

Bylaw No. 347

Cowichan Bay Waterworks District

Latecomer Agreement Bylaw No 347

A bylaw to establish a latecomer agreement for extended or excess services.

The Trustees of the Cowichan Bay Waterworks District enact as follows:

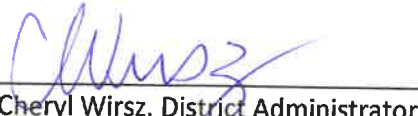
1. Where all or part of an excess or extended service has been paid by the owner of land being subdivided or developed and a latecomer charge is to be collected from an owner connecting to the excess or extended service within the period established under s.747.2[8] of the *Local Government Act*, Cowichan Bay Waterworks may enter into a Latecomer Agreement to collect latecomer fees.
2. A Latecomer Agreement between Cowichan Bay Estates Ltd. and Cowichan Bay Waterworks is hereby established and is attached as Schedule 1.
3. The Latecomer Agreement Area of Interest Map is hereby attached as Schedule 2.
4. This bylaw may be cited as the "Latecomer Agreement Bylaw No. 347".

Introduced and given first reading by the Trustees on the 2nd day of May, 2022.

Reconsidered and finally passed by the Trustees on the 2nd day of May, 2022.


Lew Penney, Chairperson

I hereby certify that this is a true copy of Latecomer Agreement Bylaw No. 347.


Cheryl Wirsz, District Administrator

- Schedule 1 – Latecomer Agreement Between Cowichan Bay Estates Ltd. and Cowichan Bay Waterworks District
- Schedule 2 – Latecomer Agreement Area of Interest Map

Schedule 1 – Latecomer Agreement Between
Cowichan Bay Estates Ltd. and Cowichan Bay Waterworks District

[attached hereto]

THIS AGREEMENT dated for reference the 2 day of MAY, 2022

BETWEEN:

COWICHAN BAY WATERWORKS DISTRICT

an improvement district under
the *Local Government Act* of British Columbia
c/o 1760 Pavenham Road
Cowichan Bay, BC, V0R 1N1

(“CBWD”)

OF THE FIRST PART

AND:

COWICHAN BAY ESTATES LTD. (Inc. #BC0938908)

921 H Canada Avenue
Duncan, BC
V9L 1V2

(the “Developer”)

OF THE SECOND PART

WHEREAS:

- A. The Developer is proceeding with Phase 3 of its Cowichan Bay Estates Development located off Vee Road in Cowichan Bay (the “**Development**”) by subdividing the lands legally described as:
- PID: 005-167-841
Lot 1, Section 5, Range 4, Cowichan District, Plan 10957, Except That Part of Said Lot Shown Outlined in Red on Plan 1659-R and Except Parts in Plans 15342, 16358, 18893, VIP81664 and EPP16402
- (the “**Land**”).
- B. The Developer is subdividing the Land into forty-nine (49) lots as shown on the preliminary subdivision plan prepared by Cowichan Engineering Services Ltd. and attached hereto as **Schedule “A”**.
- C. To proceed with the Development, a booster pump station was built at the Ordano Road Reservoir in Cowichan Bay (the “**Booster Station**”) as identified in the drawings and specifications dated June 18, 2021 approved by the CBWD, and attached hereto as **Schedule “B”**.

- D. The Booster Station ensures sufficient fire flow requirements for those lots in the Development located at an elevation above 74 meters, which encompasses 30 lots of the 49 lots planned for the Development (the “**Developer’s Lots**”).
- E. CBWD, pursuant to s. 701 of the *Local Government Act*, RSBC 2015, c 1, acknowledges that the Booster Station provides excess or extended services, since the Booster Station will benefit parcels of land in Cowichan Bay located at an elevation above 74 meters (the “**Benefitting Lots**”). The number of Benefitting Lots was estimated in the Technical Memorandum prepared by AE Engineering dated February 18, 2021 (the “**Memorandum**”) and attached hereto as **Schedule “C”**.
- F. The Memorandum estimates that over the next 15 years, two-hundred and twenty-one (221) people could benefit from the Booster Station and the projected seventy-eight (78) people who will live on the Developer’s Lots represents 35% of those people, and the parties agree that 35% of the cost to construct the Booster Station is attributable to the Development and 65% of the cost to construct the Booster Station is an excess or extended service.
- F. The Parties have agreed, based on the cost estimate attached hereto as **Schedule “D”** that the Booster Station cost estimate is \$1,069,198.08, resulting in the latecomer charge formula set out in **Schedule “E”**.
- G. CBWD considers that *its costs* to provide the Booster Station, in whole or in part, are excessive, and in accordance with s. 701(3)(b) of the *Local Government Act*, CBWD requires the Developer, as the owner of the Development, to pay the costs of the Booster Station.
- H. CBWD and the Developer wish to enter into this Agreement to confirm in writing CBWD’s requirements for the Developer to construct the Booster Station, and to record CBWD’s obligation to collect latecomer charges under s. 702 of the *Local Government Act*.

NOW THEREFORE THIS AGREEMENT WITNESSES that in consideration of the mutual covenants and agreements made by each of the parties to the other as set out herein, and for other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, CBWD and the Developer covenant and agrees as follows:

- 1. **THE BOOSTER STATION**
 - 1.1 The Developer has built the Booster Station in compliance with **Schedule B**.
 - 1.2 CBWD and the Developer acknowledge and agree that pursuant to s. 702(1)(b) of the *Local Government Act*, the Booster Station will benefit any parcel above 74m. geodetic elevation if such owner connects to CBWD’s water distribution system (the “**Water System**”) after the date of this agreement.

- 1.3 CBWD and the Developer acknowledge and agree that it is not possible to accurately predict how many future lots in Cowichan Bay will benefit from the Booster Station, and the estimate provided by AE Engineering in the Memorandum is a reasonable method to use for calculating the latecomer charges contemplated in this Agreement.
- 1.4 Based on the estimate in the Memorandum, the parties acknowledge and agree that the excess and extended services provided by the Booster Station equates to approximately 65% of the people who will benefit from the Booster Station in the next fifteen (15) years, while the remaining 35% are those people who will live in the Development.
2. **FINANCING THE BOOSTER STATION**
- 2.1 The Developer has borne all costs with bringing the Booster Station into operation, including but not limited to, the design, construction, installation and commissioning of the Booster Station.
3. **LATECOMER CHARGE**
- 3.1 CBWD will, under s. 702(1)(c) of the *Local Government Act*, impose a “**Latecomer Charge**” against each parcel of the Benefitting Lots in accordance with the Latecomer Charge Formula in **Schedule E**, as a condition of an owner of a Benefitting Lot connecting to the Water System.
- 3.2 CBWD will pay to the Developer those Latecomer Charges collected under section 3.1, and interest collected under section 3.3.
- 3.3 When calculating the Latecomer Charge, CBWD will add, collect and pay to the Developer interest, calculated annually at the rate prescribed by bylaw, as set out in **Schedule E**, payable from the period commencing on the date of this Agreement, up to the date that connection is made to the Water System; and add and retain an administration fee from any applicant who applies to be connected.
- 3.4 CBWD will not impose or collect the Latecomer Charge beyond a period of fifteen (15) years after the date of this Agreement.
- 3.5 The Developer accepts the risk that if insufficient Latecomer Charges are collected from the owners of the Benefitting Lots within the time period referred to in section 3.4, no further monies will be payable by CBWD to the Developer in respect of the Booster Station.
4. **COSTS**
- 4.1 The Developer will pay to CBWD all costs incurred by CBWD in the preparation of this Agreement, provided that such costs will be added to the cost set out in **Schedule D**.

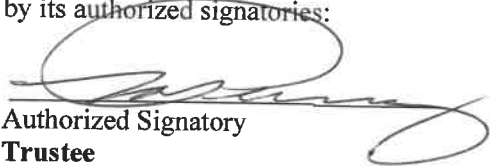
5. GENERAL PROVISIONS

- 5.1 Time is of the essence in this Agreement.
- 5.2 This Agreement is to be construed in accordance with and governed by the laws applicable in the Province of British Columbia.
- 5.3 Whenever the singular or the masculine are used in this Agreement, they shall be construed as meaning the plural or the feminine or body corporate or politic where the context or the parties require.
- 5.4 This Agreement will enure to the benefit of and be binding upon the parties hereto, their respective successors and permitted assignees.
- 5.5 The headings in this Agreement are inserted for convenience only and shall not be construed as part of this Agreement for the purpose of interpretation.
- 5.6 This Agreement may be executed in several counterparts, each of which shall be deemed to be an original and all of which together constitute one and the same instrument. Delivery of a counterpart of this Agreement by electronic facsimile transmission, email or other means of electronic communications capable of producing a printed copy will be deemed to be execution and delivery of such counterpart.

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first above written.

COWICHAN BAY WATERWORKS DISTRICT

by its authorized signatories:


Authorized Signatory
Trustee


Authorized Signatory
Trustee / District Administrator

COWICHAN BAY ESTATES LTD.

by its authorized signatories

Per:

Per:

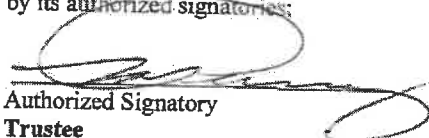
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COWICHAN BAY WATERWORKS DISTRICT

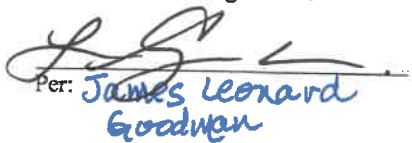
by its authorized signatories:


Authorized Signatory
Trustee


Authorized Signatory
Trustee / District Administrator

COWICHAN BAY ESTATES LTD.

by its authorized signatories


Per: James Leonard
Goodman

Per:

6

SCHEDULE "A"

**Preliminary Subdivision Plan
prepared by Cowichan Engineering Services Ltd.**

(attached hereto)

**SUBDIVISION PLAN OF
PART OF LOT 1, SECTION 5, RANGE 4, PLAN 10957, EXCEPT THAT PART OF SAID LOT
SHOWN OUTLINED IN RED ON PLAN 1659-R AND EXCEPT PARTS IN PLANS 15342, 16358,
18893, VIP81664, EPP16402 AND EPP51947; AND PART OF PARCEL B (DD 472441) OF
SECTION 6, RANGE 4, EXCEPT PARTS IN PLANS 4159, 4307, 8219, 9529, 17353,
VIP81664 AND EPP51947; BOTH OF CONICHAN DISTRICT.**

PLAN EPP92747

BCGS 928.072

SCALE

The intended plot size of this plan is 560mm in width by
866mm in height (D Size) when plotted at a scale of 1:750.

LEGEND

- All distances are in metres.
- ⊙ denotes standard capped post found.
- ⊙ denotes standard iron post found.
- ⊙ denotes standard iron pipe placed.
- ⊙ denotes GNS observed traverse hub.
- CSF denotes caution factor.
- PDF denotes found, destroyed, replaced.

Grid bearings are derived from dual frequency
differential GNS observations and are referred to
the central meridian of UTM Zone 10 48N (NAD 83).

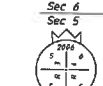
To obtain astronomic bearings referred to the meridian
bearing through Traverse Hub "A39" subtract 0° 20' 21".

The UTM coordinates and estimated absolute
accuracy achieved are derived from dual frequency differential
GNS observations to Western Canadian Deformation Array
Active Control Point station head 534929 and Monument 0181640.

This plan shows horizontal ground level distances, unless otherwise
specified. To compute grid distances, multiply ground level distances
by the average correction factor of 0.99819256. The average correction factor
has been determined based on an ellipsoidal elevation of 58 metres.

Datum NAD83 (CSRS) 3.0 D BC 1 NMT
Albert Head "534929"
UTM Zone 10 N S 309 728 484
E 453 942 893
CSF 0.99819256
Estimated Absolute Accuracy 0.51m

South 1/2 of
East 1/2 of
Sec 6 Rge 3



Rem North 40 Acres Sec 5 Rge 3

Sec 5
Rge 3

Sec 6
Rge 3

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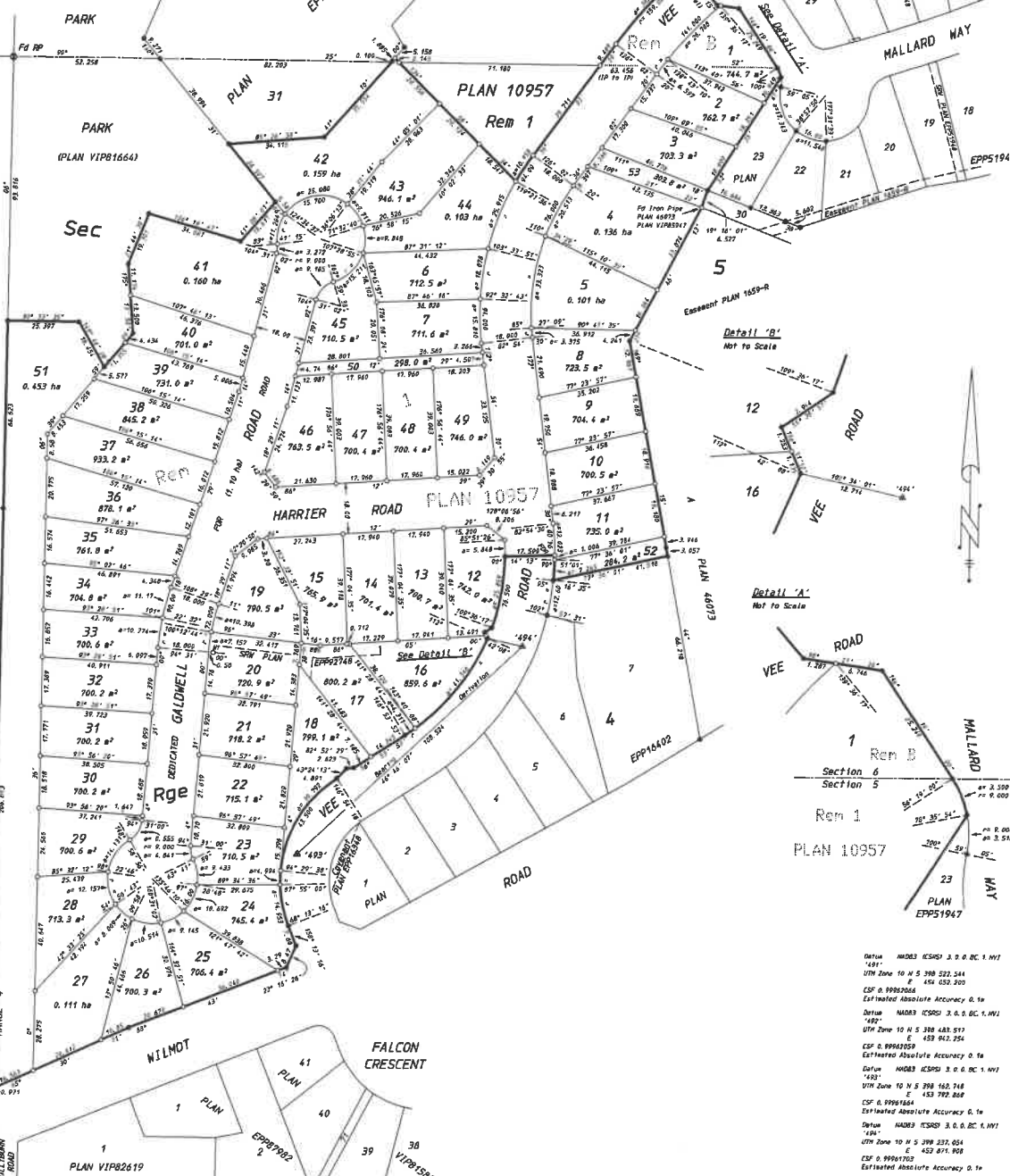
Sec 5
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Sec 6
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Sec 5
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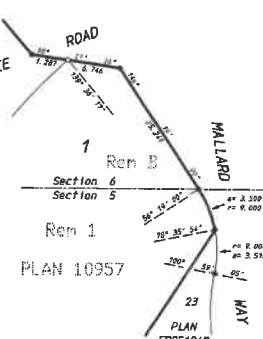
Sec 6
Rge 3

Sec 5
Rge 3



Detail 'B'
Not to Scale

Detail 'A'
Not to Scale



Datum NAD83 (CSRS) 3.0 D BC 1 NMT
"48N"
UTM Zone 10 N S 309 728 484
E 453 942 893
CSF 0.99819256
Estimated Absolute Accuracy 0.51m

Datum NAD83 (CSRS) 3.0 D BC 1 NMT
"48N"
UTM Zone 10 N S 309 728 484
E 453 942 893
CSF 0.99819256
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Datum NAD83 (CSRS) 3.0 D BC 1 NMT
"48N"
UTM Zone 10 N S 309 728 484
E 453 942 893
CSF 0.99819256
Estimated Absolute Accuracy 0.51m

This plan lies within the jurisdiction
of the Appraising Officer for Ministry of
Transportation and Infrastructure.
Ministry File No. 2016-05242

This plan lies within
the Conichan Valley Regional District.

Inspected under the Land Title Act on
the 27th day of April, 2023.
The Field survey represented by this plan
was completed on the 15th day of November 2019.
Allen L. Cox BCLS # 718

MONTY WILSON
PROFESSIONAL LAND SURVEYORS
251 COOKSTREET A10
VANCOUVER, B.C. V6E 2P1
TEL: 604-274-4745
FAX: 604-274-5000

Note:
This plan shows one or more witness posts which are
not set on the true corners.

SCHEDULE "B"

Approved Construction Drawings and Specifications

(attached hereto)



Associated Engineering (B.C.) Ltd.
#206 1016 McCallum Road
Victoria, B.C., Canada, V9B 4C6

TEL: 250.478.8383
FAX: 250.478.8101
www.ae.ca

August 10, 2021
File: 2012-2147.01.E.03.04

Caroline Stillinger
Administrator
Cowichan Bay Waterworks District
1760 Pavenham Road
Cowichan Bay, BC V0R 1N1

Re: ORDANO BOOSTER PUMP STATION DESIGN REVIEW

Dear Caroline:

1 DESIGN SUBMISSION REVIEW

Associated Engineering (B.C.) Ltd., on behalf of the Cowichan Bay Waterworks District (CBWD), has reviewed a design submission for the Proposed Ordano Road Booster Pump Station. The design was submitted by Cowichan Engineering Services on June 22, 2021. The submission consists of a covering letter dated August 4, 2021 along with updates to design package components that were reviewed previously in January and August 2020, and January, March, and July 2021. The covering letter includes responses to our July 2021 review comments.

The design includes responses to the two items identified as critical in the previous review. Several deficiencies in the design are still observed, foremost among them a lack of interdisciplinary coordination. It is likely that construction completed using these drawings will result in some changes being required in the field. However, since the most significant issues have now been addressed; we feel that this design package could now be utilized for construction of the pump station, with the developer bearing all risk for rework as a result of discrepancies between portions of the design documents. In short, we recommend that CBWD approves the design but reserves the right to reject work which does not conform to the most onerous requirement within the 78-page design appended to the letter of August 4, 2021.

2 REVIEW COMMENTS

- A. These review comments add to previous comments and must be read together with the earlier review letters. The Developer remains responsible for addressing all comments, including those not repeated below.
- B. The building envelope details have been amended to include insulation. The Contractor is to ensure that all self-adhered membranes and flashings are positively lapped to provide adequate drainage to the exterior.
- C. The cover letter clarifies that primary ventilation openings will be on NW and SE walls of the structure.

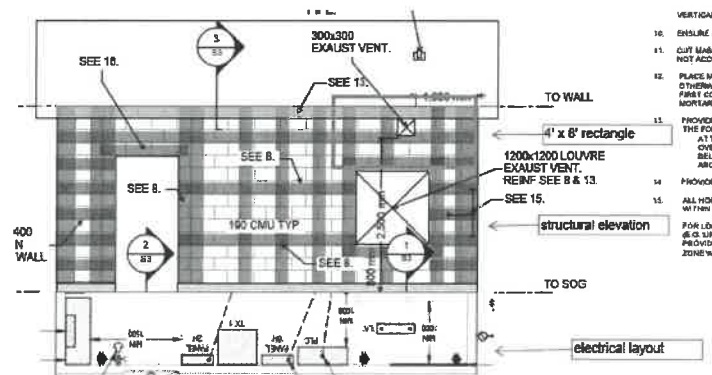
A Carbon
Neutral
Company

\\Ae.Ca\Data\Projects\Vic\20122147\01_Cow_Bay_Phase_2A\Engineering\03.04_Civil_Notes_Drawings\Booster Pump Station
Submittals\Ltr_Cowi_Design_Review_20210810_Sh.Docx



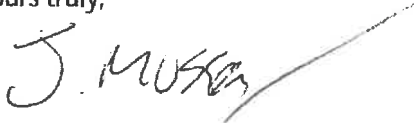
Platinum
member

- D. Structural elevations still show gable ends on the adjacent NE and SE walls. For a typical gable roof, these must be on opposite ends. The Developer is to provide written confirmation from the Structural Engineer of the correct roof orientation or to indicate desired roof type if gables are to be provided on adjacent walls. The District Engineer will require this information before they are able to provide confirmation that the Developer has substantially completed the building construction.
- E. The newly added architectural drawings call out moisture resistant drywall. As discussed previously and noted in Section 3.5 of the design report, Type X (fire rated) drywall is required. Demonstration that Type X drywall is installed will be required, to the satisfaction of the District Engineer. The District Engineer will require this information before they are able to provide confirmation that the Developer has substantially completed the building construction.
- F. Roof truss shop drawings, clearly indicating all required loading, must be prepared by a BC P.Eng. and provided to CBWD for our records. Required loading includes but is not limited to: ceiling assembly, lifting provisions, seismic, snow, and wind. The District Engineer will require these shop drawings before they are able to provide confirmation that the Developer has substantially completed the building construction.
- G. The covering letter indicates that a 4' x 8' (lengthwise) communications backboard is to be installed above the penetration on the NW wall. As shown on the following sketch, the wall does not have adequate space for this, and a suitable location for communications backboard will have to be determined in the field. The Contractor is to obtain CBWD's written approval for location of communications backboard. Backboard installed without CBWD's written approval may be rejected, in which case the Developer will be required to coordinate relocation of all items mounted upon the backboard.



We are available to discuss any of our comments noted above, should they be unclear.

Yours truly,



Jonathan Musser, P.Eng., M.A.Sc.
District Engineer

JM/sh



Cowichan Engineering Services LTD.

6468 Norcross Road
Duncan BC
V9L 6C5
Phone 250-737-1440
Fax 250-737-1551
cowichanengineering@shaw.ca

August 4, 2021

Our File: 1371-C

Cowichan Bay Waterworks District
1760 Pavenham Rd
Duncan, BC
V0R 1N1

Attn: Caroline Stillinger, District Administrator

RE: Design Submission for Booster Pump Station

Enclosed herewith is our design submission for approval for construction of the Booster Pump Station at the Ordano Reservoir site.

Enclosed is;

1. This Letter
2. Signed & Sealed Civil Design Brief
3. Signed & Sealed Civil Design Drawings
4. Signed & Sealed Structural Design Drawings of proposed building
5. Building Permit
6. Signed & Sealed Electrical Drawings
 - i. Electrical Design Brief
7. Actuator Valve – Detail Sketch
8. Ventilation Details
9. Building Envelope Confirmation

In addition we provide the following comments below with reference to Associated Engineering's (AE) design review;

1. General Notes:

- A. Enclosed are requirements set out by Praxis Architects to assure NECB compliance.
- B. Ventilation penetrations were and are shown on opposite walls (NW & SE)



Cowichan Engineering Services LTD.

6468 Norcross Road
Duncan BC
V9L 6C5
Phone 250-737-1440
Fax 250-737-1551
cowichanengineering@shaw.ca

2. Structural: GC Engineering (GCE)

A. Penetrations on the NW and SE walls

3. Electrical

A. NW penetration to be below communications backboard. Backboard is 4'x8' plywood length wise above ventilation.

Please contact us at the above contacts with any questions or concerns.

Yours Very Truly,

Cowichan Engineering Services Ltd.

A handwritten signature in black ink, appearing to read "Cameron Williams".

Cameron Williams, ASc.T.

cc Len Goodman– Cowichan Bay Estates

DESIGN BRIEF

COWICHAN BAY WATER DISTRICT BOOSTER STATION

Prepared For: Cowichan Engineering Services Ltd.
6468 Norcross Road
Duncan, BC V9L 6C5
Attention: Cam Williams

Prepared By: Islander Engineering Ltd.
623 Discovery Street
Victoria, BC V8T 5G4

Date: December 20 2019
Rev. No. 1 June 26 2020
Rev. No. 2 January 4 2021
Rev. No. 3 February 11 2021
Rev. No. 4 June 18 2021

Project: 2266 - Cowichan Bay Water



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FIGURES

- 1 Booster Station - Hydraulic Schematic
- 2 Booster Station - Schematic

APPENDIX

- A Grundfos Hydro MPC-EC 2CR95 95-2-2 3X575V Basis
- B Peerless AEF - Horizontal Split Case Single Stage Fire Pump
- C Hazen-Williams & Darcy-Weisbach Minor Losses



1 INTRODUCTION

This design brief has been prepared for the Cowichan Bay Waterworks District (CBWD) to provide information regarding the design and construction of a proposed booster pump station located at the Ordano Reservoir site. The proposed booster station is required to support the development of Phase 3A of the Cowichan Bay Estates by providing additional domestic water supply and fire protection to the existing network. The booster station will also improve domestic water supply and quality to the entire District and will increase the availability of stored emergency water for fire protection to residences located at higher elevations within the CBWD. The station design shall be in general accordance with the CBWD Engineering Specifications and Standard Drawings (February 2016), Section 4 - 9.0 Booster Pump Stations, as well as the National Fire Protection Association (NFPA) 20 - Standard for the Installation of Stationary Pumps for Fire Protection unless otherwise approved by CBWD. This report has also been prepared based on design criteria provided in a Technical Memorandum prepared by Associated Engineering (AE), *Booster Station Design Requirements* dated December 20th, 2018, and a subsequent Technical Memorandum, *Booster Pump Station Control Philosophy* dated October 2nd, 2019.

An initial submission including a preliminary Design Brief was made to CBWD in December 2019 and review comments were provided in a memorandum dated January 13th, 2020. Subsequent submissions were made to CBWD in July 2020 and February 2021 with review comments returned in memorandums dated August 10th, 2020, and March 30th, 2021. Islander understands that the selected pumps (both domestic and fire) will be input into the overall CBWD network model by their selected engineering consultant to confirm hydraulic performance. This report accompanies design drawings that have been prepared for the Site which detail critical specifications and the proposed layout of the booster pump station.

