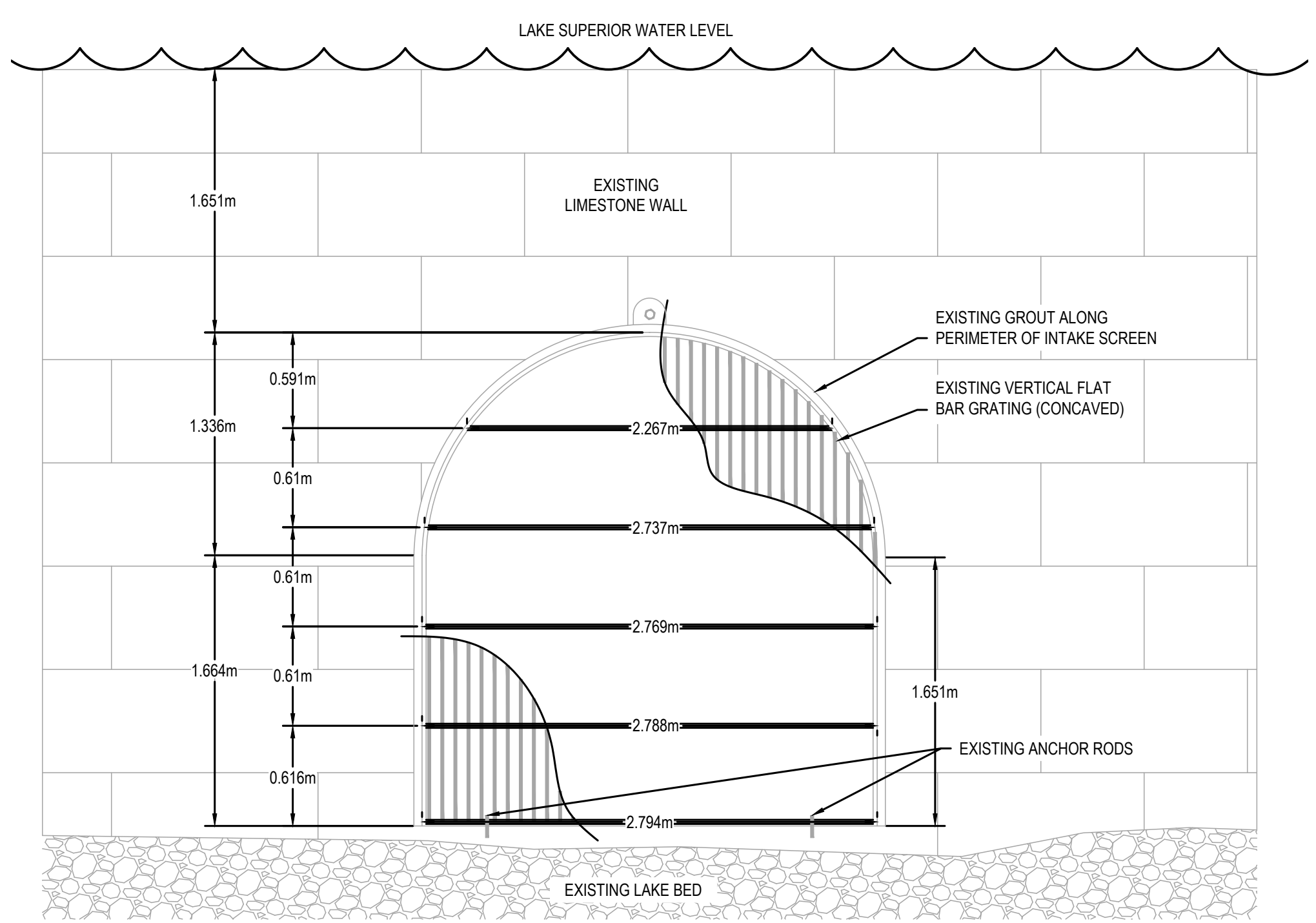
Project title / Titre du projet: **BULKHEAD INSTALLATION SAULT STE. MARIE CANAL**

Drawing title / Titre du deS.S.in: **BULKHEAD #1 DESIGN AND INSTALLATION COMPLETE ASSEMBLY SECTION VIEW**

