



REQUEST FOR TENDERS No. 21-040

Chase River Pump Station Wet Well Upgrades

ISSUED: June 21, 2021

CLOSING DATE AND TIME:

Tenders must be received on or before:
3:00pm (15:00 hrs) Pacific Time on Friday July 23, 2021

Regional District of Nanaimo Agent for Questions:

Scot Merriam, SRM Projects Ltd.

250-758-5352

smerriam@srmprojects.ca

Questions, or requested revisions to the form of contract, must be received at least eight (8) business days before the closing date.

Mandatory Proponent's Site Information Meeting:

10:30am Tuesday July 6, 2021

Chase River Pump Station

1174 Island Highway South

Nanaimo, BC

RDN Agent: Scot Merriam

RSVP requested. Site visit attendees are required to wear steel-toed footwear, high visibility vest 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, **July 23, 2021**.

Submission Requirements:

Bidders must, at minimum, submit:

1. a completed Tender Form;
2. a draft Work schedule;
3. a list of applicable labour, supervision, material and equipment charge-out rates for Extra Work

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 “CRPS Wet Well Upgrades Tender Submission – Contractor Name” 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.

ARTICLE 2. Scope of Work

Tenders are invited from qualified and experienced firms to *renew wastewater submersible pump supports, piping and related structural steel in and about the pump station wet well* at the Chase River Pump Station at 1174 Island Highway South, Nanaimo, BC (the delivery point), all as more fully described in the Tender Documents.

The Work must take place between September 20, 2021 and October 3, 2021 when the wastewater flows are normally low (refer to preliminary schedule attached). Within this allowance, bidders may choose the number of work shifts per day and hours per shift to suit their own envisioned construction workflow, with due consideration to the City of Nanaimo’s noise bylaw. Reducing the amount of pump station shutdown time is desirable.

Due to limitations in the original pump station design, the successful bidder will be required to prepare and submit an application to WorkSafe BC for OH&S Regulation section 9.22 alternate isolation measures, as well as implement such approved measures, in coordination with RDN operations personnel. *Please refer to the EXAMPLE Chase River Pump Station application for WorkSafe BC 9.22 alternate isolation measures which presents documentation previously approved by WorkSafe BC and outlines known safety hazards of the work area.*



The Work will take place in an area requiring special attention to environmental protection. Refer to the RDN's Wastewater Services Environmental Management System Contractor-Supplier Package for detail. A representative of the successful bidder will be required to undergo approximately 30 minutes of environmental training provided by the RDN. The successful bidder is then required to train all site construction workers under their supervision.

NOTE: The successful bidder will be expected to provide their own crew facilities, including but not limited to lunch trailer and washroom, along with water and electrical services for same.

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
- (4) RDN Wastewater Services Environmental Management System Contractor-Supplier Package
- (5) EXAMPLE Chase River Pump Station application for WorkSafe BC 9.22 alternate isolation measures

* Includes the description of work, the drawings, the specifications and other reference documents.

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

Where indicated, GST 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

An award shall be made on the tender that will give the greatest value to the RDN based on price, quality, warranty, and schedule/completion 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. Notice of Intent to Award is anticipated to be made within 14 days of tender closing.

ARTICLE 12. Form of Contract

The supply 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, including the scope of supply. 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, as a result 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. Upon Notice of Intent to Award, the successful Tenderer is required 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
21-040 Chase River Pump Station Wet Well Upgrades
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 \$ _____

UNIT RENTAL RATE FOR OPERATING/MAINTAINING BYPASS SYSTEM BEYOND LUMP SUM WORK COMPLETION DATE (\$/day)

PROPOSED SUBCONTRACTORS, IF ANY (list applicable work scope)



PROPOSED CONSTRUCTION START DATE

PROPOSED CONSTRUCTION END DATE

SHIFT LENGTH AND NUMBER OF SHIFTS PER DAY FOR EACH TRADE

TOTAL ESTIMATED CONSTRUCTION LABOUR AND SUPERVISION HOURS

DRAFT CONTRACTOR SCHEDULE (Gantt/Bar Chart)

Attach to Tender Form

LIST OF TIME AND MATERIAL CHARGE OUT RATES FOR EXTRA WORK

Attach to Tender Form

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.

Company: _____

Signature: _____
(Authorized Officer)

Printed: _____
(Authorized Officer)

REGIONAL DISTRICT OF NANAIMO

CHASE RIVER PUMP STATION UPGRADES RFT 21-040

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 Agreement;
 - (b) the General 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 Description of Work (attached Schedule 5);
 - (h) the Drawings (attached Schedule 6);
 - (i) the Specifications (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 an amount estimated by the REGIONAL DISTRICT to complete any Work on the Deficiency List prepared by the REGIONAL DISTRICT and 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 Work.

Except for the amounts which the REGIONAL DISTRICT in good faith is disputing and except for any set off which the REGIONAL DISTRICT may claim and except for invoices (or portions of invoices) in respect of which the REGIONAL DISTRICT has requested and

REGIONAL DISTRICT OF NANAIMO

CHASE RIVER PUMP STATION UPGRADES RFT 21-040

- not received supporting evidence, the REGIONAL DISTRICT shall pay invoices submitted to it for the Services within 30 days' receipt thereof.
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 agent 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.

REGIONAL DISTRICT OF NANAIMO

CHASE RIVER PUMP STATION UPGRADES RFT 21-040

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: _____

GENERAL TERMS & CONDITIONS OF CONTRACT
CHASE RIVER PUMP STATION UPGRADES 21-040

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, Part 2, Division 1, Sections 13 and 24; 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 Contractor, 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 or 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 \$5,000,000 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*.

SCHEDULE 1 – ADDENDA

SAMPLE

SCHEDULE 2 – SUPPLY CONTRACTOR TENDER FORM

SAMPLE

SCHEDULE 3 – SUPPLY CONTRACTOR SUPPORTING INFORMATION

SAMPLE

SCHEDULE 4 – CONTRACTOR WORK SCHEDULE

Schedule Overview Provided in RFT by RDN For Information Only

SAMPLE

ID	Task Mode	Task Name	Duration	Start	Finish	Resource Names	05 Sep '21	12 Sep '21	19 Sep '21	26 Sep '21	03 Oct '21	10 Oct '21
							S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1		Prepare and submit shop drawings for approval				M-Contr						
2		Bypass system design and submit for approval				M-Contr						
3		Prepare and submit Worksafe BC 9.22 for approval				M-Contr						
4		Apply for City of Nanaimo hydrant water use permit				M-Contr						
5		Mobilize to site, secure temporary facilities				M-Contr						
6		Set up temporary services				M-Contr						
7		Prepare, set up and test bypass equipment				M-Contr						
8		Implement bypass, isolate wet well and lockout	8 hrs	Mon 20/09/21	Mon 20/09/21	CRPS Ops,M-Contr	CRPS Ops,M-Contr					
9		Clean out wet well				M-Contr						
10		Remove pumps to be reused				M-Contr						
11		Demolition				M-Contr						
12		New structural and piping installation				M-Contr						
13		Complete tie-in from wet well to new valve station				M-Contr						
14		Reinstall pumps				M-Contr						
15		Remove wet well lockout and isolation	4 hrs?	Mon 04/10/21	Mon 04/10/21	CRPS Ops,M-Contr	CRPS Ops,M-Contr CRPS Ops M-Contr M-Contr					
16		Commission pump station with bypass on standby	2 days	Mon 04/10/21	Wed 06/10/21	CRPS Ops						
17		Remove bypass	1 day?	Wed 06/10/21	Thu 07/10/21	M-Contr						
18		Clean up and demobilize from site	2 days?	Thu 07/10/21	Sat 09/10/21	M-Contr						

Project: CRPS ConstrSched DRAFT RevA
Date: Fri 18/06/21
FOR INFO ONLY - CTR TO PROVIDE SCHEDULE

Task

Split

Milestone

Summary

Project Summary


External Tasks
 External Milestone
 Inactive Task
 Inactive Milestone
 Inactive Summary

Manual Task
 Duration-only
 Manual Summary Rollup
 Manual Summary
 Start-only

Finish-only
 Deadline
 Progress

SCHEDULE 5 – DESCRIPTION OF WORK

SAMPLE

 REGIONAL DISTRICT OF NANAIMO	<i>Request for Tenders No. 21-040</i> Chase River Pump Station Upgrades <u>Description of Work</u>	Date: June 21, 2021 Revision: 0
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1. The site of the Work is the Regional District of Nanaimo's (RDN's) Chase River Pump Station (CRPS) at 1174 Island Highway South, Nanaimo, BC.

2. **General Description**

In general, the Work shall consist of renewing submersible pump supports, piping and related structural steel in and about the pump station wet well.


3. **Definition of the Work**

The Work shall consist of supplying all materials, equipment, temporary facilities, tools, labour, supervision, overhead, and everything required to accomplish the Work described and called for in the Contract Documents.


4. **Included in the Work**

The Work shall include the supply of all materials, forms, temporary facilities, labour, supervision, plant equipment, and tools necessary to complete the Work described herein and shown on the drawings and standards. It shall generally consist of, but not specifically be limited to the following:

- 4.1. Supply all equipment, materials and consumables required to accomplish the Work.
- 4.2. Supply skilled labour and supervision with the proper qualifications to accomplish the Work in a thoroughly substantial and workmanlike manner.
- 4.3. Issue of submittals for RDN review and approval, including but not limited to equipment and prefabricated materials shop/spool drawings, welding procedure specifications and concrete mix certificates as outlined in the Contract Documents, to the RDN for review and approval well in advance of construction.
- 4.4. Field-confirm all critical fabrication/construction measurements for the Work, to the extent practicable, before the Work begins.
- 4.5. Prefabricate structural, piping and other materials with field trim adjustment/allowance.
- 4.6. Conduct all work at the CRPS site in accordance with RDN policies and procedures, City of Nanaimo bylaws, the BC Occupational Health and Safety Regulation and other applicable provincial and federal regulations, including but not limited to:
 - 4.6.1. WorkSafe BC personal protective clothing and equipment procedures;
 - 4.6.2. WorkSafe BC confined space entry procedures to address gas and other hazards;
 - 4.6.3. WorkSafe BC fall protection procedures;
 - 4.6.4. WorkSafe BC ladders, scaffolds and temporary work platforms procedures;
 - 4.6.5. WorkSafe BC cranes and hoists procedures;
 - 4.6.6. WorkSafe BC rigging procedures;

 REGIONAL DISTRICT OF NANAIMO	<p align="center"><i>Request for Tenders No. 21-040</i> Chase River Pump Station Upgrades <u>Description of Work</u></p>	<p>Date: June 21, 2021 Revision: 0</p>
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- 4.6.7. RDN Wastewater Services Environmental Management System contractor-supplier package, including training in situations where the Work could have a significant impact on the environment.
- 4.7. Clean up all debris on a daily basis and leave the job site in a clean manner, prior to leaving the site.
- 4.8. Secure the construction site from access by the public and take precautions to prevent theft.
- 4.9. Provide temporary single and multi-phase electrical power supplies for all of the site work (RDN can only provide limited 110VAC single phase power).
- 4.10. Provide all temporary crew facilities required for the Work, including but not limited to washroom, lunchroom and tool crib.
- 4.11. Provide potable water for use by the Contractor's crew.
- 4.12. Coordinate the Work with the RDN's electrical and instrumentation contractor, who plans to be working in and about the pump station buildings on related tasks while the Work is being conducted.
- 4.13. In general, carry out the Work while commercial septage deliveries are being made adjacent to the pump station building and coordinating any limited septage receiving station shutdown days required to complete the Work with RDN Operations. The septage receiving station may be shut down occasionally between 9:00am and 3:00pm with advance notice.
- 4.14. Prepare, submit to Worksafe BC for approval and work in coordination with RDN Operations to implement a BC OH&S Regulation 9.22 isolation procedure to allow the shutdown work to be safely completed, including supply of all blanks, blinds, pigs or other materials required. Such procedure shall be maintained for the beneficial use of the Contractor, the RDN, the RDN's electrical and instrumentation contractor and other agents of the RDN as per the terms of the Agreement.
- 4.15. Design, submit plan for review by the RDN's Engineer, implement and continuously operate throughout the Work, on an *uninterruptible basis*, a complete wastewater bypass system, in general conformance with the CRPS Bypass Strategy framework prepared by the RDN's Engineer. In addition to bypassing the full sewer flow, the system must address any potential leaks into the wet well from incompletely seated gates, pigs or other isolation means. Such bypass system shall be maintained and *site monitored 24 hours per day* for the beneficial use of the Contractor, the RDN, the RDN's electrical and instrumentation contractor and other agents of the RDN as per the terms of the Agreement.
- 4.16. Clean out existing pump station facilities as required to perform the Work, and dispose of any resulting effluent/solids in an environmentally responsible manner. *This includes applying to the City of Nanaimo in advance for a permit to use any water required from an adjacent hydrant.* The RDN has successfully used cold water pressure washing for this


 REGIONAL DISTRICT OF NANAIMO	<i>Request for Tenders No. 21-040</i> Chase River Pump Station Upgrades <u>Description of Work</u>	Date: June 21, 2021 Revision: 0
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purpose in the past; however, the Contractor must be prepared to take any cleaning measures necessary to prepare for the Work.

- 4.17. Remove existing submersible pumps and securely store for later reinstallation.
- 4.18. Demolish/dispose of existing submersible pump guide rails, pump bases, piping and structural steel as indicated on the Drawings.
- 4.19. Supply and install new submersible pump mounting plates, including replacement of anchor bolts.
- 4.20. Install new cast iron pump bases (supply by RDN).
- 4.21. Install new submersible pump guide bar rails (supply by RDN).
- 4.22. Supply and install new piping and structural steel supports.
- 4.23. Supply and install new structural steel platforms.
- 4.24. Inspect and pressure test piping according to ASME B31.3 Category D fluid service, including shop pressure test of prefabricated piping spools and service test of complete and installed piping systems.
- 4.25. Tie-in new wet well discharge piping to existing force main valve station inlet piping adjacent to the wet well.
- 4.26. Tie-in 200-RWW-316L-006 bypass pipeline to existing piping outside of the wet well.
- 4.27. Reinstall existing submersible pumps.
- 4.28. Work in coordination with RDN Operations to remove the OH&S Regulation 9.22 isolation procedure and wastewater bypass system.
- 4.29. Provide a pipefitter and welder at CRPS site, along with their tools, equipment and consumables, during a one day post construction commissioning period, to work with RDN operations and resolve any minor leaks or other issues that may arise.
- 4.30. Provision of red-lined project Drawings indicating as-built details, for preparation of record drawings by the Engineer.

5. **Not Included in the Work**

- 5.1. Electrical or instrumentation installation work, including but not limited to electrical de-energization for lockout. The Contractor must not disturb any electrical or instrumentation related facilities without permission from the RDN.
- 5.2. Supply of a group lockout procedure box for all electrical lockout required by the Work.
- 5.3. Ventilation system work.
- 5.4. Supply or installation of the new valve station north of the wet well as indicated on the reference drawings.
- 5.5. Supply of new cast iron submersible pump bases to CRPS site (by RDN).
- 5.6. Supply of new submersible pump guide bar rails to CRPS site (by RDN).

 REGIONAL DISTRICT OF NANAIMO	<p><i>Request for Tenders No. 21-040</i> Chase River Pump Station Upgrades <u>Description of Work</u></p>	<p>Date: June 21, 2021 Revision: 0</p>
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- 5.7. Supply of pumps to CRPS site (reuse existing).
- 5.8. Supply of new automatic air/electrically operated valves to CRPS site (by RDN).
- 5.9. Supply of all manual valves greater than 50 mm (2") in diameter to CRPS site (by RDN).

6. Installation of New Submersible Pump Bases

- 6.1. Where required, provide anchor bolts, fasteners, washers, and templates needed for installation of RDN-furnished equipment.
- 6.2. Size and locate anchor bolts in accordance with the Drawings and installation instructions.
- 6.3. Level mounting plate by means of level nuts as shown on the Drawings.
- 6.4. Adjust pump assemblies so units are properly aligned, plumb, and level with all interconnecting components.
- 6.5. After pump mounting plate, with pump base plate attached, has been set in position, aligned, and set to proper elevation, grout space between bottom of mounting plate and concrete foundation with a poured, non-shrinking grout of the proper category, as specified in Section 03600, Grout and Miscellaneous Concrete Work. Remove wedges after grout is set and pack void with grout. Existing concrete shall be wetted with clean water for 6 hours and blown with clean compressed air to remove standing water before application of cementitious grout.

SCHEDULE 6 – DRAWINGS

Title	Dwg.No.	Date	Rev
Cover Sheet, Key Plan, Drawing Index and General Notes	CRPS-G-006	Apr2021	0
Site Plan – Sht 1 – MARKUP FOR REFERENCE ONLY; NOT FOR CONSTRUCTION	CRPS-C-117	Feb2019	2
Legend and Abbreviations	CRPS-P-001	Apr2021	0
Process Flow Diagram	CRPS-P-101	Apr2021	0
P&ID Pump Station	CRPS-P-102	Apr2021	0
Floor Plan – Demolition – Lower Wet Well	CRPS-M-208- DEMO	Apr2021	0
Floor Plan – Lower Wet Well	CRPS-M-208	Apr2021	0
Floor Plan – Demolition – Upper Wet Well	CRPS-M-209- DEMO	Apr2021	0
Floor Plan – Upper Wet Well	CRPS-M-209	Apr2021	0
Mechanical Standard Details	CRPS-M-210	Apr2021	0
3D View	CRPS-M-211	Apr2021	0
Sections - Demolition	CRPS-M-212- DEMO	Apr2021	0
Sections and Details	CRPS-M-212	Apr2021	0
Pump Base Details	CRPS-M-216	Jun2021	0
Pump #1 Discharge Piping Isometric	CRPS-M-221	Apr2021	0
Pump #2 Discharge Piping Isometric	CRPS-M-222	Apr2021	0
Pump #3 Discharge Piping Isometric	CRPS-M-223	Apr2021	0
Pump #4 Discharge Piping Isometric	CRPS-M-224	Apr2021	0
Pump #5 Discharge Piping Isometric	CRPS-M-225	Apr2021	0
Pump #2 and Pump #4 Bypass Discharge Piping Isometric	CRPS-M-226	Apr2021	0

REGIONAL DISTRICT OF NANAIMO

CHASE RIVER PUMP STATION UPGRADES RFT 21-040

Pump Header Piping Isometric	CRPS-M-227	Apr2021	0
Pump Platform Structural Plan and Details	CRPS-S-202	Apr2021	0
Pump Platform Structural Plan and Details	CRPS-S-203	Apr2021	0
Pipe Line Designation Table – Line List – Sht 1	CRPS-LDT-001	Jun2021	0
Pipe Line Designation Table – Line List – Sht 2	CRPS-LDT-001	Jun2021	0
Pump Base Detail (Flygt)	CP-NP 3231	120914	NA
Full Port Eccentric Valves Dimensions & Details (DeZurik)	A55432	10/17/05	A

CHASE RIVER - PUMP STATION UPGRADES

GENERAL DRAWINGS

<u>DRAWING No.</u>	<u>PROJECT</u>
CRPS-G-006	CHASER RIVER PUMP STATION UPGRADES

DRAWING No.

<u>DRAWING No.</u>	<u>PROJECT</u>
CRPS-C-117	CHASER RIVER PUMP STATION UPGRADES

PROCESS DRAWINGS

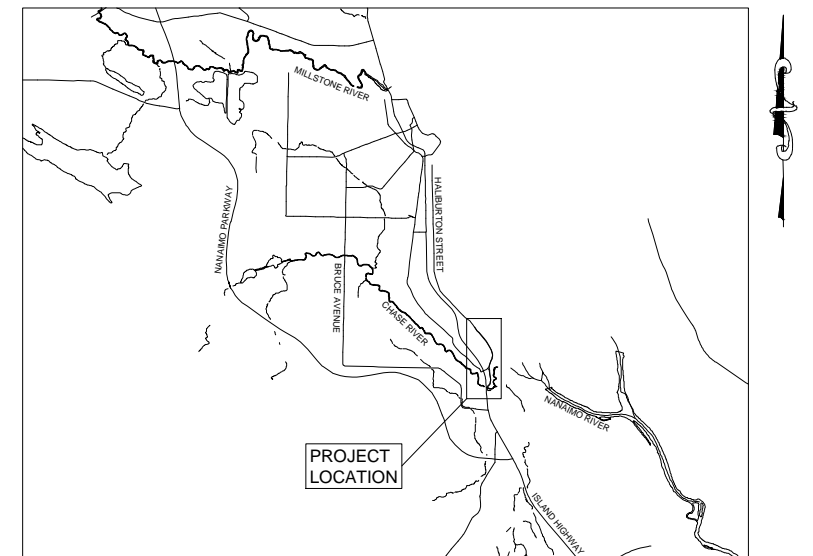
<u>DRAWING No.</u>	<u>PROJECT</u>
CRPS-P-001	CHASER RIVER PUMP STATION UPGRADES
CRPS-P-101	CHASE RIVER PUMP STATION UPGRADES
CRPS-P-102	CHASE RIVER PUMP STATION UPGRADES

MECHANICAL DRAWINGS

<u>DRAWING No.</u>	<u>PROJECT</u>	<u>TITLE</u>
CRPS-M-208-DEMO	CHASE RIVER PUMP STATION UPGRADES	FLOOR PLAN -DEMOLITION
CRPS-M-208	CHASE RIVER PUMP STATION UPGRADES	FLOOR PLAN
CRPS-M-209-DEMO	CHASE RIVER PUMP STATION UPGRADES	FLOOR PLAN -DEMOLITION
CRPS-M-209	CHASE RIVER PUMP STATION UPGRADES	FLOOR PLAN
CRPS-M-210	CHASE RIVER PUMP STATION UPGRADES	STANDARD DETAILS
CRPS-M-211	CHASE RIVER PUMP STATION UPGRADES	3D VIEW
CRPS-M-212-DEMO	CHASE RIVER PUMP STATION UPGRADES	SECTIONS - DEMOLITION
CRPS-M-212	CHASE RIVER PUMP STATION UPGRADES	SECTIONS AND DETAILS
CRPS-M-216	CHASE RIVER PUMP STATION UPGRADES	PUMP BASE DETAILS
CRPS-M-221	CHASE RIVER PUMP STATION UPGRADES	PUMP #1 DISCHARGE ISOMETRIC
CRPS-M-222	CHASE RIVER PUMP STATION UPGRADES	PUMP #2 DISCHARGE ISOMETRIC
CRPS-M-223	CHASE RIVER PUMP STATION UPGRADES	PUMP #3 DISCHARGE ISOMETRIC
CRPS-M-224	CHASE RIVER PUMP STATION UPGRADES	PUMP #4 DISCHARGE ISOMETRIC
CRPS-M-225	CHASE RIVER PUMP STATION UPGRADES	PUMP #5 DISCHARGE ISOMETRIC
CRPS-M-226	CHASE RIVER PUMP STATION UPGRADES	PUMP #2 AND PUMP #4 BYPASS DISCHARGE ISOMETRIC
CRPS-M-227	CHASE RIVER PUMP STATION UPGRADES	PUMP HEADER ISOMETRIC
CRPS-LDT-001	CHASE RIVER PUMP STATION UPGRADES	LINE DESIGNATION TABLE LINE LIST
CRPS-LDT-002	CHASE RIVER PUMP STATION UPGRADES	LINE DESIGNATION TABLE LINE LIST


DRAWING No.

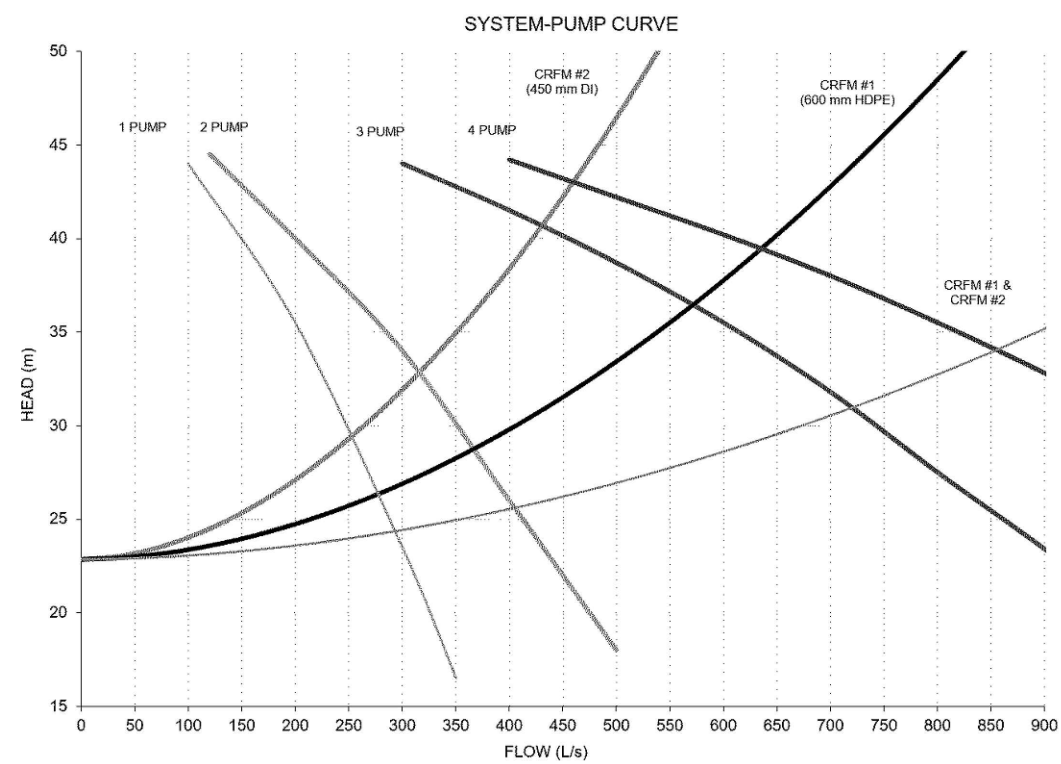
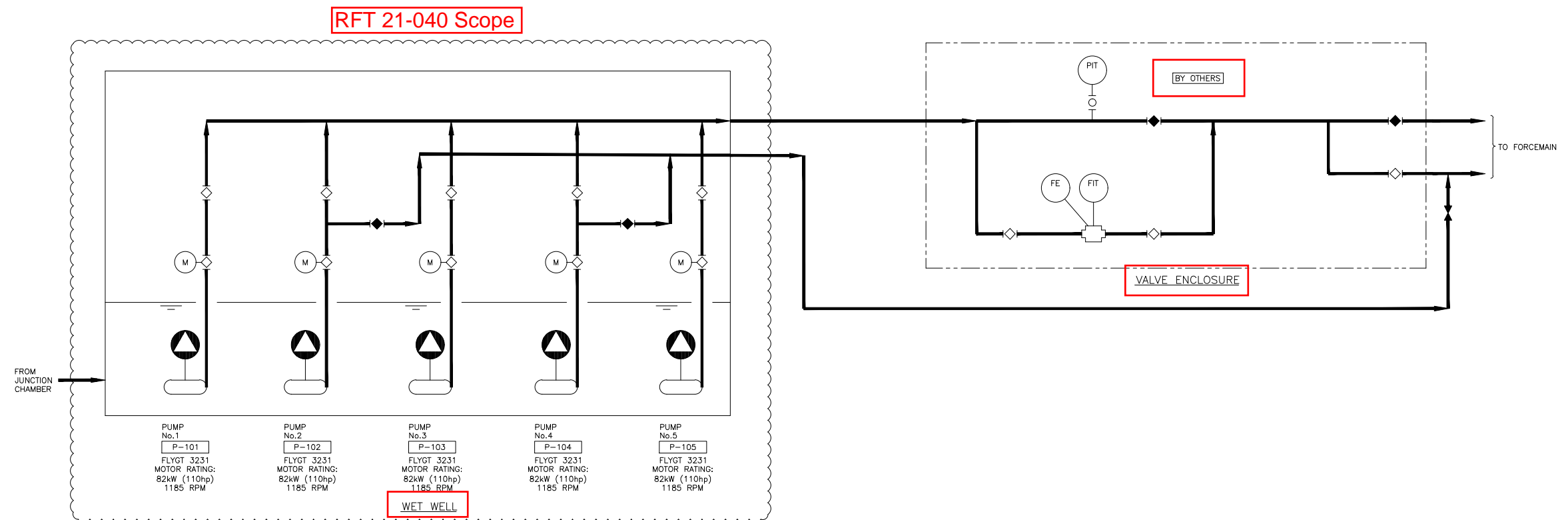
<u>DRAWING No.</u>	<u>PROJECT</u>	<u>TITLE</u>
CRPS-S-202	CHASER RIVER PUMP STATION UPGRADES	PUMP PLATFORM PLAN AND DETAILS
CRPS-S-203	CHASER RIVER PUMP STATION UPGRADES	PUMP PLATFORM PLAN AND DETAILS



LOCATION PLAN
1:50000

[illegible]

PROJECT NAME		CHASE RIVER PUMP STATION UPGRADES			
DRAWN	JH	CHASE RIVER PUMP STATION GENERAL COVER SHEET, KEY PLAN DRAWING INDEX AND GENERAL NOTES			
DESIGNED	MP				
CHECKED	JG				
APPROVED	JG	DRAWING NUMBER	CRPS-G-006	SHEET	-
				DATE	APR 2021
				PROJECT NO.	707564
				SCALE	NTS
				REV	0

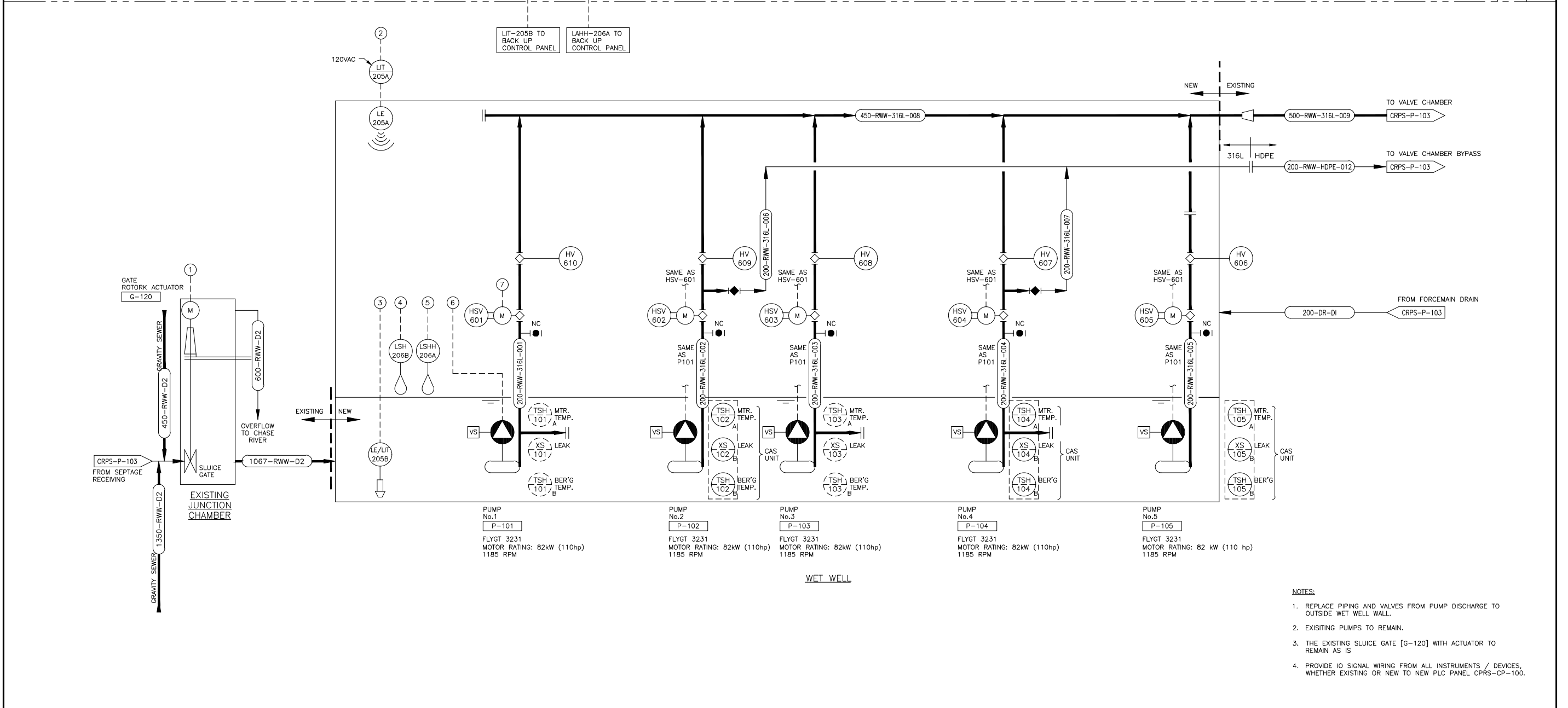


PUMP PERFORMANCE CURVE

DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP	
	REFERENCE DRAWINGS			REVISIONS				
		0	JUN 2021	ISSUED FOR CONSTRUCTION	JH	JG	JG	

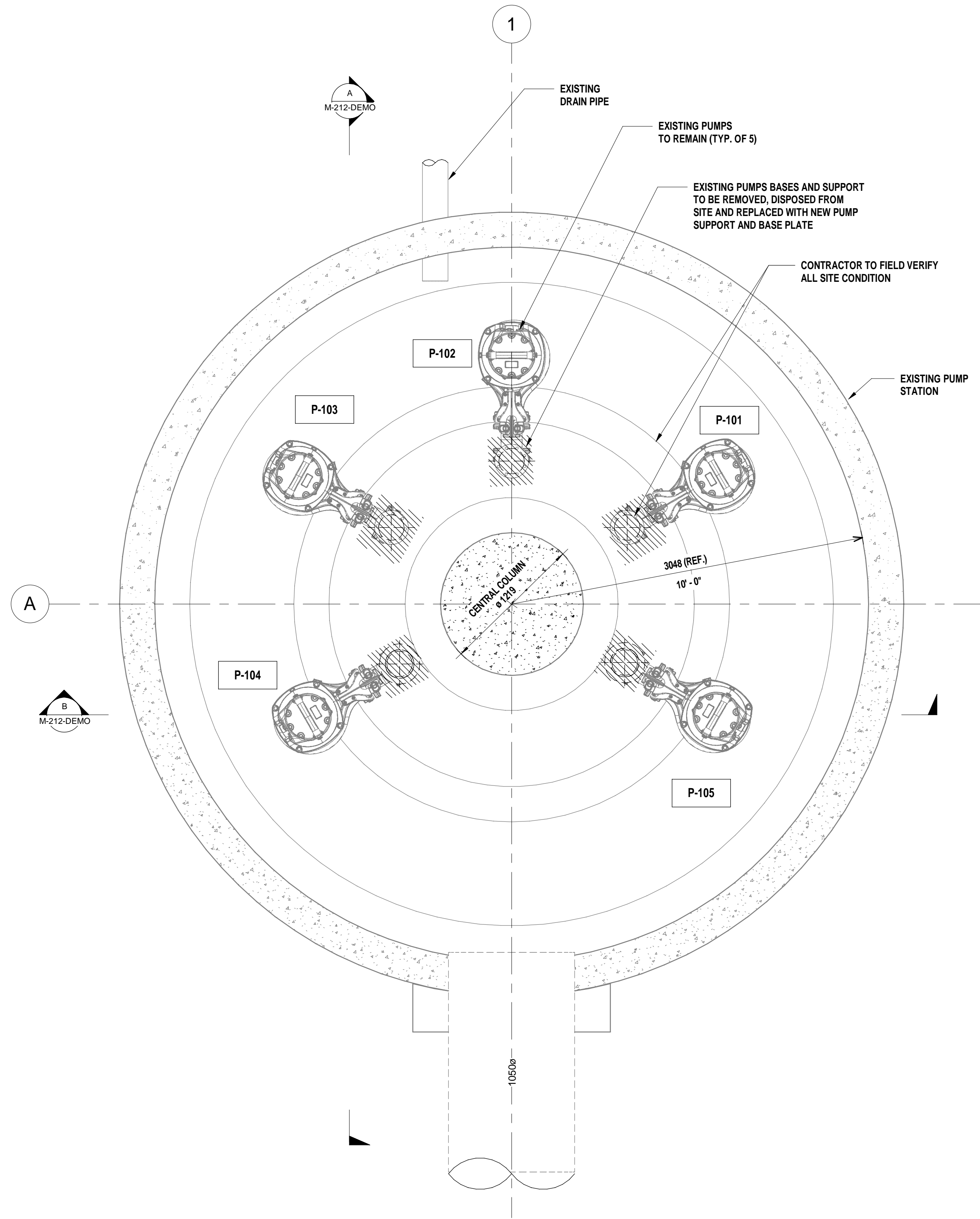


PROJECT NAME		CHASE RIVER PUMP STATION UPGRADES			
DRAWN DW	CHASE RIVER PUMP STATION REGIONAL DISTRICT OF NANAIMO PROCESS PROCESS FLOW DIAGRAM			JACOBS [®]	
DESIGNED CW					
CHECKED JG					
APPROVED JG	DRAWING NUMBER CRPS-P-101	SHEET	PROJECT NO. 707564	SCALE N.T.S.	
			DATE APR 2021	REV 0	

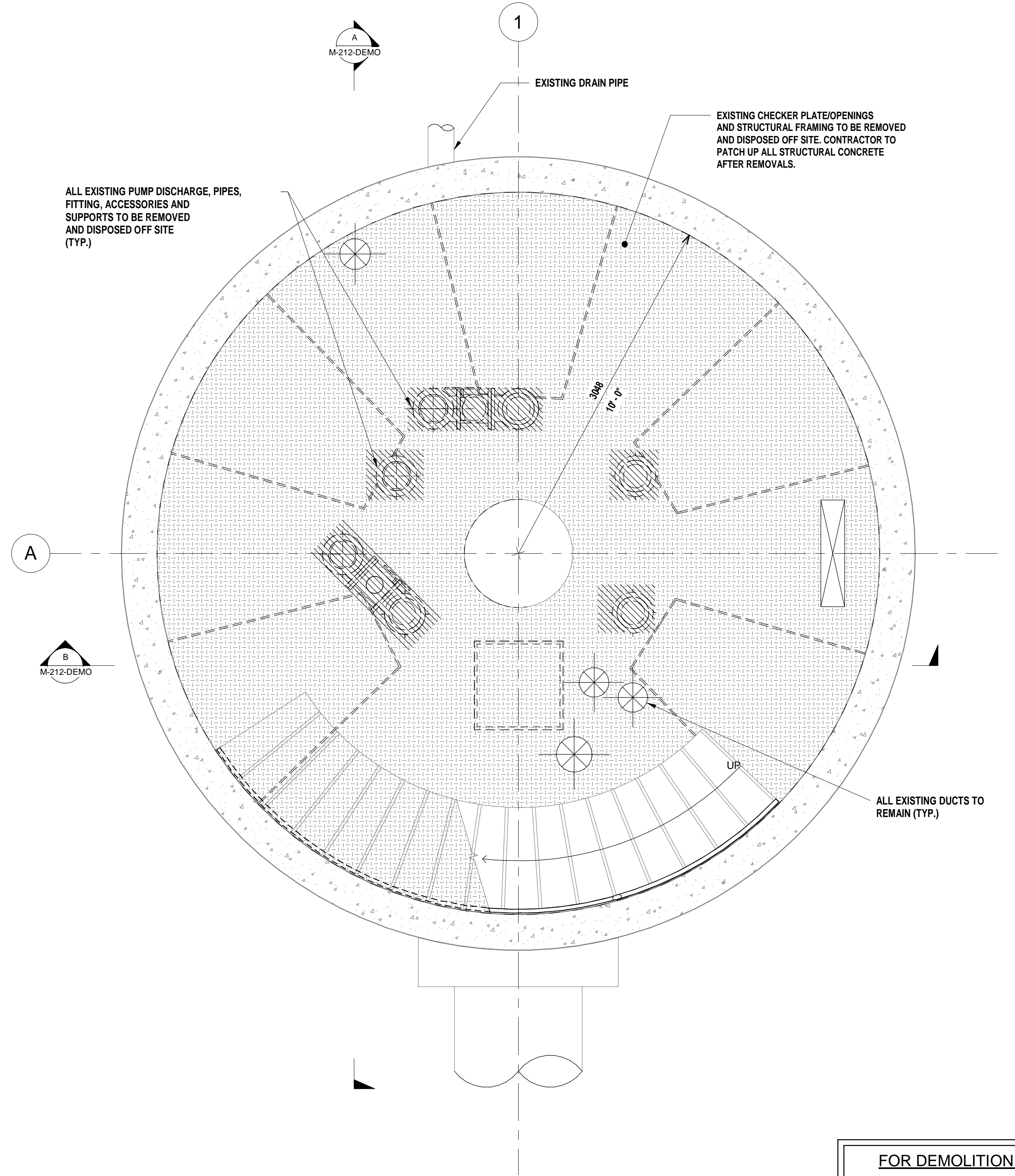


- NOTES:**
1. REPLACE PIPING AND VALVES FROM PUMP DISCHARGE TO OUTSIDE WET WELL WALL.
 2. EXISTING PUMPS TO REMAIN.
 3. THE EXISTING SLUICE GATE [G-120] WITH ACTUATOR TO REMAIN AS IS
 4. PROVIDE IO SIGNAL WIRING FROM ALL INSTRUMENTS / DEVICES, WHETHER EXISTING OR NEW TO NEW PLC PANEL CP9S-CP-100.

[illegible]



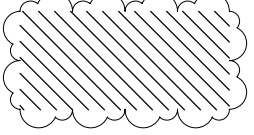
WET WELL @ EL. -4.88m



T/O PLATFORM @ EL. -2.13m

FOR DEMOLITION ONLY

DISTRICT OF NANAIMO
CHASE RIVER PUMP STATION UPGRADE PROJECT

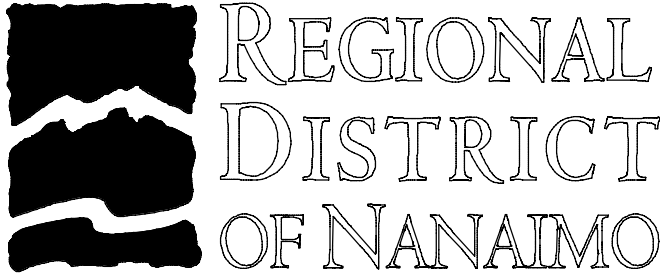



DENOTES ITEMS TO BE DEMOLISHED

DRAWING BECOMES VOID UPON COMPLETION

NOTE:
1. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE IN MILLIMETERS.