2 SYSTEM DESIGN REQUIREMENTS

The proposed system will consist of two domestic booster pumps (duty and standby), a diesel fire booster pump, electrical and controls equipment stationed within a non-



combustible, post-disaster structure. The booster station will be situated directly north of the existing reservoir with an approximate slab elevation of 87.75m geodetic (location to be confirmed and approved by CBWD). The existing site access will be maintained through the gated entrance along the south side of the Ordano Road and McGill Road intersection directly east of the proposed building. A summary for the existing Ordano Reservoir has been included in the table below,

Table 1 - Ordano Reservoir

Top Water Elevation (TWL)	100.9 m
Service Bottom Elevation (70% total storage volume)	97.0 m
Bottom Elevation	88.6 m
Total Storage Volume	1,568 m ³

Future domestic demand requirements within the CBWD are anticipated to increase which shall be supplied in part by the Ordano Reservoir system and the proposed booster station. A summary of the existing and future domestic requirements has been included in the table below,

Table 2 - Domestic Demand, CBWD

Existing Average Daily Demand (ADD)	1,140 m ³ /day (13.2 L/s)
Future Average Daily Demand	1,557 m ³ /day (18.0 L/s)
Peaking Factor	2.2
Existing Maximum Daily Demand (MDD)	2,508 m ³ /day (29.0 L/s)
Future MDD	3,425 m ³ /day (39.6 L/s)
Future MDD Pressure Zone 2	2,333 m ³ /day (27.0 L/s)



2.1 Domestic Water Supply Pumps Design Criteria

To meet the increasing demand, the proposed domestic pumps will be required to supply approximately 450 cu.m. of water per day into the existing network. The pumps shall not draw Ordano Reservoir below 85% of its total storage capacity which represents a maximum pumped volume of approximately 225 cu.m. per pump cycle when the reservoir is full. Maintaining 85% of the total storage capacity within the reservoir will ensure adequate fire flows are available to service existing dwellings within Pressure Zones 1 & 2 in the CBWD system. The domestic booster pumps will provide a maximum of 27 L/s to the system which is equivalent to the forecasted future MDD flow rate for Pressure Zone 2. Accordingly, the system will be designed to match the operating pressure of Pressure Zone 2 which corresponds to the TWL of the Telegraph Reservoir (127m H₂O). A summary of the proposed domestic design requirements has been included in the table below,

Table 3 - Domestic Pump Requirements

Domestic Flow Demand	27 L/s (Future MDD of Pressure Zone 2)
Design Head	127 m H ₂ O

- Pump Design Elevation - ±88.20m
 - a. Pump station situated north of the existing reservoir
- Inlet Hydraulic Grade Line (HGL) = 8.80m (12.5 psi)- 12.70m (18.1 psi)
 - a. Minor losses from reservoir to pump inlet = ±0.61m
 - i. Calculated using Hazen-Williams and Darcy Weisbach Equations for pipe and minor losses in fittings (attached in Appendix "C")
 - b. Minor losses in overall system to be confirmed based on hydraulic operating conditions within CBWD model
 - c. Represents Ordano Reservoir TWL to Service Bottom Elevation (70% total storage volume)
- Outlet HGL = 38.80 (55.2 psi)
 - d. Minor losses within CBWD distribution network during forecasted MDD to be confirmed by others
- Net Positive Suction Head (NPSH) Available; assumed water temperature of 10°C
 - a. At TWL (100.9m) = 22.30m (31.70 psi)
 - b. At Service Bottom Elevation (97.0m) = 18.40m (26.20 psi)

- Net Positive Suction Head (NPSH) Required = 3.63m (5.16 psi)
- 150mm discharge piping
- Limiting Velocities:
 - Pump Discharge Piping = 3.0 to 5.0 m/s
 - Pump Suction Piping = 24 to 39 L/s
 - Flow Meter Velocity range = 24 to 39 L/s

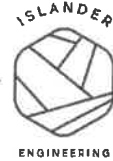
Furthermore, as per the Technical Memorandums completed by AE, the following items shall be incorporated into the final detailed design package:

- A Variable Frequency Drive(s) will be required to reduce pressure surges during pump start up and to maintain the required head for varying flow rates
- A timer is to be included to turn on the booster pump at a pre-set time
- The pumps are to be turned off at a pre-set discharge volume
- The booster pumps will also turn on during low pressure during high demand when Telegraph reservoir cannot keep up. This would be the pressure when the Telegraph reservoir drops to approximately 85% (122m hydraulic grade)

In order to prevent a pumped loop at the Ordano Reservoir, an existing altitude valve located adjacent to the reservoir shall be modified to include an actuating device that can close the valve while the pumps are in operation. Upon completion of each pump cycle, the actuator will open the valve permitting the reservoir to be replenished from the distribution network. The configuration as proposed will replenish Ordano Reservoir once approximately every three days. Additional operating information has been included in the Schematic Design Report completed by AES Engineering which is summarized in *Section 3.3* of this report.

2.2 Fire Pump Design Criteria

A fire pump shall supply the required fire flow in addition to the forecasted MDD while maintaining the minimum residual pressure (140 kPa or 20 psi at the highest operating point of the system) during fire flow scenarios and shall provide more effective access to stored water within the Ordano Reservoir for fire fighting. The fire pump shall also be equipped with a pressure sensor that turns the systems on when the network pressure

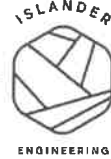


drops to 117m HGL which corresponds to the minimum residual pressure (14m pressure head or 20psi) at the highest service connections within the CBWD network (Mindy Road and Sears Road area at 103m). The working range of the proposed system will be from the bottom of the Ordano Reservoir at 88.6m to 117 m geodetic (slightly below the low-level alarm level of the Telegraph Reservoir set at approximately 118 m). A summary of the proposed fire pump design requirements has been included in the table below:

Table 4 - Fire Pump Requirements

Fire Flow Demand	133 L/s
Design Head	117m H ₂ O

- Pump Design Elevation - ±88.45m
 - a. Pump station situated north of the existing reservoir
- Inlet HGL = 0.15m (0.2 psi) – 8.55m (12.2 psi)
 - a. Minor losses from reservoir to pump inlet = ±4.44m
 - i. Calculated using Hazen-Williams and Darcy-Weisbach Equations for pipe and minor losses in fittings (attached in Appendix “C”)
 - b. Minor losses in overall system to be confirmed based on hydraulic operating conditions within CBWD model
 - c. Represents reservoir Service Bottom Elevation (70% total storage volume) to Reservoir Bottom Elevation
- Outlet HGL = 28.55m (40.6 psi)
 - e. Minor losses within CBWD distribution network during forecasted MDD to be confirmed by others
- Net Positive Suction Head (NPSH) Available; assumed water temperature of 10°C
 - a. At Service Bottom Elevation (97.0m) = 14.32m (20.36 psi)
 - b. At Reservoir Empty (88.6m) = 5.92m (8.42 psi)
- As per communication with Peerless, “NPSH_R is not provided for fire pumps as all fire pumps must perform to an NPSH test per UL/FM/ULC testing procedures and therefore NPSH_R is not a factor when sizing a fire pump that is designed for a system per NFPA-20”. Provided the suction line is submerged, NPSH_R is not a concern.
- Assumes a minimum 250mm discharge
- Limiting Velocities:
 - Pump Discharge Piping = 2.0 to 5.0 m/s
 - Pump Suction Piping = 98 to 245 L/s
 - Flow Meter Velocity range = 98 to 245 L/s



Furthermore, as per the Technical Memorandums completed by AE, the following items shall be incorporated into the final detailed design package:

- The fire pump will have a manual shutoff that can be operated by the CBWD operator or Fire Department
- The fire pump will have a communication system that can be used to notify several individuals (by phone or text message) that it has been switched on
- The altitude valve at Ordano Reservoir should be closed using an actuator when the fire pump engages
- A control valve or other suitable method should be used to reduce pressure surges at the pump start up
- The design should be in accordance with the National Fire Protection Association (NFPA) 20 – Standard for the Installation of Stationary Pumps for Fire Protection

2.3 CBWD Engineering Specifications & Standard Drawings 2016)

The design of all booster station requirements shall be in accordance with the CBWD Engineering Specifications and Standard Drawings, Section 4 - 9.0 Booster Pump Stations.

Table 5 - General Design Criteria

Friction Coefficient (Hazen Williams)	130
Standby Power	N/A
Station Piping	316L Schedule 10S; stainless steel pipe shall conform to the latest AWWA C220
Electric Actuators	AWWA Standard C540-02
Butterfly Valves	AWWA Standard C504-06
Check Valves	Silent Check Valve
Pressure Relief, Control and Air Valves	Singer or Clayton
Gate Valves	AWWA C509, Fusion bonded Epoxy to AWWA



Flow Meter	Magmeter, with 4-30mA signal. Piping to be clear minimum three pipe diameters upstream and five pipe diameters downstream
Flow Control Valves	AWWA

2.4 Pressure Requirements

The proposed booster station design shall ensure sufficient pressure within the distribution system is maintained as per CBWD Engineering Specifications and Standard Drawings, Section 2.03:

- Minimum operating pressure, MDD = 275 kPa (40psi)
- Minimum operating pressure, PHD = 240 kPa (35psi)
- Minimum residual pressure during Fire, Fire Flow plus MDD = 20 psi (140 kPa)
- Maximum desirable working pressure = 700 kPa (100 psi)

3 PUMP STATION DESIGN

The preliminary booster pump station design including the domestic and fire pumps have been included in the following sections. Schematic figures detailing the proposed system have been attached to the end of the report.

3.1 Piping:

Main Pipe Diameter and Velocities:

- Domestic Pump Discharge pipe - 150mm – 1.5 m/s (@ 27 L/s)
- Fire Pump Discharge pipe - 250mm – 2.7 m/s (@ 133 L/s)

All station piping shall be supported using flange connected pipe stands. The fire pump shall be located on a steel skid (see below). The Contractor shall provide shop drawings and product data sheets for the steel skid and all pumps, piping, valves, fittings, electrical and control equipment.

3.2 Domestic Pumps

To meet the domestic water supply pump design criteria specified in Section 2.1, a Grundfos pressure booster system (Hydro MPC E 2CR95-2-2 3x575V Basis) has been selected for approval by CBWD. The accompanying specifications have been included in Appendix "A" and have been summarized below:

- Delivers approximately 27 L/s (430 USGPM) @ 39.8m (56.6psi) TDH
- Contains 2 vertical, multistage centrifugal pumps, type CR95-2-2
- Pump rotating parts in contact with pumped liquid are made of ANSI 304 stainless steel
- All pumps are speed controlled
- Each pump is equipped with an external variable frequency drive in panel
 - a. Hydro MPC-EC maintains constant pressure through continuous adjustment of the speed of the pumps
 - b. The system performance is adapted to the demand through cutting in/out the required number of pumps and through parallel control of the pumps in operation
 - c. Pump changeover is automatic and depends on load, operating hours and fault
- Dry-running protection is standard with use of pressure transducer on suction manifold
 - d. Control MPC in a UL 12 steel control panel enclosure including main disconnect switch, all required fuses, motor protection, switching equipment and microprocessor-controlled CU 352.

3.3 Fire Pump

To meet the fire flow demand requirements specified in Section 2.2, a Peerless, AEF horizontal split case single stage diesel fire pump (Peerless - 8AEF20G) on a steel skid complete with a diesel engine to provide backup power. Preliminary fire pump system configuration has been coordinated with Chamco Industries Ltd. The pump specifications have been included in Appendix "B" and have been summarized below:

- Delivers approximately 133 L/s (2,100 USGPM) @ 32.3m (46psi) TDH

- 291mm impeller (11.46 inches)
- 75hp, pump speed of 1780 RPM, Diesel

All equipment will be mounted on 8' wide x 12' long structural steel skid with following components:

- C6 x 8.2 main structure members
- Checker-plate decking
- Four (4) lifting lugs c/w 100% MPI testing
- Sand blasted to SSPC-6, primed, and painted grey enamel

All skid piping shall be carbon steel as per the following:

- One (1) 10" fire pump suction piping with one 150# flange connection at skid edge
- One (1) 10" fire pump discharge piping with 150# flange connection at skid edge
- One (1) 8" test flow meter line with one 150# flange connection at skid edge
- For above, the piping is A106B, Sch. 40 or standard, with A234WPB weld fittings, and A105N ANSI flanges. All welding is done to ANSI B31.3 and hydro tested to code. 10% radiography is included
- All piping and welded fittings to be sand blasted to SSPC-6, primed, and painted red enamel
- All piping 2" and smaller is 304 stainless steel
- All sensing lines are stainless steel tubing c/w stainless steel fittings

A final detailed skid design package shall be procured from Chamco (or an approved equal) upon approval of the system design by CBWD.

3.4 Electrical and Controls

Electrical controls and communication will be in accordance with CBWD Engineering Specifications and Drawings Section 9.03. Communication between the Ordano Reservoir and the proposed booster station will be accomplished using the existing hard wired Telus or Shaw network and will be compatible with the existing CBWD communication system. A Schematic Design Report completed by AES Engineering dated March 3rd, 2021 summarizes the available electrical services adjacent to the site and details the on-site power and

communication requirements for the proposed booster station. Detailed design drawings completed by AES have been included with this submission. As per the AES drawings, three phase power is available from a nearby BC Hydro transformer bank (transformers are 10kVA each) located approximately 100m from the Site on McGill Road.

The existing transformer bank presently provides power to the site via overhead cables which terminate on a site service pole before dipping underground through a pilaster to service the existing buildings. AES is proposing to demolish the existing dip service and install new power and communications pilasters to service the proposed booster station and existing building. A communication connection to the local telephone and internet networks was confirmed on the existing overhead system which connects to the service pole on-site before proceeding overhead to a communication pilaster along the corner of the existing site.

3.5 Pump Building

The domestic and fire pumps, piping, valves, electrical and communications equipment are to be housed in a structure and shall consist of the following general components:

- Building footprint of 42.25 sq.m. (455 sq. ft.)
- Reinforced concrete blocks to CSA S304.1-14 'Masonry Design for Buildings' and CSA A371 'Masonry Construction for Buildings'
- Reinforced concrete slab
- Timbre roof truss complete with membrane and metal roof
- Roof trusses to be designed with suitable lifting rungs to accommodate maintenance requirements
- Double layer of 5/8" fire wall drywall on the ceiling
- Roof water leaders and footing drains connecting to Site drainage system
- Wall mounted electric heat
- Gable ends to be finished with hardy plank
- Wall mounted vents will be utilized for diesel fire pump exhaust
- Wall mounted louvers will be installed to create adequate cross ventilation as per Avalon Mechanical Specifications

- Access hatch to attic will be installed at time of construction

All design and construction shall be completed to the latest version of the British Columbia Building Code. Detailed design drawings completed by GC have been included with this submission.

4 CLOSURE

The design brief for the proposed booster pump station located at the Ordano Reservoir site within the Cowichan Bay Water District has been prepared by,

ISLANDER ENGINEERING LTD.

Please contact the undersigned if you have any questions or concerns.

Yours Truly,



Corey Brown, M.Eng., EIT, ASCT
Project Design Engineer

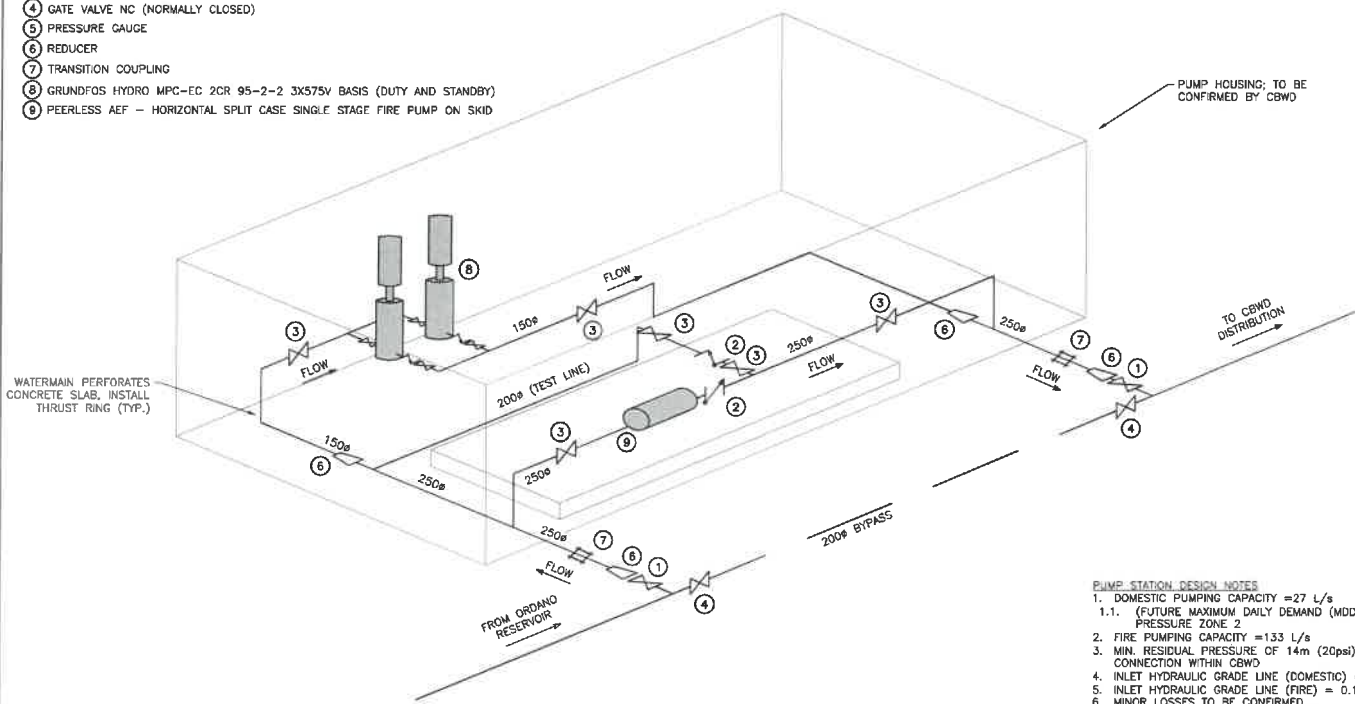


Mike Achtem, P.Eng., CCA, PMP
Principal, Review Engineer



FIGURES

- ① GATE VALVE ISOLATES SYSTEM
- ② CHECK VALVE
- ③ GATE VALVE NO (NORMALLY OPEN)
- ④ GATE VALVE NC (NORMALLY CLOSED)
- ⑤ PRESSURE GAUGE
- ⑥ REDUCER
- ⑦ TRANSITION COUPLING
- ⑧ GRUNDFOS HYDRO MPC-EC 2CR 95-2-2 3X575V BASIS (DUTY AND STANDBY)
- ⑨ PEERLESS AEF - HORIZONTAL SPLIT CASE SINGLE STAGE FIRE PUMP ON SKID



WATERMAIN PERFORATES CONCRETE SLAB, INSTALL THRUST RING (TYP.)

PUMP HOUSING; TO BE CONFIRMED BY CBWD

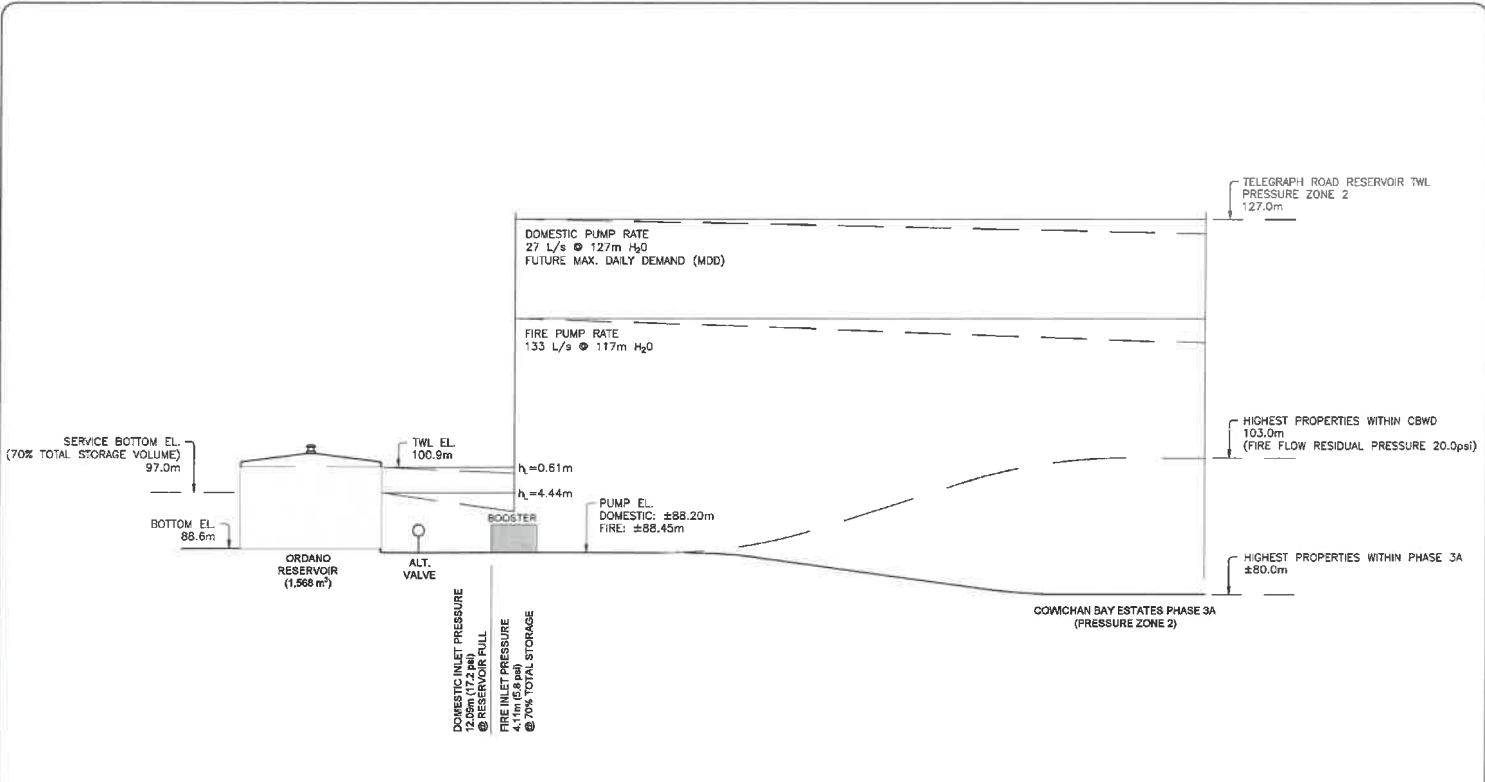
BOOSTER PUMP STATION - SCHEMATIC
NTS

PUMP STATION DESIGN NOTES

- 1. DOMESTIC PUMPING CAPACITY = 27 L/s
- 1.1. (FUTURE MAXIMUM DAILY DEMAND (MDD) WITHIN CBWD PRESSURE ZONE 2
- 2. FIRE PUMPING CAPACITY = 133 L/s
- 3. MIN. RESIDUAL PRESSURE OF 14m (20psi) AT HIGHEST SERVICE CONNECTION WITHIN CBWD
- 4. INLET HYDRAULIC GRADE LINE (DOMESTIC) = 8.80m TO 12.70m
- 5. INLET HYDRAULIC GRADE LINE (FIRE) = 0.15m TO 8.55m
- 6. MINOR LOSSES TO BE CONFIRMED
- 7. PUMP PIPING TO BE 3" 6L SCHEDULE 10 STAINLESS STEEL

FEBRUARY 4, 2021
FINAL REPORT
DRAWING

ORDANO RESERVOIR SITE BOOSTER STATION - SCHEMATIC	
COWICHAN BAY WATER DISTRICT	
IEL PROJECT - 2266	
ISSUED: FEB 4, 2021	
DRAWN BY: CBB	CHECKED BY: MJA




BOOSTER STATION - HYDRAULIC SCHEMATIC
NTS

DECEMBER 21, 2020

FINAL REPORT
DRAWING

ORDANO RESERVOIR SITE BOOSTER STATION - HYDRAULIC SCHEMATIC COWICHAN BAY WATER DISTRICT	
ISL PROJECT - 2266	
ISSUED: DEC 21, 2020	
DRAWN BY: CBB	CHECKED BY: JMTA





ISLANDER
ENGINEERING

APPENDIX A

**Grundfos Hydro MPC-EC 2CR 95 2CR95-2-2 3X575V
Basis**

Pump Performance Datasheet

Customer	:		Quote Number / ID	:	843320
Customer ref. / PO	:		Model	:	Hydro MPC-EC (CUE) 2CR 95-2-2
Tag Number	:	001		:	3x575V 60Hz
Service	:		Part Number	:	Custom system
Quantity	:	1	Stages	:	2
Quantity of pumps	:	1 active + 1 standby	Based on curve number	:	95-2-2_SB
			Date last saved	:	December 18, 2020 10:21 AM

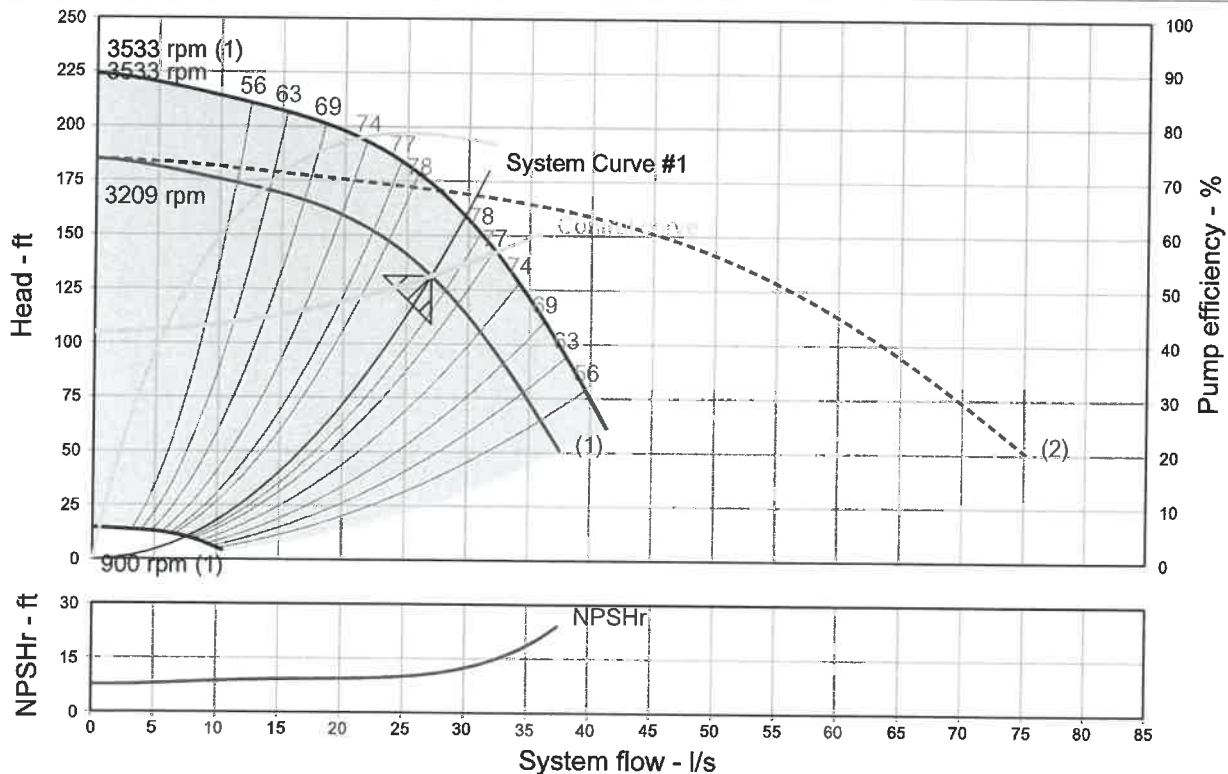
Operating Conditions		Liquid	
System flowrate	: 27.00 l/s	Liquid type	: Cold Water
Flowrate per pump	: 27.00 l/s	Additional liquid description	:
Differential head / pressure, rated (requested)	: 131.2 ft	Temperature, max	: 68.00 deg F
Differential head / pressure, rated (actual)	: 131.3 ft	Fluid density, rated / max	: 1.000 / 1.000 SG
Suction pressure, min / max	: 0.00 / 0.00 psi.g	Viscosity, rated	: 1.00 cP
NPSH available, rated	: Ample	Vapor pressure, rated	: 0.34 psi.a
Site Supply Frequency	: 60 Hz		
Power Supply	: 3ph 575V		