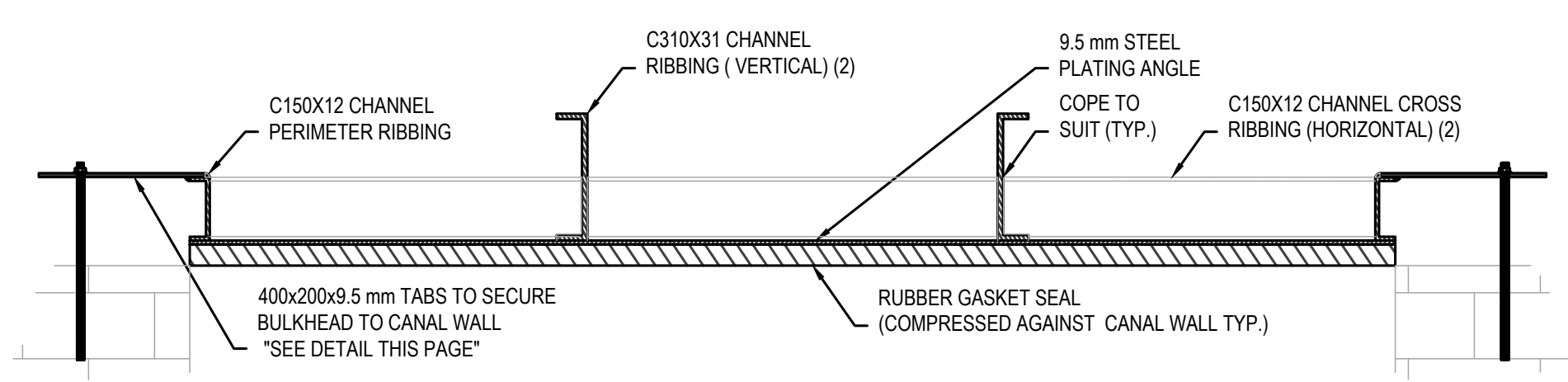
Designed by / Conçeut par: M.CARBONE / J.DICERBO / D.SPACEK	Date: DEC 18, 2020
Drawn by / Dessiné par: M.CARBONE	Date: DEC 18, 2020
Checked by / Vérifié par: J.DICERBO / D. SPACEK	Date: DEC 18, 2020
Approved by / Approuvé par: D.SPACEK	Date: DEC 18, 2020
Project No. / N° du projet: 511S.S.M	Scale / Echelle: AS NOTED
Drawing Set No. / N° de série du deS.S.in: -	Sheet No. / N° de la feuille: C6.0



