REQUEST FOR TENDERS No. 21-025

Sludge Storage Cell 3 Replacement

ISSUED: March 15, 2021

CLOSING DATE AND TIME:
Tenders must be received on or before:
3:00pm (15:00 hrs) Pacific Time on Friday April 16, 2021

Regional District of Nanaimo Contact for Questions:
Scot Merriam, SRM Projects Ltd.
250-758-5352
smerriam@srmprojects.ca

Questions, or requested revisions to the form of contract, should be received at least ten (10) days before the closing date to allow enough time to post a response.

<u>Mandatory</u> Proponent's Site Information Meeting:

10:30am Thursday March 25, 2020
RDN Liaison: Scot Merriam
French Creek Pollution Control Center
957 Lee Road
Parksville, BC V9P 1Z4

Site visit attendees are required to wear a hi-vis vest, steel-toed footwear, and a face mask

Instructions to Bidders

ARTICLE 1. Closing Date/Time/Location and Submission Requirements
Bidders must submit their TENDER on or before 3:00pm (15:00 hrs), Pacific Time, **Friday April 16, 2021**.

Submission Requirements:

Bidders must, at minimum, submit a completed Tender Form **and** draft Work schedule along with any supporting information to facilitate Regional District of Nanaimo (RDN) tender evaluation, with reference to Article 11 "Award" below.

Tenders will be accepted by Email only: In PDF format with "Sludge Storage Cell 3 Replacement" as the subject line to this electronic address: smerriam@srmprojects.ca

The RDN will not be held responsible for any technological delays.

Tenders received by any other manner will not be accepted. Tenders will not be opened in public. The RDN will endeavour to post the unverified bid results by 10:00 a.m. of the next business day following the closing.

ARTICLE 2. Scope of Work
Tenders are invited from qualified and experienced firms to demolish existing and install new sludge storage cell 3 and demolish existing and supply, deliver and install new associated piping at the French Creek Pollution Control Centre 957 Lee Road, Parksville, BC V9P 1Z4

The new sludge storage cell 3 (FRP tank) will be supplied by Others, and is expected to be delivered to the French Creek Pollution Control Centre site on or about June 3, 2021 (plus 2 weeks or minus 1 week).

A two week shutdown window is currently allowed to complete the replacement of sludge storage cell 3 (see For Information Only RDN schedule included in the Tender Documents). Within this allowance, bidders may propose construction start and end dates before and after receipt of the tank, to suit their own envisioned construction workflow, subject to RDN approval. The winning bidder is expected to adjust construction start and end dates to accommodate the stated tolerance of tank delivery to site.

COVID-19 NOTE: Due to the ongoing pandemic, the successful bidder will be expected to provide their own crew facilities, including but not limited to lunch trailer and washroom. RDN will arrange for connection of temporary electrical services to these facilities only. Potable water will not be provided.

ARTICLE 3. Tender Documents
The Tender Documents referred to in this tender package include the following:

(1) Request for Tenders, including the Tenderer's "Tender Form";
(2) RDN Standard Form Construction Contract Form of Agreement*;
(3) RDN Standard Form General Conditions of Contract

* Includes the scope of work, the drawings and the standards.

The Tenderer must carefully examine the Tender Documents. Should a Tenderer find discrepancies in, or omissions from the Tender Documents, or should they be in doubt as to their meaning, they should, prior to submitting their tender, notify the RDN contact person in writing. The Tenderer may not claim, after the submission of a tender, that there was any misunderstanding with respect to the conditions imposed by the documents.

No verbal agreement or conversation made or had at any time with any officer, agency or employee of the RDN shall affect or modify any of the terms or obligations herein stated or deemed to be any representation of warranty.

ARTICLE 4. Addenda

If the RDN determines that an amendment is required to this TENDER, the RDN will post an addendum on the RDN (www.rdn.bc.ca) and BC Bid websites (www.bcbid.gov.bc.ca). Each addendum will be incorporated into and become part of the TENDER. No amendment of any kind to the TENDER is effective unless it is contained in a written addendum issued by the RDN. It is the sole responsibility of the Proponent to check and ensure all addendums are included prior to submitting their final Tender submission.

ARTICLE 5. Tender Price

All pricing is to be in Canadian Dollars and is to include all transportation costs to the delivery point. Prices shall be filled in where indicated on the Tender Form. In the event of a price extension discrepancy when calculating the total contract value, the RDN reserves the right to correct the totals.

ARTICLE 6. Federal and Provincial Sales Taxes

GST and PST shall be shown separately on the Tender Form based on the total contract value.

ARTICLE 7. Tender Signing

The TENDER must be executed by an authorized signatory in a position to legally bind their Company to the information contained in the Tender Form.

ARTICLE 8. Revisions to Tenders

Any revision to the tender by the Tenderer must be in writing properly executed and received on or before the posted closing date and time as per the submission instructions outlined in Article 1.

ARTICLE 9. Tender Withdrawal

A Tenderer may, without prejudice to themselves, withdraw their TENDER on written request received on or before the posted closing date and time as per the submission instructions outlined in Article 1.

ARTICLE 10. Tender Rejection

.1 The RDN reserves the right to reject any or all tenders or accept other than the lowest tender and to accept the tender which it deems most advantageous.

.2 The RDN may reject a tender if:

a) After investigation and consideration, the RDN concludes that the Tenderer is not qualified to do the work and/or cannot do the work and perform the Contract in a manner satisfactory to the RDN.
b) A tender contains qualifying conditions or otherwise fails to conform to these Instructions to Tenderers.
c) A tender is incomplete, is considered incomplete in the Instructions to Tenderers, is obscure or irregular, which has erasures or corrections in the Tender Form or in which prices are omitted.
d) The RDN may, in its absolute discretion, reject a Tender submitted by Tenderer if the Tenderer, or any officer or director of the Tenderer is or has been engaged either directly or indirectly through another corporation in a legal action against the RDN, its elected or appointed officers and employees in relation to:
    - any other contract for works or services; or
    - any matter arising from the RDN's exercise of its powers, duties, or functions under the Local Government Act or another enactment within five years of the date of this Call for Tenders.

In determining whether to reject a tender under this clause, the RDN will consider whether the litigation is likely to affect the Tenderer's ability to work with the RDN, its consultants and representatives and whether the RDN's experience with the Tenderer indicates that the RDN is likely to incur increased staff and legal costs in the administration of this contract if it is awarded to the Tenderer.

.3 The RDN may reject all tenders if for any reason the RDN considers to be in its best interest to do so, including without limitation for any of the following reasons;

a) the lowest tender that the RDN considers otherwise acceptable is higher than the funds budgeted or otherwise available for the project;
b) the RDN decides not to proceed with the project or to defer the project;
c) if only one bid is received, then the tender may be reissued unless a financial analysis indicates that the sole bid represents a good value for the taxpayers ; or
d) the RDN is delayed in obtaining, or is unable to obtain, all approvals or consents it considers necessary, whether required by law or otherwise.

.4 The RDN reserves the right to consider and to reject any tender or all tenders without notice to a Tenderer or Tenderers and without permitting a Tenderer to provide additional information.

.5 In no event will the RDN be responsible for a Tenderer's costs of preparing or submitting a tender.

ARTICLE 11. Award

Awards shall be made on tenders that will give the greatest value to the RDN based on price, quality, warranty, and schedule/delivery time. The RDN shall be free to assess these criteria based solely on the information provided with tenders. The lowest, or any tender may not necessarily be accepted. The RDN will, following receipt of an acceptable tender, issue in writing a Notice of Intent to award to the successful Tenderer. Award is anticipated to be made within 14 days of tender closing.

ARTICLE 12. Form of Contract
The Agreement and General Conditions of the Contract are enclosed at the end of this document. Tenderers should carefully review this form of Contract. Tenderers may (but are not required to) request that RDN consider revisions to the form of Contract. Tenderers should submit such requests to the RDN well before the Closing Date and Time. If the RDN agrees to a request received prior to the Time, then RDN will issue an Addendum to modify the Contract. Failure to do so by the Tenderer means acceptance of the RDN form of Contract as presented.

ARTICLE 13. No Claim for Compensation
Except as expressly and specifically permitted in these Instructions to Tenderers, no Tenderer shall have any claim for any compensation of any kind whatsoever, because of participating in the tender, and by submitting a bid each Tenderer shall be deemed to have agreed that it has no claim.

ARTICLE 14. Solicitation of Board Members
"If a member of the Board, or a person who was a member of the Board in the previous six months has a direct or indirect interest in the contract, then the Tenderer shall report this to the RDN in accordance with Section 107 of the *Community Charter* upon being notified of the award of the contract.

The Tenderer warrants and represents that it has not received any information or a record from any Board member or former Board member contrary to Section 108 of the *Community Charter*." The successful Tenderer will be required to direct all communications related to their contract through the staff members responsible for the project.

ARTICLE 15. Freedom of Information and Protection of Privacy Act
All documents submitted to the RDN will be held in confidence by the RDN, subject to the provisions of the Province of British Columbia's *Freedom of Information and Protection of Privacy Act.* All tenders become the property of the RDN. The successful vendor and value of the award is routinely released.

ARTICLE 16. Conflict of Interest
The Tenderer declares that it has no financial interest, directly or indirectly in the business of any third party that would be or be seen to be a conflict of interest in carrying out the services. It warrants that neither it nor any of its officers or directors, or any employee with authority to bind the Tenderer, has any financial or personal relationship or affiliation with any elected official or employee of the RDN or their immediate families which might in any way be seen to create a conflict.

ARTICLE 17. Collusion
The Tenderer shall not engage in collusion of any sort and shall ensure that no person or other legal entity, other than the Tenderer has an interest in the TENDER. Tenderers shall prepare their TENDER without any knowledge of, comparison of figures with, or arrangement with any other person or firm preparing a tender for the same work.

ARTICLE 18. Bonding
A Bid Bond is not required for this project. The successful Tenderer will have to provide a Performance Bond and a Labour and Material Payment Bond, **each** in the amount of 50% of the total stipulated

contract price. All bonds must be original documents and must be issued by a surety company licensed to conduct business in the Province of British Columbia.

TENDER FORM
21-025 Sludge Storage Cell 3 Replacement
Page 1 of 2

Date: _____

Company Name:_____

Address: _____

Telephone:_____ Email: _____

To: Regional District of Nanaimo
C/O Scot Merriam, SRM Projects Ltd.
smerriam@srmprojects.ca

Having examined the Tender Documents, including any addenda, having viewed the work site, and having reviewed and complied with the Instructions to Bidders, we hereby offer to supply the Goods set forth in the aforesaid documents for the Stipulated Contract Price. Prices include the Tenderer's labour, supervision, material, equipment, material costs, transportation costs, overhead and profit and shall represent the cost to the Regional District of Nanaimo (RDN) of such charges excluding taxes which shall be shown separately.

Lump Sum Total Price $_____

GST (5%) $_____

Total Stipulated Contract Price $_____

PROPOSED SUBCONTRACTORS, IF ANY (list applicable work scope)

_____

_____

_____

PROPOSED CONSTRUCTION START DATE (assuming tank received on site on or about June 3, 2021)

_____

TENDER FORM
21-025 Sludge Storage Cell 3 Replacement

PROPOSED CONSTRUCTION END DATE (assuming tank received on site on or about June 3, 2021)

DRAFT CONTRACTOR SCHEDULE (Gantt/Bar Chart)

Attached to Tender Form

TOTAL ESTIMATED CONSTRUCTION LABOUR AND SUPERVISION HOURS

ACCEPTANCE

.1 The tender is open to acceptance for a period of sixty (60) calendar days from the date of bid closing.

.2 We understand that the lowest or any Bid will not necessarily be accepted. The Owner may also elect not to proceed with the Project.

.3 The RDN reserves the right to waive minor defects or irregularities in tenders.

.4 We agree to be designated as the Prime Contractor for this project per WorkSafe BC OH&S Regulations and have the necessary qualifications and are willing to accept the responsibilities as Prime Contractor for the project.

Company: _____

Signature: _____
(Authorized Officer)

Printed: _____
(Authorized Officer)

BETWEEN: _____ (the "Contractor")

AND: The Regional District of Nanaimo (the "Regional District")

THIS AGREEMENT WITNESSES that the Contractor and the REGIONAL DISTRICT agree as follows:

1. The Contractor shall provide all labour, Contractor's Plant and Equipment and materials required to perform the Work within the required time, as required by the Contract Documents, including:

   (a) this executed Construction Agreement;

   (b) the General Terms and Conditions of Contract;

   (c) any Addenda (attached Schedule 1);

   (d) the Contractor Tender Form (attached Schedule 2);

   (e) the original Contractor Supporting Information, if any (attached Schedule 3)

   (f) the Contractor Work Schedule (attached Schedule 4)

   (g) the Scope of Work (attached Schedule 5);

   (h) the Drawings (attached Schedule 6);

   (i) the Standards (attached Schedule 7);

   (j) other relevant documents such as but not limited to letters of clarification and reports or the like included by reference (attached Schedule 8).

2. Upon Substantial Completion, the REGIONAL DISTRICT shall pay the Contractor the Contract Price, as required by the Contract Documents, less any holdback amounts required under the BC Builder's Lien Act.

3. The Contract Price shall be the sum in Canadian Dollars of the following:

   (a) Up to the Tender Price set out in the accepted Tender Form and;

   (b) Payments made on account of change orders, as may be required by the Contract Documents.

   The Contract Price shall be the entire compensation owing to the Contractor by the REGIONAL DISTRICT for the Work and shall cover and include all supervision, labour, materials, Contractor's Plant and Equipment, overhead, profit, financing costs and all other costs and expenses whatsoever incurred in performing the Contract.

4. The Contractor shall commence the Work within 7 Days after issuance of the Notice to Proceed from the REGIONAL DISTRICT, unless the Notice to Proceed states otherwise, and shall attain completion of the Work by [____].

5. The Contract Documents shall form a part of this Agreement as though recited in full.

6. The Contract supersedes all prior negotiations, representations or agreements, whether written or oral and is the entire agreement between REGIONAL DISTRICT and the Contractor with respect to the subject matter of this Agreement.

7. Defined terms in this Agreement shall have the same meanings as set out in the General Conditions, except where the contrary is expressed.

8. In entering into and executing this Agreement, the Contractor has relied on its own examination of the Site, access to the Site, and on all other data, matters and things requisite to the fulfilment of the Work, and on its own knowledge of existing services or utilities along or crossing or in the vicinity of the route or facility to be installed or constructed under this Contract, and not on any representation or warranty of the REGIONAL DISTRICT.

9. The Contractor shall not assign the Contract, or any portion of the Contract, or any payments due or to become due under the Contract, without the express written consent of the REGIONAL DISTRICT.

10. No action or failure to act by the REGIONAL DISTRICT or an authorized representative of the REGIONAL DISTRICT shall constitute a waiver of any right or duty afforded any of them under the Contract, or constitute an approval or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

11. This Agreement shall enure to the benefit of and be binding upon the REGIONAL DISTRICT and the Contractor and their respective heirs, executors, legal representatives, successors and permitted assigns. In the event of more than one person being the Contractor, the grants, covenants, provisos and claims, rights, powers, privileges and liabilities shall be construed and held to be several as well as joint.

12. Time shall be of the essence of this Agreement.

13. This Agreement may be executed in any number of counterparts, each of which will be deemed to be an original and all of which taken together will be deemed to constitute one and the same instrument. Delivery by electronic transmission in portable document format (PDF) of an executed counterpart of this Agreement is as effective as delivery of an originally executed counterpart of this Agreement.

IN WITNESS WHEREOF the parties hereto have executed this Agreement as follows:

The Regional District of Nanaimo by its authorized signatory on _____ day of _____, 2021 (the date of Agreement):

SIGNED on behalf of the REGIONAL DISTRICT by:

Signature: _____

Name: _____

Title: _____

[CONTRACTOR'S NAME]

by its authorized signatory on _____ day of _____, 20__:

SIGNED on behalf of the Contractor by:

Signature: _____

Name: _____

Title: _____

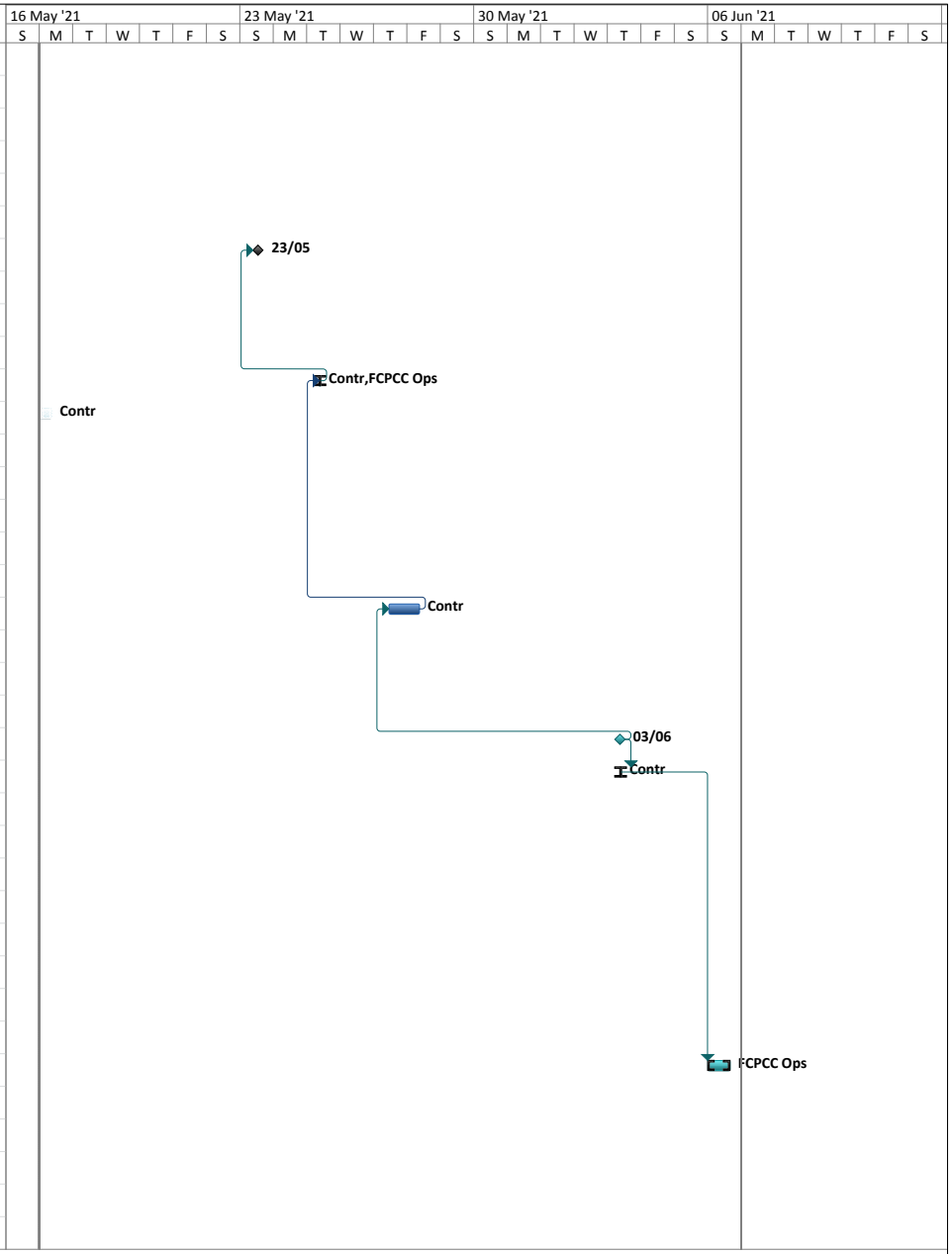
SCHEDULE 1 – ADDENDA

SCHEDULE 2 – SUPPLY CONTRACTOR TENDER FORM

SCHEDULE 3 – SUPPLY CONTRACTOR SUPPORTING INFORMATION

SCHEDULE 4 – CONTRACTOR WORK SCHEDULE

ID	Task Mode	Task Name	Duration	Start	Finish	Resource Names
1		Prefab SS piping w/field trim allowances				Contr
2		Prefab HDPE piping w/field trim allowances				Contr
3		Prefab forms for new tank pad				Contr
4		Contractor site mobilization				Contr
5		Remove concrete barriers at existing sludge tank 3				Contr
6		Prefab rebar mats for new tank pad				Contr
7		**Take existing sludge tank 3 off Line**	2 hrs	Sun 23/05/21	Sun 23/05/21	FCPCC Ops
8		Remove existing sludge tank 3 instruments				Shaw
9		Isolate/lock-out sludge tank 3 (incl. electrical/instr)				FCPCC Ops
10		Clean out/open up existing sludge tank 3				FCPCC Ops
11		**Contractor lockout**	1 hr	Tue 25/05/21	Tue 25/05/21	Contr,FCPCC Ops
12		Measure up existing sludge tank 3 inside air header	1 hr			Contr
13		Demolish existing above ground piping				Contr
14		Demolish existing SS sludge tank 3 (save ladder)				Contr
15		Remove old grout and prep existing concrete pad				Contr
16		Install forms on existing concrete pad				Contr
17		Install anchors/dowels and rebar mats in forms				Contr
18		**Pour new concrete tank base**	6 hrs	Thu 27/05/21	Fri 28/05/21	Contr
19		Excavate and demo existing underground piping				Contr
20		Install new CSP's for road crossing				Contr
21		Start installing new piping from ATADS area to tank				Contr
22		**New FRP tank delivered to FCPCC Site**	1 hr	Thu 03/06/21	Thu 03/06/21	Barski
23		Unload tank on to new concrete base/anchor down	1 hr	Thu 03/06/21	Thu 03/06/21	Contr
24		Remove tank base formwork				Contr
25		Attach ladder and hand railing to new tank				Contr
26		Finish installing new piping from ATADS area to tank				Contr
27		Install new concrete barriers by ATADS entrance				Contr
28		Backfill roadway crossing (leave flanges exposed)				Contr
29		Reinstall sludge tank 3 instruments				Shaw
30		Remove contractor locks				Contr
31		Energize pumps and instrumentation				Shaw
32		**Commission new FRP sludge tank 3 (leak check)**	8 hrs	Sun 06/06/21	Sun 06/06/21	FCPCC Ops
33		Resolve piping leaks if required				Contr
34		Finish remaining underground piping backfilling				Contr
35		Pavement repair				Contr
36		Replace concrete barriers at new sludge tank 3				Contr
37		Contractor site demobilization				Contr



Project: SS3 Replacement ConstrSched DRAFT RevA
Date: Fri 12/03/21
FOR INFO ONLY - CTR TO PROVIDE SCHEDULE

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline
Split	External Tasks	Inactive Summary	Manual Summary	Progress
Milestone	External Milestone	Manual Task	Start-only
Summary	Inactive Task	Duration-only	Finish-only

SCHEDULE 5 – SCOPE OF WORK

Title	Ref.No.	Date	Rev
Contractor Scope of Work Package – FCPCC – Sludge Storage Cell 3 Replacement (Allnorth Consultants Ltd.)	2002167	21Oct2020	C
Pipe Line List	2002167-000-2015-001	6Oct2020	B
Piping Tie-In List	2002167-000-2015-003	6Oct2020	B

Contractor Scope of Work Package

FCPCC – Sludge Storage Cell #3 Replacement

Prepared For:	Regional District of Nanaimo
Submitted By:	Allnorth 200–20 Townsite Road Nanaimo, BC V9S 5T7 Canada Phone: 250-753-7472
Allnorth Contact:	Chris Bandy, P.Eng.
Allnorth Project Number:	2002167
RDN Project Number:	RAE13
Date:	21 October 2020

DOCUMENT INFORMATION

Allnorth Project Number:	2002167
RDN Project Number:	RAE13
File Number:	14.04
Filename:	2002167-SOW-RDN Sludge Storage Cell #3 Replacement-RevC
Document Revision:	C

REVISION HISTORY

Rev.#	Date of Issue	Prepared By	Reviewed By	Approved By	Description
A	03-Sept-2020	CDB	JAG	CDB	Issued for Review
B	06-Oct-2020	CDB	JAG	CDB	Issued for Estimate
C	21-Oct-2020	CDB	-	CDB	Re-Issued for Estimate

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

1 INTRODUCTION

This document defines the contractor's scope of work for the Regional District of Nanaimo (RDN) – Sludge Storage Cell #3 Replacement project and summarizes the supporting technical documents provided.

1.1 Site Description & Conditions

The site is at RDN's French Creek Pollution Control Center at 957 Lee Road, Parksville, BC. Work shall be conducted in accordance with all applicable regulations, codes and standards as well as RDN specific site requirements and local municipal bylaws.

1.2 Scope

1.2.1 Overview

The RDN is replacing their aging Sludge Storage Cell #3. The project is multi trade and includes the demolition and removal of the existing tank and piping, installation of a new concrete pedestal, as well as the installation of the new tank and piping. Additionally, an existing pressure based level sensor and associated cables will be removed from the existing tank and reinstalled and reused with the new tank; this electrical and instrumentation work will be performed by others. It is not believed that the tank has any internals and the contractor shall reconnect existing piping connections to the new tank once it is located. The contractor shall reuse existing above ground piping supports where possible. Where this is not possible, the contractor shall relocate existing supports or provide new supports as required to ensure the piping is adequately supported. The contractor shall ensure worker safety and compliance with all applicable safety regulations for the duration of the project.

All work must be completed within the window indicated in the contractor request for quotation, with specific dates subject to verification by RDN.

1.2.2 Project Drawings and Documents

Table 1 through 4 provides the engineering documentation included with this work package.

Table 1 – Project Piping and Process Drawings and Lists

Document No.	Rev.	Description
FC-M-311	B	Sludge Storage Cell #3 General Arrangement Plan and Elevation
FC-M-312	B	Sludge Storage Cell #3 FRP Replacement Tank Data Sheet
FC-M-351	B	Sludge Storage Cell #3 Piping Support Details
300-100-DS-SS-001	B	Sludge Storage Cell #3 Piping Isometric Digested Sludge Supply/Return
300-100-DS-HDPE-002-01/02	B	Sludge Storage Cell #3 Piping Isometric Digested Sludge Supply/Return
300-100-DS-SS-003	B	Sludge Storage Cell #3 Piping Isometric Digested Sludge Supply/Return
300-150-DS-SS-004	B	Sludge Storage Cell #3 Piping Isometric Digested Sludge Overflow
300-150-DS-HDPE-005-01/02	B	Sludge Storage Cell #3 Piping Isometric Digested Sludge Overflow
300-150-DS-SS-006 -01/02	B	Sludge Storage Cell #3 Piping Isometric Digested Sludge Overflow
2002167-000-2015-001	B	Line List
2002167-000-2015-003	B	Tie-In List
15D-20.02 (Sheets 1, 4)	A	Pipe Supports Pipe Clamps
15D-20.03 (Sheets 3-6, 9, 17)	A	Pipe Supports Hanger Assemblies
15D-20.04 (Sheets 5, 10)	A	Pipe Supports Pipe Shoes, Saddles and Pads
15D-20.06 (Sheet 5)	A	Pipe Supports Sliding Supports and Travelers
15D-20.12 (Sheet 7)	A	Pipe Supports Concrete Pads and Attachments

Table 2 – Project Civil and Structural Drawings

Document No.	Rev.	Description
FC-S-312	B	Sludge Storage Cell 3 Structural Foundation Details
C-1001	A	Civil Site Layout and Area Plan

Table 3 – 3D Model and Supplementary Photographs

Document No.	Rev.	Description
-	-	200903 3D Model NWD File (Navisworks)
-	-	Figure 1: Location of Tie-Point TP-01 (Appendix A)
-	-	Figure 2: Location of Tie-Point TP-02 (Appendix A)
-	-	Figure 3: Location of Tie-Point TP-03 (Appendix A)
-	-	Figure 4: View of Existing Sludge Storage Cell #3 from Roadway (Appendix A)
-	-	Figure 5: View of Existing Pipe and Valves at Bottom of Existing Sludge Storage Cell #3 (Appendix A)

Table 4 – Vendor Drawings and Documents

Document No.	Rev.	Description
-	-	None Currently Available (will be provided with IFC issue)

1.2.3 Scope of Supply

The scope of supply provided by the RDN and the Contractor are listed in the sub-sections below.

1.2.3.1 By Owner

The following items will be provided by the RDN:

- Tank and appurtenances;
- Valves;
- Electrical and instrumentation work.

1.2.3.2 By Contractor

The following items will be provided by the Contractor:

- All other mechanical and / or piping materials and installation;
- All other civil and / or structural materials and installation.

1.2.4 Owner Preparation

- Owner shall fully drain and wash out tank with water before contract work begins;
- Owner shall isolate tank/piping before contract work begins and, as necessary, shall provide a lock-out procedure for use by the contractor;
- Owner shall retain others to complete all electrical and instrument related work such as cable removal and replacement or instrument removal and replacement.

1.2.5 Demolition Scope of Work

- The contractor shall mitigate the possibility of environmental damage from all activities related to site mobilization or demolition. In addition it is their responsibility to ensure that the disposal or recycling of all demolition items is accomplished in an environmentally friendly manner.
- Temporarily remove the existing concrete barriers from between the existing Sludge Storage Cell #3 and the roadway to prepare for excavation; these barriers are to be preserved and replaced after installation of the new tank and associated piping. Excavate underground DN 100 piping between tie-points TP-01, TP-02 and existing Sludge Storage Cell #3 inlet and overflow nozzles as well as underground instrumentation cables and DN 20 air piping. Excavated soil and asphalt shall be removed from site. The trench is to remain open and be reused for installation of new corrugated steel pipe (CSP) culverts containing the new piping and reused instrumentation cables. The contractor shall ensure that the trench is adequately sloped and covered or guarded as well as ensure worker safety and compliance with all applicable safety regulations for the duration of the project. The contractor shall provide temporary trench crossing plates if the trench is to be exposed for more than 4 hours to allow for routine forklift traffic.
- Remove DN 100 piping between TP-01 and the existing Sludge Storage Cell #3 inlet nozzle and remove from site.
- Remove DN 100 piping between TP-02 and the existing Sludge Storage Cell #3 overflow nozzle and remove from site.
- Remove DN 20 piping between TP-03 and the existing Sludge Storage Cell #3 air nozzles and remove piping and existing check valves and shut-off valves from site.
- Unthread level instrument from tank and remove instrument and associated cables and preserve for reinstallation with new tank; this work will be performed by others.
- Remove and preserve the existing tank ladder and set aside onsite; the existing ladder shall remain onsite for future reuse by the RDN. Remove existing anchor bolts and then the tank.