Performance		Material	
Speed, rated	: 3209 rpm	Material selected	: Standard - Cast Iron / 304 Stainless Steel
Speed, maximum	: 3533 rpm		
Speed, minimum	: 900 rpm		
Pump efficiency	: 78.64 %		
NPSH required / margin required	: 10.64 / 0.00 ft		
nq (imp. eye flow) / S (imp. eye flow)	: 53 / 220 Metric units		
Head maximum, rated speed	: 184.9 ft		
Head rise to shutoff	: 40.84 %		
Flow, best eff. point	: 25.94 l/s		
Flow ratio, rated / BEP	: 104.09 %		
Speed ratio (rated / max)	: 90.83 %		
Head ratio (rated speed / max speed)	: 75.57 %		
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00		
Selection status	: Acceptable		

Pressure Data	
Pump shut off pressure	: 184.5 ft H2O.g
Maximum allowable suction pressure	: 145.0 psi.g

Driver & Power Data (@Max density)	
Motor sizing specification	: Max power (non-overloading)
Margin over specification	: 0.00 %
Service factor	: 1.00
Rated power (based on duty point)	: 18.03 hp
Max power (non-overloading)	: 18.03 hp
Nameplate motor rating	: 25.00 hp / 18.64 kW (Fixed)
Panel Max FLA *	: 70 A
* addition of pilot pump, up-sizing HP, or 3x575V will affect System FLA	

Energy Indexes	
PEI (VL)	: 0.45
ER (VL)	: 55



Hydro MPC E (CUE) with CR pumps

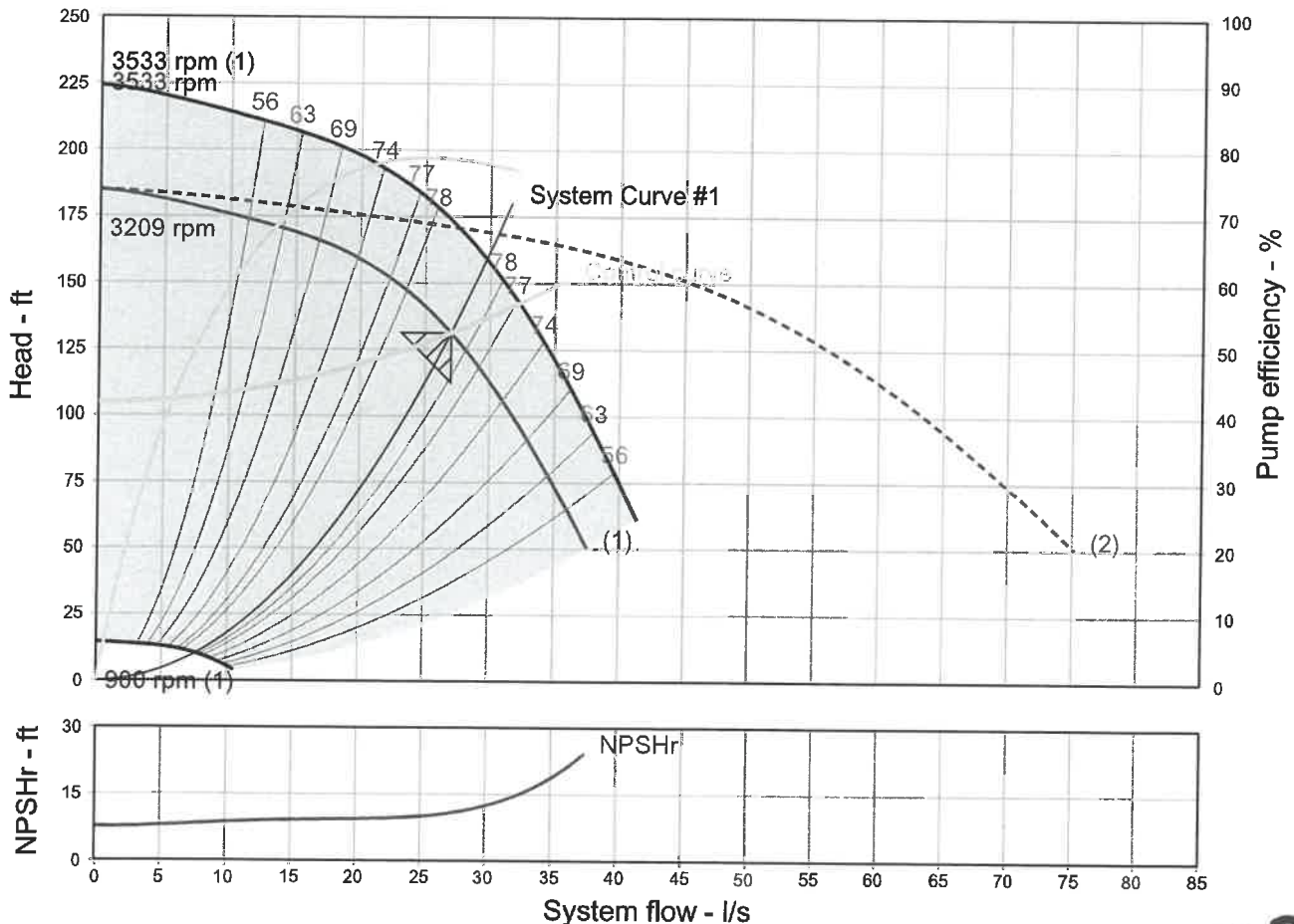
QUOTE NUMBER / ID 843320	UNIT TAG 001	QUANTITY 1
REPRESENTATIVE	SERVICE	
ENGINEER	SUBMITTED BY	DATE
CONTRACTOR	APPROVED BY	DATE
	ORDER #	DATE



**Hydro MPC-EC (CUE)
2CR 95-2-2 3x575V 60Hz
3533 rpm**

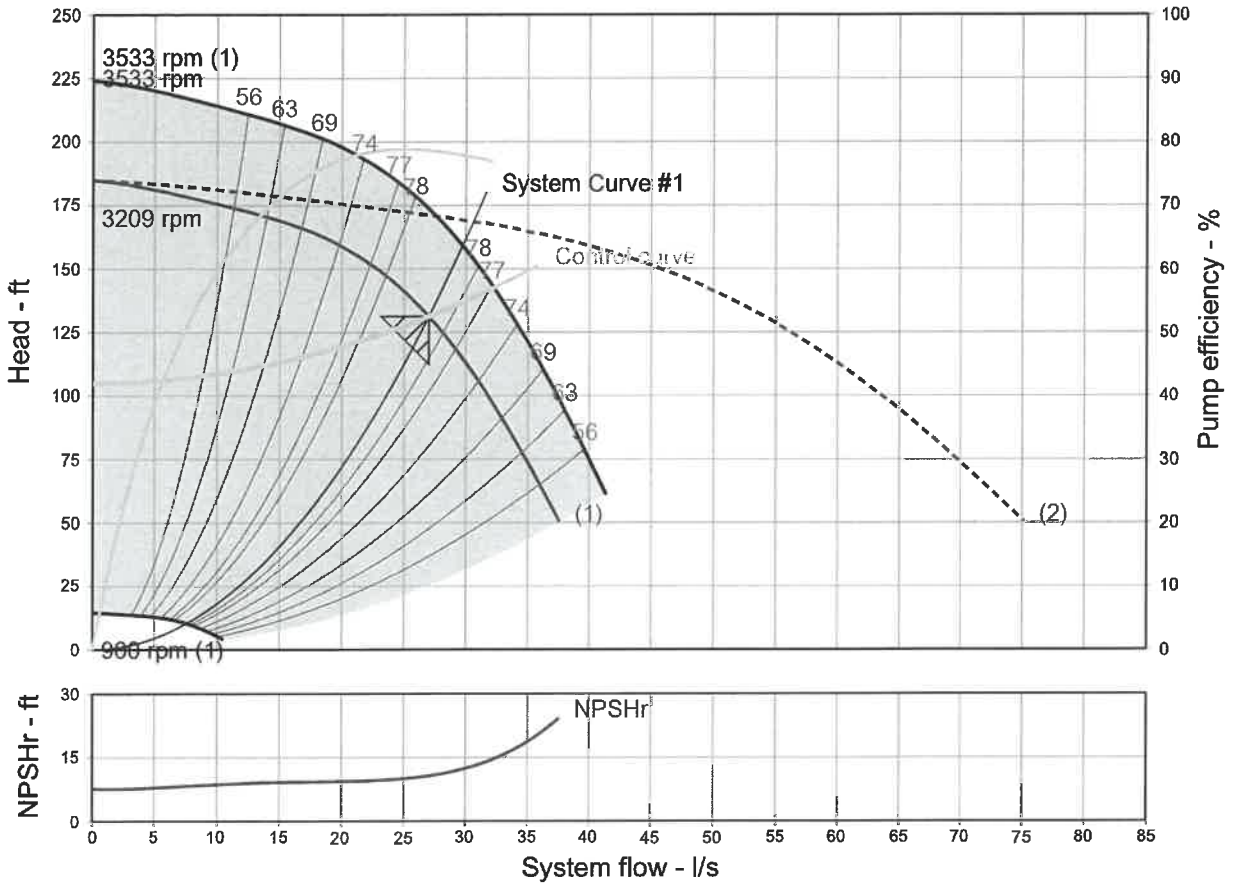
Part Number N/A

Conditions of Service		Pump Data		Motor Data	
Flow Per Pump	27.00 l/s	Material	Standard - Cast Iron / 304 Stainless Steel	Nameplate HP	25 HP
Head	131.2 ft	Pump shut off pressure	184.5 ft H2O.g	Rated Power	18.03
Liquid	Cold Water	Max Allowable Suction Pressure	334.5 ft H2O.g	Enclosure	TEFC
Temperature	68.00 deg F	Pump Efficiency	78.64 %	Voltage	575 V
NPSHr	10.64 ft	PEI (VL)	0.45	Phase	3 Phase
Viscosity	1.00 cP	ER (VL)	55		
Specific Gravity	1.000 SG				



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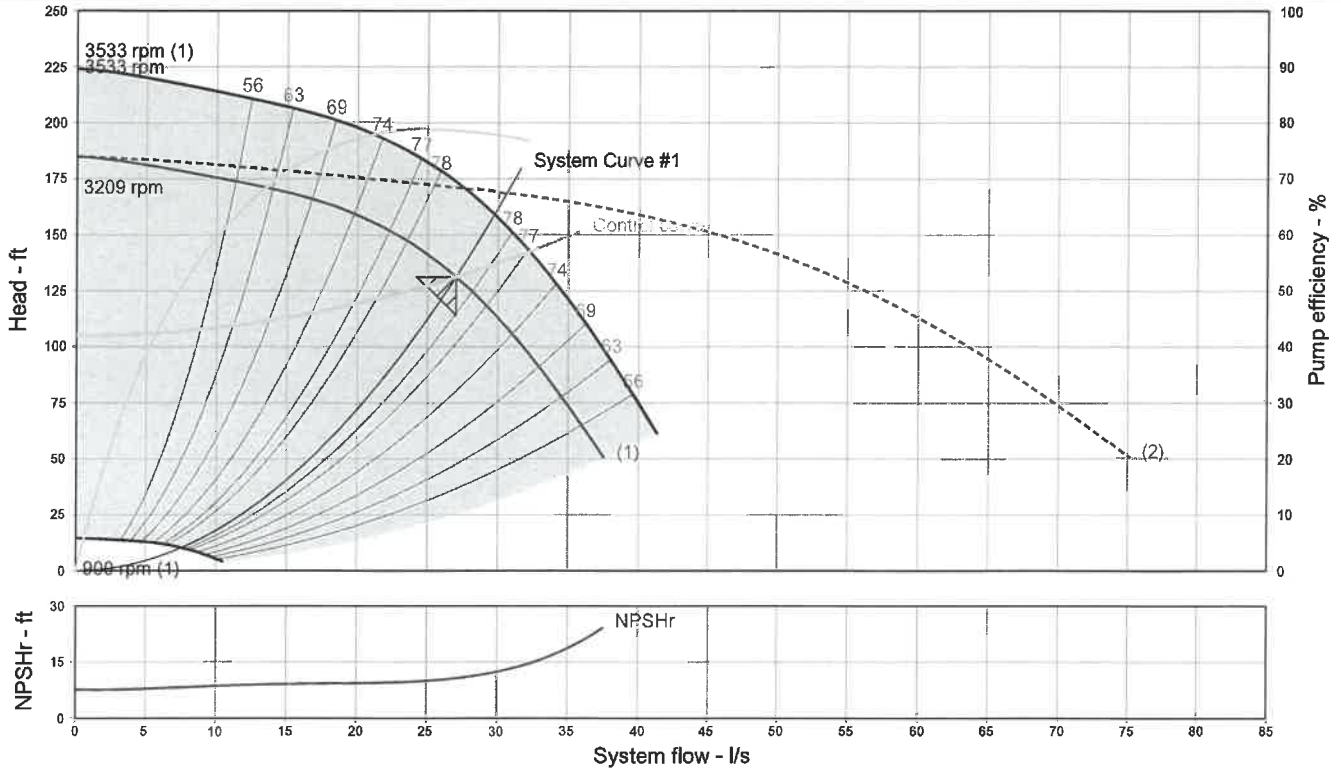
Pump Performance Curve



Customer	:		Model	:	Hydro MPC-EC (CUE) 2CR
Customer ref. / PO	:			:	95-2-2 3x575V 60Hz
Tag Number	:	001	Stages	:	2
Service	:		Speed, rated	:	3209 rpm
Quantity	:	1	Based on curve number	:	95-2-2_SB
Quote Number / ID	:	843320	Pump efficiency	:	78.64 %
Date last saved	:	December 18, 2020 10:21 AM	Rated power (based on duty point)	:	18.03 hp
System flowrate	:	27.00 l/s	NPSH required	:	10.64 ft
Flowrate per pump	:	27.00 l/s	Fluid density, rated / max	:	1.000 / 1.000 SG
Differential head / pressure, rated	:	131.2 ft	Viscosity	:	1.00 cP
Pressure control curve	:	Quadratic control curve			

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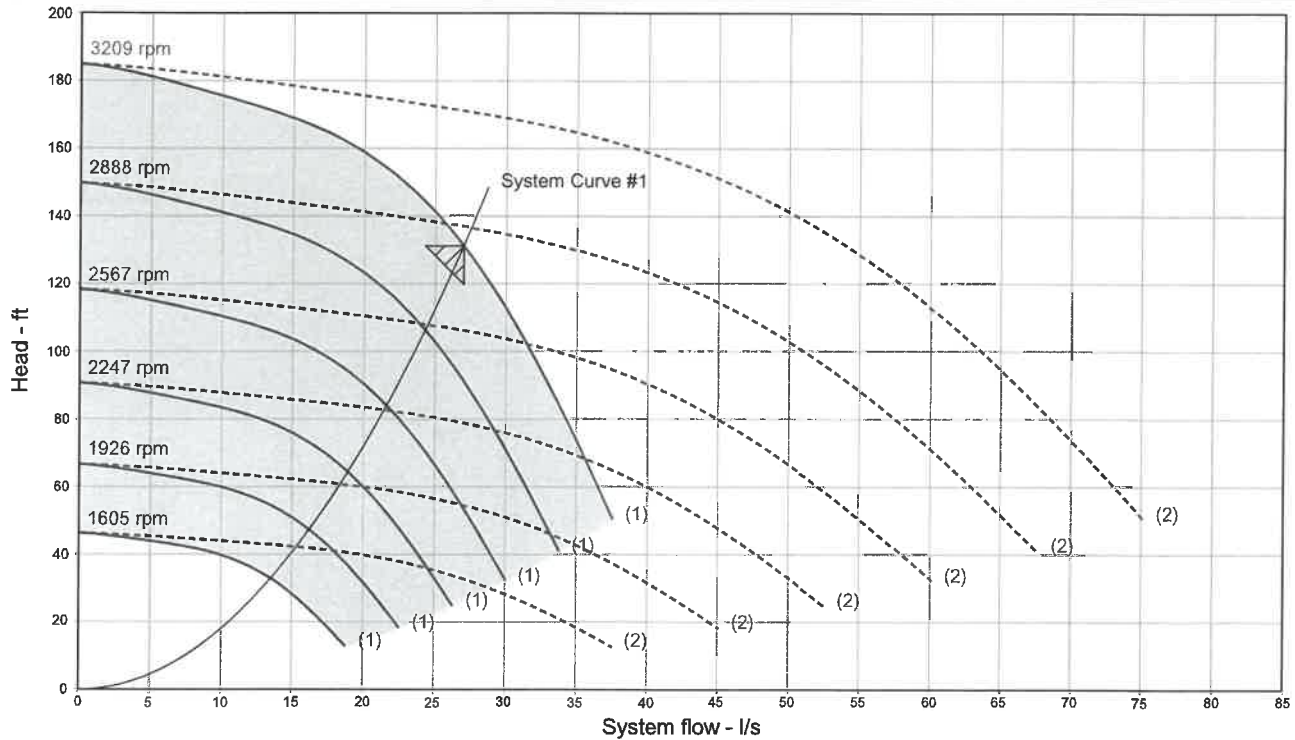
Pump Performance Curve



Project name	: Default	Tag Number	: 001	Speed, rated	: 3209 rpm
Consulting engineer	:	Service	:	System flowrate	: 27.00 l/s
Customer	:	Model	: Hydro MPC-EC (CUE) 2CR	Flowrate per pump	: 27.00 l/s
Customer ref. / PO	:		: 95-2-2 3x575V	Differential head / pressure, rated	: 131.2 ft
Quote Number / ID	: 843320	Quantity	: 60Hz : 1	Rated power (based on duty point)	: 18.03 hp
Date last saved	: December 18, 2020 10:21 AM	Quoted By (Sales Office)	: Grundfos Canada Inc. (GCA)	Max power (non-overloading)	: 18.03 hp
Pressure control curve	: Quadratic control curve	Quoted By (Sales Engineer)	: Chris Check	Pump efficiency	: 78.64 %
				Based on curve number	: 95-2-2_SB

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Multi-Speed Performance Curve



Project name	: Default	Tag Number	: 001	Speed, rated	: 3209 rpm
Consulting engineer	:	Service	:	System flowrate	: 27.00 l/s
Customer	:	Model	: Hydro MPC-EC (CUE) 2CR	Flowrate per pump	: 27.00 l/s
Customer ref. / PO	:		: 95-2-2 3x575V	Differential head / pressure, rated	: 131.2 ft
Quote Number / ID	: 843320	Quantity	: 60Hz : 1	Fluid density, rated / max	: 1.000 / 1.000 SG
Date last saved	: December 18, 2020 10:21 AM	Quoted By (Sales Office)	: Grundfos Canada Inc. (GCA)	Viscosity	: 1.00 cP
Pressure control curve	: Quadratic control curve	Quoted By (Sales Engineer)	: Chris Check	Based on curve number	: 95-2-2_SB

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Pump Performance - Additional Data

Project name	: Default	Tag Number	: 001
Consulting engineer	:	Service	:
Customer	:	Model	: Hydro MPC-EC (CUE) 2CR 95-2-2 3x575V 60Hz
Customer ref. / PO	:	Quantity	: 1
Quote Number / ID	: 843320	Quoted By (Sales Office)	: Grundfos Canada Inc. (GCA)
Date last saved	: December 18, 2020 10:21 AM	Quoted By (Sales Engineer)	: Chris Check
Stages	: 2	Speed, rated	: 3209 rpm

Performance Data		Stage, Speed and Solids Limits	
Head, maximum speed, rated flow	: 173.7 ft	Stages, maximum	: 2
Head, minimum speed, rated flow	: 407.0 ft	Stages, minimum	: 2
Head maximum, rated speed	: 184.9 ft	Pump speed limit, maximum	: 3533 rpm
Efficiency adjustment factor, total	: 1.00	Pump speed limit, minimum	: 900 rpm
Power adjustment, total	: 0.00 hp	Curve speed limit, maximum	: 3533 rpm
Head adjustment factor, total	: 1.00	Curve speed limit, minimum	: 900 rpm
Flow adjustment factor, total	: 1.00	Variable speed limit, minimum	: 900 rpm
NPSHR adjustment factor, total	: 1.00	Solids diameter limit	: 0.01 in
NPSH margin dictated by pump supplier	: 0.00 ft	Energy Indexes	
NPSH margin dictated by user	: 0.00 ft	ER (VL)	: 55
NPSH margin used (added to 'required' values)	: 0.00 ft	PEI (VL)	: 0.45

Mechanical Limits		Typical Driver Data	
Torque, rated power, rated speed	: 0.56 hp/100 rpm	Driver speed, full load	: 3525 rpm
Torque, maximum power, rated speed	: 0.56 hp/100 rpm	Driver speed, rated load	: 3546 rpm
Torque, driver power, full load speed	: 0.71 hp/100 rpm	Driver efficiency, 100% load	: N/A
Torque, driver power, rated speed	: 0.71 hp/100 rpm	Driver efficiency, 75% load	: N/A
Torque, pump shaft limit	: -	Driver efficiency, 50% load	: N/A
Radial load, worst case	: -		
Radial load limit	: -		
Impeller peripheral speed, rated	: -		
Impeller peripheral speed limit	: -		

Various Performance Data	System flow (l/s)	Head (ft)	Pump efficiency (%)	NPSHr (ft)	Power (hp)
Shutoff, rated diameter	0.00	184.9	-	-	9.36
Shutoff, maximum diameter	0.00	224.1	-	-	12.50
MCSF	-	-	-	-	-
Rated flow, minimum diameter	27.00	407.0	-	-	-
Rated flow, maximum diameter	27.00	173.7	78.52	-	23.90
BEP flow, rated diameter	25.94	136.7	78.82	10.26	18.01
120% rated flow, rated diameter	32.40	95.26	70.59	14.76	17.49
End of curve, rated diameter	37.59	50.26	46.09	24.31	16.40
End of curve, minimum diameter	10.54	3.95	46.09	1.91	0.36
End of curve, maximum diameter	41.39	60.93	46.09	29.47	21.89
Maximum value, rated diameter	-	184.9	78.82	-	18.03
Maximum value, maximum diameter	-	-	78.82	-	24.07

System differential pressure	@ Density, rated	@ Density, max
Differential pressure, rated flow, rated diameter (psi)	56.80	56.80
Differential pressure, shutoff, rated diameter (psi)	80.00	80.00
Differential pressure, shutoff, maximum diameter (psi)	96.99	96.99

Discharge pressure	@ Suction pressure, rated	@ Suction pressure, max	@ Suction pressure, rated	@ Suction pressure, max
Discharge pressure, rated flow, rated diameter (ft H2O.g)	131.0	131.0	131.0	131.0
Discharge pressure, shutoff, rated diameter (ft H2O.g)	184.5	184.5	184.5	184.5
Discharge pressure, shutoff, maximum diameter (ft H2O.g)	223.7	223.7	223.7	223.7

Ratios	
Maximum flow / rated flow, rated diameter	: 139.22 %
Head rated diameter / head minimum diameter, rated flow	: 32.25 %



Panel Part Number:
99554710

Description
Control MPC EC
2 X 25HP
3 X 575V

Selected Options: System Fault Light, Audible Alarm, Surge Protection, Pump Run Light, Normal/Emergency Switch, Service Disconnect Switch

0	6/18/2019	Control MPC EC 2 X 25HP 3 X 575V	This drawing and its content is the property of GRUNDFOS. It may not be copied for third parties or competitors. Changes are only to be made by GRUNDFOS.	PROJECT:	99554710		Panel Part Number: 99554710	SHEET: 1/10
1	9/3/2019			EDW-CD-GPC-1237				
ECM/Rev	Date							

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Feeder Circuit Protection:

Feeder circuit protection to be provided by others.
Type and size to be based on local, state and national electrical codes

Largest Motor FLA and Panel Maximum FLA:

Motor Horsepower	25HP
Motor FLA	34FLA
Panel Max. FLA	70FLA

SCCR Rating: 100 kA RMS Symmetric, 480V

UL Type Rating: 12

Wire Type	Color	Abbr.
+12/24VDC Power/PLC Input(s)	Blue	BU
-12/24VDC Power/PLC Input(s)	Blue w/White Stripe	BUWH
115VAC Primary Line Power	Black	BK
115VAC Neutral	White	WH
Ground/PE	Green/Yellow Stripe	GNYE
Analog Inputs	Orange	OG
Analog Outputs	Orange	OG
Digital Inputs (CU Components)	Violet	VT
Ground for Digital Inputs (CU Components)	Violet w/White Stripe	VTWH
Digital Outputs	Yellow	YE
Power L1	Black	BK
Power L2	Orange	OG
Power L3	Red	RD
Power Neutral	White	WH
All Other Wiring	Brown	BN

Safety / Application Notes:

**** Please Reference the "BOOSTERPAQ - HYDRO MPC"**

Installation and Operation Instructions

"BEFORE" Applying power to Panel.

** Power supply wires in front of main disconnect switch have dangerous voltage even though the main disconnect switch is off.

** Control panel must be connected professionally to the earth / ground.

** GRUNDFOS MLE motors have an integrated variable frequency drive (VFD) which provides motor overload protection. If a system utilizes MLE motors, the motor overload protection is provided by the VFD and does not require any additional motor overload protection.