CRPS-M-212-DEMO	CHASE RIVER PUMP STATION - MECHANICAL SECTIONS - DEMOLITION	0	JUN 2020	ISSUED FOR CONSTRUCTION	SR	JG	JG	
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP	
REFERENCE DRAWINGS				REVISION				

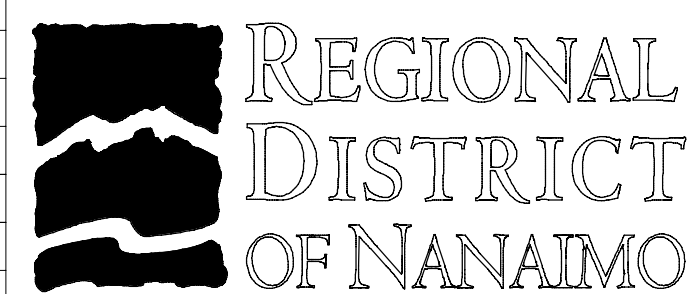



PROJECT NAME CHASE RIVER PUMP STATION UPGRADES				
DRAW SR	CHASE RIVER PUMP STATION MECHANICAL FLOOR PLANS - DEMOLITION			
DESIGNED CW				
CHECKED JG				
APPROVE JG	DRAWING NUMBER CRPS- M- 208- DEMO	SHEET -	DAT APR 2021	RE 0

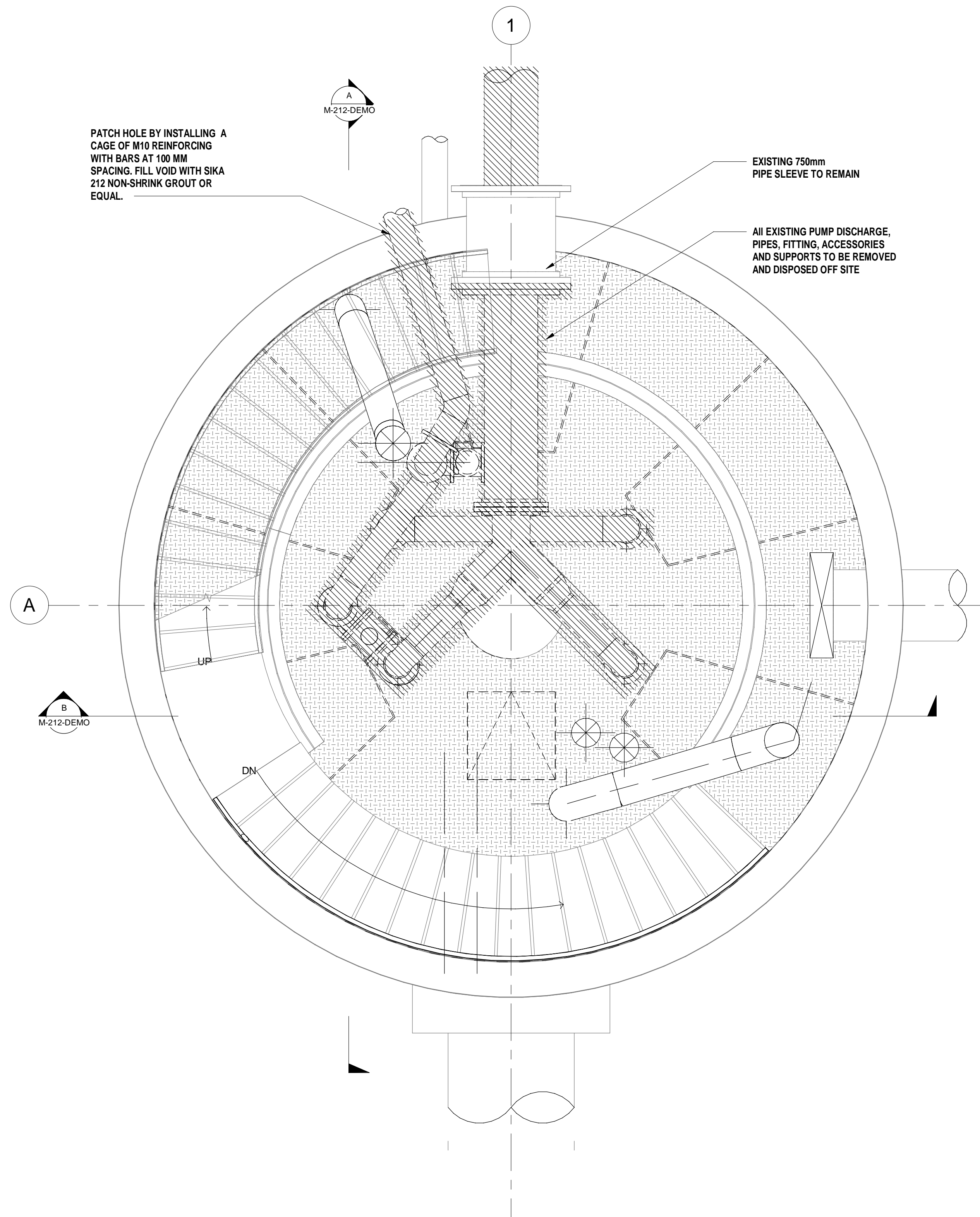


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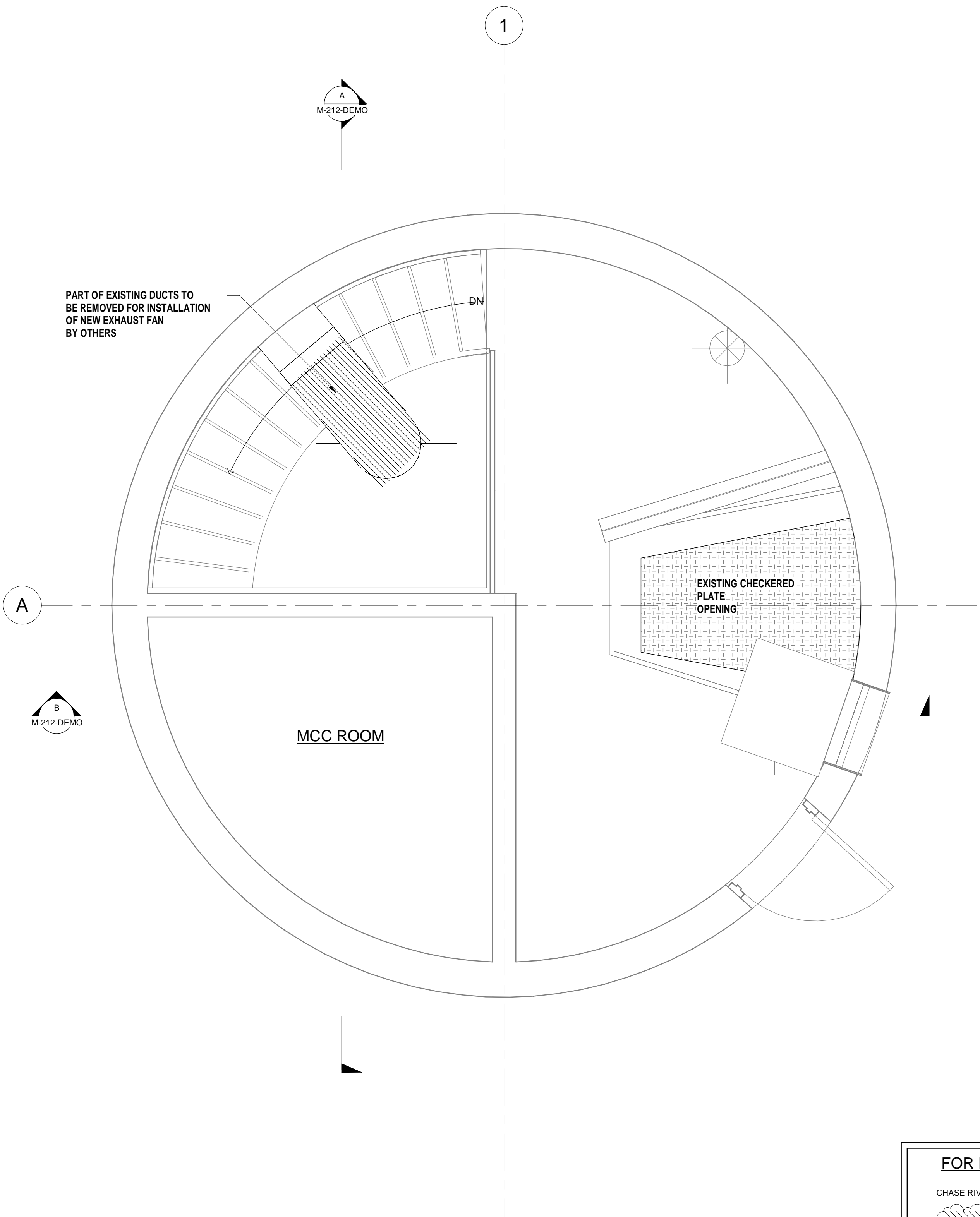
CRPS-M-212	CHASE RIVER PUMP STATION MECHANICAL SECTIONS AND DETAILS	0	JUN 2021	ISSUED FOR CONSTRUCTION	SR	JG JG
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK APP
REFERENCE DRAWINGS		REVISION				



PROJECT NAME		CHASE RIVER PUMP STATION UPGRADES			
DRAW	SR	CHASE RIVER PUMP STATION MECHANICAL FLOOR PLANS			
DESIGNED	CW				
CHECKED	JG				
APPROVE	JG	DRAWING NUMBER	CRPS- M- 208	SHEET	-
				DAT	APR 2021
				PROJECT NO.	707564
				SCALE	N.T.S
				RE	0



T/O PLATFORM EL. 6.00m

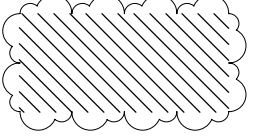


FINISHED GRADE EL. 4.30m

NOTE:
1. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE IN MILLIMETERS.

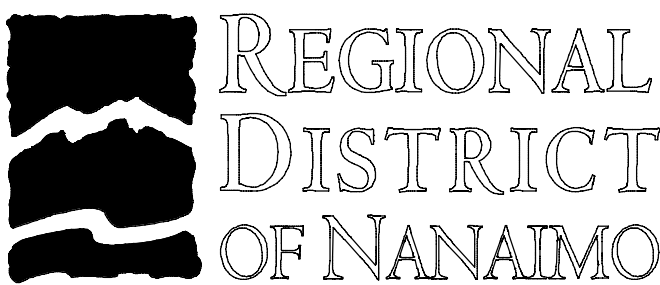
FOR DEMOLITION ONLY


DISTRICT OF NANAIMO
CHASE RIVER PUMP STATION UPGRADE PROJECT

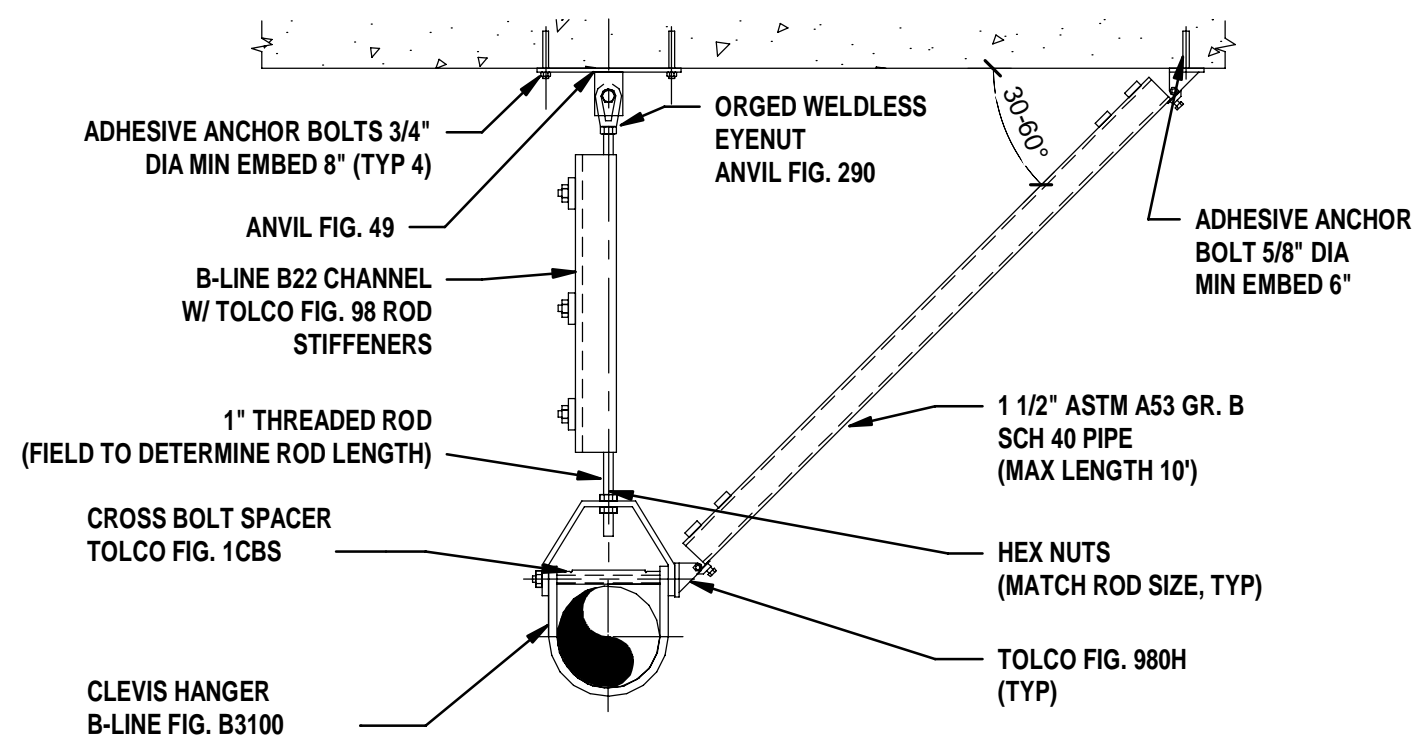
 DENOTES ITEMS TO BE DEMOLISHED

DRAWING BECOMES VOID UPON COMPLETION

CRPS-M-212-DEMO	CHASE RIVER PUMP STATION - MECHANICAL SECTIONS - DEMOLITION	0	JUN 2020	ISSUED FOR CONSTRUCTION	SR	JG	JG	
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP	
REFERENCE DRAWINGS				REVISION				

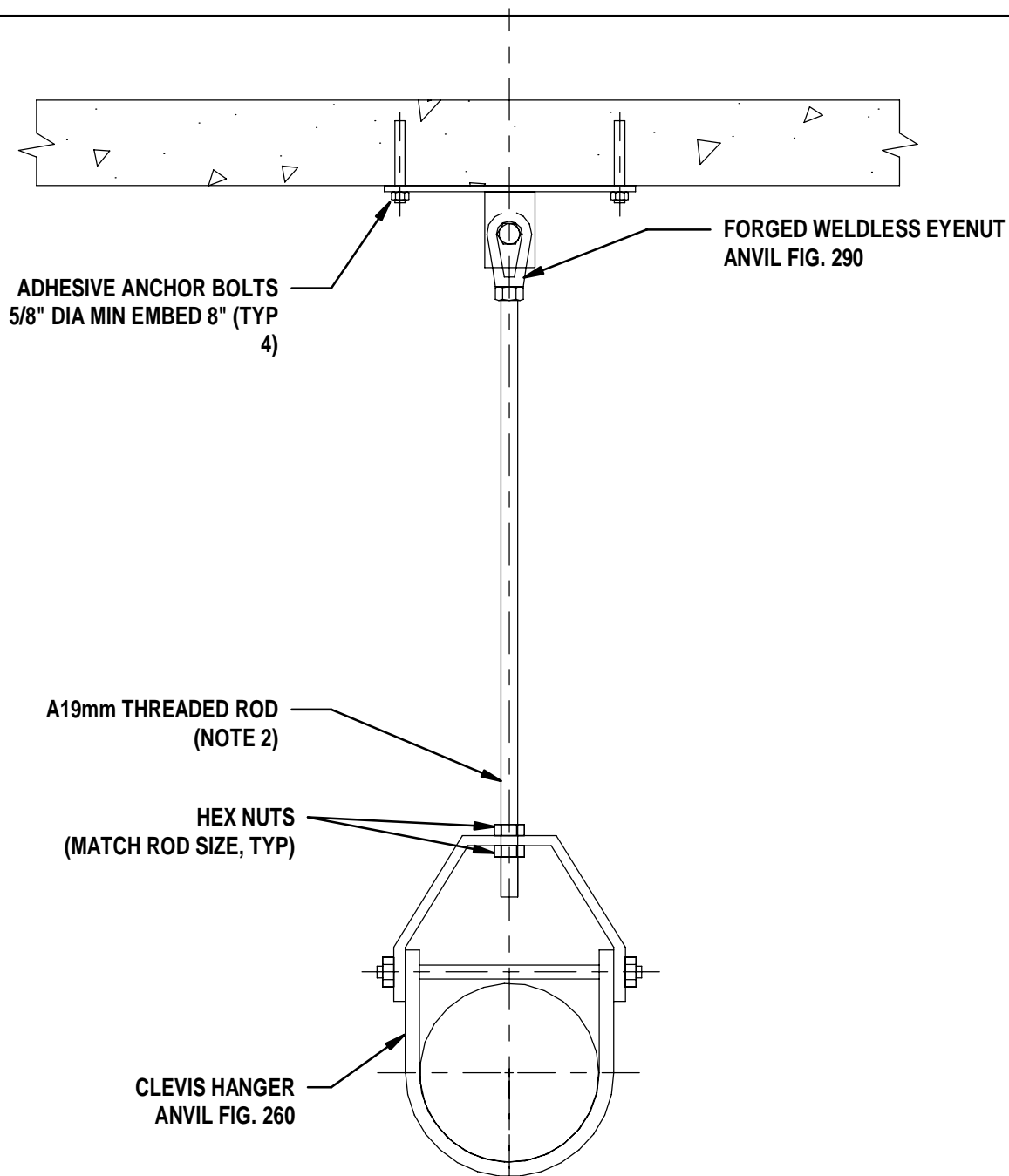


PROJECT NAME CHASE RIVER PUMP STATION UPGRADES				
DRAW SR	CHASE RIVER PUMP STATION MECHANICAL FLOOR PLANS - DEMOLITION			
DESIGNED CW				
CHECKED JG				
APPROVE JG	DRAWING NUMBER CRPS- M- 209- DEMO	SHEET -	DAT APR 2021	RE O



PIPE SUPPORT BRACED CELVIS DETAIL

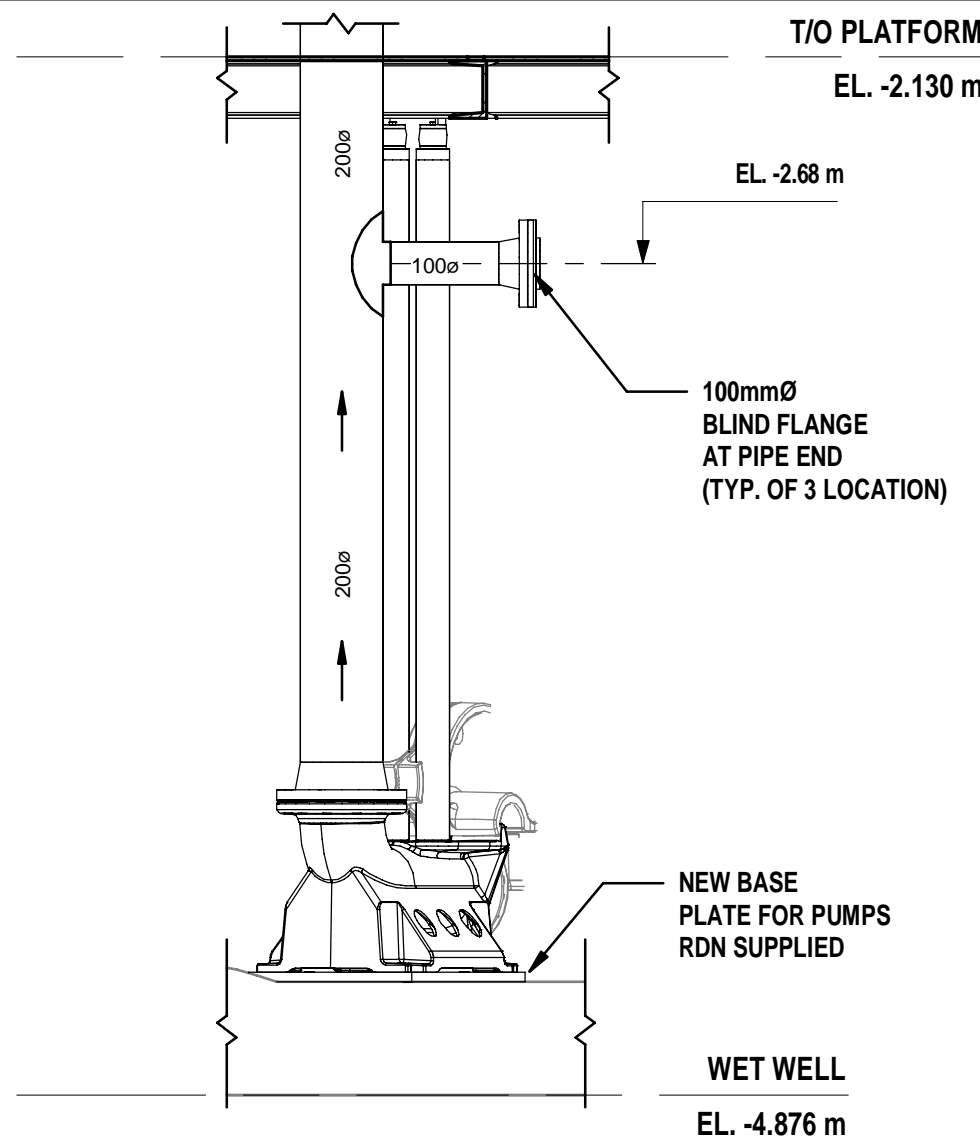
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M-209



PIPE SUPPORT CELVIS DETAIL

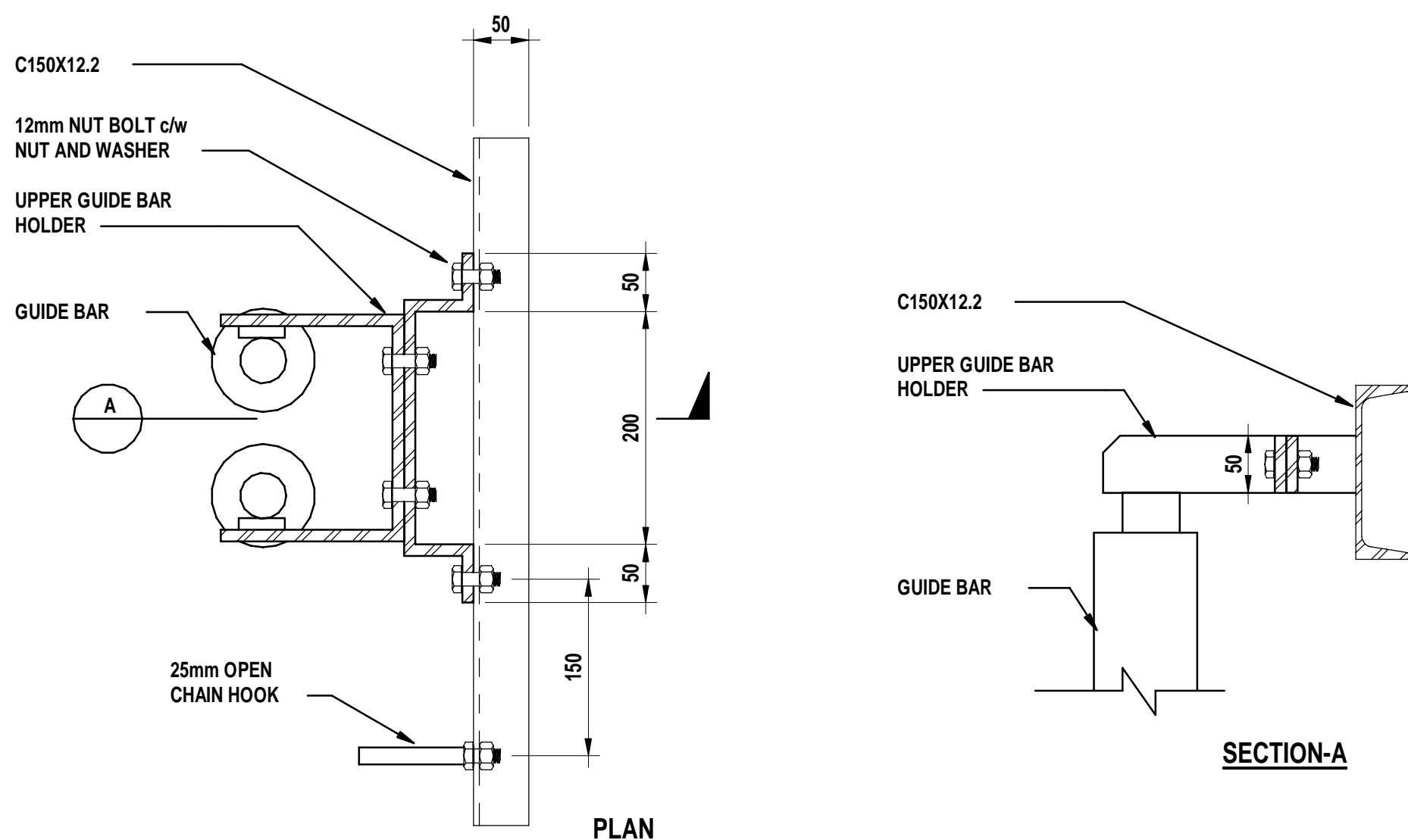
2
M-209

SEE DETAIL 5 ON CRPS-S-203 FOR SUPPORT ON ANGLES



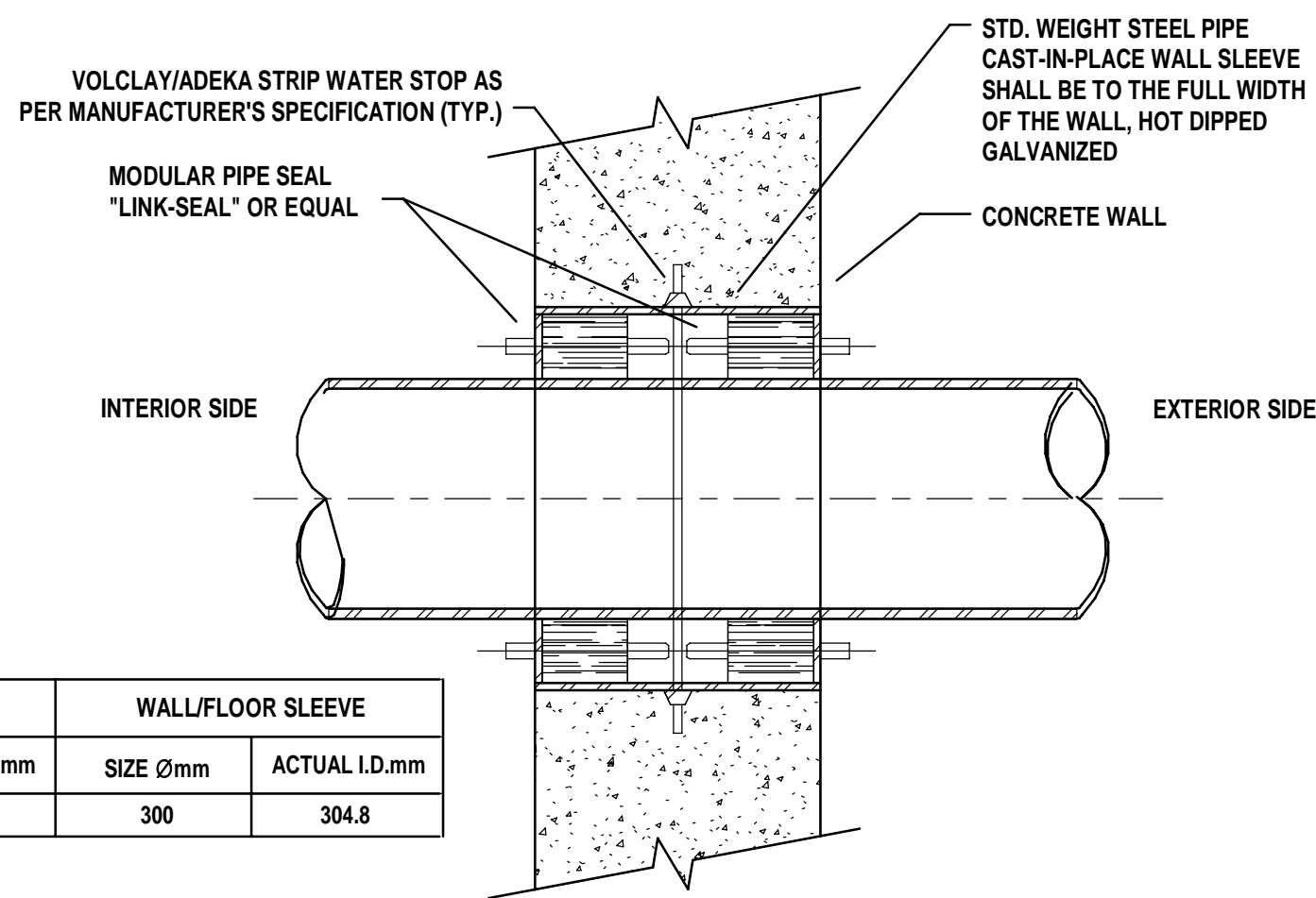
FUTURE WET WELL WASHDOWN PIPE CONNECTION DETAIL

3
M-208



PUMP GUIDE BAR HOLDER AND BRACKET DETAIL

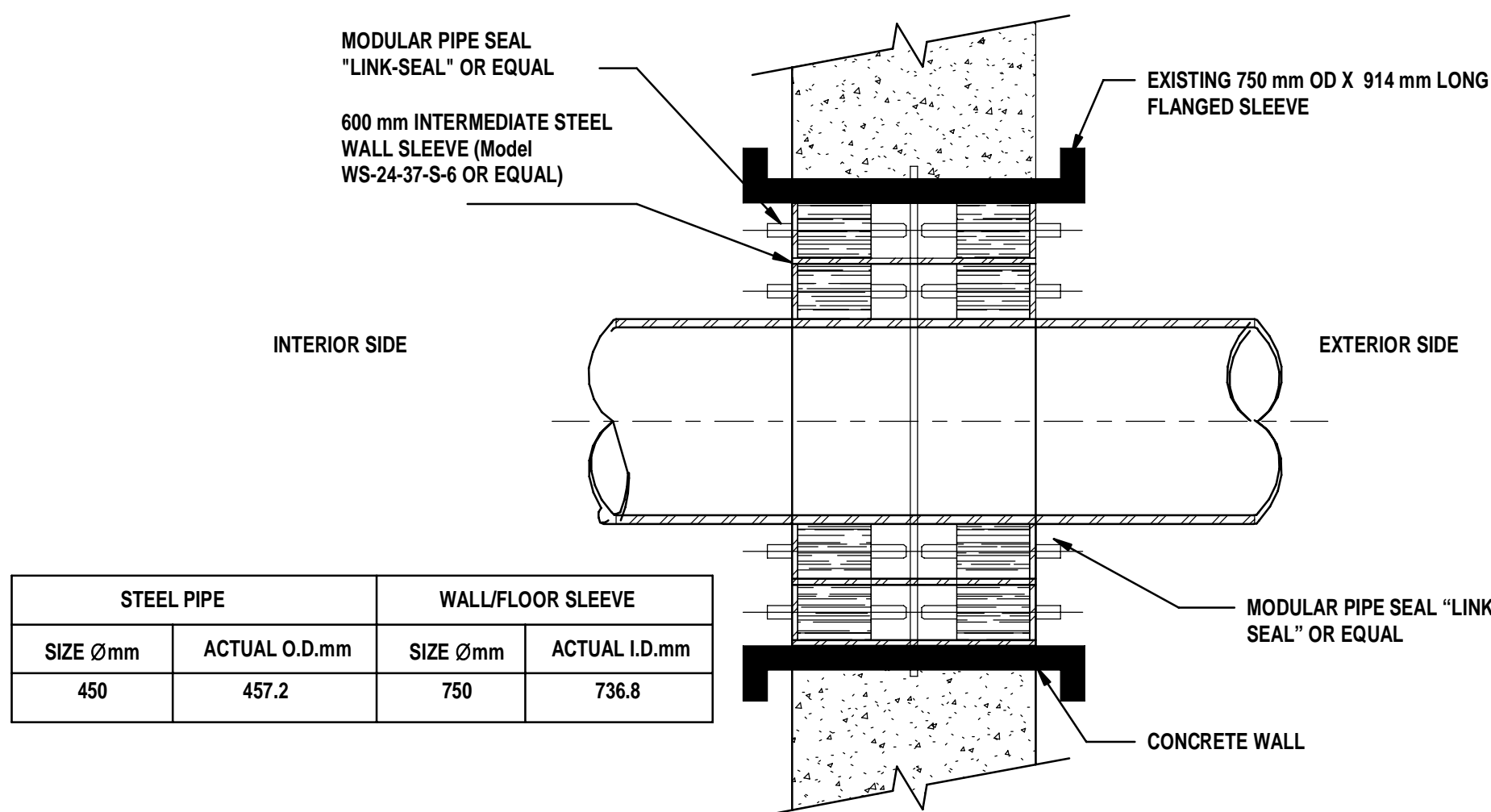
4
M-212



STEEL PIPE		WALL/FLOOR SLEEVE	
SIZE Ømm	ACTUAL O.D.mm	SIZE Ømm	ACTUAL I.D.mm
200	219.1	300	304.8

BYPASS PIPE SLEEVE DETAIL

5
M-209

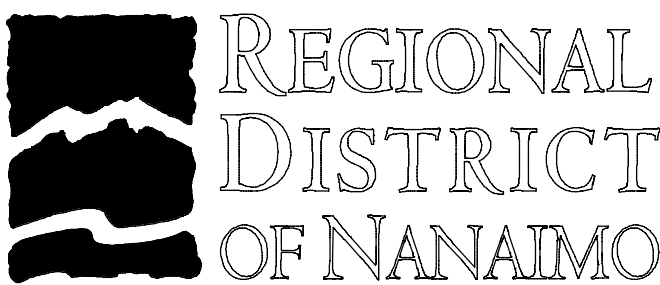


STEEL PIPE		WALL/FLOOR SLEEVE	
SIZE Ømm	ACTUAL O.D.mm	SIZE Ømm	ACTUAL I.D.mm
450	457.2	750	736.8

HEADER PIPE SLEEVE DETAIL

6
M-209

CRPS-M-212	CHASE RIVER PUMP STATION MECHANICAL SECTION AND DETAILS								
CRPS-M-209	CHASE RIVER PUMP STATION MECHANICAL FLOOR PLANS								
CRPS-M-208	CHASE RIVER PUMP STATION MECHANICAL FLOOR PLANS	0	JUN 2021	ISSUED FOR CONSTRUCTION	SR	JG	JG		
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP		
	REFERENCE DRAWINGS			REVISION					

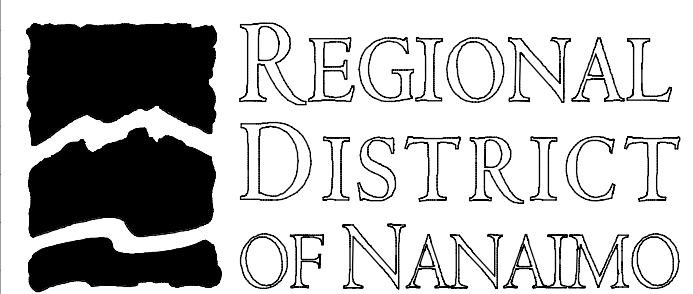



PROJECT NAME				CHASE RIVER PUMP STATION UPGRADES			
DRAW	SR	CHASE RIVER PUMP STATION MECHANICAL STANDARD DETAILS		JACOBS			
DESIGNED	CW						
CHECKED	JG			PROJECT NO.	707564	SCALE	N.T.S
APPROVE	JG	DRAWING NUMBER	CRPS- M- 210	SHEET	-	DAT	APR 2021
						RE	0

1. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETERS.
2. DO NOT SCALE DIMENSIONS, IN CASE OF ANY CONFUSION PLEASE CONTACT ENGINEER.
3. PLUG VALVES TO BE ORIENTATED WITH SEAT IN UPWARD POSITION.
4. INSTALL NEW PUMP DISCHARGE PIPING, VALVES, FITTINGS AND SUPPORTS.



CRPS-M-208	CHASE RIVER PUMP STATION MECHANICAL FLOOR PLANS	0	JUN 2021	ISSUED FOR CONSTRUCTION	SR	JG	JG
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP
	REFERENCE DRAWINGS			REVISION			



PROJECT NAME		CHASE RIVER PUMP STATION UPGRADES			
DRAW		CHASE RIVER PUMP STATION MECHANICAL SECTIONS AND DETAILS			
DESIGNED					
CHECKED					
SR				PROJECT NO.	SCALE
CW				707564	N.T.S
JG					
APPROVE	DRAWING NUMBER	SHEET	DAT	RE	
JG	CRPS- M- 212	-	APR 2021	0	

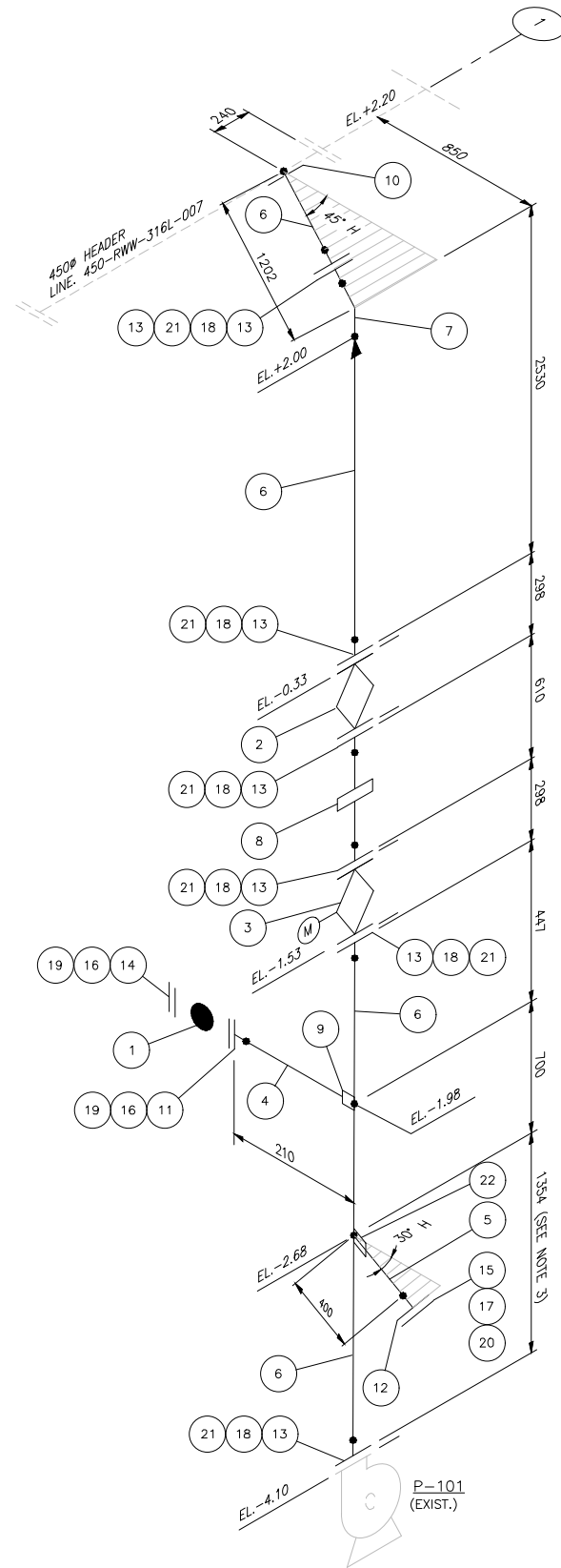


* DIMENSION TO ENDS OF GUIDE BARS

--	--		0	JUN 2021	ISSUED FOR CONSTRUCTION		SS	JG
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION			DRN	CHK
REFERENCE DRAWINGS			REVISIONS					



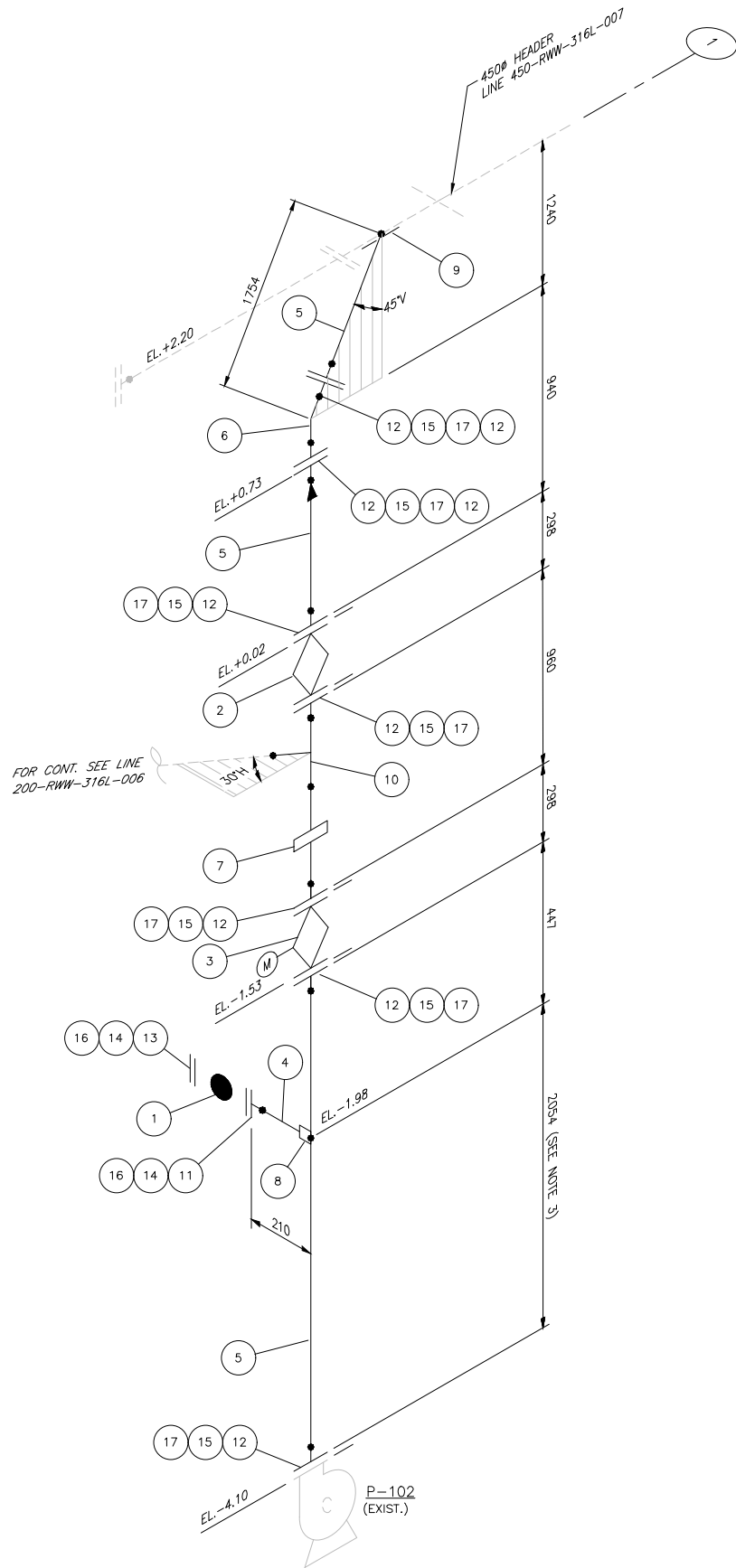
PROJECT NAME										CHASE RIVER FORCEMAIN NO. 1 REPLACEMENT AND PUMP STATION UPGRADES													
DRAWN		SS		CHASE RIVER PUMP STATION MECHANICAL										JACOBS									
DESIGNED		MP																					
CHECKED		JG		PUMP BASE DETAILS										PROJECT NO.					SCALE				
APPROVED		JG												DRAWING NUMBER					SHEET				
				CRPS-M-216					-					707564					NTS				
														JUNE 2021					0				



1. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS ARE IN METRES (m).
2. FOR LINE CONDITIONS SEE THE LINE DESIGNATION TABLE, CRPS-LDT-001.
3. CONFIRM LENGTH BASED ON FINAL ELEVATION OF MOUNTING PLATE - SEE DWG CRPS-M-216.