- Any remaining grout shall be removed in preparation for the new tank.

1.2.6 Construction Scope of Work

- It is the responsibility of the contractor to ensure the tank is installed in the prescribed location and remains true to the intended axes.
- Prepare existing foundation surface for new concrete pedestal.
- Form new concrete pedestal and place rebar and anchor rods. Embed rebar in existing foundation as indicated on the structural drawing.
- Pour new concrete pedestal. Once the concrete has reached 70% of the design strength (concrete test results are to be provided to Allnorth) the formwork may be removed.
- Lift new tank into position on concrete pedestal and secure using anchor bolts; the concrete shall have reached 70% of the design strength (concrete test results are to be provided to Allnorth) prior to erecting the tank or securing the anchor bolts.
- Prepare trench for installation of new CSP culverts containing new underground piping and reused instrument cables and plant air piping. Widen trench and place bedding materials as indicated on the mechanical / piping drawings.
- Field measure all new piping, before installation, to confirm field joint trim.
- Install new piping between tie-point TP-01 and the new Sludge Storage Cell #3 nozzle N1 including installation of new CSP culvert as indicated on the mechanical / piping drawings.
- Core a new hole in concrete wall in the vicinity of tie-point TP-02 and install new piping between TP-02 and the new Sludge Storage Cell #3 nozzle N3 including installation of new CSP culvert and new shut-off valve as indicated on the mechanical / piping drawings. See Appendix A for photographs of approximate locations of new hole and valves.
- Install new small-bore field run piping between TP-03 and the new Sludge Storage Cell #3 air nozzles including installation of new CSP culverts, and new shut-off and check valves as indicated on the mechanical / piping drawings. See Appendix A for photographs of approximate locations of new valves. Reused instrument cables are to be installed by others in the CSP culvert.
- Backfill trench and replace disturbed asphalt as indicated on the mechanical / piping drawings.
- Place precast concrete barriers including bullnose segment and locally regrade around exposed piping by adding fill to ensure a minimum of 305 mm of coverage as indicated on the mechanical / piping drawings. Provide topsoil and seed with grass.

1.2.7 Change Management Process

The contractor is responsible to verify all dimensions provided in the drawings listed in Table 1 and Table 2 before completing field joints. Field fit and the application of tolerance are the responsibility of the contractor. It is not permissible under any circumstances for the contractor to ‘cold spring’ or force metal pipe or flange fittings. It is permissible to cold bend HDPE piping provided the recommendations of the pipe manufacturer for cold bends are followed. Any changes to the design drawings required during construction due to issues with material or component supply, errors or omissions, or for any other unforeseen reason shall be brought to the attention of Allnorth for approval prior to commencing the proposed work. All approved design changes shall be included in the final record drawing documentation package. It is the responsibility of the contractor to provide suitably detailed markups and sketches to allow the production of these record drawings.

2 APPLICABLE REGULATIONS, CODES AND STANDARDS

Construction shall conform to the following Codes and Regulations as applicable. Table 5 lists the primary codes as shown in the contract documents. The following table shall be considered as guidelines. Local laws, regulations, and standards will be used where applicable and may modify the following, only as required.

Table 5 - Primary Codes & Standards

Code	Edition	Description
ASTM D3299	2018	Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
ASME B31.3	2018	Process Piping
BCBC	2018	British Columbia Building Code

3 HEALTH, SAFETY AND ENVIRONMENT

All work on this project shall comply with the latest British Columbia Occupational Health and Safety Regulation, as well as RDN standards and procedures. The work site is in close proximity to Morningstar Creek and the ocean, so the contractor shall operate with due diligence to mitigate the possibility of any adverse environmental impacts. The contractor shall have spill response plans in place to ensure rapid and complete remediation of any spills.

The contractor shall provide safety documentation such as policies, procedures and project safety plan to RDN prior to commencing the project. All staff on site will require a site orientation prior to starting work.

The contractor is responsible for housekeeping within the work area. Tooling, equipment, garbage and any other construction related items are to be kept neat and are not to introduce hazards to personnel, environment or the process.

4 DOCUMENT MANAGEMENT

The contractor shall be responsible for submitting red-lined "as-constructed" drawings to RDN / Allnorth upon completion of the work.

Appendix A Supplementary Photographs

Figure 1: Location of Tie-Point TP-01

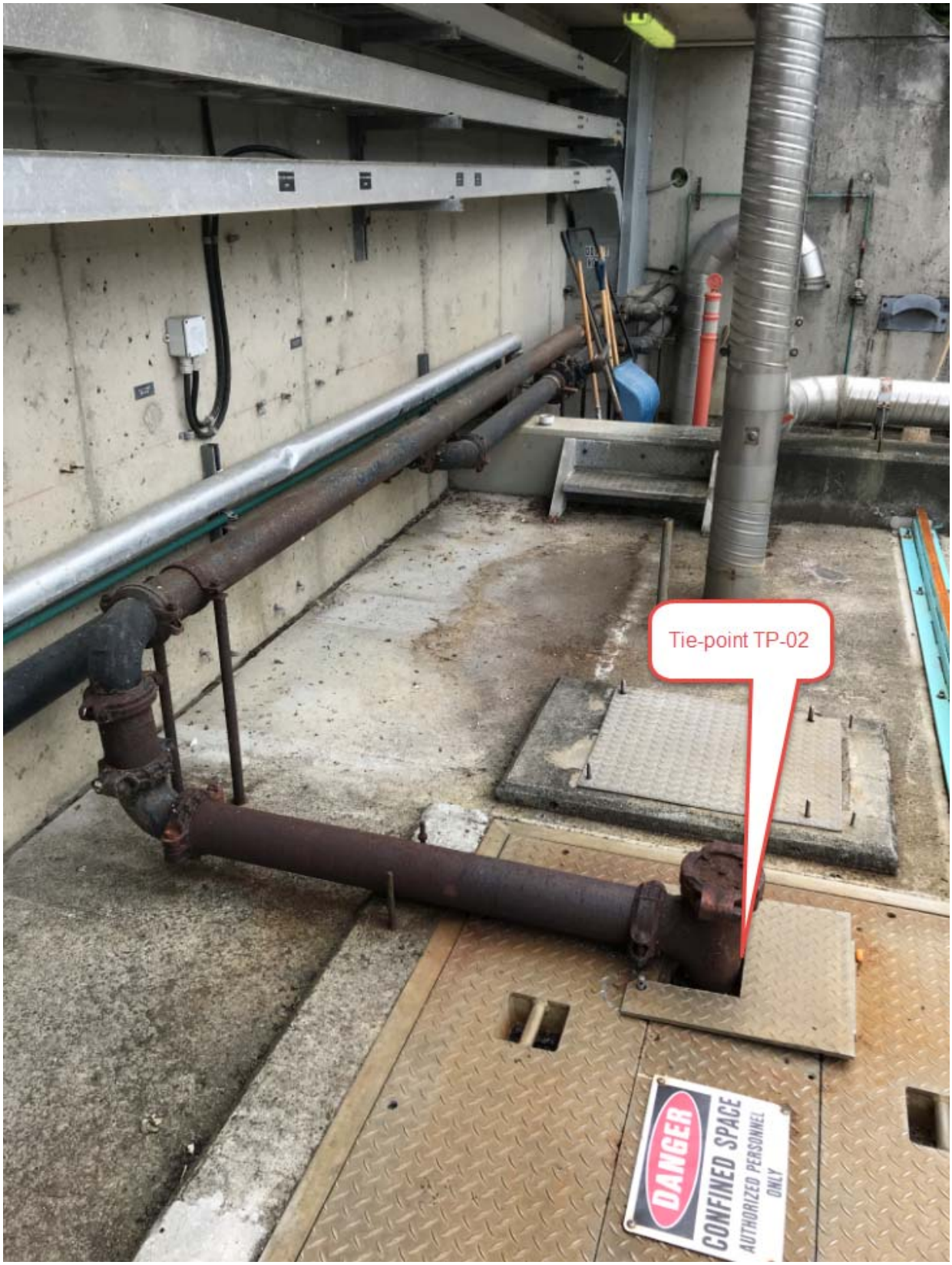


Figure 2: Location of Tie-Point TP-02

Figure 3: Location of Tie-Point TP-03 and New Core in Concrete Wall

Figure 4: View of Existing Sludge Storage Cell #3 from Roadway

Figure 5: View of Existing Pipe and Valves at Bottom of Existing Sludge Storage Cell #3

Appendix B Technical Documentation

See contract schedules 5, 6, and 7 for associated technical documentation referenced in this scope of work

REV	ISSUED FOR	DATE	BY	CHK	APP
A	ESTIMATE	3-Sep-20	CDB	JAG	CDB
B	ESTIMATE	6-Oct-20	CDB	JAG	CDB

		REV
CLIENT:	REGIONAL DISTRICT OF NANAIMO	B
PROJECT TITLE:	FCPCC - SLUDGE STORAGE CELL #3 REPLACEMENT	
PROJECT No:	2002167	
DOCUMENT No:	2002167-000-2015-001	
CLIENT PROJECT No:	RAE13	

PIPING LINE LIST

AREA	LINE NUMBER	LINE SIZE	SCH / THK	CL	PIPE MATL	PIPE GROUP	FLUID	FLUID SYMBOL	PIPE ROUTE FROM	PIPE ROUTE TO	OPERATING CONDITIONS		DESIGN CONDITIONS				MDMT	DESIGN CODE (1)	FLUID SERVICE (2)	PWHT	HEAT TRACE REQ	INSUL REQ	NON DESTRUCTIVE EXAMINATION		PRESSURE TESTING		STEAM BLOW REQ	P&ID DRAWING	RGTR REQ	COMMENT	LATEST REV
											NORM PRESS	NORM TEMP	FLOW RATE	MAX PRESS (5)	MIN TEMP	MAX TEMP							TYPE	%	TEST MEDIUM	TEST PRESS					
		(DN)									(kPag)	(°C)	(m^3/hr)	(kPag)	(°C)	(°C)	(°C)			(Y/N)	(Y/N)	(Y/N)				(kPag)	(Y/N)		(Y/N)		
300	100-DS-SS-001	100	10S	150	A312 TP316L	SS	DIGESTED SLUDGE	DS	TP-01	100-DS-HDPE-002	200	65	25	600	-8	70	-8	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	SUPPLY/RETURN LINE APPROX. 8 FT ABOVE GROUND PIPING	B
300	100-DS-HDPE-002	100	DR-11	150	PE-RT	HDPE	DIGESTED SLUDGE	DS	100-DS-SS-001	100-DS-SS-003	200	65	25	600	-8	70	-	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	SUPPLY/RETURN LINE APPROX. 44 FT UNDERGROUND PIPING	B
300	100-DS-SS-003	100	10S	150	A312 TP316L	SS	DIGESTED SLUDGE	DS	100-DS-HDPE-002	SLUDGE STORAGE CELL #3 (T 310)	200	65	25	600	-8	70	-8	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	SUPPLY/RETURN LINE APPROX. 6 FT ABOVE GROUND PIPING OWNER TO PROVIDE NEW VALVE	B
300	150-DS-SS-004	150	10S	150	A312 TP316L	SS	DIGESTED SLUDGE	DS	SLUDGE STORAGE CELL #3 (T 310)	150-DS-HDPE-005	ATM	20	25	18	-8	70	-8	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	OVERFLOW LINE APPROX. 7 FT ABOVE GROUND PIPING	B
300	150-DS-HDPE-005	150	DR-11	150	PE-RT	HDPE	DIGESTED SLUDGE	DS	150-DS-SS-004	150-DS-SS-006	ATM	20	25	18	-8	70	-	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	OVERFLOW LINE APPROX. 43 FT UNDERGROUND PIPING	B
300	150-DS-SS-006	150	10S	150	A312 TP316L	SS	DIGESTED SLUDGE	DS	150-DS-HDPE-005	TP-02	ATM	20	25	18	-8	70	-8	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	OVERFLOW LINE APPROX. 30 FT ABOVE GROUND PIPING	B
300	20-PA-SS-007	20	40S	150	A312 TP316L	SS	PLANT AIR	PA	TP-03	SLUDGE STORAGE CELL #3 (T 310)	860	20	490	860	-8	35	-8	ASME B31.3	CAT D	N	N	N	VI	100	SERVICE TEST	SERVICE TEST	N	FC-P-302	N	APPROX. 43 FT FIELD RUN PIPING OWNER TO PROVIDE NEW VALVES	B

NOTES:	PLANT AREAS:	FLUID SERVICE:	ABBREVIATIONS:	
(1) - BASED ON LATEST EDITION APPLICABLE PIPING DESIGN CODES UNLESS OTHERWISE NOTED	300 - SLUDGE DIGESTERS	CATEGORY D	CAT - CATEGORY	PWHT - POSTWELD HEAT TREATMENT
(2) - B31.3 FLUID SERVICE CATEGORY, IF APPLICABLE		CATEGORY M	CL - ASME FLANGE RATING CLASS	RGTR - REGISTRATION
(3) - OWNER RESPONSIBLE FOR PROVIDING ADEQUATE OVERPRESSURE PROTECTION DEVICES TO ENSURE DESIGN PRESSURES ARE NOT EXCEEDED		HIGH PRESSURE	MATL - MATERIAL	SCH - PIPE SCHEDULE
		HIGH TEMPERATURE	MDMT - MINIMUM DESIGN METAL TEMPERATURE	THK - THICKNESS
		NORMAL	NDE - NON DESTRUCTIVE EXAMINATION	VI - VISUAL INSPECTION
		SEVERE	NNF - NO NORMAL FLOW	XR - RADIOGRAPHIC INSPECTION
			NORM - NORMAL	MT- MAGNETIC PARTICLE INSP.
			PPO - PERSONAL PROTECTION ONLY	LT - LIQUID PENETRANT
			PROJ - PROJECT	

CLIENT:	**REGIONAL DISTRICT OF NANAIMO**	DATE:	**6-Oct-20**	Rev#	
PROJECT TITLE:	**FCPCC - SLUDGE STORAGE CELL #3 REPLACEMENT**	ISSUED FOR:	**ESTIMATE**	**B**	
		ISSUED BY:	**CDB**		
PROJECT No:	**2002167**	DOCUMENT No:	**2002167-000-2015-003**		
CLIENT PROJECT No.	**RAE13**				

PIPING TIE-IN LIST

MILL AREA No	TIE POINT NUMBER	TIE POINT LINE NUMBER	TIE POINT SIZE	EXISTING LINE NUMBER AT TIE POINT LOCATION	TYPE OF CONNECTION (1)	WORK CLASSIFICATION (2)	TIE POINT P&ID DRAWING	PRESSURE TESTING		INSPECTION REQUIREMENTS	TIE POINT REQUIRED INSTALLATION DATE	DATE TIE POINT COMPLETED	COMMENTS	REV #
								TEST TYPE	TEST PRESSURE					
			(DN)						(kPag)					
300	TP-01	100-DS-SS-001	100	-	FF	III	-	SERVICE TEST	SERVICE TEST	VI - 100%				B
300	TP-02	150-DS-SS-006	150	SLUDGE STORAGE CELL #2	SJ	III	-	SERVICE TEST	SERVICE TEST	VI - 100%				B
300	TP-03	20-PA-SS-007	20	-	TC	III	-	SERVICE TEST	SERVICE TEST	VI - 100%				B

NOTES:	**PLANT AREAS:**	**CONNECTION TYPE:**	**WORK CLASSIFICATION:**	**PRESSURE TEST TYPE:**
(1) - INDICATE TYPE OF CONNECTION REQUIRED TO PERFORM THE TIE-IN.	300 - SLUDGE DIGESTERS	CC - COLD CUT	I - IMMEDIATE WORK	HYDROSTATIC
(2) - INDICATES TYPE OF WORK CLASSIFICATION REQUIRED (SEE TABLE).		CW - COLD CUT & WELD	II - SCHEDULE W/O SHUTDOWN OF EQUIPMENT	ALTERNATE
		CT - COLD CUT, THREAD & COUPLE	III - SCHEDULE IN SEQUENCE W/ EQUIPMENT SHUTDOWN	HYDRO-PNEUMATIC
		DB - DRILLED BRANCH	IV - INSTALL WHEN LABOUR & MATERIAL AVAILABLE	PNEUMATIC
		FF - FLANGED	V - TIE-IN COMPLETED	SERVICE
		GF - GROOVED FITTING		
		HW - HOT CUT & WELD		
		HT - HOT TAP		
		TC - THREADED & COUPLED		
		SJ - SLIP JOINT		

SCHEDULE 6 – DRAWINGS

Title	Dwg.No.	Date	Rev
Civil Site Layout and Area Plan (markup)	C-1001	24Sep2019	A
Sludge Storage Cell 3 Structural Foundation Details	FC-S-312	30Sep2020	B
Sludge Storage Cell 3 General Arrangement Plan and Elevation	FC-M-311	14Oct2020	B
Sludge Storage Cell 3 FRP Replacement Tank Data Sheet	FC-M-312	20Oct2020	B
Tank Vendor Shop Drawings (to come in Addenda)	TBA	TBA	TBA
Sludge Storage Cell 3 Piping Support Details	FC-M-351	20Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Supply/Return Sht. 1 of 4	300-100-DS-SS-001	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Supply/Return Sht. 2 of 4	300-100-DS-HDPE-002-01	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Supply/Return Sht. 3 of 4	300-100-DS-HDPE-002-02	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Supply/Return Sht. 4 of 4	300-100-DS-SS-003	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Overflow Sht. 1 of 5	300-150-DS-SS-004	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Overflow Sht. 2 of 5	300-150-DS-HDPE-005-01	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Overflow Sht. 3 of 5	300-150-DS-HDPE-005-02	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Overflow Sht. 4 of 5	300-150-DS-SS-006-01	14Oct2020	B
Sludge Storage Cell 3 Piping Isometric Digested Sludge Overflow Sht. 5 of 5	300-150-DS-SS-006-02	14Oct2020	B

KEY NOTES

1. 15m BUFFER ZONE FROM MORNINGSTAR CREEK.
2. INSTALL TRUCK AXLE SCALE IN ROADWAY PULL-OUT. INSTALL SCALE DISPLAY SCOREBOARD BESIDE ROADWAY.

PLANT AREAS	
AREA 100	PRELIMINARY TREATMENT
AREA 200	SEDIMENTATION TANKS
AREA 300	ATADs
AREA 400	TRICKLING FILTERS
AREA 500	SLUDGE DEWATERING
AREA 600	SECONDARY TREATMENT
AREA 800	OPERATIONS BUILDING

6.0m WIDE ASPHALT ACCESS ROAD
BIOREACTOR 2
SECONDARY CLARIFIER 5
SRS DISTRIBUTION BOX
TRANSFORMER
SECONDARY CLARIFIER 4
BIOREACTOR 1
MOTORIZED SLIDING GATE WITH ACCESS CONTROL
AREA 600
CTU BUILDING
GENSET
CENTRATE PUMP STATION
EXISTING DRYING BED
EXISTING DRYING BED
EXISTING DRYING BED
DEWATERING BUILDING
ASPHALT DRIVEWAY
TREELINE
SURVEYED HIGH WATER MARK OF MORNINGSTAR CREEK
ISLAND HIGHWAY
BUFFER ZONE (1)
REMOVE EXISTING BRIDGE AND REPLACE WITH TWO CONCRETE BOX CULVERTS
AREA 500
AREA 100
Approximate Location of Sludge Storage Cell 3
MORNINGSTAR CREEK
RIPARIAN AREA
TRICKLING FILTERS
AREA 400
CONTACT
TRICKLING FILTER PUMP AREA
EQUALIZATION TANK
SRS SPLITTER BOX
PARKING STALLS
GRIT ROOM
CONC. CURB
AREA 300
AREA 200
SECONDARY CLARIFIER
PRIMARY CLARIFIER
AREA 800
RETAINING WALL
WASTE BIOLOGICAL THICKENER BUILDING
AU AEF
AREA 300
OPERATIONS BUILDING
SEPTAGE HOLDING TANK
M.O.T.C. 2
BLDG.
GRAVEL
OPERATIONS BUILDING
EXISTING GATE TO BE REMOVED. INSTALL MOTORIZED GATE WITH CONTROL ACCESS
LEE ROAD
R3 P. 9203
Pcl. A DD 5360–N
2 PLAN 2570
4 N 2570
BUFFER ZONE (1)
SURVEYED HIGH WATER MARK OF MORNINGSTAR CREEK
DL. 28
SITE PLAN
1:500
0 12.5 25 m
1:500

Plotted By: snejaignatova
Plot File Date Created: Sep/23/2019 12:40 PM
Layout-Sheet Name: C-1001
Filename: P:\60590631\900-CAD_GIS\910-CAD\20-SHEETS\C\60590631-C-1001.DWG

REV	DESCRIPTION	DRN	CHK	DATE (Y/M/D)
A	ISSUED FOR 60% DETAILED DESIGN	SI	KM	2019/09/24

VERIFY SCALE IF PLAN SHEET IS REDUCED
30 mm

DRN BY: SI
DES BY: MC
CHK BY: KM
APP BY: MC

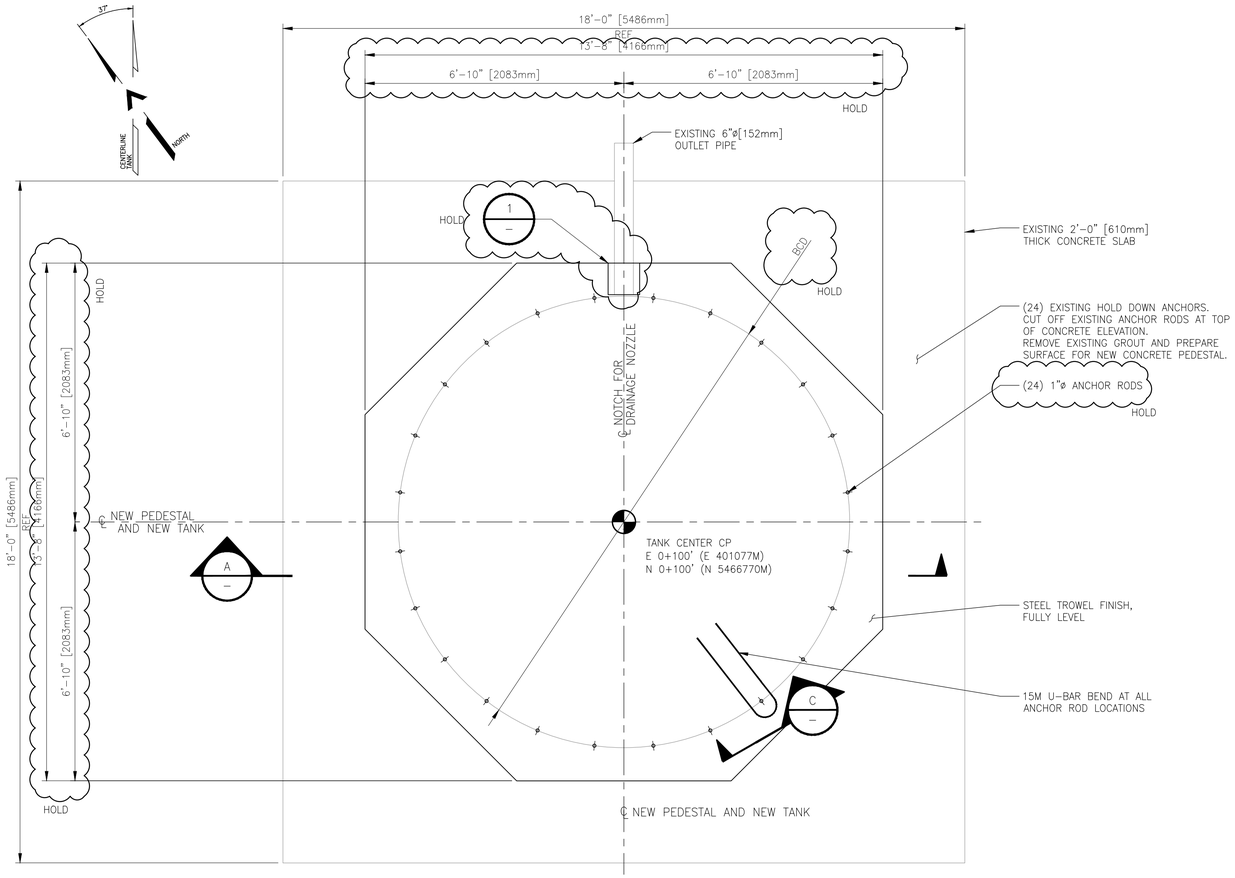
PREPARED FOR:
REGIONAL DISTRICT OF NANAIMO

PREPARED BY:
AECOM
4th FLOOR, 3292 PRODUCTION WAY, BURNABY, B.C., V5A 4R4
604-444-6400

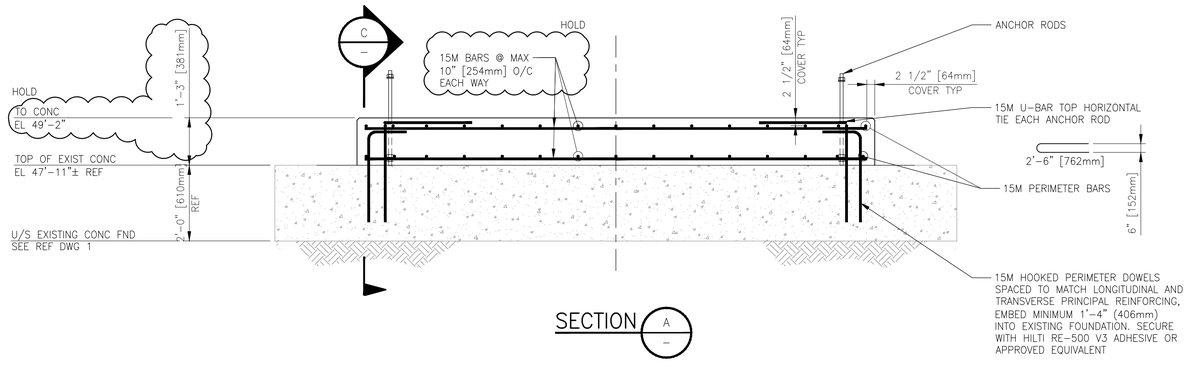
REGIONAL DISTRICT OF NANAIMO
FRENCH CREEK POLLUTION CONTROL CENTRE
STAGE IV EXPANSION

CIVIL
SITE LAYOUT AND AREA PLAN

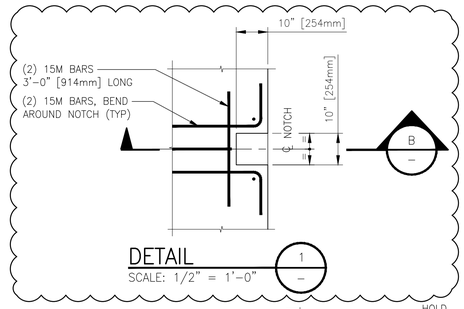
PROJECT START DATE (M / Y)	SEP/2019
PROJECT NO.	60590631
FILENAME	60590631-C-1001.dwg
RDN DRAWING No.	
DRAWING No.	C-1001



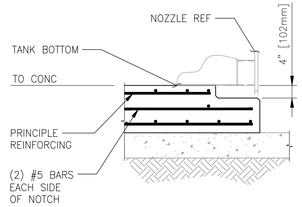
PLAN – NEW PEDESTAL FOR SLUDGE STORAGE CELL 3 TANK



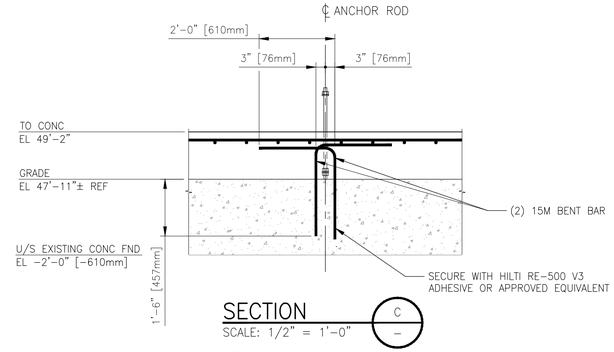
SECTION A



DETAIL 1
SCALE: 1/2" = 1'-0"

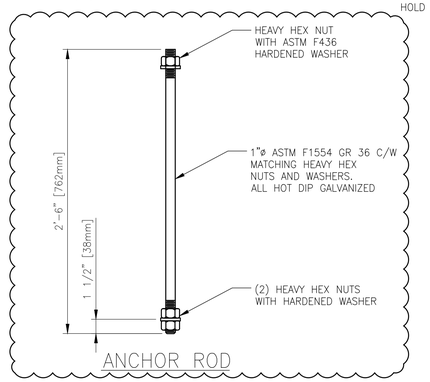


SECTION B
SCALE: 1/2" = 1'-0"



SECTION C
SCALE: 1/2" = 1'-0"

(24) LOCATIONS TOTAL



ANCHOR ROD

DESIGN

1. THE COMPLETED STRUCTURE SHOWN ON THE STRUCTURAL DRAWINGS HAS BEEN DESIGNED IN SUBSTANTIAL ACCORDANCE WITH THE BRITISH COLUMBIA BUILDING CODE 2018 WHICH IS IN COMPLIANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2015.

DESIGN LOADS

1. LOCATION : PARKSVILLE B.C.

CLIMACTIC LOADS:

GROUND SNOW	S_s	= 2.0 kPa (42.0 psf)
	I_s	= 1.25
RAIN	S_r	= 0.40 kPa (8.3 psf)
WIND	q_{50}	= 0.50 kPa (10.4 psf)
	I_w	= 1.25
SEISMIC	S_a (0.2)	= 0.917
	S_a (0.5)	= 0.859
	S_a (1.0)	= 0.519
	S_a (2.0)	= 0.322
	S_a (5.0)	= 0.106
	PGA	= 0.405
	I_E	= 1.5

WALKWAY LOADS:
LIVE LOAD = 4.8 kPa (100 psf)

CONCRETE

1. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR WORKING WITH THE CONCRETE SUPPLIER TO ENSURE THAT THE PLASTIC AND HARDENED MIX PROPERTIES MEET SITE REQUIREMENTS FOR PLACING, FINISHING, AND THE OWNERS' SPECIFIED PERFORMANCE REQUIREMENTS. THE GENERAL CONTRACTOR SHALL MEET THE DOCUMENTATION AND QUALITY CONTROL REQUIREMENTS OUTLINED UNDER THE "PERFORMANCE" ALTERNATE OF TABLE 5 OF CAN/CSA-A23.1.