Cross Reference Definition
(##-##)
Sheet-Row

Wire Types

Internal Panel Wire 
External Wire 

0	6/18/2019
1	9/3/2019
ECM/Rev	Date

Control MPC EC
2 X 25HP
3 X 575V

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PROJECT: 99554710

EDW-CD-GPC-1237




Panel Part Number: 99554710

SHEET: 2/10

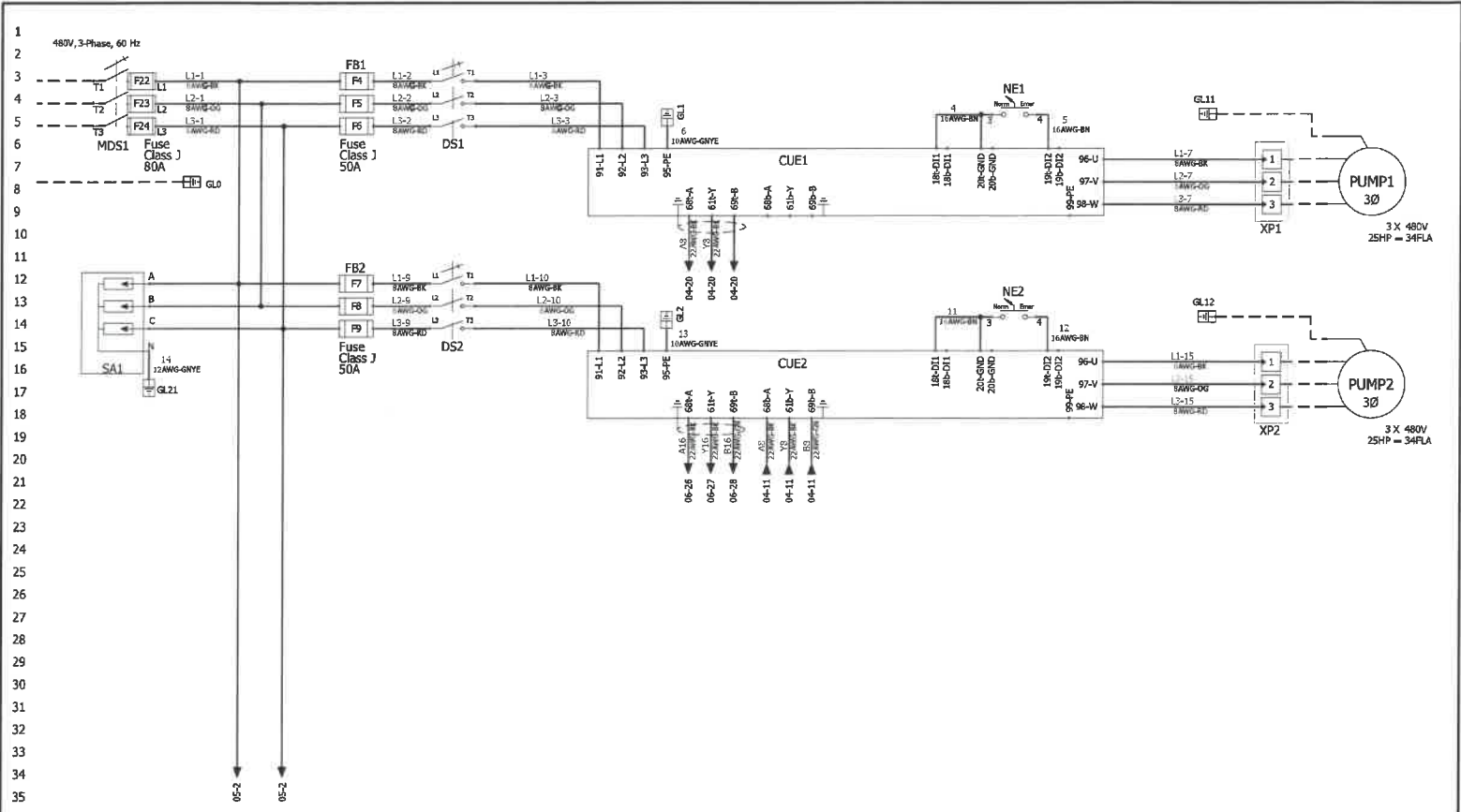
1 1-Table of Contents

2	Drawing	Revision	Date	Created by	Description
3	01	0	6/18/2019	cabel	Cover Page 01
4					
5	02	0	6/18/2019	cabel	Cover Page 02
6	03	0	6/18/2019	cabel	Drawings list
7	04	0	6/18/2019	cabel	Power 01
8	05	0	6/18/2019	cabel	Control 01
9					
10	06	0	6/18/2019	cabel	Control 02
11	07	0	6/18/2019	cabel	Panel Layout
12	08	0	6/18/2019	cabel	Panel Views
13					
14	09	0	6/18/2019	cabel	Bill Of Materials grouped by manufacturer Rev1.0 (Components)
15					
16	10	0	6/18/2019	cabel	Bill Of Materials grouped by manufacturer Rev1.0 (Components)
17					
18	11	0	6/18/2019	cabel	Main electrical closet

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0	6/18/2019	Control MPC EC 2 X 25HP 3 X 575V	This drawing and its content is the property of GRUNDFOS. It may not be copied for third parties or competitors. Changes are only to be made by GRUNDFOS.	PROJECT:	99554710		
1	9/3/2019			EDW-CD-GPC-1237	Panel Part Number: 99554710		SHEET: 3/10
ECM/Rev	Date						

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0	6/18/2019
1	9/3/2019
ECM/Rev	Date

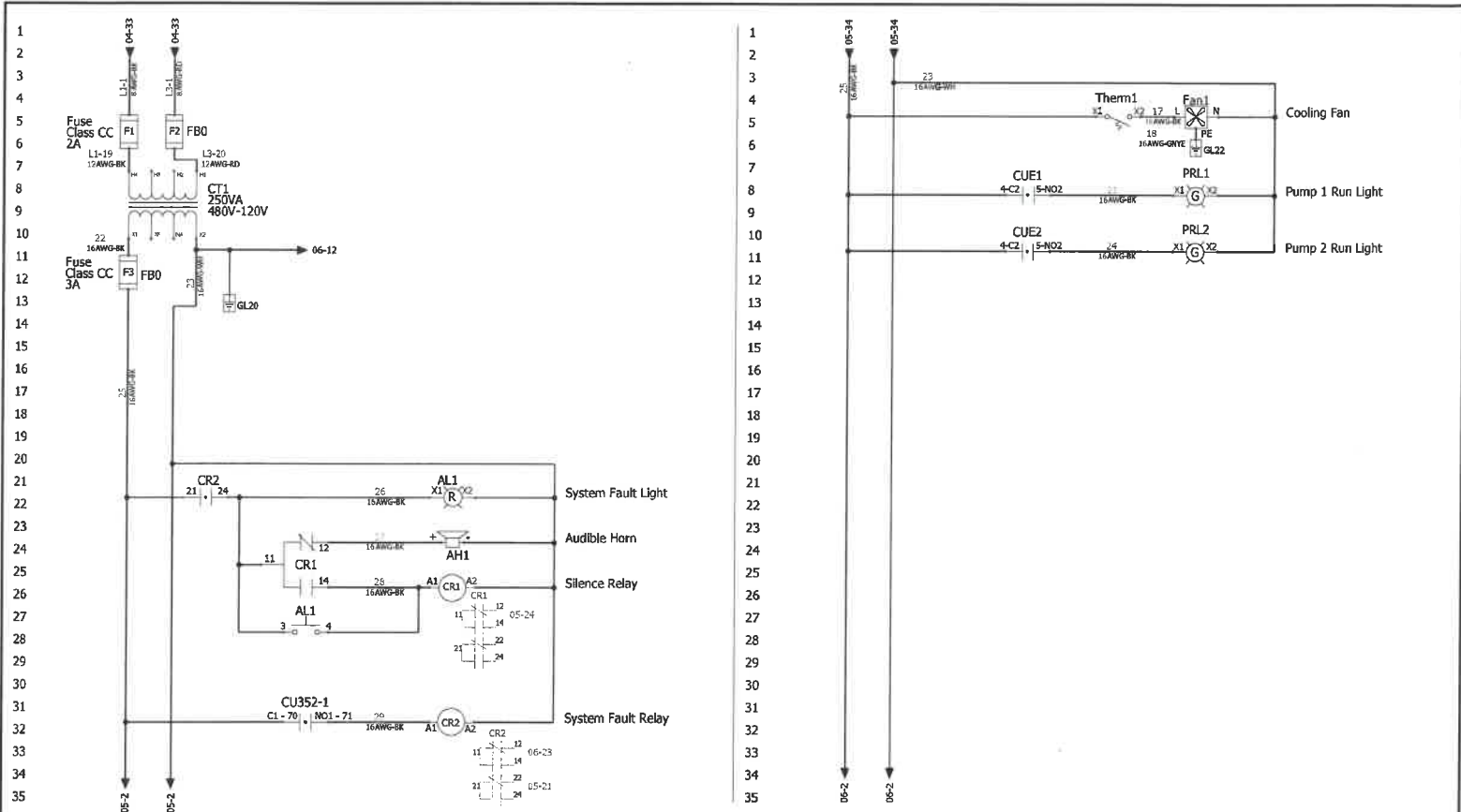
Control MPC EC
 2 X 25HP
 3 X 575V

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PROJECT: 99554710
 EDW-CD-GPC-1237

GRUNDFOS

Panel Part Number: 99554710 SHEET: 4/10



ECN/Rev	Date
0	6/18/2019
1	9/3/2019

Control MPC EC
 2 X 25HP
 3 X 575V

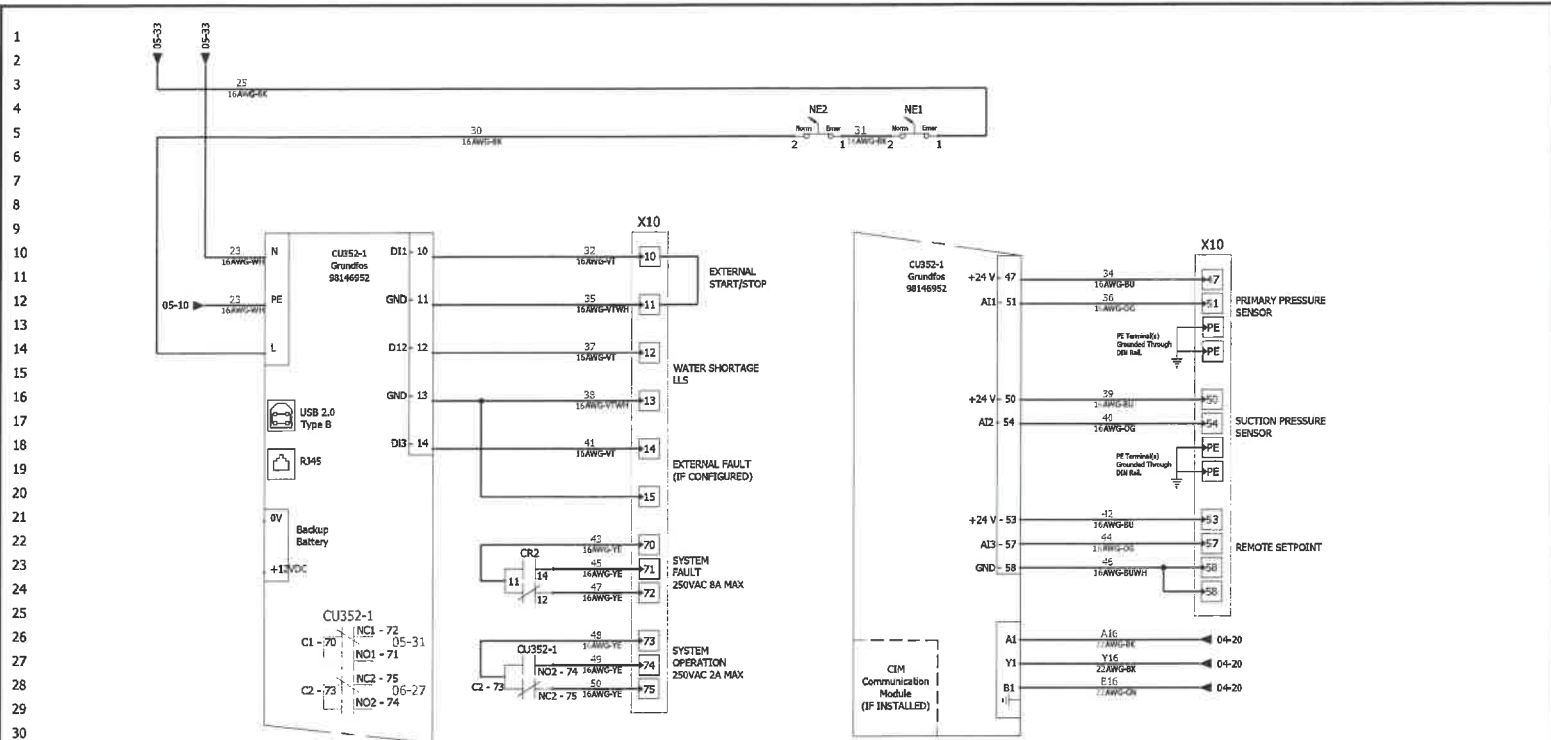
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PROJECT: 99554710
 EDW-CD-GPC-1237

GRUNDFOS

Panel Part Number: 99554710 SHEET: 5/10

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CIM COMMUNICATION MODULE TERMINATIONS

CIM	Terminal 1	Terminal 2	Terminal 3	Terminal 4
CIM 110 LON	LON terminal A	LON terminal B	LON terminal for cable screen	N/A
CIM 150 PROFIBUS DP	PROFIBUS terminal B	PROFIBUS terminal A	PROFIBUS terminal DGND	+5VDC
CIM 200 Modbus RTU	Modbus terminal D1	Modbus terminal D0	Modbus terminal common/GND	N/A
CIM 300 BACnet MS/TP	BACnet Plus terminal	BACnet Minus terminal	BACnet Ground terminal	N/A
CIM 500 BACnet IP, Modbus TCP, PROFINET IO	RJ45			

0	6/18/2019
1	9/3/2019
ECM/Rev	Date

Control MPC EC
 2 X 25HP
 3 X 575V

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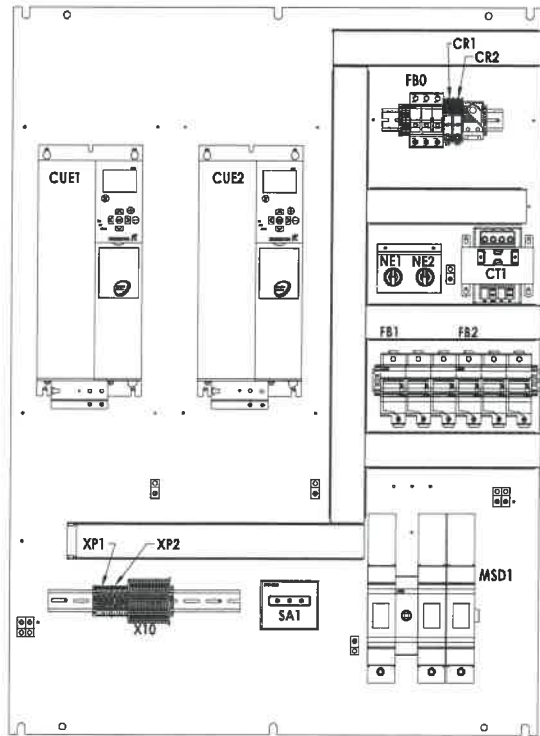
PROJECT: 99554710
 EDW-CD-GPC-1237

GRUNDFOS

Panel Part Number: 99554710 SHEET: 6/10

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0	6/18/2019	Control MPC EC
1	9/3/2019	2 X 25HP 3 X 575V
ECM/Rev	Date	

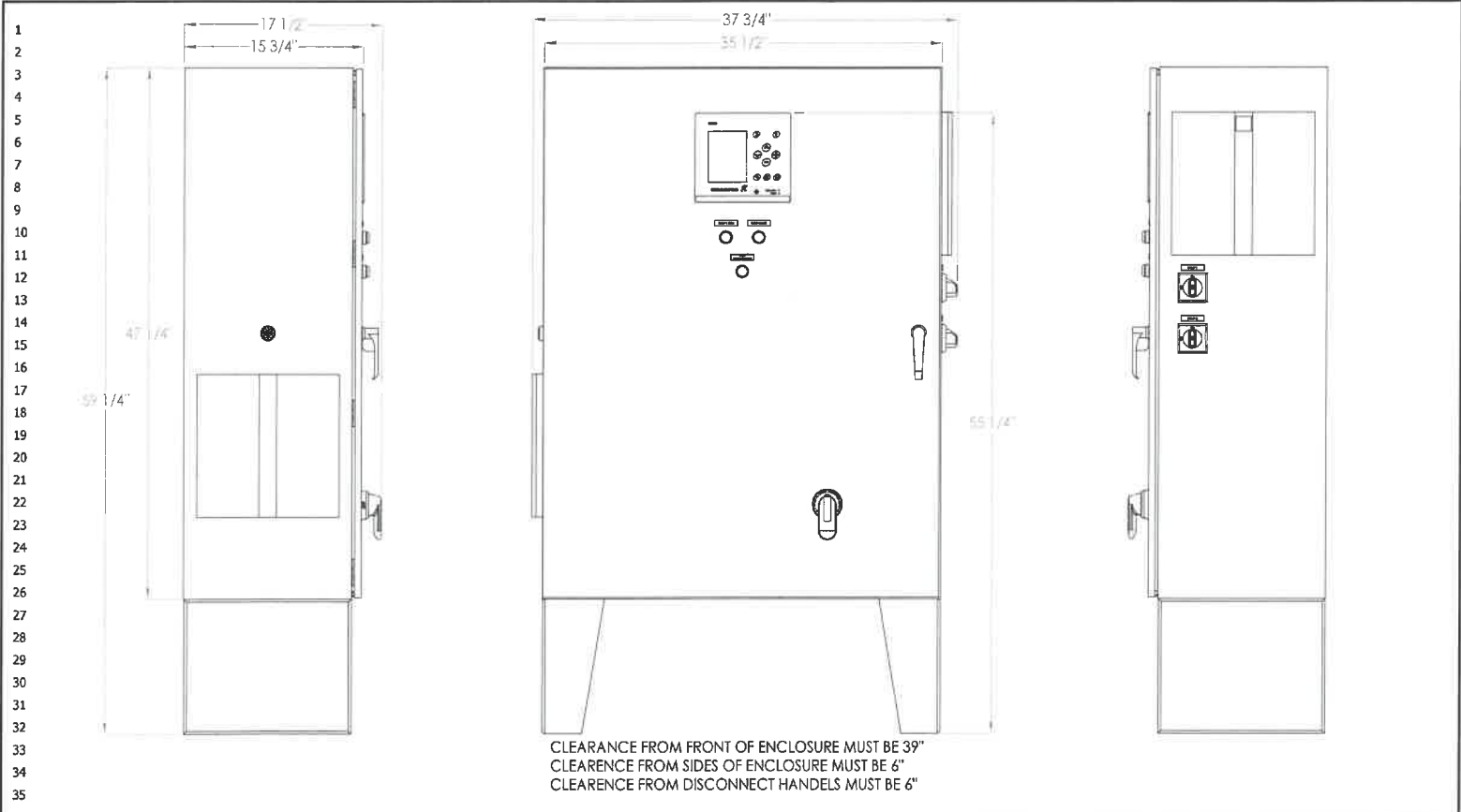
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PROJECT: 99554710
EDW-CD-GPC-1237

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Panel Part Number: 99554710 SHEET: 7/10


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0	6/18/2019	Control MPC EC 2 X 25HP 3 X 575V	This drawing and its content is the property of GRUNDFOS. It may not be copied for third parties or competitors. Changes are only to be made by GRUNDFOS.	PROJECT:	99554710	GRUNDFOS 	Panel Part Number: 99554710	SHEET: 8/10
1	9/3/2019			EDW-CD-GPC-1237				
ECM/Rev	Date							


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Article Number	Mark	Manufacturer	Reference	Description	Quantity	Component Type
13-16-26-1241	FB0	ABB	E9330CCS	Fuse Block; 3P, 30 A, Class CC, Indicator, Padlockable	1	Fuse Block 3-pole
13-16-26-1226	FB1 , FB2	ABB	E93603S	Fuse Block; 3P, 60 A, Class J, Indicator, Padlockable in Open Position	2	Fuse Block 3-Pole
13-16-66-1615	MDS1	ABB	OHY80L6	Disconnect Handle; Red/Yellow, 30/60/100/250A, Type 4, 4X, 3R, 12	1	Main Disconnect Switch
13-16-66-1348	DS1 , DS2	ABB	OHYS2RJ (Old# OHY2RJ)	Disconnect Handle; Red/Yellow, for Side Mount, Type 3R	2	Service Disconnect
13-16-66-1506	MDS1	ABB	OHZX10	Alignment Ring; Use on all Pistol Grip Handles	1	Main Disconnect Switch
13-16-66-1433	MDS1	ABB	OS100GJ12	Disconnect Switch; 100A, Fuseable, 600V, 3-Pole, Class J, Center Shaft	1	Main Disconnect Switch
13-16-66-1437	MDS1 , MDS1	ABB	OSS160G1L3	Touch Safe Cover for Disconnect switch; 100A, 600V, 3-Pole, UL98	2	Main Disconnect Switch
13-16-66-1383	DS1 , DS2	ABB	OT63FT3 (Old# OT45ET3)	Disconnect Switch; 60A, 600V, 3-Pole, Front Mount	2	Service Disconnect
13-16-66-1610	MDS1	ABB	OXPK500	Disconnect Shaft; 19.7", 6x500	1	Main Disconnect Switch
13-16-86-1024	MDS1	ABB	OZXA-24	Terminal Lug Kit; Line Side, 100/200A Disconnects, 14-2/0AWG wire, 6 Pack	1	Main Disconnect Switch
13-16-86-1021	MDS1	ABB	OZXA-175	Terminal Lug Kit; Load Side, 100/200A Disconnects, (6) 6-14AWG, 3 Pack	1	Main Disconnect Switch
13-16-81-1453	CT1	Acme	TB250B005C	Transformer; 250 VA, P/208/230/460V, S/115V	1	Controls Transformer
13-16-26-1263	F4 , F5 , F6 , F7 , F8 , F9	F.Shaw	A4J50	Fuse; 50A, 600V, Class J	6	Fuse
13-16-26-1244	F22 , F23 , F24	F.Shaw	A4J80	Fuse; 80A, 600V, Class J	3	Fuse
13-16-26-1061	F1 , F2	F.Shaw	ATQR2	Fuse; 2A, 600V, 13/32" x 1 1/2", Class CC	2	Fuse
13-16-26-1063	F3	F.Shaw	ATQR3	Fuse; 3A, 600V, 13/32" x 1 1/2", Class CC	1	Fuse
13-16-56-1029	AH1	Floyd Bell	SP-1081	Alarm; 120V, 95db, Reduced Sensitivity, Extra Fast Warble, Panel Mount	1	Audible Horn
XX-XX-XX-6030	CUE1 , CUE2	Grundfos	96754696	CUE; 25HP, 380-500VAC 3PH in, 37.5A	2	VFD
13-16-39-1093	CU352-1	Grundfos	98146952	(CM) Logic Module; Grundfos MPC Controller (CU352)	1	CU352
13-16-46-1073	CR1 , CR2	Idec	RJ2S-CL-A120	Relay; 120V, DPDT, 8A, Indicator	2	Silence Relay , System Fault Relay
13-16-46-1283	CR1 , CR2	Idec	SJ2S-07LW	Socket; 8 Pin, DIN/Pnl Mt, for RJ Relays	2	Silence Relay , System Fault Relay
65-BP-4836-02	L1	orenco	65-BP-4836-02	Backplate; 48x36, Steel, Pre-Drilled, Layout 02	1	Main electrical closet
13-66-11-1130	SAB1	OSI	13-66-11-1130	Bracket; Surge Arrestor	1	SA Bracket

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1	9/3/2019				EDW-CD-GPC-1237		Panel Part Number: 99554710
ECM/Rev	Date						SHEET: 9/10

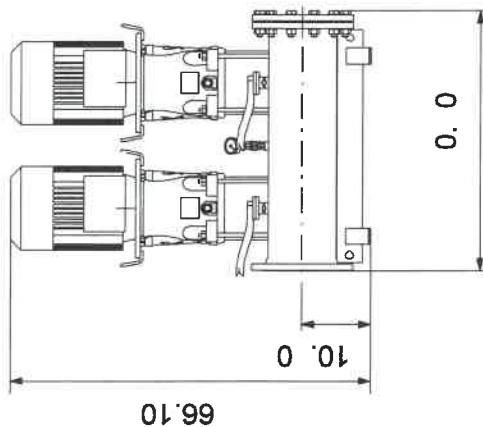
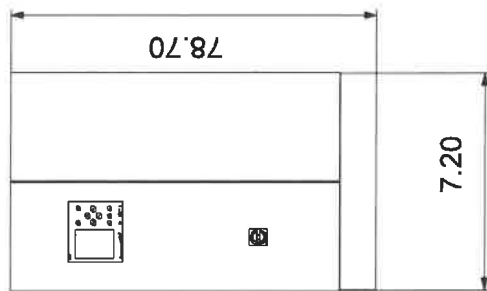
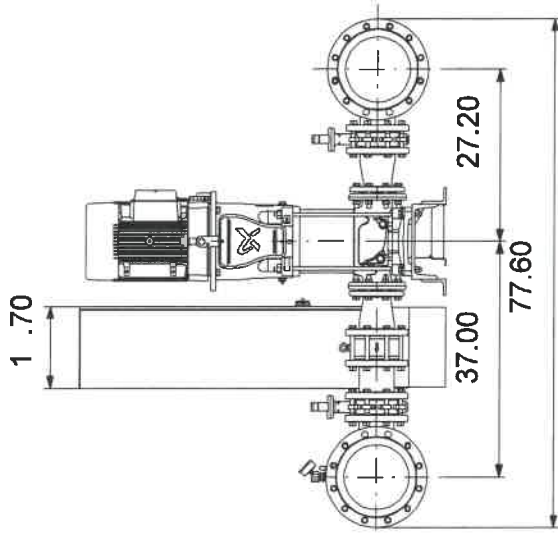
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Article Number	Mark	Manufacturer	Reference	Description	Quantity	Component Type
65-ELEC-BRKT-2HOA	SWB1	OSI	65-ELEC-BRKT-2HOA	Bracket; HOA or N/E Switch, x2	1	NE Bracket
65-LIGHT-1R-032	AL1	OSI	65-light-1R-032	Push Button Light; Fault, Push to Silence	1	System Fault Light
65-SWITCH-2-12	NE1, NE2	OSI	65-SWITCH-2-12	Switch; Two Position, 1-NO, 1-NC	2	Normal/Emergency Switch
65-TB-CU352-DB	X10 1	OSI	65-TB-CU352-DB	Terminal Blocks; Double Stack, X10 CU352 Terminals	1	CU352 Terminal Blocks
65-TB-PT-50A	XP1 1, XP2 1	OSI	65-TB-PT-50A	Terminal Blocks; Single Pump Pass Through, 50A	2	Pump Power Terminal Blocks
13-16-86-1680	GL0, GL1, GL2, GL11, GL12, GL20, GL21, GL22	Raco	TA2-Bulk	Ground Lug; 2AWG, Burndy	8	Ground Lug
13-21-11-1315	Fan1	Rittal	3243.110 (Old# 3326.117)	Axial Fan; 323/353 cfm, 120V, 50/60 Hz, NEMA 12	1	Cooling Fan
13-21-11-1325	Fan1	Rittal	3243.200 (Old# 3326.207)	Exhaust Grille; for 323/353 cfm	1	Cooling Fan
13-21-11-1272	L1	Rittal	FSK1216C	Floor Stand Kit; 12"x16", Carbon steel, 12 ga, RAL 7035, for AE & WM	1	Main electrical closet
13-21-11-1042	L1	Rittal	WM483616NC	Enclosure; 48x36x16, Steel, Single Door, Backplate Included	1	Main electrical closet
13-16-61-1010	SA1	Schneider Electric	SDSA 3650	Surge Arrestor; 3 Phase, 600V, WYE	1	Surge Arrestor
13-16-36-1421	PRL1, PRL2	Siemens	3SU11036AA401AA0	Pilot Light; Green, 110 VAC Complete	2	Pump 1 Run Light, Pump 2 Run Light
13-16-31-1095	Therm1	Stego	VESNO-01141.9-00	Thermostat; 32-140 Deg. F	1	Thermostat

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1	9/3/2019				EDW-CD-GPC-1237		Panel Part Number: 99554710
ECM/Rev	Date						SHEET: 1Q/10

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99441163 HYDRO MPC-E 2 CR95-2-2



Note: All units are in mm unless otherwise stated.
 Disclaimer: This is a simplified dimensional drawing and does not show all details.