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DISTRICT
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BILL OF MATERIAL			
ITEM NUMBER	SIZE (NPS)	QTY.	DESCRIPTION
1	50mm	1	BALL VALVE, FLANGED FLAT FACE, CLASS 150, FULL PORT, 316 STAINLESS STEEL, LOCKABLE HANDLE
2	200mm	1	ECCENTRIC PLUG VALVE, DEZURIK PEF SERIES, FLANGED, CLASS 150, ASTM A126 CLASS B CAST IRON, 100% PORT, HAND WHEEL OPERATED
3	200mm	1	ECCENTRIC PLUG VALVE, DEZURIK PEF SERIES, FLANGED, CLASS 150, ASTM A126 CLASS B CAST IRON, 100% PORT, ELECTRIC ACTUATED
4	50mm	0.1m	PIPE SCH 80, ASTM A312-TP316L STAINLESS STEEL
5	200mm	4.4m	PIPE SCH STD, ASTM A774-TP316 L STAINLESS STEEL
6	200mm	1	ELBOW 45 DEG LONG RADIUS, SCH STD, ASTM A774-TP316 L STAINLESS STEEL
7	200mm	1	COUPLING, VICTAULIC STANDARD FLEXIBLE COUPLING STYLE 77 OR EQUIVALENT, ASTM A-536, HOT DIPPED GALVANIZED, GRADE "T" NITRILE GASKET
8	50mm	1	WELDOLET, SCH 80, ASTM A182/182M - F316 L STAINLESS STEEL
9	200mm	1	BRANCH REINFORCEMENT ASME B31.3
10	200mm	1	TEE, SCH STD, ASTM A774-TP316 L STAINLESS STEEL
11	50mm	1	FLANGE CLASS 150, WELD NECK, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
12	200mm	9	FLANGE CLASS 150, WELD NECK, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
13	50mm	1	BLIND FLANGE CLASS 150, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
14	50mm	2	GASKET, CLASS 150, FULL FACE, BLACK RUBBER (EPDM) ASME B16.47
15	200mm	7	GASKET, CLASS 150, FULL FACE, BLACK RUBBER (EPDM) ASME B16.47
16	16mm	2	STUD-NUTS SETS, STUDS ASTM A193 GRADE B8M, NUTS ASTM A194 GR.4
17	20mm	7	STUD-NUTS SETS, STUDS ASTM A193 GRADE B8M, NUTS ASTM A194 GR.4

NOTES:

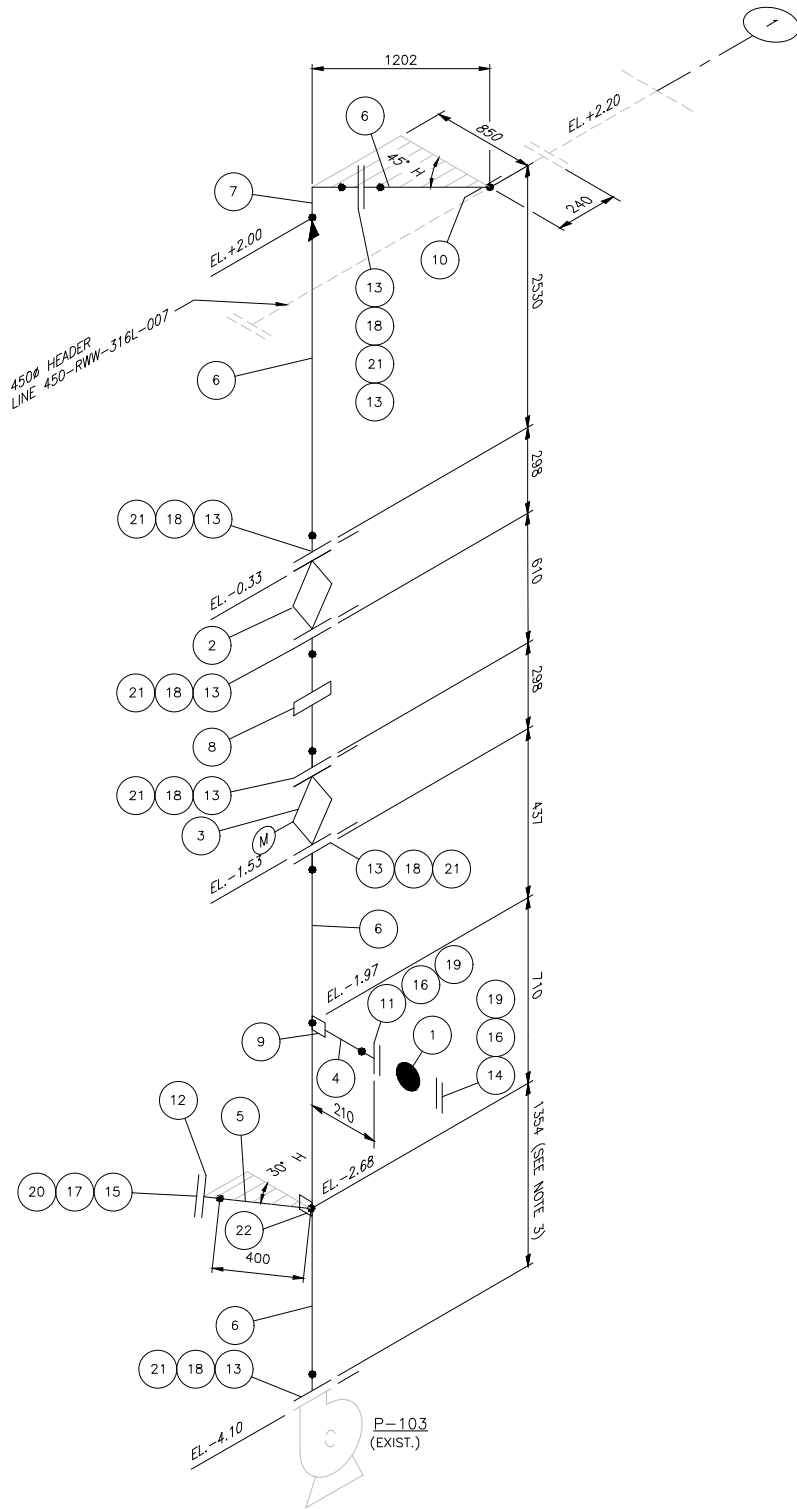
- UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS ARE IN METRES (m).
- FOR LINE CONDITIONS SEE THE LINE DESIGNATION TABLE, CRPS-LDT-001.
- CONFIRM LENGTH BASED ON FINAL ELEVATION OF MOUNTING PLATE - SEE DWG CRPS-M-216.

LINE 200-RWW-316L-002									
PROJECT NAME CHASE RIVER PUMP STATION UPGRADES									
DRAWN CT		CHASE RIVER PUMP STATION MECHANICAL PUMP #2 DISCHARGE ISOMETRIC				JACOBS®			
DESIGNED CW									
CHECKED JG						PROJECT NO. 707564		SCALE NTS	
APPROVED JG		DRAWING NUMBER CRPS-M-222			SHEET		DATE APR 2021		REV 0
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP	REFERENCE DRAWINGS	
		0	JUN 2021	ISSUED FOR CONSTRUCTION	JH	JG	JG		
REVISIONS									



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BILL OF MATERIAL			
ITEM NUMBER	SIZE (NPS)	QTY.	DESCRIPTION
1	50mm	1	BALL VALVE, FLANGED FLAT FACE, CLASS 150, FULL PORT, 316 STAINLESS STEEL, LOCKABLE HANDLE
2	200mm	1	ECCENTRIC PLUG VALVE, DEZURIK PEF SERIES, FLANGED, CLASS 150, ASTM A126 CLASS B CAST IRON, 100% PORT, HAND WHEEL OPERATED
3	200mm	1	ECCENTRIC PLUG VALVE, DEZURIK PEF SERIES, FLANGED, CLASS 150, ASTM A126 CLASS B CAST IRON, 100% PORT, ELECTRIC ACTUATED
4	50mm	0.1m	PIPE SCH 80, ASTM A312-TP316L STAINLESS STEEL
5	100mm	0.4m	PIPE SCH STD, ASTM A312-TP316L STAINLESS STEEL
6	200mm	5.7m	PIPE SCH STD, ASTM A774-TP316 L STAINLESS STEEL
7	200mm	1	ELBOW 90 DEG SHORT RADIUS, SCH STD, ASTM A774-TP316 L STAINLESS STEEL
8	200mm	1	COUPLING, VICTAULIC STANDARD FLEXIBLE COUPLING STYLE 77 OR EQUIVALENT, ASTM A-536, HOT DIPPED GALVANIZED, GRADE "tt" NITRILE GASKET
9	50mm	1	Weldolet, SCH 80, ASTM A182/182M - F316 L STAINLESS STEEL
10	200mm	1	BRANCH REINFORCEMENT ASME B31.3
11	50mm	1	FLANGE CLASS 150, WELD NECK, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
12	100mm	1	FLANGE CLASS 150, WELD NECK, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
13	200mm	7	FLANGE CLASS 150, WELD NECK, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
14	50mm	1	BLIND FLANGE CLASS 150, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
15	100mm	1	BLIND FLANGE CLASS 150, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
16	50mm	2	GASKET, CLASS 150, FULL FACE, BLACK RUBBER (EPDM) ASME B16.47
17	100mm	1	GASKET, CLASS 150, FULL FACE, BLACK RUBBER (EPDM) ASME B16.47
18	200mm	6	GASKET, CLASS 150, FULL FACE, BLACK RUBBER (EPDM) ASME B16.47
19	16mm	2	STUD-NUTS SETS, STUDS ASTM A193 GRADE B8M, NUTS ASTM A194 GR.4
20	16mm	1	STUD-NUTS SETS, STUDS ASTM A193 GRADE B8M, NUTS ASTM A194 GR.4
21	20mm	6	STUD-NUTS SETS, STUDS ASTM A193 GRADE B8M, NUTS ASTM A194 GR.4
22	100mm	1	Weldolet, SCH 80, ASTM A182/182M - F316 L STAINLESS STEEL

NOTES:

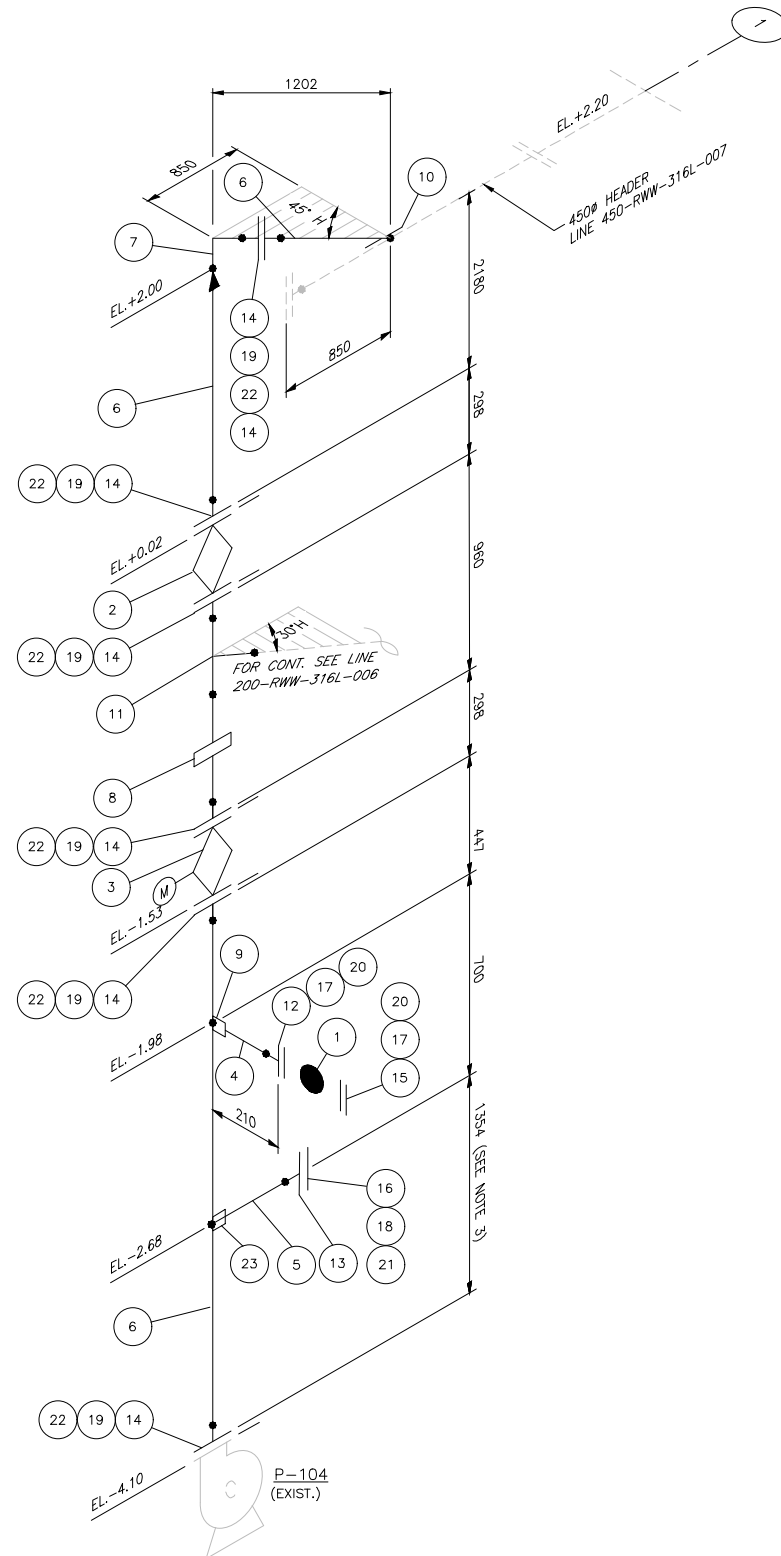
- UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS ARE IN METRES (m).
- FOR LINE CONDITIONS SEE THE LINE DESIGNATION TABLE, CRPS-LDT-001.
- CONFIRM LENGTH BASED ON FINAL ELEVATION OF MOUNTING PLATE - SEE DWG CRPS-M-216.

LINE 200-RWW-316L-003									
PROJECT NAME CHASE RIVER PUMP STATION UPGRADES									
DRAWN CT		CHASE RIVER PUMP STATION MECHANICAL PUMP #3 DISCHARGE ISOMETRIC						JACOBS	
DESIGNED CW									
CHECKED JG								PROJECT NO. 707564	
APPROVED JG		DRAWING NUMBER CRPS-M-223		SHEET		DATE APR 2021		REV 0	
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP		
REFERENCE DRAWINGS				REVISIONS					



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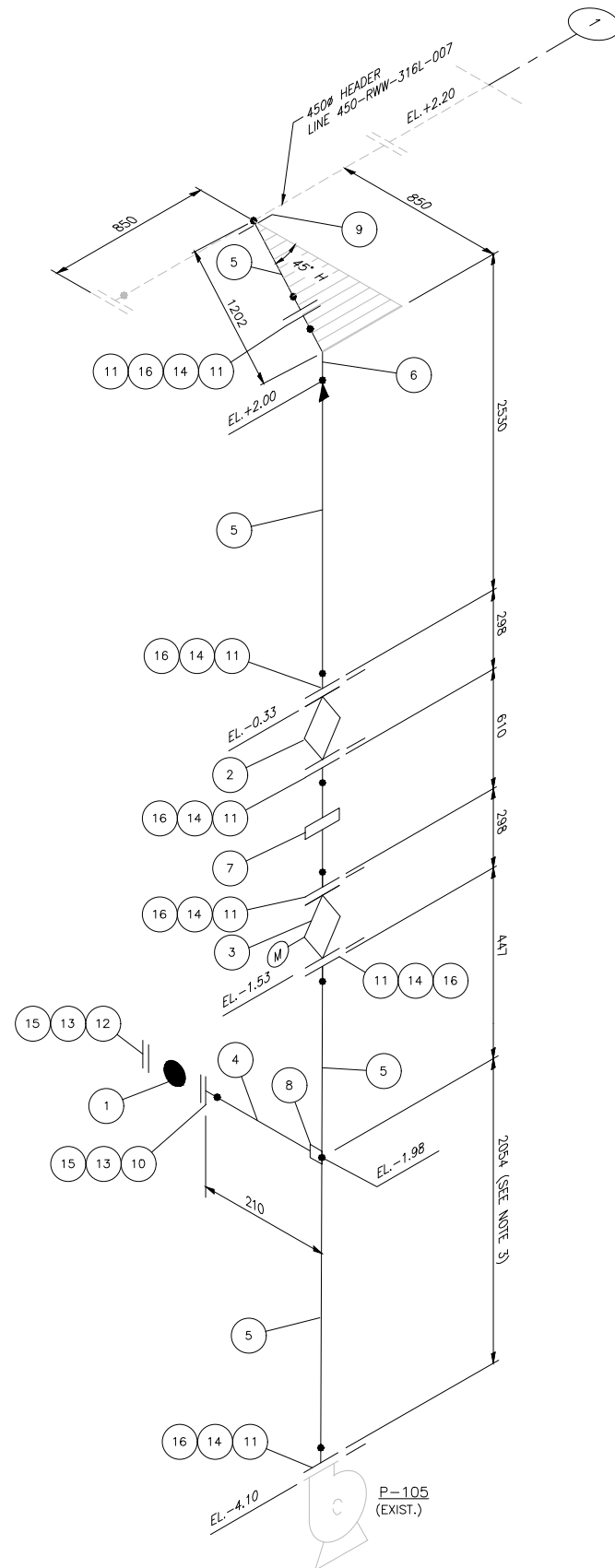




1. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS ARE IN METRES (m).
2. FOR LINE CONDITIONS SEE THE LINE DESIGNATION TABLE, CRPS-LDT-001.
3. CONFIRM LENGTH BASED ON FINAL ELEVATION OF MOUNTING PLATE - SEE DWG CRPS-M-216.



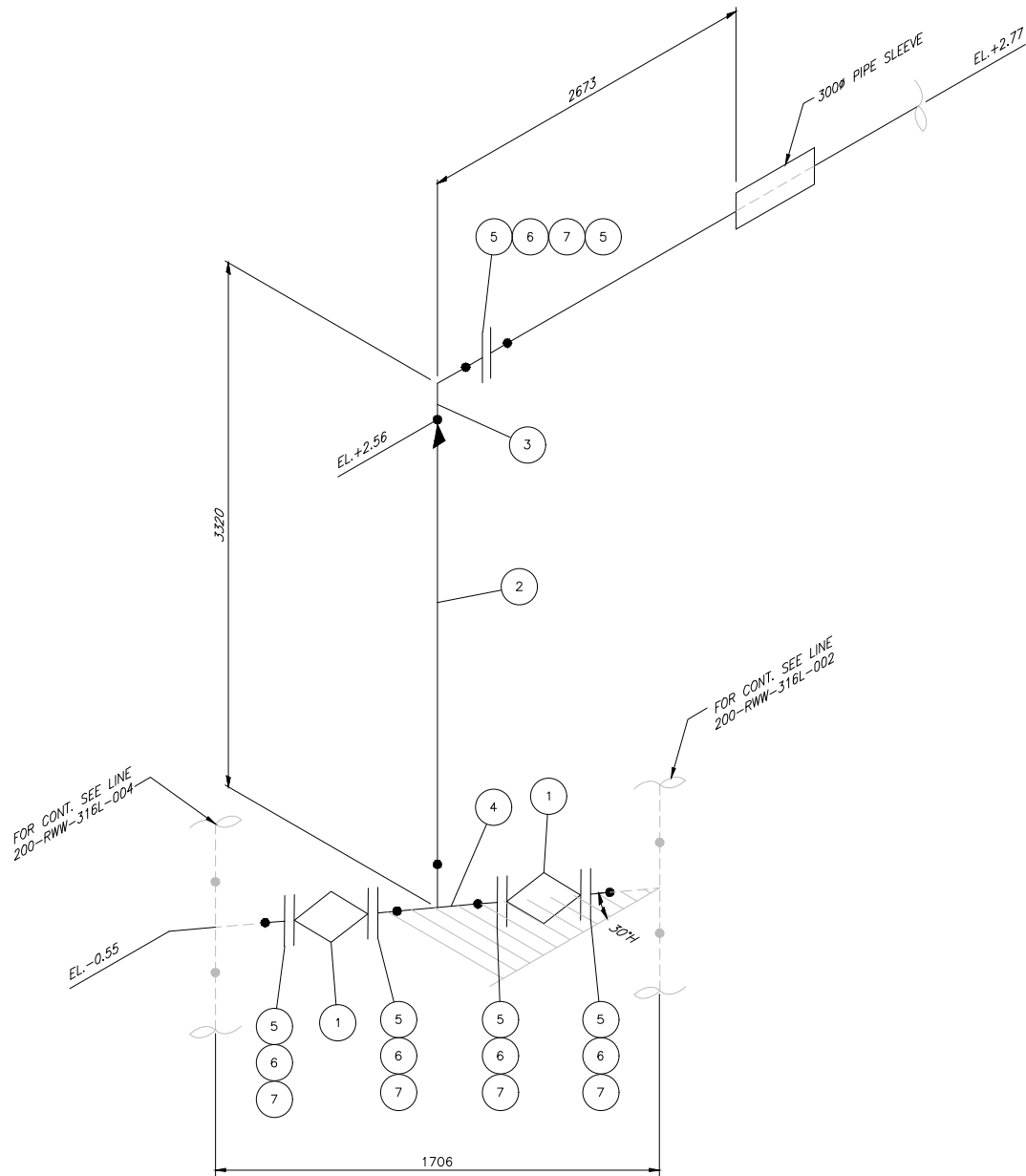
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OF NANAIMO



1. UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS ARE IN METRES (m).
2. FOR LINE CONDITIONS SEE THE LINE DESIGNATION TABLE, CRPS-LDT-001.
3. CONFIRM LENGTH BASED ON FINAL ELEVATION OF MOUNTING PLATE - SEE DWG CRPS-M-216.



REGIONAL
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OF NANAIMO



BILL OF MATERIAL			
ITEM NUMBER	SIZE (NPS)	QTY.	DESCRIPTION
1	200mm	2	ECCENTRIC PLUG VALVE, DEZURIK PEF SERIES, FLANGED, CLASS 150, ASTM A126 CLASS B CAST IRON, 100% PORT, HAND WHEEL OPERATED
2	200mm	5.2m	PIPE SCH STD, ASTM A774-TP316 L STAINLESS STEEL
3	200mm	1	ELBOW 90 DEG SHORT RADIUS, SCH STD, ASTM A774-TP316 L STAINLESS STEEL
4	200mm	1	TEE, SCH STD, ASTM A774-TP316 L STAINLESS STEEL
5	200mm	6	FLANGE CLASS 150, WELD NECK, FLAT FACE, ASTM A182/182M - F316 L STAINLESS STEEL
6	200mm	5	GASKET, CLASS 150, FULL FACE, BLACK RUBBER (EPDM) ASME B16.47
7	20mm	5	STUD-NUTS SETS, STUDS ASTM A193 GRADE B8M, NUTS ASTM A194 GR.4

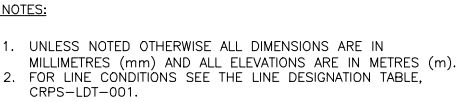
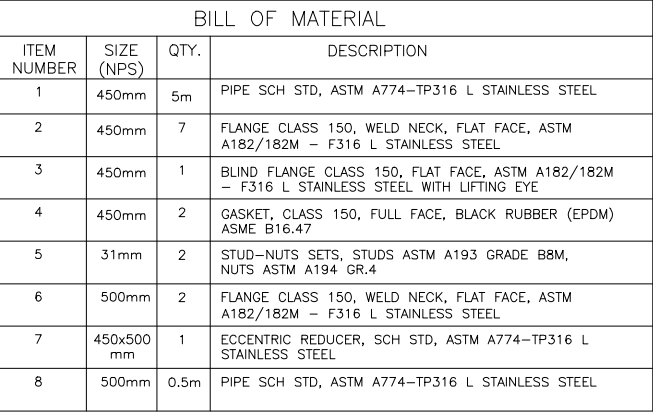
- NOTES:
- UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL ELEVATIONS ARE IN METRES (m).
 - FOR LINE CONDITIONS SEE THE LINE DESIGNATION TABLE, CRPS-LDT-001.

LINE 200-RWW-316L-006										
PROJECT NAME CHASE RIVER PUMP STATION UPGRADES										
DRAWN CT		CHASE RIVER PUMP STATION MECHANICAL PUMP #2 AND PUMP #4 DISCHARGE BYPASS ISOMETRIC				JACOBS				
DESIGNED CW										
CHECKED JG						PROJECT NO. 707564		SCALE NTS		
APPROVED JG		DRAWING NUMBER CRPS-M-226			SHEET		DATE APR 2021		REV 0	
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION	DRN	CHK	APP			
REFERENCE DRAWINGS				REVISIONS						

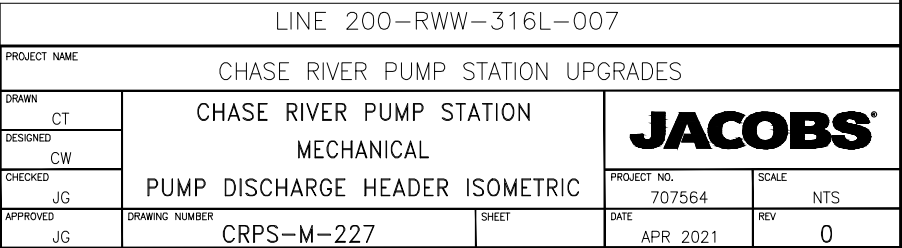


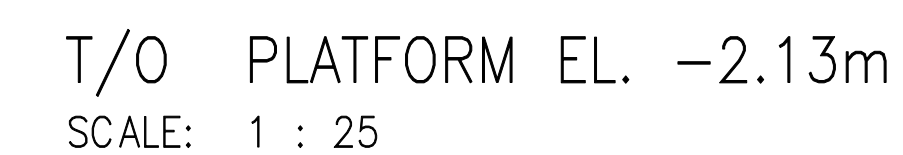
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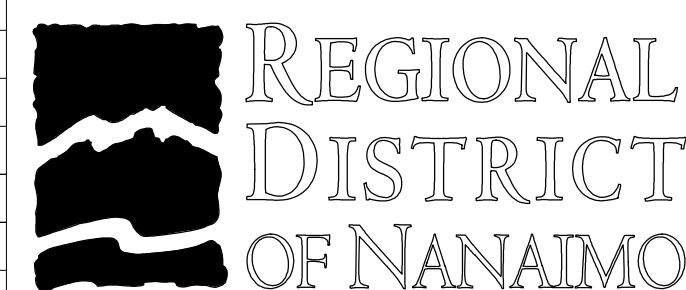
DRAWING NO.	TITLE	O	JUN 2021	ISSUED FOR CONSTRUCTION		JH	JG	JG
	REFERENCE DRAWINGS	REV	DATE	DESCRIPTION		DRN	CHK	APP
				REVISIONS				






-

DRAWING NO.	TITLE	0	JUN 2021	ISSUED FOR CONSTRUCTION		SR	PT	JG
	REFERENCE DRAWINGS	REV	DATE	DESCRIPTION		DRN	CHK	APP
				REVISION				



PROJECT NAME		CHASE RIVER PUMP STATION UPGRADES			
DRAWN	<div>SR</div> <div>CHASE RIVER PUMP STATION STRUCTURAL</div> <div>PUMP PLATFORM PLAN AND DETAILS</div>			PROJECT NO.	SCALE
DESIGNED				707564	1 : 25
CHECKED					
PT					
APPROVED	DRAWING NUMBER	SHEET	DATE	REV	
JG	CRPS-S-202	-	APR 2021	0	

CHASE RIVER PUMP STATION UPGRADES

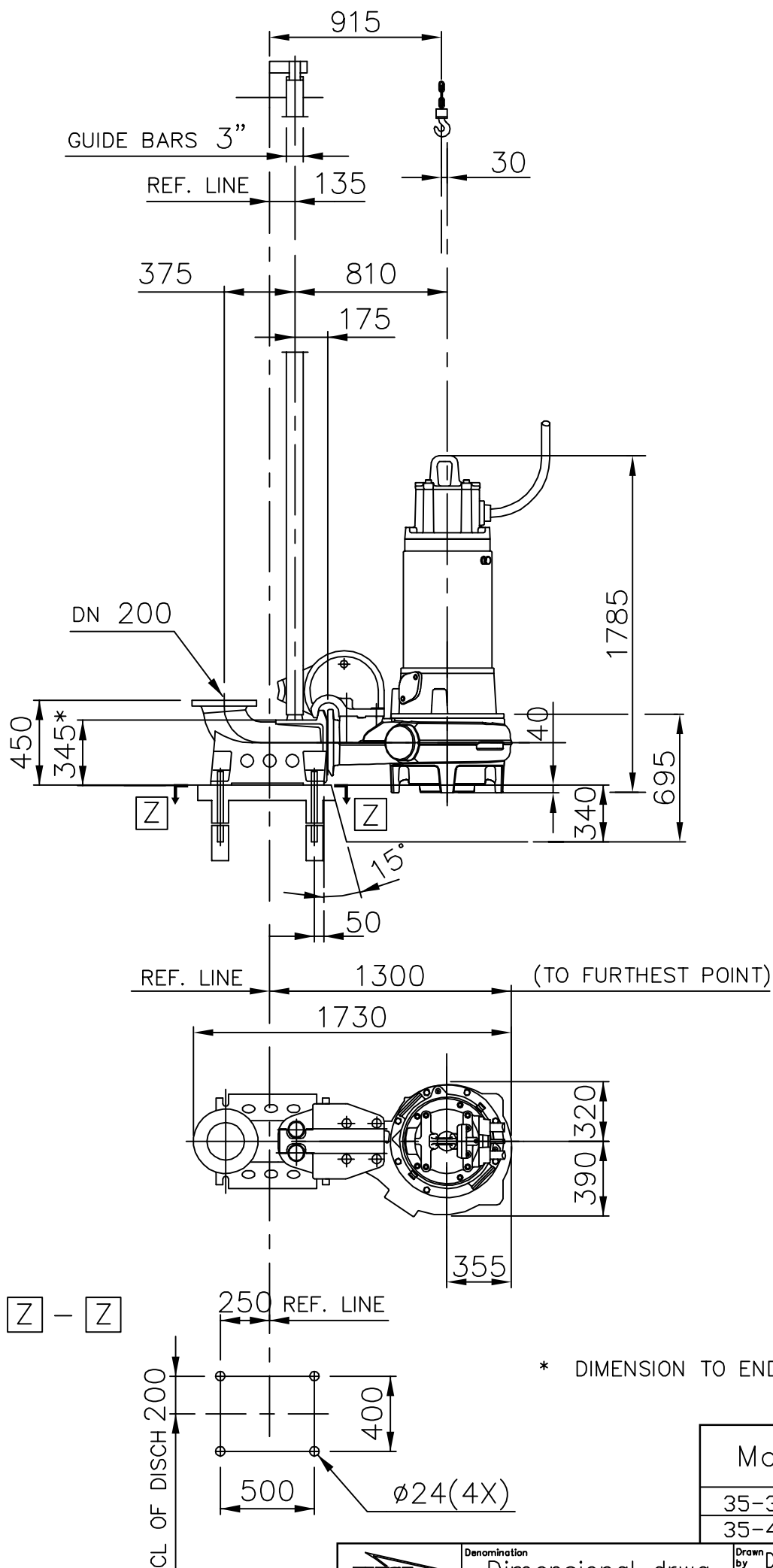
[illegible]



LINE DESIGNATION TABLE

Client:	Regional District of Nanaimo
Project:	Chase River Pump Station Upgrades
Project No:	CE774200
Revision:	0 - Issued For Construction
Date:	June 2021
	CRPS-LDT-002

[illegible]



Motor	Weight (kg)	
	Pump	Disch
35-35-XX	1380	125
35-45-XX	1410	125

FLIGHT
AUTOCAD
DRAWING

Denomination
Dimensional drwg
CP,NP 3231 665/675
DN 200

Drawn by DS	Checked by	Date 120914
Scale 1:30	Reg no 5399	
6218700		8

A	VALVE
B	ACTUATOR
P	CONNECTING PARTS

1. FLANGES ARE FLAT FACED WITH THICKNESS, DIAMETER AND DRILLING TO CLASS 125 ANSI STANDARD B16.1, EXCEPT FOR TAPPED HOLES AS INDICATED. SEE A55467 FOR NON-ANSI FLANGE DATA.

2. 13 TURNS OF HANDWHEEL ARE REQUIRED TO OPEN VALVE.

3. INSTALLATION NOTE:

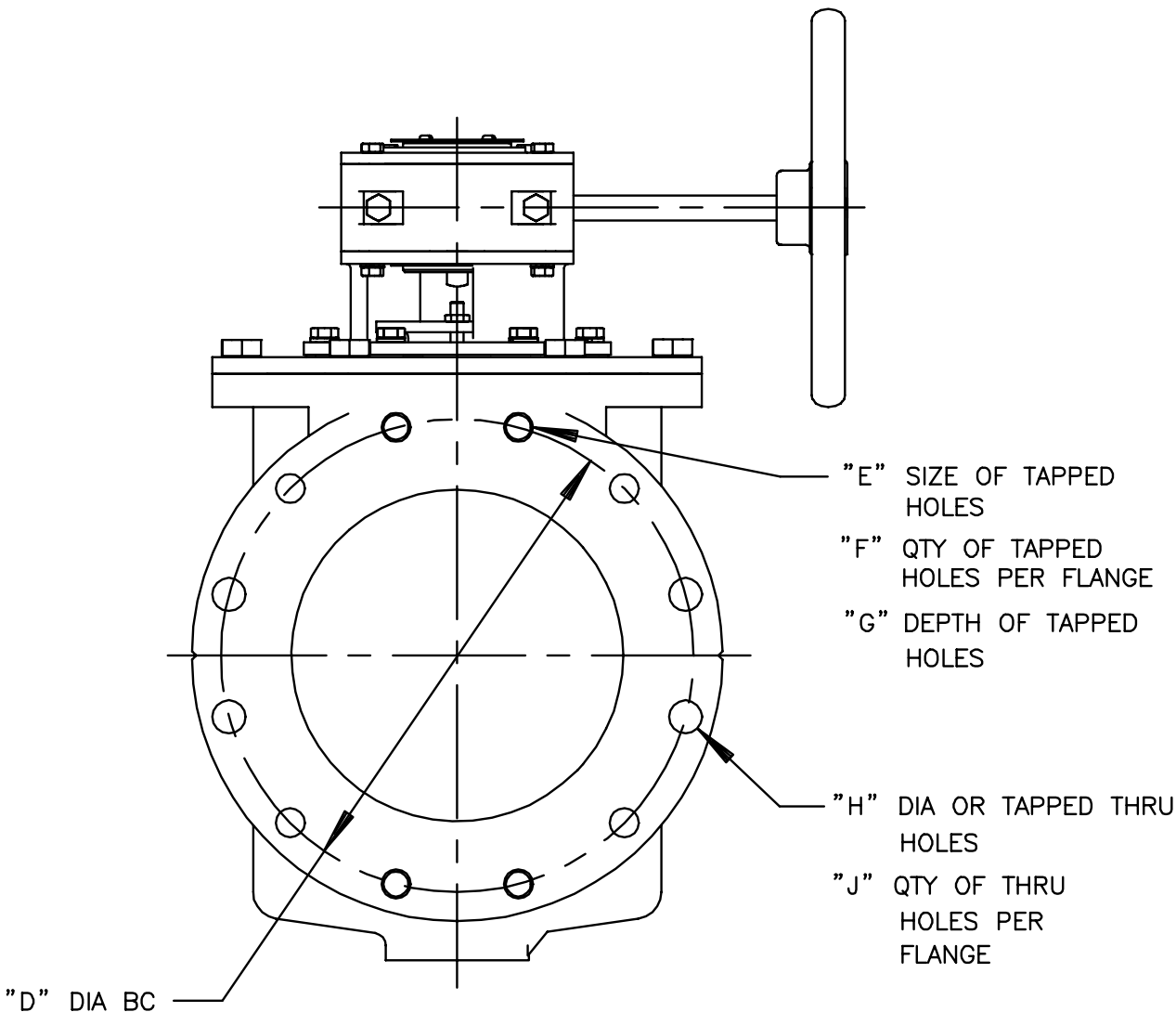
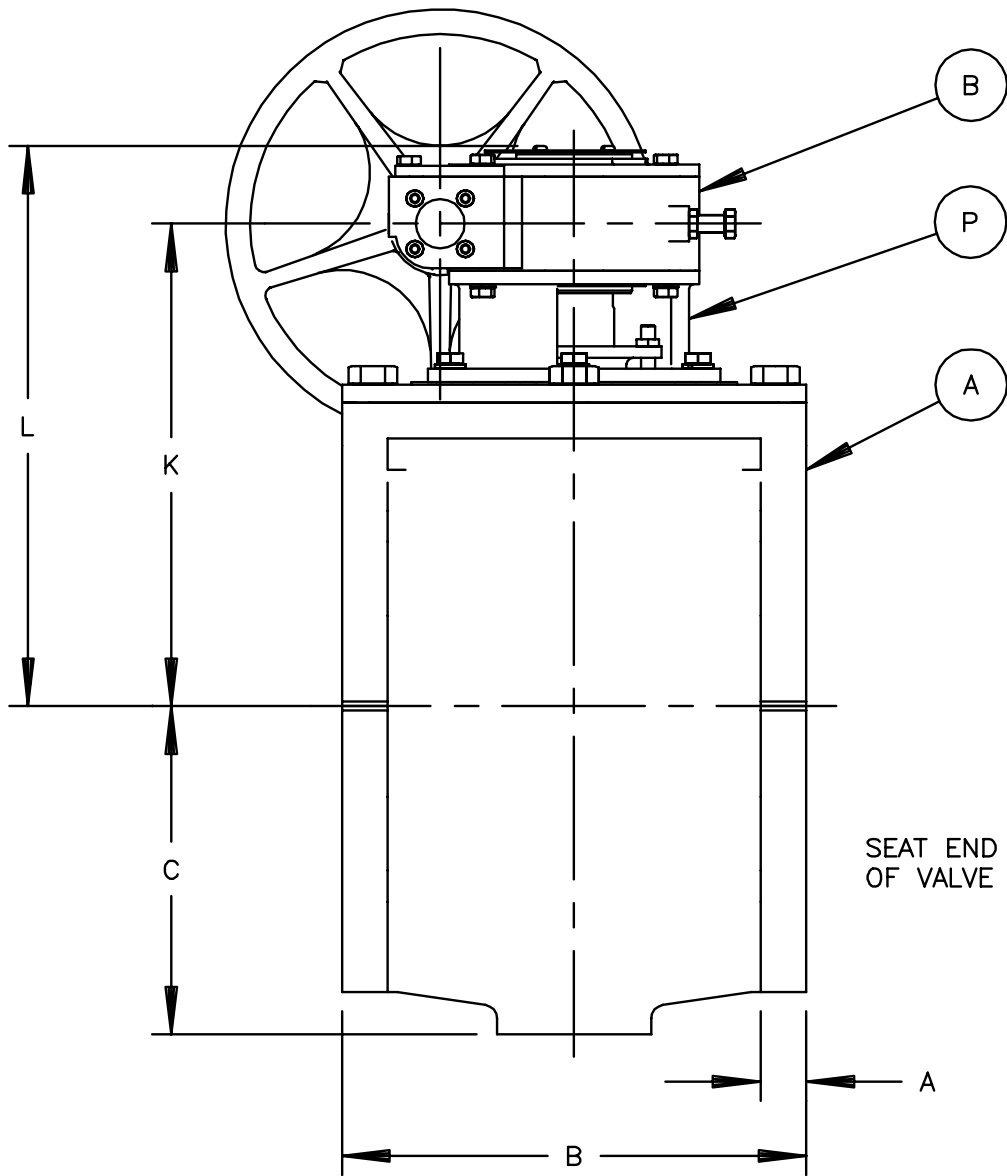
- FOR LIQUIDS & GASES:
INSTALL VALVE WITH HIGHER PRESSURE
AGAINST END OPPOSITE SEAT.

- FOR SUSPENDED SOLIDS, SLURRIES, ETC:
INSTALL VALVE WITH HIGHER PRESSURE
AGAINST SEAT END. IN HORIZONTAL
PIPELINES, VALVE SHOULD BE INSTALLED
ON IT'S SIDE SO PLUG ROTATES TO THE
TOP OF THE PIPELINE WHEN OPEN.
(SEE DIAGRAM BELOW).

Technical drawing of a valve assembly. The drawing includes the following dimensions and labels:

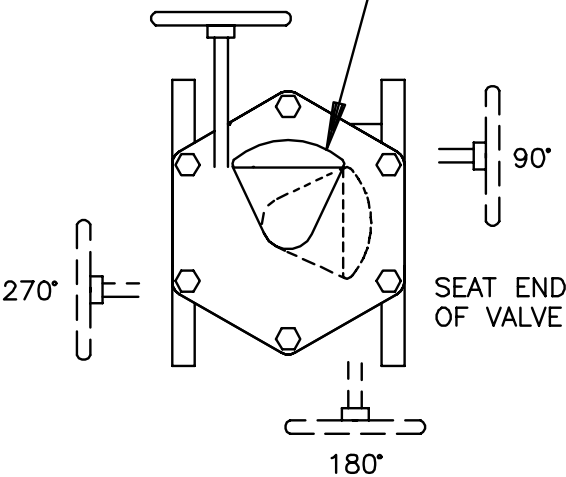
- "R" DIA (Top horizontal dimension)
- $\frac{3.75}{95}$ (Top horizontal dimension)
- $\frac{11.81}{300}$ (Right vertical dimension)
- SEAT END OF VALVE (Text label on the right)
- $\frac{3.50}{89}$ (Right vertical dimension)
- $\frac{4.50}{114}$ (Bottom horizontal dimension)
- $\frac{5.19}{132}$ (Bottom horizontal dimension)
- Labels "SEAT" and "NECK" are visible on the valve body.

THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.



PLUG IN OPEN POSITION.
SEE INSTALLATION NOTE.

STANDARD POSITION
SHOWN ON THIS DRAWING



ACTUATOR MOUNTING POSITIONS AS VIEWED FROM TOP OF VALVE. DOTTED LINES SHOW OPTIONAL MOUNTING POSITIONS.

G	
F	
E	
D	
C	
B	
A	61483 03/14/07



PEF 100% PORT ECCENTRIC VALVES SIZE 3 - 12 FLANGED
GS-6A-HD_ HANDWHEEL ACTUATED

DOCT. CODE	DRAWN SN	APPROVED SN
C1	CHECKED SN	DATE 10/17/05

A55432

SCHEDULE 7 – SPECIFICATIONS

Title	Std.No.	Date	Rev
Chase River Pump Station Bypass Plan	CE774200	15Jun2021	0
Process Piping General	SP-P-0001	16Jun2021	2
Austenitic Stainless Steel Piping	SP-P-0002	16Jun2021	2
Material and Equipment	01600	2Jun2021	0
Demolition	02220	2Jun2021	0
Grout and Miscellaneous Concrete Work	03600	2Jun2021	0
Metal Fabrications (Structural)	05502	2Jun2021	0
Piping Support Systems (Galvanized)	15060	18Jun2021	0
Process Valves General	15202	2Jun2021	0



Chase River Pump Station Upgrades

Chase River Pump Station Bypass Strategy

| 0

June 15, 2021

Regional District of Nanaimo



Chase River Pump Station Upgrades

Project No: CE774200
Document Title: Chase River Pump Station Bypass Strategy
Document No.:
Revision: 0
Document Status: Issued for Construction
Date: June 15, 2021
Client Name: Regional District of Nanaimo
Project Manager: J. Gerwien
Author: C. Williams
File Name:

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Document history and status

Revision	Date	Description	Author	Reviewed	Approved
0	June 2021	Issued For Construction	CW	JG	JG

Contents

1. Introduction 1

2. Bypass System Requirements 1

3. Bypass Strategy 1

4. Construction Sequencing 3

5. System Operation Monitoring 5

6. Installation and Teardown 5

- Appendix A. Valve Location Drawings
- Appendix B. Pump Datasheet and System Curve
- Appendix C. Site Specific Bypass Strategy Drawings

1. Introduction

The Chase River Pump Station Upgrade Project consists of the following work:

- Replacement of 2 of the existing Motor Control Centers (MCC 1 and MCC 2) with a new MCC, including Variable Frequency Drives (VFD). **By Others**
- Replacement of existing Programmable Logic Controller (PLC) panel CP-100 with a new Compact Logix PLC and Panel View HMI. **By Others**
- Replacement of wet well piping from pump bases to outside of the wet well wall. **RFT 21-040**
- Replacement of the steel operating platform and supports. **RFT 21-040**
- Replacement of existing septage rock trap chamber with a new 2,400 mm diameter precast manhole assembly. **By Others**

To facilitate the above work, the Chase River Pump Station will be shut down and a system bypass will be installed. The Contractor will be responsible for validating the design and design requirements, installation, operation and maintenance of the bypass system.

This Chase River Pump Station Bypass Strategy provides a bypass strategy based on existing information and anticipated construction activities. This plan provides a framework at a strategic level, providing general requirements and addressing identified challenges. The Contractor is required to develop and submit a detailed Bypass Plan for review prior to construction as outlined in the Contract Documents.

2. Bypass System Requirements

The bypass system is to be designed to meet the following requirements:

- **Maximum Flowrate** – 400 L/s
- **Forcemain Total Dynamic Head** – 30 m
- **Hours of Operation** – 24 hrs/day, 7 days per week
- **Redundancy** – 100% redundancy

3. Bypass Strategy

The bypass is to be installed to utilize existing infrastructure as much as possible and to minimize impact on construction activities. The strategy has been developed with the assumption the new valve enclosure will be installed at the time of this wet well bypass installation.

- **Wet Well Isolation**

The wet well will be isolated upstream in two locations to ensure double isolation. One isolation will be accomplished by closing the actuated 1066 mm diameter sluice gate valve in the Junction Chamber. The second isolation will be accomplished by installing a 1067 mm diameter inflatable plug in the sewer influent pipe at the wet well. Plug shall be installed with pressure monitoring and additional anchoring.

The wet well will be isolated downstream by closing three mainline valves in the new valve enclosure (which are typically open) and maintaining the closure of two valves (which are typically closed). Having all valves in new valve chamber closed provides double isolation between the bypass valves and the downstream wet well.

Isolation requirements are described in more detail in Table 1. Refer to Appendix A for the valve location drawings.