2. CONCRETE PROPERTIES:

NEW STRUCTURES				
ELEMENT	MIN. COMPRESSIVE STRENGTH 28 DAYS U.N.O.	EXPOSURE CLASS	AIR CONTENT CATAGORY	MAX W/C RATIO
TANK PEDESTAL	35	A-2	1	0.45

CEMENT TYPE HIGH EARLY (HE) MAY BE USED TO FACILITATE CONSTRUCTION SCHEDULE.

4. GENERAL CONTRACTOR TO PROVIDE CONCRETE TEST RESULTS TO ALLNORTH FOR 7, 21 & 28 DAYS.

5. CURING OF CONCRETE TO MEET THE REQUIREMENTS FOR THE EXPOSURE CLASS AS OUTLINED IN CLAUSE 7.4.1 AND 7.4.2 AS WELL AS TABLES 2 AND 20 OF CAN/CSA-A23.1.

6. ALL BOTTOM EDGES OF EXPOSED SLABS AND BEAMS, AS WELL AS EDGES OF WALLS AND COLUMNS, TO BE CHAMFERED 3/4" x 3/4" [19mmx19mm].

7. GENERAL CONTRACTOR TO PROVIDE TEST RESULTS TO ALLNORTH IF BACKFILL OR FORM STRIPPING IS REQUIRED BEFORE 7 DAYS OF CURING.

8. ROUGHEN AND CLEAN ALL COLD JOINT SURFACES PRIOR TO PLACING NEW CONCRETE. PRESOAK EXISTING CONCRETE WITH CLEAN WATER FOR 8 HOURS MINIMUM BEFORE NEW CONCRETE POUR. EXISTING CONCRETE TO BE "SATURATED AND SURFACE DRY" (NO PUDDLES) WHEN NEW CONCRETE PLACED.

9. MAXIMUM AGGREGATE SIZE IS 3/4" [19mm].

CONCRETE REINFORCEMENT

1. REINFORCEMENT SHALL CONFORM TO THE FOLLOWING STANDARDS:
   10M AND LARGER (UNO): CSA G30.18R, GRADE 400W

2. UNLESS OTHERWISE NOTED CONCRETE COVER TO REINFORCEMENT SHALL BE:
   CAST AGAINST EARTH OR GROUND – 3" [76mm]
   EXPOSED TO WEATHER OR EARTH – 2" [50mm]
   CONCRETE EXPOSURE CLASS A-2 – 2 1/2" [64mm]

3. DO NOT SUBSTITUTE DEFORMED WIRE FOR REINFORCING BARS WITHOUT PRIOR APPROVAL FROM ALLNORTH.

4. PROVIDE SUFFICIENT SUPPORTS TO MAINTAIN CONCRETE COVER AS SPECIFIED. ALL SUPPORTS AND BARS MUST BE TIED TOGETHER TO MAINTAIN REINFORCING STEEL SECURELY IN PLACE DURING CONCRETE PLACEMENT.

5. LAP SPLICE LENGTHS:

REBAR SIZE	CONCRETE STRENGTH 30MPa & GREATER
10M	20" [508Mmm]
15M	28" [711mm]
20M	42" [1067mm]
25M	54" [1372mm]
30M	64" [1626mm]

6. MINIMUM HOOK LENGTH FOR 25M BAR IS 24" [610mm].

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
S-1	BIO SOLIDS TANK (BAYVIEW ENG)	1
C-1000	CIVIL OVERALL SITE PLAN	2
FC-M-311	SLUDGE STORAGE CELL #3 PLAN & ELEV.	3
FC-M-312	SLUDGE STORAGE CELL #3 DATA SHEET	4

PRELIMINARY

ISSUED FOR
INFORMATION
Date: 2020/SEP/30

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/09/30	ISSUED FOR INFORMATION	POZ	-	SW
A	20/08/13	ISSUED FOR INFORMATION	POZ	-	SW

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

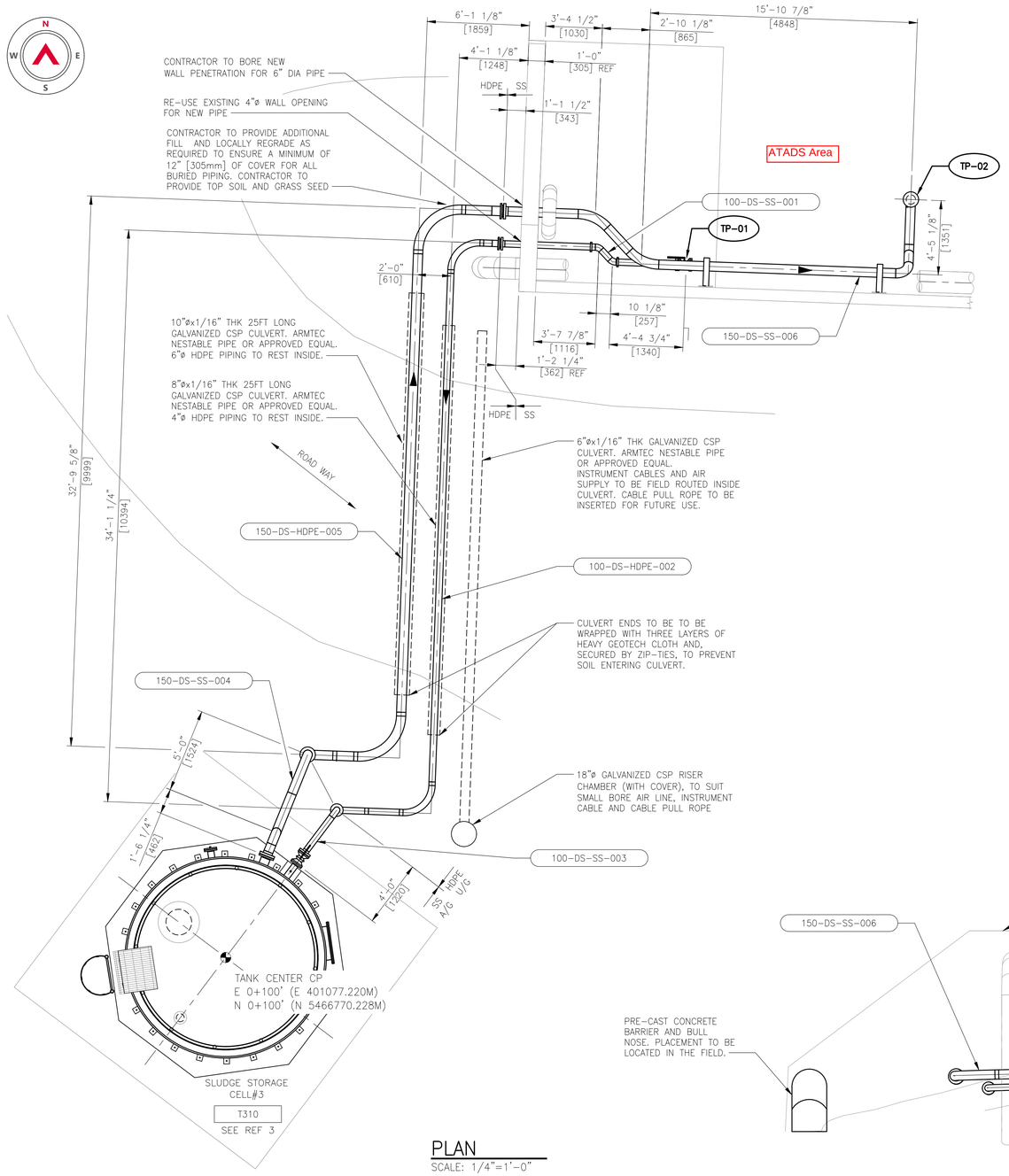
TITLE: **SLUDGE STORAGE CELL 3 STRUCTURAL FOUNDATION DETAILS**

CLIENT NO:	RAE13	DRWN:	POZ	DATE:	20/08/11
PROJECT NO:	2002167	DSGN:	SW	DATE:	20/08/11
DRAWING SIZE:	ANSI "D"	CHKD:	-	DATE:	-
SCALE:	1/2" = 1'-0"	APVD:	-	DATE:	-

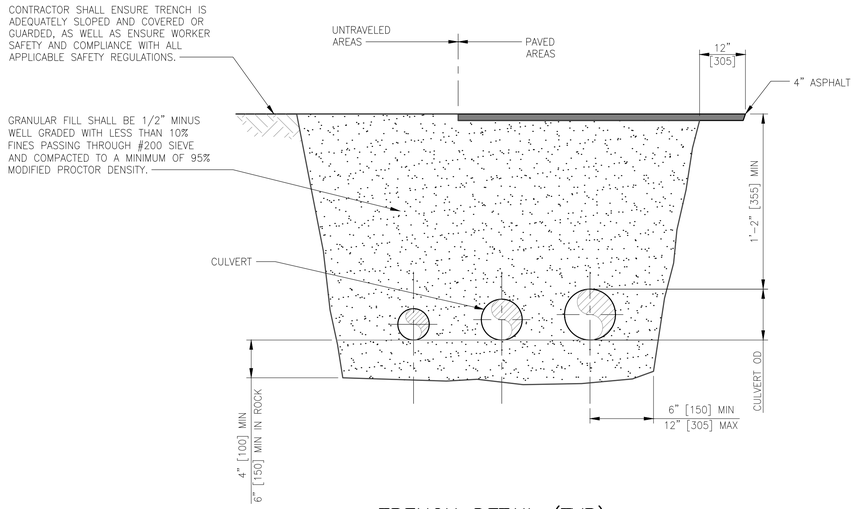
PROJECT: **FCPCC-SLUDGE STORAGE CELL 3 REPLACEMENT**

DWG NO: **FC-S-312** REV: **B**

Date: 2020/09/30 9:41 AM | User: Per Zetterberg | File: P:\WA\2020\2002167 RDN-Sludge Storage Cell 3 Replacement\1000-Dwgs\1012-Struct\01-Production\FC-S-312 | Layout: Rev B | Paper Size: 34" x 22"



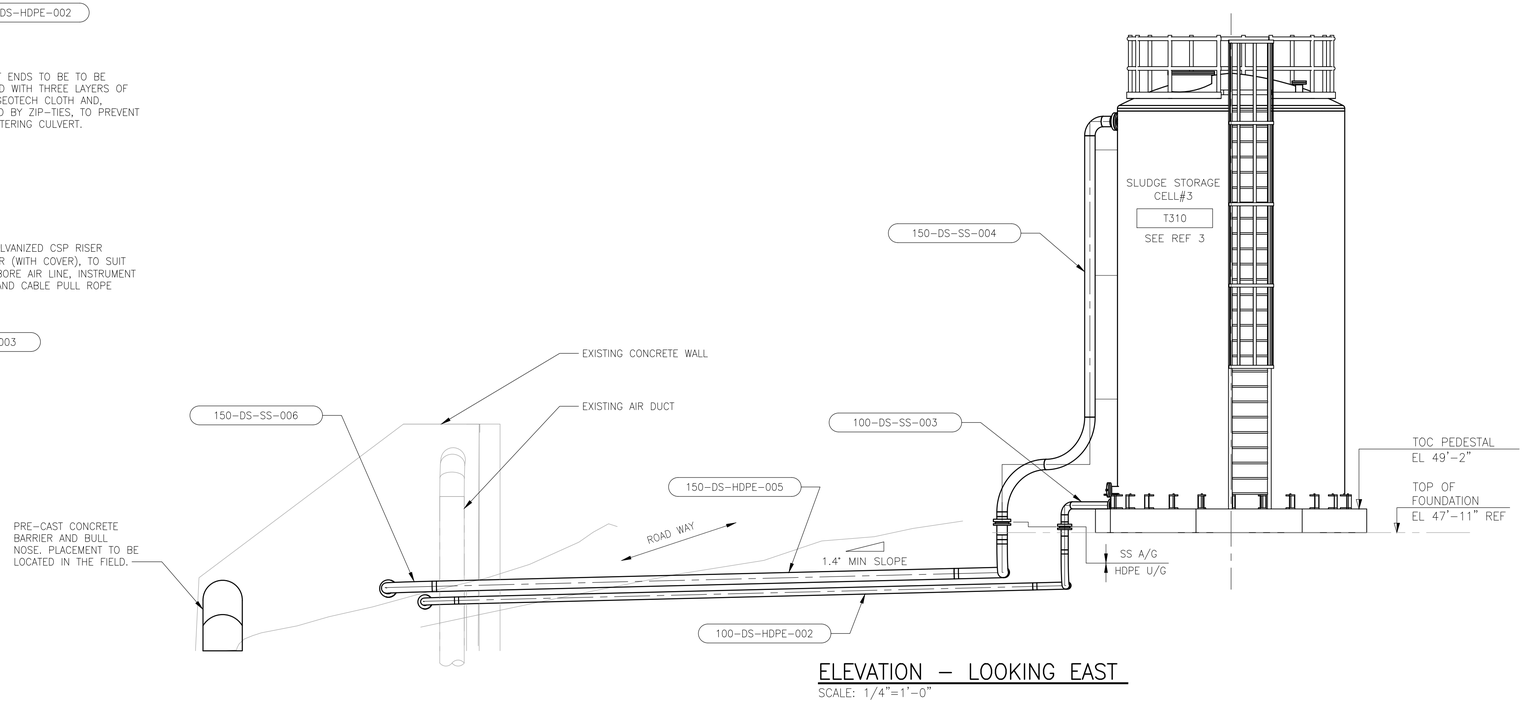
PLAN
SCALE: 1/4"=1'-0"



TRENCH DETAIL (TYP)
SCALE: NTS

NOTES

1. BACKFILL SHALL BE A FINE GRANULAR MATERIAL FREE OF ORGANICS AND DELETERIOUS SUBSTANCES, COMPOSED OF INERT, CLEAN, DURABLE, ANGULAR FRAGMENTS OF UNIFORM QUALITY.
2. THE CONTRACTOR SHALL PERFORM A MINIMUM OF ONE MODIFIED PROCTOR TEST ON EACH MATERIAL USED FOR THE PROJECT. THE CONTRACTOR SHALL PROVIDE RESULTS OF ALL AGGREGATE TESTING TO THE ENGINEER.
3. EXCAVATED MATERIALS SHALL BE REMOVED FROM SITE AND DISPOSED OF IN AN ENVIRONMENTALLY FRIENDLY MANNER.



ELEVATION – LOOKING EAST
SCALE: 1/4"=1'-0"

REFERENCE DRAWINGS			REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF	DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
C-1001	AECOM - CIVIL OVERALL SITE PLAN	1	300-150-DS-SS-006	ISOMETRIC LINE 150-DS-SS-006	9
FC-S-312	SLUDGE STORAGE FOUNDATION DETAILS	2			
FC-M-312	SLUDGE STORAGE CELL#3 DATA SHEET	3			
300-100-DS-SS-001	ISOMETRIC LINE 100-DS-SS-001	4			
300-100-DS-HDPE-002	ISOMETRIC LINE 100-DS-HDPE-002	5			
300-100-DS-SS-003	ISOMETRIC LINE 100-DS-SS-003	6			
300-150-DS-SS-004	ISOMETRIC LINE 150-DS-SS-004	7			
300-150-DS-HDPE-005	ISOMETRIC LINE 150-DS-HDPE-005	8			

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

TITLE:
SLUDGE STORAGE CELL#3 GENERAL ARRANGEMENT PLAN & ELEVATION

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

CLIENT NO:	RAE13	DRWN:	DRM	DATE:	20/08/27
PROJECT NO:	2002167	DSGN:	DRM	DATE:	20/08/27
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE:	20/09/01
SCALE:	AS NOTED	APVD:		DATE:	

DWG NO: **FC-M-311** REV: **B**

Date: 2020/10/14 9:21 AM | User: Andrew Bert | File: P:\NA\Plant3D\200216\Ortho\s\DWGs\FC-M-311 | Layout: Rev8 | Paper Size: 34" x 22"

ATTACHMENT LUG SCHEDULE / DESIGN LOADS FOR ATTACHMENT LUG

REPAD NUMBER	QTY	ORIENTATION	HEIGHT FROM DATUM	±F_X [N]	±F_Y [N]	±F_Z [N]	NOTES
PS1A	1	0°	5790	2000	2000	4000	• ELEVATIONS ARE TO CENTERLINE OF REPAD • ORIENTATIONS ARE REFERENCED TO THE CENTERLINE OF REPAD
PS1B	1	330°	5790	2000	2000	4000	
PS2A	1	0°	5060	2000	2000	4000	
PS2B	1	330°	5060	2000	2000	4000	
PS3A	1	0°	2895	2000	2000	4000	
PS3B	1	330°	2895	2000	2000	4000	
PS4A	1	0°	2135	2000	2000	4000	
PS4B	1	330°	2135	2000	2000	4000	

NOZZLE SCHEDULE

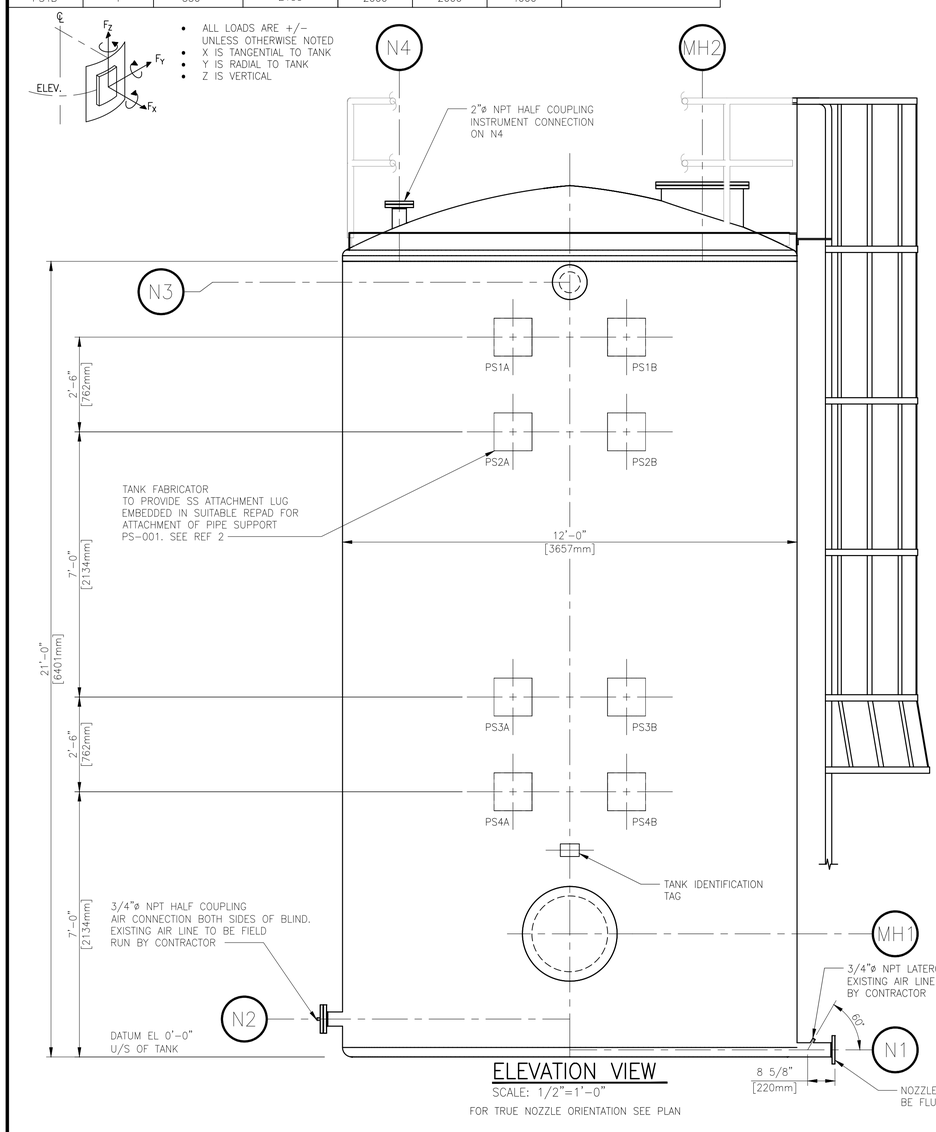
NOZZLE NO	SIZE	QTY	CLASS	HEIGHT$_1$ FROM DATUM	PROJ$_2$ FROM TANK ℄	CONNECTION TYPE	NOZZLE NECK SCHEDULE	DESCRIPTION
N1	100	1	150	57mm	2135mm	FLG RF	–	INLET / DRAIN
N2	100	1	150	305mm	2015mm	FLG RF	–	AIR PURGE
N3	150	1	150	6233mm	2015mm	FLG RF	–	OVER FLOW
N4	100	1	150	6860mm	–	FLG RF	–	INSTRUMENT
MH1	750	1	–	1000mm	2015mm	–	–	MAN HOLE
MH2	750	1	–	7010mm	–	–	–	MAN HOLE

NOZZLE SCHEDULE NOTES:
1. HEIGHT FROM DATUM TO ℄ OF NOZZLE OR FOF FOR ROOF NOZZLES.
2. PROJECTION FROM TANK ℄ TO FOF OR RADIAL POSITION OF ROOF NOZZLES.

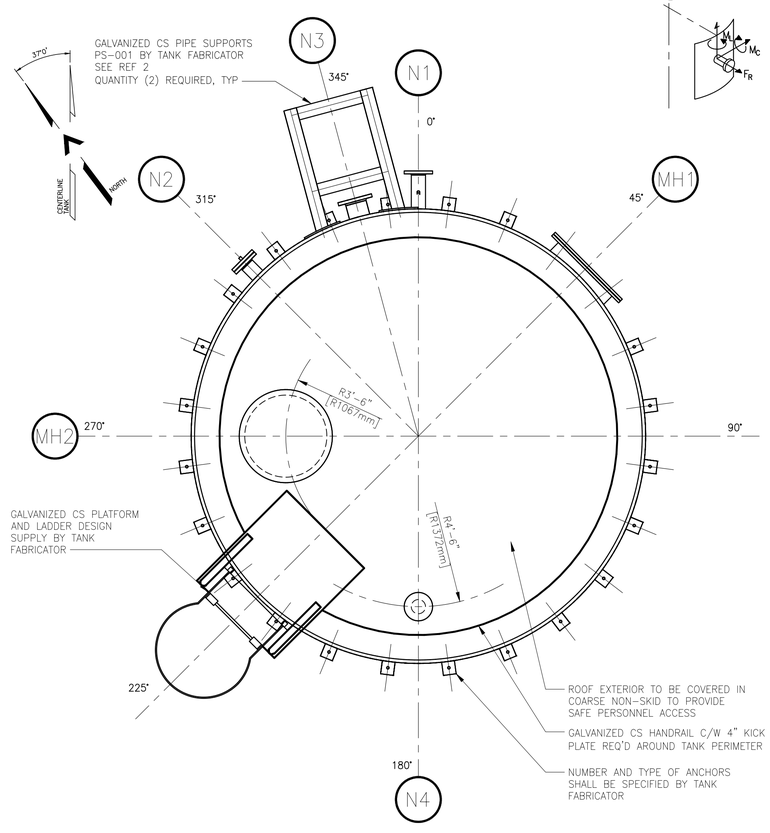
DESIGN LOADS FOR NOZZLES

NOZZLE SIZE	RADIAL FORCE COMPRESSION/TENSION [N]	CIRCUMFERENTIAL / LONGITUDINAL MOMENT [N–M]
50	1300	160
75	1600	300
100	1700	410
150	2500	730
200	4400	1130
250	5100	1820
300	5600	2410

* MINIMUM DESIGN LOADS UNLESS STATED OTHERWISE. ALLOWABLE LOADS SHALL BE CALCULATED BASED ON APPLICABLE TANK DESIGN CODE.



ELEVATION VIEW
SCALE: 1/2"=1'–0"
FOR TRUE NOZZLE ORIENTATION SEE PLAN



PLAN VIEW
SCALE: 1/2"=1'–0"

DESIGN DATA

CONTENTS	DESCRIPTION	AEROBICALLY DIGESTED MUNICIPAL WASTEWATER SLUDGE	
	PROPERTIES	pH: 8.2	SPECIFIC GRAVITY: 1.012
	CHEMICAL COMPOSITION	SEE CUSTOMER RFQ SPECIFICATIONS	
	LEVEL FROM DATUM	OPERATING: 20FT (6,100mm)	MAX: 20'–2" (6,150mm)
DESIGN CONDITIONS	DESIGN CODE	ASTM D3299 (TYPE II, GRADE 2)	
	DESIGN PRESSURE	MIN: 355mm H_2O (VAC)	MAX: 355mm H_2O
	PRESSURE/VACUUM RELIEF	N/A	
	DESIGN TEMPERATURE	MIN: –8°C	MAX: 70°C
	OPERATING	PRESSURE: ATM	TEMPERATURE: 65°C
	TEST PRESSURE	STATIC HYDRO TEST AT MAX LEVEL	
	FOUNDATION	BY OTHERS	
	AMBIENT TEMPERATURE	MIN: –8°C	MAX: 26°C
	ACTIVE VOLUME	64,600 L (TO U/S OF OVERFLOW)	
LOCATION	IN/OUTDOORS	OUTDOORS, PARKSVILLE, BC	
DESIGN LOADS	WIND	IN ACCORDANCE WITH ASTM D3299 AND BC BUILDING CODE	
		q_{50}=0.50 kPa, I_w=1.25	
	SNOW	IN ACCORDANCE WITH ASTM D3299 AND BC BUILDING CODE	
		S_S=2.0 kPa, S_R=0.40 kPa, I_S=1.25	
	SEISMIC	IN ACCORDANCE WITH ASTM D3299 AND BC BUILDING CODE	
		Sa(0.2)=0.917, PGA=0.405, I_E=1.5	
	LIVE (ROOF)	IN ACCORDANCE WITH ASTM D3299 AND BC BUILDING CODE (4.8 kPa MIN)	
	CONCENTRATED	IN ACCORDANCE WITH ASTM D3299 AND BC BUILDING CODE	
	TOP PLATFORM	N/A	
MATERIAL SPECIFICATIONS (ASTM, ANSI, OR PROJECT SPEC)	VESSEL SHELL	ASTM – FRP	
	CORROSION ALLOWANCE	SHELL : N/A	BOTTOM: N/A / ROOF: N/A
	RESIN	AS PER MANUFACTURER'S STANDARD, 5% ANTIMONY TRIOXIDE ADDITIVE ALLOWED TO ACHIEVE ASTM E84 CLASS 1 FLAME SPREAD RATING	
	INSULATION (EXT SURFACES)	SHELL: N/A	
	CLADDING (EXT SURFACES)	SHELL: N/A	
	PAINTING (EXT SURFACES)	LEAF GREEN – RAL 6002, NOTE J	
	NOZZLE NECK	–	
	MANWAY NECK	–	
	FLANGES AND BLINDS	VANSTONE C/W BACK–UP RING MAY BE HOT–DIPPED GALVANIZED CS OR EPOXY COATED CAST DI	
	GASKETS FOR MANWAYS	BUNA–N	
	FLANGE BOLTS & NUTS	ASTM A193 B8M BOLTS C/W A194 8M HEAVY HEX NUTS	
OTHER STANDARDS & SPECIFICATIONS	FABRICATION AND QA	FABRICATION SPECIFICATION FOR FRP TANKS FOR ATMOSPHERIC PRESSURE SERVICE (RDN)	
SCOPE OF SUPPLY	VARIATIONS ARE PERMITTED SUBJECT TO OWNER'S APPROVAL AND TO SUIT CODES. ALL VARIATIONS SHALL BE DOCUMENTED.		
	FABRICATOR	TANK DESIGN	
	FABRICATOR	TANK SUPPLY INCLUDING ALL TEMPORARY BRACING AND SADDLE REQUIRED FOR SHIPPING	
	FABRICATOR	TANK IDENTIFICATION TAG AS PER DESIGN CODE OR OWNERS STANDARD	
	FABRICATOR	SURFACE PREPARATION AND PAINTING FOR EXTERIOR SURFACES	
	FABRICATOR	TANK ATTACHMENT LUG AS PER ATTACHMENT LUG SCHEDULE AND ATTACHMENT LUG LOADS	
	FABRICATOR	ALL BOLTING AND GASKET FOR MANWAYS	
	FABRICATOR	THREE LIFTING LUGS MINIMUM	
	OWNER	ANCHOR BOLTS	
	FABRICATOR	LADDER, PLATFORMS AND HANDRAIL, NOTE I	
	OWNER	FOUNDATION DESIGN	
	FABRICATOR	DESIGN AND SUPPLY OF PS–001, SEE REFERENCE 2	
GENERAL NOTES	A. THE TANK FABRICATOR IS RESPONSIBLE FOR ENSURING THAT THE TANK DESIGN AND FABRICATION ARE IN COMPLIANCE WITH CODES AND SPECIFICATIONS LISTED ABOVE. B. INSPECTION AND TESTING SHALL BE IN COMPLIANCE WITH CODES AND SPECIFICATIONS ABOVE INCLUDING HYDRO TEST. C. TANK FABRICATOR TO DESIGN ANCHORS AND CONFIRM THE QUANTITY, GRADE, DIAMETER AND LENGTH OF ANCHOR BOLTS AND LAYOUT. D. THE TANK FABRICATOR SHALL SUPPLY DRAWINGS AND CALCULATIONS IN ACCORDANCE WITH THE PURCHASE SPECIFICATION. THE TANK VENDOR SHALL INCLUDE THE EMPTY WEIGHT, OPERATING WEIGHT, WATER FLOODED WEIGHT, VERTICAL AND HORIZONTAL LOADS, TANK ROOF ALLOWABLE LOAD AND THE OVERTURNING MOMENT FOR THE FOUNDATION DESIGN, DESIGN FOR FLOODED CONDITION, TANK SUPPORTS & REINFORCEMENTS. E. ALL FLANGE BOLT HOLES TO STRADDLE VERTICAL CENTER LINES. F. TANK NOZZLE DESIGN SHALL CONFORM TO THE LOAD TABLE PROVIDED IN THE TANK SPECIFICATION. G. STAINLESS STEEL NAMEPLATE SHALL BE ATTACHED TO THE TANK SHELL ADJACENT TO THE MANHOLE H. OVERALL HEIGHT TO BE CONFIRMED BY FABRICATOR PENDING DISHED ROOF DESIGN. I. LADDER, PLATFORM, KICK PLATE AND HANDRAIL DESIGN TO BE IN ACCORDANCE WITH CODES AND SPECIFICATIONS LISTED ABOVE. THEY SHALL BE REMOVABLE AND SHIPPED LOOSE WITH ATTACHMENT HARDWARE FOR INSTALLATION ON SITE. J. TANK FABRICATOR SHALL RECOMMEND A COATING SYSTEM SUITABLE FOR APPLICATION TO FRP SUBSTRATE WITH EXPOSURE TO UV AND WEATHER CONSISTENT WITH OUTDOOR USAGE. SURFACE PREPARATION SHALL BE AS PER THE COATING MANUFACTURER'S STANDARD BUT SHALL NOT BE LESS THAN SSPC – SP 1 FOLLOWED BY LIGHT SANDING WITH FINE SANDPAPER AND DUST REMOVAL. DFT PER COAT AND TOTAL DFT SHALL BE AS PER THE COATING MANUFACTURER'S STANDARD BUT TOTAL DFT SHALL NOT BE LESS THAN 3.0–5.0mm. COATING ON ROOF TO INCLUDE NON–SKID ADDITIVE.		