ISLANDER
ENGINEERING

APPENDIX B

Peerless AEF - Horizontal Split Case Single Stage Fire Pump



Pump Performance Datasheet

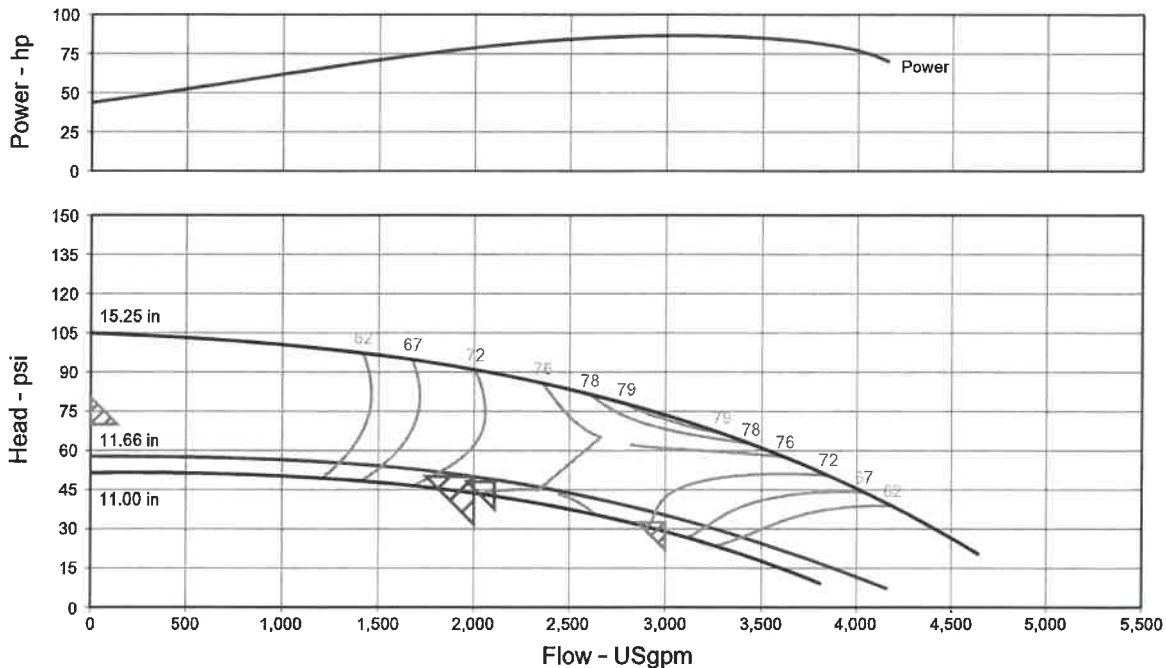
Customer	:	Quote Number / ID	:
Customer ref. / PO	:	Peerless Model	: 8AEF15G
Tag Number	:	Stages	: 1
Service	:	Based on curve number	: 8AEF15G-1780Fix Rev May 2019
Quantity	: 1	Date last saved	:

Operating Conditions		Liquid	
Flow, rated	: 2,000 USgpm	Liquid type	: Cold Water
Differential head / pressure, rated (requested)	: 50.00 psi	Additional liquid description	:
Differential head / pressure, rated (actual)	: 50.02 psi	Solids diameter, max	: 0.00 in
Suction pressure, rated / max	: 0.20 / 12.10 psi.g	Solids concentration, by volume	: 0.00 %
NPSH available, rated	: Ample	Temperature, max	: 68.00 deg F
Site Supply Frequency	: 60 Hz	Fluid density, rated / max	: 1.000 / 1.000 SG
		Viscosity, rated	: 1.00 cP
		Vapor pressure, rated	: 0.34 psi.a

Performance		Material	
Speed, rated	: 1780 rpm	Material selected	: Cast Iron
Impeller diameter, rated	: 11.66 in		
Impeller diameter, maximum	: 15.25 in		
Impeller diameter, minimum	: 11.00 in		
Efficiency	: 73.96 %		
NPSH required / margin required	: - / 0.0 ft		
Ns (imp. eye flow) / Nss (imp. eye flow)	: 1,498 / - US Units		
MCSF	: -		
Head, maximum, rated diameter	: 57.75 psi		
Head rise to shutoff	: 15.50 %		
Flow, best eff. point	: 2,402 USgpm		
Flow ratio, rated / BEP	: 83.26 %		
Diameter ratio (rated / max)	: 76.46 %		
Head ratio (rated dia / max dia)	: 54.98 %		
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00		
Selection status	: Acceptable		

Pressure Data	
Maximum working pressure	: 69.85 psi.g
Maximum allowable working pressure	: 175.0 psi.g
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: N/A

Performance based on test acceptance - Hyd Inst 14.6 Unilateral (1U)
 The rated point is the only guaranteed point (within the specified HI grade) on the performance curve.
 The published closed valve head has a +6% tolerance.
 Other specified duty points, including their tolerances, shall be per separate agreement between Peerless Pump Co. and buyer.

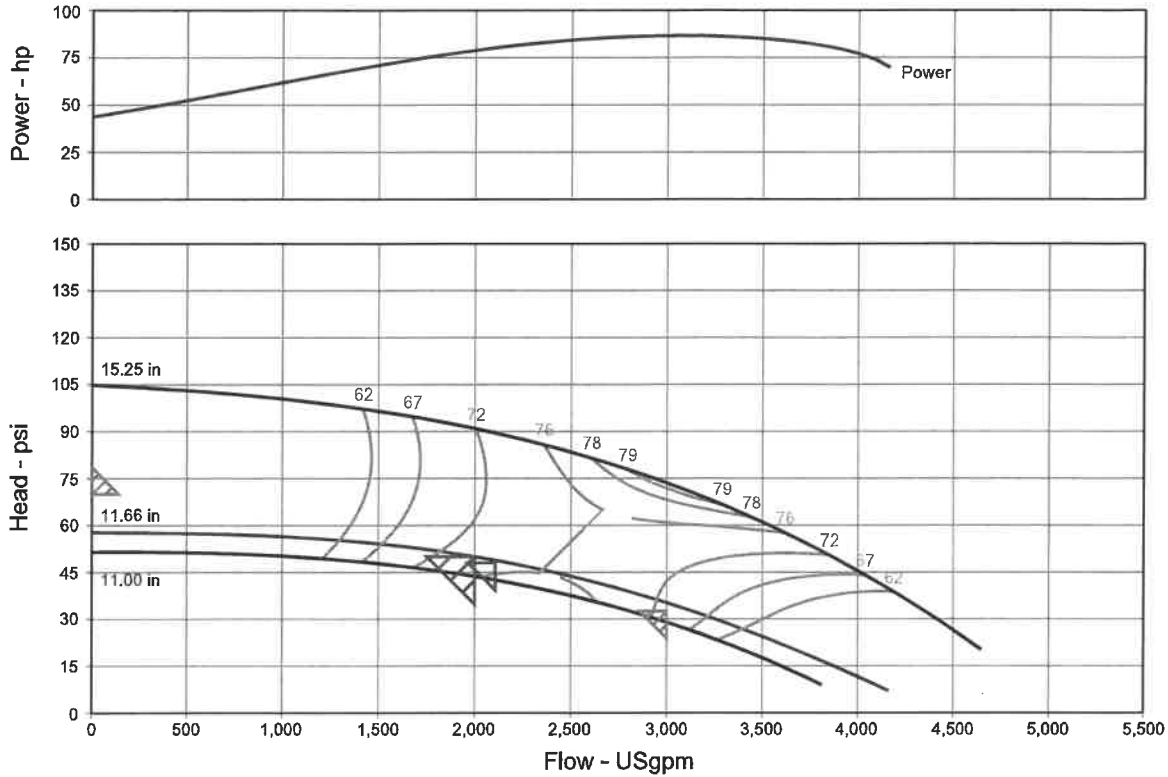


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Pump Performance Curve

Performance based on test acceptance - Hyd Inst 14.6 Unilateral (1U)
 The rated point is the only guaranteed point (within the specified HI grade) on the performance curve.
 The published closed valve head has a +6% tolerance.
 Other specified duty points, including their tolerances, shall be per separate agreement between Peerless Pump Co. and buyer.



Customer	Peerless Model	: 8AEF15G
Customer ref. / PO	Stages	: 1
Tag Number	Speed, rated	: 1780 rpm
Service	Based on curve number	: 8AEF15G-1780Fix Rev May 2019
Quantity	Efficiency	: 73.96 %
Quote Number / ID	Rated power (based on duty point)	: 78.9 hp
Date last saved	NPSH required	: -
Flow, rated	Viscosity	: 1.00 cP
Differential head / pressure, rated	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Fluid density, rated / max		
: 2,000 USgpm		
: 50.00 psi		
: 1.000 / 1.000 SG		

Flow (USgpm)	Head (psi)	Efficiency (%)	Power (hp)	NPSHr (ft)	Thrust, total (lbf)
0	57.75	0.00	43.7	-	-
463	57.45	29.97	51.7	-	-
925	56.64	50.58	60.4	-	-
1,388	54.78	64.20	69.1	-	-
1,851	51.44	72.36	76.7	-	-
2,313	46.35	75.72	82.6	-	-
2,776	39.33	74.08	86.0	-	-
3,238	30.35	66.39	86.4	-	-
3,701	19.51	50.76	83.0	-	-
4,164	7.01	24.42	69.8	-	-

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Construction Datasheet

Customer : Customer ref. / PO : Tag Number : Pump Model : 8AEF15G	Quote Number / ID : Service : Date last saved : Quantity :
Construction	Listings and Approvals
Direction of Rotation (viewed from drive end) : Clockwise (RH) Suction Flange Diameter : 10.00 in Suction Flange Rating : 125lb ANSI Flat faced Discharge Flange Diameter : 8.00 in Discharge Flange Rating : 125lb ANSI Flat faced Impeller Diameter : 11.66 in Bearing Type : Single Row Bearing Lubrication : Grease Maximum Working Pressure : 69.85 psi.g Pump Seal : Packing seal Rotor Group : N/A	UL : No FM : Yes ULC : Yes CE : No NSF61 : No NSF372 : No
Materials	Engine Information
Pump Casing : Cast Iron Impeller : Silicon Brass Pump Shaft : Carbon steel Shaft Sleeve : 304SS with O-ring Case Ring : Bismuth tin bronze Impeller wear ring : Integral Paint : Peerless Fire Red	Manufacturer : - Model : - Cooling type : N/A Rated speed : N/A Rated power : N/A Derated power : N/A Installation elevation : 1,200 in Installation temperature (max) : 68.00 deg F Engine voltage : N/A Preheater voltage : N/A Fuel supply : None Tier : N/A Silencer type : None Silencer size : N/A Silencer configuration : N/A Flexible exhaust connection : N/A Drive shaft type : N/A Tank : None Torsional coupling : No Batteries : No Rack and cables : No Cooling loop size : N/A Cooling loop material : N/A ULC fuel lines : No Fuel system : No Ventilation : N/A Base mounted controller adapter : No
Additional information	Testing
Pump Base : N/A Mounting : Bare pump Max suction pressure** : 12.10 psi.g	Hydraulic performance test : Non-witnessed per HI 14.6 1U Hydrostatic test : Non-witnessed Curve approval : No NPSH test : N/A String test : N/A Test w/ motor : No
Approximate Weights	
Bare Pump : 885 lb Driver : N/A Base : N/A	

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Pump Performance - Additional Data

Project name	Tag Number	:
Commissioned	Service	:
Representative	Model	: 8AEF15G
Customer	Quantity	: 1
Customer ref. / PO	Quoted By (Sales Office)	: Chamco Industries Ltd. - Calgary
Quote Number / ID	Quoted By (Sales Engineer)	: Song Deng
Date last saved	Speed, rated	: 1780 rpm
Stages		

Performance Data		Stage, Speed and Solids Limits	
Head, maximum diameter, rated flow	: 90.94 psi	Stages, maximum	: 1
Head, minimum diameter, rated flow	: 43.68 psi	Stages, minimum	: 1
Head, maximum, rated diameter	: 57.75 psi	Pump speed limit, maximum	: 1780 rpm
Efficiency adjustment factor, total	: 1.00	Pump speed limit, minimum	: 1780 rpm
Power adjustment, total	: 0.0 hp	Curve speed limit, maximum	: 1780 rpm
Head adjustment factor, total	: 1.00	Curve speed limit, minimum	: 1779 rpm
Flow adjustment factor, total	: 1.00	Variable speed limit, minimum	: 700 rpm
NPSHR adjustment factor, total	: 1.00	Solids diameter limit	: 0.74 in
NPSH margin dictated by pump supplier	: 0.0 ft		
NPSH margin dictated by user	: 0.0 ft		
NPSH margin used (added to 'required' values)	: 0.0 ft		

Mechanical Limits		Typical Driver Data	
Torque, rated power, rated speed	: 4.43 hp/100 rpm	Driver speed, full load	: 1780 rpm
Torque, maximum power, rated speed	: 4.86 hp/100 rpm	Driver speed, rated load	: 1784 rpm
Torque, driver power, full load speed	: 5.62 hp/100 rpm	Driver efficiency, 100% load	: N/A
Torque, driver power, rated speed	: 5.62 hp/100 rpm	Driver efficiency, 75% load	: N/A
Torque, pump shaft limit	: -	Driver efficiency, 50% load	: N/A
Radial load, worst case	: -		
Radial load limit	: -		
Impeller peripheral speed, rated	: -		
Impeller peripheral speed limit	: -		

Various Performance Data	Flow (USgpm)	Head (psi)	Efficiency (%)	NPSHr (ft)	Power (hp)
Shutoff, rated diameter	0	57.75	-	-	43.7
Shutoff, maximum diameter	0	104.8	-	-	79.0
MCSF	-	-	-	-	-
Rated flow, minimum diameter	2,000	43.68	75.83	-	67.2
Rated flow, maximum diameter	2,000	90.94	71.93	-	147.5
BEP flow, rated diameter	2,402	45.15	75.81	-	83.5
120% rated flow, rated diameter	2,400	45.18	75.81	-	83.4
End of curve, rated diameter	4,164	7.01	24.42	-	69.8
End of curve, minimum diameter	3,814	8.96	29.81	-	66.9
End of curve, maximum diameter	4,648	20.18	38.14	-	143.5
Maximum value, rated diameter	-	57.75	75.81	-	86.6
Maximum value, maximum diameter	-	-	79.55	-	162.0

System differential pressure	@ Density, rated	@ Density, max
Differential pressure, rated flow, rated diameter (psi)	50.00	50.00
Differential pressure, shutoff, rated diameter (psi)	57.75	57.75
Differential pressure, shutoff, maximum diameter (psi)	104.8	104.8

Discharge pressure	@ Suction pressure, rated	@ Suction pressure, max	@ Suction pressure, rated	@ Suction pressure, max
Discharge pressure, rated flow, rated diameter (psi.g)	50.20	62.10	50.20	62.10
Discharge pressure, shutoff, rated diameter (psi.g)	57.95	69.85	57.95	69.85
Discharge pressure, shutoff, maximum diameter (psi.g)	105.0	116.9	105.0	116.9

Ratios	
Maximum flow / rated flow, rated diameter	: 208.18 %
Head rated diameter / head minimum diameter, rated flow	: 114.47 %

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Pump Performance - Additional Data

NFPA 20 Data

Maximum allowed head at shutoff	: 70.00 psi (140.00 %)	Minimum allowed runout flow	: 3,000 USgpm (150.00 %)
Actual shutoff head	: 57.75 psi		
Minimum allowed head at 150 % flow	: 32.50 psi (65.00 %)	Actual runout flow	: 4,164 USgpm
Actual head at 150 % flow	: 35.22 psi	Rated power (based on duty point)	: 78.9 hp
		Max power (non-overloading)	: 86.6 hp

Product Line Options

Driver Type	: Diesel engine	Tolerance Type	: Hyd Inst 14.6 Unilateral (1U)
-------------	-----------------	----------------	---------------------------------



Peerless Express 20.4.2

Customer :										Model : 8AEF15G
Customer ref. / PO :										Stages : 1
Tag Number :										Speed, rated : 1780 rpm
Service :										
Condition #		1	2	3	4	5	6	7	8	
Description		-	-							
Temperature, max	deg F	68.00	68.00							
Fluid density, rated / max	SG	1.000 / 1.000	1.000 / 1.000							
Viscosity, rated	cP	1.00	1.00							
Primary condition		⊙	○	○	○	○	○	○	○	
Model		8AEF15G								
Stages		1								
Impeller diameter, rated	in	11.66								
Flow, rated	USgpm	2,000	2,108							
Head, rated (requested)	psi	50.00	48.00							
Head, rated (actual)	psi	50.00	48.84							
Suction pressure, rated / max	psi.g	0.20 / 12.10	2.00 / 3.00							
NPSH available, rated	ft	Ample	Ample							
Speed, rated	rpm	1780	1780							
Selection status		Acceptable	Acceptable							
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]		1.00 / 1.00 / 1.00 / 1.00	1.00 / 1.00 / 1.00 / 1.00							
Efficiency	%	73.96	74.82							
NPSH required	ft	-	-							
Submergence	ft	-	-	-	-	-	-	-	-	
Rated power (based on duty point)	hp	78.9	80.3							

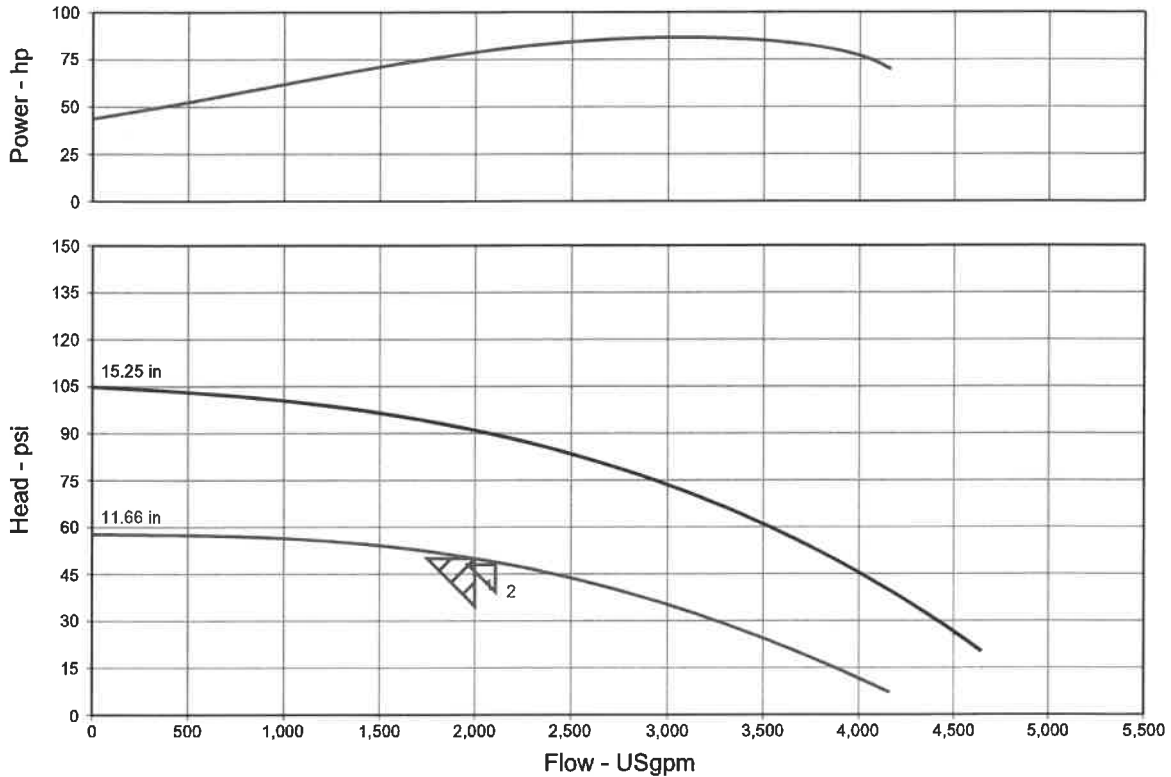
Chamco Industries Ltd. - Calgary - 8900 Venture Ave SE - Calgary, AB T3S 0A2
 phone: (403) 777-1253 - fax: (403) 777-1207

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Multiple Conditions Curve

Performance based on test acceptance - Hyd Inst 14.6 Unilateral (1U)
 The rated point is the only guaranteed point (within the specified HI grade) on the performance curve.
 The published closed valve head has a +6% tolerance.
 Other specified duty points, including their tolerances, shall be per separate agreement between Peerless Pump Co. and buyer.



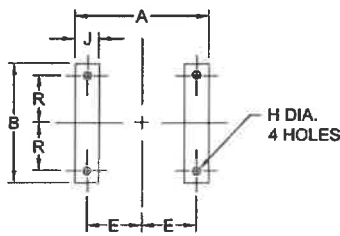
Customer	:		Model	:	8AEF15G
Customer ref. / PO	:		Stages	:	1
Tag Number	:		Speed, rated	:	1780 rpm
Service	:		Based on curve number	:	8AEF15G-1780Fix Rev
Quantity	:	1		:	May 2019
Quote Number / ID	:		Efficiency	:	73.96 %
Date last saved	:		Rated power (based on duty point)	:	78.9 hp
Flow, rated	:	2,000 USgpm	NPSH required	:	-
Differential head / pressure, rated	:	50.00 psi	Viscosity	:	1.00 cP
Fluid density, rated / max	:	1.000 / 1.000 SG	Cq/Ch/Ce/Cn	:	1.00 / 1.00 / 1.00 / 1.00
			[ANSI/HI 9.6.7-2010]		
			Submergence		





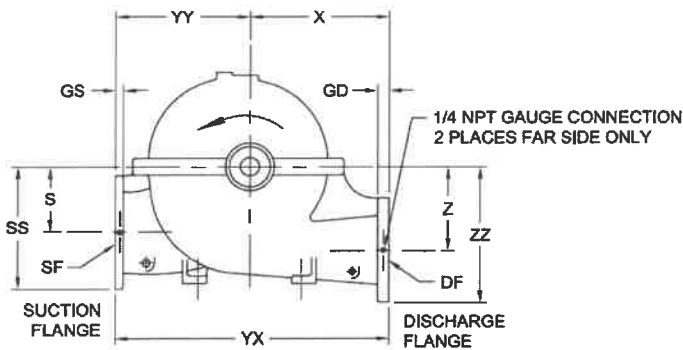
General Arrangement

PLAN VIEW OF FEET

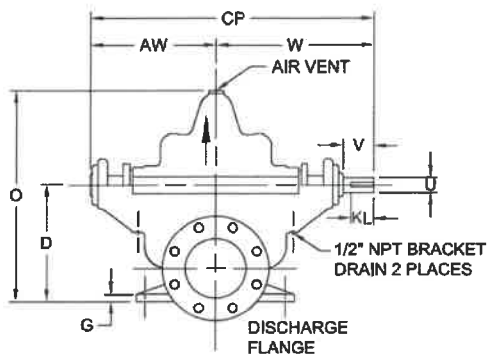


KEYWAY

DETAIL SHAFT END



LH ROTATION (CCW) RH ROTATION (CW)



GENERAL	
Pump Model	8AEF15G
Listing / Approval	FM/ULC Listed
Rated Flow	2,000 USgpm
Liquid	Cold Water
Rated Pressure	50.00 psi
Specific Gravity	0.99824
Rated Speed	1780 rpm
Customer	
Quote No.	
Item No.	
Project	
Date	

A	18.00 in	S	9.00 in	GS	1.88 in	ZZ	17.75 in	AW	14.75 in
B	19.00 in	SS	18.00 in	GD	1.62 in	O	28.00 in	W	19.00 in
R	8.25 in	SF	10.00 in	YX	33.69 in	D	16.00 in	V	4.00 in
J	3.38 in	YY	17.69 in	Z	10.00 in	G	1.12 in	KL	3.00 in
E	7.50 in	X	16.00 in	DF	8.00 in	CP	33.75 in	U	1.88 in

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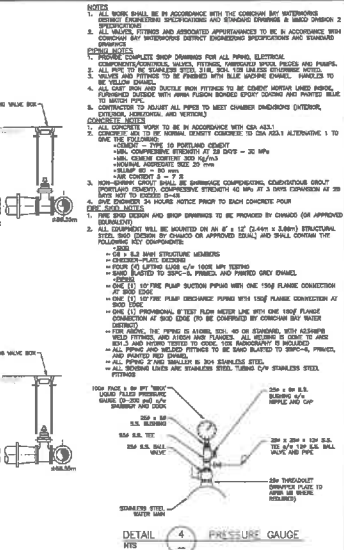
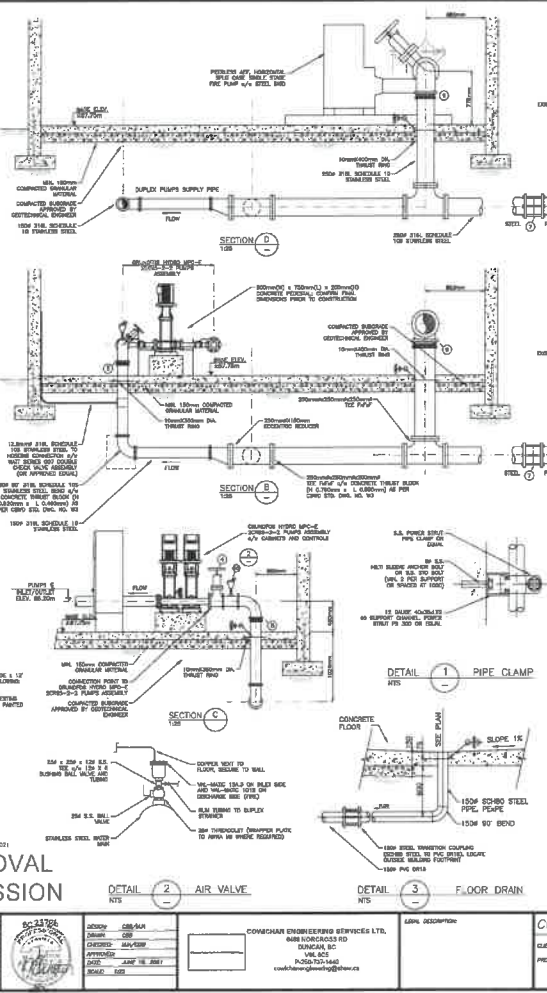
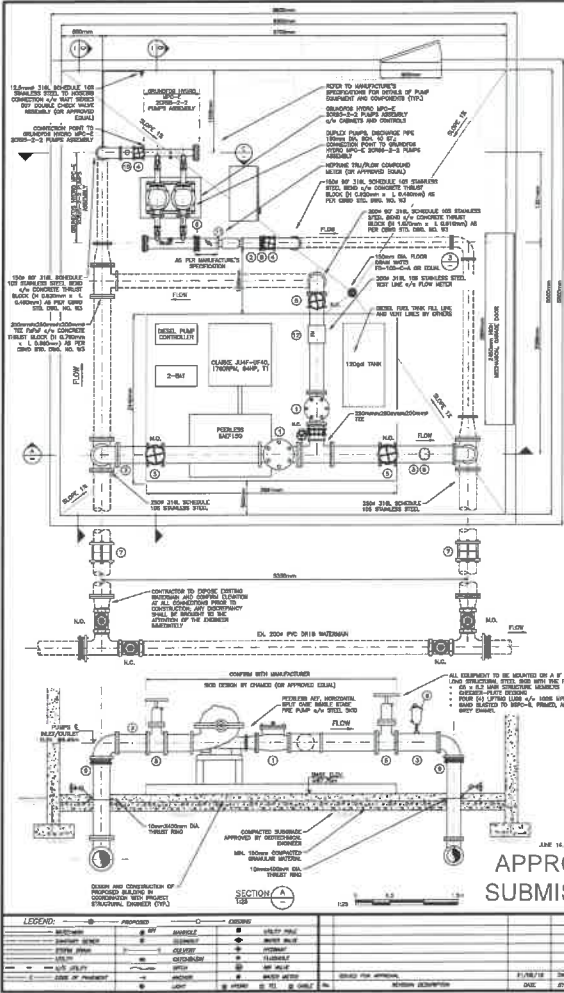
ISLANDER
ENGINEERING