Table 1 – Valve Isolation Requirements

Valve ID Number	Nominal Diameter (mm)	Description	Isolation Requirements
P-1	1067	Wet Well Influent Pipe	Inflatable Isolation Plug
V-1	1066	Junction Chamber	Close valve. Require isolation plug (P-1) downstream in wet well influent pipe.
V-2	500	Mainline Isolation Valve	Close valve (typically open)
V-3	500	Flow Meter Bypass Valve	Valve to remain close
V-4	500	Mainline Isolation Valve	Close valve (typically open)
V-5	450	Forcemain #2 Isolation Valve	Valve to remain close
V-6	500	Mainline Isolation Valve	Close valve (typically open)
V-7	300	Bypass Valve	Open for use
V-8	300	Bypass Valve	Open for use

- Pump Selection**

The bypass system will pump from the existing 500 mm x 2400 mm rectangular Junction Chamber. The maximum chamber depth is 8.9 m (bottom elevation of -4.4 m). The Junction Chamber can surcharge to an elevation of 1.5 m without impacting upstream operation.

Two 200 L/s trailer mounted vacuum assisted, end suction centrifugal diesel pumps have been selected to operate in parallel for the bypass operation. 250 mm diameter smooth bore hose suction and discharge piping are to be installed. The proposed pump datasheet and system curves are included in Appendix B. Table 2 summarizes the system curve details. The Contractor may propose alternative pumps that meet the stated bypass system requirements.

Table 2– Pump and System Details

Criteria	Per Pump
Maximum Chamber Depth	8.9 m
Flowrate	200 L/s
Suction Lift Required	3 to 8.9 m
Suction Pipe Length	10 m
Suction Pipe Diameter	250 mm
Suction Velocity	4 m/s

Discharge Length	45 m
Bypass Discharge Pipe Diameter	250 mm
Bypass Discharge Velocity	4 m/s
Total System Dynamic Head	40 m

The pumps are to be automatically controlled by a pressure sensor or submersible level transducer, which maintains the sewage level in the Junction Chamber within the set parameters (maximum EL 1.5 m). The pumps are to be operated monitored and manned by trained personnel full time during operation.

- **Bypass Connections**

The 250 mm diameter suction hoses shall be installed and supported in the Junction Chamber. Existing platforms and infrastructure shall be removed by the Contractor to facilitate suction installation. The Junction Chamber shall be cleaned, with any sludge and debris removed prior to bypass installation.

The 250 mm diameter bypass hoses will connect back into the forcemain system via the new valve enclosure using the two bypass valves. One discharge line will connect to the newly installed HDPE Forcemain #1 via the partnering 300mm diameter plug valve in the new valve enclosure. The other discharge line to connect to the adjacent 300mm diameter plug valve which will convey flow to the ductile iron Forcemain #2.

The proposed site specific bypass strategy drawings are included in Appendix C.

4. Construction Sequencing

The suggested sequence of construction described herein is based on Jacobs' knowledge of the design components and not on experience in the construction of such Work.

The Contractor may on his own initiative submit an alternate proposed sequence of construction for review.

Suggested construction sequence:

- Inspect existing works, locate existing valves and exercise valves to confirm operational. Coordinate inspection with Regional District of Nanaimo (RDN) operations staff. This may require exposing tie-in points to confirm condition of existing pipework.
- Inspect Junction Chamber and internal platforms and appurtenances. Confirm what needs to be removed for the installation of the 250 mm diameter suction hoses and how hoses will be installed and supported.
- Submit bypass plan for review and acceptance.
- Following acceptance, clean Junction Chamber and appurtenances including removing any sludge and debris at the base of chamber and sump. Install and support suction piping.
- Position trailer mounted diesel pumps, connect suction piping and install pressure/level sensor in Junction Chamber
- Connect bypass hose to pumps and lay hose above ground to connection points for tie-in.

- Connect one bypass hose to 300mm plug valve (V-8) within new valve enclosure. Will require check valve and 250 x 300 mm reducer. This will convey flow to the 600 mm diameter HDPE forcemain (Forcemain #1).
- Connect one bypass hose to 300mm plug valve (V-7) within new valve enclosure. Will require check valve and 250 x 300 mm reducer. This can convey flow to the 450 mm diameter DI forcemain (Forcemain #2).
- Coordinate with RDN operations staff the upcoming bypass works. Coordinate requirements for septage facility collection. Confirm date for CRPS wet well isolation and pump shut down. Plan work during low flow conditions monitoring upcoming weather conditions.
- On agreed date, RDN to close Junction Chamber sluice gate valve, V-1, during low flow conditions.
- RDN to switch off CRPS pumps and close valves V-2, V-4 and V-6 in new valve enclosure. Valves V-3 and V-5 to remain close.
- Contractor to open bypass valve V-8 to Forcemain #1 in the new valve chamber and start associated bypass pump. Drain pipework in new valve chamber to reduce septicity.
- Use sump pumps to drain CRPS wet well with discharge to Junction Chamber and to remain operating until inflatable plug P-1 has been installed and wet well has been cleaned and drained.
- Install inflatable plug, P-1, in the sewer influent pipe. Clean and prepare wet well for work.
- Open bypass valve V-7 to Forcemain #2 in readiness for use.
- Carry out works at the CRPS facility.
- Coordinate with civil contractor the installation of new valve station bypass line to new valve chamber and other connection points ready for tie-in once CRPS works are complete.
- Once CRPS works have been completed (accepted and commissioned) plan decommissioning of bypass piping.
- Remove inflatable plug, P1.
- Open Junction Chamber sluice gate valve, V-1
- Stop bypass pumps and close valves V-7 and V-8 for each bypass hose.
- Open valves V-2, V-4 and V-6 and use CRPS to pump flow through Forcemain #1.
- Drain Forcemain #2.
- Disconnect bypass hoses and remove overland bypass hoses, pumps and suction hoses.
- Replace platforms within Junction Chamber and complete restoration.

5. System Operation Monitoring

The Contractor shall provide a full time monitor of the bypass system while in operations. Should the pumps experience a problem, the Contractor will mobilize a service technician to troubleshoot the problem. All provisions and precautions to be taken during installation, operation and decommissioning the system in order to prevent sewage backups, overflows or spills. The pumps are to be monitored constantly while in operation and the connecting piping to be check hourly.

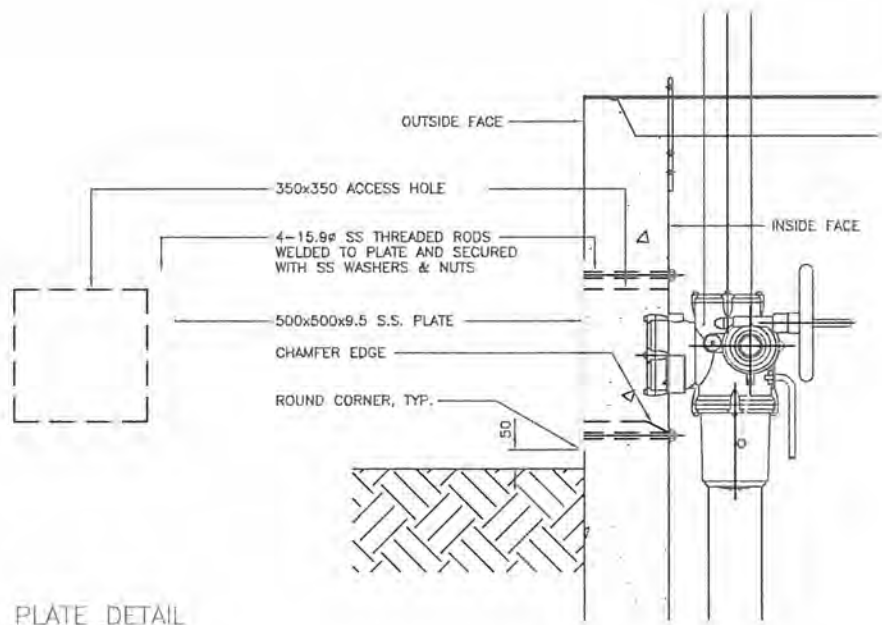
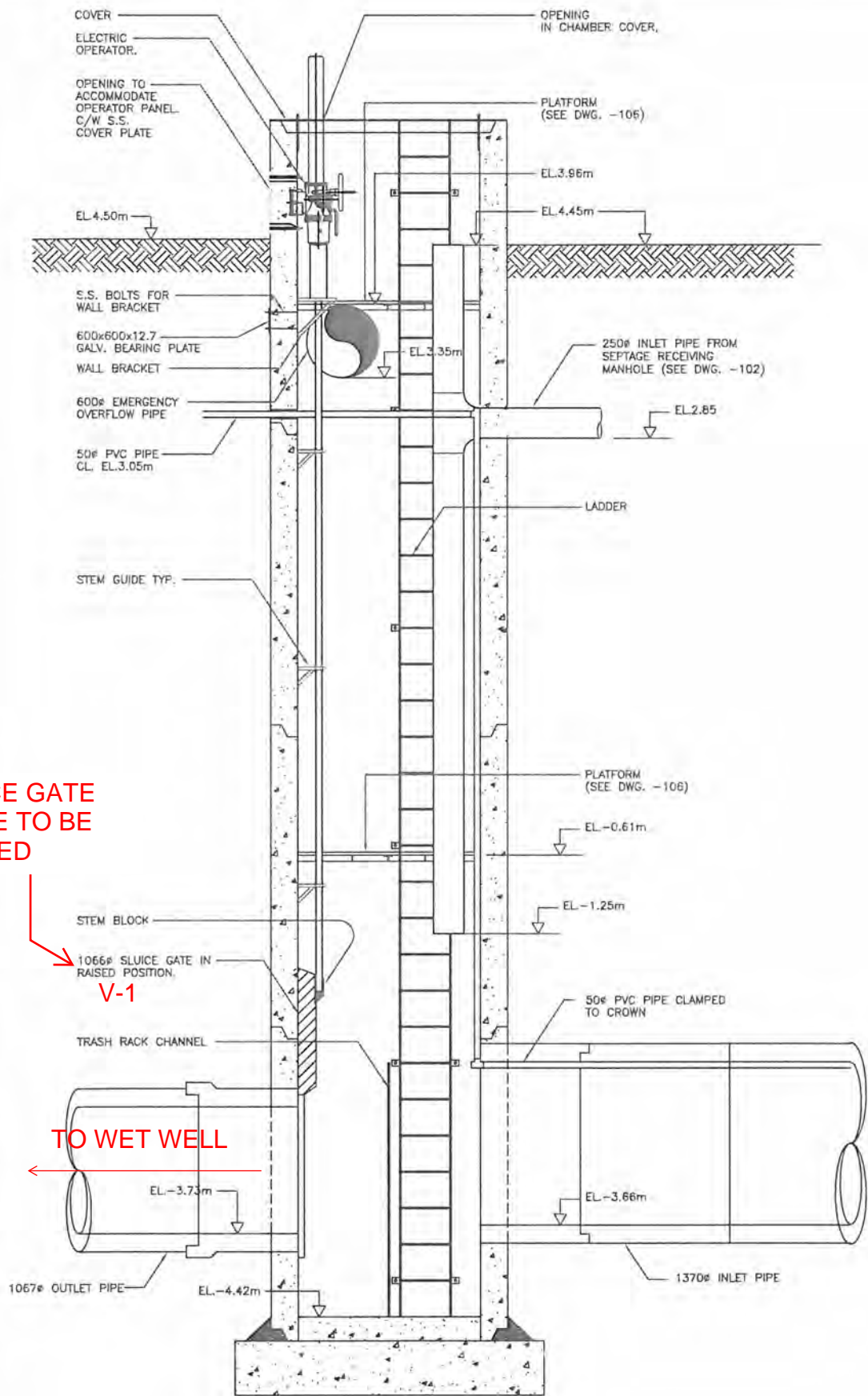
6. Installation and Teardown

Prior to removal the system shall be flushed with potable water and clean up measures to be documented. Installation of the bypass system will be supervised by a qualified profession. The placement of pumps and hoses will be according to the actual site conditions encountered at the time construction. The bypass system is to be installed in a manner not to obstruct site or construction access to the wet well or valve station construction sites.

Appendix A. Valve Location Drawings

VALVE LOCATION DRAWINGS
PAGE 1 OF 3

VERIFY SCALES
BAR IS BASED ON
ORIGINAL DRAWING
0 20mm
IF NOT 20mm ON
THE SHEET, ADJUST
SCALES ACCORDINGLY



ACCESS HOLE DETAIL
SCALE: 1:10

PLATE DETAIL
SCALE: 1:10

- TAG: G-120
- MANUFACTURER: ROTORK CONTROLS
- MAKE: IQ SERIES.
- SPEED: 362 mm/minute
- POWER: 575 VAC 3 PHASE. CURRENT 13.5A
- APPROVAL: CSA
- DUTY: CAPABLE OF 60 STARTS PER HOUR.
- CLASSIFICATION: ZONE 1, DIV 1, GROUP D EXPLOSION PROOF AND RATED FOR IP68.
- ATMOSPHERE: AIR WITH H2S GAS, METHANE GAS, AND MOISTURE.
- LOCAL OPERATORS: LOCAL/OFF/REMOTE AND OPEN/CLOSE SELECTOR SWITCHES.
- MANUAL OPERATOR: SIDE MOUNTED HANDWHEEL WITH CLUTCH.
- LOCAL INDICATION: LCD WITH NUMERIC AND ICON DISPLAY.
- POSITION TRANSMITTER: 4 - 20 mA ACTUATOR POWERED REPRESENTING GATE POSITION IN % OPEN
- POSITION SWITCHES: 4 CONFIGURABLE DRY CONTACT POSITION SWITCHES.
- CONFIGURATION: INCLUDE AN INFRARED REMOTE CONTROL IQ SETTING TOOL.
- CONTROL MODE: OPEN/STOP/CLOSE MAINTAINED CONTROL WITH INTERNALLY FED 120 VAC CIRCUITS.
- WARRANTY: 2 YEARS.
- MOUNTING: 316 SS OR COATED STEEL PEDESTAL TO SUIT LOCATION AND PROVIDE ACCESS TO THE HANDWHEEL.
- STEM COVER: 316 SS STEM COVER TO ENCLOSE THE PROTRUDING GATE SHAFT COMPLETELY WHEN THE GATE IS FULLY OPEN.
- GATE STEM: 316 STAINLESS STEEL DIAMETER STEM SHAFT FOR 1,066 mm CAST IRON GATE TO SUIT DESIGN AND SITE CONDITIONS
- STEM GUIDES: CAST IRON WITH COATING AND AS DESIGNED BY ARMTEC.
- MOUNTING: CAST IRON WITH COATING FOR ACTUATOR WALL MOUNTING BRACKET.
- COATING: COATING MENTIONED ABOVE TO BE: SHOP PRIMED AND COATED WITH COAL-TAR EPOXY TO A MINIMUM OF 16-MILS.
- SHOP DRAWING: SUBMIT SHOP DRAWINGS AND INCLUDE FIELD MEASUREMENTS REQUIRED FOR CONFIRMATION OF GATE STEM LENGTH, ACTUATOR PIPE STAND LENGTH, PIPE STAND WALL BRACKET LOCATION, STEM GUIDE LOCATIONS AND LOCATION OF ACCESS HOLE FOR ACTUATOR.

SLUICE GATE
VALVE TO BE
CLOSED

TO WET WELL

NO.	DATE	ENG.	BY	SUBJECT
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1	JAN 04/01	MQ/AL	PL	PLATFORMS & ELEC. OPERATOR
0		L.P.	S.T.	
REVISIONS				
PROJECT NO.		882819-603		
SCALE		AS SHOWN		
DRAWN		S.T.		
DESIGNED		L.P.		
CHECKED		L.W.P.		
APPROVED				
APPROVED				
DATE		DEC 2001		

ASSOCIATED
ENGINEERING

DISTRICT PROJECT NUMBER
0810-20-CRPS-04

DISTRICT DRAWING NUMBER
CRPS-C-109

REGIONAL DISTRICT
OF NANAIMO

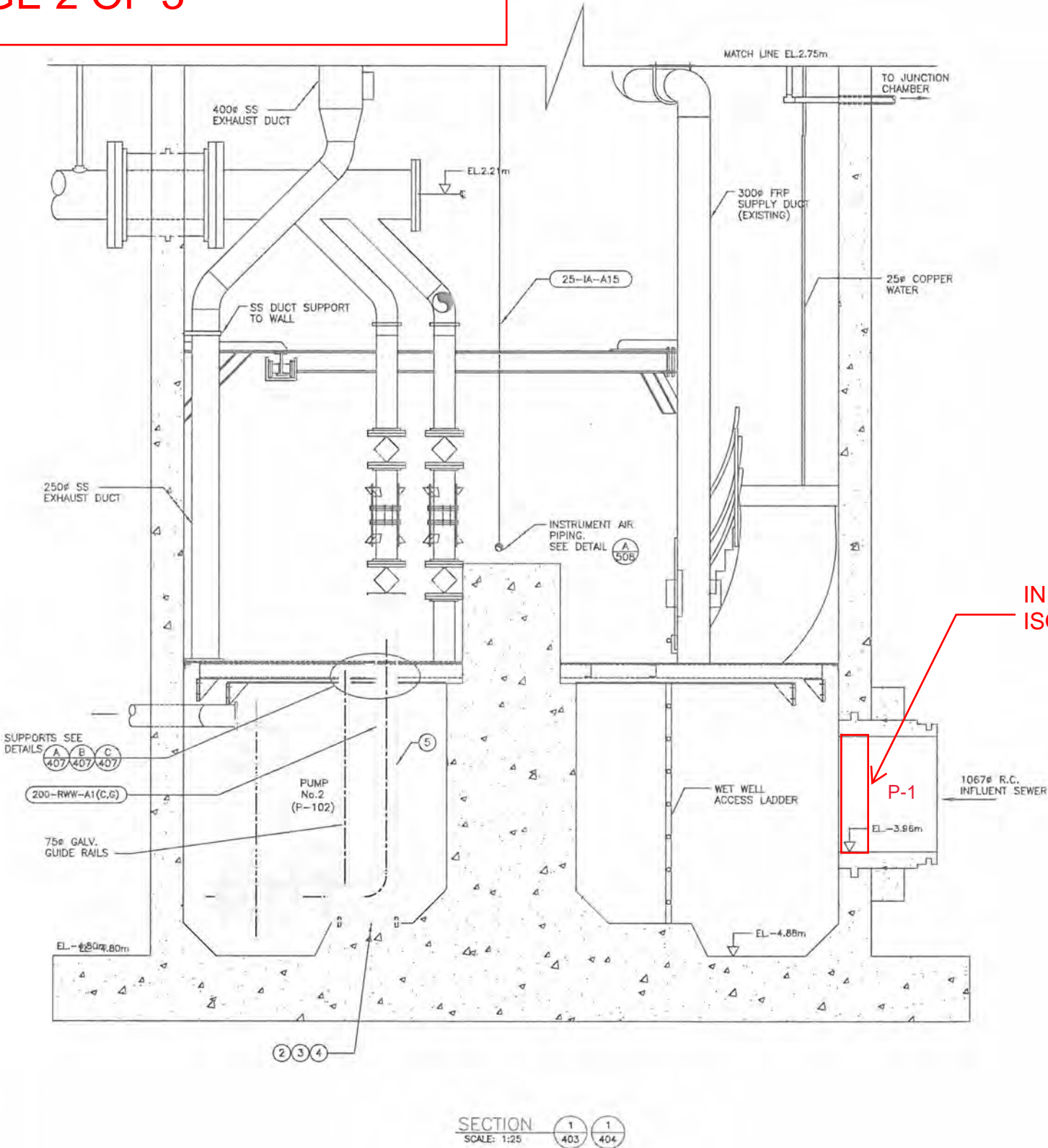
CHASE RIVER
PUMPING STATION UPGRADE

DRAWING NUMBER	REV. NO.	SHEET
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CRPS-C-109

VALVE LOCATION DRAWINGS
 PAGE 2 OF 3



INFLATABLE ISOLATION PLUG

- 1. CONTRACTOR TO INSTALL OWNER SUPPLIED PUMP No. 2 AND ACCESSORIES AS SPECIFIED.
- 2. MODIFY PUMP BASE PLATE WITH FLAT WASHERS WELDED TO PLATE, TO FIT EXISTING ANCHOR FRAME BOLT PATTERN.
- 3. USE MACHINE BASE GROUT TO LEVEL PUMP BASE PLATE.
- 4. FASTEN BASE TO EXISTING 25 DIA. GALV. BOLTS WITH 25 DIA. NYLON COATED SS LOCK NUTS.
- 5. REPLACE 200 DIA. (8 IN) SECTION OF PIPE WITH NEW STEEL PIPE SECTION (EPOXY LINED AND COATED) AND FLANGES. LENGTH TO SUIT. ADJUST PIPE AS REQUIRED TO SUIT ALIGNMENT.
- 6. REPLACE ALL DAMAGED GASKETS.
- 7. REPLACE ALL EXISTING BOLTS AND NUTS ON SUPPORTS AND FASTENERS WITH SS BOLTS AND NUTS TO SUIT.
- 8. REMOVE EXISTING PIPING, PUMP BASE PLATE AND MISCELLANEOUS METALS FROM WET WELL AND DELIVER TO OWNER'S WORKS YARD.

VERIFY SCALES
 BAR IS BASED ON ORIGINAL DRAWING
 0 20mm
 IF NOT 20mm ON THE SHEET, ADJUST SCALES ACCORDINGLY

THIS DRAWING IS A REPRODUCTION FROM ORIGINAL DESIGN DRAWINGS. ACTUAL EQUIPMENT, MATERIALS OF CONSTRUCTION, LOCATIONS AND DIMENSIONS ARE UNKNOWN. CONTRACTOR IS RESPONSIBLE FOR CONFIRMATION OF ALL INFORMATION SHOWN ON DRAWING.

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0	14 APR 00	K.M.	S.T.	ISSUED FOR TENDER
NO.	DATE	ENG.	BY	SUBJECT
REVISIONS				
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SCALE		AS SHOWN		
DRAWN		S.T.		
DESIGNED		K.M./S.F.		
CHECKED		D.P.		
APPROVED				
APPROVED				
DATE		MARCH 2000		

ASSOCIATED ENGINEERING



DISTRICT PROJECT NUMBER
 0810-20-CRPS-04

DISTRICT DRAWING NUMBER
 CRPS-M-211

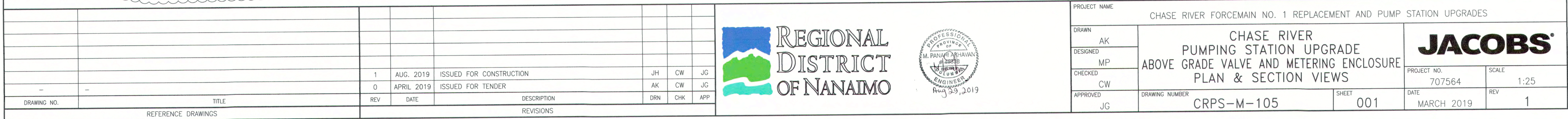
REGIONAL DISTRICT OF NANAIMO

CHASE RIVER PUMPING STATION UPGRADE

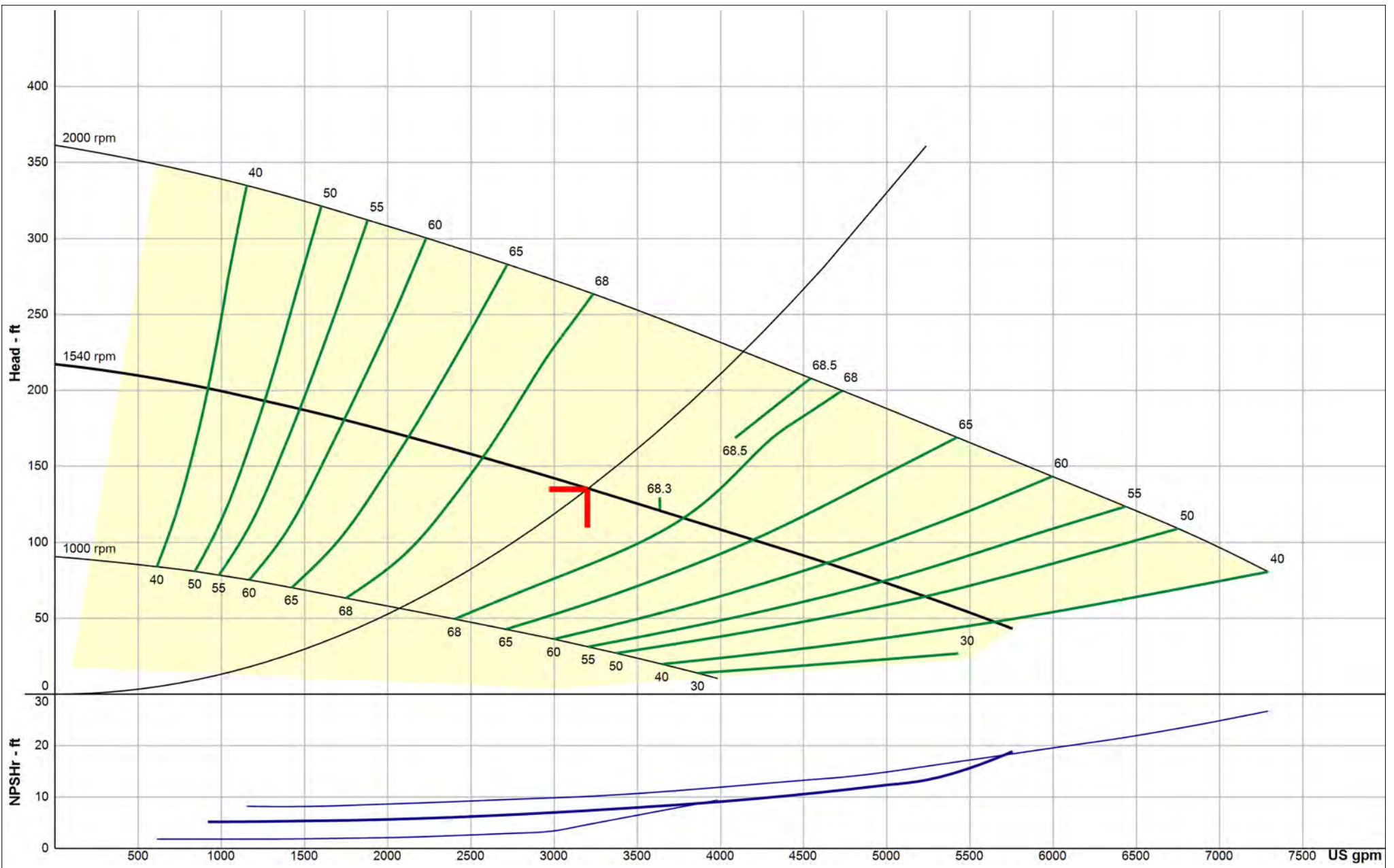
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CRPS-M-211



Appendix B. Pump Datasheet and System Curve



Company: Jacobs Engineering
Name: Pump Curve
Date: 04/14/2020

Pioneer Pump
Catalog: Pioneer Pump.60, Vers 1.2
Pioneer Prime - Adjustable
Design Point: 3200 US gpm, 135 ft
Static Head: 0 ft

Model: PP108S17-16"
Speed: 1540 rpm
Dia: 16 in
Curve: 09823HQ
Size: 10x8



Pump Data Sheet - Pioneer Pump

Company: Jacobs Engineering
Name: Pump Curve
Date: 04/14/2020



Pump:

Model: PP108S17-16" Dimensions: Suction: 10 in
Type: Pioneer Prime Discharge: 8 in
Synch Speed: Adjustable
Dia: 16 in
Curve: 09823HQ
Size: 10x8

Fluid:

Name: Water
SG: 1 Vapor Pressure: 0.256 psi a
Density: 62.4 lb/ft³ Atm Pressure: 14.7 psi a
Viscosity: 1.1 cP
Temperature: 60 °F

Search Criteria:

Flow: 3200 US gpm Near Miss: ---
Head: 135 ft Static Head: 0 ft

Pump Limits:

Temperature: --- Sphere Size: 3.5 in
Wkg Pressure: ---

Motor:

Consult Pioneer Pump to select a motor for this pump.

Pump Selection Warnings:

None

--- Duty Point ---

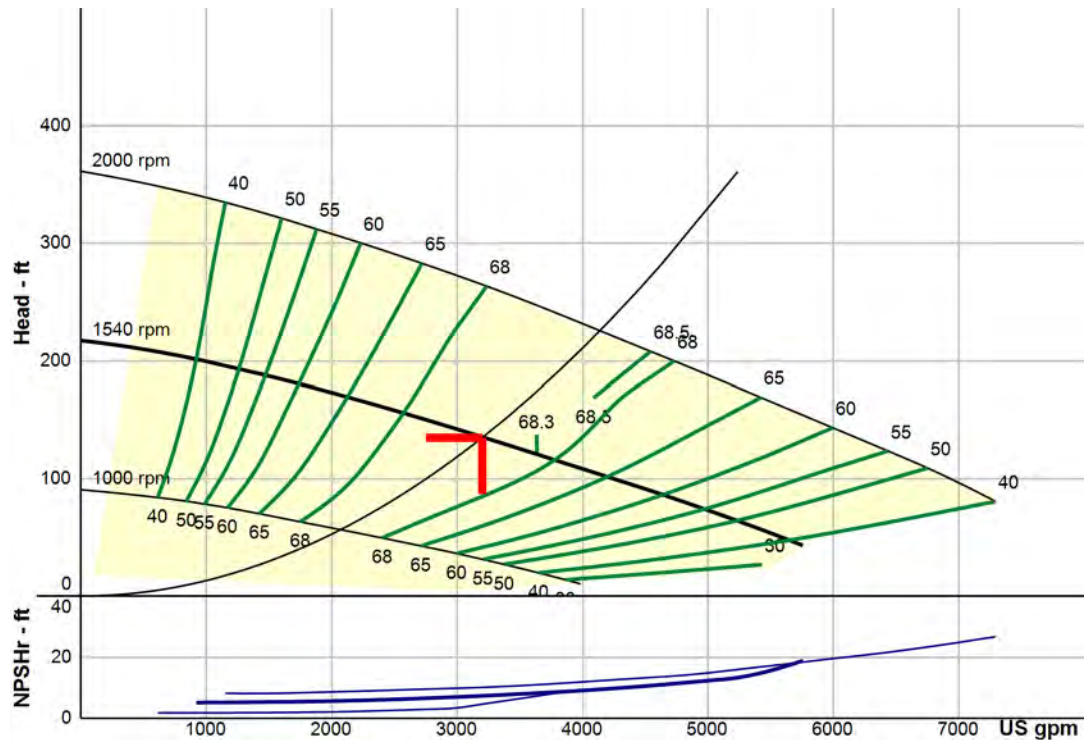
Flow: 3202 US gpm
Head: 135 ft
Eff: 68.2%
Power: 157 hp
NPSHr: 7.47 ft
Speed: 1540 rpm

--- Design Curve ---

Shutoff Head: 217 ft
Shutoff dP: 94.1 psi
Min Flow: --- US gpm
BEP: 68.3% @ 3636 US gpm
NOL Power:
175 hp @ 5755 US gpm

--- Max Curve ---

Max Power:
372 hp @ 6751 US gpm



Performance Evaluation:

Flow	Speed	Head	Efficiency	Power	NPSHr
US gpm	rpm	ft	%	hp	ft
3840	1540	114	67.6	163	8.73
3200	1540	135	68.2	157	7.46
2560	1540	156	67.9	149	6.3
1920	1540	175	62.4	136	5.61
1280	1540	193	50.5	123	5.26



Pioneer Prime

PP108S17L71



Typical Pump Configuration

Performance

Pioneer Prime series - vacuum assisted, end suction centrifugal pump

Bare shaft, frame mounted, fully automatic dry priming, vacuum assisted, run dry, heavy duty solids handling pump

Size	10" x 8" 250 x 200 mm
Flow, Max	7,600 USgpm 1750 m ³ /h 480 l/s
Head, Max	450 feet 140 meters
Flow at BEP	4,600 USgpm 1060 m ³ /h 290 l/s
Efficiency at BEP	80%
Solids Handling, Max	3.5" 89 mm
Operating Speed, Max	2000 rpm
Suction Connection	10" (250 mm) 150 ANSI Flanges
Delivery Connection	8" (200 mm) 150 ANSI Flanges
Bearing Lubrication	Oil STD Grease optional
Fasteners	Imperial

Applications

Dirty water	Raw water pumps
Sewage bypass	Flood pumps
Silt returns	Mine dewatering
Cooling pumps	

High pressure, high flow, heavy duty solids handling pump

Designed to run over a broad range of performance while delivering outstanding suction lift, the PP108S17 is the solid choice. The rugged construction and modular design provide proven reliability and flexibility in the most demanding applications.

UltraPrime™ Priming System

Priming System	Mechanically Driven Diaphragm Style Vacuum Pump
Air Removal Capability	50 CFM
Priming Chamber	Single chamber with positive sealing air separation PosiValve™ with stainless steel float ball & linkage.
Discharge Check Valve	Swing Style - ductile iron with Buna-n Disc

Other Specifications

Mechanical Seal	Single seal w/ tungsten carbide vs. silicon carbide seal faces, Viton® elastomers, 300 series stainless steel hardware and spring, designed for indefinite dry running
Pump End Bearing	Single Row Ball
Drive End Bearing	Double Row Angular Contact
Shaft	17-4 PH Stainless Steel

Construction Materials

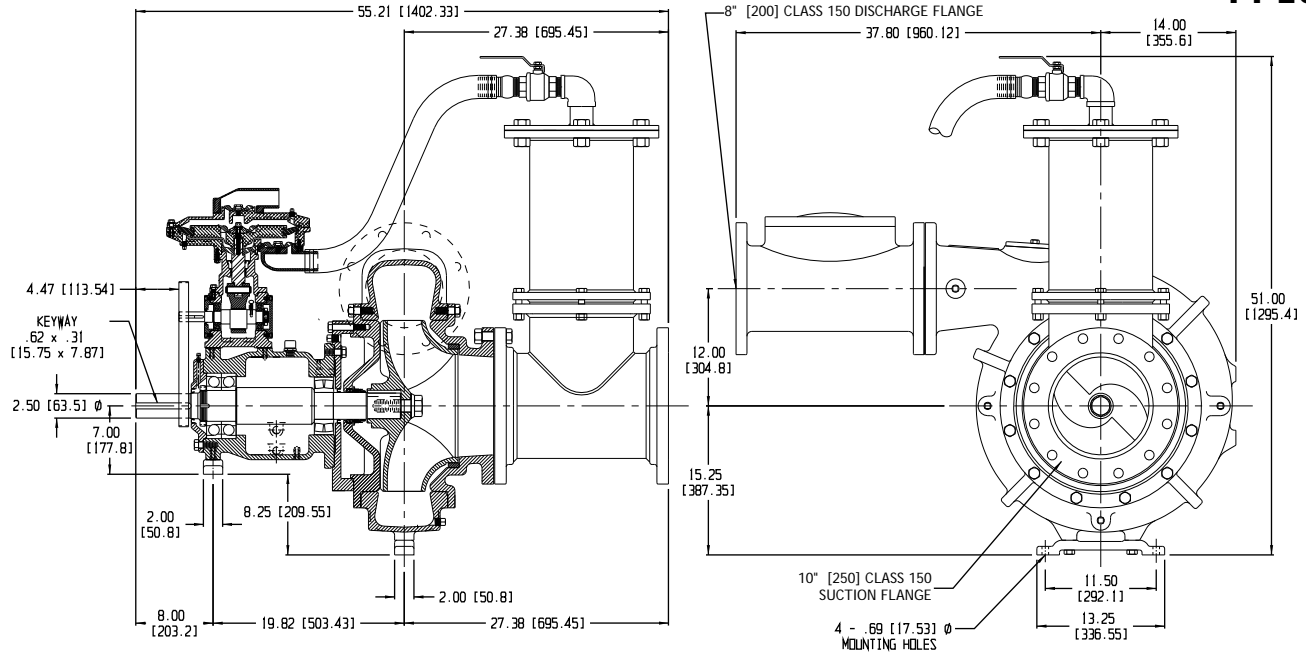
	Standard Construction	CD4MCu Stainless Steel
Impeller	CA6NM SS	CD4MCu
Volute	Ductile Iron ASTM A536 65-45-12	CD4MCu
Wear Ring	ASTM A48 Class 40 Gray Iron	316 SS
Suction Cover	Ductile Iron ASTM A536 65-45-12	CD4MCu
Bracket	Ductile Iron ASTM A536 65-45-12	CD4MCu
Backplate	Ductile Iron ASTM A536 65-45-12	CD4MCu

Mechanical Dimensions



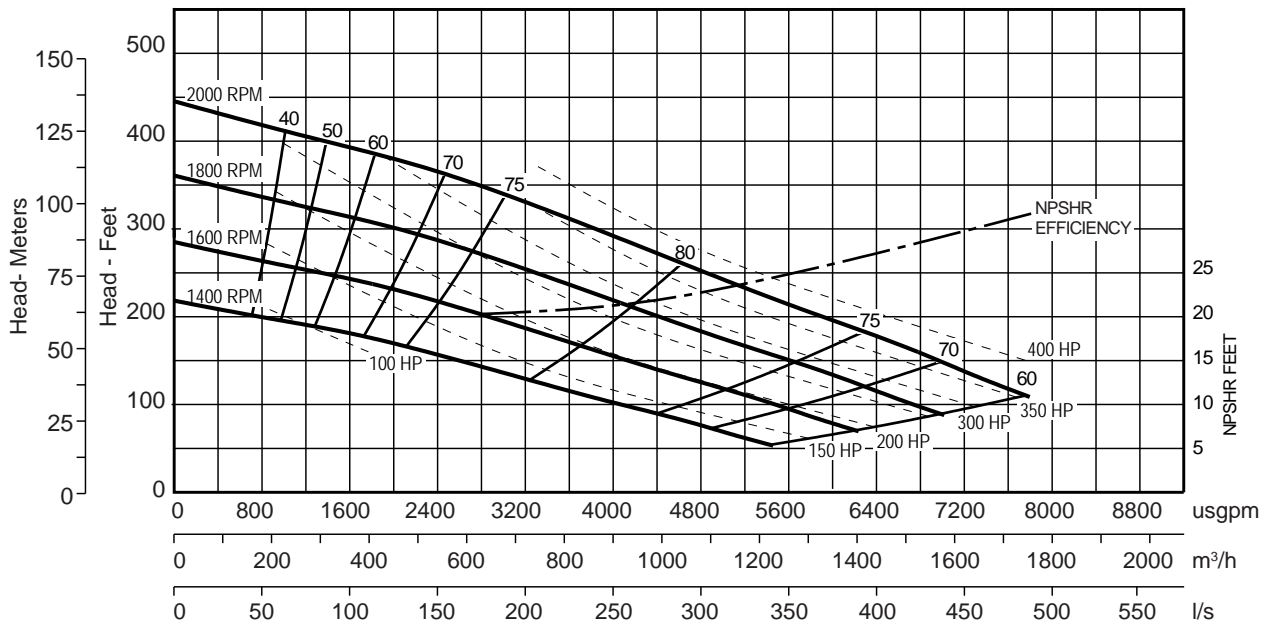
Typical Pump Configuration

PP108S17



Performance Curve

Model: PP108S17	Impeller Dia: 17.5"	Speed: Variable	Solids Size: 3.5"	Curve #07997HQ
-----------------	---------------------	-----------------	-------------------	----------------



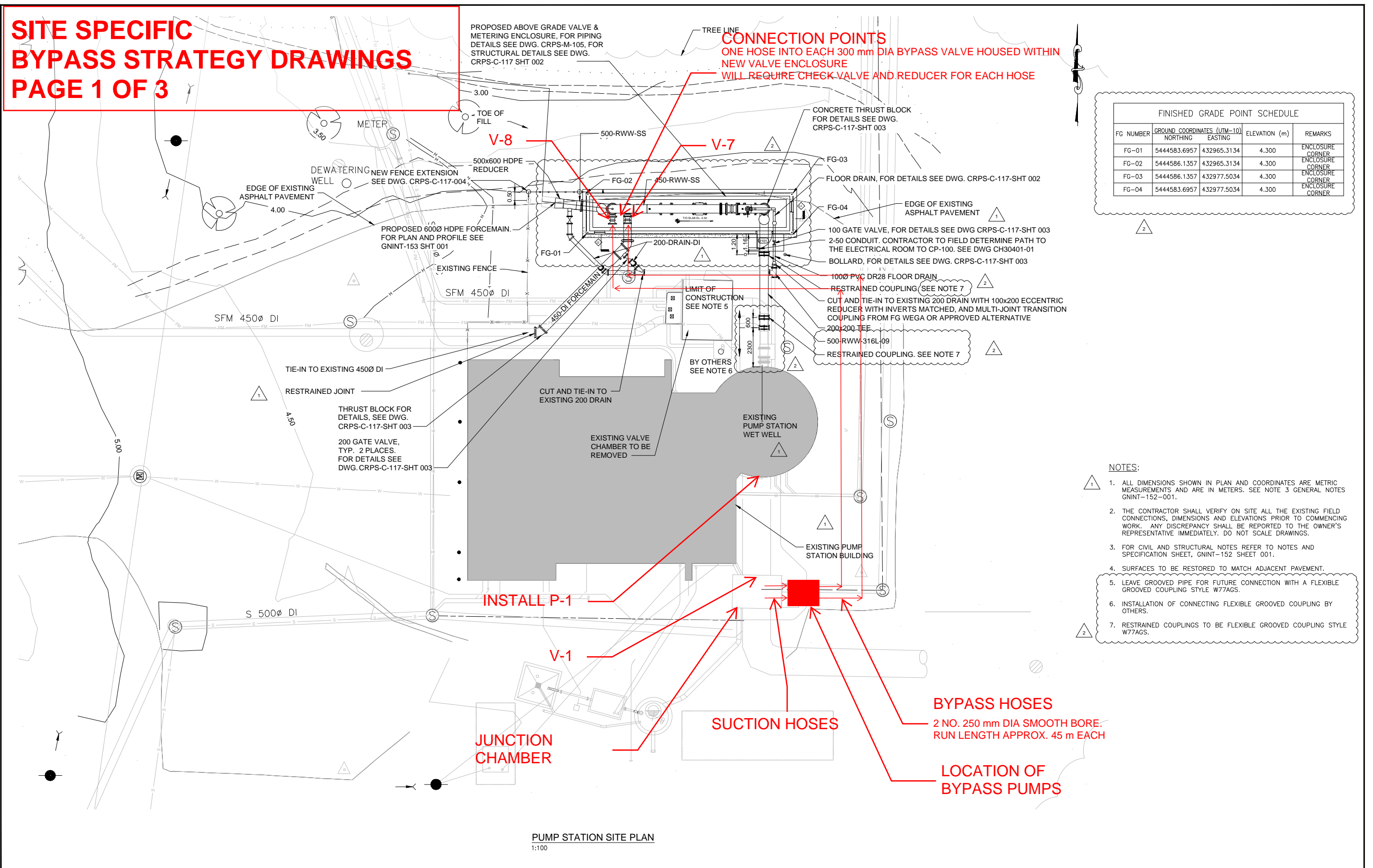
Note: Losses from priming system not shown

Corporate +1 (503) 266-4115 ■ EMEA +44 (0)1449 736777 ■ South Africa +27 (0) 118240085 ■ Australia +61 3 9988 1650

www.pioneerpump.com


Appendix C. Site Specific Bypass Strategy Drawings

SITE SPECIFIC BYPASS STRATEGY DRAWINGS PAGE 1 OF 3




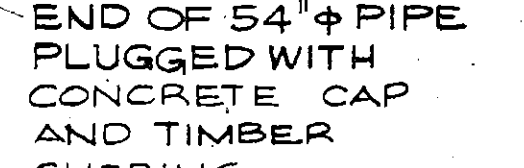
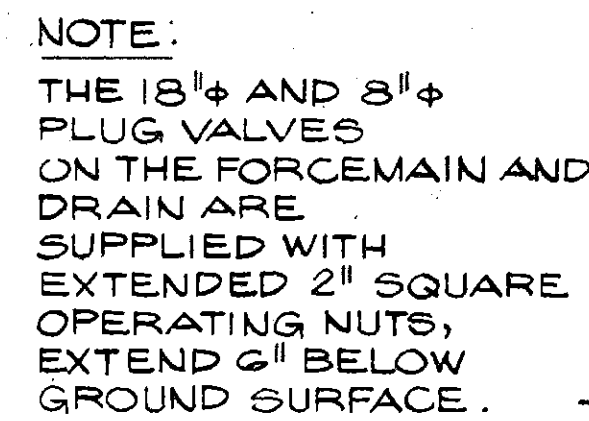
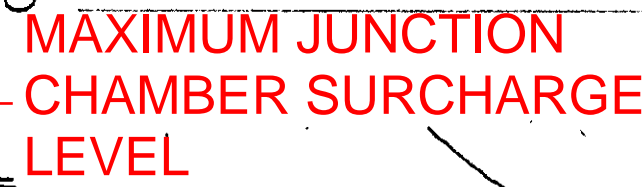
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FG NUMBER	GROUND COORDINATES (UTM-10)		ELEVATION (m)	REMARKS
	NORTHING	EASTING		
FG-01	5444583.6957	432965.3134	4.300	ENCLOSURE CORNER
FG-02	5444586.1357	432965.3134	4.300	ENCLOSURE CORNER
FG-03	5444586.1357	432977.5034	4.300	ENCLOSURE CORNER
FG-04	5444583.6957	432977.5034	4.300	ENCLOSURE CORNER

- ### NOTES:
1. ALL DIMENSIONS SHOWN IN PLAN AND COORDINATES ARE METRIC MEASUREMENTS AND ARE IN METERS. SEE NOTE 3 GENERAL NOTES GNINT-152-001.
 2. THE CONTRACTOR SHALL VERIFY ON SITE ALL THE EXISTING FIELD CONNECTIONS, DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK. ANY DISCREPANCY SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE IMMEDIATELY. DO NOT SCALE DRAWINGS.
 3. FOR CIVIL AND STRUCTURAL NOTES REFER TO NOTES AND SPECIFICATION SHEET, GNINT-152 SHEET 001.
 4. SURFACES TO BE RESTORED TO MATCH ADJACENT PAVEMENT.
 5. LEAVE GROOVED PIPE FOR FUTURE CONNECTION WITH A FLEXIBLE GROOVED COUPLING STYLE W77AGS.
 6. INSTALLATION OF CONNECTING FLEXIBLE GROOVED COUPLING BY OTHERS.
 7. RESTRAINED COUPLINGS TO BE FLEXIBLE GROOVED COUPLING STYLE W77AGS.