REFERENCE DRAWINGS

DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
FC-M-351	PIPING SUPPORT DETAILS	2
FC-S-312	SLUDGE STORAGE FOUNDATION DETAILS	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/20

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/20	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

TITLE: **SLUDGE STORAGE CELL#3 FRP REPLACEMENT TANK DATA SHEET**

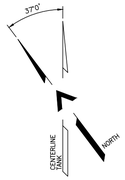
CLIENT NO:	RA613	DRWN:	DRM	DATE:	20/08/21
PROJECT NO:	2002167	DSGN:	DRM	DATE:	20/08/21
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE:	20/08/27
SCALE:	AS NOTED	APVD:		DATE:	

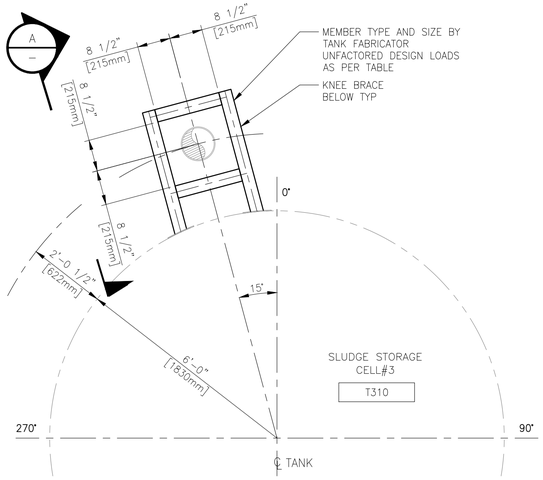
PROJECT: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

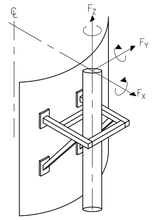
DWG NO: **FC-M-312** REV: **B**

Date: 2020/10/21 9:14 AM | User: Dave McMullen | File: P:\NA\2020\2002167 RDN-Sludge Storage Cell 3 Replacement\1000-Dwgs\1014-Mech\01-Production\FC-M-312 | Layout: RevB | Paper Size: 34" x 22"

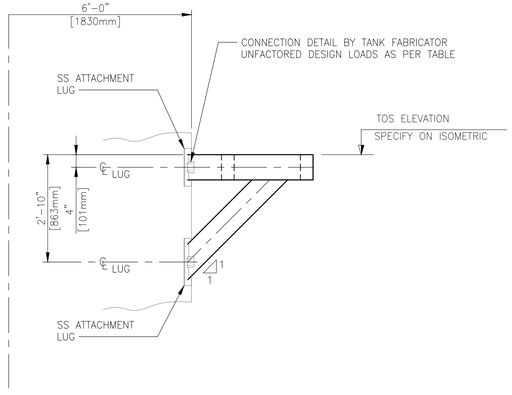
DESIGN LOADS FOR PS-001			
$\pm F_X$ [N]	$\pm F_Y$ [N]	$\pm F_Z$ [N]	NOTES
2250	2250	4500	• REFERENCED TO THE CENTERLINE OF PIPE SUPPORT





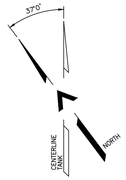


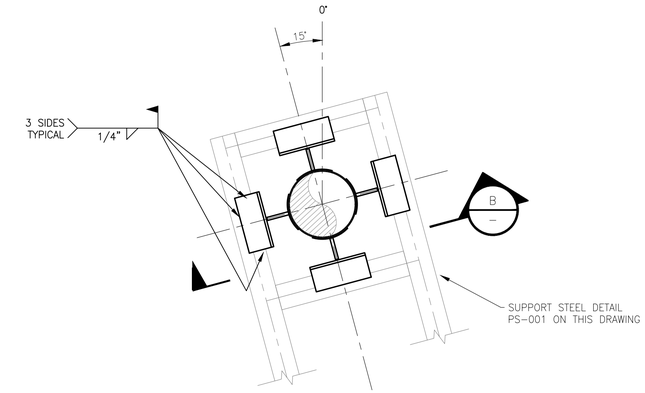
PLAN
SCALE: 1/2"=1'-0"



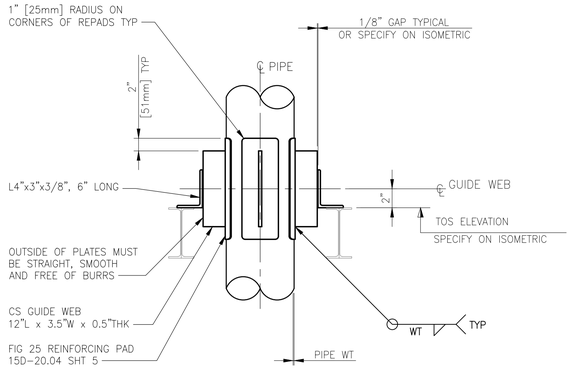
SECTION A
SCALE: 1/2"=1'-0"

DETAIL PS-001
BY TANK FABRICATOR
QUANTITY (2) REQUIRED





PLAN
SCALE: 1"=1'-0"



SECTION B
SCALE: 1"=1'-0"

PIPE GUIDE IN VERTICAL POSITION

DETAIL PS-002
BY INSTALLATION CONTRACTOR

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-312	SLUDGE STORAGE CELL#3 DATA SHEET	1
FC-S-312	SLUDGE STORAGE FOUNDATION DETAILS	2
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	3

NOTES:

1. ALL WELDS TO BE CONTINUOUS, STITCH WELDING IS NOT ACCEPTABLE.
2. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992-20.
3. STEEL TO BE HOT DIP GALVANIZED.

ISSUED FOR
ESTIMATE
Date: 2020/OCT/20

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/20	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/10/13	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

TITLE: **SLUDGE STORAGE CELL#3 PIPING SUPPORT DETAILS**

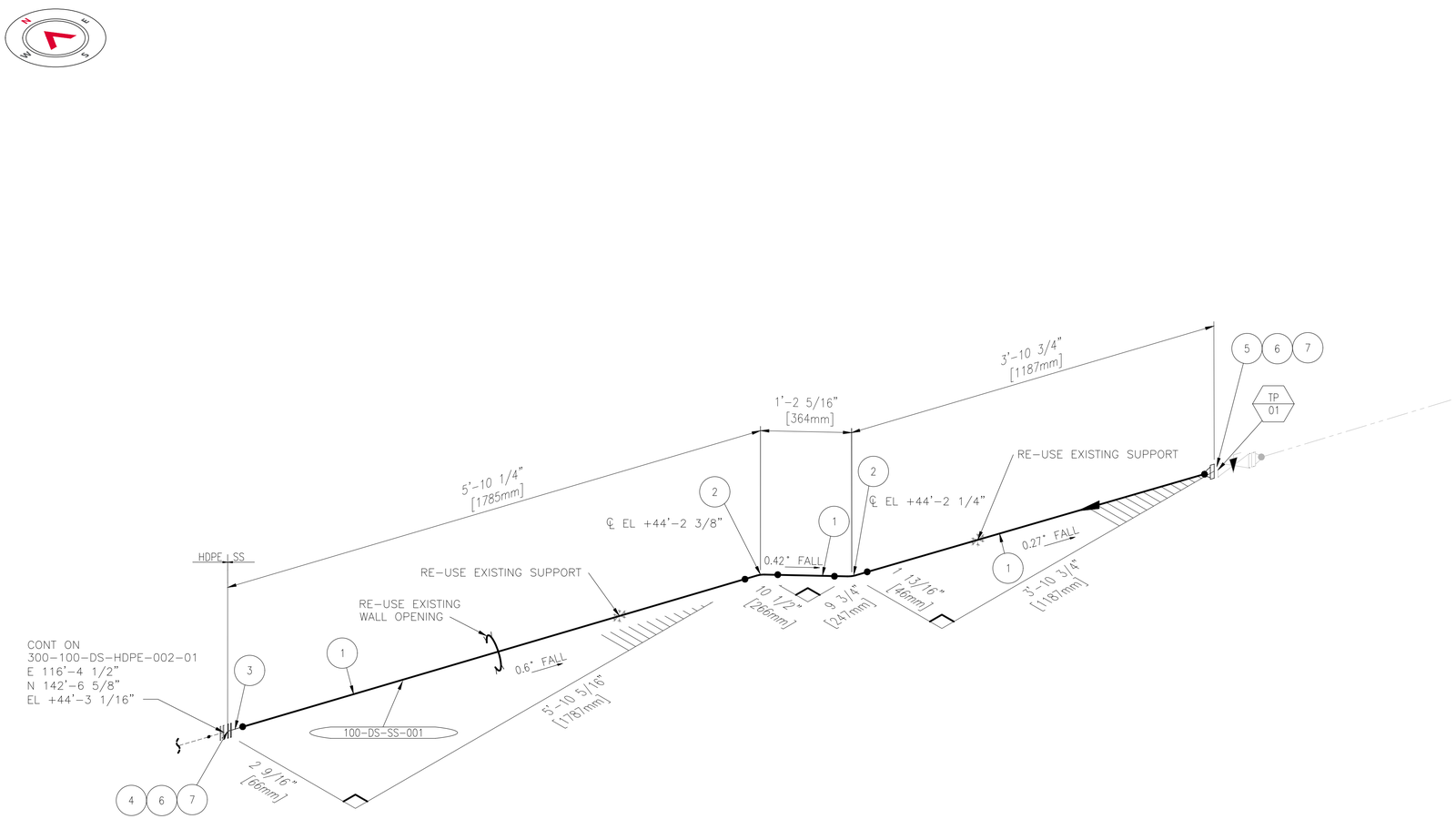
PROJECT: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

CLIENT NO:	RAE13	DRWN: DRM	DATE: 20/10/01	
PROJECT NO:	2002167	DSGN: DRM	DATE: 20/10/01	
DRAWING SIZE:	ANSI "D"	CHKD: CDB	DATE: 20/10/01	
SCALE:	AS NOTED	APVD:	DATE:	

DWG NO: **FC-M-351** REV: **B**

Date: 2020/10/21 9:19 AM | User: Dave McMullen | File: P:\NA\2020\2002167 RDN-Sludge Storage Cell 3 Replacement\1000-Dwgs\1014-Mech\01-Production\FC-M-351 | Layout: RevB | Paper Size: 34" x 22"

BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	3M	4"	PIPE, BE, SCH 10S, SS, WELDED, ASTM A312 GR TP316L
2	2	4"	ELBOW, 45 LR, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
3	1	4"	STUB END, SHORT PATTERN, BW, SCH 10S, SS, ASTM A403 GR WP316L, ASME B16.9
4	1	4"	FLANGE, LJ, CLASS 150, SS, FORGED, ASTM A182 GR F316L, ASME B16.5
5	1	4"	FLANGE, WN, FF, CLASS 150, SCH 10S, SS ASTM A182 GR F316L, ASME B16.5
6	16	5/8"	BOLT, STUD, CONTINUOUSLY THREADED STAINLESS STEEL, ASTM A193 GR B8M, ASME B18.2.1, ASME B1.1 CL 2A, C/W HEAVY HEX NUTS SS, ASTM A194 GR 8M, ASME B18.2.2, ASME B1.1 CL 2B
7	2	4"	GASKET, 1/8" THK, FF, BUNA N OR APPROVED EQUIVALENT



NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. ALL MATERIALS, DESIGN, FABRICATION, ASSEMBLY, ERECTION, EXAMINATION, INSPECTION AND TESTING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3.
8. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ASME B31.3 AND ASME SECTION IX CODES.
9. FILLET WELDS SHALL BE 1/4", UNLESS NOTED OTHERWISE IN THE ISOMETRIC OR PIPE SUPPORT DETAILS.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL 3 PLAN & ELEVATION	1
300-100-DS-HDPE-002	ISOMETRIC LINE 100-DS-HDPE-002	2
300-100-DS-SS-003	ISOMETRIC LINE 100-DS-SS-003	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

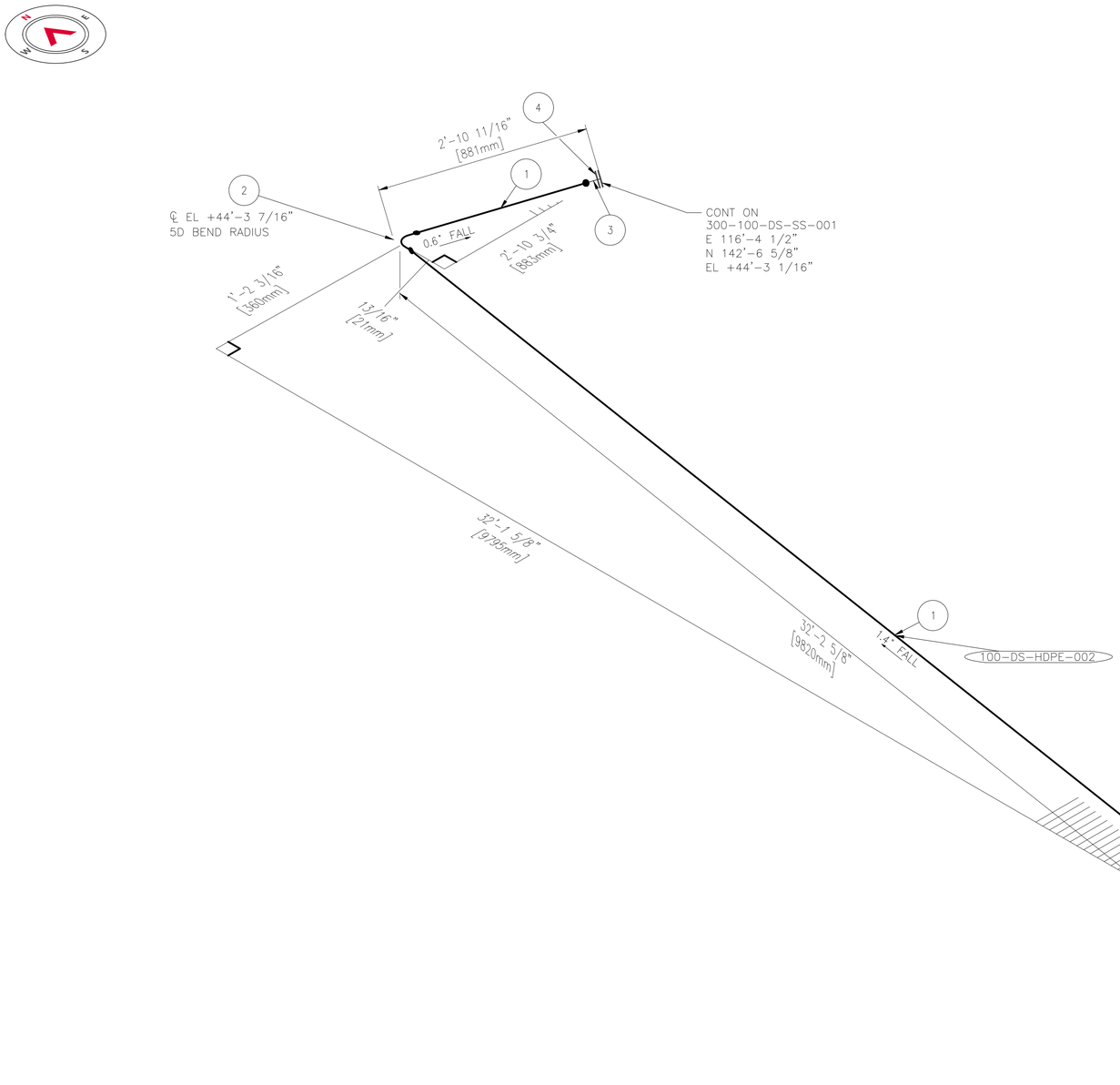
TITLE:
SLUDGE STORAGE CELL#3
PIPING ISOMETRIC
DIGESTED SLUDGE SUPPLY/RETURN

CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-100-DS-SS-001** REV: **B**

Date: 2020/10/14 9:32 AM | User: Andrew Bert | File: P:\NA\Plan3D\2002167\Isometric\Allnorth_JFC\Prodisos\Drawings\201014 Check Plot\300-100-DS-SS-001 Rev8 | Layout: Model | Paper Size: 34" x 22"



BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	9.5M	4"	PIPE, HDPE, PE-RT, IPS DR 11, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
2	1	4"	ELBOW, 90 5D BEND, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
3	1	4"	FLANGE ADAPTER, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
4	1	4"	BACK UP RING, FOR USE WITH FLANGE ADAPTER, CLASS 150, 316L SS, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL

NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. CONTRACTOR TO VERIFY TEMPERATURE AND PRESSURE RATING OF HDPE PIPE AND FITTINGS TO MEET OR EXCEED THE TEMPERATURES AND PRESSURES NOTED ON LINE LIST 2002167-000-2015-001.
8. ALL HDPE PIPE SHALL BE INSTALLED BY A QUALIFIED TECHNICIAN AS PER THE MANUFACTURER'S RECOMMENDATIONS.
9. HEATING AND BENDING OF HDPE PIPE SHALL NOT BE PERMITTED.
10. ONLY MOLDED HDPE FITTINGS SHALL BE USED. FABRICATED FITTINGS SHALL NOT BE PERMITTED.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
300-100-DS-SS-001	ISOMETRIC LINE 100-DS-SS-001	2
300-100-DS-SS-003	ISOMETRIC LINE 100-DS-SS-003	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

TITLE:
SLUDGE STORAGE CELL#3 PIPING ISOMETRIC DIGESTED SLUDGE SUPPLY/RETURN

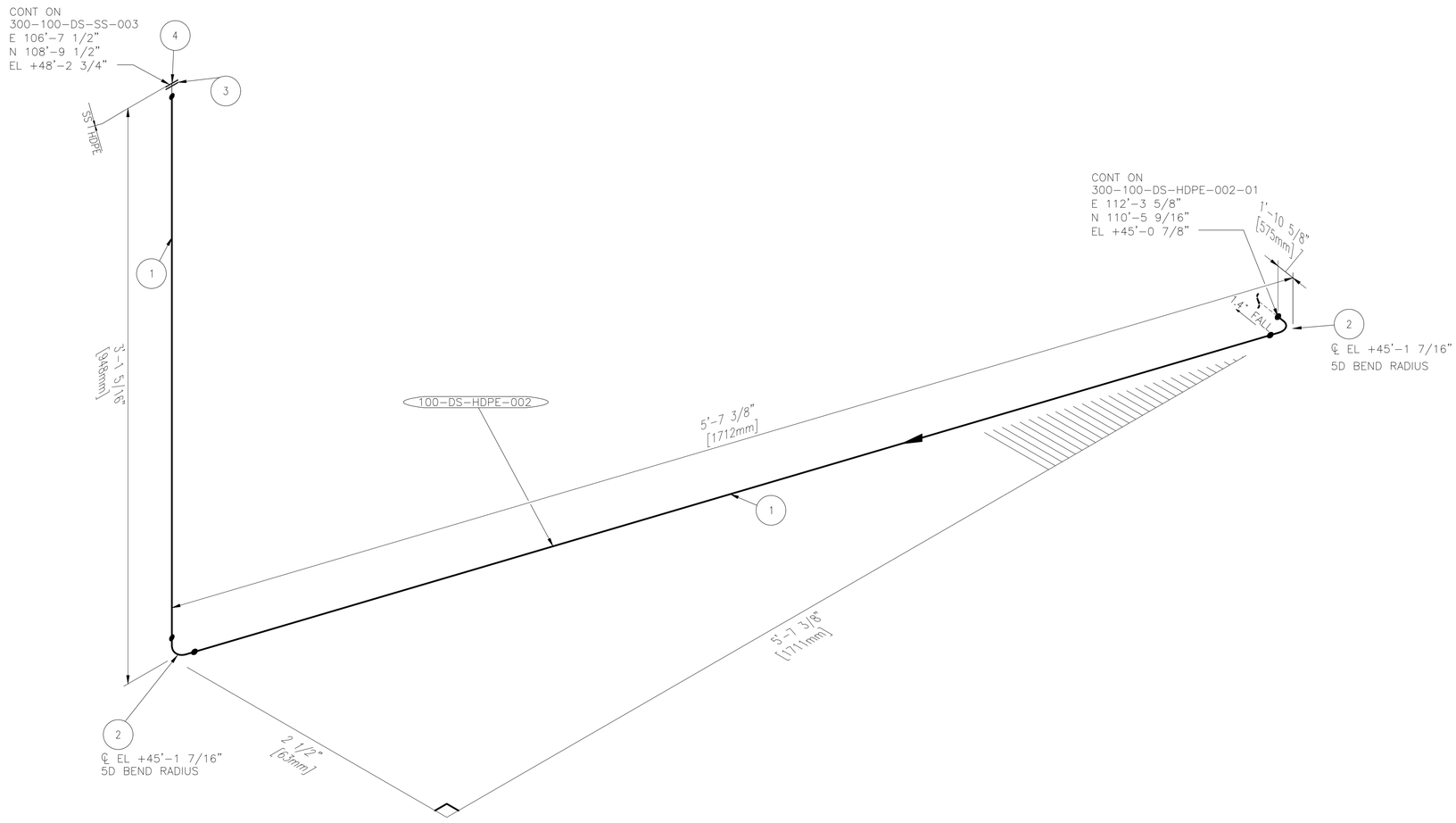
CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-100-DS-HDPE-002-01**
REV: **B**

Date: 2020/10/14 11:49 AM | User: Andrew Bert | File: P:\NA\Plant3D\2002167\IsometricsAllnorth_JFC\Prod\isos\Drawings\201014 Check Plot\300-100-DS-HDPE-002-01 | Layout: Model | Paper Size: 34" x 22"

BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	0.8M	4"	PIPE, HDPE, PE-RT, IPS DR 11, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
2	2	4"	ELBOW, 90 5D BEND, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
3	1	4"	FLANGE ADAPTER, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
4	1	4"	BACK UP RING, FOR USE WITH FLANGE ADAPTER, CLASS 150, 316L SS, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL



NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. CONTRACTOR TO VERIFY TEMPERATURE AND PRESSURE RATING OF HDPE PIPE AND FITTINGS TO MEET OR EXCEED THE TEMPERATURES AND PRESSURES NOTED ON LINE LIST 2002167-000-2015-001.
8. ALL HDPE PIPE SHALL BE INSTALLED BY A QUALIFIED TECHNICIAN AS PER THE MANUFACTURER'S RECOMMENDATIONS.
9. HEATING AND BENDING OF HDPE PIPE SHALL NOT BE PERMITTED.
10. ONLY MOLDED HDPE FITTINGS SHALL BE USED. FABRICATED FITTINGS SHALL NOT BE PERMITTED.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
300-100-DS-SS-001	ISOMETRIC LINE 100-DS-SS-001	2
300-100-DS-SS-003	ISOMETRIC LINE 100-DS-SS-003	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

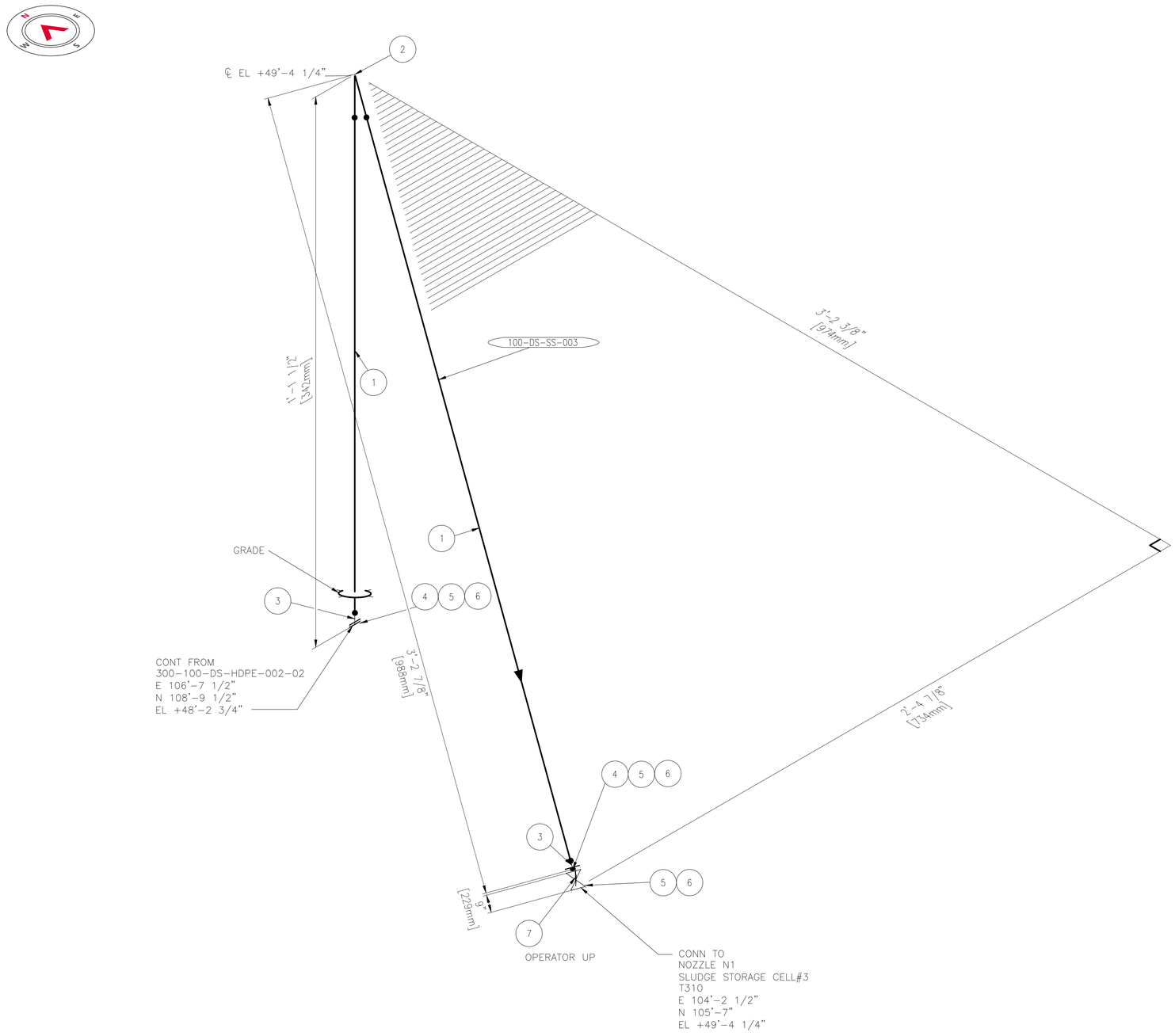
TITLE:
SLUDGE STORAGE CELL #3
PIPING ISOMETRIC
DIGESTED SLUDGE SUPPLY/RETURN

CLIENT NO:	RAE13	DRWN: ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN: DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD: CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD: CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-100-DS-HDPE-002-02** REV: **B**

Date: 2020/10/14 11:52 AM | User: Andrew Bert | File: P:\NAI\Plant3D\2002167\IsometricsAllnorth_IFC\Prod\isos\Drawings\201014 Check Plot\300-100-DS-HDPE-002-02 | Layout: Model | Paper Size: 34" x 22"



BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	0.9M	4"	PIPE, BE, SCH 10S, SS, WELDED, ASTM A312 GR TP316L
2	1	4"	ELBOW, 90 LR, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
3	2	4"	STUB END, SHORT PATTERN, BW, SCH 10S, SS, ASTM A403 GR WP316L, ASME B16.9
4	2	4"	FLANGE, LJ, CLASS 150, SS, FORGED, ASTM A182 GR F316L, ASME B16.5
5	24	5/8"	BOLT, STUD, CONTINUOUSLY THREADED STAINLESS STEEL, ASTM A193 GR B8M, ASME B18.2.1, ASME B1.1 CL 2A, C/W HEAVY HEX NUTS SS, ASTM A194 GR 8M, ASME B18.2.2, ASME B1.1 CL 2B
6	3	4"	GASKET, 1/8" THK, FF, BUNA N OR APPROVED EQUIVALENT
7	1	4"	VALVE, ECCENTRIC PLUG, DEZURIK PEC, 4, F1, S2, NBR, CR*NT C/W ACC*LV-4 OR APPROVED EQUAL

NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. ALL MATERIALS, DESIGN, FABRICATION, ASSEMBLY, ERECTION, EXAMINATION, INSPECTION AND TESTING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3.
8. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ASME B31.3 AND ASME SECTION IX CODES.
9. FILLET WELDS SHALL BE 1/4", UNLESS NOTED OTHERWISE IN THE ISOMETRIC OR PIPE SUPPORT DETAILS.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL 3 PLAN & ELEVATION	1
300-100-DS-SS-001	ISOMETRIC LINE 100-DS-SS-001	2
300-100-DS-HDPE-002	ISOMETRIC LINE 100-DS-HDPE-002	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