APPENDIX C

Hazen-Williams & Darcy-Weisbach Minor Losses

Total Static Head (70% Full)	9.3	Dia	121	122.5	124.0	125.5	127.0	128.5	130.0	131.5	133.0	134.5	136.0	137.5	139.0	140.5	142.0	143.5	145.0	146.5	148.0	149.5	151.0
HW Steel Pipe C-Factor	100	mm																					
HW PVC Pipe C-Factor	150	mm																					
Incremental Flow	1.5		1.918	1.942	1.965	1.989	2.013	2.037	2.061	2.084	2.106	2.132	2.156	2.179	2.203	2.227	2.251	2.274	2.298	2.322	2.346	2.370	2.393
Ordano Reservoir Booster Station (Fire Pump System)																							
200Ø PVC Pipe Reservoir	203	1.50	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.11
200Ø 90° DI Bend	203	0.70	0.50	0.51	0.52	0.54	0.55	0.56	0.58	0.59	0.60	0.62	0.63	0.64	0.66	0.67	0.69	0.70	0.72	0.73	0.75	0.76	0.78
200Ø PVC Pipe	203	5.70	0.27	0.27	0.28	0.29	0.29	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35	0.36	0.37	0.38	0.38	0.39	0.40	0.40
200Ø x 200Ø x 200Ø Tee (Branch)	203	1.00	0.71	0.73	0.75	0.77	0.78	0.80	0.82	0.84	0.86	0.88	0.90	0.92	0.94	0.96	0.98	1.00	1.02	1.04	1.07	1.09	1.11
200Ø PVC Pipe	203	2.70	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.19
200Ø x 200Ø x 200Ø Tee (Line)	203	0.20	0.14	0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.20	0.21	0.21	0.22	0.22
200Ø PVC Pipe	203	9.40	0.44	0.45	0.46	0.47	0.48	0.49	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.60	0.61	0.62	0.63	0.64	0.65	0.67
200Ø x 200Ø x 200Ø Tee (Branch)	203	1.00	0.71	0.73	0.75	0.77	0.78	0.80	0.82	0.84	0.86	0.88	0.90	0.92	0.94	0.96	0.98	1.00	1.02	1.04	1.07	1.09	1.11
250Ø x 200Ø Eccentric Reducer			0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.007
250Ø PVC Pipe	256	6.00	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13
250Ø x 250Ø x 250Ø Tee (Branch)	256	1.00	0.27	0.28	0.29	0.29	0.30	0.31	0.32	0.32	0.33	0.34	0.34	0.35	0.36	0.37	0.38	0.38	0.39	0.40	0.41	0.42	0.43
250Ø 90° DI Bend	256	0.70	0.19	0.20	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.29	0.29	0.30
250Ø SS Pipe	256	3.40	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16
250Ø Gate Valve (Full Open)	256	0.20	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.09
Head Loss (Reservoir to Pump Inlet)			3.69	3.78	3.87	3.97	4.06	4.15	4.25	4.34	4.44	4.54	4.64	4.74	4.84	4.94	5.05	5.15	5.26	5.37	5.47	5.58	5.69

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BILL OF MATERIALS

ITEM QUANTITY DESCRIPTION

- 200 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING
- 150 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING
- 100 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING
- 50 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING
- 250 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING
- 150 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING
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- 50 GAL. STEEL TANK WITH 1/2" THICKNESS AND 1/2" DIA. MANHOLE WITH 1/2" DIA. MANHOLE COVER AND 1/2" DIA. MANHOLE RING

APPROVAL SUBMISSION

<p>LEGEND:</p> <p>APPROVED: [Symbol]</p> <p>REVISION: [Symbol]</p> <p>DATE: 07/18/18</p>	<p>DESIGNER: [Name]</p> <p>CHECKER: [Name]</p> <p>DATE: 07/18/18</p>	<p>COMPANY: COMWICHAN ENGINEERS SERVICES LTD.</p> <p>ADDRESS: [Address]</p> <p>PHONE: [Phone]</p> <p>EMAIL: [Email]</p>	<p>PROJECT: COMWICHAN BAY WATER DISTRICT</p> <p>LOCATION: OREGON ROAD RESERVOIR BOOSTER STATION</p>	<p>SCALE: 1/8" = 1'-0"</p> <p>DATE: 07/18/18</p>
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ABBREVIATIONS

A/FB ASPHALT IMPREGNATED FIBRE BOARD
 ALT. ALTERNATE
 ARCH. ARCHITECTURAL
 B.C.E. BOTTOM CHORD
 EXTENSION
 B.L. BOTTOM LOWER LAYER
 B.U. BOTTOM UPPER LAYER
 BM. BEAM
 BOT. BOTTOM
 BPO BAR PLACING ORDER
 BTWN BETWEEN
 BRG. BEARING
 CANT. CANTILEVER
 C.J. CONTRL. JOINT
 CL. CENTER LINE
 CLR. CLEAR
 COL. COLUMN
 CONC. CONCRETE
 CONT. CONTINUOUS
 C.P. COMPLETE
 PENETRATION
 C/W COMPLETE WITH DETAIL
 D.L. DEAD LOAD
 D.O. DO OVER (DITTO)
 D.P. DEEP
 DWG. DRAWING
 DWLS DOWELS
 E.E. EACH END
 E.F. EACH FACE
 ELEC. ELECTRICAL
 EL. ELEVATION
 ELEV. ELEVATION
 E.S. EACH SIDE
 E.W. EACH WAY
 EXIST. EXISTING
 EX. EXTRA
 EXT. EXTERIOR
 F.D. FLOOR DRAIN
 F.S. FAR SIDE
 FTG FOOTING
 GALV. GALVANIZED
 G.L. GRID LINE
 H1E HOOK ONE END
 H2E HOOK 2 ENDS
 H.D.G. HOT DIPPED GALVANIZED
 HOR. HORIZONTAL
 HORIZ. HORIZONTAL
 I.F. INSIDE FACE
 INT. INTERIOR

JT. JOINT
 L.G. LONG
 L.L. LIVE LOAD
 LLM LONG LEG HORIZONTAL
 LLV LONG LEG VERTICAL
 LSH LONG SIDE HORIZONTAL
 LSV LONG SIDE VERTICAL
 L.V. LENGTH VARIES
 L.W. LONG WAY
 MAX. MAXIMUM
 MECH. MECHANICAL
 MIN. MINIMUM
 N.I.C. NOT IN CONTRACT
 N.S. NEAR SIDE
 N.T.S. NOT TO SCALE
 O/C ON CENTRE
 O.F. OUTSIDE FACE
 OPP. OPPOSITE
 PLA POINT LOAD ABOVE
 P/T PRESSURE TREATED
 R.D. ROOF DRAIN
 REINF. REINFORCING
 RW REINFORCED WITH
 S.D.L. SUPERIMPOSED DEAD LOAD
 SIM. SIMILAR
 S.I.P. STRUCTURAL INSULATED PANEL
 S.O.G. SLAB ON GRADE
 STAG. STAGGERED
 STR. STIRRUP
 S.W. SHORT WAY
 TEMP. TEMPERATURE
 REINFORCING
 THK THICK
 THRU THROUGH
 T.J. TIE JOINT
 TLL TOP LOWER LAYER
 T.O. TOP OF
 T.O.C. TOP OF CONCRETE
 T.O.S. TOP OF STEEL/SLAB
 TUL TOP UPPER LAYER
 TYP. TYPICAL
 T & B TOP AND BOTTOM
 T & G TONGUE AND GROOVE
 U.N.O. UNLESS NOTED OTHERWISE
 US UNDERSIDE
 VERT. VERTICAL
 WT. WALL THICKNESS
 W.P. WORK POINT

DESIGN DATA - CONTINUED

DESIGN DEFLECTION LIMITS:
 DEFLECTION LIMITS (SERVICEABILITY) LESSER OF U.N.O.:
 ROOFS & FLOORS, TOTAL LOAD = SPAN / 180
 FLOORS, LIVE LOAD = SPAN / 200
 WALLS, WIND LOAD = SPAN / 350
 ROOFS, SNOW & LIVE LOADS
 FINISHES SUSCEPTIBLE TO CRACKING = SPAN / 360
 FINISHES NOT SUSCEPTIBLE TO CRACKING = SPAN / 240
 MAXIMUM LIVE / SNOW DEFLECTION FOR ANY SPAN = 1" (25mm)
 LATERAL STOREY DRIFT = HEIGHT / 500

MATERIAL SPECIFICATIONS

WOOD
 TO CONFORM WITH CSA/CAN 086-14 ENGINEERING DESIGN IN WOOD (LIMIT STATES DESIGN)

MINIMUM DESIGN PROPERTIES
 LAMINATED VENEER LUMBER (L.V.L.)
 E = 1800 ksi
 F_b = 2500 psi
 F_v = 285 psi
 F_c = 750 psi (PERPENDICULAR)
 F_c = 2310 psi (PARALLEL)

FRAMING

- 1. GRADES AND TYPES TO BE AS FOLLOWS U.N.O.:
 - BEAMS & MULTI-PLY BEAMS, & PLYWOOD WEB JOISTS: TJI, MICROLAM AND/OR PARALAM BY Weyerhaeuser, OR APPROVED EQUAL
 - WOOD BASED SHEATHING: ORIENTED STRANDBOARD TO CSA-0473-9-93(R, 2011) GRADE O-2 PLYWOOD TO CSA 0325-16
 - STRUCTURAL JOISTS & PLANKS: SPF #2 OR BETTER
 - STRUCTURAL LIGHT FRAMING: SPF #2 OR BETTER
 - WOOD POSTS & BUILT UP COLUMNS: SPF #2 OR BETTER
 - RIM BOARD: 1 1/4" LSL 1.3E

HARDWARE

- 1. TO CONFORM TO THE FOLLOWING U.N.O.:
 - NUTS: ASTM A307, A325, A325M, A490, A490M
 - THREADED ROD: ASTM A307
 - SCREWS: GRK R55, SIMPSON SDS WASHERS/ASTM F436M
 - STEEL ROD: ASTM A448 OR ASTM A307

CONCRETE

- 1. CONCRETE SHALL BE MIXED, PLACED AND CURED IN ACCORDANCE WITH CSA A23.1 OR CSA A23.2 WITH PERFORMANCE REQUIREMENTS OF: 35 MPa COMPRESSIVE STRENGTH AT 28 DAYS AND MEETING EXPOSURE CLASS C-1

CONCRETE REINFORCEMENT

- 1. CONFORM TO CSA G30 SERIES F_y=400MPa FOR ALL REINFORCEMENT.

GENERAL

1. THE CONTRACTOR SHALL EXAMINE ALL CONTRACT DOCUMENTS, CHECK DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER FOR CLARIFICATION PRIOR TO COMMENCING CONSTRUCTION. DISCREPANCIES NOT REPORTED ARE THE RESPONSIBILITY OF THE CONTRACTOR. CHECK AND VERIFY ALL DIMENSIONS WITH THE ARCHITECTURAL DRAWINGS BEFORE COMMENCING WITH ANY WORK. NOTIFY THE ARCHITECT OF ANY ERRORS OR OMISSIONS.
2. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH PLANS FROM OTHER DISCIPLINES
3. DO NOT CONSTRUCT FROM THESE DRAWINGS UNLESS MARKED "ISSUED FOR CONSTRUCTION".
4. ALL DESIGN TO CONFORM TO THE CBC 2018 AND ALL OTHER APPLICABLE CODES AND PRACTICES AND BEST PRACTICES.
5. FIELD REVIEWS: NOTIFY THE ENGINEER 48 HOURS IN ADVANCE FOR FIELD REVIEWS AND APPROVAL OF THE FOLLOWING:
 - A. CONCRETE REINFORCEMENT BEFORE EACH CONCRETE POUR
 - B. WOOD FRAMING BEFORE COVERING UP
6. THE DESIGN HAS BEEN PREPARED BASED ON THE ASSUMPTION THAT THE OWNER AND/OR OPERATOR HAS A SITE SAFETY PLAN IN PLACE TO ADDRESS AND MITIGATE SAFETY HAZARDS, BOTH COMMON AND SPECIFIC TO THIS PROJECT.
7. TYPICAL DETAILS AND GENERAL NOTES APPLY UNLESS NOTED OTHERWISE ON PLANS.
8. GENERAL CONTRACTOR TO ADVISE AND COORDINATE WITH CONSULTANTS IF CONFLICTS ARISE BETWEEN SPECIFICATIONS AND DRAWINGS PRIOR TO PROCEEDING WITH SHOP DRAWINGS, FABRICATION, AND/OR CONSTRUCTION.

DESIGN DATA

DESIGN CODE: CBC 2018 PART 4.
 IMPORTANCE FACTOR: POST-DISASTER.

ROOF

DEAD LOADS:
 FRAMING, ASPHALT SHINGLE, GYPSUM CEILING,
 NOMINAL MECHANICAL & ELECTRICAL 0.72 kPa

ENVIRONMENTAL LOADS: BASED ON DUNCAN, BC
 DESIGN SNOW LOAD (S_s) 1.80 kPa
 RAIN LOAD (S_r) 0.40 kPa

FLOOR

DEAD LOADS
 CONCRETE SELF WEIGHT 24 kN/m³

LIVE LOADS:
 TYPICAL FLOOR SPACE 4.80 kPa
 WIND LOADS: HOURLY WIND PRESSURE (1/50) 0.36 kPa

SEISMIC DATA: S_{se}(0.2) = 1.17 S_{se}(0.5) = 1.09
 S_{se}(1.0) = 0.831 S_{se}(2.0) = 0.378
 S_{se}(5.0) = 0.118 S_{se}(10.0) = 0.042
 PGA = 0.513 PGV = 0.786
 SITE CLASS: D

SOIL CONDITIONS:
 THE FOUNDATION HAS BEEN DESIGNED BASED ON THE FOLLOWING ASSUMED VALUES:

SERVICE BEARING CAPACITY 100 kPa
 ULTIMATE BEARING CAPACITY 140 kPa

HEATED FROST DEPTH 1'-6"
 UNHEATED FROST DEPTH 2'-0"

GENERAL CONTRACTOR TO ENGAGE A GEOTECHNICAL ENGINEER TO VERIFY ASSUMED VALUES.



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 1865 Francisco Terrace, Victoria, BC V8M 4A8

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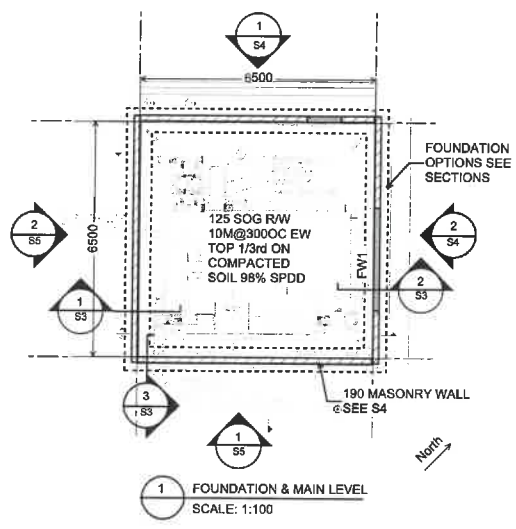
No.	DESCRIPTION	BY	DATE
3	ISSUED FOR APPROVAL	G.C.	2020.08.10
2	ISSUED FOR REVISED BP	G.C.	2020.12.23
1	ISSUED FOR BUILDING PERMIT	G.C.	2020.07.05

COWICHAN BOOSTER PUMP STATION BUILDING

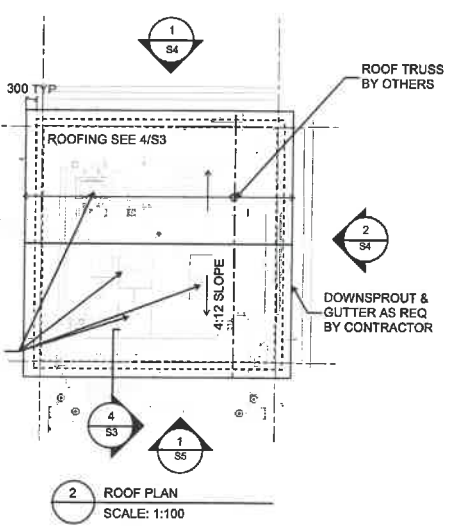
GENERAL NOTES

Scale	As Indicated	Revision No.
Project No.	20093	1
Drawn	HY	Drawn No.
Designed	HY	Date 2020.08.10
Checked	GC	Date 2020.08.10
Reviewed	GC	Date 2020.08.10

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ROOF TRUSS ALLOW FOR POINT LOAD 2000lb FOR HOISTING HEAVY MECH EQUIPMENT FOR MAINTENANCE. (MIN 2x UNIT WEIGHT). COORDINATE LOCATION BY CONTRACTORS.



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188 Praeger Terrace, Victoria, BC V8N 1M8

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When the engineer shall have completed your initial obligations, Contractors shall verify and be responsible for all dimensions and conditions shown on this drawing. The Engineer shall be relieved of any liability from the dimensions and conditions shown on this drawing. Your attention shall be directed to the Engineer for approval prior to proceeding with the work.



No.	DESCRIPTION	BY	DATE
3	ISSUED FOR APPROVAL	G.C.	2021.06.18
2	ISSUED FOR REVISED BP	G.C.	2020.12.23
1	ISSUED FOR BUILDING PERMIT	G.C.	2020.07.28

COWICHAN BOOSTER PUMP STATION BUILDING

PLANS

Scale	As Issued	Revision No.
1/8" = 1'-0"	2020	1
Drawn	HY	Drawing No.
Design	HY	Date 2020.06.10
Design Checked	GC	Date 2020.06.10
Design Reviewed	GC	Date 2020.06.10

CONCRETE

1. CONCRETE IS TO BE TESTED IN ACCORDANCE WITH CSA A23.1-14/23.2-14 AND BY A QUALIFIED TESTING AGENCY AS REQUESTED BY THE ENGINEER. THREE TEST CYLINDERS SHOULD BE TAKEN FOR EVERY 75 CU METERS OR LESS OF CONCRETE PLACED. A MINIMUM OF ONE TEST OF THREE CYLINDERS IS REQUIRED PER POUR.
2. SAWCUT CONTROL JOINTS FOR SLABS ON GRADE AS SOON AS POSSIBLE SPACED AT 25 TIMES THE SLAB THICKNESS, NOT EXCEEDING 4.5m SPACING OR AT LOCATIONS SHOWN ON DRAWINGS, AS PER CSA A23.
3. ENSURE SLEEVES, TIES, ANCHOR RODS, PIPE HANGERS AND ANY OTHER INSERTS OR OPENINGS REQUIRED IN THE CONCRETE BY OTHER TRADES ARE COMPLETED.

CONCRETE REINFORCING

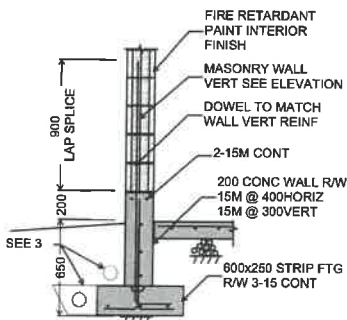
1. TIE ALL BARS SECURELY IN PLACE TO PREVENT DISPLACEMENT. SUPPORT SLAB REINFORCEMENT ON SUITABLE CHAIRS OR SUPPORTS AT MAXIMUM 1.2 METER CENTRES. PROVIDE CORNER BARS TO MATCH HORIZONTAL WALL REINFORCEMENT.
2. CLEAR COVER TO REINFORCEMENT (PRINCIPAL REINFORCEMENT) IS: CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 75mm EXPOSED TO EARTH OR WEATHER 40mm NOT EXPOSED TO EARTH OR WEATHER OR NOT IN CONTACT WITH THE GROUND: SLABS AND WALLS 25mm
3. UNLESS OTHERWISE NOTED, USE CLASS B TENSION SPLICE FOR ALL REINFORCING STEEL.

ROUGH CARPENTRY

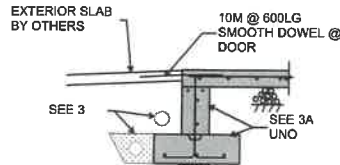
1. WOOD FRAMING TO CONFORM TO NLGA STANDARD GRADING RULES FOR CANADIAN LUMBER AND CSA 086-14 ENGINEERING DESIGN IN WOOD (LIMIT STATES DESIGN).
2. THE ROOF SHEATHING AND SUPPORTING ROOF MEMBERS HAVE BEEN DESIGNED AS A DIAPHRAGM. DIAPHRAGM CONNECTION REQUIREMENTS FOR THE ROOF SHEATHING ARE: 64 (2 1/2") LONG COMMON NAILS @ 75 (3") OC AT SUPPORTED PANEL EDGE AND AT 300 (12") OC ALONG INTERMEDIATE FRAMING MEMBERS.
3. WIRE NAILS, SPIKES AND STAPLES TO CSA B111-1974(R2003).

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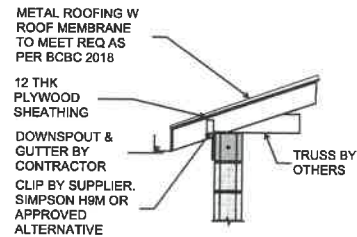
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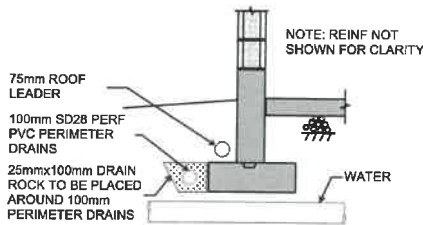
1 FDN @ TYP WALL
SCALE: 1:25




2 FND @ DOOR
SCALE: 1:25



4 ROOF TRUSS ON WALL
SCALE: 1:25



3 FDN @ WATERMAIN
SCALE: 1:25



P.Eng. P.Eng.

REVISIONS			
No.	DESCRIPTION	BY	DATE
2	ISSUED FOR APPROVAL	G.C.	2021.06.16
2	ISSUED FOR REVISED BP	G.C.	2020.12.22
1	ISSUED FOR BUILDING PERMIT	G.C.	20.07.28

Project

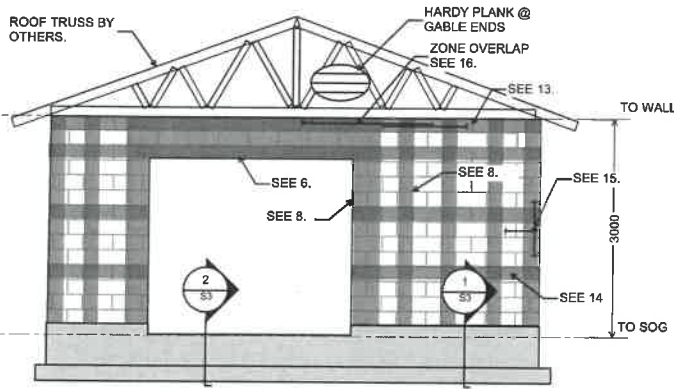
COWICHAN BOOSTER PUMP STATION BUILDING

Title

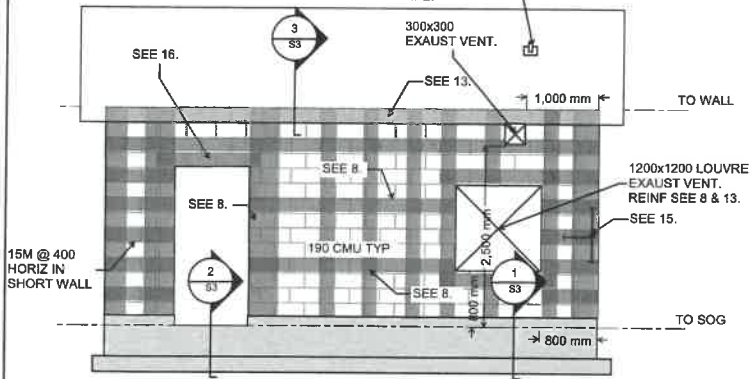
SECTION & DETAILS

Scale	As indicated	Revision No.	1
Project No.	20083	Design No.	
Drawn	HY	Date	2020.08.31
Designed	HY	Date	2020.08.31
Design Checked	GC	Date	2020.08.31
Drawn/Reviewed	GC	Date	2020.08.31

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2. NE ELEVATION 1:50



1. NW ELEVATION 1:50

MASONRY NOTES

1. PROVIDE PLAN AND REINFORCED CONCRETE BLOCK TO CSA S304.1-14 "MASONRY DESIGN FOR BUILDINGS" AND CSA A371 "MASONRY CONSTRUCTION FOR BUILDINGS".
2. PROVIDE HOLLOW LOAD BEARING UNITS TO CSA A185 SERIES-14, NORMAL WEIGHT, 25MPa UNITS (M7.5SAB), BASED ON NET AREA. PROVIDE HOLLOW CLAY UNITS TO CSA A62.14. PROVIDE MORTAR TO CSA A174.14, TYPE S ONLY.
3. MASONRY GROUT: DESIGN STRENGTH 20MPa (3000PSI) (12.5 MPa BASED ON CYLINDER STRENGTH), WEIGHT 24kN/m³ (150 PCF), CEMENT TYPE 15, AIR 1-4%, SLUMP 200-250, 10mm AGGREGATE.
4. PROVIDE NEW DEFORMED BARS TO CSA G30.16, GRADE 400. LAP SPICE 650mm FOR 15M TYP UNO.
5. PROVIDE LADDER TYPE JOINT REINFORCEMENT TO CSA G30.5, 9ga. GALVANIZED, CONTACT WELDED, MINIMUM LAP 150mm. INSTALL HORIZONTAL WALL REINFORCEMENT AT EVERY SECOND COURSE.
6. UNLESS NOTED OTHERWISE, PROVIDE LINTELS AS PER THE FOLLOWING:
 LINTEL
 SPAN UP TO 1200 200 DP, RW 1-15M T&B
 1200 TO 2400 400 DP, RW 2-15M T&B, 10M STIR. @ 200
 2400 TO 3000 800 DP, RW 2-25M T&B, 10M STIR. @ 200
 EXTEND LINTELS A MINIMUM OF 400 PAST OPENINGS.
7. PROVIDE KNOCKOUT TYPE BOND BEAMS 2 COURSES DEEP AT ALL FLOOR AND ROOF LINES AND PARAPETS, AND AT MAX. OF 2.44 METRES O.C. REINFORCE WITH 2-15M CONTINUOUS BOT. INCLUDING AROUND CORNERS.
8. EXCEPT AS NOTED, PROVIDE VERTICAL FULL HEIGHT REINFORCING AT THE FOLLOWING LOCATIONS:
 1-15M AT 600 O/C MAX.
 2-15M AT ENDS OF ALL WALLS
 4-15M OVER 2 CELLS AT CORNERS & INTERSECTIONS
 2-15M AT EACH SIDE OF DOORS AND WINDOWS OVER 2 CELLS.
9. BUILD MASONRY TRUE-TO-LINE, PLUMB, SQUARE AND LEVEL WITH VERTICAL JOINTS IN PROPER ALIGNMENT. CONFORM TO CSA A371-14.
10. ENSURE A MAXIMUM JOINT WIDTH 8 ROUND BAR TOOL.
11. CUT MASONRY UNITS WITH A MASONRY SAW. BROKEN UNITS ARE NOT ACCEPTABLE.
12. PLACE MASONRY UNITS IN RUNNING BOND UNLESS STATED OTHERWISE ON THE DRAWINGS. USE FACE BEDDING EXCEPT ON FIRST COURSES AND CELLS TO BE GROUTED WHERE FULL BED MORTARING IS TO BE USED.
13. PROVIDE 200DP, BOND BEAM REINFORCED WITH 2-15M, CONT. AT THE FOLLOWING LOCATIONS:
 AT THE TOP OF WALLS
 OVER WINDOW OPENINGS
 BELOW WINDOW OPENINGS
 ABOVE AND BELOW MECHANICAL OPENINGS
14. PROVIDE 200DP, BOND BEAM REINFORCED WITH 4-15M, @ 800 MAX
15. ALL HORIZ BAR TO HAVE 180 DEGREE HOOK AT ENDS. DO NOT SPLICE WITHIN 600mm FROM WALL ENDS
16. FOR LOCATION OVERLAP BETWEEN 2 ZONES IN SAME DIRECTION (E.G. LINTEL BEAM & BOND BEAM OVERLAP), USE LARGER REINF. PROVIDE TENSION LAP SPLICE OF SMALLER BAR DIAMETER BEYOND ZONE WHERE LARGER BAR IS REQUIRED.