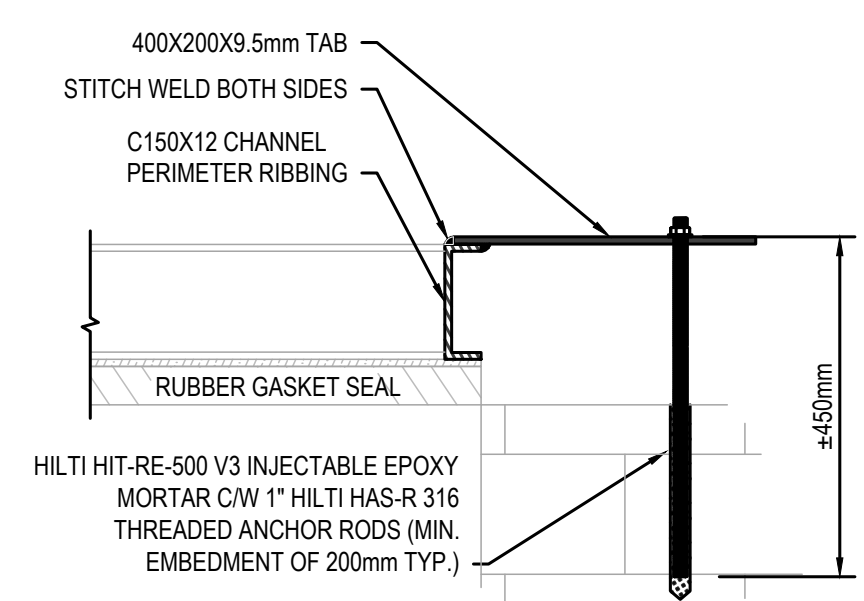
SAULT STE. MARIE, ONTARIO



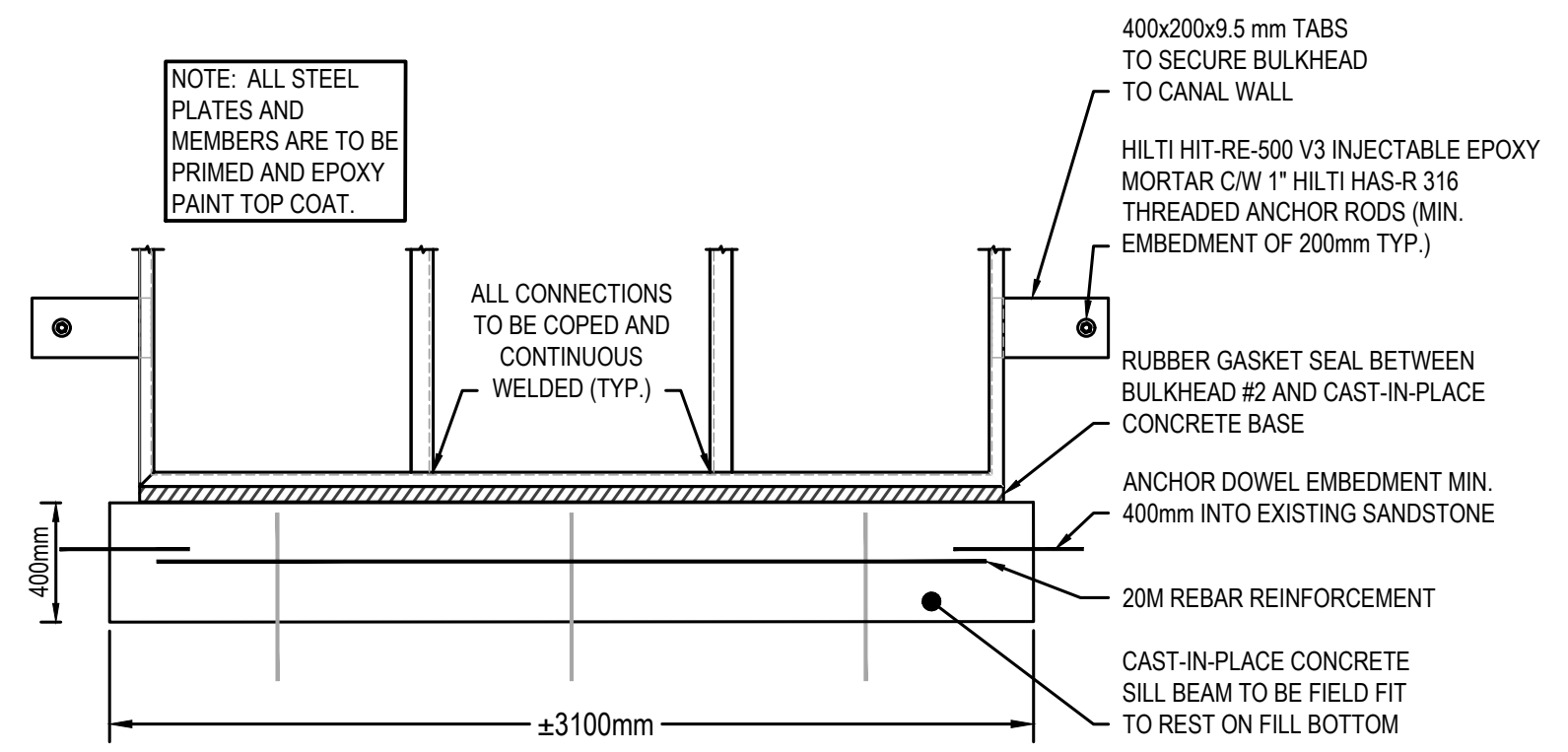
EXISTING INTAKE GRATE
SCALE: NTS



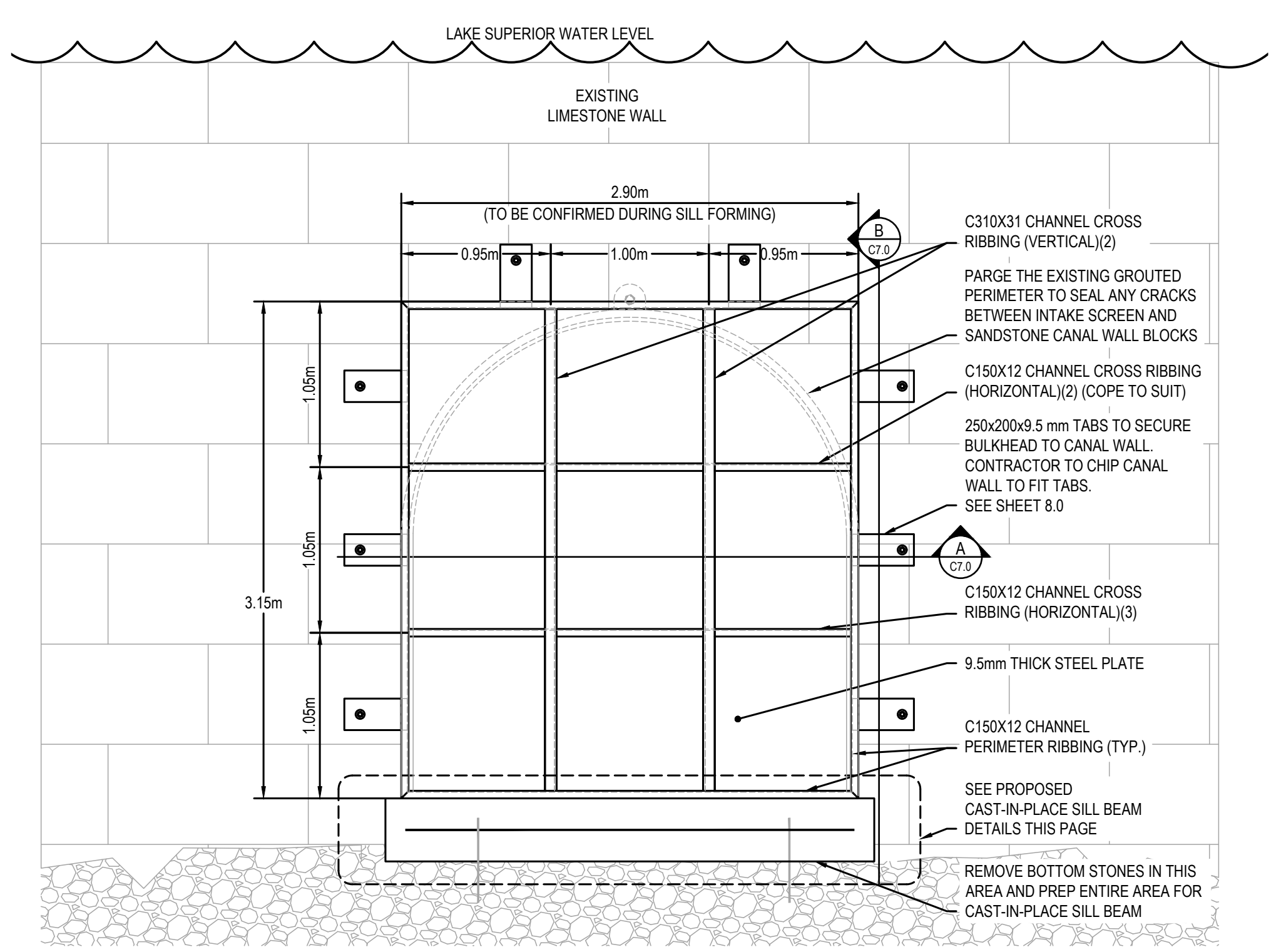
PROPOSED BULKHEAD SECTION
SCALE: 1:15



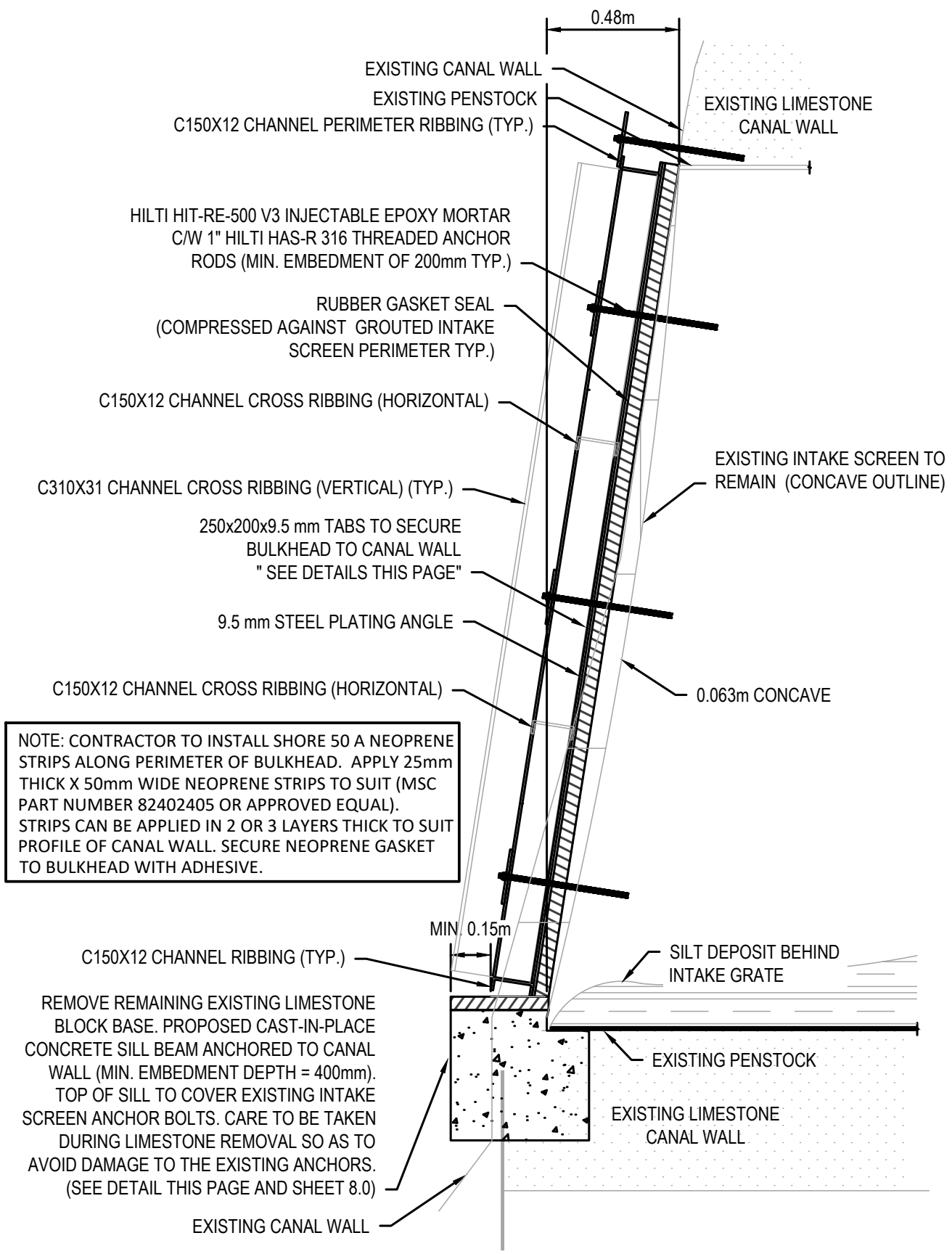
TAB DETAIL
SCALE: NTS



PROPOSED CAST-IN-PLACE CONCRETE SILL BEAM
SCALE: NTS



PROPOSED INTAKE BULKHEAD #2 ELEVATION
SCALE: NTS



PROPOSED INTAKE BULKHEAD SECTION
SCALE: 1:20



VIEW OF EXISTING INTAKE GRATE
SCALE: NTS

No.	Date	Description	Drawn by	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