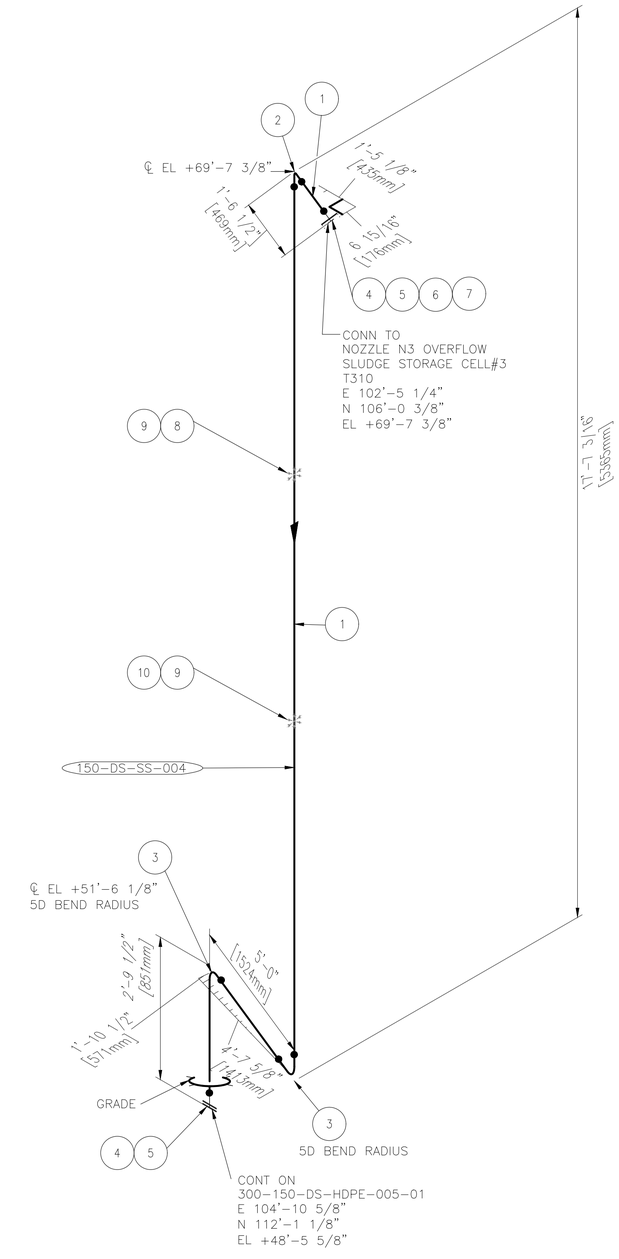
TITLE:
SLUDGE STORAGE CELL#3
PIPING ISOMETRIC
DIGETSED SLUDGE SUPPLY/RETURN

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

DWG NO: **300-100-DS-SS-003** REV: **B**

Date: 2020/10/14 11:38 AM | User: Andrew Bert | File: P:\NA\Plant3D\2002167\Isometric\Allnorth_IFC\Prod\ssx\Drawings\201014 Check Plot\300-100-DS-SS-003 | Layout: Model | Paper Size: 34" x 22"



BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	7M	6"	PIPE, BE, SCH 10S, SS, WELDED, ASTM A312 GR TP316L
2	1	6"	ELBOW, 90 LR, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
3	2	6"	ELBOW, 90 5D BEND, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
4	2	6"	STUB END, SHORT PATTERN, BW, SCH 10S, SS, ASTM A403 GR WP316L, ASME B16.9
5	2	6"	FLANGE, LJ, CLASS 150, SS, FORGED, ASTM A182 GR F316L, ASME B16.5
6	8	3/4"	BOLT, STUD, CONTINUOUSLY THREADED STAINLESS STEEL, ASTM A193 GR B8M, ASME B18.2.1, ASME B1.1 CL 2A, C/W HEAVY HEX NUTS SS, ASTM A194 GR 8M, ASME B18.2.2, ASME B1.1 CL 2B
7	1	6"	GASKET, 1/8" THK, FF, BUNA N OR APPROVED EQUIVALENT
8	1	6"	PIPE SUPPORT, FIG GHA, C/W FIG 30 REPAD, 15D-20.06 SHT 5
9	2	6"	PIPE SUPPORT, SEE PIPE SUPPORT DETAIL PS-001, FC-M-351
10	1	6"	PIPE SUPPORT, SEE PIPE SUPPORT DETAIL PS-002, FC-M-351

NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. ALL MATERIALS, DESIGN, FABRICATION, ASSEMBLY, ERECTION, EXAMINATION, INSPECTION AND TESTING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3.
8. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ASME B31.3 AND ASME SECTION IX CODES.
9. FILLET WELDS SHALL BE 1/4", UNLESS NOTED OTHERWISE IN THE ISOMETRIC OR PIPE SUPPORT DETAILS.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
FC-M-351	PIPE SUPPORT DETAILS	2
300-150-DS-HDPE-005	ISOMETRIC LINE 150-DS-HDPE-005	3
300-150-DS-SS-006	ISOMETRIC LINE 150-DS-SS-006	4

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

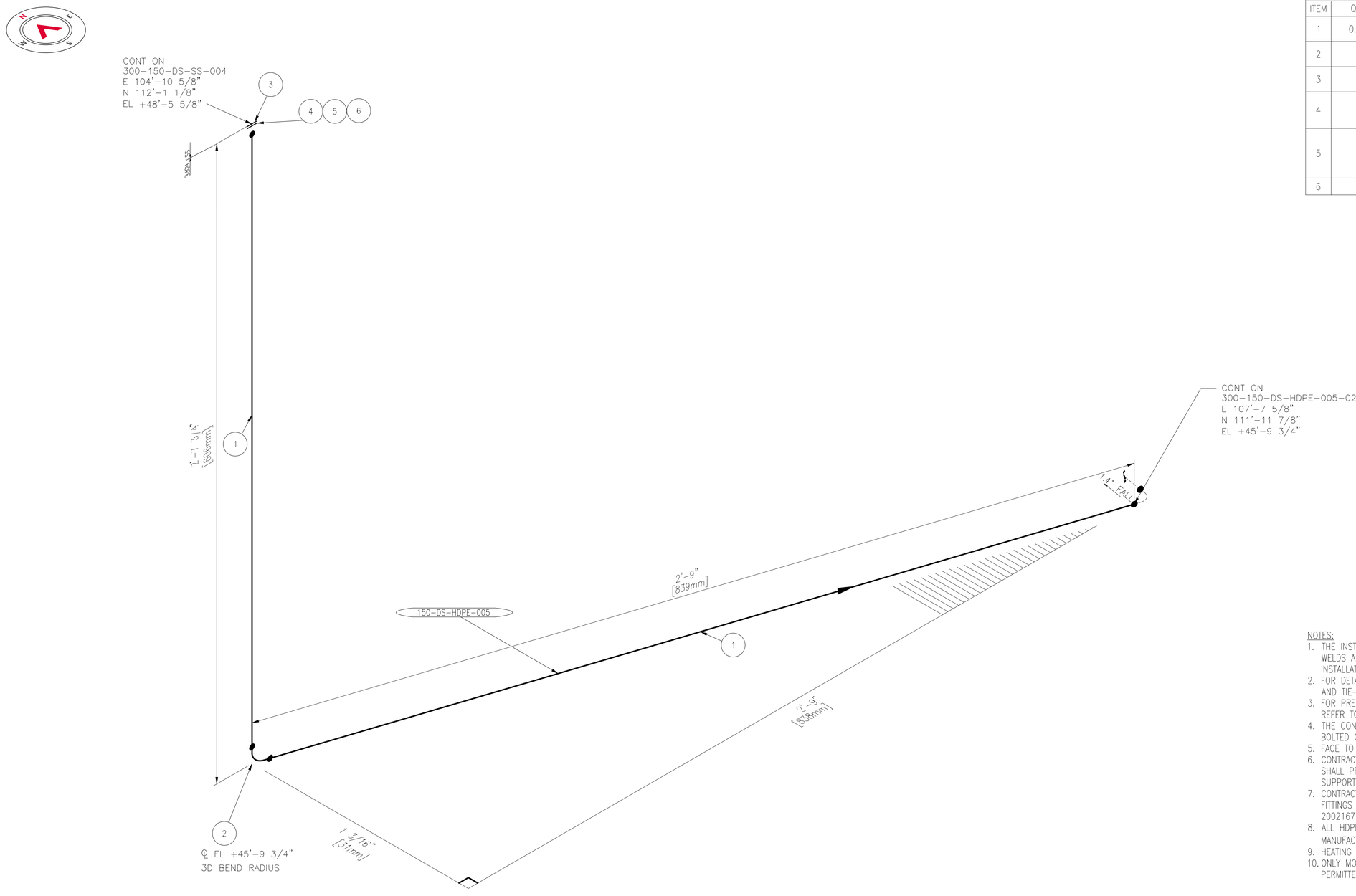
TITLE:
SLUDGE STORAGE CELL #3
PIPING ISOMETRIC
DIGESTED SLUDGE OVERFLOW

CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-150-DS-SS-004** REV: **B**

Date: 2020/10/14 11:10 AM | User: Andrew Bert | File: P:\NA\Plant3D\2002167\Isometric\Allnorth_IFC\Prodisos\Drawings\201014 Check Plot\300-150-DS-SS-004 RevB | Layout: Model | Paper Size: 34" x 22"



BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	0.5M	6"	PIPE, HDPE, PE-RT, IPS DR 11, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
2	1	6"	ELBOW, 90 3D BEND, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
3	1	6"	FLANGE ADAPTER, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
4	1	6"	BACK UP RING FOR USE WITH FLANGE ADAPTER, CLASS 150, 316L SS, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
5	8	3/4"	BOLT, STUD, CONTINUOUSLY THREADED STAINLESS STEEL, ASTM A193 GR B8M, ASME B18.2.1, ASME B1.1 CL 2A, C/W HEAVY HEX NUTS SS, ASTM A194 GR 8M, ASME B18.2.2, ASME B1.1 CL 2B
6	1	6"	GASKET, 1/8" THK, FF, BUNA N OR APPROVED EQUIVALENT

NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. CONTRACTOR TO VERIFY TEMPERATURE AND PRESSURE RATING OF HDPE PIPE AND FITTINGS TO MEET OR EXCEED THE TEMPERATURES AND PRESSURES NOTED ON LINE LIST 2002167-000-2015-001.
8. ALL HDPE PIPE SHALL BE INSTALLED BY A QUALIFIED TECHNICIAN AS PER THE MANUFACTURER'S RECOMMENDATIONS.
9. HEATING AND BENDING OF HDPE PIPE SHALL NOT BE PERMITTED.
10. ONLY MOLDED HDPE FITTINGS SHALL BE USED. FABRICATED FITTINGS SHALL NOT BE PERMITTED.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
300-150-DS-SS-004	ISOMETRIC LINE 150-DS-SS-004	2
300-150-DS-SS-006	ISOMETRIC LINE 150-DS-SS-006	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

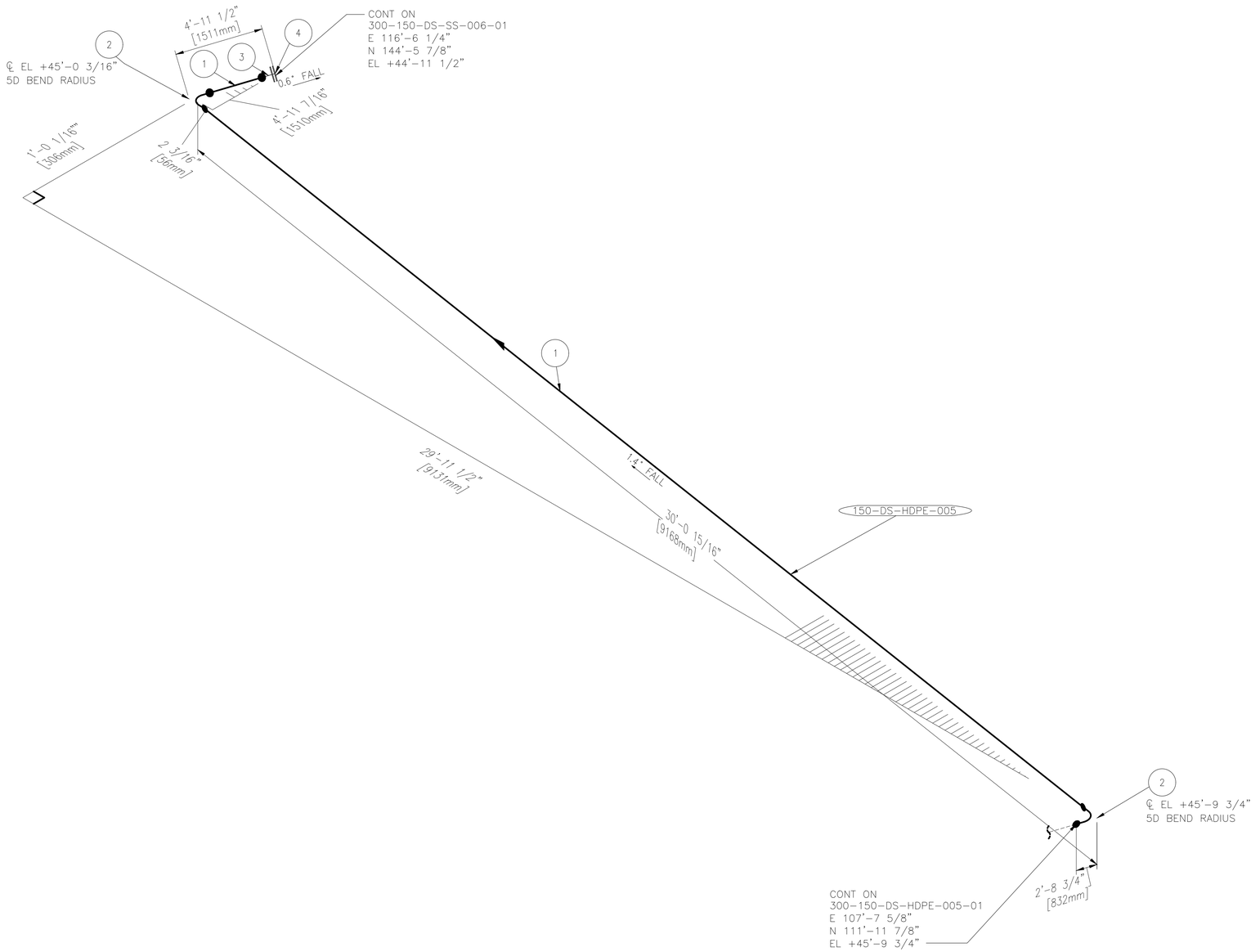
TITLE:
SLUDGE STORAGE CELL #3
PIPING ISOMETRIC
DIGESTED SLUDGE OVERFLOW

CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-150-DS-HDPE-005-01** REV: **B**

Date: 2020/10/14 11:13 AM | User: Andrew Bert | File: P:\NAI\Plant3D\2002167\IsometricsAllnorth_IFC\Prod\isos\Drawings\201014 Check Plot\300-150-DS-HDPE-005-01 RevB | Layout: Model | Paper Size: 34" x 22"



BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	8.9M	6"	PIPE, HDPE, PE-RT, IPS DR 11, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
2	2	6"	ELBOW, 90 5D BEND, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
3	1	6"	FLANGE ADAPTER, HDPE, PE-RT, IPS DR11, MOLDED, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL
4	1	6"	BACK UP RING, FOR USE WITH FLANGE ADAPTER, CLASS 150, 316L SS, ISCO PLATINUM STRIPE 1800 OR APPROVED EQUAL

NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. CONTRACTOR TO VERIFY TEMPERATURE AND PRESSURE RATING OF HDPE PIPE AND FITTINGS TO MEET OR EXCEED THE TEMPERATURES AND PRESSURES NOTED ON LINE LIST 2002167-000-2015-001.
8. ALL HDPE PIPE SHALL BE INSTALLED BY A QUALIFIED TECHNICIAN AS PER THE MANUFACTURER'S RECOMMENDATIONS.
9. HEATING AND BENDING OF HDPE PIPE SHALL NOT BE PERMITTED.
10. ONLY MOLDED HDPE FITTINGS SHALL BE USED. FABRICATED FITTINGS SHALL NOT BE PERMITTED.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
300-150-DS-SS-004	ISOMETRIC LINE 150-DS-SS-004	2
300-150-DS-SS-006	ISOMETRIC LINE 150-DS-SS-006	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

TITLE:
SLUDGE STORAGE CELL #3
PIPING ISOMETRIC
DIGESTED SLUDGE OVERFLOW

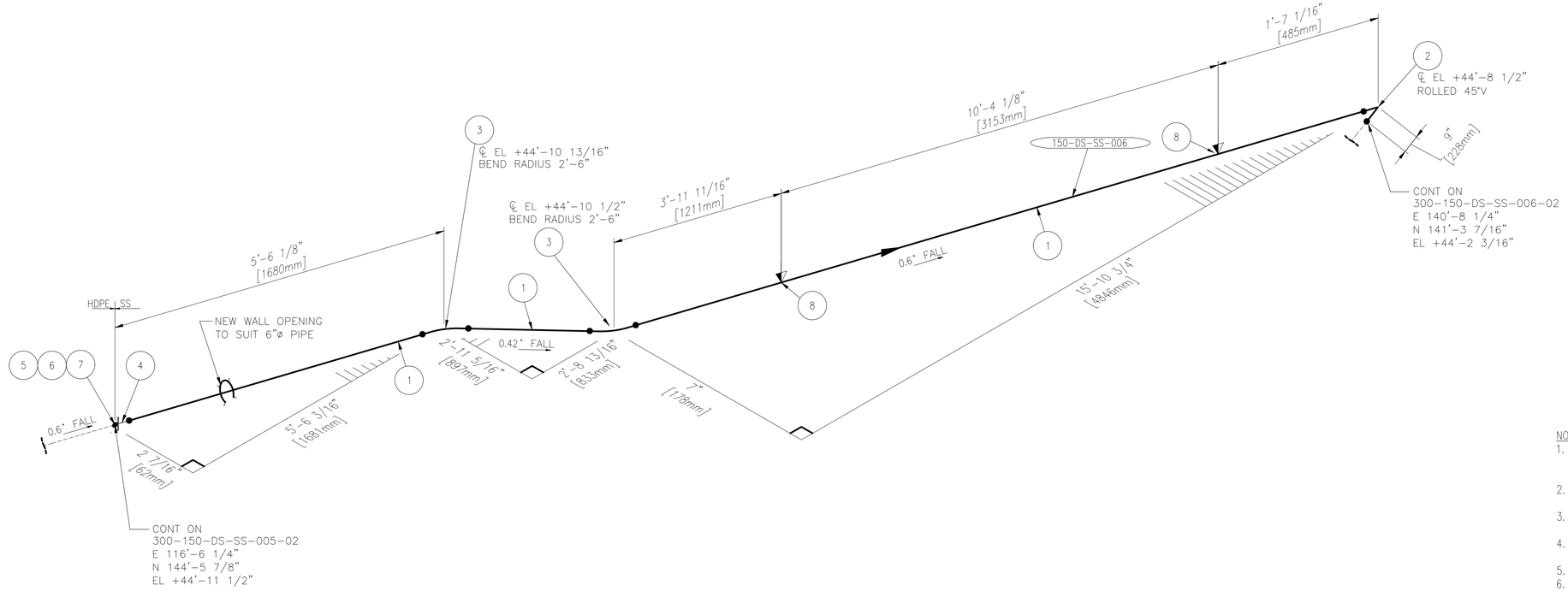
CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-150-DS-HDPE-005-02** REV: **B**

Date: 2020/10/14 11:22 AM | User: Andrew Bert | File: P:\NA\Plant3D\2002167\Isometric\Allnorth_IFC\Prodisos\Drawings\201014 Check Plot\300-150-DS-HDPE-005-02 RevB | Layout: Model | Paper Size: 34" x 22"

BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	7.5M	6"	PIPE, BE, SCH 10S, SS, WELDED, ASTM A312 GR TP316L
2	1	6"	ELBOW, 90 LR, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
3	2	6"	ELBOW, 45 5D BEND, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
4	1	6"	STUB END, SHORT PATTERN, BW, SCH 10S, SS, ASTM A403 GR WP316L, ASME B16.9
5	1	6"	FLANGE, LJ, CLASS 150, SS, FORGED, ASTM A182 GR F316L, ASME B16.5
6	8	3/4"	BOLT, STUD, CONTINUOUSLY THREADED STAINLESS STEEL, ASTM A193 GR B8M, ASME B18.2.1, ASME B1.1 CL 2A, C/W HEAVY HEX NUTS SS, ASTM A194 GR 8M, ASME B18.2.2, ASME B1.1 CL 2B
7	1	6"	GASKET, 1/8" THK, FF, BUNA N OR APPROVED EQUIVALENT
8	2	6"	FIG TFA, W4x13 TOS 46'-10" 15D-20.12 SHT 7, C/W FIG HY 15D-20.03 SHT 17



NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. ALL MATERIALS, DESIGN, FABRICATION, ASSEMBLY, ERECTION, EXAMINATION, INSPECTION AND TESTING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3.
8. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ASME B31.3 AND ASME SECTION IX CODES.
9. FILLET WELDS SHALL BE 1/4", UNLESS NOTED OTHERWISE IN THE ISOMETRIC OR PIPE SUPPORT DETAILS.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
300-150-DS-SS-004	ISOMETRIC LINE 150-DS-SS-004	2
300-150-DS-HDPE-005	ISOMETRIC LINE 150-DS-HDPE-005	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

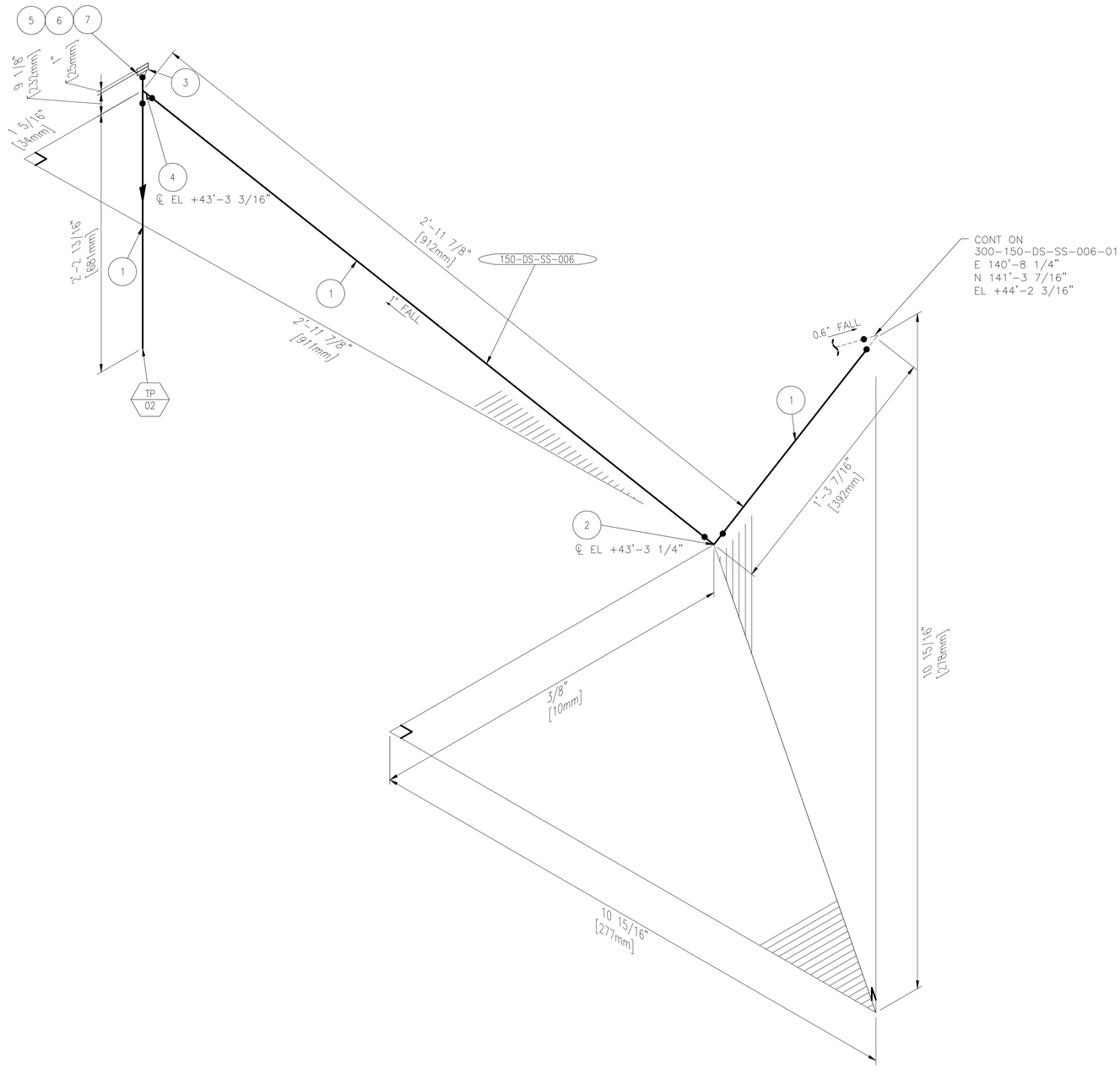
TITLE:
SLUDGE STORAGE CELL #3
PIPING ISOMETRIC
DIGETSED SLUDGE OVERFLOW

CLIENT NO:	RAE13	DRWN:	ASB	DATE: 20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE: 20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE: 20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE: 20/08/28

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

DWG NO: **300-150-DS-SS-006-01**
REV: **B**

Date: 2020/10/14 11:27 AM | User: Andrew Bert | File: P:\NA\Plant3D\2002167\Isometric\Allnorth_IFC\Prodisos\Drawings\201014 Check Plot\300-150-DS-SS-006-01 | Layout: Model | Paper Size: 34" x 22"



BILL OF MATERIALS			
ITEM	QTY	SIZE	DESCRIPTION
1	1.6M	6"	PIPE, BE, SCH 10S, SS, WELDED, ASTM A312 GR TP316L
2	1	6"	ELBOW, 45 LR, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
3	1	6"	FLANGE, BLIND, RF, CLASS 150, SS, FORGED, ASTM A182 GR F316L, ASME B16.5
4	1	6"	TEE, BW, SCH 10S, SS, WROUGHT, ASTM A403 GR WP316L, ASME B16.9
5	1	6"	FLANGE, WN, RF, CLASS 150, SCH 10S, SS, FORGED, ASTM A182 GR F304L, ASME B16.5
6	8	3/4"	BOLT, STUD, CONTINUOUSLY THREADED STAINLESS STEEL, ASTM A193 GR B8M, ASME B18.2.1, ASME B1.1 CL 2A, C/W HEAVY HEX NUTS SS, ASTM A194 GR 8M, ASME B18.2.2, ASME B1.1 CL 2B
7	1	6"	GASKET, 1/8" THK, FF, BUNA N OR APPROVED EQUIVALENT

NOTES:
1. THE INSTALLER SHALL BE RESPONSIBLE FOR REVIEWING AND ASSIGNING ALL FIELD WELDS AND TRIM ALLOWANCES TO ENSURE PROPER FIT-UP AND TO MEET THEIR INSTALLATION STRATEGY REQUIREMENTS.
2. FOR DETAILED PIPELINE INFORMATION REFER TO THE LINE LIST 2002167-000-2015-001 AND TIE-POINT LIST 2002167-000-2015-003.
3. FOR PRESSURE, TEMPERATURE, TESTING, INSPECTION AND HEAT TRACING REQUIREMENTS REFER TO LINE LIST 2002167-000-2015-001.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING BOLT LENGTHS FOR ALL BOLTED CONNECTIONS.
5. FACE TO FACE DIMENSIONS DO NOT INCLUDE GASKET THICKNESS.
6. CONTRACTOR TO REUSE EXISTING PIPE SUPPORTS WHERE POSSIBLE. THE CONTRACTOR SHALL PROVIDE NEW SUPPORTS AS REQUIRED TO ENSURE THE PIPING IS ADEQUATELY SUPPORTED.
7. ALL MATERIALS, DESIGN, FABRICATION, ASSEMBLY, ERECTION, EXAMINATION, INSPECTION AND TESTING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3.
8. ALL WELDING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ASME B31.3 AND ASME SECTION IX CODES.
9. FILLET WELDS SHALL BE 1/4", UNLESS NOTED OTHERWISE IN THE ISOMETRIC OR PIPE SUPPORT DETAILS.

REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
FC-M-311	STORAGE CELL#3 PLAN & ELEVATION	1
300-150-DS-SS-004	ISOMETRIC LINE 150-DS-SS-004	2
300-150-DS-HDPE-005	ISOMETRIC LINE 150-DS-HDPE-005	3

ISSUED FOR
ESTIMATE
Date: 2020/OCT/14

NOT FOR CONSTRUCTION

REV	YY/MM/DD	DESCRIPTION	DRWN	CHKD	APVD
B	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB	CDB
A	20/09/03	ISSUED FOR ESTIMATE	DRM	CDB	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

TITLE:
SLUDGE STORAGE CELL #3
PIPING ISOMETRIC
DIGESTED SLUDGE OVERFLOW

PROJECT:
FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

CLIENT NO:	RAE13	DRWN:	ASB	DATE:	20/08/28
PROJECT NO:	2002167	DSGN:	DRM	DATE:	20/08/28
DRAWING SIZE:	ANSI "D"	CHKD:	CDB	DATE:	20/08/28
SCALE:	AS NOTED	APVD:	CDB	DATE:	20/08/28

DWG NO: **300-150-DS-SS-006-02** REV: **B**

Date: 2020/10/14 12:14 PM | User: Andrew Bert | File: P:\NAPlant3D\2002167\Isometric\Allnorth_JFCProdIsos\Drawings\201014 Check Plot\300-150-DS-SS-006-02 | Layout: Model | Paper Size: 34" x 22"

SCHEDULE 7 – STANDARDS

Title	Std.No.	Date	Rev
Process Piping General	SP-P-0001	15Mar2021	0
Austenitic Stainless Steel Piping	SP-P-0002	15Mar2021	0
High Density Polyethylene (HDPE) Piping	SP-P-0003	15Mar2021	0
Pipe Supports Pipe Clamps Shts 1, 4	15D-20.02	14Oct2020	A
Pipe Supports Hanger Assemblies Shts 3, 4, 5, 6, 9, 17	15D-20.03	14Oct2020	A
Pipe Supports Pipe Shoes, Saddles and Pads Shts 5, 10	15D-20.04	14Oct2020	A
Pipe Supports Sliding Supports and Travelers Sht 5	15D-20.06	14Oct2020	A
Pipe Supports Concrete Pads and Attachments Sht 7	15D-20.12	14Oct2020	A

1. General

1.1. Summary

1.1.1. This specification outlines general requirements for the supply and installation of process piping, valves, fittings and related appurtenances at the Regional District of Nanaimo (RDN) Facilities. More detailed requirements are contained in other specifications. This specification must be referenced to and interpreted simultaneously with all other specifications pertinent to the Work.