CH30401-01								
CRPS-M-105	ABOVE GRADE VALVE AND METERING ENCLOSURE: PLAN AND SECTION VIEWS							
GNINT-153 SHT 001	FORCEMAIN NO.1 & WATER REPLACEMENT-PLAN AND PROFILE							
CRPS-C-117 SHT 002	VALVE AND METERING ENCLOSURE - FOUNDATION PLAN, SECTION AND DETAILS	2	JUN 2021	ISSUED FOR INFORMATION		SS	JH	JG
CRPS-C-117 SHT 003	VALVE AND METERING ENCLOSURE - SECTIONS AND DETAILS	1	AUG 2019	ISSUED FOR CONSTRUCTION		JH	MC	JG
CRPS-C-117 SHT 004	TYPICAL FENCING DETAILS	0	APR 2019	ISSUED FOR TENDER		RO	LC	JG
DRAWING NO.	TITLE	REV	DATE	DESCRIPTION		DRN	CHK	APP
REFERENCE DRAWINGS		REVISIONS						



PROJECT NAME						CHASE RIVER FORCEMAIN NO. 1 REPLACEMENT AND PUMP STATION UPGRADES					
DRAWN		SS		CHASE RIVER PUMP STATION UPGRADES SITE PLAN							
DESIGNED		MP									
CHECKED		CW									
APPROVED		JG		DRAWING NUMBER		CRPS-C-117		SHEET		001	
								PROJECT NO.		707564	
								SCALE		1:100	
								DATE		FEB 04, 2019	
								REV		2	



REVISIONS	ISSUE	DATE	DRN	CHD	APPD	DESCRIPTION	ISSUE	DATE	DRN	CHD	APPD	DESCRIPTION	DESIGNED J.T.	DAYTON & KNIGHT LTD. CONSULTING ENGINEERS M.D. Dayton Oct 4 1979	REGIONAL DISTRICT OF NANAIMO CHASE RIVER PUMPING STATION PIPE PROFILES	SCALE: HORIZ: NTS , VERT: 1"=5' DRAWING No. 122-46-2 SHEET 3 OF 23 ISSUE B N-INT-085
	B	6/25/82	JT	ST	BW	" RECORD DRAWING "							DRAWN V.A.B.			
													CHECKED ST BW			

SITE SPECIFIC
BYPASS STRATEGY DRAWINGS
PAGE 3 OF 3

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IF NOT 20mm ON THE SHEET, ADJUST SCALES ACCORDINGLY	

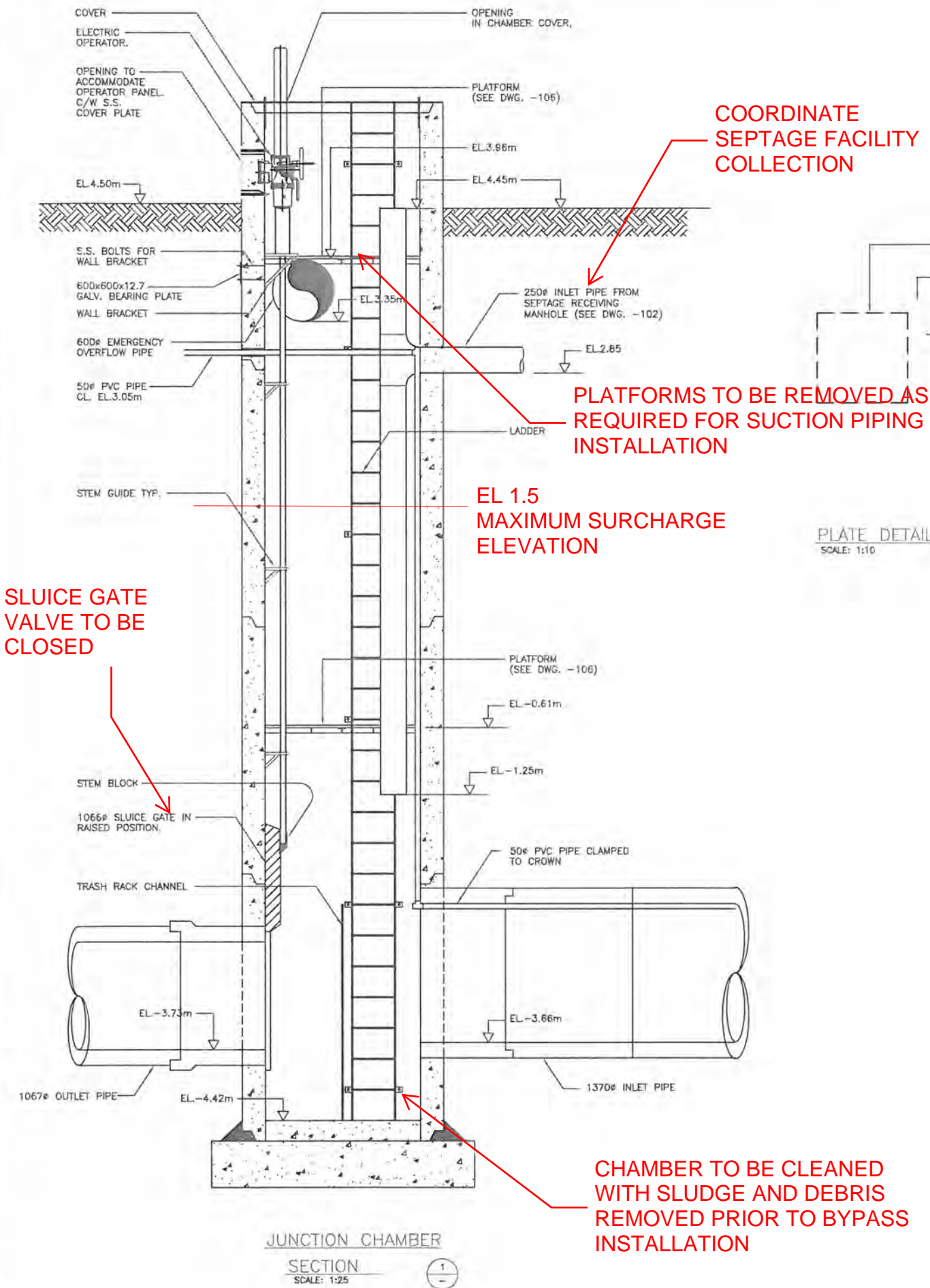
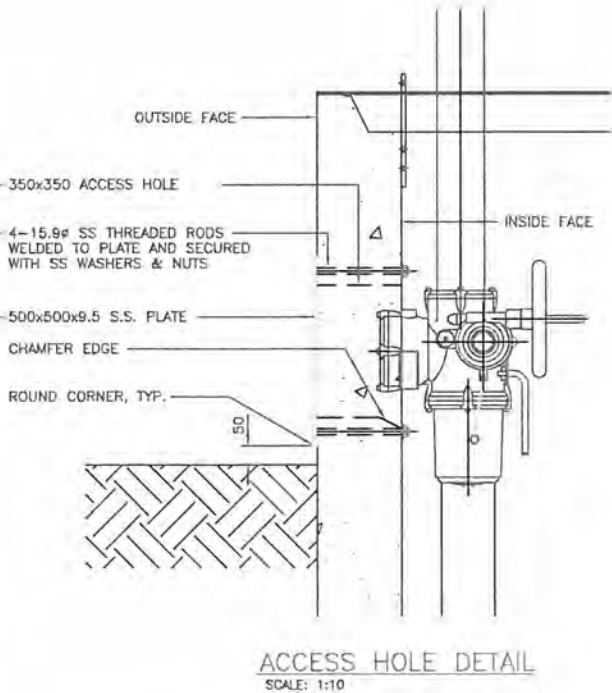


PLATE DETAIL
SCALE: 1:10



- * TAG: G-120
- * MANUFACTURER: ROTORK CONTROLS
- * MAKE: IQ SERIES
- * SPEED: 362 mm/minute
- * POWER: 575 VAC 3 PHASE. CURRENT 13.5A
- * APPROVAL: CSA
- * DUTY: CAPABLE OF 60 STARTS PER HOUR.
- * CLASSIFICATION: ZONE 1, DIV 1, GROUP D EXPLOSION PROOF AND RATED FOR IP68.
- * ATMOSPHERE: AIR WITH H2S GAS, METHANE GAS, AND MOISTURE.
- * LOCAL OPERATORS: LOCAL/OFF/REMOTE AND OPEN/CLOSE SELECTOR SWITCHES.
- * MANUAL OPERATOR: SIDE MOUNTED HANDWHEEL WITH CLUTCH.
- * LOCAL INDICATION: LCD WITH NUMERIC AND ICON DISPLAY.
- * POSITION TRANSMITTER: 4 - 20 mA ACTUATOR POWERED REPRESENTING GATE POSITION IN % OPEN
- * POSITION SWITCHES: 4 CONFIGURABLE DRY CONTACT POSITION SWITCHES.
- * CONFIGURATION: INCLUDE AN INFRARED REMOTE CONTROL IQ SETTING TOOL.
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- * STEM COVER: 316 SS STEM COVER TO ENCLOSE THE PROTRUDING GATE SHAFT COMPLETELY WHEN THE GATE IS FULLY OPEN.
- * GATE STEM: 316 STAINLESS STEEL DIAMETER STEM SHAFT FOR 1,066 mm CAST IRON GATE TO SUIT DESIGN AND SITE CONDITIONS
- * STEM GUIDES: CAST IRON WITH COATING AND AS DESIGNED BY ARMETEC.
- * MOUNTING: CAST IRON WITH COATING FOR ACTUATOR WALL MOUNTING BRACKET.
- * COATING: COATING MENTIONED ABOVE TO BE: SHOP PRIMED AND COATED WITH COAL-TAR EPOXY TO A MINIMUM OF 16-MILS.
- * SHOP DRAWING: SUBMIT SHOP DRAWINGS AND INCLUDE FIELD MEASUREMENTS REQUIRED FOR CONFIRMATION OF GATE STEM LENGTH, ACTUATOR PIPE STAND LENGTH, PIPE STAND WALL BRACKET LOCATION, STEM GUIDE LOCATIONS AND LOCATION OF ACCESS HOLE FOR ACTUATOR.

NO.	DATE	ENG.	BY	SUBJECT
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REVISIONS				
PROJECT NO.	882819-603			
SCALE	AS SHOWN			
DRAWN	S.T.			
DESIGNED	L.P.			
CHECKED	L.W.P.			
APPROVED				
APPROVED				
DATE	DEC 2001			

ASSOCIATED
ENGINEERING



DISTRICT PROJECT NUMBER

0810-20-CRPS-04

DISTRICT DRAWING NUMBER

CRPS-C-109

REGIONAL DISTRICT
OF NANAIMO

CHASE RIVER
PUMPING STATION UPGRADE

DRAWING NUMBER	REV. NO.	SHEET
CH3-105		

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

- 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

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

- 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 spool drawings must be prepared by the fabricator for all piping systems greater than 50 mm in diameter to indicate assembly details; pipe size, shop and field weld locations, 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 prepared by the Engineer and provided in the design package, the electronic files for such isometrics may be provided to the fabricator for their convenience, at the discretion of the RDN.
- 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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

- 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

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

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 or Category D fluid service as indicated on the drawings.

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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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- 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 supplying 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).
- 1.6.13. Fabricating Tolerances for pipefittings and assemblies shall conform to the Pipe Fitters Institute Standard ES-3.

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

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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 (default, unless specified otherwise on the drawings) — raised face weld neck 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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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 full/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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

- 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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
---	-------------------------------	--

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 welds for piping butt joints shall be full penetration.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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- 3.8.5. 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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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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.

 REGIONAL DISTRICT OF NANAIMO	Process Piping General	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0001
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- 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.

 REGIONAL DISTRICT OF NANAIMO	Austenitic Stainless Steel Piping	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0002
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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

 REGIONAL DISTRICT OF NANAIMO	Austenitic Stainless Steel Piping	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0002
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- 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 Restrained 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.

 REGIONAL DISTRICT OF NANAIMO	Austenitic Stainless Steel Piping	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0002
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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, slip-on or weld neck. Raised face for Class 150. Flat face for flange connecting to ductile/cast iron Class 125 flanges or other equipment and appurtenances requiring such.

 REGIONAL DISTRICT OF NANAIMO	Austenitic Stainless Steel Piping	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0002
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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 welds for piping butt joints shall be full penetration.

 REGIONAL DISTRICT OF NANAIMO	Austenitic Stainless Steel Piping	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0002
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- 3.1.6. All welding of the root pass of austenitic 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.
- 3.1.7. Clean welds after fabrication in accordance with ASTM A380.
- 3.1.8. 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.
- 3.1.9. Any noticeable discolouration on the piping after welding shall be removed by pickling.
- 3.1.10. 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.
- 3.1.11. Thread stainless steel pipe in accordance with threading machine manufacturer's instructions.
- 3.1.12. Fabricating Tolerances for pipefittings and assemblies shall conform to the Pipe Fitters Institute Standard ES-3.

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 be removed after fabrication. In all cases, if iron contamination is suspected, the piping must be pickled to remove the contamination and prevent rust staining.

 REGIONAL DISTRICT OF NANAIMO	Austenitic Stainless Steel Piping	Date: June 16, 2021 Revision: 2 Ref. No: SP-P-0002
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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.

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 PRODUCTS

- A. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock and may also include existing materials or components required for reuse.
- B. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
- C. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.2 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

1.3 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current progress schedule and coordinate to avoid conflict with the Work and conditions at site.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable. Include ULC labels on products so specified.
- C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at site. Inspect for completeness and evidence of damage during shipment.

- D. Remove damaged products from site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.4 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in Contractor provided approved storage yards or sheds. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- C. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 15 degrees C. Protect electrical, instrumentation, and control products, and insulation against moisture, water, and dust damage. Connect and operate continuously all space heaters furnished in electrical equipment.
- D. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- E. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- F. Hazardous Materials: Prevent contamination of personnel, storage building, and site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.
- F. Equipment Finish:
 - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.
 - 2. If manufacturer has no standard color, provide equipment with white finish as approved by Owner.
- G. Bolted Connections: Project bolt ends minimum 3 mm but not more than one bolt diameter beyond nut faces.
- H. Flanges: Arrange with bolt holes straddling vertical centreline.

2.2 FABRICATION AND MANUFACTURE

- A. General:
 - 1. Manufacture parts to North American standard sizes and gauges.
 - 2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
 - 3. Design structural members for anticipated shock and vibratory loads.
 - 4. Use 6 mm minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
 - 5. Modify standard products as necessary to meet performance Specifications.

2.3 SOURCE QUALITY CONTROL

- A. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- B. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.2 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Repaint painted surfaces that are damaged prior to equipment acceptance.
- D. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at site, available for review at all times.

3.3 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

END OF SECTION

SECTION 02220

DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Equipment and materials scheduled for demolition are as shown on the Drawings.

1.2 SUBMITTALS

- A. Information Submittals:
 - 1. Methods of demolition and equipment proposed to demolish each structure.
 - 2. Copies of any authorizations and permits required to perform the Work including transportation to the disposal site/s and the use disposal site/s. Any payments necessary to obtain the authorization and permits shall be borne by the Contractor.
 - 3. The Contractor shall also arrange for any inspections necessary from relevant authorities for proper execution and demolishing works. All costs associated with these shall be met by the Contractor.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 DEMOLITION

- A. Drawings define minimum portion of materials to be removed. Unless otherwise shown, rough cuts or breaks may be made exceeding limits of demolition shown.
- B. Remove all materials associated with existing equipment that is to be removed or relocated.
- C. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 20 mm below final finished surface.
- D. Carry out demolition in accordance with requirements of provincial and municipal authorities.
- E. At end of each work shift leave work in safe condition so that no part of remaining structure is in danger of toppling, collapsing, or falling.

3.2 DISPOSAL

- A. Dispose of debris and other nonsalvaged materials offsite in licensed landfills. The debris and non salvaged material from site shall be removed as quickly as possible. Burning of debris or selling of materials on site will not be permitted.
- B. If the disposal site is not a licensed landfill, Contractor shall submit details of this site. Necessary written approval from relevant authorities shall be submitted.

3.3 SALVAGE

- A. Equipment and materials, including piping within the limits of demolition, unless otherwise specified, will become the property of Contractor.

END OF SECTION

SECTION 03600

GROUT AND MISCELLANEOUS CONCRETE WORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Grouting including:
 - a. Filling tie holes.
 - b. Filling openings and blockouts.
 - c. Grouting under base plates for equipment and fittings and structural steel.
 - d. Through bolt openings.
 - e. Grouted-in dowels for connecting to existing concrete.
 - 2. Alterations and modifications to existing structures, including:
 - a. Removing existing concrete.
 - b. Cutting construction joint keys in existing structures.
 - c. Finishing of existing concrete.
 - d. Refinishing.
- B. Comply with the the following statutes codes and standards and all amendments thereto.
 - 1. American Society for Testing and Materials International (ASTM):
 - a. C230/C230M, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
 - b. C307, Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
 - c. C531, Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - d. C579, Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - e. C882/C882M, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
 - f. C939/C939M, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
 - g. C940, Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.
 - h. C1107/C1107M-17, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - i. C1181/C1181M, Standard Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.
 - j. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Product data of grouts including installation, application, and maintenance instructions.
 - 2. Proposed method for keeping existing concrete surfaces wet prior to placing hydraulic cement grout.
 - 3. Forming method for fluid grout placements.
 - 4. Curing method for grout.
- B. Quality Control Submittals:
 - 1. Manufacturer's printed Instructions:
 - a. Adding fiber reinforcing to batching.
 - b. Water/Cementing material ratio of grout.
 - c. Mixing of grout.
 - 2. Manufacturer's proposed training schedule for grout work.
 - 3. Manufacturer's Certificate of Compliance:
 - a. Grout free from chlorides and other corrosion-causing chemicals.
 - b. Nonshrink hydraulic cement grout properties of Types II and III, verifying expansion at 3 or 14 days will not exceed the 28-day expansion and nonshrink properties are not based on gas or gypsum expansion.
 - 4. Manufacturer's Certificate of Proper Installation.
 - 5. Statements of Qualification: Nonshrink grout manufacturer's representative.
 - 6. Test Reports for Nonshrink Hydraulic Cement Grout:
 - a. Test results and service report from demonstration and training session.
 - b. Field test reports and laboratory test results for field-drawn samples.
 - 7. Load Test Results for Grouted in Dowels:
 - a. Submit load test results of grouted - in dowels.

1.3 QUALIFICATIONS

- A. Nonshrink Grout Manufacturer's Representative: Authorized and trained representative of grout manufacturer. Minimum of 1 year experience that has resulted in successful installation of grouts similar to those for this Project.

1.4 GUARANTEE

- A. Manufacturer's guarantee containing disclaimer on the product data sheet, grout bag, or container limiting responsibility to only the purchase price of products and materials furnished will not be accepted.
- B. Manufacturer guarantees participation with Contractor in replacing or repairing grout found defective due to faulty materials, as determined by industry standard test methods.

PART 2 PRODUCTS

2.1 NONSHRINK HYDRAULIC CEMENT GROUT AND EPOXY GROUT SCHEDULE

A. Furnish grout of type specified for applications in the following schedule:

	Temperature Range	Maximum Placing Time	
Application	4 to 38 ° C	20 minutes	Greater than 20 minutes
Filling tie holes	I	I	I
Blockouts for gate guides	I or II		II
Column base plates single-storey	I or II		II
Bases for precast wall sections	II	II	II
Base plates for columns over one storey	II	II	II
Through-bolt openings	II	II	II
Baseplates and/or soleplates with vibration, thermal movement, etc.	III or Epoxy Grout	III or Epoxy Grout	III or Epoxy Grout

2.2 NONSHRINK HYDRAULIC CEMENT GROUT

A. Type I:

1. Nonmetallic and nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with ASTM C1107/C1107M:
 - a. Flowable consistency 140 percent, five drops in 30 seconds, in accordance with ASTM C230.
 - b. Flowable for 15 minutes.
4. No bleeding of grout at maximum allowed water.
5. Minimum strength of flowable grout,
 - a. 20 MPa at 3 days,
 - b. 35 MPa at 7 days,
 - c. 48 MPa at 28 days.
6. Manufacturers and Products:
 - a. BASF.; MasterFlow 100.
 - b. Euclid Chemical Co.; NS Grout.
 - c. Dayton Superior Corp.; 1107 Advantage Grout.

B. Type II:

1. Nonmetallic, nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. No segregation or settlement of aggregate at fluid consistency at specified times or temperatures.

4. Test in accordance with ASTM C1107/C1107M:
 - a. Fluid consistency 20 to 30 seconds in accordance with ASTM C939/C939M.
 - b. Temperatures of 5, 27, and 38 degrees C.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of fluid grout,
 - a. 25 MPa at 1 day
 - b. 30 MPa at 3 days
 - c. 52 MPa at 28 days.
7. Maintain fluid consistency when mixed in 1 to 7 m³ loads in ready-mix truck.
8. Manufacturers and Products:
 - a. BASF.; Master Flow 928.
 - b. Euclid Chemical Co.; Hi-Flow Grout.
 - c. Dayton Superior Corp.; Sure-Grip High Performance Grout.

C. Type III:

1. Metallic and nongas-liberating.
2. Prepackaged aggregate grout requiring only the addition of water.
3. No segregation or settlement of aggregate at fluid consistency at specified times or temperatures.
4. Test in accordance with ASTM C1107/C1107M:
 - a. Fluid consistency 20 to 30 seconds in accordance with ASTM C939/C939M.
 - b. Temperatures of 5 and 38 degrees C.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of fluid grout,
 - a. 28 MPa at 1 day
 - b. 35 MPa at 3 days
 - c. 62 MPa at 28 days.
7. Maintain fluid consistency when mixed in 1 to 7 m³ loads in ready-mix truck.
8. Manufacturer and Product:
 - a. BASF; MasterFlow 885
 - b. Euclid Chemical Co.: Hi Flow Metallic Grout

2.3 NONSHRINK EPOXY GROUT

- A. High-strength, nonshrink, high-temperature epoxy grouting material developed for the support of heavy equipment with vibratory loads.
- B. Three-component mixture of a two-component epoxy resin system (100 percent solids) with a graded, precision aggregate blend.
- C. Premeasured, prepackaged system.
- D. Flowable.
- E. Minimum compressive strength in accordance with ASTM C579 Method B, 65 MPa at 23 degrees C at 7 days, 76 MPa at post cure.

- F. Maximum creep resistance in accordance with ASTM C1181/C1181M at 4 MPa, 60 degrees C; 6.0 by 10^{-3} mm/mm.
- G. Minimum bond strength in accordance with ASTM C882/C882M, 14 MPa.
- H. Minimum tensile strength in accordance with ASTM C307, 14MPa.
- I. Maximum coefficient of thermal expansion in accordance with ASTM C531 at 23 degrees C to 99 degrees C, 41.4 by 10^{-6} mm/mm/degrees C.
- J. Working Time: Minimum 2 hours at 10 degrees C; 1.5 hours at 21 degrees C; 50 minutes at 32 degrees C.
- K. Good chemical resistance.
- L. Good effective bearing area.
- M. Noncorrosive.
- N. Moisture insensitive.
- O. Modify resin and aggregate content where recommended by epoxy grout manufacturer to provide desired epoxy grout flow properties.
- P. Manufacturer and Product:
 - 1. BASF; MasterFlow 648.
 - 2. Dayton Superior Corp.; Pro-Poxy 2000 Normal Set.

2.4 DOWELLING GROUT

- A. Hydraulic Cement Grout:
 - 1. MasterEmaco T 545 by BASF.
 - 2. Epoxy grout:
 - 3. Approved by an ICC Evaluation Services Report for conformance to CSA A23.3 Annex D requirements for doweling of steel reinforcing bars in cracked concrete.
 - 4. Suitable for long-term loads as well as for wind and seismic loads.
 - 5. Meet requirements of ASTM C881/C881M.
 - 6. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments.
 - 7. Disposable, Self-Contained Cartridge System:
 - a. Capable of dispensing both components in proper mixing ratio.
 - b. Fit into manually or pneumatically operated caulking gun.
 - 8. Manufacturers and Products:
 - a. Hilti, Inc.; HIT RE 500 SD (ELC 3814) or HIT HY 200 (ELC 3187) Adhesive Anchors.
 - b. Powers Fasteners; Power PURE110+ Epoxy Adhesive Anchor System (ELC 3298).
 - c. Simpson Strong-Tie Co., Inc.; SET-XP Epoxy Adhesive Anchors (ESR 2508).

PART 3 EXECUTION

3.1 NONSHRINK GROUT

- A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's representative's printed training instructions.
- B. Epoxy Grout: Concrete slab shall be fully cured for 28 days to ensure excess water has evaporated. Test concrete surface for moisture in accordance with ASTM D4263 before epoxy grout is placed.
- C. Form Tie or Through-Bolt Holes: Provide nonshrink hydraulic cement grout, Type I and II, fill space with dry pack dense grout hammered in with steel tool and hammer. Through-bolt holes coordinate dry pack dense grout application with vinyl plug.
- D. Grouting Machinery Foundations:
 - 1. Use nonshrink hydraulic cement grout except where equipment supplier specifically recommends nonshrink epoxy grout.
 - 2. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by abrasive blasting, chipping, or by mechanical means to remove any soft material. Surface roughness in accordance with manufacturer's written instructions.
 - 3. For nonshrink hydraulic cement grout, thoroughly clean concrete surface and metal surfaces to be in contact with grout to remove all paint, oil, grease, loose rust, and all other foreign matter.
 - 4. For nonshrink epoxy grout, thoroughly clean concrete surface and abrasive blast metal surfaces to be in contact with grout unless grout manufacturer states in writing that abrasive blasting is not necessary.
 - 5. Set machinery in position and wedge to elevation with steel wedges or use cast-in leveling bolts. Remove wedges after grout is set and pack void with grout.
 - 6. Form with watertight forms at least 50 mm higher than bottom of plate.
 - 7. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative's training instructions.
 - 8. If grout cannot be placed from one edge and flowed to the opposite edge, air vents shall be provided through the plate to prevent air entrapment.
 - 9. Radius all corners of grout pad.
 - 10. Install expansion joints for epoxy grout placement in accordance with manufacturer's written instructions.

3.2 GROUTED-IN DOWEL FOR CONNECTING TO EXISTING CONCRETE

- A. Using a Hydraulic Cement Based Dowelling Grout:
 - 1. Drill hole in existing concrete of diameter equal to diameter of dowel bar plus [20] mm.
 - 2. Clean hole of dust and debris.
 - 3. Fill hole to surface with dowelling grout.
 - 4. Install dowel bar and wipe away overflow.

5. Secure dowel bar firmly in position and do not disturb bar for minimum of 24 hours after installation.

B. Using an Epoxy Type Dowelling Grout:

1. Drill hole and install dowel in accordance with manufacturer's printed instructions.

3.3 ALTERATIONS TO EXISTING CONCRETE

A. General:

1. Cut out, remove, or modify parts of existing concrete structures, roughen surfaces, cut keys, weld bars, and carry out other items of work as required.
2. Use satisfactory methods which will not result in damage to equipment or other parts of the structures by vibration, dust, water, or other contaminants.
3. Verify actual conditions before beginning alterations.
4. After alterations are done, repair surface defects and damaged areas and finish surface to match adjacent areas.

B. Cutting Construction Joint keys in Existing Concrete:

1. Where slabs or walls are placed against existing concrete cut a 40 mm deep continuous standard key.
2. Roughen surface and provide thoroughly bonded concrete.

C. Finishing of Existing Concrete Surfaces:

1. As a result of alterations where previously exterior faces become interior, abrasive blast and clean entire surface.
2. Patch surface depressions with sand-cement mortar.
3. Grind smooth fins and protrusions.
4. Apply sack-rubbed finish to entire exposed surface to match adjacent interior surfaces.

D. Refinishing:

1. Refinish cut edges of openings flush and smooth, with a bonding agent and concrete or with a non-shrink non-ferrous pre-blended hydraulic cement grout of same colour as adjacent concrete.
2. Cut back exposed reinforcing bars 25 mm from the finished surface level. Fill voids at each bar with grout. Grind edges smooth after repairs and modifications have been completed.

E. Existing Reinforcing Dowels Encased in Lean Concrete or Lime Mortar:

1. Break out existing encasement and expose reinforcing dowels. Clean individual bars to bare metal by abrasive blast cleaning. Straighten bars as required.
2. Report any missing or damaged reinforcing bars to the Engineer before proceeding further.

3.4 FIELD QUALITY CONTROL

A. Evaluation and Acceptance of Nonshrink Hydraulic Cement Grout:

1. Inspect the surface preparation of concrete substrates onto which nonshrink grout materials are to be applied, for conformance to the specified application criteria including, but not limited to, substrate profile, degree of cleanliness, and moisture.
2. Inspect preparation and application of nonshrink grout form work for conformance to the manufacturer's recommendations.
3. Conduct a final review of completed nonshrink grout installation for conformance to these Specifications.
4. Provide a flow cone and cube molds with restraining plates onsite. Continue tests during Project as demonstrated by grout manufacturer's representative.
5. Perform flow cone and bleed tests, and make three 50 mm by 50 mm cubes for each cubic metre of each type of nonshrink grout used. Use restraining caps for cube. Use restraining caps for cube molds in accordance with ASTM C1107/ C1107M.
6. For large grout applications make three additional cubes and one more flow cone test. Include bleed test for each additional cubic metre of nonshrink grout placed.
7. Consistency: Grout with consistencies outside range requirements will be rejected.
8. Segregation: Grout when aggregate separates will be rejected.
9. Tests must show that strength attained by non shrink grout cubes is equal to or greater than minimum strength specified.
10. Strength Test Failures: Remove and replace non shrink grout work failing strength tests.
11. Perform bleeding test in accordance with ASTM C940 to demonstrate grout will not bleed.
12. Store cubes at 21 degrees C.
13. Inspect ambient conditions during various phases of epoxy grouting installation for conformance with the epoxy grout manufacturer's requirements.
14. Inspect the surface preparation of concrete substrates onto which epoxy grout materials are to be applied, for conformance to the specified application criteria including, but not limited to, substrate profile, degree of cleanliness, and moisture.
15. Inspect the surface preparation of the metallic substrates onto which the epoxy primer is to be applied.
16. Inspect the epoxy-primed metallic substrate for coverage and adhesion.
17. Inspect preparation and application of epoxy grout form work for conformance to the manufacturer's recommendation.
18. Verify consistency obtained is sufficient for the proper field placement at the installed temperatures.
19. Inspect and record that the "pot life" of epoxy grout materials is not exceeded during the installation.
20. Inspect epoxy grout for cure.
21. Inspect and record that localized repairs made to grout voids are in conformance with the specification requirements.
22. Conduct a final review of completed epoxy grout installation for conformance to these Specifications.
23. Compression tests and fabrication of specimens for epoxy grout shall be made in accordance to ASTM C579, Method B, at intervals during construction as selected by the Project representative. A set of three specimens shall be made for testing at 7 days, and each earlier time period as appropriate.

24. Independent testing laboratory to prepare, store, cure, and test cubes in accordance with ASTM C579.
25. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

3.5 MANUFACTURER'S SERVICES GENERAL

A. General:

1. Coordinate demonstrations, training sessions, and applicable site visits with grout manufacturer's representative. Allow 2 week notice to grout manufacturer's representative for scheduling purposes.
2. Provide and conduct onsite, demonstration and training sessions for bleed tests, mixing, flow cone measurement, cube testing, application, and curing for each category and type of grout.
3. Ensure necessary equipment and materials are available for demonstration.
4. Conduct training prior to equipment mount installation work on equipment pads.
5. Training for each type of grout shall be not less than 4 hours' duration.

B. Nonshrink Grout Training:

1. Training is required for all Type III and epoxy grout installations.
2. Provide nonshrink grout installation training by the qualified grout manufacturer's representative for Contractor's workers that will be installing nonshrink grout for baseplates and equipment mounts. Schedule training to allow Engineer's attendance.
3. Establish location at site and schedule time for grout manufacturer's demonstration and training session of proposed nonshrink grouts. Mix nonshrink grouts to required consistency, test, place, and cure on actual Project, e.g., baseplates and tie holes to provide actual on-the-job training.
4. Use minimum of two bags for each grout Type II and Type III. Mix grout to fluid consistency and conduct flow cone and two bleed tests, make a minimum of six cubes for testing of two cubes at 1, 3, and 28 days. Use remaining grout for final Work.
5. Include recommended grout curing methods in the training.
6. Transport test cubes to independent test laboratory and obtain test reports.
7. Training by manufacturer's representative does not relieve Contractor of overall responsibility for this portion of the work.
8. Submit a list of attendees that have been satisfactorily trained to perform epoxy grout installation for equipment mounting.

C. Epoxy Grout Training:

1. Provide epoxy grout installation training by the qualified epoxy grout manufacturer's representative for Contractor's workers that will be installing epoxy grout for equipment mounts. Schedule training to allow Engineer's attendance.
2. Include training in:
 - a. Performance testing such as compressive strength testing of the epoxy grout.
 - b. All aspects of using the products, from mixing to application.
3. Transport test cubes to independent test laboratory and obtain test reports.

4. Training by manufacturer's representative does not relieve Contractor of overall responsibility for this portion of the work.
5. Submit a list of attendees that have been satisfactorily trained to perform epoxy grout installation for equipment mounting.

END OF SECTION

SECTION 05502

METAL FABRICATIONS (STRUCTURAL)

PART 1 PRODUCTS

1.1 STEEL SUPPORT FRAMES FOR FLOOR PLATE AND GRATING

- A. Steel angle support frames to be embedded in concrete shall be stainless steel Type 304 unless indicated otherwise.
- B. Provide stainless steel anchors for stainless steel support frames.

1.2 CHECKERED FLOOR PLATE

- A. Fabricate angle frames and border bars with the following features:
 - 1. Corners neatly fitted, welded, mitred.
 - 2. Shop welded border bars.
 - 3. Weld strap anchors to angle frames for casting into concrete.
 - 4. Size angle frames to fit floor plate with clearances between frames and floor plate not exceeding 3 mm on any side.
- B. Material:
 - 1. Stainless Steel: ASTM A793, AISI Type 304 .
 - 2. Aluminum: ASTM B632/B632M, Alloy 6061-T6.
- C. Minimum Thickness:
 - 1. Steel and Stainless Steel: 6 mm, unless shown otherwise on Drawings.
 - 2. Aluminum: 10 mm, unless shown otherwise on Drawings.
- D. Surface shall be raised-lug pattern or diamond tread, unless shown otherwise on Drawings.

1.3 FIXING ANGLES

- A. Fabricate fixing angles where indicated and as detailed on the Drawings.
- B. Material:
 - 1. Stainless Steel: ASTM A793, AISI Type 304.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Clean off dirt on installed miscellaneous metal surfaces.

END OF SECTION

SECTION 15060

PIPING SUPPORT SYSTEMS

PART 1 GENERAL

1.1 WORK OF THIS SECTION

- A. Work of this Section includes furnishing and installation of pipe support systems. Comply with support design details shown on the Drawings.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
 - 1. American Society of Mechanical Engineers (ASME):
 - a. B31.3, Process Piping.
 - b. B31.9, Building Services Piping.
 - 2. American Society for Testing and Materials (ASTM):
 - a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - b. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - c. A780/A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - 3. Canadian General Standards Board (CGSB):
 - a. 1-GP-181, Ready-Mixed Organic Zinc-Rich Coating.
 - 4. Canadian Standards Association (CSA):
 - a. B51 Boiler, Pressure Vessel, and Pressure Piping Code.
 - 5. Manufacturers Standardization Society (MSS):
 - a. SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application and Installation.
 - 6. National Building Code of Canada (NBC), with Manitoba Amendments.

1.3 DEFINITIONS

- A. Wetted or Submerged: Submerged, less than 300 mm above liquid surface, below top of channel wall, under cover or slab of channel or tank, or in other damp locations.
- B. Design Differential Temperature: The temperature differential between the piping design temperature and outdoor winter 1 percent design temperature as defined by the governing building code.

PART 2 PRODUCTS

2.1 GENERAL

- A. When specified items are not available, fabricate pipe supports of correct material and to general configuration indicated by catalogs.
- B. Support material to be as follows unless otherwise approved:
 - 1. Commercially available clamps, clevis', rods, brackets, nuts and bolts – hot-dip galvanized carbon steel;
 - 2. Fabricated structural steel members and anchor plates – hot-dip galvanized carbon steel;
 - 3. Concrete anchors – galvanized carbon steel

2.2 PIPE HANGERS

- A. Clevis Type:
 - 1. MSS SP-58, Type 1.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 260.
 - b. Cooper B-Line; Figure B3100.
- B. J-Hanger:
 - 1. MSS SP-58 Type 5.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 67.
 - b. Cooper B-Line; Figure B3690.
- C. Adjustable Split-Ring Type:
 - 1. MSS SP-58 Type 6.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 104.
- D. Adjustable Split-Ring Type with Turnbuckle:
 - 1. MSS SP-58 Type 11.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 108 with Figure 230.
- E. Extension Split Pipe Clamp:
 - 1. MSS SP-58 Type 12.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 138R.
 - b. Cooper B-Line; Figure B3198R or B3198H.
- F. Adjustable Yoke Pipe Roll:
 - 1. MSS SP-58 Type 43.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 181.

- b. Cooper B-Line; Figure B3110.

2.3 SADDLE SUPPORTS

- A. Pedestal Type – Non-Adjustable:
 - 1. MSS SP-58 Type 37.
 - 2. Schedule 40 pipe stanchion, non-adjustable saddle with U-bolt, and anchoring flange.
 - 3. Manufacturers and Products:
 - a. Anvil; Figure 259.
 - b. Cooper B-Line; Figure B3090.
- B. Pedestal Type – Adjustable:
 - 1. MSS SP-58 Type 38, with U-bolt.
 - 2. Schedule 40 pipe stanchion, adjustable saddle with U-bolt, and anchoring flange.
 - 3. Manufacturers and Products:
 - a. Anvil; Figure 265.
 - b. Cooper B-Line; Figure B3092.

2.4 ROLLER SUPPORTS

- A. Roller Chair:
 - 1. Manufacturers and Products:
 - a. Anvil; Figure 175.
 - b. Cooper B-Line; Figure B3120.
- B. Adjustable Roller Support:
 - 1. MSS SP-58 Type 41.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 177.
 - b. Cooper B-Line; Figure B3122.
- C. Pipe Roll:
 - 1. MSS SP-58 Type 44.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 271.
 - b. Cooper B-Line; Figure B3117SL.
- D. Adjustable Pipe Roll:
 - 1. MSS SP-58 Type 46.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 274, 274P, or 275.
 - b. Cooper B-Line; Figure B3118SL.

2.5 BOLTED SUPPORTS

- A. Flange Type:
 - 1. Bolts directly to pipe flange.

2. Adjustable pipe stanchion, single or double pipe supports.
3. Manufacturers and Products:
 - a. Cooper B-Line; Figure B3094.
 - b. Standon; Model S89.

2.6 WALL BRACKETS

- A. Welded Steel Bracket (medium duty):
 1. MSS SP-58 Type 32.
 2. Manufacturers and Products:
 - a. Anvil; Figure 195.
 - b. Cooper B-Line; Figure B3066.
- B. Welded Steel Bracket (heavy duty):
 1. MSS SP 58 Type 33.
 2. Manufacturers and Products:
 - a. Anvil; Figure 199.
 - b. Cooper B-Line; Figure B3067.

2.7 PIPE CLAMPS

- A. Riser Clamp:
 1. MSS SP-58 Type 8.
 2. Manufacturers and Products:
 - a. Anvil; Figure 261.
 - b. Cooper B-Line; Figure B3373.
- B. Offset Pipe Clamp:
 1. Manufacturers and Products:
 - a. Anvil; Figure 103.
 - b. Cooper B-Line: Figure B3148.
- C. Pipe Strap:
 1. MSS SP-58 Type 26.
 2. Manufacturers and Products:
 - a. Anvil; Figure 262.
 - b. Cooper B-Line: Figure B2400.

2.8 CHANNEL TYPE SUPPORT SYSTEMS

- A. Pre-Engineered Support System:
 1. Channel Size:
 - a. Steel: 12-gauge, 41.3 mm wide minimum.
 - b. FRP: 38.1 mm wide minimum.
 2. Members and Connections: Design for all loads with safety factor of 5.
 3. Pipe Clamps: Two-piece clamps for all pipes unless otherwise noted.
 4. Manufacturers and Products:

- a. Anvil; Power-Strut.
- b. Cooper B-Line; Strut System.
- c. UBS Industries; Unistrut.
- d. Tyco; Aickinstrut (FRP system).

2.9 FLOOR-MOUNTED PIPE SUPPORT SYSTEMS

- A. W, H, or HSS shapes steel sections.
- B. MI Industrial Modular Support System supplied by Hilti may be used as alternative support system.
- C. Support system shall be placed at locations not to interfere with equipment maintenance and walkways.

2.10 ACCESSORIES

- A. Hanger Rods, Clevises, Nuts, U-bolts, Sockets, and Turnbuckles: In accordance with MSS SP-58.
- B. Concrete Inserts:
 - 1. MSS SP-58 Type 18.
 - 2. Continuous channel insert with load rating not less than that of hanger rod it supports.
 - 3. Manufacturers and Products:
 - a. Cooper B-Line; Figure B22I, B32I, or B52I.
- C. Beam Clamps:
 - 1. MSS SP-58 Type 21, 28, 29, or 30.
 - 2. Concentric loading type which engage both sides of flange.
 - 3. Manufacturers and Products:
 - a. Anvil; Figure 133 or 292.
 - b. Cooper B-Line; Figure B3050 or B3054.
- D. Insulation Protection Saddles:
 - 1. MSS SP-58 Type 39.
 - 2. Manufacturers and Products:
 - a. Anvil; Figure 160 through 166A.
 - b. Cooper B-Line; Figure B3160 through B3165.
- E. Insulation Protection Shields:
 - 1. MSS SP-58 Type 40.
 - 2. Galvanized steel or stainless steel.
 - 3. Manufacturers and Products:
 - a. Anvil; Figure 167.
 - b. Cooper B-Line; Figure B3151.
- F. Vibration Isolation Pads:

1. Type: Neoprene waffle.
2. Manufacturers and Products:
 - a. Mason Industries; Type W.
 - b. Korfund; Korpad 40.

2.11 PIPE GUIDES

A. Intermediate Guides:

1. Piping 150 mm and Smaller:
 - a. Type: Pipe clamp with oversized pipe sleeve to provide minimum 3.2 mm clearance.
 - b. Manufacturers and Products:
 - 1) Cooper B-Line; B3148 or B3180.
 - 2) Anvil; Figure 103.
2. Piping 200 mm and Larger:
 - a. Type: Specially formed U-bolts with double nuts to provide 6.4 mm minimum clearance around pipe.
 - b. U-Bolt Stock Size:
 - 1) 200 mm Pipe: 15.9 mm.
 - 2) 250 mm Pipe: 19.1 mm.
 - 3) 300 mm Through 400 mm Pipe: 22.2 mm.
 - 4) 450 mm Through 762 mm Pipe: 25.4 mm.