Victoria Office 778-333-2243
 1967 Francisco Terrace, Victoria, BC V8W 0A8

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No.	DESCRIPTION	BY	DATE
3	ISSUED FOR APPROVAL	GC	2021.08.16
2	ISSUED FOR REVISION	GC	2020.12.23
1	ISSUED FOR BUILDING PERMIT	GC	2020.07.08

COWICHAN BOOSTER PUMP STATION BUILDING

MASONRY WALL ELEVATIONS

Scale	As Indicated	Revision No.
Scale	As Indicated	1
Checked	HY	Checked by
Designed	HY	Date 2021.08.16
Design Checked	GC	S4
Designer/Reviewer	GC	Date 2021.08.16

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Metric dimensions shall have precedence over imperial dimensions. Contractors shall verify all dimensions for all structures and a certificate signed on this site and by the Engineer shall be provided for any variations from the dimensions and conditions shown on the drawing. Such drawings shall be submitted to the Engineer for approval prior to proceeding with construction.



P. (S) Ng Parents

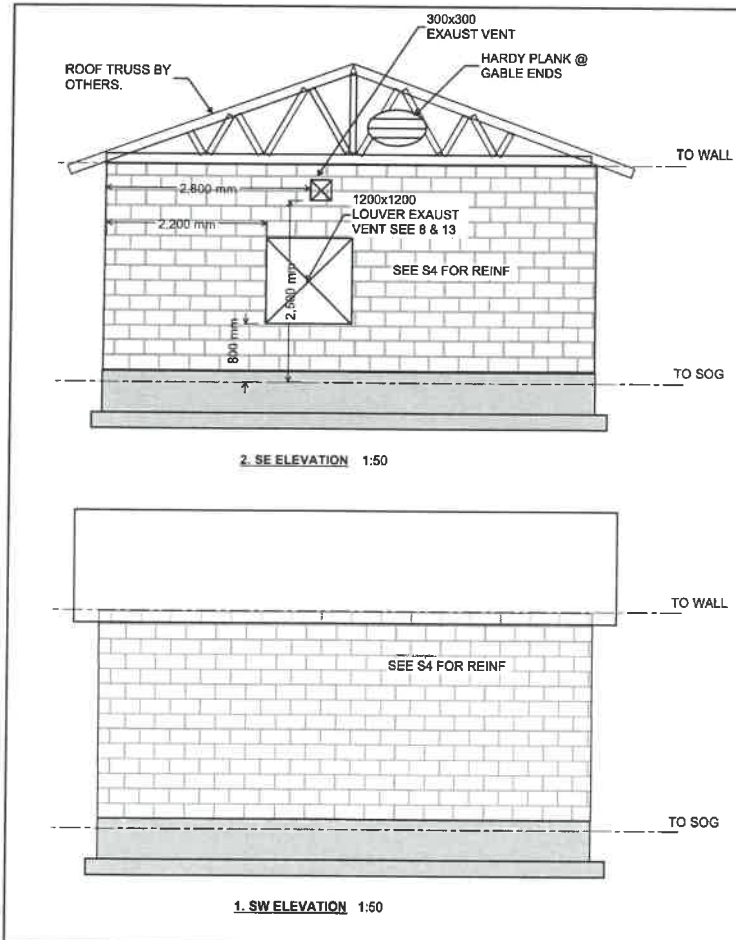
No.	DESCRIPTION	BY	DATE
3	ISSUED FOR APPROVAL	G.C.	2020.08.18
2	ISSUED FOR REVISED BP	G.C.	2020.12.23
1	ISSUED FOR BUILDING PERMIT	G.C.	2020.07.08

REVISIONS

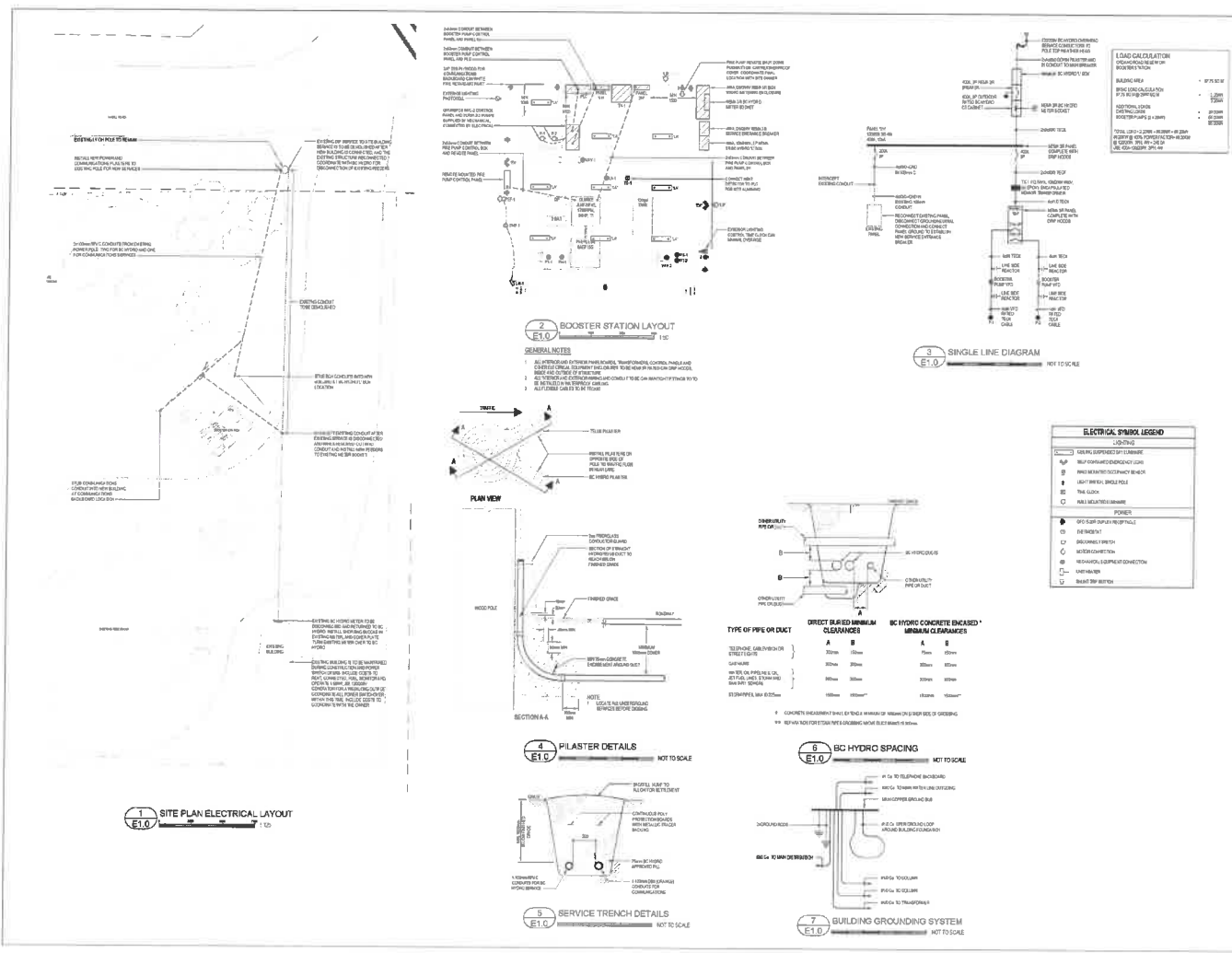
Project
COWICHAN BOOSTER PUMP STATION BUILDING

Title
MASONRY WALL ELEVATIONS

Scale	As Indicated	Revision No.
Project No.	20003	1
Client	HY	Drawing No.
Designated	HY Date 2020.06.30	55
Design Checked	GC	
Design Approved	GC Date 2020.08.30	



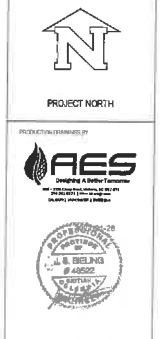
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Contractor must check and verify all dimensions of conditions on site and report any discrepancies to design office engineer prior to proceeding with work.

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REV	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	2021-01-28
2	ISSUED FOR PERMITS REVIEW	2021-01-05
3	ISSUED FOR REVISIONS	2021-01-21
4	ISSUED FOR REVISIONS	2021-02-03
5	ISSUED FOR REVIEW	2021-01-07

PROJECT NAME
ORDANO RESERVOIR BOOSTER STATION

2206 - COWICHAN BAY WATER DISTRICT COWICHAN BAY, BC

DESIGNED BY
AES ENGINEERING LTD.

ELECTRICAL LAYOUTS AND LEGEND

DATE JANUARY 2021
SCALE AS NOTED
DRAWN BY RB
CHECKED BY AE
DESIGNER J. SUTHERLAND

DRAWING NUMBER
E1.0

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COWICHAN VALLEY REGIONAL DISTRICT
 LAND USE SERVICES DEPARTMENT
 175 Ingram Street, DUNCAN, BC V9L 1N8
 Tel: 250.746.2610; Email: inspections@cvrld.bc.ca

**SITE
COPY**

BUILDING PERMIT APPLICATION

Project Info

Address 1700 Ordano, Cowichan Bay, BC					
Lot 1	District Cowichan	Plan 101600	Elec. Area D	PID 005-069-831	Zoning
Description of Work: Ordano Reservoir Booster Pump Station					

Owner

Name(s) /Company Cowichan Bay Estates Ltd			Contact George Schmidt		
Address PO Box 126, Duncan, BC V9L 3X1		City		Postal Code	
Phone 250-715-8199		E-mail george_karin@shaw.ca			

Applicant or Contractor (circle one)

Name			Company Superior Excavating Ltd		
Address 6149 Scott Rd		City Duncan BC		Postal Code V9L 6Y8	
Phone 250-715-0454		E-mail brent@superiorexcavating.ca			

I, the owner of the above property, hereby authorize and appoint Cowichan Engineering Services Ltd as my agent for this application. The undersigned owner/authorized agent of the owner makes application for the permit specified herein, and declares that the information submitted in support of the application is true and correct in all respects.

Owner's Signature	Date March 9, 2021	Authorized Agent Signature 	Date March 9, 2021
-------------------	-----------------------	--------------------------------	-----------------------

Personal Information Declaration: This information is collected for the administrative and/or operational functions of the CVRD as authorized by the 'Local Government Act' and CVRD Building Bylaw No. 3422. This information has been collected, and may be used, and/or listed in a Building Permit Listing, or forwarded to authorized agencies in accordance with the 'Freedom of Information and Protection of Privacy Act'.

OFFICE USE ONLY

Building Classification	<input type="checkbox"/> SFD	<input type="checkbox"/> Residential	<input type="checkbox"/> Institutional	<input type="checkbox"/> Commercial	<input checked="" type="checkbox"/> Industrial	<input type="checkbox"/>
Construction	<input checked="" type="checkbox"/> New	<input type="checkbox"/> Addition	<input type="checkbox"/> Renovation	<input type="checkbox"/> Decommission	<input type="checkbox"/> Replacement	<input type="checkbox"/>
Building	Fee	Engineering	Fee	Value of Improvement (including labour)		
Building Permit	312	Water Connection		\$ 31,200		
Plumbing Permit	18	(Service Area)		Building Inspector: SB		
Building Services	-	Sewer Connection		Engineering Department: /		
Land Titles	25	(Service Area)		Planning: FL		
Other		Other		Date Issued: MAR 10 2021		
Subtotal	\$ 355	Subtotal	\$	Total Permit Fee: \$ 355		

Building Permit Issuance (Office Use)

Permission is hereby granted to CONSTRUCT BOOSTER PUMP STATION Complying with all CVRD Bylaws, BC Building Code and Approved Plans marked 'Site Copy'	DP <input type="checkbox"/> or DVP <input type="checkbox"/> # EXEMPT
Conditions RELYING ON PROFESSIONALS FOR POST DISASTER IMPROVANCE	This Building Permit is issued subject to conditions of the above DP or DVP. CVRD GIS Assigned Address /
Permit No. 21-D-062	Date
Owner/Agent Signature at time of pick up X	Receipt No. 69



COWICHAN VALLEY REGIONAL DISTRICT BUILDING INSPECTION DIVISION

175 Ingram Street, Duncan, BC V9L 1N8 Tel: 250.746.2610 FAX: 250.746.2621
inspections@cvrld.bc.ca

- **ONLY FRONT OFFICE STAFF BOOK INSPECTIONS**
- **24 HOURS NOTICE IS REQUIRED PRIOR TO INSPECTION**
- **BUILDING PERMIT NO. 21-D-062 MUST BE GIVEN**

LIST OF POTENTIAL INSPECTIONS

- Footing forms (PRIOR to pouring concrete)
- Perimeter tile and drain rock cover
- Water/sewer hook-up
- Underslab & roughed in plumbing
- Framing
- Braced wall panels
- Site built showerbase membrane (24 hr. test-install test ball in drain)
- Insulation
- Fire separations (at each layer prior to taping)
- Masonry fireplace (smoke chamber)
- Manufactured chimneys and solid fuel appliances
- Substantial completion

A SIGN MUST BE POSTED AT ALL TIMES DISPLAYING THE HOUSE NUMBER AND THE PROVIDED PERMIT NUMBER IN A CONSPICUOUS LOCATION THAT IS VISIBLE FROM THE FRONTING STREET

The **HOUSE NUMBER (civic address)** * is a requirement for Emergency Services

- Ambulance, Police, Fire Department, Hydro, Telephone, etc.

***As per CVRD House Numbering Bylaw Nos. 373 and 430**

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Building Permit No.

21-D-062

1700 Ordano Road

Post in Visible Location



Inspections & Enforcement Division

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Designing A Better Tomorrow

Schematic Design Report
**COWICHAN BAY WATER
DISTRICT ORDANO
BOOSTER STATION**

PREPARED FOR:

**George Schmidt
Cowichan Bay Estates Ltd.**

PO Box 126
Duncan BC
V9L 3X1

AUTHORED BY

Jacob Bieling, P. Eng

PEER REVIEWED BY

Iain Barnes, P. Eng

SUBMITTED BY:

AES Engineering Ltd.
500 - 3795 Carey Road
Victoria, BC Canada V8Z 6T8
P 250.381.6121 F 250.381.6811
www.AESEngr.com

PROJECT NO. 1-20-054

March 3, 2021

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3.0	EXISTING LOCATION	1
3.1	ORDANO RESERVOIR.....	1
4.0	NEW BUILDING REQUIREMENTS FROM OTHERS.....	1

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1.0 INTRODUCTION

AES Engineering Ltd were retained by Cowichan Bay Estates and George Schmidt to review and develop a schematic design report for the electrical power and control requirements for the new booster station located at the Ordano Reservoir to support the phase 3A development of Cowichan Bay Estates. This report is based on the submission of various other consultants reports and design documents provided to AES by the client.

2.0 EXISTING LOCATION

2.1 ORDANO RESERVOIR

This existing site is located on the corner of Ordano and McGill road and consists of a pump station and water storage and pressure tower. The design reports provided do not indicate any electrical modifications to existing structures or systems, so AES will assume all existing conditions will remain unless an electrical requirement mandates action.

There is three phase power high voltage currently available on a nearby BC Hydro pole located about 100m from the site on McGill road. BC Hydro will extend this three-phase power further down the road to the site service pole. BC Hydro will provide a new, dedicated transformer bank to supply a 400A, 120/208V three phase service to the site. Power will be via pilaster dip off this BC Hydro pole, and then run underground to the BC Hydro approved service entrance and metering cabinet in the new building.

Communications connection to the local telephone and internet networks is via an overhead system running below the electrical cables, which connects to the same service pole and then a further overhead run to a communication pilaster located in the trees at the corner of the existing site.

3.0 NEW BUILDING REQUIREMENTS

The following requirements are based on the provided design reports from other disciplines, and a review of the site from the street.

The design reports from the other disciplines has decided on the installation of a diesel driven fire pump, with electrical supply and monitoring as required.

1. A New building is required for housing all the new equipment. This will require base building electrical services such as lights, receptacles, heat, ventilation, data connections and distribution and control equipment. Locations for these services will be coordinated with equipment positions in the building. The building is designed as a post-disaster building but this generally no bearing on electrical components selected.

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2. A New BC Hydro transformer bank and overhead/underground service at 120/208V, three phase will be required to meet the new pump requirements. This service will route to the new building location and will be sized to pick up the entire site load. New metering will be installed at the new building, and transformation and reconnection to existing building will be performed. BC Hydro has provided their working documents supporting the revisions to the utility equipment located off site. Short circuit calculations to ensure new equipment is suitably rated for the Utility Fault current will be performed.
3. The design will include provisions for temporary generator power to maintain existing building operation during service switch over. Design will attempt to minimize this outage time to reduce the shutdown time.
4. A Standby or Emergency generator is not considered necessary, AES was directed to remove the generator from project scope by Cowichan Engineering Services on 2021/01/26. Battery supplied for lights, exit signs and control systems has been provided.
5. The booster station building arrangement will be such to minimize the impact of a water leak or spray from a pipe or pump. This will be accomplished by ensuring that all electrical equipment is mounted off the floor to allow for drainage via a floor drain; mounting panels and controls away from piping or potential leakage points; specifying electrical enclosures suitable for wet or damp locations with gasketed enclosures and corrosion resistant materials.

Lighting for the booster station will include linear LED, vapour proof fixtures within the building connected to an occupancy sensor to turn them off when nobody is in the space. Exterior lighting will be provided to support safe access to the building after hours and will be controlled via photocell. These LED fixtures will be selected to be Dark Sky compliant and to not impact neighbouring properties or roadways with glare or lighting trespass. Lighting levels of between 35–45-foot candles has been used for lighting selection and spacing.

6. A new 120/208V main distribution panel, BC Hydro metering, and 600V step up transformer to supply the pumps working voltage will be provided. The new distribution will include breakers and circuiting for the 600V domestic pumps and associated VFD's (variable Frequency Drive). Short circuit levels for the main distribution and all sub panels will be calculated.
 - a. Design will include remote shut off switch for the diesel fire pump for CBWD and Fire Department. Location to be confirmed by users.
 - b. The diseltec fire pump will tie into an annunciation autodialled to call individuals when it is operating. Design intent will be to share this system with the control annunciator system, if used.
7. AES will coordinate the process & instrumentation diagram for connection of pressure and discharge of all pumps to manage pressure spikes and maintain controlled discharge volumes. These will be routed

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back to a centralized programmable logic controller (PLC) and shared with the appropriate VFD and pump control systems.

- a. VFDs will be reviewed to ensure THD injection into the load side of the distribution is less than the IEEE 519 limits.
 - b. The pumps will have timing controls to turn on the normal booster pumps at pre-set times.
 - c. The pumps will be started/stopped via timer along with input from the pressure zone, reservoir level and fire pump operation. The domestic pumps will be shut down if the fire pump is operating or if the reservoir level is drawn below the prescribed level.
8. The existing booster pump control MPC load cycling and protection system that comes integrated with VFDs will be interconnected with the PLC system for control, annunciation, and monitoring.
 9. AES will coordinate with CBWD and the equipment suppliers to allow for provision for remote control of pump MPC and PLC system. Current scope does not include design of the remote interconnection, but the PLC specifications will require this to be possible without additional expansion cards. Space will also be set aside in the control panel for this equipment.
 10. AES will design the new communication system to branch off from the existing Ordano booster station I/T system. The new communication system will interconnect the existing facility with the new booster station. AES will coordinate with the other disciplines to determine control methodology between the new and existing systems. Client has not clarified if off site I/O will be via, radio, cellular or land line. AES will ensure PLC can output to radio and cellular transmitters or switches and has provided communication conduit and pilaster for connection to Telus/Shaw if required.
 11. AES will provide PLC and HMI system requirements, including I/O lists, performance requirements, device types to meet CBWD sole source components where required, and preliminary dimensional drawings. These will be for pricing and final design by the contractor's control trade. This system will be designed to manage all new sensors, input and control functions, and will leave sufficient space to allow for future growth.
 12. Proposed instrumentation for the booster station would include:
 - a. Inlet pressure transducer – used to represent reservoir water level and for comparison to outlet pressure. Shutdown of domestic operation could be triggered from this signal if reservoir level drops to 85%.

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- b. Outlet pressure transducer – used to represent pressure zone water pressure and for determining domestic pump startup and variable speed level, if used.
- c. Outlet pressure switch – differential pressure switch with band used to represent a call for the fire pump to start and run.
- d. Leak sensor – to monitor for build up of water within the space. This could report or signal an alert to the District.
- e. Room temperature sensor – monitor for overheating in the room to prevent damage to VFDs and similar equipment within the space. This effectively monitors for failure of any ventilation system installed.

End of Report

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From: Colin Robins <CRobins@summitvalve.com>
Sent: Thursday, June 17, 2021 11:23 AM
To: Cameron Williams
Cc: 'Holland Baker'; Dustin Ewanowich
Subject: RE: Ordano - 25943
Attachments: 210-19-X.pdf

Hi Cam / Holland,

Thank you for taking the time to meet with me this morning. I've discovered that the Cla-Val 210-19 pilot system is not noted in our standard pricelist. I've sent an RFQ to the factory detailing the requirements, we expect to have pricing back tomorrow.

Attached is the referenced 210-19 schematic. I've highlighted the altitude pilot, and pressure sustaining pilot in RED. These pilots are existing on the customers valves, and will be re-used in the new pilot system to cut down on cost. I have also highlighted the solenoid and auxiliary Hytrol valve in GREEN. These are the components being added for the solenoid control function.

I will include a copy of the schematic with installation details in our quotation. Please let me know if you need anything else.

Thank you,



Colin Robins
Account Manager

778-879-9889

778-285-7590

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NEWPORT BEACH, CALIFORNIA

CATALOG NO.
210-19/610-19

DRAWING NO.
85021

REV
H

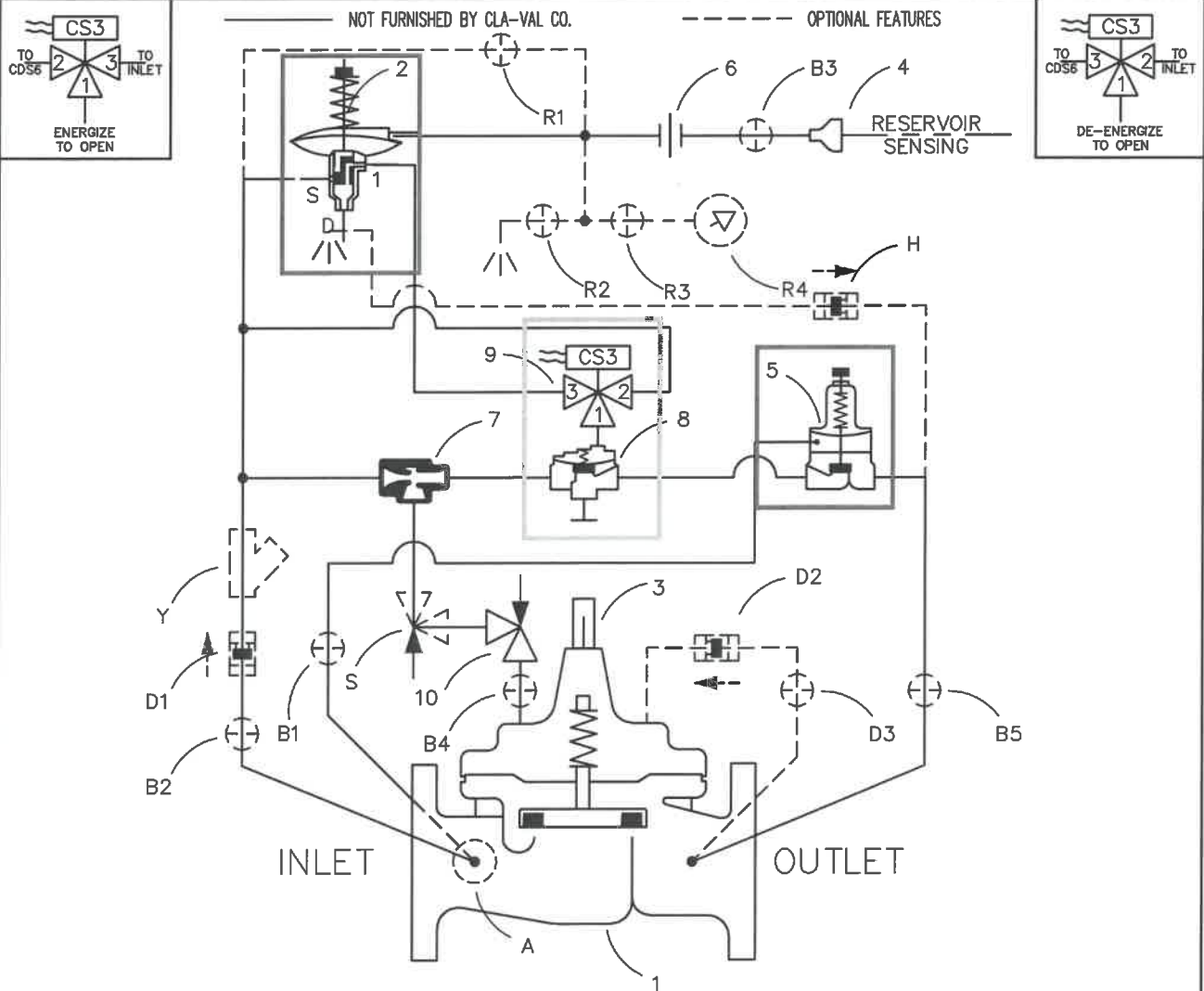
TYPE OF VALVE AND MAIN FEATURES

COMBINATION ALTITUDE, PRESSURE SUSTAINING
AND SOLENOID SHUTOFF VALVE

DESIGN		
DRAWN	CH	11-19-73
CHK'D	RB	11-20-73
APVD	RB	11-20-73

AK	11-26-02
AK	04-16-09
MS	6-14-13
F	ADDED 600 SERIES (NED 47537)
G	ADDED "D" OPTIONAL FEATURE (21541)
H	ADDED CRL60 TO COMPONENT LIST; ADDED FEATURE "R" (ECO 23596)


LTR	DESCRIPTION	DATE
	BY	BY
A-D	SEE REVISION FILE	
E	REDRAWN ON CAD; CHANGED CDS5 TO CDS6 (ECO 17665)	7-30-99



ITEM NO.	BASIC COMPONENTS	QTY			
1	100-01 HYTROL (210-19) MAIN VALVE	1	8	100-01 AUXILIARY HYTROL (REV. FLOW)	1
	100-20 HYTROL (610-19) MAIN VALVE		9	CS3S SOLENOID CONTROL	1
2	CDS6A ALTITUDE PILOT CONTROL	1	10	CV FLOW CONTROL (CLOSING)	1
3	X101 VALVE POSITION INDICATOR	1			
4	BELL REDUCER	1			
5	CRL/CRL60 PRESSURE RELIEF CONTROL	1			
6	UNION	1			
7	X47A EJECTOR	1			
OPTIONAL FEATURE SUFFIX ADDED TO CATALOG NUMBER					
A	X46A FLOW CLEAN STRAINER	1	Y	X43 "Y" STRAINER	1
B	CK2 COCK (ISOLATION VALVE)	5			
D	CHECK VALVES WITH COCK	1			
H	PILOT DRAIN TO OUTLET	1			
R	RESERVOIR GAUGE WITH TESTER	1			
S	CV FLOW CONTROL (OPENING)	1			

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 CLA-VAL CO. NEWPORT BEACH, CALIFORNIA	CATALOG NO.	DRAWING NO.	REV
	210-19/610-19	85021	H
TYPE OF VALVE AND MAIN FEATURES		DESIGN	
COMBINATION ALTITUDE, PRESSURE SUSTAINING AND SOLENOID SHUTOFF VALVE		DRAWN	CH 11-19-73
		CHK'D	RB 11-20-73
		APVD	RB 11-20-73

OPERATING DATA

I. ALTITUDE VALVE FEATURE:

ALTITUDE CONTROL (2) IS A SPRING-LOADED, 3-WAY, DIAPHRAGM-ACTUATED CONTROL THAT SENSES PRESSURE IN THE RESERVOIR. WHEN RESERVOIR PRESSURE (LIQUID LEVEL) IS LOWER THAN THE SET POINT OF CONTROL (2), PORTS 1 AND D ARE INTERCONNECTED. THIS RELIEVES PRESSURE IN THE COVER CHAMBER OF AUXILIARY HYTROL (8), OPENING AUXILIARY HYTROL (8) AND THE MAIN VALVE OPENS UNDER THE COMMAND OF PRESSURE RELIEF CONTROL (5) TO FILL THE RESERVOIR. RESERVOIR SENSING PRESSURE INCREASES AS THE LIQUID LEVEL RISES IN THE RESERVOIR. WHEN RESERVOIR PRESSURE INCREASES TO THE SET POINT OF CONTROL (2), CONTROL (2) SHIFTS, INTERCONNECTING PORTS S AND 1. THIS PRESSURIZES THE COVER CHAMBER OF AUXILIARY HYTROL (8), CLOSING AUXILIARY HYTROL (8) AND THE MAIN VALVE CLOSES. ALTITUDE CONTROL (2) ADJUSTMENT: TURN THE SPRING ADJUSTING NUT CLOCKWISE TO INCREASE THE LIQUID LEVEL SHUTOFF POINT AND COUNTERCLOCKWISE TO DECREASE THE LIQUID LEVEL SHUTOFF POINT.