1.1.2. When details are not provided in the design package, the Contractor shall design, select, locate and provide expansion joints, pipe guides and anchors required for pipe lines included in the Work.

1.1.3. All materials not specifically listed or specified but required to complete the installation are the responsibility of the Contractor.

1.2. References

1.2.1. Definitions

a) Maximum working pressure: The greatest continual pressure at which the piping system operates.

b) Design Package: Issued For Construction Drawings; Specifications and Engineering Work Package (EWP), Scope of Work (SOW) or other written description of the Work to be done.

c) Test pressure: The hydrostatic pressure used to determine system compliance.

d) Interior: Within an environmentally controlled enclosure where the temperature is maintained above 5°C.

e) Submerged: Regularly or occasionally immersed in liquid; or within 3.0 m above maximum water level within a structure or lagoon/pond.

f) Outdoor: Exposed, above ground, outside or within an enclosure that is not environmentally controlled.

g) Buried: Placed directly in soil and/or granular fill.

h) Engineer: The Engineer or Engineering Firm responsible for the design.

i) Owner's Representative: The Engineer responsible for the general design of the Work and contractually acting as The Consultant on behalf of the RDN, or other named agent of the RDN responsible for managing or coordinating the Work.

j) Contractor's Engineer: A professional engineer registered in the Province of British Columbia who is qualified and retained to perform detailed piping design for the Work, including but not limited to thermal expansion design, at the Contractor's cost.

1.2.2. Reference Standards

a) Conform with the most recent version of all standards referenced in this Section.

b) ANSI B1 .1: Unified Inch Screw Threads, UN and UNR Thread Form

c) ANSI/AWWA C606: Grooved and Shouldered Joints

d) ASME B31.3: Process Piping

e) ASTM B16.21: Nonmetallic Flat Gaskets for Pipe Flanges

f) ASTM A193: Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications ASTM A194: Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

g) ASTM A307: Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength

h) ASTM A354: Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners

i) ASTM A563: Carbon and Alloy Steel Nuts

j) ASTM B32: Solder Metal

k) ASTM B633: Electrodeposited Coatings of Zinc on Iron and Steel (m) ASTM B766: Electrodeposited Coatings of Cadmium

1.3. Coordination

1.3.1. Prior to construction, the Contractor must coordinate with others, if required, to locate openings and place sleeves in cast in place concrete and/or masonry.

1.4. Required Contractor Submittals to RDN - For Review in Advance of Fabrication/Construction

1.4.1. Before fabrication, provide materials certificates for each type of pipe material and for each fitting, valve, coupling, and all specified appurtenances used to complete the work covered in this section.

1.4.2. Isometric drawings must be prepared for all piping systems greater than 50 mm in diameter to indicate assembly details; pipe size, welds, flanges, couplings, valve placement, valve operating wheels, vents and drains, cathodic protection, seismic restraint system, expansion joints, guides, anchors, supports and provisions for thrust restraint, wall penetrations, as well as any other pertinent details. When piping isometrics are not provided in the design package, the development of piping isometrics will be the responsibility of the Contractor.

1.4.3. Provide details of any shop fabricated pipe and fittings.

1.4.4. Where directed by the Owner’s Representative, provide mill test results or product samples.

1.4.5. For restrained, mechanical, and expansion joints provide manufacturer's catalogue data, shop drawings and assembly drawings confirming general arrangement, dimensions, tolerances,

materials of construction, weights and installation details.

1.4.6. If requested, the piping fabricator shall submit a demonstrated fillet and butt weld on a test sample of pipe to be examined and approved by a certified inspection company. The test specimens will be submitted to the RDN's inspection company at the RDN's expense. Any retesting required by the RDN shall be completed at the Contractor's expense.

1.4.7. Catalogue cut sheets and/or shop drawings for each type of valve indicating the valve data and pressure rating, materials of construction, dimensions, head loss characteristics through the valve, operating torque and valve end configuration.

1.4.8. Where valves cannot be supplied as specified in the Design Package, in advance of construction, the Contractor is to provide a Detailed Valve Specification Sheet and indicate with check marks where the proposed valve meets the requirements specified and with written amendments where the product differs from the specification. This submission will be reviewed by the Engineer. This submission does not guarantee approval, and the Engineer could recommend an alternative valve.

1.5. Required Contractor Submittals to RDN – For Information

1.5.1. Submit radiographic weld test and other shop inspection and test results, indicating that the Work meets the specifications.

1.5.2. Provide current and complete documentation of welder's qualifications prior to the commencement of any welding. All welders involved in the Work must provide the correct documentation, including but not limited to Welding Certifications.

1.5.3. Prior to commencing any welding of stainless-steel pipe, submit a Welding Procedure Specification (WPS) including a written description of welding techniques including but not limited to materials, methods, and quality control. Certify that the technique is acceptable for the intended service condition. Written procedures must be signed and sealed at the Contractor's cost by a professional engineer registered in BC qualified for welding design.

1.5.4. When not provided in the Design Package, provide hanger, joint restraint, expansion joint, guide, anchor, support and seismic restraint system design details including locations, load information, design calculations and illustrative drawings, stamped and signed by a professional engineer registered in the Province of British Columbia

1.5.5. Submit manufacturer's catalogue data and assembly drawings for mechanical, restraint and expansion joints confirming general arrangement, dimensions, tolerances, materials of construction, weights and installation details.

1.5.6. Submit Operating and Maintenance data for valves. Include complete description of operation together with detailed drawings, a complete list of replacement and repair parts, and parts manufacturer's identifying numbers.

1.6. Quality Assurance

1.6.1. Review the drawings prior to installation of piping, conduit services, and fixtures, identify any conflicts and cooperate with the Owner's Representative to determine the adjustments necessary to resolve these conflicts.

1.6.2. Provide complete, fully tested and operational process piping systems.

1.6.3. Comply with all laws, ordinances, rules, regulations, codes and orders of all authorities having jurisdiction relating to this work.

1.6.4. All welding of pipe and fittings shall be undertaken by welders certified for pipe welding for each applicable pipe welding procedure through the Industry Training Authority (ITA) and holding a Level A or Level B interprovincial Red Seal Ticket. For stainless steel welding, a Level A Red Seal Ticket is required.

1.6.5. Any fabricators supplying goods for the Work shall be fully approved by the Canadian Welding Bureau under the requirements of CSA W47.

1.6.6. All pipe fabrication and welding shall be in accordance with ASME B31.3 Process Piping for normal fluid service.

1.6.7. Perform visual examinations of all welding to reveal any surface or root defects, unacceptable weld fit-ups, arc strikes, weld spatter, or insufficient heat tint removal.

1.6.8. Perform visual examination of shop welding before shipping.

1.6.9. Radiographic inspections of all piping included in the Work must be completed to meet the welding standards cited in this specification.

1.6.10. Spot-radiographic inspection of welds, or alternative method, may be conducted at the option and at the expense of the RDN. The Owners Representative will designate such company to carry out inspection of welds at the site of erection, and the Contractor shall fully co-operate with the Owner's Representative in suppling such labour and working space as may be required. Welding judged unacceptable shall be repaired using a method satisfactory to the Engineer at no additional cost to the Owner. The Contractor shall pay for the spot inspection of all welds which are judged unacceptable.

1.6.11. For each defective weld, two additional radiographic inspections at locations identified by the Owner's Representative will be required, plus a radiograph of the repair. Costs for such additional radiographic inspections including the radiograph of the repair shall be borne by the Contractor.

1.6.12. The RDN may use any method of inspection necessary to establish quality control and ensure adherence to welding procedures. Any weld test specimen coupons submitted shall clearly identify the welder(s).

1.7. Delivery, Storage and Handling

1.7.1. Store on site as recommended by materials manufacturer to prevent damage, undue stresses, or weathering. Store materials a minimum of 200 mm above ground with sufficient supports to prevent bending.

1.7.2. Protect non-UV light inhibited plastic materials from sunlight.

1.7.3. Provide shipping devices to maintain the face-to face dimension of each expansion joint during shipment, storage and installation.

2. Products

2.1. Bolts and Studs

2.1.1. Provide hex head bolts and studs, threads to ANSI B1.1, standard coarse thread series.

2.1.2. Connecting stainless steel to stainless steel: Grade B8 ASTM A193, C1.1.

2.1.3. Connecting stainless steel to steel or cast/ductile iron: Provide carbon steel bolts and studs, Grade B to ASTM A307, heavy hex, zinc plated to ASTM B633. Bolt sizes to AWWA C110.

2.1.4. Connecting steel, or unless otherwise specified:

2.1.4.1. Provide carbon steel bolts and studs, Grade B to ASTM A307, heavy hex, zinc plated to ASTM B633

2.1.4.2. Bolt sizes to AWWA C110.

2.1.5. Axial stress in bolts shall not exceed 40% or material yield strength based on the unthreaded body area.

2.2. Nuts and Washers

2.2.1. Provide hex head nuts, threads to ANSI B1.1, standard coarse thread series. Greater than 25 mm, provide heavy hex.

2.2.2. Connecting stainless steel to stainless steel: Provide nuts to ASTM A194 Grade 8.

2.2.3. Connecting stainless steel to steel or cast/ductile iron: Provide carbon steel nuts, Grade A to ASTM A563. Provide flat hardened steel washers to ASTM F436. Nuts and washers to be zinc plated to ASTM B633. Always include washers.

2.2.4. Connecting steel, or unless otherwise specified: Provide carbon steel nuts, Grade A to ASTM A563. Provide flat hardened steel washers to ASTM F436. Nuts and washers to be zinc plated to ASTM B633

2.2.5. Tie-rods

2.2.5.1. Provide tie-rods continuously threaded to ASTM A354 and fabricated in accordance with 81.1 (screw threads, coarse thread series). Tie rods to be steel zinc plated to ASTM B633.

2.3. Fittings

2.3.1. Provide fittings with wall thickness equal to or greater than the pipe, of the same material, coating, lining and pressure rating as pipe or better.

2.3.2. Provide eccentric reducers in horizontal lines with the flat side on top, unless shown otherwise.

2.3.3. Provide concentric reducers in vertical lines unless indicated otherwise.

2.3.4. Provide smooth flow standard radius elbows for process air service unless otherwise specified on the drawings.

2.4. Joints — Flanges

2.4.1. Flanges for mating to equipment or valves must be compatible with those items. In all situations similar faced flanges only shall be mated.

2.4.2. Class 150 — raised face with ring gaskets, unless mating to, lap joint flanges or equipment with flat faced flanges.

2.4.3. Class 300 — Not used.

2.4.4. Where dissimilar metals are to be connected, furnish dielectric fittings and/or isolating flanges, including major bolt sleeves and washers.

2.4.5. Gaskets

2.4.5.1. Conform to ASTM B1621 and AWWA C228 Table 1.

2.4.5.2. Minimum gasket thickness 3.175 mm.

2.4.5.3. Provide full face gaskets for flat faced flanges

2.4.5.4. Provide ring type gaskets for raised face flanges.

2.4.5.5. Provide gasket materials suitable for the temperature, pressure and corrosivity of the fluid conveyed in the pipeline.

2.4.5.5.1. Provide liquid service gaskets of EPDM or neoprene.

2.4.5.5.2. Provide air service gaskets of compressed Kevlar with neoprene binder, suitable for service conditions.

2.5. Joints — Threaded Couplings

2.5.1. Provide screwed joints with American Standard threads.

2.5.2. Provide Teflon tape suitable for pipe material and service.

2.6. Joints — Grooved Joint Coupling

2.6.1. Provide pipe grooving, couplings and gaskets conforming to ANSI/AWWA C606. Victaulic or approved equal.

2.6.2. Provide for liquid service Victaulic Grade “E” EPDM flush seal gasket or approved equal.

2.6.3. Provide cut grooves on schedule 40, standard wall or thicker pipe, roll grooves for Sch 10 and Sch 5 stainless steel Grooved joint flange adapters shall be used only where specifically indicated.

2.7. Joints — Flexible and Restrained Joint Couplings

2.7.1. Provide cylindrical center ring, two follower rings, two resilient gaskets, and connecting bolts. Robar, Dresser or equal.

2.7.2. If joint restrained add restraining rods and gussets welded to the pipe. Provide sufficient restraint to resist pressure equal to twice the system test pressure, as recommended by the manufacturer.

2.7.3. Provide gasket suitable for service conditions.

2.8. Joints - Welding

2.8.1. Use welding materials conforming to CSA W48.

2.8.2. Provide electrodes compatible with the material welded and which deposit metal with strength and corrosion resistance properties at least equivalent to the base metal.

2.9. Lining and Coating

2.9.1. Do not paint or line stainless steel pipe.

3. Execution

3.1. Preparation

3.1.1. Prior to installation, inspect and field measure to ensure that conflicts or other irregularities do not impede the proper installation of piping.

3.1.2. Make all minor modifications required to suit equipment and structural element locations and elevations, at no expense to the RDN.

3.1.3. Advise the Owner's Representative of all modifications. Indicate all intended piping modifications on the shop drawings submitted prior to fabrication or installation. Do not commence work on related piping until the Owner's Representative's approval has been received.

3.1.4. Prior to valve and pipe appurtenance installation, field measure and check all equipment locations, pipe alignments, and structural installation. Ensure that valve location and orientation provides suitable access to all valve operators. Ensure that sufficient easily disassembled joints are provided to allow for removal and replacement of all valves and pipe appurtenances.

3.2. Pipe Handling

3.2.1. Inspect each pipe, fitting and piping appurtenance prior to installation. Do not install damaged material or materials with damaged linings or coatings.

3.2.2. Repair pipe with damaged protective coatings according to coating manufacturer's directions and to the Owner's Representative's satisfaction.

3.2.3. Remove all foreign matter from inside of piping and piping appurtenances prior to installation.

3.2.4. Use proper implements, slings, tools and facilities for the proper protection of the pipe and fittings. Exercise care in the installation so as to avoid damage to pipe or coatings.

3.3. Conflicts

3.3.1. For any field run pipe, confirm the pipework routing with Owner's Representative prior to commencement of fabrication and installation. Advise Owner's Representative of any conflicts with existing services, structures, or services yet to be installed. Where necessary, amend the routing of pipework to avoid conflict, as instructed by Owner's Representative

3.4. Buried Pipe Installation

3.4.1. For buried stainless steel pipe apply tape to buried pipe and welded joints. Use Polyken, Tec-Tape or Denso tape consisting of primer and tape applied to minimum thickness of 0.90 mm in accordance with AWWA C209.

3.4.2. For flanged or coupled joints and for fittings use petrolatum primer, mastic and tape; Polyken, Tec-Tape or Denso, in accordance with AWWA C217.

3.5. Above Ground Pipe Installation

3.5.1. Make adequate provision in piping runs for expansion, contraction, slope and anchorage.

3.5.2. Install pipe support system to adequately secure the pipe and to prevent undue vibration, sag and stress.

3.5.3. Provide temporary supports as necessary during construction to prevent overstressing equipment, valves or pipe.

3.5.4. Accurately cut all piping for fabrication using field measurements.

3.5.5. Install pipes in straight alignment. Variance from the true alignment shall not exceed 10 mm in any direction or as required in ASME B31.3 whichever is less.

3.5.6. Fabricate and assemble pipe runs to ensure that pipework is not stressed to achieve

the designed alignment and that no stresses are transferred to equipment or equipment flanges. “Springing” of pipework to ensure alignment is not permitted.

3.5.7. The Contractor shall undo and subsequently remake all pipework connections where so instructed by the Owner’s Representative to ensure that springing does not occur.

3.5.8. Take care not to damage equipment, piping appurtenances, valves, flanges, or other joints.

3.6. Connections to Equipment and Existing Piping

3.6.1. Verify fit and materials at each connection prior to making the connection. Where joining piping to existing equipment, confirm flange type on the equipment and install matching pipe flanges to suit.

3.6.2. Modifications to either new or existing materials required to make connections shall be approved by the Owner’s Representative in writing prior to the connections being made.

3.7. Pipe Joints

3.7.1. General

3.7.1.1. Provide joints that can be readily disassembled at the minimum within 1.0 m of any connection to equipment, on both sides of structural penetrations, and within 0.6 m of all threaded end valves.

3.7.1.2. Allow a minimum of 150 mm to face or 75 mm to edge of flanges or grooved joint couplings from wall, floor or ceiling unless otherwise shown.

3.7.2. Threaded

3.7.2.1. Unless specifically noted on the Drawings, threaded couplings shall only be used on piping with nominal diameters less than 65 mm.

3.7.2.2. Ream the ends of all pipes to remove all burrs and cuttings when fabricating threaded joints.

3.7.2.3. Clean out pipe prior to joining.

3.7.2.4. Apply Teflon tape to male threads and join pipe. Do not use extra tape to make up for slack in the joint.

3.7.2.5. Install threaded pipe with as few joints as possible. Short lengths of pipe coupled together shall not be used, except where a union is specifically shown on the drawings.

3.7.2.6. If it is necessary to back off a screwed joint after it is made, the thread shall be cleaned, and new Teflon tape applied.

3.7.2.7. Threads shall not be caulked.

3.7.2.8. Bushings shall not be used.

3.7.2.9. Nipples in threaded piping shall be shoulder nipples. Close nipples shall not be used unless specifically indicated.

3.7.3. Flanged

3.7.3.1. Clean flanges and gaskets prior to connection.

3.7.3.2. Lubricate gaskets with soapy water and apply anti-seize compound to bolts.

3.7.3.3. Bring flanges into close parallel and lateral alignment.

3.7.3.4. Tighten bolts progressively, proceeding from side to side of the flange. Wrenches used for tightening bolts shall be in good condition and properly sized to prevent rounding of nut and bolt heads. Apply manufacturer's torque recommendations when connecting to valves and equipment. Do not over torque bolts.

3.7.3.5. Do not use washers to take up excess bolt length.

3.7.3.6. Bolt projection beyond nuts shall be approximately two full threads.

3.7.3.7. Align flanges which connect piping to mechanical equipment to close parallel and lateral alignment prior to tightening bolts. Do not place strain on equipment.

3.7.3.8. Install flange adapters in accordance with manufacturer's recommendations.

3.7.3.9. Install lap joint flanges in vibration free service only. Do not install in buried or submerged environments.

3.7.4. Grooved Joint Couplings

3.7.4.1. Install grooved joints and grooved joint flange adapters as recommended by manufacturer using manufacturer's recommended lubricants on gaskets.

3.7.4.2. All grooving tools and accessories to be manufactured by grooved product supplier.

3.8. Welding – General

3.8.1. Metal surfaces in and adjacent to the welding groove shall be dry before welding commences and kept dry and free from dirt, loose scale, slag, grease or any other foreign contaminant.

3.8.2. All welds after welding is complete must be cleaned and surface prepared as required for the final coating, finish or passivation method to be applied.

3.8.3. The end of each pipe shall be carefully fitted to butt accurately with proper gap to the preceding pipe or fitting. Before placing the pipe in position, the ends of the pipe shall be made truly circular by an approved method and, if necessary, for large pipes "spiders" shall be placed in each to keep them truly circular.

3.8.4. All stainless steel pipe welding shall be completed using a full purge TIG (GTAW) process.

3.9. Field Welding

3.9.1. In general, field welding should be avoided except where necessary. Field welding may be performed with the prior written consent of the Owner's representative, as indicated by the approval of the Contractor's shop drawings.

3.9.2. Field welding shall conform to the general requirements of AWWA C206 "Field Welding of Steel Water Pipe Joints", and the quality requirements under "Welding- General" in this specification.

3.9.3. Field welding shall not be done under conditions that will negatively affect the completed weld including but not limited to: moisture; blowing sands or dust; high winds; low temperatures. If in the Owner's Representative's opinion, protection from prevailing weather conditions is necessary, then all welding shall cease until this protection is provided at the Contractor's cost, and welds done under poor conditions shall be re-made. The Contractor shall be prepared for such events and will not be compensated for downtime associated with delays of this nature

3.9.4. When the ambient temperature is below 0°C all welding operations shall cease unless an appropriate welding procedure has been submitted. Written procedures to be signed and sealed at the Contractor's cost by a professional engineer registered in BC qualified for welding design.

3.9.5. In general, field welds shall be butt type, suitably beveled to the satisfaction of the Owner's Representative.

3.9.6. Pipes cut in the field for closing pieces and other field joints shall be cut to a smooth uniform level. Edges shall be smooth and not serrated and shall be ground smooth if they are rough after cutting.

3.10. Pipe Structural Penetrations

3.10.1. Refer to Structural Drawings and Specifications.

3.10.2. Coordinate with other divisions to locate and place sleeves or cast-in-place pipe sections prior to the construction of concrete and masonry building elements.

3.11. Drains, Vents, Flushing Connections, Sample Points

3.11.1. Provide manual air vents at the high points of each reach of pipeline.

3.11.2. Provide manual drains at the low points of each reach of pipeline. Pipe drains shall be routed to a sump, gutter floor drain, or other approved collection point.

3.12. Testing

3.12.1. All piping shall be pressure tested as per ASME B31.3 and the test witnessed by the Owner's Representative.

3.12.2. Review pipe pressure testing procedures with Owner's Representative at least 1 week prior to commencement of pressure testing. Initial service leak testing for Category D fluid service is acceptable where approved by the Owner's Representative.

3.12.3. Give Owners Representative 24 hours' notice of testing.

3.12.4. Thoroughly clean all piping prior to pressure testing.

3.12.5. Prior to pressure testing ensure piping is adequately restrained.

3.12.6. Do not insulate, bury, concrete surround or otherwise conceal work until piping systems are tested and accepted.

3.12.7. Supply all equipment, gauges and materials including fluids for pressure testing.

3.12.8. Install fittings for air relief, gauges and drainage as needed to complete testing. After testing remove and plug fittings.

3.12.9. Cap and plug all lines that are normally open ended. Remove on completion of testing.

3.12.10. Isolate all low pressure equipment or pipeline appurtenances during testing to protect the equipment or pipeline appurtenances from damage.

3.12.11. Repair and replace any defective work using new material.

3.12.12. General Testing Criteria:

3.12.12.1. When information is not provided on a Piping Line List the test pressure shall be 1.5 times the maximum working pressure. Confirm system working pressure with Consultant prior to pipe testing.

3.12.12.2. Test duration: 10 minutes or as defined by ASME B31.3.

3.12.12.3. There shall be no loss of pressure during testing, and no visual evidence of leakage.

3.13. Cleaning and Flushing

3.13.1. After installation and prior to testing, perform initial cleaning of process and utility pipelines.

3.13.2. Unless waived in writing by the Owner's Representative, clean piping greater than 150 mm and less than 600 mm by passing a tightly fitting cleaning ball or swab through the pipeline. Remove instrumentation or piping appurtenances that may be damaged by this procedure and replace after cleaning.

3.13.3. Give lines smaller or equal to 150 mm an initial flush with clean water for piping normally conveying liquid commodities, or purge with air or inert gas for piping normally conveying air or gas.

3.13.4. Flush with clean water and drain pipes conveying liquid commodities after testing. Dispose of testing and flushing water in a manner approved by the Owner's Representative that causes no damage to buildings or siteworks.

3.13.5. For piping conveying air or gas less than or equal to 150 mm diameter, purge with air and/or inert gas before testing. Upon completion of testing and cleaning, drain and dry the piping with a dry air stream.

1. General

1.1. Summary

1.1.1. This Specification section applies to supply, fabrication, and installation of austenitic (304 or 316) stainless steel process piping for Regional District of Nanaimo (RDN) water and wastewater systems.

1.1.2. This specification must be referenced to and interpreted simultaneously with all other specifications pertinent to the Work described herein.

1.1.3. Related Requirements

a) Process Piping General SP-P-0001

b) Process Valves General SP-P-0101

1.2. Reference Standards

1.2.1. Conform with the most recent version of all standards referenced in this Section.

a) ASME B31.3 Process Piping

b) ANSI/ASME B16.5: Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard

c) ANSI/ASME B16.9: Factory Made Wrought Buttwelding Fittings

d) ANSI/ASME B16.11: Forged Fittings, Socket-Welding and Threaded

e) ANSI/ASME B16.21: Nonmetallic Flat Gaskets for Pipe Flanges

f) ANSI/ASME B36.19: Stainless Steel Pipe

g) ASTM A182: Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings and Valves and Parts for High Temperature Service

h) ASTM A240: Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications

i) ASTM A312: Seamless, Welded and Heavily Cold Worked Austenitic Stainless Steel Pipes

j) ASTM A380: Standard Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment and Systems

k) ASTM A403: Wrought AustenitIc Stainless Steel Piping Fittings

l) ASTM A480: General Requirements for Flat-Rolled Stainless and Heat –Resisting Steel Plate, Sheet and Strip

m) ASTM A778: Welded, Unannealed Austenitic Stainless Steel Tubular Products

n) ASTM A967: Chemical Passivation Treatments for Stainless Steel Parts

o) AWWA C220: Stainless Steel Pipe ½" (13 mm) and Larger

p) AWWA C226: Stainless-Steel Fittings for Waterworks Service, Sizes ½". through 72" (13 mm through 1,800 mm)

q) AWWA C227: Bolted, Split-Sleeve Restraind and Nonrestrained Couplings for Plain-End Pipe

r) AWWA C606: Grooved and Shouldered Joints

1.3. Delivery, Storage and Handling

1.3.1. Protect materials from contamination from dirt or road salt by shrink wrap or other suitable packaging, and end caps, prior to shipment.

1.3.2. Store materials in such a way to prevent scratching and scoring of the surface and to avoid contact with dirt or carbon steel.

1.4. Design Conditions

1.4.1. Use the following design conditions:

a) Normal commodity temperature range: 2 to 25°C.

b) Normal ambient temperature range: Indoor 0 to 40°C. Outdoor -20 to 40°C.

c) Normal service operating pressure range: 0 to 400 kPa

2. Products

2.1. When detailed piping bill of materials are not provided on the design drawings, provide piping systems with components as detailed in the table below, suitable for the design and operating conditions:

Item	Size	Description
Pipe	50 mm & smaller	Schedule 40S: ASTM A312/A312M, Type 316 seamless, pickled and passivated.
	60 mm & larger	Schedule 10S: ASTM A778, “as-welded” grade, Type 316L.
Joints	50 mm & smaller	Socket weld, except where alternate joint type required to mate with equipment or piping appurtenances.
	60 mm & larger	Butt-welded or flanged.
Fittings	50 mm & smaller	Socket weld forged, except as noted in Joints above: 1,000 CWP, ASTM A182/A182M, Grade F316L.
	60 mm & larger	Butt-Welded: ASTM A774/A774M Grade 316L conforming to MSS SP 43, “as-welded” grade, pickled and passivated; fitting wall thickness to match adjoining pipe; long radius elbows unless shown otherwise.
Branch Connections	50 mm & smaller	Tee or reducing tee in conformance with Fittings above.
	60 mm & larger	Butt-welding tee or reducing tee in accordance with Fittings above.
Flanges	All	Forged Stainless Steel: ASTM A182/A182M, Grade F316L, ASME B16.5 or B16.47 Class 150 or Class 300, slip-on or weld neck . Raised face for Class 150 and Class 300. Flat face for flange connecting to ductile/cast iron Class 125 flanges or other equipment and appurtenances requiring such.

Item	Size	Description
Unions	50 mm & smaller	Socket weld forged: ASTM A182/A182M, Grade F316, 13800 or 20700 kPag WOG, integral ground seats, AAR design meeting the requirements of ANSI B16.11, bore to match pipe.
Bolting	All	Forged Flanges: Type 316 stainless steel, ASTM A320/A320M Grade B8M hex head bolts and ASTM A194/A194M Grade 8M hex head nuts.
Gaskets	All Flanges	Flanged 5 mm thick, unless otherwise specified, black rubber (EDPM), hardness 80 (Shore A), rated 93 degrees C minimum, conforming to ASME B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Blind flanges shall be gasketed covering entire inside face with gasket cemented to blind flange.
Thread Lubricant	50 mm & smaller	Teflon tape.

3. Execution

3.1. Stainless Steel Pipe Welding and Fabrication

3.1.1. Stainless steel fabrication shall be done in an approved fabrication shop set up to handle, fabricate and weld stainless steel using handling procedures designed to eliminate carbon contamination of the stainless steel including but not limited to: the use of stainless steel tools including wire brushes, chisels, files and hammers, welding gloves and grinding wheels. Only 300 series stainless steel brushes or wheels shall be used on austenitic stainless steel alloys.

3.1.2. Areas used for fabrication of austenitic and nickel alloys shall be separated from carbon steel areas by methods suitable to prevent contamination by dirt, carbon steel shavings, grinding dust and sparks, and zinc dust from painting operations. Welding gloves and tools used during the fabrication of stainless steel shall not have been used on previous carbon steel work.

3.1.3. Where tape is used for backing purge gas the tape shall use an adhesive backing such that when no longer required it can be completely removed with residual adhesive removed by a suitable solvent or abrasive.

3.1.4. Clean piping to a pre-weld zone extending 50 mm on either side of the weld with alcohol or acetone.

3.1.5. All welding of the root pass of austenic stainless steel pipe shall be done using the Gas

Tungsten Arc Weld (GTAW) process with shielding gas protection of the backside of the weld sufficient to reduce oxygen content to a level that can avoid granulation and ensure a high quality corrosion resistant weld. Large bore piping may be internally back welded to achieve the same result.

3.1.6. Clean welds after fabrication in accordance with ASTM A380.

3.1.7. Pickle and passivate welds after fabrication in accordance with AWWA C220, ASTM A380 and ASMT A967 by immersing in a liquid bath of pickling solution. Large bore piping shall be cleaned with a pickling paste.

3.1.8. Any noticeable discolouration on the piping after welding shall be removed by pickling.

3.1.9. Once sufficient pickling time has elapsed to re-passivate the stainless steel surface, clean the piping of all acids by thoroughly rinsing the pipe with water.

3.1.10. Thread stainless steel pipe in accordance with threading machine manufacturer's instructions.

3.2. Pipe Grooving

3.2.1. Groove stainless steel pipe in accordance with grooving machine manufacturer's instructions.

3.2.2. Contamination from iron particles by pressure contact with rollers or tooling should, if at all possible, be avoided. Where stainless steel rollers or tools are unavailable, adhesive plastic films or tape can be used to prevent direct contact. They shall removed after fabrication. In all cases, if iron contamination is suspected, the piping must be pickled to remove the contamination and prevent rust staining.