B. Alignment Guides:

1. Piping 200 mm and Smaller:
 - a. Spider or sleeve type.
 - b. Manufacturers and Products:
 - 1) Anvil; Figure 255 or 256.
 - 2) Cooper B-Line; Figure B3281 through B3287.
 - 3) Flexonics; Series PGT.
2. Piping 250 mm and Larger:
 - a. Adjustable double roller type.
 - b. Manufacturers and Products:
 - 1) Anvil; Figure 177 with Figure 171.
 - 2) Cooper B-Line; Figure B3122A.

2.12 PIPE ANCHORS

A. Anchor Chairs:

1. Type: Anchor chair with U-bolt strap.
2. Manufacturers and Products:
 - a. Cooper B-Line; Figure B3147A or B3147B.

PART 3 EXECUTION

3.1 INSTALLATION

A. General:

1. Install support systems in accordance with MSS SP-58, unless shown otherwise.
2. Support piping such that the pipe loads are carried by pipe supports and not by the connected equipment.
3. Support large or heavy valves, fittings, and appurtenances independently of connected piping.
4. Support no pipe from pipe above it.
5. Support pipe at changes in direction and elevation, adjacent to flexible joints and couplings, and where shown.
6. Do not install pipe supports and hangers in equipment access areas or bridge crane areas.
7. Brace hanging pipes against horizontal movement by both longitudinal and lateral sway bracing and to reduce movement after startup.
8. Install pipe anchors where required to withstand expansion thrust loads and to direct and control thermal expansion, where shown and/or where required by Contractor's design.
9. Repair mounting surfaces to original condition after attachments are made.

B. Standard Pipe Supports:

1. Horizontal Suspended Piping:
 - a. Single Pipes: Adjustable swivel-ring, split-ring, or clevis hangers.
 - b. Grouped Pipes: Trapeze hanger systems.
 - c. Furnish galvanized steel insulation protection shield and oversized hangers for insulated pipe.
 - d. Furnish precut sections of rigid insulation with vapor barrier at hangers for insulated pipe.
2. Horizontal Piping Supported from Walls:
 - a. Single Pipes: Wall brackets or wall clips attached to wall with anchors. Clips attached to wall mounted framing also acceptable.
 - b. Stacked Piping:
 - 1) Wall mounted framing system and clips acceptable for piping smaller than 75 mm minimal diameter.
 - 2) Piping clamps that resist axial movement of pipe through support not acceptable.
 - c. Wall mounted piping clips not acceptable for insulated piping.
3. Horizontal Piping Supported from Floors:
 - a. Stanchion Type:
 - 1) Pedestal Type, adjustable with stanchion, saddle, and anchoring flange.
 - 2) Use yoked saddles for piping whose centerline elevation is 450 mm or greater above floor and for exterior installations.
 - 3) Provide neoprene waffle isolation pad under anchoring flanges, adjacent to equipment or where otherwise required to provide vibration isolation.

- b. Floor Mounted Channel Supports:
 - 1) Use for piping smaller than 75 mm nominal diameter running along floors and in trenches at piping elevations lower than can be accommodated using pedestal pipe supports.
 - 2) Attach channel framing to floors with anchor bolts.
 - 3) Attach pipe to channel with clips or pipe clamps.
 - c. Concrete Cradles: Use for piping larger than 75 mm along floor and in trenches at piping elevations lower than can be accommodated using stanchion type.
 - 4. Vertical Pipe: Support with wall brackets and base elbow or riser clamps on floor penetrations.
 - 5. Standard attachments, unless indicated otherwise on the Drawings:
 - a. To Concrete Ceilings: Concrete inserts.
 - b. To Steel Beams: I-beam clamp or welded attachments.
 - c. To Wooden Beams: Lag screws and angle clips to members not less than 62.5 mm thick.
 - d. To Concrete Walls: Concrete inserts or brackets or clip angles with anchor bolts.
 - 6. Existing Walls and Ceilings: Install as specified for new construction, unless shown otherwise.
- C. Intermediate and Pipe Alignment Guides:
- 1. Provide pipe alignment guides (or pipe supports that provide same function) at expansion joints and loops.
 - 2. Guide pipe on each side of expansion joint or loop at a distance of 4-pipe and 14-pipe diameters from each joint or loop.
 - 3. Install intermediate guides on metal framing support systems not carrying pipe anchor or alignment guide.
- D. Accessories:
- 1. Insulation Protection Shield: Install on insulated non-steel piping with oversize rollers and supports.
 - 2. Insulation Protection Saddle: Install on insulated steel pipe. Oversize rollers and supports.
 - 3. Vibration Isolation Pad: Install under base flange of pedestal type pipe supports adjacent to equipment, and where required to isolate vibration.
 - 4. Dielectric Barrier:
 - a. Install between carbon steel members and copper or stainless steel pipe.
 - b. Install between stainless steel supports and non-stainless steel ferrous metal piping.
 - 5. Electrical Isolation: Install 6.4 mm by 75 mm neoprene rubber wrap between submerged metal pipe and oversized clamps.

END OF SECTION

SECTION 15202

PROCESS VALVE GENERAL

PART 1 GENERAL

1.1 SUMMARY

- A. This Supplemental Specification Section specifies supply and installation of all valves and related appurtenances installed on process piping systems. This section must be referenced to and interpreted simultaneously with all other Sections pertinent to the Work described herein.

1.2 SUBMITTALS - REVIEW

- A. Provide catalogue cuts and/or shop drawings for each type of valve and actuator indicating the valve number, materials of construction, dimensions, head loss characteristics through the valve, operating torque and maximum pull on actuator, and valve end configuration.
- B. Provide valve pressure/temperature rating. For bidirectional valves provide rating for both sealing directions.
- C. For butterfly and plug valves provide headloss vs. percent open curves.
- D. Canadian Registry Number (CRN) designated by the Province of British Columbia. Where applicable.
- E. A copy of the specific valve specification sections marked to indicate with check marks where the valve supplied meets the specification and with written amendments with explanation where the product differs from the specification.
- F. On piping submittals, indicate direction of sealing.

1.3 SUBMITTALS - FOR OPERATIONS AND MAINTENANCE MANUALS

- A. Submit operation and maintenance data for incorporation into operation and maintenance manual, including detailed exploded views, a complete numbered list of replacement and repair parts, and supplier and parts manufacturer's contact information.

1.4 QUALITY ASSURANCE

- A. If a CRN is not available, provide a letter notarized in Canada and stating:
 - 1. The standard or code under which the valve was manufactured (ANSI, MSS, AWWA, etc.)
 - 2. If not stated under the code in Item (a), state the pressure/temperature rating of the valve body, seat, and all seals.
 - 3. The quality control program under which the valve was manufactured.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver valves and unload at site using methods which do not damage casings, coatings or any valve or actuator parts.
- B. Clearly tag each valve stating size, type, coatings and mating parts.
- C. Store on site using methods recommended by the manufacturer to prevent damage, stress, weathering or corrosion.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide valves of the same type, size range and service from a single manufacturer.
- B. All valves to have true alignment or bores.
- C. Unless otherwise indicated on the Process and Instrumentation drawings valves shall be the same size as the pipe run in which they are to be installed.
- D. Valves to open counter-clockwise.
- E. The process drawings indicate major process valves required for the process to operate as intended. Where a valve may be required for the process to function correctly or is required to satisfy fire and safety codes but is not shown in the drawings, inform the Engineer and provide details and suggestions for remedial action. Do not commence piping in the related pipe run until obtaining the Engineer's approval.

2.2 VALVE ENDS

- A. Unless otherwise shown on the Drawings, valves less than 75 mm diameter to have female threaded connections conforming to ANSI B1.20.1. Valve sizes greater or equal to 75 mm to have flanged connections to ANSI B16.1 or ANSI B16.5. Valves with grooved joint ends are not to be used without the written approval of the Engineer.
- B. Lug style water body valves shall have tapped holes.

2.3 MANUAL LEVER OR HANDWHEEL ACTUATORS

- A. Provide operator and actuator types as specified on the Drawings.
- B. Provide lever actuators for small diameter quarter turn valves. Operator to be perpendicular to the pipe run when the valve is closed.
- C. Unless noted otherwise on the Drawings, provide lever operator for ball and butterfly valves less than 150 mm diameter, and plug valves less than 100 mm diameter, unless noted otherwise on drawings.

- D. Maximum pull on the end of the lever arm or at the rim of a handwheel not to exceed 300 N when one side of the valve is at test pressure and one side is at atmospheric pressure. If greater force is required, provide suitable gear operator.
- E. Minimum Hand Wheel Diameter:
 - 1. 38 mm valve: 75 mm handwheel.
 - 2. 50 mm valve: 85 mm handwheel.
 - 3. 250 mm valves and larger: 400 mm handwheel.
- F. Minimum Lever Operator Length:
 - 1. 25 mm valve: 125 mm lever.
 - 2. 38 mm valve: 150 mm lever.
 - 3. 50 mm valve: 150 mm lever.
 - 4. 75 mm valve: 175 mm lever.
 - 5. 100 mm valve: 225 mm lever.
 - 6. 150 mm valve: 250 mm lever.

2.4 MANUAL GEAR ACTUATORS

- A. Provide manual gear actuators for valves not specified to have a manual lever operator.
- B. Worm gear operator to be equipped with a non-rising stem handwheel and an integrated visual indicator of the valve position.
- C. Gear operators shall be grease lubricated. Where gear operators are intended for direct bury or submergence, seal units with long life lubricant recommended by the gear operator manufacturer for the specific application. Gear operators for direct bury or submergence to be manufactured in accordance with AWWA C504.
- D. Equip operators with mechanical stop-limiting devices to prevent over travel of the disc, ball or plug in the open and closed positions, self-locking to hold the valve in any intermediate position between full open and full closed. Actuator components between the input and the stop limiting device shall be designed to withstand, without damage, a rim pull of 890 N for a handwheel or chainwheel and an input torque of 400 N m for wrench nuts.
- E. Actuator shall provide 1.25 times required operating torque under full rated line pressure for direct bury or submergence applications, or for commodities with 2% or greater solids content; 1.0 times required operating torque under full rated line pressure in other applications.
- F. Maximum pull at rim of hand wheel with gear operator - 300 N.
- G. Manual operators for buried service valves to include an AWWA operating nut and be gasketed and grease packed for submerged operation at water pressures up to 700 kPa. Where angle valve stem extensions are employed, they shall be angle geared. Provide valve stem extension to surface with cast iron valve box, lid and rock plate.
- H. Operators intended for submerged applications to be rated as such and be grease packed and fully sealed for full submergence up to depths of 7m. Use stainless steel or epoxy

- coated cast or ductile iron enclosures. All stem extensions shall be manufactured from a suitable grade of stainless steel.
- I. Actuator body to be exterior epoxy coated.
 - J. Orientation of valve as per mechanical drawings or to allow for the greatest degree of hand wheel access.
 - K. For manual valves on pipes 75 mm and greater mounted over 2 m above the operating floor, provide chain wheel gear operators, sized so that a force of 150 N is sufficient to open the valve when one side of valve is at test pressure and the other side is at atmospheric pressure. Chain pulley to mesh positively with the chain. Extend chain from valve operator to 1.2 m above the operating floor or as directed by the Engineer, with exact dimensions field determined. Provide approved chain hooks where required to prevent chain from hanging within traffic paths.

2.5 ELECTRIC ACTUATORS

- A. Electric Motor Actuators:
 - 1. General:
 - a. Provide electric actuators suitable for Class 1, Division 1 or Division 2 electrical area classification service, as appropriate, when located in hazardous areas. Refer to the electrical drawings for area classification details.
 - b. All electric motor actuators to be 120 VAC unless approved by the Engineer.
 - c. Comply with AWWA C542.
 - d. Controls integral with the actuator and fully equipped as specified in AWWA 542.
 - e. Provide control interface with SCADA system using hardwired signals.
 - f. Stem protection for rising stem valves.
 - g. Suitable for -40 degrees Celsius to 45 degrees Celsius environment.
 - h. For larger valves requiring the addition of an intermediate gearbox, the gearbox shall be of the same manufacturer as the actuator.
 - i. A design that allows the gear case to be opened for inspection or disassembly without releasing the stem thrust or taking the valve out of service.
 - j. Circuitry which ensures the motor turns in the correct direction irrespective of the supply polarity connected to the power terminal; valves and operator to suffer no damage due to incorrect power connection.
 - k. Instantaneous reversal protection whereby an automatic time delay circuit limits the current surges when an actuator is signaled to instantaneously reverse its direction.
 - l. Anti-hammer protection whereby electronic torque limitation switches off the actuator when a preset load is reached due to an obstruction or end of travel.
 - m. Bi-metal thermostat embodied in the motor control transformer windings to prevent overheating due to extensive use.
 - n. Jammed valve motor protection whereby a logic circuit protects the motor from overheating by de-energizing the motor if the valve does not move after developing maximum torque.
 - o. Provide a minimum of 6 independently configurable latching relays for remote indication.
 - a) Relay 1 shall make when valve is fully closed.

- b) Relay 2 shall make when valve is fully open.
 - c) Relay 3 shall break when valve is fully closed.
 - d) Relay 4 shall break when valve is fully open.
 - e) Relay 5 for collective fault (torque fault and other electrical faults).
 - f) Relay 6 shall indicate when remote is selected.
 - p. Opto-isolators incorporated to interface with remote control inputs to protect the logic circuits from high voltage transients appearing at the actuator terminals.
 - q. Actuator shall include a diagnostic module which will store and enable download of historical actuator data to permit analysis of changes in actuator or valve performance. Retrieval of this information must be demonstrated in the field.
2. Open/Close Service:
- a. Size motors for continuous duty.
 - b. Actuators to be sized with a minimum 2.0 safety factor based on the maximum unseating and seating torque of the valve. The safety factor shall be demonstrated and documented at time of commissioning under real service conditions using actuator software. Motor stall torque not to exceed torque capacity of valve.
 - c. LOCAL-OFF-REMOTE Selector Switch:
 - a) Pad lockable in each position.
 - b) Integral OPEN-STOP-CLOSE selector with seal-in circuits to control valve in LOCAL position.
 - c) OPEN / CLOSE command signals from PLC to control valve in REMOTE position.
 - d) Auxiliary contact that closes in REMOTE position.
 - e) Valve end position limit switch signals for OPENED / CLOSED status.
 - f) OPENED and CLOSED indicating lights.
 - d. Valves shall close upon loss of signal or loss of power unless indicated otherwise.
 - e. AC motor with solid state reversing starter or dc motor with solid state reversing controller and built-in overload protection. Non-solid-state compliant equipment will not be acceptable. Controller capable of 1200 starts per hour.
 - f. Duty cycle limit timer and adjustable band width, or equivalent, to prevent actuator hunting.
3. Actuator Operation - General:
- a. Suitable for full 90-degree rotation of quarter-turn valves or for use on multiturn valves.
 - b. Manually override handwheel.
 - c. Valve position indication.
 - d. Operate from FULL CLOSED to FULL OPEN positions or the reverse in a minimum of 60 seconds.
 - e. Nonintrusive Electronics: Local controls, diagnostics, and calibration, including limit and torque switch settings, shall be accomplished non intrusively. Electronic valve position display with capability to show continuous torque output. If applicable, provide two hand-held configuration units for every 10 actuators provided, two minimum.
4. Specific Operational requirement:

- a. Due to the nature of the wet well and the location of the valves, there is a set of LOCAL/OFF/REMOTE selectors and OPEN/STOP/CLOSE selectors on the PLC panel located at grade in the Lunch Room.
- b. Provide the interconnect wiring drawings between the said Selector switches as above and the Integral selectors on the valve actuator, to enable valve operation as detailed below for each of the 5 valves:

Mode selection at L-O-R on Actuator	Mode selection at L-O-R on PLC panel	Operation enabled
L	L	Via Control elements on Valve actuator
R	L	Via Control elements on PLC panel
R	R	From PLC
L	R	Not allowed

5. Enclosure:
 - a. Unless otherwise indicated, provide enclosure as defined in NEMA 250, Type 6P.
 - b. Contain 120-volt space heaters or electrical compartment shall be non-breathing to prevent condensation.
6. Limit Switch:
 - a. Single-pole, double-throw (SPDT) type, field adjustable, with contacts rated for 5 amps at 120 volts ac.
 - b. Each valve actuator to have a minimum of two transfer contacts at end position, one for valve FULL OPEN and one for valve FULL CLOSED.
 - c. Housed in actuator control enclosure.
7. Tag Nos and Qty: HSV 601, HSV 602, HSV 603, HSV 604, HSV 605 / 5 nos
8. Manufacturers and Products:
 - a. AUMA rotary Actuator (SAR Series).

2.6 VALVE IDENTIFICATION

- A. Tag all valves using 304 stainless steel tags with 12 mm high engraved letters and numbers. Fill numbers and letters with black paint. Attach tag to valve using a 304 stainless steel chain or braided wire. Inscription to include valve size in mm, manufacturer and model number.

2.7 COATING

- A. Coat all carbon steel, ductile iron and cast iron valves and actuators for corrosion protection. Use liquid or fusion bonded epoxy or approved equal.
- B. All valves and actuators to be provided with factory applied coatings rated warranted for the intended service application.

PART 3 EXECUTION

3.1 PREPARATION

- A. The valve and piping arrangement indicated on the drawings is based on typical dimensions for valves of the specified type. Make all necessary modifications in the Work to allow for discrepancies between the valve dimensions shown and those supplied for the Work, at no extra cost.
- B. Ensure that valve location and orientation provides suitable access to manual operators and that sufficient space and accessibility is available for automatic actuators.
- C. Ensure that valve location and orientation provides sufficient space for tightening of flange and valve nuts with a standard wrench.
- D. Ensure that valve actuators can operate without conflicting with other piping, equipment, structures or insulation. Do not cut insulation to allow valve actuators to operate. Where conflicts are identified, inform the Engineer and propose modifications. Do not commence work on the affected piping run until modifications are approved.

3.2 INSTALLATION

- A. Install all valves in accordance with manufacturer's instructions.
- B. In horizontal pipe runs other than in locations where space does not permit, mount all valves except for butterfly valves and trunnion ball and plug valves with a vertical operating shaft with the actuator at the top. In no case install a valve with the operator shaft pointing down.
- C. Mount butterfly valves and trunnion ball and plug valves with the shaft in a horizontal orientation. Plugs to rotate to top of pipe to open. Disks to swing up in direction of flow to open.
- D. Provide spool pieces between butterfly valves, swing check valves and fittings as required to allow for free disc movement.
- E. Do not over torque bolts to correct for misalignment.
- F. Support valves in position using temporary supports until valves are fixed in place.

3.3 COATING

- A. Repair and damage to shop coating as recommended by valve manufacturer, including and not limited to:
 - 1. Steel brushing for removal of any rust.
 - 2. Solvent cleaning of repair and surrounding area.
 - 3. Priming coat.
 - 4. Two coats of top coat.

3.4 TESTING

- A. All valves to be shop tested according to current applicable ANSI or AWWA Standards and the standards under which the valves were manufactured.
- B. Operate valves under simulated and/or real process conditions to ensure valves operate as intended.
- C. Pressure test valves in conjunction with the pipes in which the valves are installed.

END OF SECTION

SCHEDULE 8 – OTHER RELEVANT DOCUMENTS

Title	Ref. No.	Date	Rev
Contractor \$5MM CGL insurance certificate – to come			
Contractor \$2MM pollution liability insurance certificate – to come			
Contractor performance bond – to come			
Contractor labour and material bond – to come			
Contractor Worksafe BC clearance letter – to come			

Document #:	WWS-COM-10.1
Revision #:	17
Effective Date:	31 January 2020
Reviewed by:	L. Mueller, EMS Coordinator
Approved by:	I. Lundman, Operations Sup't

WWS-COM-10.1 Contractor-Supplier Package

The purpose of this package is to convey the requirements of Regional District of Nanaimo Wastewater Services' (WWS) Environmental Management System (EMS) to contractors and suppliers. This package is applicable to all wastewater treatment facilities and pump stations.

As a contractor or supplier to WWS, you have a responsibility to comply with all provisions identified in the Contract Documents regarding Environmental Protection. Where Contract Documents do not exist, the service provider will comply with Sections Two, Three and Four.

Please retain a copy for your records.

PACKAGE CONTENTS:

1.0 General Overview: ISO 14001

- 1.1 Environmental Management System (EMS)
- 1.2 Environmental Policy and ISO Clause
- 1.3 Environmental Aspects and Impacts
- 1.4 Environmental Objectives and Targets

2.0 Operating Procedures

3.0 Emergency Preparedness and Response Procedures

4.0 Environmental Specifications

- 4.1 Air Emissions
- 4.2 Cleaning Equipment
- 4.3 Dust Control
- 4.4 Energy Consumption
- 4.5 Hazardous Materials
- 4.6 Noise
- 4.7 Sensitive Areas
- 4.8 Spills
- 4.9 Surface Water Control
- 4.10 Waste Management - Solid Non-Hazardous Waste

5.0 Attachments

- Environmental Policy
- ISO Clause

I, _____ of _____
(please print name) (please print company name)

acknowledge that I have received a Contractor-Supplier Package (ISO 14001 Contractor Supplier Environmental Performance Requirements) containing the materials listed above.

(Date)

(Supplier/Contractor Employee's Signature)

(Date)

(WWS Project Manager's Signature)

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1.0 GENERAL OVERVIEW: ISO 14001

1.1 Environmental Management System (EMS)

- An EMS is the part of an organization's management system, used to develop and implement its environmental policy and manage its environmental aspects.
- It includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources.

1.2 Environmental Policy and ISO Clause

- An Environmental Policy is a statement by the organization of its overall intentions and direction related to its environmental performance. It provides a framework for action and for the setting of environmental objectives and environmental targets.
- It is a driver for implementing and maintaining our EMS and reflects commitment to continual improvement, legal compliance and prevention of pollution
- The Environmental Policy is posted at each of the WWS wastewater treatment facilities and pump stations, and is available on the RDN website: www.rdn.bc.ca
- Uncontrolled copy of the Environmental Policy attached (Section 5.0 of this package)
- Uncontrolled copy of WWS' ISO Clause (Section 5.0 of this package)

1.3 Environmental Aspects and Impacts

- Environmental Aspect: element of an organization's activities, products or services that can interact with the environment.
- Environmental Impacts: any changes to the environment whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
- Environmental impacts include:
 - Air Pollution and Odour
 - Depletion of Natural Resources (Energy Use)
 - Landfill (Garbage)
 - Noise
 - General Repairs-Construction (Sensitive Areas)
 - Sewage Bypass (Leak/Spill)
 - Treatment Disposal (Hazardous Waste)

1.4 Environmental Objectives and Actions

- Environmental Objective: overall environmental goal consistent with the environmental policy, that an organization sets itself to achieve.
- Environmental Target: a detailed performance requirement that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
- Objective and Targets are set to minimize environmental impacts.
- Any legal requirements that must be met by the organization (i.e. permit requirements) help create the objectives and targets.

Document #:	WWS-COM-10.1
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2.0 OPERATING PROCEDURES

- All WWS wastewater treatment facilities have Operating Procedure Manuals.
- Procedures applicable to contractors and suppliers will be supplied by the WWS Project Manager at pre-construction meetings or prior to the work commencing.
- Contractors and Suppliers will be required to sign a Procedure Checklist acknowledging that they have received copies of applicable procedures at a pre-construction meeting or prior to commencing work on site.
- The WWS Project Manager will ensure that a site induction is completed prior to work commencing as per the ISO Clause attached. (Section 5.0 of this package)

3.0 EMERGENCY PREPAREDNESS AND RESPONSE PROCEDURES

- All WWS wastewater treatment facilities have Emergency Preparedness and Response Procedure Manuals.
- Procedures applicable to contractors and suppliers will be supplied by the WWS Project Manager at pre-construction meetings or prior to the work commencing.
- Contractors and Suppliers will be required to sign a Procedure Checklist acknowledging that they have received copies of applicable procedures at a pre-construction meeting or prior to commencing work on site.
- The WWS Project Manager will ensure that a site induction is completed prior to work commencing as per the ISO Clause (Section 5.0 of this package).

4.0 ENVIRONMENTAL SPECIFICATIONS

Contractors and suppliers must abide by the following environmental specifications while working on site, as applicable.

4.1 Air Emissions

- Contractors and Suppliers will ensure that excess vehicle idling is minimized.
- Contractors will ensure that their staff are trained in the proper use and handling of all materials and chemicals to ensure air emissions/odours are minimized.
- No open burning of waste materials is permitted.

4.2 Cleaning Equipment

- Do not clean equipment in streams/rivers or lakes.
- Clean construction equipment prior to entering roadways.
- Do not clean equipment in locations where debris can gain access to sewers, watercourses or aquifers.

4.3 Dust Control

- Transport dusty materials in covered haulage vehicles.
- Public roadways shall be kept clean and free of mud.

4.4 Energy Consumption

- Contractors and Suppliers will use energy efficient equipment when undertaking any work on a job site, where practical.
- Contractors and Suppliers staff will turn off lights and equipment when not in use and where practical when on a job site.

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4.5 Hazardous Materials

- Hazardous materials brought on site and removed shall be managed in accordance with current MOE Regulations current at the time of work.
- Governing Ministry of Labour Regulations respecting protection of works, remedial handling and disposition of Designated Substances encountered shall be followed.
- Do not empty fuel, lubricants, herbicides, pesticides, fungicides, paint materials, solvents or other chemicals into sewers or watercourses (only legally acceptable disposal methods are acceptable).

4.6 Noise

- Use vehicles and equipment with efficient muffling devices.
- Provide and use devices that will minimize noise levels in construction areas.
- Minimize noise resulting from activities while on-site whenever practical.

4.7 Sensitive Areas

- Inform WWS staff in writing of the particular schedule for each river crossing, channelizing or other work in the designated sensitive areas.
- Avoid encroachment on unique natural areas and establish boundary protection and signage to avoid encroachment.
- Do not disturb habitats of rare or endangered species. Agree and implement mitigative measures with WWS staff.
- Protect wetland sites used as feeding or breeding areas by migratory fowls or as habitats for other animals and establish boundary protection and signage to avoid such encroachment.
- Schedule construction in sensitive areas so that there will be minimal interference with water uses including fish migration or spawning, or disruption of incubation periods for eggs.
- Keep removal of vegetation to a minimum.
- Contain and deposit on land all aquatic plants uprooted or cut prior to or during construction.

4.8 Spills

- If requested, the contractor will provide to the WWS Project Manager for approval an Environmental Plan which addresses spill prevention, and spill response and communication.
- The contractor will be provided with a WWS Spill Response procedure in the event an Environmental Plan is not requested by WWS. If the contractor is provided with a WWS Spill Response procedure, the contractor will be required to follow instructions assigned to 'operator' in the procedure.
- Spill containment must be provided for any equipment containing fuel.
- Be prepared at all times to intercept, clean up and dispose of any spillage that may occur whether on land or water.
- Keep all materials required for clean-up of spills readily accessible on-site (e.g. spill kit)
- The contractor must dispose of all spillage and contaminated material the contractor generates. Contaminated material may not be stored on site.
- Report spills to EMBC at 1-800-663-3456 as per the *BC Spill Reporting Regulation*, which applies for the purposes of the *BC Environmental Management Act*.
- Notify WWS staff immediately if there are any spills and provide the EMBC confirmation number, where one has been provided.
- Results of all spill investigations must be forwarded to the WWS Project Manager and Chief Operator of the facility at which the spill occurred.

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- Reporting of releases is also a requirement of federal and other provincial legislation, including the Canadian Environmental Protection Act, and the Transportation of Dangerous Goods Act.

4.9 Sediment and Erosion Control

- The contractor, where ground work is required, will follow the project's sediment and erosion control plans.
- If no sediment and erosion control plan is in place the following procedures should be used :
 - Control all surface water and groundwater including rainfall and run-off. Ensure that erosion is controlled and that flooding of excavations or damage to structures does not occur.
 - Intercept surface drainage as far back from excavations as practical by means of ditches, berms or other interception methods as may be required for effective control.
 - Direct pumped water or run-off to settling ponds or sediment basins prior to discharge to adjacent storm sewers or watercourses as per provincial and federal regulations
 - The contractor is to discharge only to RDN approved discharge point(s).
 - Intercept and divert concentrated run-off from unstable areas under sheet flow conditions, as directed by the Engineer.
 - Do not direct any flow of water across or over pavements, except through approved pipes or properly constructed troughs.
 - Keep gutters and drainage ditches open at all times to provide adequate surface drainage.
 - Maintain all existing storm sewers clean and free of deleterious materials and blockages.
 - Provide splash pads where water is discharged to the watercourse.
 - Dispose of water so as not to be injurious to public health or safety, to property or to any part of work completed or under construction.
- The contractor must follow any other requirements identified in the contract document with WWS.

4.10 Waste Management – Solid Non-Hazardous Waste

- No open burning is permitted.
- All wastes generated by contractors will be cleaned-up and disposed of as per BC Ministry of Environment Regulations.
- Whenever possible Contractors and Suppliers should utilize recycling opportunities for the disposal of waste.

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5.0 ATTACHMENTS



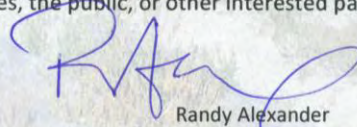
RDN Wastewater Services Environmental Policy

The Regional District of Nanaimo's (RDN) Wastewater Services (WWS) Environmental Policy reflects the values and priorities of the RDN's Board Strategic Plan 2019 - 2022, Regional Growth Strategy and Liquid Waste Management Plan.

The RDN's WWS is committed to providing reliable, high quality, and cost-effective wastewater services to the people and communities we serve. We strive to optimize our treatment and re-use processes and employ proven pollution prevention strategies at our facilities to protect and enhance the natural environment for future generations. In fulfillment of this commitment, it is the WWS policy:

- To do our utmost to comply with the letter and spirit of relevant environmental laws and regulations. There shall be thorough and accurate measurement and reporting of our environmental compliance.
- To prevent pollution. This includes improving the quality of treated wastewater and avoiding or reducing environmental pollution produced directly from WWS operations, or indirectly by the consumption of power, fuel, chemicals, and other resources.
- To identify and monitor environmental impacts and set measurable objectives and targets to reduce those impacts on the environment.
- To foster openness and dialogue with employees, First Nations and the public, including community engagement and public outreach, and respond to their concerns about potential hazards and impacts of our operations.
- To continually improve our performance relevant to this environmental policy.

This policy will be communicated regularly to all WWS staff and will be made available to regulatory agencies, the public, or other interested parties upon request.



Randy Alexander

General Manager, Regional and Community Utilities

Date: 20 November 2019

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Approved by:	I. Lundman, Operations Sup't

ISO CLAUSE

Whereas the Regional District of Nanaimo's Wastewater Services (WWS) is operating to the ISO 14001:2015 standard, it is a condition of this contract that the Contractor comply with the WWS' Environmental Management System (EMS).

As per PM-08.0 Element 7.2 Competence and Element 7.3 Awareness, paragraph 5.11 of the WWS' EMS Policy and Procedure Manual:

1. Any contracted personnel whose activities can create a significant impact (as defined by the WWS' EMS) on the environment are required to undergo training. Such training will require one session of approximately one half hour.
2. While the Regional District of Nanaimo (the RDN) will provide the initial training to a representative Contractor, it is the responsibility of the Contractor to train the Contractor's own personnel, as well as any personnel of the Contractor's Subcontractor who will be working on a site of WWS.
3. The Contractor hereby warrants that it will provide any ISO 14001 related training which the RDN deems necessary to the Contractor's own personnel and any personnel of the Contractor's Subcontractor and will forward records thereof to the RDN at no additional charge to the RDN.



Date: July 13, 2020

Attention: Don MacFadgen
Senior Regional Officer
WorkSafe BC
4980 Wills Road Nanaimo, BC
V9T 6C6

EXAMPLE ONLY

Attention Mr. MacFadgen,

Re: Application for Acceptance of Alternate Isolation Measures for Confined Space Entry – Wellington and Chase River Pump Station Wet Wells

Enclosed is The Regional District of Nanaimo – Greater Nanaimo Pollution Control Centre's application for acceptance of updated alternate isolation measures for access into the Wellington and Chase River Pump Station Wet Wells. These spaces are very similar and therefore a combined application is being submitted. The spaces are located within the Regional District of Nanaimo, both specifically within the City of Nanaimo.

This is the second time an application for these spaces is being submitted. Previously Occupation Hygiene Officer Sus de Leeuw was the issuing officer, **201916961065A**. There are no changes from the initial application with the exception of the requesting the new acceptance be valid for a period of 5 years as this is very routine work.

In putting together this application, we have worked extensively with our qualified persons, Jason Hindson, CRSP and Karren Kossey, CRSP of ORCA Health and Safety Consulting Inc. (ORCA), to create the required documents in support of this application. Please feel free to communicate with them directly in regard to this application.

We are available and prepared to meet with you to answer any questions that you may have in order to ensure that this application is accepted in a timely manner.

I can be reached by telephone at 250-816-2767 (cell).

Sincerely,

A handwritten signature in black ink, appearing to read "R. Skwarczynski", written over a horizontal line.

Robert Skwarczynski
Chief Operator
Greater Nanaimo Water Pollution Control Centre



Attachments:

- 1) 9.22 Application – Wellington and Chase River Pump Station Wet Wells
- 2) JHSC Representative letter confirming review of 9.22 Application
- 3) Wellington and Chase River Pump Station Wet Wells - Hazard Assessment
- 4) Wellington and Chase River Wet Wells - Entry Procedure
- 5) Isolation Procedure for Wellington Pump Station Wet Well (WPS)
- 6) Isolation Procedure for Chase River Pump Station Wet Well (CRPS)
- 7) Diagram 1 (Side Profile of Wellington Wet Well)
- 8) Diagram 2 (Side Profile of Chase River Wet Well)
- 9) Confined Space Rescue Plan
- 10) Written Rescue Agreement with City of Nanaimo Fire Department

EXAMPLE ONLY

Wellington and Chase River Pump Station Wet Wells

9.22 Application for Alternate Isolation Procedures

1.0 Overview/ Description of Space

The Regional District of Nanaimo (RDN) – Greater Nanaimo Water Pollution Control Centre requests approval of alternate isolation measures for its workers and contractors to enter two spaces. Specifically, Wellington Pump Station Wet Well and Chase River Pump Station Wet Well. Once the spaces are isolated, as per the submitted alternate isolation measures, the wet wells will have any residual grit removed via a vacuum truck, if deemed necessary. The planned tasks will not have an impact on the isolation means.

The wet wells are located at the bottom of pump stations. To access the wet well a worker must pass through the station to reach the access hatches to the wet wells themselves. The portion of the pump station the worker must pass through is designed for continuous human occupancy. Wellington Pump station has a ladder to access its lower portion while Chase River has stairs (see Diagram 1 and 2 included in this application package). To enter each of these a safe work procedure has been developed.



Wellington Pump Station Wet Well



Chase River Pump Station Wet Well

2.0 Why Isolation is Not Practicable as Specified in 9.18 of the OHSR

Isolation of these spaces as per 9.18 of the regulations is not possible because of the design of the system. This system relies on the use of valves and sluice gates to isolate flows to allow for maintenance and repairs. The cost of upgrading the system to meet 9.18 is not practicable.

3.0 Confined Space Administrator

Ian Lundman
Operations Superintendent
RDN - Wastewater Services
250-758-1157
ilundman@rdn.bc.ca

Qualified Person(s)

Jason Hindson, CRSP – ORCA Health and Safety Consulting Inc.
(250) 618-6022
j.hindson@orcasafety.ca

Karren Kossey, CRSP – ORCA Health and Safety Consulting Inc.
(250) 618-3481
k.kossey@orcasafety.ca

4.0 Description of Hazards and Associated Alternate Measures Used to Control Hazards

A. Atmospheric Hazards: Oxygen Deficiency, Hydrogen Sulfide, Methane (LEL)

There is a potential for decomposition gases, specifically hydrogen sulphide and methane (H₂S and CH₄ respectively). Consumption of oxygen occurs when organic matter breaks down, thus, lack of oxygen is also possible.

To control atmospheric hazards in these wet wells the space will first be isolated, cleaned as much as possible from the outside and then supplied with positive pressure dilution ventilation will be used. The space will be ventilation for 15 minutes before entry and continuously while the entrant in in the space.

Atmospheric Hazard Controls

- **Washing from Outside**

The possibility exists that gases will be trapped in the residual material that will remain after draining the spaces. Before entering the spaces, they will be washed from the deck level as much as possible. The majority of remaining material will be grit, coarse sand and gravel. If the is sufficient grit and it is decided it must be removed, the goal will be to remove as much as possible without entering the space. However, before entering the space, any remaining sewer debris and grit will at least be disturbed with a hose to release any potentially trapped gases BEFORE completing ventilation prior to entry. In addition, while washing the wet wells, the pumps will remain running allowing water to be drawn up the outlets and remain in the pipes, held back by a valve and check valve, rather than simply containing sanitary sewage.

- **Gas Monitoring:**

The entrant will wear a 4-gas monitor into the space.

4 Gas Monitor Alarm settings:

Gas		Low Alarm	High Alarm
Oxygen	O ₂	20.5%	22.0%
Hydrogen Sulfide	H ₂ S	5 ppm	10 ppm
Lower Explosive Limit (Cal. To Methane, CH ₄)	LEL	5%	10%
Carbon Monoxide	CO	10 ppm	25 ppm

- The gas monitor will be calibrated, as per the manufacturers specifications and bump tested on the same day prior to use.
- The spaces will be tested prior to entry for oxygen (O₂) deficiency, LEL %, Hydrogen Sulfide (H₂S), Carbon Monoxide (CO).
- The space will be continuously monitored by the entrant wearing a 4-gas monitor into the space.
- If the monitor alarms, the entrant must immediately identify why and if the reason is not known, the entrant must exit the space.
- Re-entry will be authorized only when the entrant's supervisor has determined that any identified issue has been adequately addressed.
- 4 Gas-monitor will be logged on the entry permit at least every 20 minutes by the standby person.
- Standby person will be in continuous communication with entrants by voice.
- **Ventilation:**
 - Each wet well will be ventilated by blowing 900 cfm into space for 15 minutes prior to entry and continuously while in space.
 - This will provide ~20 air exchanges per hour or a complete air exchange every 3 minutes.
 - Ventilation will provide dilution ventilation (positive pressure).
 - Ensure the intake of the fan for the wet wells is near the outlet, the end of the poly duct, of the bigger fan.
 - The duct will be extended within 24" of the bottom of the space.
 - Ensure the end of the duct is within 10 ft. of the entrant's location and preferably directed toward him/her.
 - Ensure the fan is set up so that fresh air is being drawn from the outside.
 - In addition to general dilution ventilation, the vacuum truck will provide a limited degree of point source exhaust ventilation as the grit is being disturbed/pulled from the space.
- **Isolation:**
 - The incoming flow to the wet wells will be stopped by sluice gates, one for each space. Fluid will remain against the sluice gate within the pipe. This will greatly reduce any potential for gases to seep past the isolation means, the sluice gate, and into the space. The outlets will have water in them, as a result of washing, again greatly reducing the risk of any gases from entering the space through the planned isolation means.

B. Infectious Hazards – Sewer Exposure

These Wet Wells are part of the sanitary sewage collection system. Hepatitis A is the most prevalent infectious hazard from sewer systems. Excessive contact with sewage has been found to increase the exposure to Hepatitis A. Other hazards include giardiasis and leptospirosis.

During normal operation, untreated sanitary sewage collected from the residents of Nanaimo is collected in both wet wells from which it is pumped to a force main and travels to the Greater Nanaimo Pollution Control Centre for treatment.

Before entering, the wet well will be drained, flushed and then washed with a hose. However, there will be up to approximately 1 foot of grit, mostly coarse sand and gravel, remaining in the bottom. This is the material to be removed by the vacuum truck, if deemed necessary.

Infectious Hazard Controls

- The wet wells will be drained, flushed and washed with a hose from the outside prior to entry. An infectious hazard potential will be reduced but still presented.
- Entrants will wear Tyvek Coveralls, Rubber CSA Safety Toe Boots, Hard Hat, Nitrile and Work Gloves and Safety Glasses, Full-face respirator with P100/OV/AG cartridges.
- Once the space is fully washed and it is being inspected the entrants can wear coveralls instead of Tyvek.
- Do NOT use hands to handle any material in the space. Only use tools.
- Decontamination with soap and water after immediately exiting the space is required.
- All staff that are exposed to biological sewage hazards are offered Hepatitis B immunizations from the RDN

C. Isolation/ Lock-out Hazards

Each Wet Well has a number of adjacent pipes that must be isolated. Below is a summary of those points and the pipes contents. See the attached isolation procedure for each Wet Well.

Adjacent Piping and Contents	
 Adjacent Piping – Wellington Wet Well <ul style="list-style-type: none"> • 36 in. Inlet Pipe – Sanitary Sewage. • 3 x 8 in. Outlets via pumps • 12 in. force main 	Adjacent Piping – Chase River Wet Well <ul style="list-style-type: none"> • 42 in. Inlet Pipe – Sanitary Sewage • 7 x 8 in. Outlets via pumps • 4 in. Sani-Truck Dump Inlet • 20 in. Overflow bypass • 8 in. Force main drain

Isolation Controls

Adjacent Piping – Wellington Wet Well	
ISOLATION POINT	CONTROL METHOD
 <ul style="list-style-type: none"> • 36 in. Inlet Pipe – Sanitary Sewage 	 <ul style="list-style-type: none"> • Close and lockout sluice gate.
 <ul style="list-style-type: none"> • 3 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage 	 <ul style="list-style-type: none"> • Close and lockout plug valves.
 <ul style="list-style-type: none"> • 12 in. force main – fed by outlets via pumps - isolation valve 	 <ul style="list-style-type: none"> • ¼ Turn Plug Valve as well as a water actuated plug valve

Adjacent Piping – Chase River Wet Well	
ISOLATION POINT	CONTROL METHOD
<ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage 	<ul style="list-style-type: none"> Close and lockout sluice gate.
<ul style="list-style-type: none"> 7 x 8 in. Outlets via pumps 	<ul style="list-style-type: none"> Close and lockout plug and air actuated valves.
<ul style="list-style-type: none"> 4 in. Sani-Truck Dump Inlet - 	<ul style="list-style-type: none"> Cap, lock Sani-Truck Inlet to Wet well. Also notify collection companies, post signage and erect barriers around dumping bay.
<ul style="list-style-type: none"> 20 in. Overflow bypass 	<ul style="list-style-type: none"> Close and lockout bypass valve to wet well
<ul style="list-style-type: none"> 8 in. Force main drain 	<ul style="list-style-type: none"> Isolate with inflatable plug. This is to isolate any atmospheric hazard and not a pressure one.

D. Engulfment/ Immersion Hazards

There is a risk of engulfment associated with entry into these spaces. Specifically, from the 36 in and 42 in. inlets and backflow from the outlets through which the material is normally pumped.

Engulfment Controls

In addition to the isolation procedures, because of the engulfment risk, some isolation points MUST BE certified by a Professional Engineer and those certifications valid and current DURING the entry. At this time, to maximize the use of such certification, the isolation points have not been inspected by a Professional Engineer yet. This will occur once the Alternate Isolation Measures have been accepted but BEFORE any entry is made.

Isolation Points Requiring Professional Engineer Certification	
 Adjacent Piping – Wellington Wet Well <ul style="list-style-type: none"> 36 in. Inlet – Sluice Gate 3 x 8 in. Outlets via pumps – ¼ Turn Plug Valves 	Adjacent Piping – Chase River <ul style="list-style-type: none"> 42 in. Inlet – Sluice Gate 7 x 8 in. Outlets via pumps – ¼ Turn Plug Valves 20" influent chamber bypass

5.0 How Workers will be Informed of the Required Measures Presented in the Approved Application

• JHSC Consultation

This Alternate Measure application and related documentation (Confined Space Hazard Assessment, Entry and Lockout Procedure as well as the Rescue Plan) have been presented to and reviewed by a JHSC representative (see letter included from JHSC).

• Pre-job meeting by Supervisor will cover off:

- Confined space hazards, risks and safe entry procedures
- Requirements of this Application Acceptance
- Review of rescue plan and drill

6.0 Supervision of Alternate Measures

- **Standby Person** for (moderate hazard) on Site must:
 - Standby person is to be stationed at or near the access
 - Confirm effective and continuous means to communicate with entrant.
 - Maintain continuous visual contact of entrant.
 - Confirm effective means to summon additional help should it be required
 - Check on the well-being of the entrant(s) regularly (at least every 20 minutes)
 - Ensure that the required controls remain in place and continue to be effective (i.e. intake of fan)
 - Ensure the end of the duct is within 10 ft. of the entrant. Move as necessary.
 - Ensure continuous effective communication between the entrant, standby person and vacuum truck operator
- **Robert Skwarczynski** – is the Chief Operator and oversees the operation of the system.
- **A Trained Supervisor** –will be monitoring crew to ensure compliance with this application.
- **Jason Hindson, CRSP/Karren Kossey, CRSP**– Qualified persons - available to attend site, if requested.