Revision / Révision	Detail number / Numéro de détail	Sheet number / Numéro de la feuille
A		
B		

Consultant's Name / Nom de l'expert-conseil: **wsp**

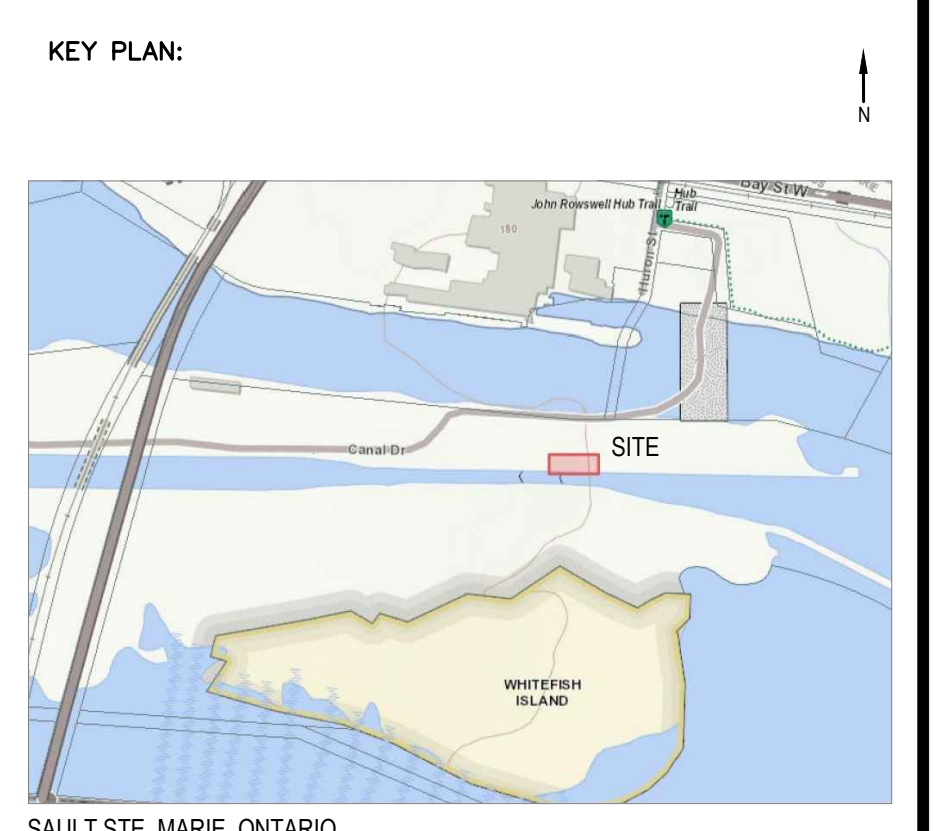
Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACEK**

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CORNWALL, ONTARIO CANADA K6G 3E5
TEL: 613-833-8602 | FAX: 705-636-0335 | WWW.WSP.COM
WSP-SP201-15-001-001 (WSP# 151-00105-14)

Project title / Titre du projet: **BULKHEAD INSTALLATION SAULT STE. MARIE CANAL**

Drawing title / Titre du deS.S.in: **BULKHEAD #2 DESIGN AND INSTALLATION**

Designed by / Conçeut par: M.CARBONE / J.DICERBO / D.SPACEK	Date: DEC 18, 2020
Drawn by / Dessiné par: M.CARBONE	Date: DEC 18, 2020
Checked by / Vérifié par: J.DICERBO / D. SPACEK	Date: DEC 18, 2020
Approved by / Approuvé par: D.SPACEK	Date: DEC 18, 2020
Project No. / N° du projet: 511S.S.M	Scale / Echelle: AS NOTED
Drawing Set No. / N° de série du deS.S.in: -	Sheet No. / N° de la feuille: C7.0



GROUT FILL BETWEEN INTAKE SCREEN AND CANAL WALL TO BE SEALED THROUGH PARGING. THE LAYER OF PARGE IS TO COVER THE CREVICE AT THE METAL/GROUT AND SANDSTONE GROUT INTERFACES, AND ANY CRACKS WITHIN THE EXISTING GROUT.