3.3. Fabricated Fittings

3.3.1. Shop fabricated fittings made from rolled stock in accordance with ASTM A240 shall be in a solution annealed condition. Shop fabricated fittings made from pipe shall be in accordance with AWWA C220, ASTM A312, ASTM A778. Design standard shall be in accordance with AWWA C226 and thickness of all reinforcement collars and pads shall be determined by the appropriate formula in the latest edition of AWWA M11.

3.4. Pipe Coating: Do not paint stainless steel piping unless clearly indicated on the drawings.

1. General

1.1. Summary

1.1.1. This section applies to supply and installation of High Density Polyethylene (HDPE) Piping (HDPE) for pressure piping.

1.1.2. This section must be referenced to and interpreted simultaneously with all other Sections pertinent to the Work described herein.

1.1.3. Related Requirements

a) Process Piping General SP-P-0001

b) Process Valves General SP-P-0101

1.2. References

1.2.1. Comply with:

a) RDN Bylaw 500 where applicable.

b) National Standards of Canada/Canadian Standards Association

i. CAN/CSA B137, Thermoplastic Pressure Piping Compendium.

c) American Society of Mechanical Engineers (ASME):

i. B16.5 Pipe Flanges and Fittings

d) American Water Works Association (AWWA)

i. AWWA C228, Stainless Steel Pipe Flanges for Water Service

ii. AWWA C207, Steel Pipe Flanges for Waterworks Service

iii. AWWA C110, Ductile-Iron and Gray-Iron Fittings

e) ASTM International (ASTM):

i. D638, Standard Test Method for Tensile Properties of Plastics.

ii. D2657, Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings

iii. D2774, Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

iv. D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

v. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

vi. F714, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR PR) Based on Outside Diameter.

1.3. Submittals

1.3.1. Shop Drawings:

a) Catalog information confirming pipe, fittings, pressure rating, thickness, size and other materials conform to requirements of this Section.

b) Drawings of specific connection details.

1.3.2. Informational Submittals:

a) Certification from pipe manufacturer that Contractor is qualified to join, lay, and handle pipe.

b) Field Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:

i. Testing dates.
ii. Piping systems and section(s) to be tested.
iii. Method of isolation.
iv. Method of conveying water from source to system being tested.
v. Calculation of maximum allowable leakage for piping section(s) to be tested.
vi. Method for safe disposal of tested water.

c) Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.

d) Test report documentation.

1.4. Qualifications

1.4.1. Pipe Manufacturer: Listed with Plastic Pipe Institute as meeting recipe and mixing requirements of resin manufacturer for resin used to manufacture pipe for this Project.

1.4.2. Persons fusing HDPE pipe shall have proven experience with fusing HDPE pipe and shall have received training for fusing HDPE pipe in accordance with recommendations of pipe supplier or fusing equipment supplier.

1.5. Delivery, Storage and Handling

1.5.1. Delivery, storage and handling shall be in accordance with manufacturer's recommendations.

1.5.2. Pipes, fittings, and specials shall be marked indicating manufacturer's name, pipe type, size and class.

1.5.3. Shipping: Do not scrape, cut, kink, or otherwise damage pipe during transportation.

1.5.4. Storage:

a) Limit stacking of pipe to a height that will not cause excessive deformation of bottom layers of pipes under anticipated temperature conditions.

b) Where necessary due to ground conditions that may damage the pipes and fittings, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.

c) Following manufacturer's recommendations for cold weather storage.

1.5.5. Damaged pipes, fittings and specials will not be accepted.

1.6. Environmental Conditions

1.6.1. Fusing Conditions:

a) Allow for expansion and contraction due to temperature change.

2. Products

2.1. Pipe and fittings materials

2.1.1. Pipe lengths, fittings, and flanged connections to be joined by thermal butt fusion shall be of same type, grade, and class as specified in the Drawing Notes for entire polyethylene compound and supplied from same raw material supplier.

2.1.2. Fittings shall be molded for sizes 200 mm and smaller and shall be fabricated from polyethylene pipe; for sizes 250 mm and larger, by means of thermal butt fusion or molded. Ends of fabricated fittings shall not be trimmed to match pipe section to which they are going to be joined. Polyethylene fittings shall have same or higher pressure rating as pipe when installed.

2.1.3. Flanges shall be Stainless Steel type 304L to AWWA C228 Class SD flange unless otherwise specified on the drawings. Flanges shall conform in dimensions and drilling to ANSI B16.5 or ANSI B16.1, unless specified otherwise.

1.1.1. Flang connections to ductile iron flanges shall be flat-faced.

2.1.4. Gaskets shall be Full Face Neoprene Rubber 3.18mm (1/8") thick, unless noted on the drawings.

2.1.5. Joints: Thermal butt fusion, except where connecting to unions, valves, and equipment with flanged connections that may require future disassembly.

2.1.6. Bolts, Nuts, Washers: Type 316 stainless steel, ASTM A193, Grade B8 hex head bolts; and ASTM A194, Grade 8 hex head nuts. Bolts shall be fabricated in accordance with ANSI B18.2.2 and provided with washers of same material as bolts.

3. Execution

3.1. Examination

3.1.1. Verify Conditions Prior to Installation.

3.1.2. Inspect pipe and fittings to ensure no cracked, scored, gouged, broken or otherwise defective materials are being used.

3.2. Installation

3.2.1. Fabricate and install polyethylene pipe in strict conformance with pipe manufacturer's recommendations.

3.2.2. Joining: Butt fuse pipes and fittings in accordance with pipe manufacturer's recommendations. Depending on site conditions, perform butt fusion joining in or outside of excavation.

3.2.3. Mechanical Connections: Connect HDPE pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems with flanged connections as follows:

a) Polyethylene "stub end", thermally butt fused to ends of pipe. Backing flange, as specified.

b) Bolt and nut of sufficient length to show a minimum of three complete threads when joint is made and tightened to manufacturer's standard. Retorque nuts after 4 hours.

c) Gaskets as specified.

3.2.4. Special Precautions at Flanges: Support polyethylene pipe connected to heavy fittings, manholes, and rigid structures in such a manner that no subsequent relative movement between polyethylene pipe at flanged joint and rigid structures is possible.

3.3. Placement in Trench:

3.3.1. Handle joined pipeline in such a manner that pipe is not damaged by dragging it over sharp and cutting objects.

3.3.2. Position slings for handling pipeline away from butt fused joints.

3.3.3. Remove sections of damaged pipe and replace it with undamaged pipe. Damaged pipe is defined as pipe with visible kinks or scores/gouges exceeding 10% of the wall thickness.

3.3.4. Exercise care when lowering pipe into trench to prevent damage or twisting of pipe.

3.3.5. Snake pipe from one side of trench to other to allow for thermal and settling movements.

3.3.6. At flanges, valves, and connections, excavate trench bottom out sufficiently to ensure clearance between undisturbed trench bottom and flange, valve, or connection.

3.3.7. Handle pipe with special care during temperature below freezing.

3.3.8. Maintain trench dry and do not lay pipe in water.

3.3.9. If the temperature of air is below 0 degrees C, provide all necessary heating equipment, tarpaulins, etc. to prevent trench from freezing.

3.3.10. Lay no pipe when air temperature is below –4 degrees C, unless permission has been granted by the Engineer.

PIPE CLAMPS

THIS STANDARD CONTAINS VARIOUS CLAMPING AND SUPPORT ASSEMBLY DRAWINGS.
SEE 15D–20.00 FOR GENERAL NOTES.

NOTES:

1. PIPE CLAMP INSIDE DIMENSION SHALL MATCH THE OUTSIDE DIAMETER OF THE PIPE. FOR OUTSIDE DIAMETER OF FABRICATED STAINLESS STEEL PIPING, SEE SPECIFICATION 15S–02.01.

2. HANGER ROD DIAMETER, IF NOT SPECIFIED WITH PIPE SUPPORT SELECTION, SHALL BE IN ACCORDANCE WITH 15D–20.03, SHEET 5, TABLE B3. HANGER RODS 1 3/4" DIAMETER AND LARGER SHALL BE SHOP THREADED.

3. DOUBLE BOLT CLAMPS AND LUGS, WHEN USED FOR RIGID HANGERS, MAY TRANSFER LOAD TO ONE SIDE ONLY. THE SIZE OF A SINGLE ROD SHALL BE SELECTED THAT IT WILL CARRY THE TOTAL RISER LOAD.

4. CARBON STEEL PIPE CLAMPS ON STAINLESS STEEL PIPE SHALL HAVE WOVEN HEAT–RESISTANT FABRIC SEE 15D–20.00, SHEET 6, PARAGRAPH 7.4.

5. RISER LUG(S) SHALL BE USED TO SUPPORT CARBON STEEL PIPELINES 4" DIAMETER AND LESS. SEE 15D–20.03, SHEET 8, FIGURE 17.

6. VERTICAL STAINLESS STEEL PIPE LINES REQUIRING RISER CLAMP SUPPORTS SHALL BE REINFORCED AS SPECIFIED ON THE PIPING DRAWING OR WITH STAINLESS STEEL HALF–PIPE SEGMENTS MADE FROM PIPE OF EQUAL DIAMETER, THICKNESS AND MATERIAL, AS THE PIPE. SHEAR LUGS SHALL BE WELDED TO REINFORCING PAD.

7. SHEAR LUG SIZES AND APPLICATION PER 15D–20.02 SHEET 3 TABLE A2, TO BE VERIFIED BY THE STRESS ENGINEER.

8. FOR APPLICATION OF RISER CLAMP FIGURE 2, SEE 15D–20.03, SHEET 14, ASSEMBLY HS & HSA.

9. FOR APPLICATION OF NON STANDARD DOUBLE BOLT RISER CLAMP SEE 15D–20.03, SHEET 15, ASSEMBLY HTA.

10. WHEN LOAD IS CARRIED BY SHEAR LUGS, STRESS ENGINEER TO VERIFY SHEAR LUG SIZE FOR APPLICABLE PIPE WALL STRESSES AND APPLICATION.

11. AFTER CLAMP INSTALLATION, SHEAR LUGS SHALL BE LOCATED SYMMETRICALLY AND WELDED TO THE PIPE WITH 3/8" (MINIMUM) CONTINUOUS FILLET WELDS, EXCEPT IN AREAS WHERE LUGS CONTACT THE RISER CLAMP.

12. A STRICT CONTACT TOLERANCE SHALL BE GUARANTEED BETWEEN SHEAR LUGS AND RISER CLAMP SO THAT THE RISER CLAMP HAS COMPLETE CONTACT ON ALL SHEAR LUGS SIMULTANEOUSLY UNDER ALL LOADING CONDITIONS.

13. RISER CLAMP BOLTS SHALL HAVE ALL THREADS UPSET AFTER INSTALLATION TO PREVENT NUTS FROM VIBRATING LOOSE.

14. SPAN REPRESENTS THE MAXIMUM RECOMMENDED DISTANCE BETWEEN HANGERS ON A CONTINUOUS AND STRAIGHT RUN OF HORIZONTAL CS STANDARD WEIGHT PIPE FILLED WITH WATER.

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: Regional District of Nanaimo

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

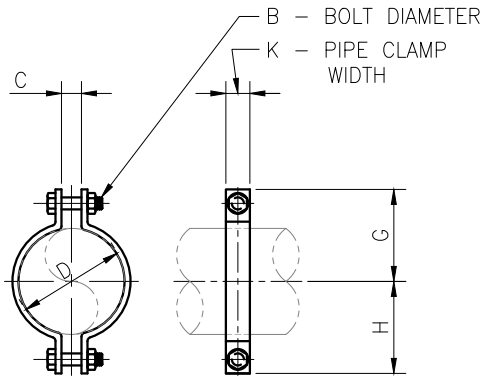
ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS PIPE CLAMPS**

DWG NO: **15D-20.02**

SHEET: **1** REV: **A**



NOTES:
1. SEE 15D–20.02, SHEET 1 FOR PIPE CLAMP NOTES.
2. MAXIMUM TEMPERATURE CARBON STEEL 750°F.
3. MAXIMUM TEMPERATURE GALVANIZED 450°F.
4. CLAMPS FOR STAINLESS STEEL PIPE PER 15D–20.02, SHEET 1.
5. FOR USE ON COLD OR HOT SUSPENDED PIPE LINES WHERE NO INSULATION IS REQUIRED.
6. FOR MINIMUM ROD SIZE AND HANGER SPACING SEE 15D–20.03, SHEET 1 AND 15D–20.03, SHEET 3.
7. IF DIFFERENT LOADS OR DIMENSIONS ARE REQUIRED, REFER TO FIGURE 42SD NON–STANDARD TWO BOLT PIPE CLAMP.

TABLE A3

D NOMINAL PIPE DIAMETER	MODERATE LOADS						
	B	C	G	H	K	MAX LOAD 650°F (LB)	MAX LOAD 750°F (LB)
1/2"	5/16"	1/2"	1 22/32"	1 17/32"	1"	500	–
3/4"			1 25/32"	1 21/32"			
1"			1 29/32"				
1 1/4"			2 5/32"	1 31/32"			
1 1/2"			2 7/32"	2 3/32"		800	
2"	1/2"		2 3/4"	2 3/4"		1040	930
2 1/2"		5/8"	3 1/4"	3 1/4"			
3"			3 1/2"	3 1/2"			
4"			4 1/4"	4 1/4"			
6"	3/4"	1 1/4"	5 3/4"	5 3/4"	1 1/2"	1615	1440
8"			6 7/8"	6 7/8"			
10"	7/8"	1"	8 9/16"	8 9/16"	2"	2490	2220
12"			9 9/16"	9 9/16"			
14"		1 1/8"	10 5/8"	10 5/8"	2 1/2"		
16"			11 5/8"	11 5/8"			
18"	1"	1 1/4"	13"	13"		3060	2730
20"	1 1/8"	1 3/8"	14 1/8"	14 1/8"			
24"	1 1/4"	1 5/8"	16 7/8"	16 7/8"	3"		
30"	1 3/4"	2"	21 1/8"	21 1/8"	4"	3500	3360

FIGURE 3 – MEDIUM PIPE CLAMP (SEE NOTE 7)
(ANVIL FIGURE 212 OR APPROVED EQUAL)

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: Regional District of Nanaimo

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS PIPE CLAMPS**

DWG NO: **15D-20.02**

SHEET: **4** REV: **A**

ENGINEERING DATA

TABLE B2: STAINLESS STEEL PIPELINES WITH SCHEDULE 5S, SCHEDULE 10S, SUPPORTED FROM STRUCTURES THAT CAN CARRY THE MAXIMUM HANGER SPACING.

D NOMINAL PIPE DIAMETER (SEE NOTE 10)	MAXIMUM PIPE HANGER SPACING IN FEET		SINGLE ROD HANGER		DOUBLE ROD HANGER	
	LIQUID SERVICE	VAPOUR SERVICE	HANGER FIGURE NUMBER	MINIMUM ROD DIAMETER	HANGER FIGURE NUMBER	MINIMUM ROD DIAMETER
1/2"	5	5	SEE SHEET 17 FOR FIGURES HY AND HYA – NON-INSULATED SEE SHEET 18 FOR FIGURES HZ AND HZA – INSULATED	3/8"	TRAPEZE TYPE HANGER ASSEMBLIES FOR A SINGLE PIPE SUPPORT ONLY. SEE SHEET 16 FIGURE HV. LOAD CALCULATIONS ARE NECESSARY FOR MULTIPLE PIPES SUPPORTED FROM TRAPEZE TYPE HANGER ASSEMBLIES	3/8"
3/4"		6				
1"	6	7				
1 1/2"	8	9				
2"		10				
2 1/2"	10	12		1/2"		
3"		14				
4"	11	16		5/8"		1/2"
6"	14	21		3/4"		5/8"
8"		24				
10"	16	27		7/8"		3/4"
12"	18	30		1"		7/8"
14"		32				
16" *	19	34				
18"		37				
20"	20	39		1 1/4"		1"
22"		41				1 1/4"
24" **	22	43				
30"	24	49		1 1/2"		1 1/2"
36"	AS SPECIFIED ON PIPING SUPPORT DRAWINGS					
40"						

FOR NOTES SEE SHEET 4.

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS HANGER ASSEMBLIES**

DWG NO: **15D-20.03**

SHEET: **3** REV: **A**

NOTES: (CONTINUED FROM SHEET 3)

1. PIPE HANGER SPACING, ROD DIAMETERS, AND CLAMP SELECTIONS IN TABLE B2 – DO NOT APPLY WHERE CONCENTRATED LOADS SUCH AS VALVES AND VERTICAL RISERS, ETC. OCCUR. PIPE HANGERS SHOULD BE PLACED AS CLOSE AS POSSIBLE TO CONCENTRATED LOADS WITH THE MAXIMUM HANGER SPACING SUITABLY REDUCED TO PREVENT EXCESSIVE SAG, BENDING AND SHEAR STRESSES, AND/OR OVERLOADING OF PIPE HANGER COMPONENTS

2. WHENEVER AN OFFSET OCCURS IN THE PIPING BETWEEN TWO HANGERS THE MAXIMUM HANGER SPACING SHALL BE REDUCED 25%.

3. REINFORCING/WEAR PADS PER 15D–20.04, SHEET 5 FIGURE 25, ARE REQUIRED FOR PIPING RESTING ON SUPPORTS FOR LINES 2 INCH DIAMETER AND LARGER TO ENSURE WEAR PROTECTION, MINIMIZE PIPE FLATTENING AND MAXIMUM HANGER SPACING.

4. ROD DIAMETERS DO NOT APPLY FOR SPRING HANGERS OR TO INDIVIDUALLY ENGINEERED HANGERS.

5. SEE 15D–20.00 PARAGRAPH 7 FOR ADDITIONAL NOTES.

6. FOR CALCULATED LOADS, ROD DIAMETER WILL BE SIZED IN ACCORDANCE WITH MSS SP–58.

7. SEE DS 15D–20.03 SHEET 5, TABLE B3 FOR ADDITIONAL NOTES AND ROD LOAD CAPACITIES.

8. PIPE HANGER SPACING FOR PIPING GREATER THAN 30" DIAMETER TO BE AS PER PIPING SUPPORT DRAWINGS AND SHALL BE APPROVED BY THE STRESS ENGINEER.

9. PIPE HANGER SPACING IS MAXIMUM UNSUPPORTED SPAN FOR STAINLESS STEEL PIPE FILLED WITH WATER, TEMPERATURE 200°F (93°C) MAXIMUM.

10. MAXIMUM PIPE HANGER SPACING FOR SINGLE HANGER ROD ASSEMBLIES INCLUDED IN TABLE B2 REQUIRE:
    * ANVIL FIGURE 216 CLAMPS (OR EQUIVALENT) SHALL BE USED FOR PIPING SIZED 16" DIAMETER AND GREATER;
    ** ANVIL FIGURE 295H CLAMPS (OR EQUIVALENT) SHALL BE USED FOR PIPING SIZED 24" DIAMETER AND GREATER.

    THE RESPONSIBLE ENGINEER SHALL CONFIRM THE HANGER CLAMP REQUIREMENTS FOR LESSER SPAN LENGTHS BASED UPON THE PROJECT REQUIREMENTS.

11. DOUBLE HANGER ROD ASSEMBLIES ARE SIZED TO ACCEPT THE TOTAL SPAN LOAD WITH A SINGLE HANGER ROD.

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS HANGER ASSEMBLIES**

DWG NO: **15D-20.03**

SHEET: **4** REV: **A**

ENGINEERING DATA

TABLE B3: LOAD CARRYING CAPACITIES OF THREADED ASTM A36, A575 HOT ROLLED CARBON STEEL ROD PER MSS SP–58.

NOMINAL ROD DIAMETER	MAXIMUM LOAD @ 650°F
	THREADED
3/8" (NOTE 3)	730
1/2" (NOTE 3)	1,350
5/8"	2,160
3/4"	3,230
7/8"	4,480
1"	5,900
1 1/4"	9,500
1 1/2"	13,800
1 3/4"	18,600
2"	24,600
2 1/4"	32,300
2 1/2"	39,800
2 3/4"	49,400
3"	60,100

NOTES:

1. HANGER ROD DIAMETER, IF NOT SPECIFIED WITH PIPE SUPPORT SELECTION, SHALL BE IN ACCORDANCE WITH TABLE B1, 15D–20.03, SHEET 1.
2. ROOT AREA OF THREAD ARE TO BE BASED UPON COARSE THREAD (UNC).
3. HANGER RODS SHALL BE A MINIMUM OF 3/8" DIAMETER. THE USE OF 3/8" DIAMETER ROD IS LIMITED TO PIPING ≤ 4" DIAMETER. FOR PIPING > 4" DIAMETER, THE ROD DIAMETER SHALL BE IN ACCORDANCE WITH MSS SP–58.
4. WHEN SELECTING HANGER RODS FOR TRAPEZE TYPE HANGER ASSEMBLY, DOUBLE RISER CLAMPS, DOUBLE RISER LUGS AND DUMMY PIPES ON RISERS USED FOR RIGID HANGERS, THE SIZE FOR A SINGLE ROD SHALL BE BASED ON THE TOTAL RISER LOAD AS ONLY ONE OF THE TWO RODS MAY CARRY THE TOTAL LOAD.
5. LOAD RATING OF CARBON STEEL THREADED HANGER RODS SHALL BE IN ACCORDANCE WITH MSS SP–58

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

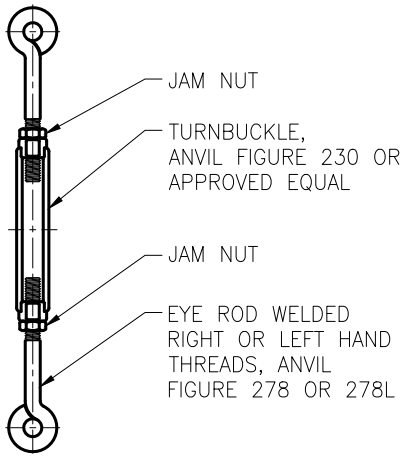
ALLNORTH APPROVED: DATE:

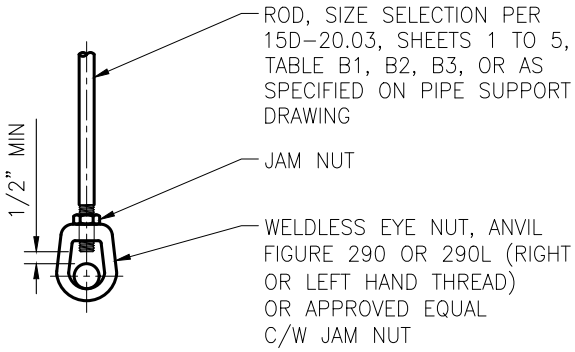
CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS HANGER ASSEMBLIES**

DWG NO: **15D-20.03**

SHEET: **5** REV: **A**





NOTES:
1. MAXIMUM TEMPERATURE PLAIN 750°F
2. MAXIMUM TEMPERATURE GALVANIZED 450°F.
3. TURNBUCKLE c/w TAPPED RIGHT HAND AND LEFT HAND THREAD.
4. SEE SUPPLIER INFORMATION FOR MAXIMUM LOADS.

FIGURE 12 – TURNBUCKLE AND EYE ROD WELDED
FIGURE 12A – TURNBUCKLE ONLY

FIGURE 13 – WELDLESS EYE NUT (MAXIMUM ROD SIZE 2 1/2")

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB	DATE: 20/10/13	
ALLNORTH APPROVED:	DATE:	
CLIENT APPROVED:	DATE:	

TITLE: **PIPE SUPPORTS HANGER ASSEMBLIES**

DWG NO: **15D-20.03**

SHEET: **6** REV: **A**

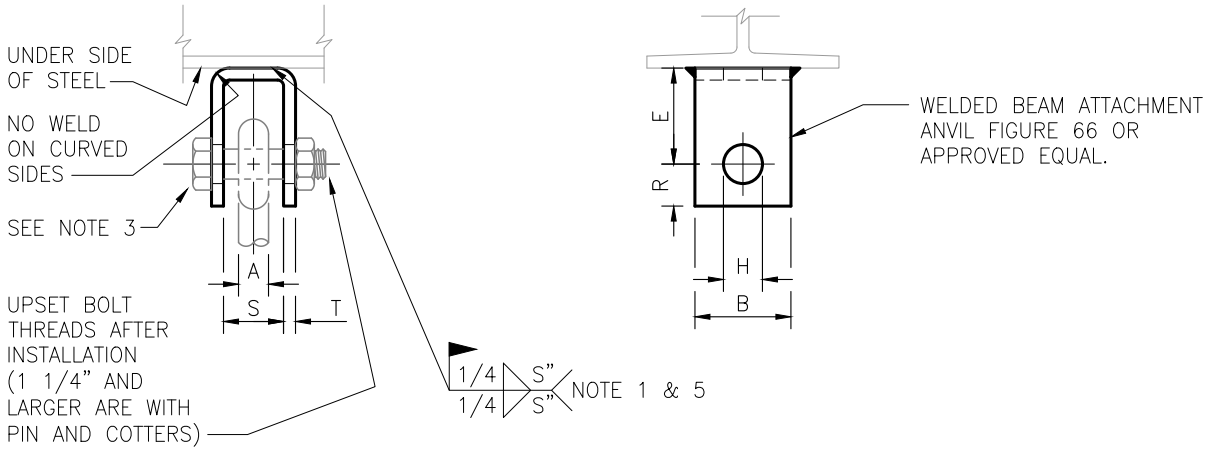


FIGURE 19 – WELDED BEAM ATTACHMENT

TABLE B6

ROD SIZE	PIN OR BOLT SIZE	DIMENSION IN INCHES						
A	C	E	B	H	R	S	T	MAX LOAD 650°F (LB)
3/8"	1/2" X 2 1/2"	2"	2"	9/16"	7/8"	1 1/4"	1/4"	730
1/2"	5/8" X 2 1/2"			11/16"				1350
5/8"	3/4" X 2 3/4"			13/16"				2160
3/4"	7/8" X 4"		2 1/2"	15/16"	1 1/8"	1 7/8"	3/8"	3230
7/8"	1" X 4"	3"		1 1/8"	1 1/4"	2"		4480
1"	1 1/8" X 5"		3"	1 1/4"	1 1/2"	2 1/2"	1/2"	5900
1 1/4"	1 3/8" X 5 3/8"		4"	1 1/2"	2"		5/8"	9500
1 1/2"	1 5/8" X 6"	4"	5"	1 3/4"	2 1/2"	3"	3/4"	13800
1 3/4"	1 7/8" X 6 7/8"	5"		2"	2 3/4"	3 3/4"		18600

NOTES:
1. WHEN WELDING TO UNDERSIDE OF A LOADED BEAM, THE WELDING BEAD W SHALL ALWAYS BE APPLIED TO A DIRECTION PARALLEL TO THE BEAM LONGITUDINAL CENTERLINE
2. WELDED BEAM ATTACHMENT FOR HANGER ROD 2" DIAMETER ARE FABRICATED.
3. 1 3/4" DIAMETER ROD AND SMALLER ARE FORMED USING BOLT ON PIN AND EYE ROD.
4. WELDING IN ACCORDANCE WITH MSS SP–58.
5. FILLET WELD STRENGTH SHALL BE EQUAL TO UTS = 70000 PSI. FILLET WELDS SHALL BE 'S' INCHES LONG AS INCLUDED IN TABLE B6.

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: PIPE SUPPORTS HANGER ASSEMBLIES

DWG NO: 15D-20.03

SHEET: 9 REV: A

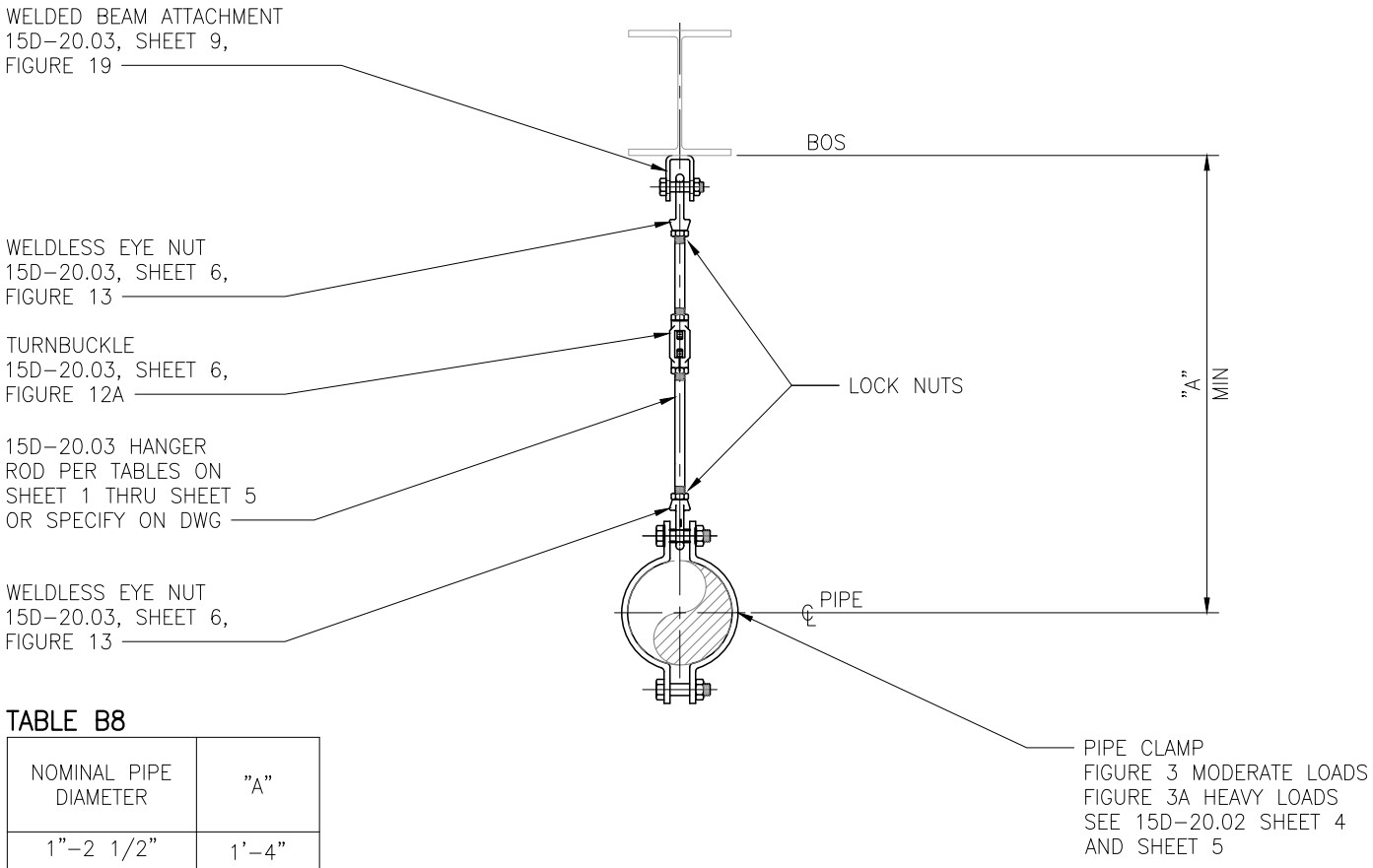


TABLE B8

NOMINAL PIPE DIAMETER	"A"
1"–2 1/2"	1'–4"
3"	1'–5"
4"	1'–6"
6"	1'–7"
8"	1'–8"
10"	1'–9"
12"	1'–10"
14"	2'–0"
16"	2'–1"
18"	2'–3"
20"	2'–5"
24"	2'–8"

NOTES:

1. FOR ROD SIZES 2" DIAMETER AND LARGER, SUPPORT DETAIL WILL BE INDIVIDUALLY DESIGNED AND SPECIFIED ON PIPE SUPPORT DRAWINGS.