7.0 Time Frame Required for Project Needing Alternate Measures

The RDN needs to enter the wet wells to complete this work as soon as possible to take advantage of the current low system flows. This work is considered routine and is completed every year. It is therefore requested that the acceptance be valid for a period of at least 5 years which will give the RDN the opportunity to complete maintenance work annually. It is understood that if the tasks to be completed are different than those presented, a new application will need to be submitted.

Completed and Reviewed by the following people.

Robert Skwarczynski
RDN GNPCC
Chief Operator

Spencer Clarke
RDN GNPCC
JHSC Representative

Jason Hindson, CRSP
Orca Health and Safety
Consulting Inc.



Date: July 13, 2020

EXAMPLE ONLY

Attention: Don MacFadgen
Senior Regional Officer
WorkSafeBC
4980 Wills Road
Nanaimo, B.C.
V9T 6C6

Attention Mr. MacFadgen,

**Re: Regional District of Nanaimo – Greater Nanaimo Water Pollution Treatment Centre JHSC
Consultation of the Application for “Acceptance of Alternate Isolation Measures for Confined Space
Entry into Wellington and Chase River Pump Station Wet Wells”.**

In order to proceed with the work to be done explained in the 9.22 application for **“Acceptance of Alternate Isolation Measures for Confined Space Entry into Wellington and Chase River Pump Station Wet Wells”**, according to WorkSafeBC Guideline 9.22, accompanying documentation should also include information from the Joint Health and Safety Committee indicating the committee’s comments on the proposal, or other information that indicates the affected party has been consulted on the alternate measures.

Based on review of the application **“Acceptance of Alternate Isolation Measures for Confined Space Entry into Wellington and Chase River Pump Station Wet Wells”** and associated documentation, there are no comments at this time.

Sincerely,





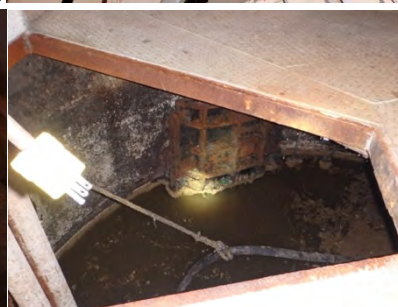
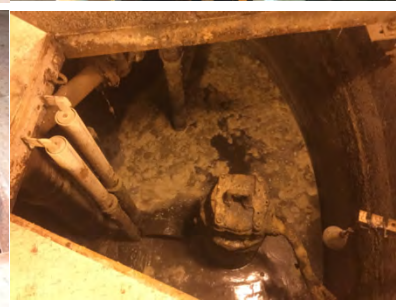
A handwritten signature in black ink that reads "S. Clarke".

Spencer Clarke
JHSC Representative
RDN – Greater Nanaimo Water Pollution Control Centre

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Confined Space Location(s):		Date of Site Visit: March 4, 2019																						
Wellington Pump Station - 5200 Fillinger Cres. Nanaimo, BC		Date of documentation: May 4, 2019																						
Chase River Pump Station - 1174 Island Highway South, Nanaimo, BC.		Date of Revision: July 14, 2020																						
Task this assessment is for: <ul style="list-style-type: none">• Inspection• Wash Well Area• Remove grit with vacuum truck (as required, based on an on-site assessment)		<ul style="list-style-type: none">• Pipe fitting/Replacing Pump Bases (Anchoring Pipes – Drilling Concrete)• Cutting and grinding as needed with a zip cutter/grinder• Welding to Repair Pipes (Welding a patch onto uncoated carbon steel) - SMAW																						
Description		Findings																						
Describe Space (size, openings, access, materials of construction)			<table><tr><th colspan="3">Space Dimensions</th></tr><tr><td></td><td>Wellington</td><td>Chase</td></tr><tr><td>Length</td><td colspan="2">-</td></tr><tr><td>Width</td><td colspan="2">-</td></tr><tr><td>Height</td><td>12 ft.</td><td>9 ft.</td></tr><tr><td>Diameter</td><td>16 ft.</td><td>20 ft.</td></tr><tr><td>VOLUME</td><td>2,412 ft³</td><td>2,827 ft³</td></tr></table>	Space Dimensions				Wellington	Chase	Length	-		Width	-		Height	12 ft.	9 ft.	Diameter	16 ft.	20 ft.	VOLUME	2,412 ft³	2,827 ft³
	Space Dimensions																							
		Wellington		Chase																				
	Length	-																						
	Width	-																						
	Height	12 ft.		9 ft.																				
Diameter	16 ft.	20 ft.																						
VOLUME	2,412 ft³	2,827 ft³																						
																								
																								
																								
																								
																								

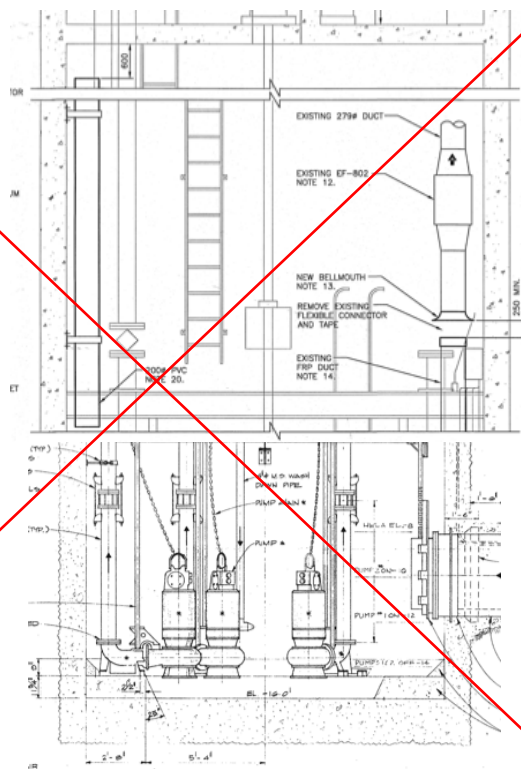
Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

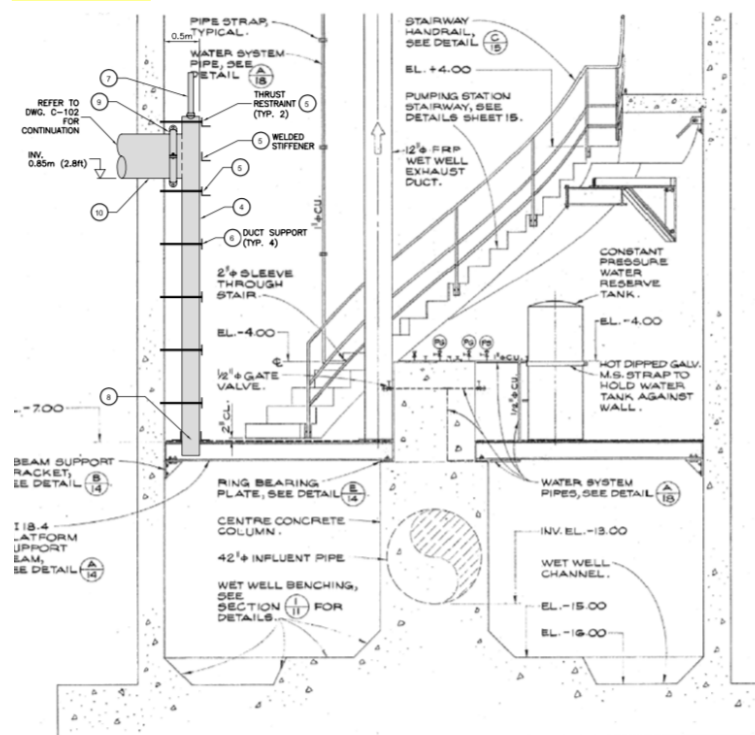
* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Two concrete wet wells, that are similar. They are each located at the bottom of large pumps stations. Their lid is constructed of checker plating and separates the wet well from the rest of the pump station. To access each wet well, workers must pass through the pump station before descending down a fixed ladder through a hatch. The pump station itself, above the wet well, is designed for continuous human occupancy. Chase River PS has a set of stairs and Wellington has a fixed ladder. This document and its accompanying entry procedure are limited to identifying hazards and prescribing controls for ONLY entering the wet wells and not the pump stations. Safe work procedures are in place for workers who enter and conduct work inside of the pump stations.

~~Wellington~~



Chase River




Use of Space:	Temporary storage and pumping of sanitary sewage as part of a sewage collection system.
Equipment Inside:	Pumps, Piping, Valves
Space Contents:	Untreated sanitary sewage and grit consisting of sand and gravel.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Piping:	Wellington Pump Station Wet Well<ul style="list-style-type: none">36 in. Inlet Pipe – Sanitary Sewage5 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage4 in. Inlet – Drain – Wash Down By-Pass Pipe3 in. Inlet – Drain –From the MCC Floor and Wet Well Platform Drain.		Chase River Pump Station Wet Well <ul style="list-style-type: none">42 in. Inlet Pipe – Sanitary Sewage7 x 8 in. Outlets via pumps – Sanitary Sewage4 in. Sani-Truck Dump Inlet (indirectly flows into Wet Well) – Sanitary Sewage20 in. Overflow bypass8 in. Force main drain line #1 and #2			
Describe Access Points	1.		Access to each wet well is through a hinged hatch and a fixed ladder. However, each wet well has a number of pie shaped hatches that allow the pumps to be pulled that can also be used to raise/lower equipment and maintain a visual on the entrant. Additionally, the wet well can be accessed by these via a portable ladder. The pie shaped hatches are 52 in. to 66 in. long and 52 in. wide at their widest point and 18 to 33 in. at their narrowest (see pictures above).	Access Dimensions		
					Welling.	Chase
				Length	33 in.	24 in.
				Width	30 in.	24 in.
				Diameter	-	-
Describe Adjacent Spaces	There is a staging area above the space where a vacuum truck will be parked.					

Is it a Confined Space?				
NOTE: if the answer to all of the first four questions is YES then it is a confined space				
Assessment	Yes	No	Explanation	
Is there a limited or restricted means of entry/exit for rescue purposes? (Can two people walk in & out with a stretcher without unreasonable effort?)	✓		Access to the space is via a fixed or portable ladder.	
Is the space not intended for human occupancy? (Spaces that are intended for human occupancy have an easy access and adequate lighting and ventilation.)	✓		The space is used for the temporary storage and pumping untreated sewage.	
Is the space enclosed or partially enclosed? (enclosed enough to restrict ventilation)	✓		Partially enclosed.	
Is the space large enough for a worker to enter? (it must be big enough to physically get inside and a worker is considered to have entered a confined space once their breathing zone has broken the plane of the confined space)	✓		2,412 ft ³	2827 ft ³
Is this a Confined Space?	YES			

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Excluded space with no ability for a toxic atmosphere to exist or develop prior to entry (crawl space/ attic with passive ventilation, excavations, swimming pools, new/unconnected manholes for storm or sewer that have not been hooked up yet)		x	
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Question	Yes	No	Hazard	Controls
1. Is there a potential for oxygen enrichment/deficiency ?	✓		Deficiency <ul style="list-style-type: none"> Rusting components Organic decomposition of sanitary sewage. 	<ul style="list-style-type: none"> 4 gas-monitor prior to entry and continuously while entrant(s) in space Use a 5000 CFM fan to provide ventilation to the bottom of the pump station, the lid area of the wet well. Ventilate the wet well itself by blowing 900 cfm into space for 15 minutes prior to entry and continuously while in space. Ensure end of duct extends within 24" of the bottom of the space and within 10 ft. of the worker.
2. Is there a potential for flammable/explosive gases/vapors ? Specify.	✓		<ul style="list-style-type: none"> Methane (CH₄) – Decomposition (anaerobic) of sanitary sewage - Spaces direct sanitary sewage as part of treatment process. Grinding/Zip Cutting/Welding Carbon Steel <ul style="list-style-type: none"> Sparks 	<ul style="list-style-type: none"> Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content. If grit is to be removed, remove as much grit as possible without entering the space. Organic/Sanitary sewer debris that cannot be removed by washing from the outside must at least be disturbed and disturb the remaining grit as much as possible from outside of the space BEFORE ventilation and entry. Allow pumps to run while washing space from the outside to flush outlets and allow water to remain in outlet pipes rather than sanitary sewage. 4 gas-monitor prior to entry and continuously while entrant(s) in space Use a 5000 CFM fan to provide ventilation to the bottom of the pump station, the lid area of the wet well. Ventilate the wet well itself by blowing 900 cfm into space for 15 minutes prior to entry and continuously while in space.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
				<ul style="list-style-type: none"> ○ Ensure end of duct extends within 24" of the bottom of the space and within 10 ft. of the worker and preferably directed toward him/her. <p>Grinding/Zip Cutting/Welding Carbon Steel</p> <ul style="list-style-type: none"> ○ To be completed after the space is washed and ventilated. ○ <i>Grinder/Zip</i> - Entrant must change into/wear coveralls that are FR/Cotton, wear safety glasses with side shields, face shield, work gloves and half face respirator with P100 cartridges. ○ <i>Welding</i> - Entrant must change into/wear coveralls that are FR/Cotton, wear welding shield, leather gauntlet gloves, half face respirator with P100/OV cartridges and hearing protection. ○ Keep combustibles out of the space ○ Have a fire extinguisher readily available
3. Is there a potential for toxic gases/vapors ? Specify.	✓		<ul style="list-style-type: none"> • Hydrogen Sulphide (H₂S) – Decomposition (anaerobic) of sanitary sewage – Spaces collect and pump sanitary sewage. • Chase River Pump Station has a Sani-Truck Dump Inlet. Chase River Pump Station has a Sani-Truck Dump Inlet. When trucks dump their load operators have experienced H₂S readings >5ppm in the wet well. Otherwise, elevated H₂S levels do NOT occur in the Chase River Wet Well. • Carbon Monoxide (CO) – From small engine and vehicles including the vacuum truck. • Carbon monoxide from zip cutting, grinding and welding 	<ul style="list-style-type: none"> • Chase River Pump Station - Cap, lock Sani-Truck Inlet to Wet well. Also notify collection companies, post signage and erect barriers around dumping bay. • Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content. • If grit is to be removed, remove as much grit as possible without entering the space. • Organic/Sanitary sewer debris that cannot be removed by washing from the outside must at least be disturbed and disturb the remaining grit as much as possible from outside of the space BEFORE ventilation and entry. • Allow pumps to run while washing space from the outside to flush outlets and allow water to remain in outlet pipes rather than sanitary sewage. • 4 gas-monitor prior to entry and continuously while entrant(s) in space

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
				<ul style="list-style-type: none"> Carbon Monoxide sensor will be used as an indicator sensor for all products of combustion. Entrant to wear a full-face respirator with P100/OV/AG cartridges for cleaning inside of the space. Use a 5000 CFM fan to provide ventilation to the bottom of the pump station, the lid area of the wet well. Ventilate the wet well itself by blowing 900 cfm into space for 15 minutes prior to entry and continuously while in space. Ensure the exhaust from both pump station ventilation system does not encroach on the intake of the ventilation fan. Set up fan so that it is drawing air from outside of the space. Ensure end of duct extends within 24" of the bottom of the space and within 10 ft. of the worker. Move the duct as required. As the grit is being disturbed/pulled from the space, the suction from the hose will provide a degree of localized exhaust ventilation. Ensure vehicles/small equipment do not idle/run within 25 ft. of space or intake of ventilation fan. Use an exhaust extension on vacuum truck to direct exhaust away from the site, as required. Welding requires localized exhaust control, either a smoke eater or a localized exhaust fan
4. Is there a potential for dusts, particulates, vapors, fumes? Specify	✓		<ul style="list-style-type: none"> Vapour from washing that may contain biohazards. Raw sewage can contain bacteria, viruses, protozoa, parasitic worms, fungi that cause illnesses such as hepatitis, typhoid fever, dysentery, cholera etc. Inhaling or ingesting contaminated mists can result in these illnesses. 	<ul style="list-style-type: none"> Use a 5000 CFM fan to provide ventilation to the bottom of the pump station, the lid area of the wet well. Ventilate the wet well itself by blowing 900 cfm into space for 15 minutes prior to entry and continuously while in space. Set up fan so that it is drawing air from outside of the space. Ensure end of duct extends within 24" of the bottom of the space and within 10 ft. of the worker. Move the duct as required. Entrant to wear a full-face respirator with P100/OV/AG cartridges for cleaning inside of the space.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
			<ul style="list-style-type: none"> Historically (informed by RDN employees), when washing from the outside of the wet well, vapour does not enter the pump station from below. <p>Zip Cutting/Grinding Mild Steel (no coatings) and Welding on Patch - SMAW (on uncoated, corroded mild steel)</p> <ul style="list-style-type: none"> Carbon Steel contains iron, chromium and nickel primarily. Grinding and cutting will produce fume with oxides and particulate which are skin, eye, and respiratory irritants. They can all produce Metal Fume Fever (flu like symptoms with sweet/ metallic taste in mouth) and are carcinogens over long periods of exposure. <p>Pipe Fitting/Replacing Pump Bases (Drilling Concrete to mount/remount pipes)</p> <ul style="list-style-type: none"> Mechanically disturbing concrete (drilling, cutting) releases silica, a carcinogen. 	<ul style="list-style-type: none"> Pump stations are fitted with fixed ventilation system that draws air from the work area above the wet well, ABOVE the checker plated wet well lids. Ensure this system is running during the duration of the work. <p>Grinding/Zip Cutting Carbon Steel</p> <ul style="list-style-type: none"> To be completed after the space is washed and ventilated. Entrant must change into/wear coveralls that are FR/Cotton, wear safety glasses with side shields, face shield, work gloves and half face respirator with P100 cartridges. <p>Welding on Patch - SMAW (on uncoated, corroded, mild steel)</p> <ul style="list-style-type: none"> To be completed after the space is washed and ventilated. Entrant must change into/wear coveralls that are FR/Cotton, wear welding shield, leather gauntlet gloves, half face respirator with P100/OV cartridges and hearing protection. Welding requires localized exhaust control, either a smoke eater or a localized exhaust fan <p>Pipe Fitting (Drilling Concrete to mount/remount pipes)</p> <ul style="list-style-type: none"> Entrant must use wet methods/HEPA attachment when drilling concrete and wear minimum ½ face respirator with P100 cartridges.
5. Is there any hazard(s) due to the confined space location ? (Physical in nature - traffic, below grade, above grade, nearby power lines)	✓		<ul style="list-style-type: none"> Below grade – possible for gases heavier than air to migrate into space 	<ul style="list-style-type: none"> 4 gas-monitor prior to entry and continuously while entrant(s) in space Use a 5000 CFM fan to provide ventilation to the bottom of the pump station, the lid area of the wet well. Ventilate the wet well itself by blowing 900 cfm into space for 15 minutes prior to entry and continuously while in space.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
6. Are there any nearby hazards which may affect this confined space (drawing in air contaminants)?		x		
7. Are there any hazards due to the confined space's design/structure (hidden openings, tight quarters, obstacles, protruding objects, crush hazards, pinch hazards, etc.)?	✓		<ul style="list-style-type: none"> Access will be via a fixed or portable ladder from the cat walk. The wet well is covered by a deck with multiple hatches. 	<ul style="list-style-type: none"> Portable ladder must extend 3 rungs beyond railing and secured in place. Maintain 3-point contact when using ladder to descend into Wet Well. Entrant to be connected to fall protection when using any ladder. Maintain visual contact of the worker at all times while he/she is completing required tasks.
8. Are there any hazards due to the confined space's materials of construction (fiberglass, leaching, rusting metal tank, rotting materials, obstructions etc.?)	✓		<ul style="list-style-type: none"> Wet Well constructed of concrete which when mechanically disturbed will release silica, a known carcinogen (i.e. drilled, ground, cut). Metal components – corrosion/rusting which consumes oxygen 	<ul style="list-style-type: none"> If drilling of concrete is required, use wet methods or a HEPA attachment When drilling concrete, entrant must wear Entrainment must change into/wear coveralls, wear safety glasses with side shields, work gloves and half face respirator with P100 cartridges. 4 gas-monitor prior to entry and continuously while entrant(s) in space
9. Are there any hazards due to the confined space's USE (toxic, corrosive, or other materials, residues, or purge gases,	✓		<ul style="list-style-type: none"> The space is used for the collecting and pumping untreated sewage. Once drained there will be approximately 1 foot of grit, accumulation on floor of space. 	<ul style="list-style-type: none"> Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content. If grit is to be removed, remove as much grit as possible without entering the space. Organic/Sanitary sewer debris that cannot be removed by washing from the outside must at least be disturbed and disturb the

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
bridging of materials, etc.)?				remaining grit as much as possible from outside of the space BEFORE ventilation and entry.
10. Are there any energy sources that could cause injury if released? (electrical, mechanical, hydraulic, pneumatic, thermal, steam)	✓		<ul style="list-style-type: none"> Pumps Sensors Welding Equipment 	<ul style="list-style-type: none"> De-energize and lockout pumps. At Chase River Pump Station one pump must be left in standby mode. This is due to the sensitivity of the area overflowing to the river and the limited shutdown duration. This will allow the pump to be turned on immediately as the entrant exits the space. Explain to workers which pump is in standby mode and tag out at HMI Panel. Ensure there is a communication strategy in place and a procedure prior to entering the space. Follow written de-energization/lockout procedures Ensure Welding equipment is used as per manufacturer's directions and training.
11. Isolation of pipes required? (gas, solid, fluid) If yes, a written lockout/isolation procedure is required.	✓		<p>Wellington Pump Station Wet Well</p> <ul style="list-style-type: none"> 36 in. Inlet Pipe – Sanitary Sewage 3 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage 12 in. force main isolation valve 4 in. Inlet – Drain – Wash Down By-Pass Pipe 3 in. Inlet – Drain – From the MCC Floor and Wet Well Platform Drain. <p>Chase River Pump Station Wet Well</p> <ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage 7 x 8 in. Outlets via pumps – Sanitary Sewage 4 in. Sani-Truck Dump Inlet (indirectly flows into Wet Well) – Sanitary Sewage 20 in. Overflow bypass 	<p>Wellington Pump Station Wet Well</p> <ul style="list-style-type: none"> 36 in. Inlet Pipe – Sanitary Sewage – Close and lockout sluice gate. 5 x 8 in. Outlets via pumps – Close and lockout plug valves. 12 in. force main isolation valve - ¼ Turn Plug Valve as well as a water actuated plug valve 4 in. Inlet – Drain – Wash Down By-Pass Pipe – Close and lockout plug valve <p>Chase Pump Station Wet Well</p> <ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage – Close and lockout sluice gate. 5 x 8 in. Outlets via pumps – Close and lockout plug valves. 4 in. Sani-Truck Dump Inlet - Cap, lock Sani-Truck Inlet to Wet well. Also notify collection companies, post signage and erect barriers around dumping bay. 20 in. Overflow bypass – Close and lockout bypass valve to wet well 8 in. Force main drain – Isolate with inflatable plug. This is to isolate any atmospheric hazard and not a pressure one.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
			<ul style="list-style-type: none"> 8 in. Force main drain - This is to isolate any atmospheric hazard and not a pressure one. 	<p>For BOTH Wet Wells</p> <ul style="list-style-type: none"> Follow written isolation/lockout procedures Alternate Isolation Measure Approval (9.22) required from WSBC
12. Is there potential for entrapment ?		x		
13. Is there any potential for engulfment ?	✓		<p>Wellington Pump Station Wet Well</p> <ul style="list-style-type: none"> 36 in. Inlet Pipe – Sanitary Sewage 3 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage <p>Chase River Pump Station Wet Well</p> <ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage 7 x 8 in. Outlets via pumps – Sanitary Sewage 20" influent chamber bypass 	<ul style="list-style-type: none"> Ensure inlet, sluice gates and outlet plug valves are certified by a Professional Engineer. Chase River - 20 in. Overflow bypass – must be certified by a Professional Engineer. Follow written isolation/lockout procedures Alternate Isolation Measure Approval (9.22) required from WSBC
14. Is there a danger from drowning ?	✓		<ul style="list-style-type: none"> The space normally contains sanitary sewage. 	<ul style="list-style-type: none"> Drain/pump out wet wells before entry.
15. Is there any danger of slipping/tripping ?	✓		<ul style="list-style-type: none"> Fixed/Portable Ladder Wet space Uneven surface/floor, grit, accumulated material Standing on equipment, slipping off 	<ul style="list-style-type: none"> Maintain 3-point contact when using ladder. Remain aware and ensure stable footing when working in space Work in a way that the entrant can stand on the bottom of the space rather than on the grit, accumulated material. Remain aware of benched floor. Do not stand on equipment in the space (i.e. pumps)
16. Are there any height hazards that require special consideration? (fall	✓		<ul style="list-style-type: none"> Access via a fixed/portable ladder. Fall into sanitary sewage 	<ul style="list-style-type: none"> Maintain 3-point contact when using ladder. Ensure portable ladder is secure and extend 3 rungs above guardrail.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
arrest harness and lifeline, ladder, scaffolding)				<ul style="list-style-type: none"> Entrant(s) to be connected to a self-retracting lifeline while entering/exiting, using ladder. When using fixed ladder, ensure each rung is stable before fully committing weight. Workers to use fall protection around each access/hatch.
17. Is there a danger from falling objects or process materials? If yes, eliminate the hazard or use PPE as appropriate.	✓		<ul style="list-style-type: none"> No toe rail – falling objects Hoisting Equipment from space 	<ul style="list-style-type: none"> Keep tools at least 3 feet away from space edges – use a designated equipment tarp Do not suspend/hold tools over entrant's head Pass tools/equipment to Entrant(s) with a bucket/rope or using positive hand-off techniques. Entrant(s) to wear hardhat Do not stand below live loads.
18. Are there any noise hazards? (loud tools, hearing injury, communication difficulties) If yes, specify PPE and communication plan.	✓		<ul style="list-style-type: none"> Ineffective communication Large chamber – echoing Use of vacuum truck Zip Cutting/Grinding/Welding 	<ul style="list-style-type: none"> BEFORE starting work ensure effective communication is in place between for completion of ALL TASKS: <ul style="list-style-type: none"> Entrant(s) and Standby Person Standby Person and Emergency Services Communication Strategies: <ul style="list-style-type: none"> VOICE/RADIO to contact standby person/entrant VOICE/RADIO to contact onsite rescue/additional assistance CELL PHONE to contact Emergency Services (911) Do not yell, talk low and steady to communicate Hearing protection when using tools/vacuum truck in the space. Ensure effective communication can be maintained for duration of the entry.
19. Is there any potential skin, ingestion, contact hazard ?	✓		<ul style="list-style-type: none"> Sanitary sewage residue (including sharps) Raw sewage can contain bacteria, viruses, protozoa, parasitic worms, fungi that cause illnesses such as hepatitis, typhoid fever, dysentery, 	<ul style="list-style-type: none"> Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content. If grit is to be removed, remove as much grit as possible without entering the space. Be aware of any residual sewer material

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
			<p>cholera etc. Inhaling or ingesting contaminated mists can result in these illnesses.</p> <p>Grinding/Zip Cutting/Welding Carbon Steel</p> <ul style="list-style-type: none"> Hot, sharp surfaces, flying projectiles, disc failure, grit, sparks 	<ul style="list-style-type: none"> Do NOT use hands to handle any material in the space. Only use tools. <p>Cleaning/ Vacuuming of Grit–</p> <ul style="list-style-type: none"> Tyvek, Rubber CSA Safety Toe Boots, Hard Hat, Nitrile and Work Gloves and Safety Glasses, Full-face respirator with P100/OV/AG cartridges. <p>Inspection</p> <ul style="list-style-type: none"> ONCE CLEANED – Coveralls, Rubber CSA Safety Toe Boots, Hard Hat, Nitrile and Work Gloves and Safety Glasses <p>Grinding/Zip Cutting/Welding Carbon Steel</p> <ul style="list-style-type: none"> To be completed after the space is washed and ventilated. Entrant must change into/wear coveralls that are FR/Cotton, wear safety glasses with side shields, face shield, work gloves and half face respirator with P100 cartridges. Ensure guard is in place and the RPM of the grinding/cutting wheel matches that of the tool Follow good hygiene practices, wash with soap and water upon exiting space.
20. Are there any temperature hazards? (hot, cold, wet) If yes, specify appropriate PPE and work schedule.	✓		<ul style="list-style-type: none"> Working in Tyvek <p>Welding on Patch - SMAW (on uncoated, corroded, mild steel)</p> <ul style="list-style-type: none"> UV, high temperature welding arcs, molten metal – Skin and Eye Burns 	<ul style="list-style-type: none"> Ensure workers remain hydrated, dressed appropriately under PPE/TYVEK and are monitored for effects of heat exhaustion. <p>Welding on Patch - SMAW (on uncoated, corroded, mild steel)</p> <ul style="list-style-type: none"> To be completed after the space is washed and ventilated. Entrant must change into/wear coveralls that are FR/Cotton, wear welding shield, leather gauntlet gloves, half face respirator with P100/OV cartridges and hearing protection. Welding requires localized exhaust control, either a smoke eater or a localized exhaust fan
21. Are there any laser or radioactive measuring devices?		x		
22. Is artificial lighting required?	✓		<ul style="list-style-type: none"> No permanent lighting source in the space. 	<ul style="list-style-type: none"> Open hatches above workers location Entrant to wear helmet with light source

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Question	Yes	No	Hazard	Controls
23. Power tools (risk of electrocution)?	✓		<ul style="list-style-type: none"> Electrically powered equipment in a wet environment. 	<ul style="list-style-type: none"> All electrical equipment must use a GFCI.
24. Identify any work specific hazards (not identified already in this assessment)	✓		<ul style="list-style-type: none"> Use of Hand Tools - Soft tissue injuries – manual lifting and awkward postures. 	<ol style="list-style-type: none"> Keep elbows by beltline (don't over reach). Keep load as close to the body as possible. Maintain a stable footing and base of support. Ask for help when needed. Take mini-breaks & stretch as needed.
			<ul style="list-style-type: none"> Vacuum truck hose – suction force at end. 	<ul style="list-style-type: none"> Entrant must maintain visual contact to end of the vacuum truck hose and keep end directed away from him/her. Ensure continuous effective communication between the entrant, standby person and vacuum truck operator
25. Entry Permit Required	✓		<ul style="list-style-type: none"> Isolation/De-Energization/Lockout Risk of Engulfment/Entrapment 	<ul style="list-style-type: none"> YES – Entry Permit Required
26. Rescue	✓		<ul style="list-style-type: none"> Evacuation of injured worker 	<ul style="list-style-type: none"> ENTRY Rescue Required Entrant to wear harness and be connected to fall protection during entry/exit. Follow Rescue Plan Written Rescue Agreement in place with the City of Nanaimo Fire Department

From above assessment (including air quality as well as physical hazards) indicate Hazard Rating prior to critical controls:

Low: _____

Moderate: _____

High: XXXXXX

Critical Control Measures Required:

Hazard Category	Identified Hazard	Requirements
Hazardous Atmosphere	<ul style="list-style-type: none"> Hydrogen Sulphide (H₂S) – Decomposition (anaerobic) of sanitary sewage – Spaces collect and pump sanitary sewage. 	<ul style="list-style-type: none"> Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content. If grit is to be removed, remove as much grit as possible without entering the space.

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

	<ul style="list-style-type: none"> Methane (CH₄) – Decomposition (anaerobic) of sanitary sewage - Spaces direct sanitary sewage as part of treatment process. Chase River Pump Station has a Sani-Truck Dump Inlet. Chase River Pump Station has a Sani-Truck Dump Inlet. When trucks dump their load operators have experienced H₂S readings >5ppm in the wet well. Otherwise, elevated H₂S levels do NOT occur in the Chase River Wet Well. 	<ul style="list-style-type: none"> Organic/Sanitary sewer debris that cannot be removed by washing from the outside must at least be disturbed and disturb the remaining grit as much as possible from outside of the space BEFORE ventilation and entry. Allow pumps to run while washing space from the outside to flush outlets and allow water to remain in outlet pipes rather than sanitary sewage. Chase River Pump Station - Cap, lock Sani-Truck Inlet to Wet well. Also notify collection companies, post signage and erect barriers around dumping bay.
Drowning	<ul style="list-style-type: none"> The space normally contains sanitary sewage. 	<ul style="list-style-type: none"> Drain/pump out wet wells before entry.
Engulfment	<p>Wellington Pump Station Wet Well</p> <ul style="list-style-type: none"> 36 in. Inlet Pipe – Sanitary Sewage 5 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage <p>Chase River Pump Station Wet Well</p> <ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage 7 x 8 in. Outlets via pumps – Sanitary Sewage 	<ul style="list-style-type: none"> Ensure inlet, sluice gates and outlet plug valves are certified by a Professional Engineer. Chase River - 20 in. Overflow bypass – must be certified by a Professional Engineer. Chase River - 8 in. Force main drain – must be certified by a Professional Engineer. Follow written isolation/lockout procedures Alternate Isolation Measure Approval (9.22) required from WSBC
Hazardous Energy	<ul style="list-style-type: none"> Pumps Sensors 	<ul style="list-style-type: none"> De-energize and lockout pumps. At Chase River Pump Station one pump must be left in standby mode. This is due to the sensitivity of the area overflowing to the river and the limited shutdown duration. This will allow the pump to be turned on immediately as the entrant exits the space. Explain to workers which pump is in standby mode and tag out at HMI Panel. Ensure there is a communication strategy in place and a procedure prior to entering the space. Follow written de-energization/lockout procedures

Wellington and Chase River Pump Stations Wet Wells Confined Space Hazard Assessment

EXAMPLE ONLY

* Inspection/Wash Well and Remove Grit with Vacuum Truck *

Hazard rating once critical controls above are in place:

Low: _____


Moderate: XXXXXX

High: _____

Evaluated by: Jason Hindson, CRSP
Qualified Person(s)
Orca Health & Safety Consulting Inc.

Reviewed By: Rob Skwarczynski
Chief Operator

Zach Suhan
JHSC Representative



Date: May 22, 2019



CONFINED SPACE ENTRY PROCEDURE

EXAMPLE ONLY

Date: May 22, 2019

Revision: July 14, 2020

Space: Wellington and Chase River
Pump Stations, Wet Wells at Bottom

Location: Wellington – 5200 Fillinger Cres. Nanaimo, BC
Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

1. SCOPE & HAZARD RATING



This confined space entry procedure applies to the task(s) outlined in the “Wellington and Chase River Pump Station, Wet Wells at Bottom” Confined Space Hazard Assessment for the following tasks:

- Inspection
- Wash Well Area
- Remove grit with vacuum truck (as required, based on an on-site assessment)
- Pipe fitting/Replacing Pump Bases (Anchoring Pipes – Drilling Concrete)
- Cutting and grinding as needed with a zip cutter/grinder
- Welding to Repair Pipes (Welding a patch onto uncoated carbon steel) - SMAW

If the planned task(s) will result in the generation of air contaminants other than those listed in hazard assessment for this space and work activity, another risk assessment must be carried out and this procedure must be revised before you proceed.

Overall Hazard Rating - **AFTER** Critical Controls are in Place

MODERATE

2. KEY HAZARD CONTROLS PRIOR TO ENTRY

The Confined Space Hazard Assessment MUST BE reviewed prior to entry and commencement of task(s).

CRITICAL HAZARDS OF SPACE

Hazard Category	Identified Hazard	Requirements
Hazardous Atmosphere	<ul style="list-style-type: none">• Hydrogen Sulphide (H₂S) – Decomposition (anaerobic) of sanitary sewage – Spaces collect and pump sanitary sewage.• Methane (CH₄) – Decomposition (anaerobic) of sanitary sewage - Spaces direct sanitary sewage as part of treatment process.• Chase River Pump Station has a Sani-Truck Dump Inlet. Chase River Pump Station has a Sani-Truck Dump Inlet. When trucks dump their load, operators have experienced H₂S readings >5ppm in the wet well. Otherwise, elevated H₂S levels do NOT occur in the Chase River Wet Well.	<ul style="list-style-type: none">• Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content.• If grit is to be removed, remove as much grit as possible without entering the space.• Organic/Sanitary sewer debris that cannot be removed by washing from the outside must at least be disturbed and disturb the remaining grit as much as possible from outside of the space BEFORE ventilation and entry.• Allow pumps to run while washing space from the outside to flush outlets and allow water to remain in outlet pipes rather than sanitary sewage.• Chase River Pump Station - Cap, lock Sani-Truck Inlet to Wet well. Also notify collection companies, post signage and erect barriers around dumping bay.
Drowning	<ul style="list-style-type: none">• The space normally contains sanitary sewage.	<ul style="list-style-type: none">• Drain/pump out wet wells before entry.



CONFINED SPACE ENTRY PROCEDURE

EXAMPLE ONLY

Date: May 22, 2019

Revision: July 14, 2020

Space: Wellington and Chase River

Location: Wellington – 5200 Fillinger Cres. Nanaimo, BC

Pump Stations, Wet Wells at Bottom

Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

The Confined Space Hazard Assessment MUST BE reviewed prior to entry and commencement of task(s).

CRITICAL HAZARDS OF SPACE

Hazard Category	Identified Hazard	Requirements
Engulfment	Wellington Pump Station Wet Well <ul style="list-style-type: none">36 in. Inlet Pipe – Sanitary Sewage5 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage Chase River Pump Station Wet Well <ul style="list-style-type: none">42 in. Inlet Pipe – Sanitary Sewage7 x 8 in. Outlets via pumps – Sanitary Sewage	<ul style="list-style-type: none">Ensure inlet, sluice gates and outlet plug valves are certified by a Professional Engineer.Chase River - 20 in. Overflow bypass – must be certified by a Professional Engineer.Chase River - 8 in. Force main drain – must be certified by a Professional Engineer.Follow written isolation/lockout proceduresAlternate Isolation Measure Approval (9.22) required from WSBC
Hazardous Energy	<ul style="list-style-type: none">PumpsSensors	<ul style="list-style-type: none">De-energize and lockout pumps.At Chase River Pump Station one pump must be left in standby mode. This is due to the sensitivity of the area overflowing to the river and the limited shutdown duration. This will allow the pump to be turned on immediately as the entrant exits the space.Explain to workers which pump is in standby mode and tag out at HMI Panel. Ensure there is a communication strategy in place and a procedure prior to entering the space.Follow written de-energization/lockout procedures

GENERAL HAZARD CONTROLS OF THE SPACE

Control Measure	Requirements
Entry Permit Required?	YES <ul style="list-style-type: none">Complete entry permit and have the Responsible Supervisor authorize before entry into the space.Complete entry log.
Atmospheric Monitoring	<ul style="list-style-type: none">4 – Gas monitoring (O₂, LEL, CO, H₂S) prior to ventilation, prior to entry and continuously while an entrant(s) is in the space.Carbon Monoxide sensor will be used to identify the presence of products of combustion.
Ventilation	Positive Pressure Ventilation <ul style="list-style-type: none">Ensure the exhaust system for the pump station is on for the duration of time inside the station/wet well Positive Pressure Ventilation of Pump Station Bottom (Area above Wet Well) <p>This measure is needed to ensure to provide effective ventilation to a worker inside the wet well.</p> <ul style="list-style-type: none">Use a 5000 CFM fan to provide ventilation to the bottom of the pump station, the lid area of the wet well.Draw air in from outside of the pump station, ensuring it is coming from a clean source. Ensure the exhaust from the pump station does not encroach on the intake of the ventilation fan.Ensure vehicles/small equipment do not idle/run within 25 ft. of space or intake of ventilation fan.



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Pump Stations, Wet Wells at Bottom

Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

	<ul style="list-style-type: none"> Use an exhaust extension on vacuum truck to direct exhaust away from the site, as required. Ensure the duct of the 5000 CFM fan extends within 24 inches of the lid of the wet well. Ensure that the duct is located opposite to the exhaust system for the pump station and within 24 inches of the floor, the lid area of the wet well. <p>Positive Pressure Ventilation of Pump Station Bottom (Wet Well Itself)</p> <ul style="list-style-type: none"> Ventilate the wet well with 900 CFM (volume of air at the end of the duct), blowing into the space for 15 minutes prior to entry and continuously while an entrant is in the space. This will provide 20+ air exchanges per hour. Ensure the fan is rated for at least twice the prescribed ventilation rate when using a ≤ 25 ft. duct (confirm with manufacturer's instructions that fan will provide required ventilation). Ensure the intake of the fan for the wet wells is near the outlet, the end of the poly duct, of the bigger fan. At a minimum the end of the duct must be suspended no more than 24" above the bottom of the wet well and is within 10 ft. of the worker. Move the duct as required during completion of work activities.
Standby Person	MODERATE Hazard Space - Standby person is to be stationed at or near the access and check on the well-being of the entrant regularly (at least every 20 minutes)
Hazardous Energy	<ul style="list-style-type: none"> Pumps Sensors <p>Wellington Pump Station Wet Well</p> <ul style="list-style-type: none"> 36 in. Inlet Pipe – Sanitary Sewage 5 x 8 in. Outlets via pumps (wet well currently has 3 pumps) – Sanitary sewage 12 in. force main – Fed by Outlets via pumps 4 in. Inlet – Drain – Wash Down By-Pass Pipe 3 in. Inlet – Drain – From the MCC Floor and Wet Well Platform Drain. <p>Chase River Pump Station Wet Well</p> <ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage 7 x 8 in. Outlets via pumps – Sanitary Sewage 4 in. Sani-Truck Dump Inlet (indirectly flows into Wet Well) – Sanitary Sewage 20 in. Overflow bypass 8 in. Force main drain line #1 and #2
Rescue	A Rescue Plan that allows for a: <ul style="list-style-type: none"> ENTRY Rescue (A rescuer is required to enter the space to assist an entrant to exit the space)

HAZARDS AND CONTROLS OF SPECIFIC TASK(S) (Not already identified)

GENERAL ENTRY PPE <i>(To be worn unless otherwise specified below)</i>	<ul style="list-style-type: none">• Tyvek, Rubber CSA Safety Toe Boots, Hard Hat, Nitrile and Work Gloves and Safety Glasses, Full-face respirator with P100/OV/AG cartridges.<ul style="list-style-type: none">○ Inspection – ONCE CLEANED – Coveralls, Rubber CSA Safety Toe Boots, Hard Hat, Nitrile and Work Gloves and Safety Glasses•	
TASK	HAZARD	CONTROL(S)



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Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

Work Position (Ergonomics)	Soft tissue injuries – manual lifting and awkward postures.	<ol style="list-style-type: none">1. Keep elbows by beltline (don't over reach).2. Keep load as close to the body as possible.3. Maintain a stable footing and base of support.4. Ask for help when needed.5. Take mini-breaks & stretch as needed.
Zip Cutting/Grinding Mild Steel (no coatings)	<ul style="list-style-type: none">○ Carbon Steel contains iron, chromium and nickel primarily. Grinding and cutting will produce fume with oxides and particulate which are skin, eye, and respiratory irritants. They can all produce Metal Fume Fever (flu like symptoms with sweet/ metallic taste in mouth) and are carcinogens over long periods of exposure.○ Carbon monoxide from zip cutting, grinding and welding○ Sparks○ Hot surfaces, flying projectiles, disc failure	<p>General:</p> <ul style="list-style-type: none">○ To be completed after the space is washed and ventilated.○ Keep combustibles out of the space○ Have a fire extinguisher readily available○ Ensure guard is in place and the RPM of the grinding/cutting wheel matches that of the tool <p>PPE:</p> <ul style="list-style-type: none">○ Entrant must change into/wear coveralls that are FR/Cotton, wear safety glasses with side shields, face shield, work gloves and half face respirator with P100 cartridges.
Welding to Repair Pipes (Welding a patch onto uncoated carbon steel) - SMAW	<ul style="list-style-type: none">○ Carbon Steel contains iron, chromium and nickel primarily. Grinding and cutting will produce fume with oxides and particulate which are skin, eye, and respiratory irritants. They can all produce Metal Fume Fever (flu like symptoms with sweet/ metallic taste in mouth) and are carcinogens over long periods of exposure.○ Carbon monoxide from zip cutting, grinding and welding○ Sparks○ Hot surfaces, flying projectiles, disc failure○ Electric shock	<p>General:</p> <ul style="list-style-type: none">○ To be completed after the space is washed and ventilated.○ Keep combustibles out of the space○ Have a fire extinguisher readily available○ Ensure Welding equipment is used as per manufacturer's directions and training.○ Welding requires localized exhaust control, either a smoke eater or a localized exhaust fan <p>PPE:</p> <ul style="list-style-type: none">○ Entrant must change into/wear coveralls that are FR/Cotton, wear welding shield, leather gauntlet gloves, half face respirator with P100/OV cartridges and hearing protection.
Pipe Fitting/Replacing Pump Bases – Drilling Concrete (To mount/remount pipes)	<ul style="list-style-type: none">○ Wet Well constructed of concrete which when mechanically disturbed will release silica, a known carcinogen (i.e. drilled, ground, cut).	<p>General:</p> <ul style="list-style-type: none">○ If drilling of concrete is required, use wet methods or a HEPA attachment <p>PPE:</p> <ul style="list-style-type: none">○ Entrant must change into/wear coveralls, wear safety glasses with side shields, work gloves and half face respirator with P100 cartridges.