RIGHT AND LEFT SIDE JOGS OF STONE WALL AT THE INTAKE SCREEN
SCALE: NTS



BOTTOM RIGHT CORNER (JOG IN STONE)
SCALE: NTS



VIEW OF EXISTING INTAKE GRATE
SCALE: NTS



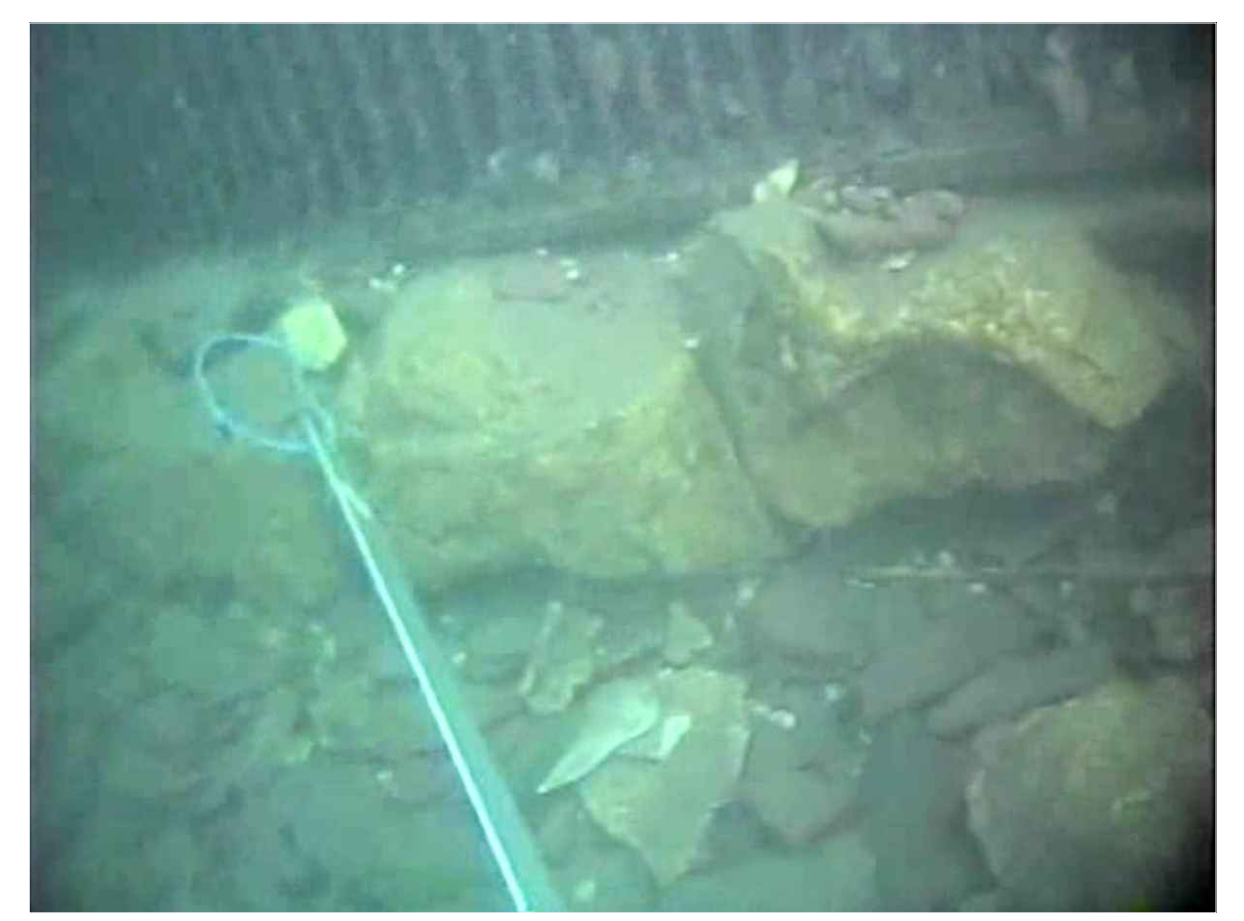
EXPOSED BOTTOM ANCHOR (RIGHT SIDE)
SCALE: NTS



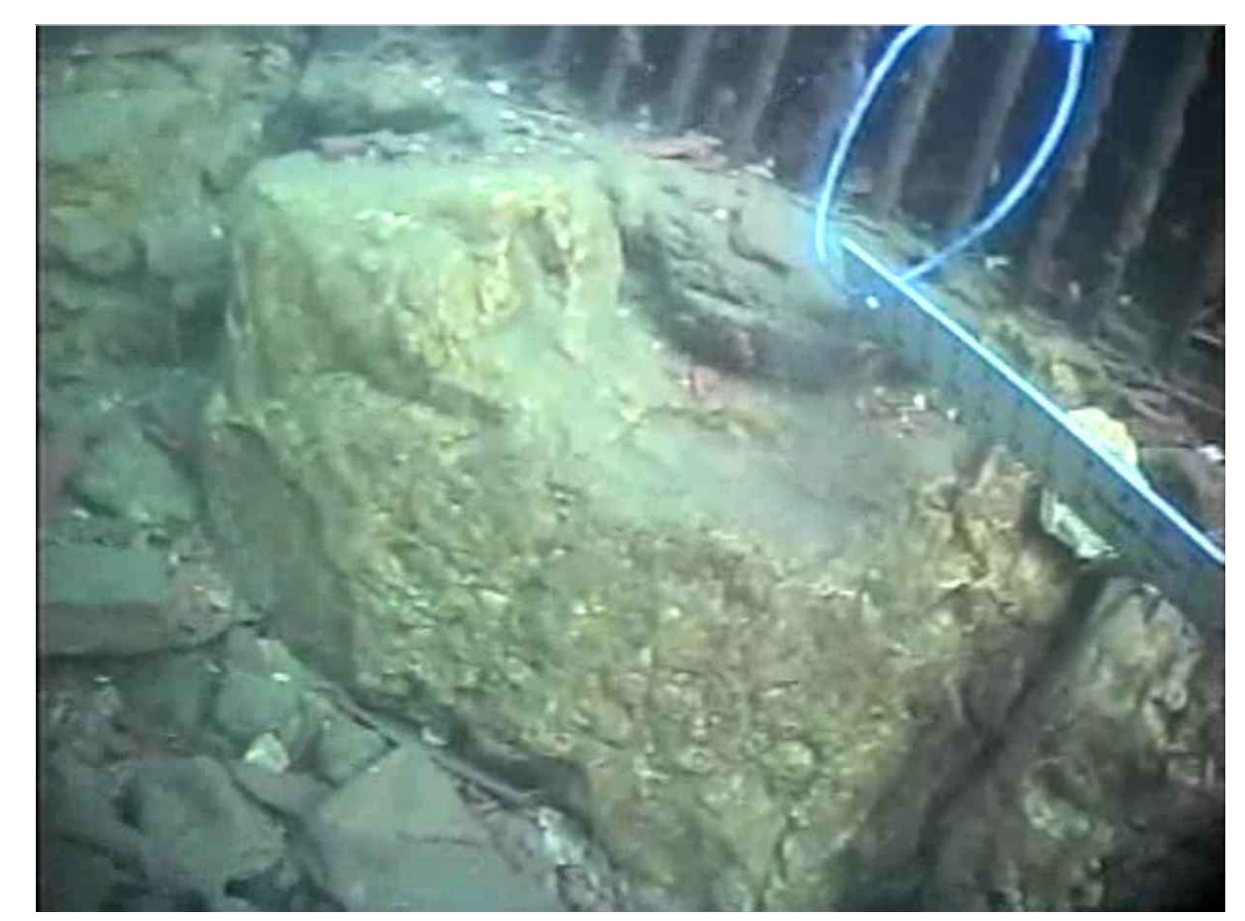
MISSING EXISTING BOTTOM STONE
SCALE: NTS



CONCAVE DEFLECTION OF INTAKE SCREEN
SCALE: NTS



EXISTING SANDSTONE TO BE REMOVED
SCALE: NTS



GROUT ENCASED BOTTOM ANCHOR (LEFT SIDE)
SCALE: NTS



GROUT FILL BETWEEN SCREEN AND STONE (TO BE PARGED)
SCALE: NTS

No.	Date	Description	Drawn by deS.S.ite pat	Approved Approuvé
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

Revision / Revision	
A	Detail number / Numéro de détail
B	Sheet number / Numéro de la feuille

Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name / Nom de l'expert-conseil: **wsp**

1348 ROSEMOUNT AVENUE, CORNWALL, ONTARIO CANADA, K6G 3E5
TEL: 613-833-8820 | FAX: 705-636-4335 | WWW.WSP.COM
WSP (SP20) 15-001-001 (WSP# 151-00185-14)

Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACEK**

Project title / Titre du projet: **BULKHEAD INSTALLATION SAULT STE. MARIE CANAL**

Drawing title / Titre du deS.S.in: **BULKHEAD #2 REFERENCE PHOTOS**

Designed by / Concept par: M.CARBONE / J.DICERBO / D.SPACEK	Date: DEC 18, 2020
Drawn by / Dessiné par: M.CARBONE	Date: DEC 18, 2020
Checked by / Vérifié par: J.DICERBO / D. SPACEK	Date: DEC 18, 2020
Approved by / Approuvé par: D.SPACEK	Date: DEC 18, 2020
Project No. / N° du projet: 511S.S.M	Scale / Echelle: NTS
Drawing Set No. / N° de série du deS.S.in: -	Sheet No. / N° de la feuille: C8.0