FIGURE HY – FOR MODERATE LOADS – NON–INSULATED STAINLESS STEEL & CARBON STEEL PIPING
FIGURE HYA – FOR HEAVY LOADS – NON–INSULATED STAINLESS STEEL & CARBON STEEL PIPING

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

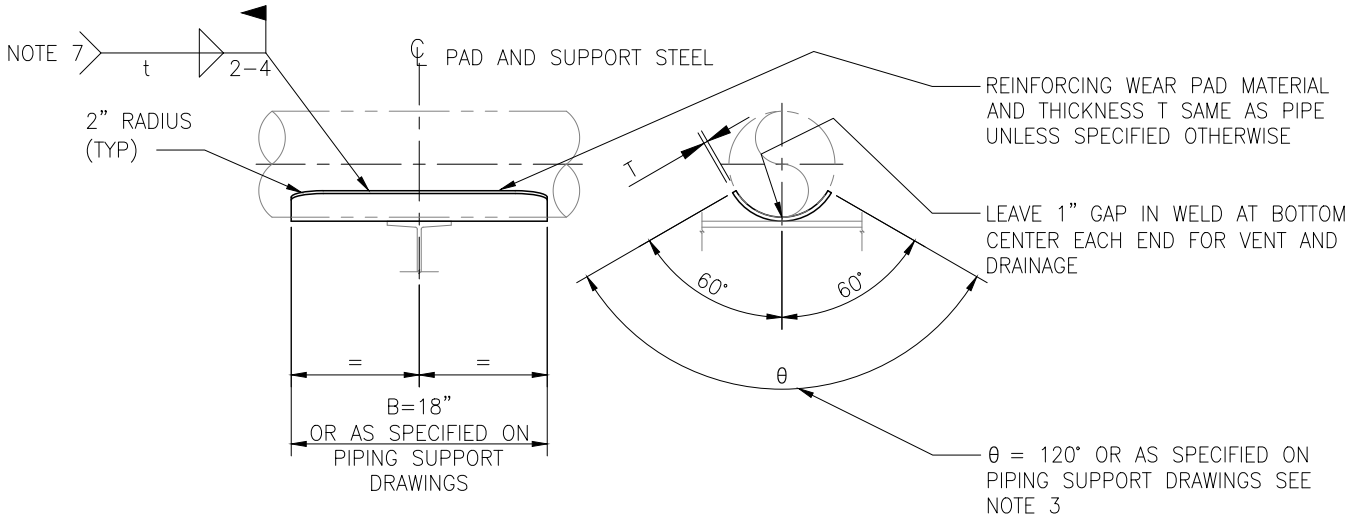
ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS HANGER ASSEMBLIES**

DWG NO: **15D-20.03**

SHEET: **17** REV: **A**



NOTES:

1. PIPES SCHEDULE STANDARD OR GREATER RESTING ON STEEL SHALL BE EVALUATED FOR REINFORCING WEAR PAD REQUIREMENT.
2. PIPES 18" DIAMETER AND LARGER, SCHEDULE STANDARD OR LESS RESTING ON STEEL WILL REQUIRE REINFORCING PADS PER 15D–20.04, SHEET 6, FIGURE 25A
3. WHEN REINFORCING WEAR PAD IS USED WITH 15D–20.05, SHEET 8, ASSEMBLY LX GUIDE, REINFORCING/WEAR PAD CONTACT SHALL BE 120°. FOR OTHER APPLICATIONS INCREASE OR DECREASE θ AS REQUIRED.
4. ALL STAINLESS STEEL PIPING RESTING ON STEEL REQUIRES STAINLESS STEEL WEAR PADS.
5. FOR COMPATIBLE GUIDE SELECTION SEE 15D–20.05, SHEET 9, ASSEMBLY LV AND 15D–20.05, SHEET 10, ASSEMBLY LYA/LZA.
6. MAXIMUM FILLET WELD t = REPAD THICKNESS. AS REQUIRED, CONTINUOUS FILLET WELD (EXCEPT GAP AS NOTED) SHALL BE SPECIFIED ON PIPE SUPPORT DRAWING WHEN PAD FUNCTIONS PRIMARILY AS REINFORCEMENT OF PIPE WALL. OTHERWISE, APPLY INTERMITTENT FILLET WELDING FOR PIPE RESTING AND SLIDING ON SUPPORT STEEL AS PAD FUNCTIONS PRIMARILY AS A WEAR PLATE.
7. MINIMUM FILLET WELD SIZE t = 1/4" OR THE REINFORCING PAD THICKNESS.

FIGURE 25 – REINFORCING WEAR PAD FOR CARBON STEEL AND STAINLESS STEEL PIPE RESTING ON STEEL

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

PROJ. NO: RAE13

CHECKED: CDB	DATE: 20/10/13	
ALLNORTH APPROVED:	DATE:	
CLIENT APPROVED:	DATE:	

TITLE: PIPE SUPPORTS PIPE SHOES, SADDLES AND PADS

DWG NO: 15D-20.04

SHEET: 5

REV: A

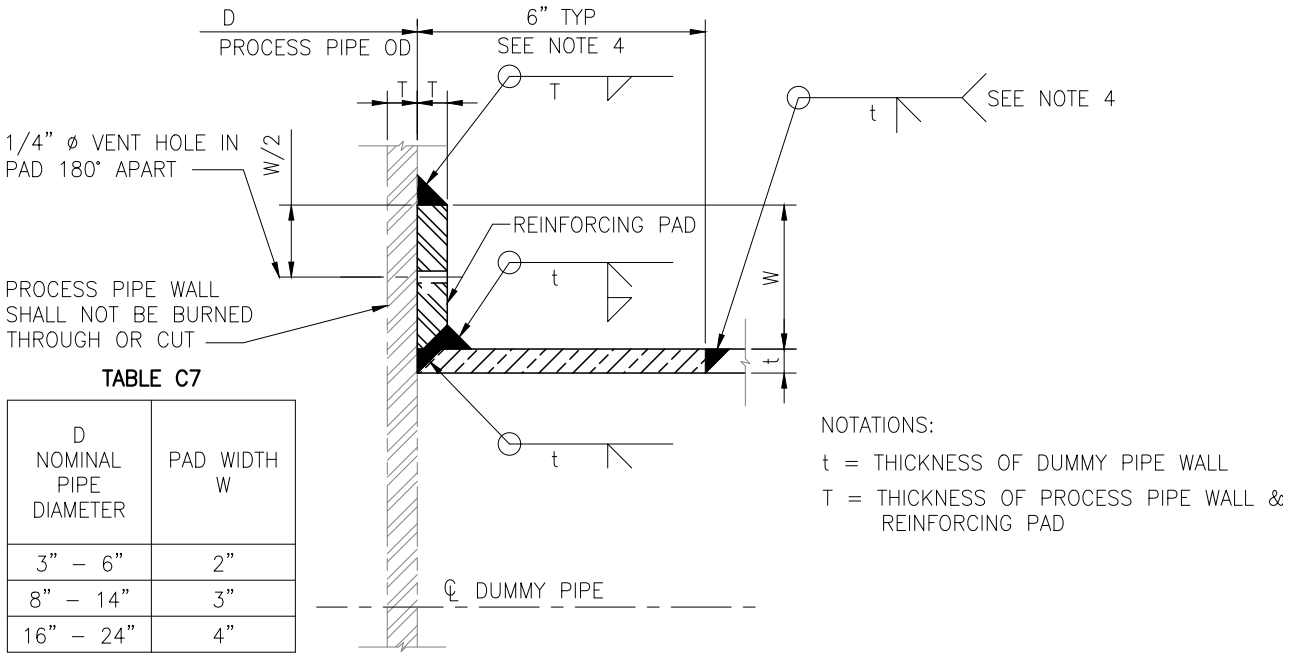


TABLE C7

D NOMINAL PIPE DIAMETER	PAD WIDTH W
3" – 6"	2"
8" – 14"	3"
16" – 24"	4"

NOTATIONS:

t = THICKNESS OF DUMMY PIPE WALL

T = THICKNESS OF PROCESS PIPE WALL & REINFORCING PAD

NOTES:

1. PROCESS PIPE OVER 400°F SHALL HAVE DUMMY PIPE FILLED WITH INSULATION MATERIAL.
2. DUMMY PIPE RELIEF SLOTS AND WELDING NOTES FOR LINES OVER 600°F, REFER TO 15D-20.04, SHEET 9, FIGURE 28.
3. STRESS ENGINEER TO DETERMINE THE REQUIREMENT FOR A REPAD.
4. IF THE PROCESS PIPE IS STAINLESS STEEL OR ALLOY SPECIFICATION, WELD A 6" LONG PIPE SPOOL TO THE PROCESS PIPING THAT IS THE SAME MATERIAL AND SCHEDULE AS THE PROCESS PIPE. BUTT WELD A CARBON STEEL DUMMY PIPE THE SAME SCHEDULE AS THE PROCESS PIPE TO THE STAINLESS STEEL OR ALLOY STEEL 6" LONG PIPE SPOOL. ALL PIPE FABRICATION AND WELDS INCLUDING THE REPAD SHALL BE SHOP FABRICATED AND WELDED, UNLESS NOTED OTHERWISE.

FIGURE 30 – DUMMY PIPE WITH REINFORCING PAD (600°F AND LESS)

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

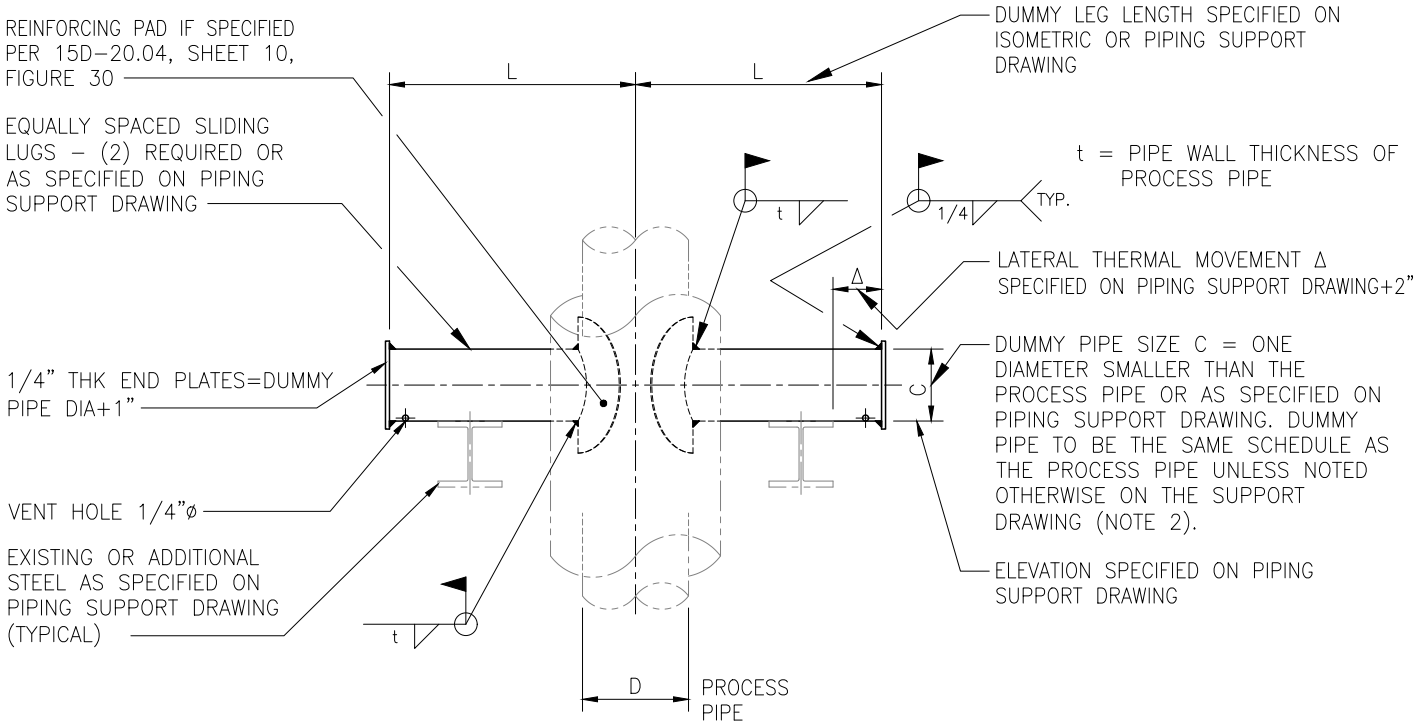
ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS PIPE SHOES, SADDLES AND PADS**

DWG NO: **15D-20.04**

SHEET: **10** REV: **A**



GH – SLIDING RISER SUPPORT AS SHOWN
GHA – GH SUPPORT WITH REINFORCING PAD

GHB – SLIDING RISER SUPPORT WITH ONE LUG ONLY
GHC – GHB SUPPORT WITH REINFORCING PAD

NOTES:
1. PROCESS PIPE OVER 400°F SHALL HAVE DUMMY PIPE FILLED WITH INSULATION MATERIAL.
2. DO NOT USE STAINLESS STEEL PIPE WITH WALL THICKNESS LESS THAN SCH 10S AS DUMMY PIPE.

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT

PROJ. NO: RAE13

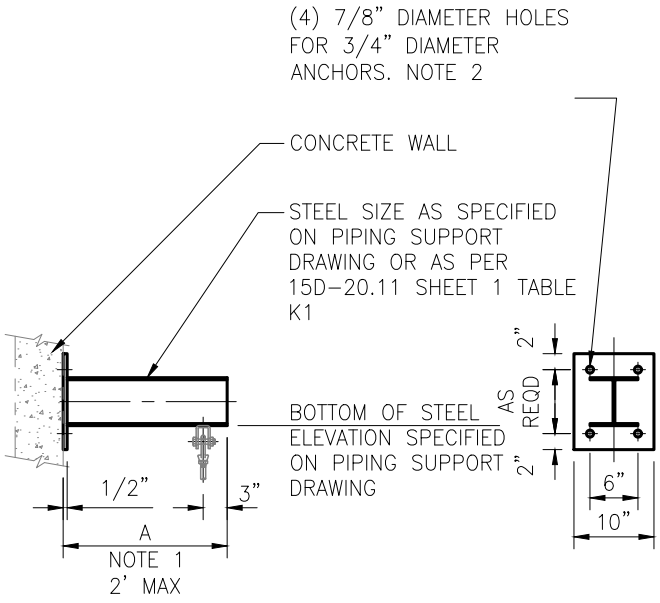
CHECKED: CDB	DATE: 20/10/13	
ALLNORTH APPROVED:	DATE:	
CLIENT APPROVED:	DATE:	

TITLE: PIPE SUPPORTS SLIDING SUPPORTS AND TRAVELLERS

DWG NO: 15D-20.06

SHEET: 5

REV: A



TFA – WITHOUT BRACE

NOTES:
1. A DIMENSION AS SPECIFIED ON PIPING SUPPORT DRAWING.
2. MECHANICAL CONCRETE FASTENERS SHALL BE HILTI KWIK BOLT II EXPANSION ANCHORS, OR APPROVED EQUIVALENT. OVERSIZED DRILLED HOLES SHALL NOT BE PERMITTED.

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
A	20/10/14	ISSUED FOR ESTIMATE	DRM	CDB

CLIENT: REGIONAL DISTRICT OF NANAIMO

Allnorth

PROJECT NAME: **FCPCC - SLUDGE STORAGE CELL#3 REPLACEMENT**

PROJ. NO: RAE13

CHECKED: CDB DATE: 20/10/13

ALLNORTH APPROVED: DATE:

CLIENT APPROVED: DATE:

TITLE: **PIPE SUPPORTS CONCRETE PADS AND ATTACHMENTS**

DWG NO: **15D-20.12**

SHEET: **7** REV: **A**

SCHEDULE 8 – OTHER RELEVANT DOCUMENTS

Title	Ref. No.	Date	Rev
TBA			

GENERAL TERMS & CONDITIONS OF CONTRACT
SLUDGE STORAGE CELL 3 REPLACEMENT 21-025

PART 1 LAW APPLICABLE

This Contract shall be construed under and according to the laws of the Province of British Columbia, Canada.

PART 2 PRIME CONTRACTOR DESIGNATION

The Contractor must be registered with WorkSafe BC and be in good standing with remittance up to date throughout the agreement and is designated as the Prime Contractor and shall fulfill the Prime Contractor responsibilities as defined in:

a) WorkSafeBC *Occupational Health and Safety Regulation,* Notice of Project, Section 20.2, and Coordination of multiple employer workplaces, Section 20.3;

b) *Workers Compensation Act* (BC), Coordination at multiple-employer workplaces, Section 118, Subsections (1) & (2); and

c) General Requirements, Section 3.10 WorkSafe BC.

PART 3 QUALITY OF WORK AND MATERIALS

The whole of the materials and/or the Work, whether or not so stated herein, shall be done in the most substantial and professional manner with new materials, articles, equipment and work of the best quality and description and by employment of properly skilled trades and in strict conformity with and as required by this contract to the satisfaction of the REGIONAL DISTRICT whether or not so stated herein. Materials and equipment shall be the products of suppliers or manufacturers of established reputation engaged in the supply or manufacture of such materials or equipment.

Materials are to be installed or incorporated into the Work applied in accordance with the manufacturer's directions. Use the techniques and application best suited for the type of material being used.

PART 4 JUDGE OF WORK AND MATERIALS

The REGIONAL DISTRICT shall be the final judge of all work, materials and plants in respect of both quality and quantity and their decisions of all questions in dispute with regard thereto will be final.

All materials shall be subject to inspection and test by and shall meet the approval of the REGIONAL DISTRICT.

In case any materials, equipment and supplies are defective in material or quality or otherwise not in conformity with the specifications of the contract, the REGIONAL DISTRICT shall have the right either to reject them or to require their correction.

Acceptance or rejection of the materials, equipment, supplies, etc. shall be made as promptly as practicable after delivery, but failure to inspect and accept or reject supplies shall not relieve the contractor from responsibility for such supplies as are not in accordance with the specifications.

PART 5 RECTIFICATION OF DAMAGE AND DEFECTS

The Contractor shall rectify any loss or damage for which, in the opinion of the REGIONAL DISTRICT, the Contractor is responsible, at no charge to the REGIONAL DISTRICT and to the satisfaction of the REGIONAL DISTRICT. In the alternative, the REGIONAL DISTRICT may repair the loss or damage and the Contractor shall pay to the REGIONAL DISTRICT the costs of repairing the loss or damage forthwith upon demand from the REGIONAL DISTRICT. Where, in the opinion of the REGIONAL DISTRICT, it is not practical or desirable to repair the loss or damage, the REGIONAL DISTRICT may estimate the cost of the loss or damage and deduct such estimated amount from the amount owing to the Contractor hereunder.

PART 6 WARRANTY AND GUARANTEE

The Work shall be warranted to be free of defects, and shall be guaranteed by the Contractor for a period of one (1) year from the date of acceptance. On receipt of notice from the REGIONAL DISTRICT the Contractor shall promptly make all repairs arising out of defective work or any equipment or materials supplied by him.

The REGIONAL DISTRICT is hereby authorized to make such repairs if, ten (10) days after the giving of such notice to the Contract, the Contractor has failed to make or undertake with due diligence said repairs; provided, however, that in the case of an emergency, where, in the opinion of the REGIONAL DISTRICT delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and all expense in connection therewith shall be charged to the Contractor.

PART 7 ASSIGNMENT

The Contractor shall not assign, sub-contract or let out as task work any part of the Work, and shall not assign any interest herein or any right to payment hereunder without first having had and obtained the consent in writing of the REGIONAL DISTRICT; which consent the REGIONAL DISTRICT may withhold in its absolute discretion. If the REGIONAL DISTRICT should consent to any such assignment, sub-contracting or letting out as task work of all or any part of the Work, the Contractor shall by reason thereof be in no ways relieved from his responsibility for the fulfillment of the Work, but shall continue to be responsible for the same in the same manner as if all the Work had been performed by the Contractor himself.

PART 8 TERMINATION

The REGIONAL DISTRICT may by written notice to the Contractor terminate the whole or any part of this contract in any one of the following circumstances:

a) If the Contractor fails to perform the Work within the time specified herein or any extension thereof.

b) If the Contractor fails to perform any of the other provisions of this contract, or so fails to make progress as to endanger performance of this contract in accordance with its terms and in any of these circumstances, does not cure such failure within a period of ten (10) days, or such longer period as the REGIONAL DISTRICT may authorize, in writing, after receipt of notice from the REGIONAL DISTRICT specifying any such failure.

d) In the event that the Contractor performs any act or does anything by which the REGIONAL DISTRICT shall incur any liability whatsoever.

e) The REGIONAL DISTRICT may terminate the Agreement, without any cost or penalty or consequence whatsoever, if it concludes, acting reasonably on the information available to it, that the Contractor is in material non-compliance with, or has been convicted of a material offence or violation of, health, safety, labour or environmental laws.

f) In the event that any creditor of the Contractor causes a writ of execution or similar writ or court order to be served upon the REGIONAL DISTRICT requiring the REGIONAL DISTRICT to pay to such creditor or to a sheriff or other public official or to the Court any portion of the consideration due to the Contractor under this Contract.

g) In the event that the Contractor shall be adjudged bankrupt or if it should make a general assignment for the benefit of creditors or if it becomes insolvent or is appointed by a creditor of if it should take the benefit of any Act that may be in force for bankrupt or insolvent debtors.

Upon termination of the Contract as aforesaid, the REGIONAL DISTRICT shall have no obligation to the Contractor except for such labour and materials as have been supplied or performed up to the date of the termination of the Contract.

PART 9 STATUTES, MUNICIPAL BY-LAWS AND PERMITS

Unless otherwise noted, the Contractor shall take out all necessary permits and licenses required to permit the Contractor to perform its obligations under the Contract. The Contractor shall give all notices and comply with all REGIONAL DISTRICT regulations, all laws, by-laws, ordinances, rules and regulations, whether federal, provincial or municipal, relating to the business it carries on and the services provided pursuant to the Contract, including the Workers' Compensation Act and the Employment Standards Act.

PART 10 SITE INSPECTION

The Contractor shall make site inspections of all appropriate areas to determine their general condition and to ensure the fulfillment of the contract requirements.

PART 11 USE OF PREMISES

The Contractor shall abide by, and shall ensure its employees abide by, all appropriate regulations, including but not limited to regulations relating to fire, safety, parking, traffic control and health. The Contractor will ensure that all of its employees are aware of the applicable regulations.

PART 12 DAMAGE TO PERSON AND PROPERTY

The Contractor shall use due care that no persons are injured, no property damaged or lost, and no rights are infringed in the performance of the Work, and the Contractor shall be solely responsible for all loss, damages, costs and expenses in respect of any injury to persons, damage of property, or infringement of the rights of others incurred in the performance of the Work or caused in any other manner whatsoever by the Contractor, or its employees.

PART 13 CLEAN UP

The Contractor shall at all times conduct the work in an orderly and reasonably tidy manner, and shall at suitable intervals remove any accumulation of rubbish or refuse materials. At no time shall any person employed by the Contractor or by any of his Subcontractors discard any litter or garbage on or adjacent to the site, except into a suitable container. Upon completion and before final acceptance of the work, the Contractor shall remove all rubbish, surplus, or discarded materials and equipment and shall leave the site in a clean and neat condition.

PART 14 CURRENCY OF PAYMENT

All reference to money in this Contract shall refer to and mean lawful money of Canada.

PART 15 DAMAGES FOR DELAY

If the work is not completed and/or the materials delivered before or upon the expiration of the time limited therefore all costs which the REGIONAL DISTRICT shall be put to by reason thereof shall be charged to the Contractor.

PART 16 PAYMENTS

The Contractor will be solely responsible for invoicing the REGIONAL DISTRICT ensuring to include the REGIONAL DISTRICT's Purchase Order number on all invoices to assure timely payment.

All invoices are subject to prior review and approval by the REGIONAL DISTRICT and approved invoices will be paid on a net 30 day basis unless otherwise negotiated and agreed to in writing.

If the REGIONAL DISTRICT does not approve of the services or part of them which are the subject of the invoice, the REGIONAL DISTRICT shall advise the Contractor in writing of the reasons for non-approval and the Contractor shall remedy at no additional cost to the REGIONAL DISTRICT before the REGIONAL DISTRICT shall be obliged to pay the invoice or any part of it, as the case may be.

PART 17 CHANGE ORDERS

If for any reason it may become desirable during the course of the work to change the alignment, dimensions or design, or to add to or to omit portions thereof, the REGIONAL DISTRICT reserves the right to issue change orders to give effect to such changes as may, in the opinion of the REGIONAL DISTRICT be necessary or desirable.

The change may or may not result in a change in the amount of the work. If the changes do, in the opinion of the REGIONAL DISTRICT, change the amount of the work, the contract price shall be adjusted as mutually agreed between the Contractor and the REGIONAL DISTRICT.

PART 18 PROTECTION OF REGIONAL DISTRICT AGAINST CLAIMS

The Contractor shall assume the defense of, and indemnify and hold harmless the REGIONAL DISTRICT and its officers, employees and agents, from and against all claims relating to materials furnished and to inventions, copyrights, trademarks, or patents and rights thereto used by the Contractor in the execution of this contract and in subsequent use and/or operation by the REGIONAL DISTRICT.

PART 19 INSURANCE

Insurance Obtained by Contractor

General

The Contractor shall itself and cause each subcontractor to obtain and maintain, at its own expense, the insurance set out below until all conditions of the Contract have been fully complied with.

Commercial General Liability Insurance

Commercial General Liability Insurance providing third party bodily injury, death, and property damage coverage in an amount of not less than $2,000,000 per occurrence, indicating that the REGIONAL DISTRICT is added as Additional Insureds. The policy shall include Premises and Operations Liability; Contractor's Protective Liability with respect to the Operations of sub-contractors; Completed Operations Liability; Contractual Liability; Non-Owned Automobile Liability; and a Cross Liability and/or Severability of Interest clause protecting each insured to the same extent as if they separately insured.

The policy shall also contain a clause providing that the REGIONAL DISTRICT will receive 30 days' notice of cancellation or of any material change in coverage which will reduce the extent of coverage provided to the REGIONAL DISTRICT.

The Contractor shall file with the REGIONAL DISTRICT, prior to the commencement of work, a certificate of insurance in a form acceptable to the REGIONAL DISTRICT evidencing this policy. The Contractor shall also file with the REGIONAL DISTRICT evidence of the renewal on this policy. The Contractor is responsible for paying all deductibles.

Automobile Third Party Liability Insurance

A Standard Owner's Form Automobile Policy for each vehicle used in the performance of the Contract and regulated by the Insurance (Motor Vehicle) Act or similar legislation. The Third Party Legal Liability Limits are to be in an amount not less than $2,000,000 per occurrence.

Contractor's Equipment Insurance

The Contractor shall maintain an All Risk insurance policy covering all construction equipment, mobile equipment, miscellaneous equipment, tools, office contents and other miscellaneous property whether owned, leased or rented or for which the Contractor may be responsible, that is used in any way in connection with this Contract.

Other Insurance

The Contractor and subcontractors shall provide at their own cost any additional insurance which they are required by law to provide or which they consider necessary.

Waiver of Subrogation

Each insurance policy obtained by the Contractor or any subcontractor shall include the following clause:

"Waiver of Subrogation

It is understood and agreed that in the event of a loss and upon payment of any claim hereunder, the insurer will waive its right of subrogation against the REGIONAL DISTRICT and any of their servants, agents, employees, parent, subsidiary, affiliated or related firms."

PART 20 FORCE MAJEURE

Neither party shall be responsible for any delay or failure to perform its obligations under this agreement where such a delay or failure is due to fire, flood, explosion, war, embargo, governmental action, pandemic, epidemic, act of public authority, act of god or to any other cause beyond its control, except labour disruption. In the event force majeure occurs, the party who is delayed or fails to perform shall give prompt notice to the other party and shall take all reasonable steps to eliminate the cause. Should the force majeure event last longer than 30 calendar days, the REGIONAL DISTRICT may terminate this agreement immediately by written notice to the contractor without further liability, expense, or cost of any kind.

PART 21 DISPUTE RESOLUTION

21.1 If the parties to this Agreement are unable to agree on the interpretation or application of any provision in the Agreement, or are unable to resolve any other issue relating to this Agreement, the parties agree to the following process in the order it is set out:

(a) the party initiating the process will send written notice to the other party (the "Dispute Notice"); and

(b) the parties will promptly, diligently and in good faith, including the senior management of both parties, take all reasonable measures to negotiate an acceptable resolution to the disagreement or dispute.

21.2 If the parties are unable to negotiate a resolution within 30 days of the Dispute Notice, the parties may request the assistance of a mediator agreed to by the parties within 30 days written notice of a request to appoint a mediator by any party, failing which the mediator will be appointed by the B.C. International Commercial Arbitration Centre (BCICAC), and unless the parties agree otherwise, this mediation will follow BCICAC rules and will terminate 60 days after the appointment of the mediator.

21.3 The parties will be responsible for their own costs under the dispute resolution process set out in this part 21.0.

PART 22 INDEPENDENT CONTRACTOR

The Contractor shall be, and in all respects be deemed to be, an independent contractor and nothing in this *Agreement* shall be construed to mean that the Contractor is an employee of the REGIONAL DISTRICT or that any agency, joint venture or partnership exists between the *Contractor* and the *REGIONAL DISTRICT*.