CONFINED SPACE ENTRY PROCEDURE

EXAMPLE ONLY

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Pump Stations, Wet Wells at Bottom

Location: Wellington – 5200 Fillinger Cres. Nanaimo, BC
Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

3. Equipment Required

GENERAL CONFINED SPACE ENTRY EQUIPMENT (REFERENCE SAFE WORK PROCEDURES FOR OTHER REQUIRED EQUIPMENT)		
<input type="checkbox"/> 4 Gas Detector (O ₂ , CO, H ₂ S, LEL) <input type="checkbox"/> Ventilation Fan – 5000 CFM (Fan rating) with appropriate duct for reaching within 24 inches of the pump station floor, the lid area of the wet well. <input type="checkbox"/> Ventilation Fan and duct (min. 900 CFM at end of duct required) <input type="checkbox"/> Portable Ladder	<input type="checkbox"/> Communication Equipment (RADIO, CELL PHONE) <input type="checkbox"/> Tripod/Davit Arm <input type="checkbox"/> Self-Retracting Lifeline with Winch <input type="checkbox"/> Temporary Fall Protection Guarding <input type="checkbox"/> Lockout Kit/Equipment <input type="checkbox"/> GFCI for Electrical Equipment	<input type="checkbox"/> Bucket and Rope <input type="checkbox"/> Level 1 First Aid Kit <input type="checkbox"/> Eye Wash Station <input type="checkbox"/> Additional Rescue Equipment (See Rescue Plan) <input type="checkbox"/> OTHER EQUIPMENT AS IDENTIFIED IN APPLICABLE PROCEDURES/ DOCUMENTATION
PERSONAL PROTECTIVE EQUIPMENT (REQUIRED LIST - FOR GENERAL ENTRY AND TASKS)		
<input type="checkbox"/> FR Coveralls <input type="checkbox"/> Tyvek Coveralls <input type="checkbox"/> CSA Safety Toed Rubber Boots <input type="checkbox"/> Hard Hat <input type="checkbox"/> Gloves (NITRILE/WORK)	<input type="checkbox"/> Eye Protection (SAFETY GLASSES/FACE SHIELD/FULL-FACE RESPIRATOR) <input type="checkbox"/> Respiratory Protection (FULL and ½ FACE RESPIRATOR with P100/OV/AG CARTRIDGES)	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Harness <input type="checkbox"/> Auxiliary Light Source

4. Entry Procedure

Topic	#	Procedure	Reminders
Entry Log/Permit	1.	Complete and post Confined Space Entry Permit	<i>Ensure all fields are completed.</i> <i>Permits require supervisors written authorization.</i>
Tailboard	2.	Supervisor Conduct a tailboard meeting which includes: <ul style="list-style-type: none"> Assignment of roles and responsibilities (Responsible Supervisor, Standby, Entry and Rescue) Review Documentation: <ul style="list-style-type: none"> CS Hazard Assessment CS Entry procedure CS Rescue Plan Lockout and Isolation procedures, Specific work procedures, WSBC Alternate Isolation Measures Acceptance (WSBC 9.22) Professional Engineer Certification of Isolation Points Written Rescue Agreement Other applicable documentation 	<i>Record assignees of roles and responsibilities, meeting attendees and that all necessary documents have been reviewed.</i>
Standby	3.	Supervisor to assign a competent and responsible standby person.	<i>Record name of person assigned the role of Standby Person.</i>



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Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

Topic	#	Procedure	Reminders
		<p>Moderate Hazard Space:</p> <ul style="list-style-type: none"> Standby person is to be stationed at or near the access Confirm effective and continuous means to communicate with entrant. Maintain continuous visual contact of entrant. Confirm effective means to summon additional help should it be required Check on the well-being of the entrant(s) regularly (at least every 20 minutes) Ensure that the required controls remain in place and continue to be effective (i.e. intake of fan) Ensure the end of the duct is within 10 ft. of the entrant. Ensure continuous effective communication between the entrant, standby person and vacuum truck operator 	<p><i>The standby person cannot enter the space for <u>any</u> reason.</i></p>
Rescue Plan	4.	<ul style="list-style-type: none"> Reconfirm assignment of Rescue Roles and Responsibilities Review how the rescue will be initiated and how the entrant will be rescued Note any restrictions to the work process that may be required based on planned method of rescue 	<p><i>Record names of persons assigned rescue duties.</i></p> <p><i>Review Rescue Plan.</i></p> <p><i>Ensure equipment is SET-UP and "Ready to Go!"</i></p>
Communication	5.	<p>Standby Person to check method of communication to confirm effective between,</p> <ul style="list-style-type: none"> Entrant and Standby Person Standby Person and Rescue Resources Standby Person and Emergency Services (911) 	<p><i>During initial entry into the confined space, test communications to ensure there are no unexpected "Dead Spots."</i></p>
Establish Safe Work Zone/ Traffic Control	6.	<ul style="list-style-type: none"> Establish site safe work zone Establish a staging area, Keep tools/equipment/supplies not in use at least 3 feet away from access. 	
Lockout – Energy/ Isolation	7.	<p>Energy Sources</p> <ul style="list-style-type: none"> Pumps Follow written lockout procedure <p>Isolation</p> <p>Wellington Pump Station Wet Well</p> <ul style="list-style-type: none"> 36 in. Inlet Pipe – Sanitary Sewage – Close and lockout sluice gate. 12 in. force main isolation valve 3 x 8 in. Outlets via pumps – Close and lockout plug valves 4 in. Inlet – Drain – Wash Down By-Pass Pipe – Close and lockout plug valve 	<p><i>Spaces requiring lock-out/ isolation require a permit.</i></p> <p><i>Hazardous Energy Sources require <u>written</u> lockout/isolation procedures to be on site.</i></p> <p><i>Ensure all associated documentation is on site, if required (PEng. Certification, Alternate Measure Acceptance).</i></p>



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Pump Stations, Wet Wells at Bottom

Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

Topic	#	Procedure	Reminders		
		<p>Chase Pump Station Wet Well</p> <ul style="list-style-type: none"> 42 in. Inlet Pipe – Sanitary Sewage – Close and lockout sluice gate. 7 x 8 in. Outlets via pumps – Close and lockout plug and air actuated valves. 4 in. Sani-Truck Dump Inlet - Cap, lock Sani-Truck Inlet to Wet well. Also notify collection companies, post signage and erect barriers around dumping bay. 20 in. Overflow bypass – Close and lockout bypass valve to wet well 8 in. Force main drain – Isolate with inflatable plug. <p>For BOTH Wet Wells</p> <ul style="list-style-type: none"> Follow written isolation/lockout procedures Alternate Isolation Measure Approval (9.22) required from WSBC <p>De-energization and Lockout of some or all of the points may have to occur after emptying, cleaning the space.</p>			
Check Gas Detector	8.	<p>Outside the space,</p> <ul style="list-style-type: none"> Turn on and check battery and function of the gas detector(s). Ensure detector(s) is calibrated as per the manufacturer's instructions. Ensure detector(s) has been zeroed and a bump test has been completed within the last 24 hours. Clear the peaks before use. 	Recommended Alarm Set Points	LOW Alarm	HIGH Alarm
			O ₂	20.5%	22.0%
			LEL	5%	10%
			CO	10 ppm	25 ppm
			H ₂ S	5 ppm	10 ppm
Open Access	9.	<ul style="list-style-type: none"> Test around the access point with the gas detector before and while opening it. Open access. Remain aware of your position in relation to the access, while opening (i.e. open from hinge side, take a knee, etc.) Secure hatch in open position, as required. Use fall protection around open hatches when there is sewage/liquid still in the wet well. 			
Emptying/ Cleaning of Space	10.	<ul style="list-style-type: none"> Wash as much of the space from the deck level without entering as possible. The majority of remaining material will be grit with minimal organic content. If grit is to be removed, remove as much grit as possible without entering the space. Organic/Sanitary sewer debris that cannot be removed by washing from the outside must at least be disturbed and disturb the remaining grit as much as possible from outside of the space BEFORE ventilation and entry. 	<p><i>While washing note any locations where residue may be left and make sure entrant is aware.</i></p>		



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Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

Topic	#	Procedure	Reminders		
		<ul style="list-style-type: none">Allow pumps to run while washing space from the outside to flush outlets and allow water to remain in outlet pipes rather than sanitary sewage.			
Test Atmosphere for Initial Conditions	11.	<ul style="list-style-type: none">Thoroughly test the atmosphere in the space <u>before</u> ventilation. If the levels exceed the maximum permissible levels listed to the right, an unexpected hazard is present. <p>STOP → DO NOT ENTER → CONTACT YOUR SUPERVISOR.</p>	Maximum Permissible Levels Prior to Ventilation		
			O ₂	19.5% (min)	22% (max)
			LEL	10 %	
			CO	0 ppm	
			H ₂ S	10 ppm	
Mechanically Ventilate Space (Wet Well)	12.	<p><u>Positive Pressure Ventilation of Pump Station Bottom (Wet Well Itself)</u></p> <ul style="list-style-type: none">Follow manufactures directions in regard to setting up fan to ensure correct volume of air is being delivered to the space (i.e. duct length, number of bends, etc).Ventilate the wet well with 900 CFM (volume of air at the end of the duct), blowing into the space for 15 minutes prior to entry and continuously while an entrant is in the space. This will provide 20+ air exchanges per hour.Ensure the fan is rated for at least twice the prescribed ventilation rate when using a ≤ 25 ft. duct (confirm with manufacturer’s instructions that fan will provide required ventilation).Ensure the intake of the fan for the wet wells is near the outlet, the end of the poly duct, of the bigger fan.At a minimum the end of the duct must be suspended no more than 24” above the bottom of the wet well and is within 10 ft. of the worker. Move the duct as required during completion of work activities.	<p>Ensure contaminants are not introduced to space or ventilation fan intake.</p> <p><i>If mechanical ventilation fails at any time during entry, the space must be vacated immediately.</i></p>		
Re-Test Atmosphere	13.	<ul style="list-style-type: none">Re-test the air inside the space after ventilating for 15 minutes. Air monitoring must read equivalent or better than “Clean Respirable Air” levels. <p>Clean Respirable Air (CRA) is:</p> <p>Oxygen (O2) = ~ 20.9 % (20.8 to 21%)</p> <p>Combustibles (LEL) = 0%</p> <p>Carbon Monoxide, CO = ≤ 2 ppm</p> <p>Hydrogen Sulfide, H₂S = ≤ 1 ppm</p> <p>If the atmosphere does not contain CRA, workers are not allowed to enter.</p> <p>STOP → DO NOT ENTER → CONTACT YOUR SUPERVISOR.</p>	<p>Typically, when air is not clean after ventilation, there are a couple possibilities:</p> <ol style="list-style-type: none">1) Contaminants generated are different than what was assessed.2) Ventilation is not pushing/pulling the amount of air required at the end of the duct. Recheck ventilation system for bends in duct,		



CONFINED SPACE ENTRY PROCEDURE

EXAMPLE ONLY

Date: May 22, 2019

Revision: July 14, 2020

Space: Wellington and Chase River

Location: Wellington – 5200 Fillinger Cres. Nanaimo, BC

Pump Stations, Wet Wells at Bottom

Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

Topic	#	Procedure	Reminders
			<i>faulty fan, joints not connected properly.</i>
Don PPE/Specific Instructions	14.	Don Personal Protective Equipment required for entry and the assigned task(s) being completed.	
		Specific Instructions (other than PPE) <ul style="list-style-type: none">All electrical equipment to be fitted with a GFCI	
Fall Protection/Lifeline	15.	<ul style="list-style-type: none">Entrant to be connected to a self-retracting lifeline with winch while using the ladder to enter/exit the space.Workers are to use a fall protection system when working near open hatches while there is sewage/liquid in the wet well.Once the wet well is drained, pumped out, fall protection is not required.	<i>Standby must assist in managing the lifeline/fall protection system to ensure that it does not become entangled.</i>
Access – Specific Instructions	16.	<ul style="list-style-type: none">Confirm hatch is secured in the open position, if applicable.Confirm entrant is securely attached to the self-retracting lifeline.If using a portable ladder, ensure it extends 3 rungs beyond the access and is secured in place.While using a fixed ladder, confirm integrity of each rung before fully committing weight.Maintain 3-point contact while entering the space and using ladder.	
Enter to Perform Tasks	17.	<ul style="list-style-type: none">Enter the space and carry out the planned task(s).Monitor the atmosphere on a continuous basis while entrants are inside the space.The focus of atmospheric monitoring is the entrant's breathing zone.Remember to periodically check the peaks on the gas monitor.The ventilation duct is to be moved during the completion of tasks so that the end of the duct remains within 10 ft. of the worker (the duct that is providing 900 CFM)Remain aware of slip/trip/snag hazards.Do not stand on equipment in the space (i.e. pumps)Remain aware and ensure stable footing when working in spaceWork in a way that the entrant can stand on the bottom of the space rather than on the grit, accumulated material.Lower tools/equipment using a bucket and not over entrant or using positive hand-off techniques.Do not stand below live loads.	<p><i>Entrant(s) name and entry time recorded on Entry Log/Permit.</i></p> <p><i>Remain aware of changes in the monitor readings, even those that do not cause the monitor to alarm (Check PEAKS).</i></p> <p><i>If the monitor alarms, the entrant must identify why and if the reason is not immediately identifiable, the entrant must exit the space. Re-entry will be authorized only when the entrant's supervisor has determined that any identified issue has been adequately addressed.</i></p>



CONFINED SPACE ENTRY PROCEDURE

EXAMPLE ONLY

Date: May 22, 2019

Revision: July 14, 2020

Space: Wellington and Chase River

Location: Wellington – 5200 Fillinger Cres. Nanaimo, BC

Pump Stations, Wet Wells at Bottom

Chase River - 1174 Island Highway South, Nanaimo

Task(s): Inspection/ Wash Well Area and Remove grit with vacuum truck

Topic	#	Procedure	Reminders
		<ul style="list-style-type: none">Entrant must maintain visual contact to end of the vacuum truck hose and keep end directed away from him/her.Ensure continuous effective communication between the entrant, standby person and vacuum truck operator	<p><i>In the event of a ventilation and/or respiratory equipment failure, exit the space immediately.</i></p> <p><i>If the work activity may affect the rescue plan in any way, STOP and the impact must be discussed and if required, additional resources added.</i></p>
Re-entry – Atmospheric Testing	18.	<p>Pre-entry testing must be repeated, and results recorded if:</p> <ul style="list-style-type: none">The space is vacated for more than 20 minutes; orVentilation is interrupted; orSpace is out of sight at any time.	<p><i>Record this information on your Entry Log/Permit.</i></p>
Post Entry	19.	<ul style="list-style-type: none">Wash with soap and water after exiting the space.Inspect all equipment prior to re-storing. If any equipment damaged, burned or frayed, it must be immediately fixed or replaced prior to restoring.Confined space Entry Permits are to be retained for a minimum of one year from date of entry.	

Additional Information

For further information regarding confined space entry requirements, refer to WorkSafe BC OH&S Regulation Part 9 & Part 4 (rescue).

Completed By: Jason Hindson, CRSP
Qualified Person(s)

Reviewed By: Rob Skwarczynski
Chief Operator

Zach Suhan
JHSC Representative

Orca Health & Safety Consulting Inc.

Date: May 25, 2019

WPS Isolation Plan

Step #	What to do
1	Close 36" influent isolation gate valve
2	Pump down the wet well
3	Lockout 3 pumps
4	Close and lockout the 12" force main isolation plug valve
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
Notes:	

EXAMPLE ONLY

CRPS Isolation Plan

EXAMPLE ONLY

Step #	What to do
1	Lock out 4 out of 5 pumps (put remainder in standby mode)
2	Lock out 6 out of 7 isolation valves
3	Pig 8" Force main drain line to wet well
4	Ensure the wet well influent bypass valve is closed
5	Close the 42" influent gate to the station
6	Pump down the wet well using the unlocked pump
7	Post do not operate tags on the HMI and leave 1 valve and 1 pump in standby for emergency
8	Monitor influent chamber level during the confined space entry
9	
10	
11	
12	
13	
14	
15	
16	
Notes:	

~~Side Profile of Wellington Wet Well/Pump Station~~

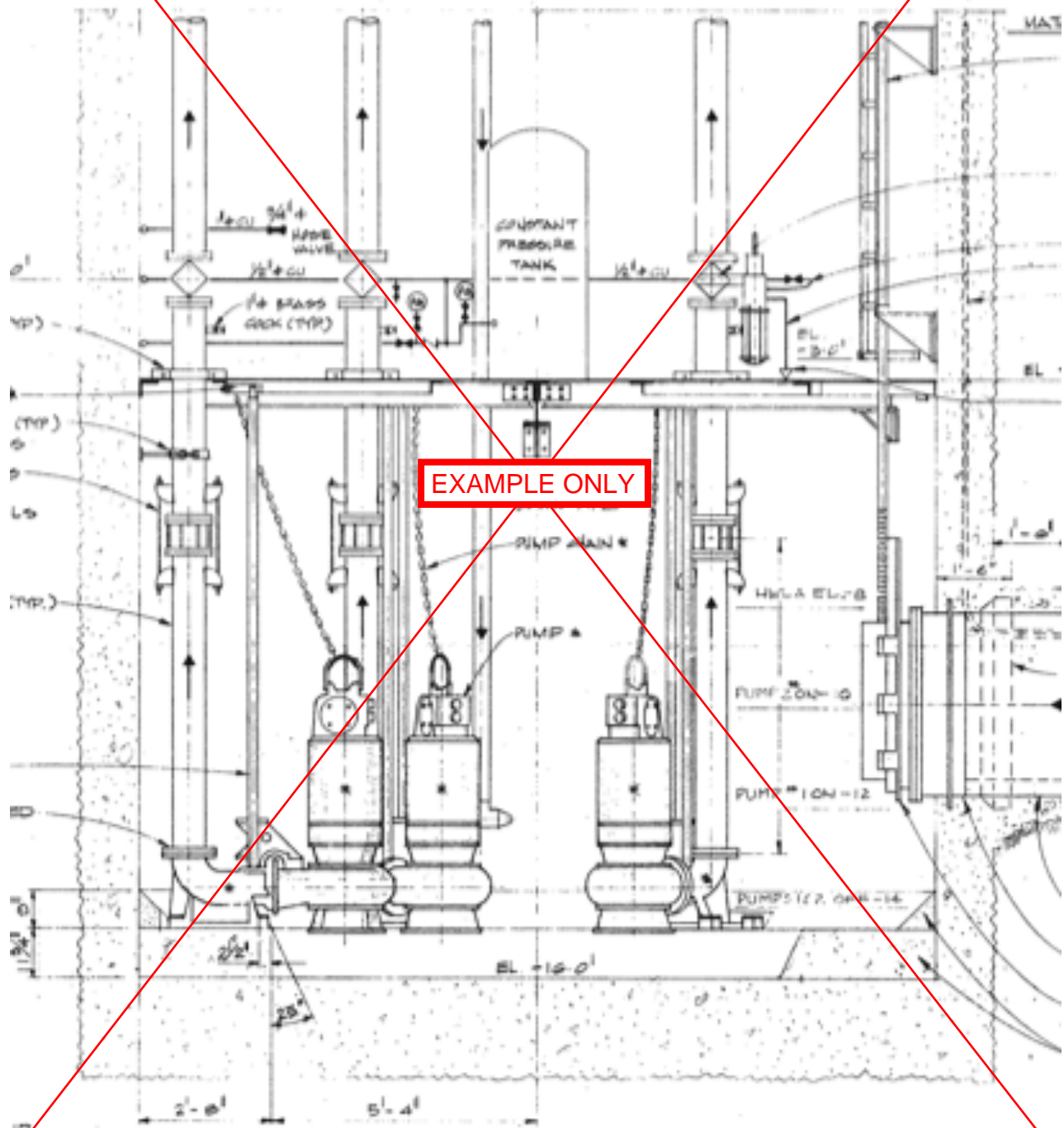
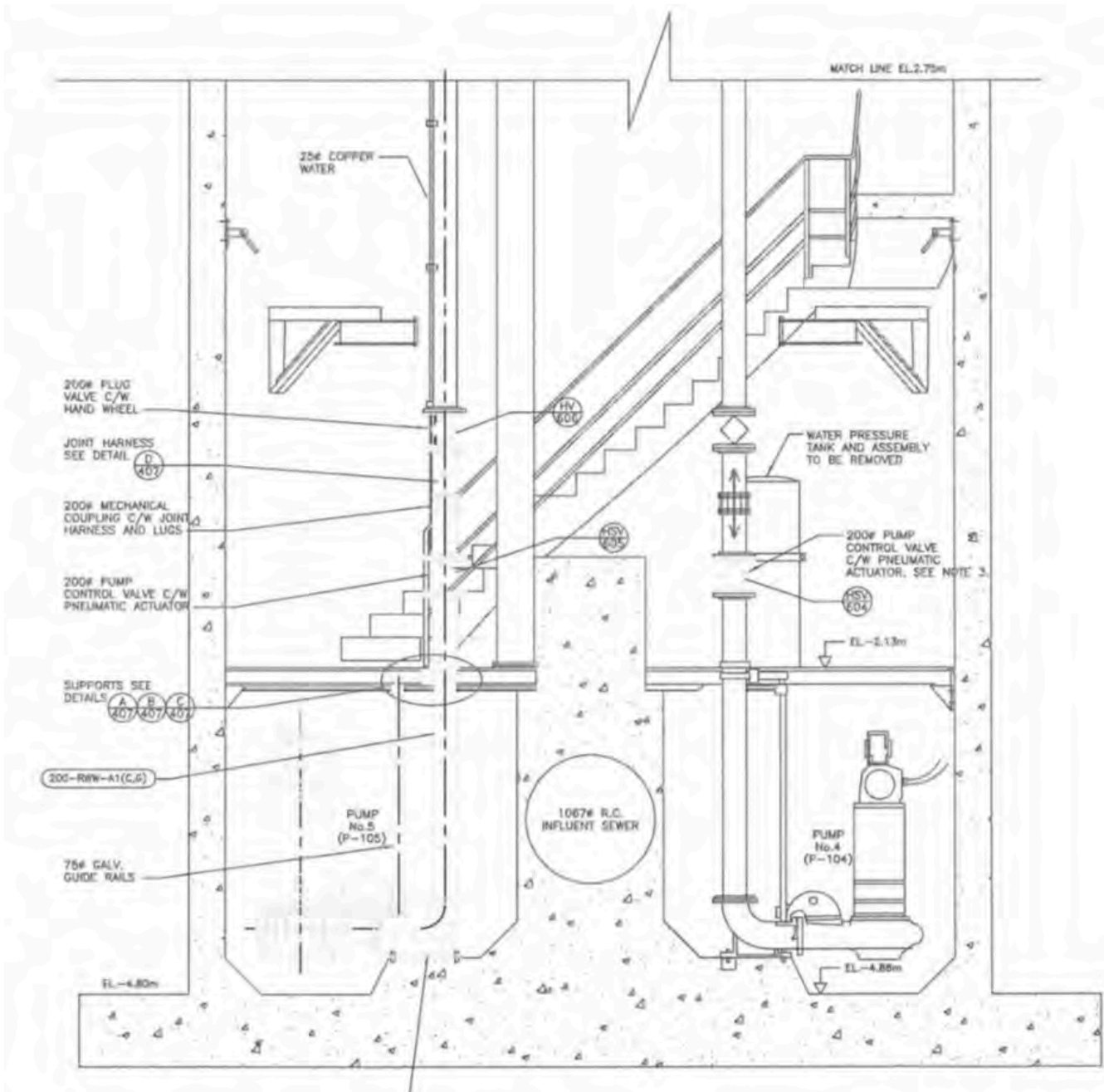


DIAGRAM 2 –

EXAMPLE ONLY

Side Profile of Chase River Wet Well/Pump Station



CONFINED SPACE RESCUE PLAN



Spaces Requiring an ENTRY Rescue LOW/MODERATE HAZARD CONFINED SPACE

Date: **March 23, 2017**

Revised: **March 18, 2018**

EXAMPLE ONLY

Location: **Spaces that are part of the Regional District of Nanaimo Sewer Collection System**

SCOPE: This Confined Space Rescue Plan is **ENTRY/INTERNAL** rescue into a **LOW/MODERATE** hazard atmosphere. It is for entries where the entrant will be connected to a self-retracting lifeline with a winch for ENTRY and EXIT only. During the entry and completion of tasks, the entrant will **NOT** remain connected to a lifeline and/or below the access point and obstacles, that may hinder the rescue, could be introduced. There is a written RESCUE SERVICES AGREEMENT with the City of Nanaimo Fire Department. It is the responsibility of the CS Supervisor to ensure "effective" rescue services are available. The rescue team must be trained, this plan reviewed before each entry and practiced/drilled at least annually.

APPLICABLE SPACES:

Spaces through-out the Regional District of Nanaimo's Sewer Collection System located in areas that fall under the jurisdiction of the Nanaimo Fire Department. These are entries where an entrant will not/cannot remain connected to an external retrieval/rescue means.

RESCUE PLAN OVERVIEW

- Upon initiation of a rescue, all other on-site confined spaces will be immediately evacuated.
- The first goal of the Rescue Team is to aid the injured entrant's self-rescue attempt.
- Although the planned method of rescue is an **ENTRY/INTERNAL** one, a non-entry/external rescue will be attempted using the entrant's lifeline if possible and if any self-rescue attempt fails or is not possible.
- If an ENTRY/INTERNAL rescue is required, the Nanaimo Fire Department will be notified and requested to respond as per the Rescue Services Agreement.
- The equipment identified in this plan is only to allow for safe entry/exit from the space and to allow a NON-ENTRY/EXTERNAL rescue should it be possible.

Possible/Expected Injuries Medical, Bruises/Sprains (from slips and trips)

ROLES AND RESPONSIBILITIES FOR RESCUE (Note assignment(s) on entry log/permit)

**Minimum Number of Personnel
Required for Rescue:**

1

Role	Responsibility
Rescue Leader/ Standby Person/ Rescuer/ First Aid	<p>A single person that will fill all roles:</p> <ul style="list-style-type: none"> Directs and coordinates initial rescue efforts at the site/assists the Fire Department (FD) as directed until the injured entrant is safely out of the space and handed over to emergency services. Communicates with entry personnel, summons and assists with rescue efforts, keeps records of all confined space entrants and atmospheric readings, ensures controls remain effective and orders evacuation, if necessary. Assists entrant in exiting the space if self-rescue is possible or a NON-ENTRY/EXTERNAL rescue, if possible during entry/exit from the space. Must be trained in first aid (Another person in the plant can fill this role)


RESCUE SYSTEM	Rescue Method	<input type="checkbox"/> External Manual Retrieval (NON-ENTRY RESCUE)		<input checked="" type="checkbox"/> Internal Manual Retrieval (ENTRY RESCUE)	
	Rescue System	<input type="checkbox"/> Horizontal System		<input checked="" type="checkbox"/> Vertical System	<input type="checkbox"/> Combination Horz/Vert System
	Pre-Rigging Required?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Notes:	Self-Retracting Lifeline to be used for entry/exit from the confined space. The FD is responsible for establishing and deploying any additional systems.	
	Anchor Required?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Type:	<input type="checkbox"/> Horizontal	<input checked="" type="checkbox"/> Vertical (<10 ft) <input checked="" type="checkbox"/> Vertical (>10 ft) <small>Min 5000lbs.</small>
	Anchor to be used:	<input checked="" type="checkbox"/> Tripod/Davit Arm/Suitable anchor			

EQUIPMENT REQUIRED (In addition to that listed in the Entry Procedure)

Ensure all required equipment and personnel for the planned method of rescue are "Ready to Go!"

EQUIPMENT	General Equipment:		First Aid & Packaging Equipment:	
	Gas Monitor (2 nd One Designated for Rescue Purposes)	2	First Aid Kit – OFA Level 1	1
	Communication Equipment (Radio/Cell)	1	Entrant's Harness (worn for entry)	1

CONFINED SPACE RESCUE PLAN

 REGIONAL DISTRICT OF NANAIMO	Spaces Requiring an ENTRY Rescue LOW/MODERATE HAZARD CONFINED SPACE	Date: March 23, 2017 Revised: March 18, 2018 Location: Spaces that are part of the Regional District of Nanaimo Sewer Collection System
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EXAMPLE ONLY

	Source of Light (as required)	1		
	Lifeline/Rope Requirements and Rescue Rigging Equipment			
	Tripod/Davit Arm/Suitable Anchor	1	Self-Retracting Lifeline with Winch	1
	Rescue Team PPE – EACH ENTRY RESCUER (Ensure additional PPE Requirements in CS Entry Procedure are met, as required):			
	Additional PPE is not required for an external rescuer other than that listed in the confined space hazard assessment/entry procedure for working while stationed at the access point. The FD is responsible for ensuring its personnel are appropriately protected from any hazards.			

PLANNING - Before Work Begins

PLANNING / SET-UP	CS SUPERVISOR reviews the Confined Space Hazard Assessment, Entry procedure, this Rescue Plan and ALL other applicable/required documentation.		
	CS SUPERVISOR assesses the characteristics and hazards of the confined space , as well as the work to be completed and ensures this rescue plan is adequate and the required resources are available (equipment, PPE and personnel).		
	Roles & Responsibilities – CS SUPERVISOR ensures rescue team roles and responsibilities are assigned to competent workers (Rescue Leader, Standby Person, Rescuer(s)/First Aid Attendant). (NOTE ON ENTRY LOG/PERMIT)		
	Communication – Confirm planned methods of communication are effective between: <ul style="list-style-type: none"> Entrant & Standby Person – Voice Standby Person & Emergency Services – Cell Phone Standby Person & Rescue Team – Voice (will be located at the space) FD Rescue Team Members – As per Nanaimo Fire Department Standard Operating Practice 		
	Rescue Team/Equipment Location – The NON-ENTRY/EXTERNAL rescue team and equipment will be at the space. The ENTRY/INTERNAL rescue team (Nanaimo Fire Department) will be stationed off site and will respond once called.		
	Restrictions for the Entry/Entrant(s) Work to ensure this rescue plan remains effective: <ul style="list-style-type: none"> The entrant must be connected to a self-retracting lifeline during entry/exit from the confined space. 		
	No further harm: Note if there are any objects upon which the injured entrant may become caught on during an external rescue attempt. This will be reconfirmed by a verbal/visual assessment at the time of rescue.		
	RESCUE LEADER notes any additional hazards, controls, comments regarding the planned method of rescue in the comments section of the entry log/permit. (NOTE ON ENTRY LOG/PERMIT)		
	Review Rescue Plan: In tailboard talk, the Rescue Leader explains how the rescue will be completed, discussing: <ul style="list-style-type: none"> Roles and Responsibilities How the rescue plan will be initiated, Rescue Team notified? How the injured entrant will be rescued (Method and System)? Restrictions to the entry/entrant(s) that may be required based on the planned method of rescue 		
	RESCUE LEADER ensures all required rescue equipment is set up BEFORE any worker enters the confined space. If Lockout/Isolation is required, RESCUER(S) lockout BEFORE entry is made/work begins. A group lockout procedure must be used and the group lock box stationed with the standby worker.		

WHAT TO DO	Person Responsible	WHAT TO DO - On Initiation of Rescue
	STANDBY PERSON	In case of an emergency, work location will be: As identified on the ENTRY LOG/PERMIT
	STANDBY PERSON	Notifies/ summons the pre-determined rescue team members.
	RESCUE LEADER	Must consider “Why is rescue needed?” <ul style="list-style-type: none"> Assess the situation (ask entrant, if possible) and reassess all known hazards. Ensure the prescribed controls are still in place and effective (confirm atmosphere with monitor). Control any newly identified hazards and document in the comments section of the Confined Space Entry Log/Permit (note on entry log permit). Rescue Team Personnel safe (currently and to perform their role)?
	RESCUE LEADER	Call 911 and state it is a Confined Space Emergency and explain the nature of all known injuries, number

CONFINED SPACE RESCUE PLAN



Spaces Requiring an ENTRY Rescue LOW/MODERATE HAZARD CONFINED SPACE

Date: **March 23, 2017**

Revised: **March 18, 2018**

EXAMPLE ONLY

Location: **Spaces that are part of the Regional District of Nanaimo Sewer Collection System**

	of people involved, location of the confined space, any site access notes, and the on-site telephone number.
RESCUE LEADER	Self-Rescue attempts should be encouraged, if safe to do so and no further harm may result.
RESCUE LEADER	Determine if a NON-ENTRY/EXTERNAL RESCUE can safely be performed, including assistance from a fellow entrant <u>already</u> in the space. Confirm that the injured entrant will NOT become caught on any object and the possible injuries allow for this type of rescue.
ENTRANT	At the direction of the RESCUE LEADER , a fellow ENTRANT <u>already</u> in the space can assist an injured entrant in relocating to a position below the tripod/davit arm/suitable anchor.
RESCUER	At the direction of the RESCUE LEADER , switch the self-retracting lifeline to retrieval/winch mode and begin to raise the injured entrant. Ensure that he/she does NOT BECOME CAUGHT on any object and that the CABLE IS NOT allowed to RUB AGAINST any edge/object, protect if necessary.
RESCUER(S)/ FIRST AID	Once the injured entrant is outside of the space, move to a safe area, reassess and maintain medical responsibility until relieved by a higher level of care (i.e. Emergency Medical Personnel/On site designated First Aid Attendant)
FIRST AID	Once the injured entrant has retrieved from the space, assess the injured entrant and provide an update to the RESCUE LEADER . <ul style="list-style-type: none"> • Nature and Mechanism of Injury, • Level of Consciousness (Alert, Verbal, Pain, Unresponsive) • ABC – Airway, Breathing, Circulation • Rapid Body Survey
RESCUE LEADER	If an ENTRY/INTERNAL Rescue is required <u>only</u> trained and equipped FD Technical Rescue personnel may enter the space to perform a rescue. The FD will have their own Rescue Plan.
STANDBY PERSON	While waiting for the FD, reconfirm that the identified hazards are appropriately controlled and that there are no new hazards that need to be addressed. (i.e. Air Monitoring, Ventilation, Isolation/Lockout) <ul style="list-style-type: none"> ➤ CONFIRM ATMOSPHERE IS SAFE and continuously monitor.
RESCUE LEADER and RESCUE TEAM	Upon FD arrival, assists as per the request of the Incident Commander
RESCUE LEADER	Update the FD upon arrival: <ul style="list-style-type: none"> • How many entrants are in the space? • Injured entrant(s) location • Possibly Injuries and Mechanism <ul style="list-style-type: none"> • Hazards of the Space (Hazard Assessment) • Hazard Controls in place (Entry Procedure) • Gas Monitor Readings • Lockout Box Location (if applicable)
RESCUE LEADER	Workers requiring medical treatment are to be transported to the nearest Hospital or Medical Center as noted on the Confined Space Entry Log/Permit (Injured/rescued entrants must not transport themselves to seek medical attention).
RESCUE LEADER	Inform the CS SUPERVISOR when the rescue operation is completed, secure the scene and await further direction.

Completed by:

Jason Hindson, CRSP

Reviewed by:

Robert Skwarczynski

Zach Suhan

Qualified Person(s)

Chief Operator - GNPCC

JHSC Representative



Orca Health and Safety Consulting
Inc.

Date: March 23, 2017

EXAMPLE ONLY

The *Workers Compensation Act* requires that the employer must post a copy of this report in a conspicuous place at or near the workplace inspected for at least seven days, or until compliance has been achieved, whichever is the longer period. A copy of this report must also be given to the joint committee or worker health and safety representative, as applicable.

A revised version of the *Workers Compensation Act* took effect on April 6, 2020. The B.C. government's revisions aim to make the Act easier to read and understand, and to reorganize the numbering to make laws easier to find. The revisions make no changes to B.C.'s laws concerning workers' compensation, occupational health and safety, and employers' assessment premiums. Please be aware there may be a transitional period where correspondence from WorkSafeBC may include references to either the previous Act or the revised Act. For more information, visit www.worksafebc.com/WCA2019 or call the Prevention Information Line at 604.276.3100, or toll free within BC at 1.888.621.7233 (SAFE).

Inspection Report #202016686096A

Employer Name	Jobsite Inspected	Scope of Inspection
REGIONAL DISTRICT OF NANAIMO	6300 Hammond Bay Road Nanaimo BC V9T 6N2	Wellington and Chase River Pump Station Wet Wells

Date of Initiating Inspection	Date of This Inspection	Delivery Date of This Report	Delivery Method
Aug 13, 2020	Aug 13, 2020	Aug 13, 2020	Email

THERE ARE ZERO (0) ORDERS OR OTHER ITEMS OUTSTANDING

**ACTION MAY STILL BE NECESSARY TO ENSURE COMPLIANCE
PLEASE READ FULL REPORT**

INSPECTION NOTES

Application for acceptance

The employer has requested that WorkSafeBC accept alternate measures under section 9.22 of the Occupational Health and Safety Regulation. The employer has provided the following documents to support its request:

- * Letter dated July 13, 2020 Re: Application for Acceptance of Alternate Isolation Measures for Confined Space Entry - Wellington and Chase River Pump Station Wet Wells.
- * Letter dated July 13, 2020 Re: Regional District of Nanaimo - Greater Nanaimo Water Pollution Treatment Centre JHSC Consultation of the Application for "Acceptance of Alternate Isolation Measures for Confined Space Entry into Wellington and Chase River Pump Station Wet Wells"
- * Confined Space Entry Procedure for Wellington and Chase River Pump Stations Wet Wells at Bottom dated May 22, 2019 (revised: July 14, 2020)
- * Confined Space Hazard Assessment for Wellington and Chase River Pump Stations Wet Wells at Bottom dated May 4, 2019 (revised: July 14, 2020)
- * Letter dated May 24, 2011 Re: Agreement for Confined Space Rescue Services
- * Confined Space Rescue Plan dated March 23, 2017 (Revised: March 18, 2018)
- * Diagram 1 Side Profile of Wellington Wet Well / Pump Station
- * Diagram 2 Side Profile of Chase River Wet Well / Pump Station
- * CRPS Isolation Plan
- * WPS Isolation Plan
- * IR201916961065A

Two wet wells similar in design and operation, one located at 5200 Fillinger Cres and the other at 1174 Island Hwy S in Nanaimo, are to be accessed by workers. The purpose of entry was reported to be for:

- Inspection
- Wash Well Area
- Remove grit with vacuum truck (as required, based on an on-site assessment)
- Pipe fitting/Replacing Pump Bases (Anchoring Pipes – Drilling Concrete)
- Cutting and grinding as needed with a zip cutter/grinder
- Welding to Repair Pipes (Welding a patch onto uncoated carbon steel) - SMAW

In accordance with OHS Guideline G9.22-2, a Prevention Officer may make the decision on behalf of WorkSafeBC in this case.

Decision

The acceptance is granted to the employer, Regional District of Nanaimo Firm No. 138613, who has responsibility to ensure that the terms of this acceptance are complied with. The acceptance is only applicable to the wet well/pump station at 5200 Fillinger Cres, Nanaimo and 1174 Island Hwy S, Nanaimo. If the location of the worksite changes or if the acceptance granted to one jobsite is to be applied to another jobsite, the employer must apply for another acceptance.

Special Terms

The conditions and procedures set out in the above-noted documents must be complied with as well as the following:

- * All requirements of the Workers Compensation Act and the Occupational Health and Safety Regulation must be followed.
- * All procedures as provided in the documentation must be followed and where inconsistencies occur, the higher control measure

must be followed.

- * Any engineering certifications required must be valid at the time of entry.
- * The employer must ensure the work procedures, roles & responsibilities, emergency plan and rescue procedures are reviewed with the workers prior to the start of work.
- * The employer/owner must ensure appropriate measures and systems are in place to coordinate the health and safety of this employer's and any other employer's (sub contractors) at this worksite.
- * A ventilation system for the control of airborne contaminants in a confined space must be designed, installed and maintained in accordance with established engineering principles.
- * Gas monitoring equipment must be bump tested on the day of the entry and calibrated in accordance with the manufacturer's instructions.
- * The alternative measures may be performed by the employer's own workers and also by its contractors who will be entering the confined spaces under the accepted alternative measures.

Posting

A copy of these terms, along with any documents to which they refer, must be maintained at the worksite and be available for inspection by WorkSafeBC officers. The same documents must be posted on a suitable bulletin board in legible condition for the period of the acceptance. If affected workers will not receive notice by posting on a bulletin board, then the acceptance must be otherwise made known to all affected workers.

Joint Committee

A copy of these terms, along with any documents to which they refer, must be given to the Joint Occupational Health and Safety Committee or to the Worker Health and Safety Representative, as applicable.

Time-limited

The acceptance will be valid for the duration of the project, but for no longer than one (1) year (August 13, 2021) from the date of this acceptance.

Verification

The worksite may be inspected by WorkSafeBC officers to confirm these terms are being met.

Failure to Comply

If the terms and conditions of this acceptance are not complied with, the acceptance may be deemed to be void. Any non-compliance with the terms and conditions of this acceptance, or other infractions relating to the subject matter of the acceptance, may result in imposition of orders and administrative penalties.

Validity

The granting of this acceptance is based on the completeness and accuracy of the information provided to WorkSafeBC. Any failure to have provided complete and accurate information may result in revocation of the acceptance and imposition of orders and administrative penalties.



6951 Westminster Highway, Richmond, BC
Mailing Address: PO Box 5350 Stn Terminal, Vancouver BC, V6B 5L5
Telephone 604 276-3100 Toll Free 1-888-621-7233 Fax 604 276-3247

EXAMPLE ONLY

INSPECTION REPORT
Worker and Employer Services Division
202016686096A

Reconsideration

WorkSafeBC may reconsider the granting of the acceptance, or its terms, if it is later found to have been granted in error, new information is received since it was granted or the applicable Occupational Health and Safety Regulation provisions are substantively amended.

If there are any questions regarding the items noted in this inspection report, please contact me for further clarification or other assistance:

Lisa Kennedy, CIH, CRSP
Occupational Hygiene Officer

WorkSafeBC
4980 Wills Road
Nanaimo, V9T 6C6
Phone: 250-751-8080

More information can be found under the Workers Compensation Act and the Occupational Health and Safety Regulation at the following website: www.worksafebc.com

REFERENCES

In addition to any orders, or other items, and the information provided in the Inspection Notes section in this Inspection Report, the officer may discuss other health and safety issues with the employer arising out of the inspection. The information below sets out the health and safety requirements discussed with the employer, and unless otherwise noted, violations of these requirements were not observed.

Reference	Details Discussed
OHS9.22(1) Section 9.18 does not apply if (a) a measure specified in section 9.18 to control or isolate harmful substances contained in adjacent piping from a confined space is not practicable, and (b) the employer implements alternative measures of control or isolation that are acceptable to the Board.	As applicable.
OHS9.22(2) All workers affected by measures implemented under Subsection 9.22(1) must be informed of the measures taken and instructed in any applicable work procedures.	As applicable.

Employer #	Mailing Address	Classification Unit #	Operating Location
138613	6300 HAMMOND BAY RD NANAIMO BC V9T 6N2	753004	001

Lab Samples Taken	Direct Readings	Results Presented	Sampling Inspection(s)	Workers onsite during Inspection	Notice of Project Number
N	N	N			

Inspection Report Delivered To	Employer Representative Present During Inspection	Worker Representative Present During Inspection	Labour Organization & Local
Rob Skwarczynski	Not Applicable	Not Applicable	CUPE 401

WorkSafeBC Officer Conducting Inspection
Lisa Kennedy

*Inspection Time	*Travel Time
0.25 hrs	0.00 hrs

*The time recorded above reflects the inspection time and travel time associated with this inspection report and includes time spent on pre and post-inspection activities. Additional time may be added for subsequent activity.

Request a Review

Any employer, worker, owner, supplier, union, or a member of a deceased worker's family directly affected may, within 45 calendar days of the delivery date of this report, in writing, request the Review Division of WorkSafeBC to conduct a review of an order, or the non-issuance of an order, by contacting the Review Division. Employers requiring assistance may contact the Employers' Advisers Office at 1-800-925-2233.

To submit a request online, visit <https://www.worksafebc.com/en/review-appeal/submit-request>

WorkSafeBC values your feedback. To obtain that feedback, an external market research provider may be contacting you to complete a survey.