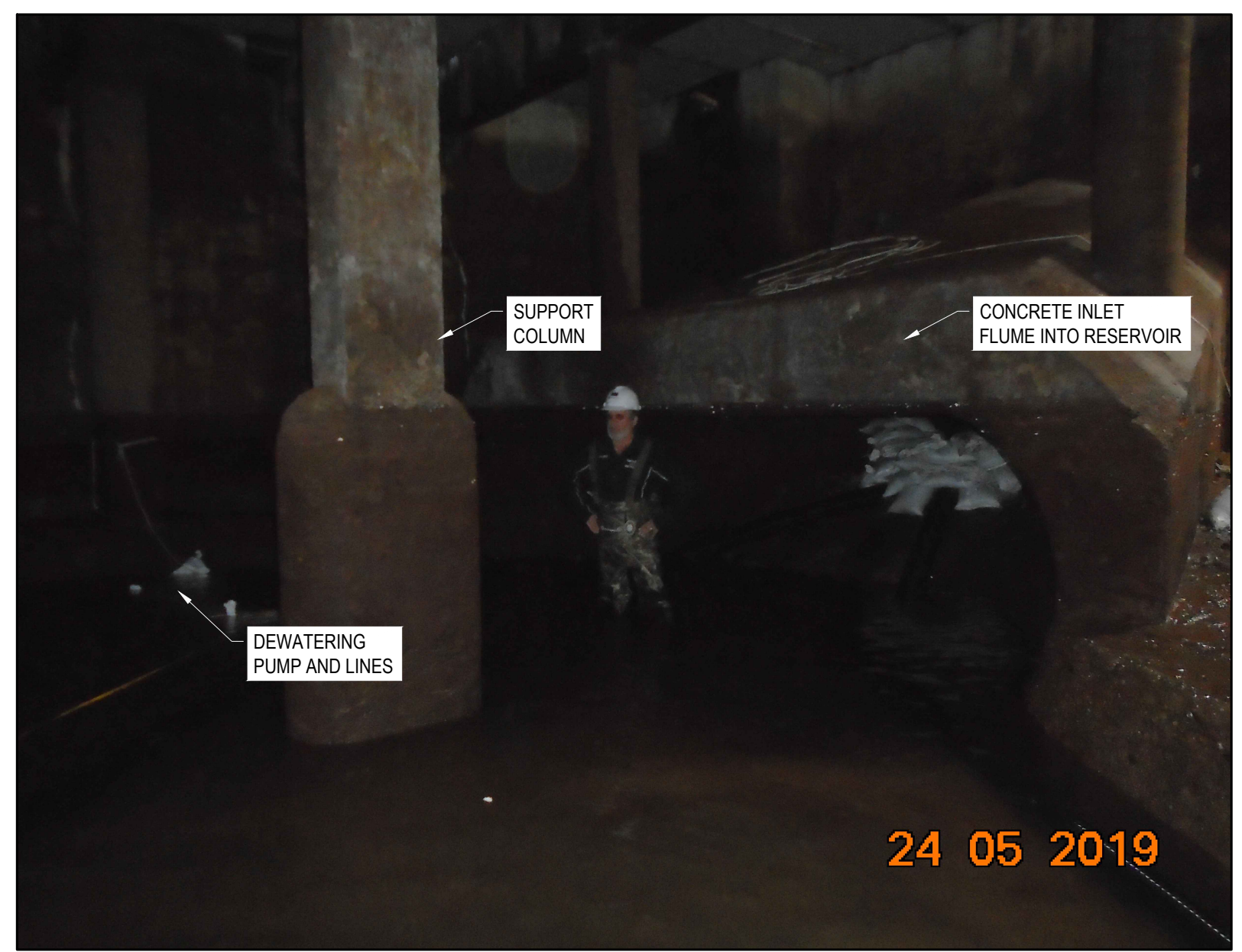
KEY PLAN:



SAULT STE. MARIE, ONTARIO



RESERVOIR ACCESS HATCH
SCALE: NTS



PENSTOCK INLET FROM WITHIN RESERVOIR
SCALE: NTS



RESERVOIR OUTLET FROM WITHIN RESERVOIR
SCALE: NTS



CURRENT PENSTOCK PIPE CONDITIONS
SCALE: NTS



VALVE CHAMBER WITH SOUTH VALVE
SCALE: NTS



CURRENT CONDITIONS AT VALVE CHAMBER
SCALE: NTS



NEW STORM SEWER MANHOLE 2019
SCALE: NTS



VALVE CHAMBER AT POWERHOUSE
SCALE: NTS



ACCESS TO RESERVOIR AND PENSTOCK
SCALE: NTS

No.	Date	Description	Drawn by de.S.S.ite pat	Approved
4	18/12/20	ISSUED FOR TENDER	M.CARBONE	D.SPACEK
3	30/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
2	16/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK
1	03/11/20	ISSUED FOR CLIENT REVIEW	M.CARBONE	D.SPACEK

Revision / Revision	
A	Detail number
B	Sheet number
A	Número de detail
B	Número de la feuille

Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name / Nom de l'expert-conseil: **wsp**

Eng. Stamp / Sceau de l'ingénieur: **D. M. SPACEK**

Project Title / Titre du projet: **BULKHEAD INSTALLATION SAULT STE. MARIE CANAL**

Drawing Title / Titre du de.S.S.in: **REFERENCE PHOTOS**

Designed by / Conçeut par: M.CARBONE / J.DICERBO / D.SPACEK	Date: DEC 18, 2020
Drawn by / Dessiné par: M.CARBONE	Date: DEC 18, 2020
Checked by / Vérifié par: J.DICERBO / D. SPACEK	Date: DEC 18, 2020
Approved by / Approuvé par: D.SPACEK	Date: DEC 18, 2020
Project No. / N° du projet: 511S.S.M	Scale / Echelle: NTS
Drawing Set No. / N° de série du de.S.S.in: -	Sheet No. / N° de la feuille: C8.1