II. PRESSURE RELIEF FEATURE:


PRESSURE RELIEF CONTROL (5) IS A NORMALLY CLOSED CONTROL THAT RESPONDS TO MAIN VALVE INLET PRESSURE CHANGES. AN INCREASE IN INLET PRESSURE TENDS TO OPEN CONTROL (5) AND A DECREASE IN INLET PRESSURE TENDS TO CLOSE CONTROL (5). THIS CAUSES MAIN VALVE COVER PRESSURE TO VARY AND THE MAIN VALVE MODULATES (OPENS AND CLOSES), MAINTAINING A RELATIVELY CONSTANT PRESSURE AT THE MAIN VALVE INLET. WHEN INLET PRESSURE IS LOWER THAN THE SET POINT OF CONTROL (5), CONTROL (5) CLOSES. THIS PRESSURIZES THE MAIN VALVE COVER CHAMBER AND THE MAIN VALVE CLOSES. PRESSURE RELIEF CONTROL (5) ADJUSTMENT: TURN THE ADJUSTING SCREW CLOCKWISE TO INCREASE THE SETTING.

LTR	DESCRIPTION	BY	DATE
	SEE SHEET 1		

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 CLA-VAL CO. NEWPORT BEACH, CALIFORNIA	CATALOG NO.	DRAWING NO.	REV
	210-19/610-19	85021	H
TYPE OF VALVE AND MAIN FEATURES		DESIGN	
COMBINATION ALTITUDE, PRESSURE SUSTAINING AND SOLENOID SHUTOFF VALVE		DRAWN	CH 11-19-73
		CHK'D	RB 11-20-73
		APVD	RB 11-20-73

OPERATING DATA-CONTINUED

III. SOLENOID CONTROL FEATURE:

SOLENOID CONTROL (9) IS A DIRECT-ACTING, 3-WAY SOLENOID CONTROL THAT CHANGES POSITION WHEN THE COIL IS DE-ENERGIZED OR ENERGIZED. THIS APPLIES OR RELIEVES PRESSURE IN THE COVER CHAMBER OF AUXILIARY HYTROL (8), PROVIDING THE OPERATION SHOWN IN THE FOLLOWING TABLE:

SOLENOID CONTROL (9)		210E-19/610E-19 SERIES		210D-19/210D-19 SERIES	
POSITION	PORTS CONNECTED	AUXILIARY HYTROL (8) POSITION	MAIN VALVE (1) POSITION	AUXILIARY HYTROL (8) POSITION	MAIN VALVE (1) POSITION
ENERGIZED	1 & 2	OPEN	OPEN UNDER COMMAND OF CONTROLS (2) & (5)	CLOSED	CLOSED
DE-ENERGIZED	1 & 3	CLOSED	CLOSED	OPEN	OPEN UNDER COMMAND OF CONTROLS (2) & (5)

IV. CLOSING SPEED CONTROL:

CV FLOW CONTROL (10) CONTROLS THE CLOSING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE CLOSE SLOWER.

V. OPTIONAL FEATURE OPERATING DATA:

SUFFIX A (FLOW CLEAN STRAINER):

A SELF-CLEANING STRAINER IS INSTALLED IN THE MAIN VALVE INLET BODY BOSS WHICH PROTECTS THE PILOT SYSTEM FROM FOREIGN PARTICLES.

SUFFIX B (ISOLATION VALVES):

CK2 COCKS (B1), (B2), (B3), (B4), AND (B5) ARE USED TO ISOLATE THE PILOT SYSTEM FROM MAIN LINE PRESSURE. THESE VALVES MUST BE OPEN DURING NORMAL OPERATION.

SUFFIX D (CHECK VALVES WITH COCK):


WHEN OUTLET PRESSURE IS HIGHER THAN INLET PRESSURE, CHECK VALVE (D2) OPENS AND (D1) CLOSES. THIS DIRECTS THE HIGHER OUTLET PRESSURE INTO THE MAIN VALVE COVER AND THE MAIN VALVE CLOSES.

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BY	DATE
DESCRIPTION	
SEE SHEET 1	
LTR	

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 CLA-VAL CO. NEWPORT BEACH, CALIFORNIA	CATALOG NO. 210-19/610-19	DRAWING NO. 85021	REV H
	TYPE OF VALVE AND MAIN FEATURES COMBINATION ALTITUDE, PRESSURE SUSTAINING AND SOLENOID SHUTOFF VALVE		DESIGN DRAWN CH 11-19-73 CHK'D RB 11-20-73 APV'D RB 11-20-73

OPERATING DATA-CONTINUED

SUFFIX H (PILOT DRAIN TO OUTLET):

CDC CHECK VALVE (H) IS USED WHEN PILOT DRAIN TO ATMOSPHERE IS NOT DESIRED. WHEN OUTLET PRESSURE IS HIGHER THAN INLET PRESSURE, CHECK VALVE (H) CLOSSES.

SUFFIX R (RESERVOIR GAUGE WITH TESTER):

TO SET THE RESERVOIR PRESSURE FOR ALTITUDE CONTROL (2), ISOLATE RESERVOIR SENSING LINE. CLOSE CK2 COCK (R2) AND OPEN CK2 COCKS (R1) AND (R3). THIS APPLIES PRESSURE TO ALTITUDE CONTROL (2) SENSING CHAMBER. WHEN THE DESIRED PRESSURE HAS BEEN REACHED BY READING PRESSURE GAUGE (R4), ADJUST ALTITUDE CONTROL (2). CLOSE CK2 COCK (R1) AND OPEN CK2 COCK (R2). THIS RELIEVES EXCESS PRESSURE TO ATMOSPHERE, SETTING THE DESIRED RESERVOIR PRESSURE FOR ALTITUDE CONTROL (2). DURING NORMAL OPERATIONS CK2 COCKS (R1) AND (R2) MUST BE CLOSED.

SUFFIX S (OPENING SPEED CONTROL):

FLOW CONTROL (S) CONTROLS THE OPENING SPEED OF THE MAIN VALVE. TURN THE ADJUSTING STEM CLOCKWISE TO MAKE THE MAIN VALVE OPEN SLOWER.

SUFFIX Y (Y-STRAINER):

A Y-PATTERN STRAINER IS INSTALLED IN THE PILOT SUPPLY LINE TO PROTECT THE PILOT SYSTEM FROM FOREIGN PARTICLES. THE STRAINER SCREEN MUST BE CLEANED PERIODICALLY.

V. CHECK LIST FOR PROPER OPERATION:

- SYSTEM VALVES OPEN UPSTREAM AND DOWNSTREAM.
- AIR REMOVED FROM THE MAIN VALVE COVER AND PILOT SYSTEM AT ALL HIGH POINTS.
- PERIODIC CLEANING OF STRAINER (Y) IS RECOMMENDED (OPTIONAL FEATURE).
- RESERVOIR SENSING LINE PROPERLY CONNECTED.
- CV FLOW CONTROL (10) OPEN AT LEAST 4 TURNS.
- CV FLOW CONTROL (S) OPEN AT LEAST 4 TURNS (OPTIONAL FEATURE).
- CORRECT VOLTAGE TO SOLENOID CONTROL (9).
- CK2 COCKS (B1), (B2), (B3), (B4), (B5), AND (D3) OPEN (OPTIONAL FEATURE).
- CK2 COCKS (R1) AND (R2) CLOSED (OPTIONAL FEATURE).

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DESCRIPTION

DATE

BY

LTR

SEE SHEET 1



June 18, 2021
P: 221219

COWICHAN ENGINEERING SERVICES
6468 Norcross Rd
Duncan, BC V9L 6C5

Attention: Cam Williams, AScT

Reference: Ordano Booster Pump Station Ventilation
Cowichan Bay, BC

The attached sealed equipment specifications were selected by Avalon Mechanical Consultants to facilitate proper cooling and ventilation for the booster pump station and the diesel engine driven fire pump it houses.

In their Design Review Report dated March 30, 2021, Associated Engineering correctly identified the fact that there was inadequate ventilation provided. Based on the performance data given for the diesel booster pump, the required fan and associated intake and exhaust louvers were calculated and sized. This system will provide adequate airflow to prevent overheating of the diesel pump, as well as combustion air requirements.

Sincerely,

AVALON MECHANICAL CONSULTANTS LTD.

A handwritten signature in black ink, appearing to read 'Jon Edgell', is written over a light blue horizontal line.

Jon Edgell, P.Eng.

Principal

Written: Jon Edgell
File: 221219 Ordano Station Letter

A handwritten number '85' in black ink, located in the bottom right corner of the page.

GRILLE / DIFFUSER / LOUVER SCHEDULE						
TAG	MAKE	MODEL	FINISH	MOUNTING	NOTES	COMMENTS
IL-1	GREENHECK	EAC-601 TFB24	MILL	WALL	1,2	FOR 8" WALL. IF 4" WALL, REPLACE WITH MODEL EAC-401
EL-1	PRICE	DE639	MILL	WALL	2,3	FOR 8" WALL. IF 4" WALL, REPLACE WITH MODEL DE438

NOTES:
 1. MOTORIZED DAMPER - INTERLOCKED WITH FAN OPERATION
 2. BIRD SCREEN
 3. GRAVITY BACKDRAFT DAMPER

FAN SCHEDULE										
TAG	SERVICE	TYPE	SIZE	MAKE	MODEL	POWER/LOAD	SOUND	WEIGHT	CONTROL	NOTES
EF-1	PUMP ROOM	CABINET	2500 CFM @ 25"	GREENHECK	SQ-160-VG	115/1 3/4HP	6.3 SONES	145 LBS	COOLING T-STAT	1,2,3

NOTES:
 1. SPRING ISOLATION
 2. GRAVITY BACKDRAFT DAMPER
 3. COOLING THERMOSTAT CONTROL (SET TO 30°C - ADJUSTABLE)

FAN/INTAKE LOUVER AND EXHAUST LOUVER TO BE INSTALLED ON OPPOSING SIDES OF THE BUILDING IN ORDER TO CREATE ADEQUATE CROSS-VENTILATION. INSTALLATION HEIGHT TO BE A MINIMUM 2' ABOVE SLAB, BUT PREFERABLY HIGH UP THE WALL.

AVALON HAS BEEN ASKED TO SIZE AND SPECIFY COMPONENTS ONLY. NO DRAWINGS HAVE BEEN PREPARED. IF NECESSARY, PROVIDE DRAWINGS AND/OR PICTURES TO AVALON FOR COORDINATION OF LOCATIONS.



AM AVALON MECHANICAL
 300-1245 Esquimalt Road
 Victoria, BC V8A 3P2
 250-384-4128
 info@avalonmechanical.com

103-5220 Dublin Way
 Nanaimo, BC V9T 2K8
 250-595-2180

DRAWINGS ARE NOT TO BE USED FOR COSTING, PRICING, TENDER, OR CONSTRUCTION UNLESS THEY HAVE BEEN ISSUED AS SUCH.

AVALON MECHANICAL WILL NOT BE RESPONSIBLE FOR ANY ADDITIONAL WORK, COSTS, OR COORDINATION REQUIRED FOR DRAWINGS USED FOR OTHER PURPOSES THAN INDICATED.

ORANDO BOOSTER PUMP STATION
 VENTILATION SYSTEM COMPONENTS
 COWICHAN BAY, BC

PROJECT NORTH

DESIGNED
 CJP

AVALON PROJECT NO.
 221219

SHEET NUMBER

M-1.01

APPROVED
 JE

SCALE
 AS NOTED

sp



July 21, 2021

Cameron Williams
Cowichan Engineering Services Ltd.
6468 Norcross Road
Duncan, BC

V9L 6C5

RE. Building Envelope Services
Booster Pump Station
Ordano Reservoir Site

Dear Cameron,
I have reviewed the documents provided and offer the following re. meeting NECB 2017 Performance requirements.

Zone 4	<3000	Thermal Transmittance	RSI	R
				Overall Thermal Resistance
	Walls	0.315	3.175	18.0
	Roofs	0.193	5.181	29.4
	Floors	0.227	4.405	25.0
	All doors	2.1		
Assemblies in contact with ground				
	Walls	0.568		
3.2.3.1.(5)	Floors	.757 for 1.2 m		
Air Leakage				
	OH Doors	5.0L/(s.m2)	ASTM E283	
	Other Doors	.5L/(s.m2)		

Refer to the attached drawings for detail information.

Walls Above Ground:

The proposed construction is 190 mm concrete masonry units with structural reinforcing as called for. RSI of 3.175 (R18.0) required. I suggest the simplest means to achieve this is with an EIFS (Exterior Insulation and Finish System). I recommend the following: StoTherm ci with Sto IMPACT, using 100 mm GPS insulation (R4.7). Regular EPS will not provide the required RSI. (R value per inch 3.7, x 4 = R14.4).

Recommend interior be painted with washable acrylic paint (semi gloss) per Master Painter's spec., walls and ceiling.

Roof (with attic):

The required overall thermal resistance is RSI 5.181 (R29.4). To achieve this the space between the bottom chords of trusses should be filled with R12 (for 2x4 bottom chord) with R-20 continuous over. Ensure minimum ventilation clearance at exterior walls over insulation. Provide soffit ventilation and gable vents (total minimum open area 1/300 building floor area). Refer to elevations attached for gable vents.

Ceiling finish 6 mil polyethylene vapour retarder, 2 layers 16 mm moisture resistant GWB, painted.

Below Ground:

Inside perimeter to have horizontally RSI 1.32 (R 7.5) = 50 mm XPS insulation 1.2 m wide continuously (see building section). Ensure 10 mil polyethylene vapour retarder membrane under slab on grade.

Doors:

Refer to the table above for information re. required door thermal and air leakage performance.

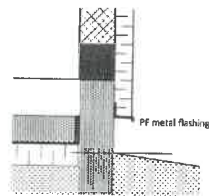
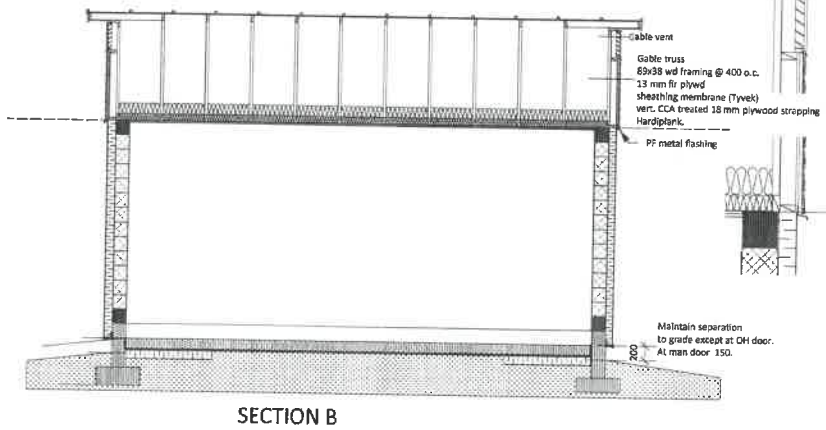
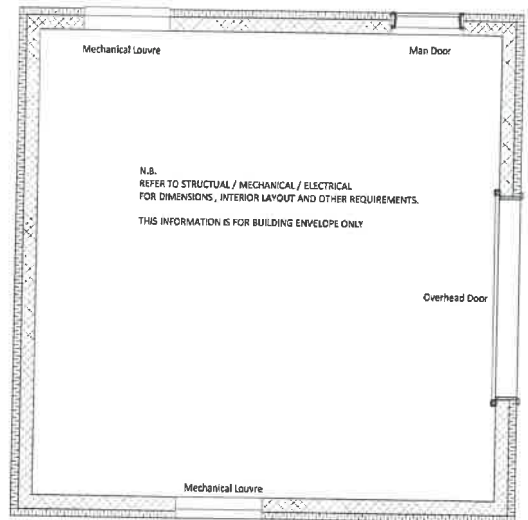
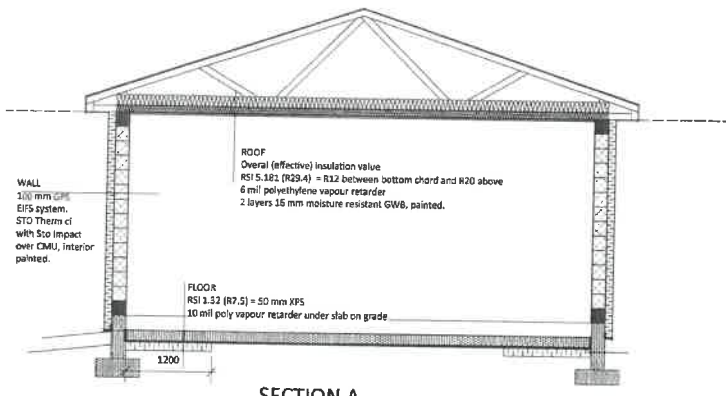
Trust this addresses the building envelope component of this project.

PRAXIS ARCHITECTS INC

per:



Robert Rocheleau, Architect AIBC
Director

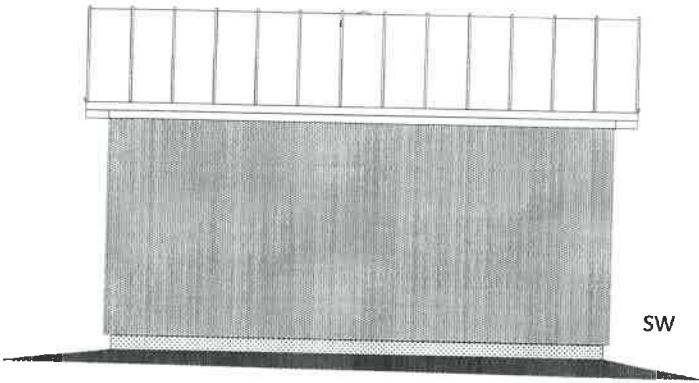


PLAN AND SECTIONS

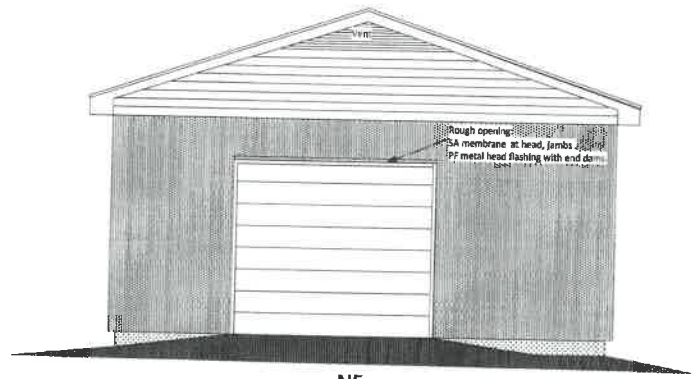
BUILDING ENVELOPE
BOOSTER PUMP STATION
ORDANO RESERVOIR SITE

PRAXIS ARCHITECTS INC.
401 - 1245 Esquimalt Rd.
Victoria, BC
V9A 3P2

July 22, 2021

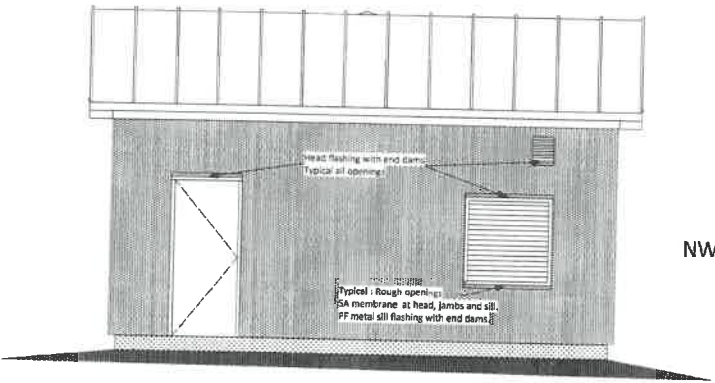


SW

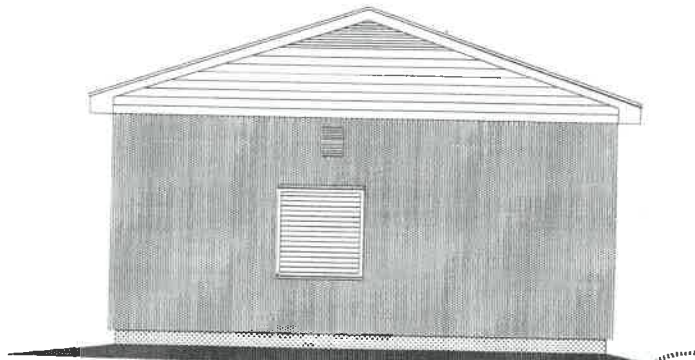


NE

N.B.
REFER TO MECHANICAL AND ELECTRICAL FOR ADDITIONAL ITEMS TO BE INTEGRATED INTO BUILDING ENVELOPE NOT INDICATED HERE. ALL PENETRATIONS OF ROOF AND WALL ASSEMBLIES TO BE SEALED TO ENSURE CONTINUOUS VAPOUR / AIR RETARDER IS PROVIDED.



NW



SE

ELEVATIONS
BUILDING ENVELOPE
BOOSTER PUMP STATION
ORDANO RESERVOIR SITE

PRAXIS ARCHITECTS INC.
401 - 1245 Esquimalt Rd.
Victoria, BC
V9A 3P2



July 22, 2021

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SCHEDULE "C"

**Technical Memorandum dated February 18, 2021
prepared by Associated Engineering (BC) Ltd.**

(attached hereto)



TECHNICAL MEMORANDUM

Issue Date:	February 18, 2021	File No.:	
To:	Caroline Stillinger	Previous Issue Date:	None
From:	Robyn Casement, P.Eng.	Project No.:	2020-2010-00
Client:	Cowichan Bay Waterworks District		
Project Name:	Cowichan Bay Estates Booster Pump Latecomer Agreement		
Subject:	Latecomer Agreement Analysis		

1 BACKGROUND

The Cowichan Bay Waterworks District (CBWD) has retained Associated Engineering to develop a payment formula for a proposed latecomer agreement that will allocate costs for a new Booster Pump Station (BPS). The BPS is being constructed to improve fire protection performance within the CBWD pipe network. Its construction has been spurred by the ongoing multi-phased residential development being completed by Cowichan Bay Estates Ltd. (CBE). The conditions of the development were established in 2012 and included the provision of a BPS to service the new lots above 74m elevation. However, benefits from the BPS will not be limited to CBE's development but will be apparent in other areas of the CBWD.

CBE has proposed to enter a latecomer agreement with the CBWD that will help to recover the construction cost of the BPS by allocating charges to future connections that will benefit from the pump station. The latecomer agreement would be in effect for 15 years and payments collected during this period would be given to the payor who originally paid for the BPS construction. To establish a fixed value for the latecomer charge, the total cost of the BPS is divided by the future growth expected within the benefitting area within the term of the agreement.

This memo outlines the steps taken to determine the area that will see a significant benefit from the BPS: the Area of Interest (AOI), the expected future population growth within the AOI during the latecomer agreement term, and a system for assigning latecomer charges for future connections.

2 ESTABLISHING AREA OF INTEREST

The AOI is the area that will see a significant benefit following the construction of the BPS. This area is defined by system pressure as well as the type of development expected. Refer to Figure 2-1 for an overview of the CBWD.

2.1 Selection Based on Pressure Requirements

The CBWD has two pressure zones and three reservoirs. Pressure Zone 1 (PZ1) is serviced by all three reservoirs, while Pressure Zone 2 (PZ2), being higher in elevation is serviced by only two reservoirs, the Ordano Reservoir and the Telegraph Reservoir. Since the Ordano Reservoir (top water elevation of 101m) is lower than the Telegraph Reservoir (top water elevation of 127m), PZ2 is mainly served by the Telegraph Reservoir. The BPS is intended to boost pressure at the Ordano Reservoir outlet to provide higher pressure water for fighting fire as well as improve water circulation during typical domestic demand.

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Memo To: Caroline Stillinger, Cowichan Bay Waterworks District

February 18, 2021

Page 2

The pressure in PZ1 is limited by the presence of pressure reducing valves (PRVs) that control the pressure of water entering PZ1 from PZ2. For this reason, the boosted pressure from the BPS will not benefit PZ1 as the excess pressure would be lost as the water flows through the PRV.

Certain areas of PZ2 will see a fire protection benefit from the BPS, particularly those above 74m elevation. CBWD's Engineering and Standard Specifications require a minimum residual pressure of 20 psi during fire flows, however, as an open, gravity-supplied system, the pressure in the system is established by the water level in the reservoir, which cannot meet the minimum residual pressure for areas above 74m elevation. By boosting the system pressure during fire flows, these areas will be brought into compliance with the engineering standards.

2.2 Selection Based on Potential Development

As latecomer charges will be applied to future connections, it is necessary to estimate future population growth over the term of the agreement. We reviewed planning information issued by the Cowichan Valley Regional District (CVRD), including the Official Community Plan (OCP) for Electoral Area D (which includes Cowichan Bay) and the Zoning Bylaw. The OCP is a forward-looking document that estimates population growth projections and assigns land use designations intended to shape future development. Associated reviewed the version available as of September 2020.

There are many land use designations identified in the OCP, however, we have assumed that future population growth will occur in the areas designated to allow for residential development. This includes some commercial areas that allow for accessory residential use. We have also assumed that the population growth will occur uniformly across the Electoral Area. Table 2-1 and 2-2 outline the specific land use designations we have included in our analysis.

We have not included agricultural land use designations in our analysis. Although secondary suites are permitted in these designations, the OCP describes the intent of these units as providing housing for farm help. We have assumed this would be a transient population and would not represent permanent population growth. Additionally, agricultural land uses are large, very sparsely populated areas. Since we have assumed population growth will occur uniformly across the AOI, including agricultural areas would skew the population distribution away from areas of higher population density. Table 2-3 summarizes the findings of the analysis.

See Figure 2-2 for an overview of the AOI.

Memo To: Caroline Stillinger, Cowichan Bay Waterworks District

February 18, 2021

Page 3

**Table 2-1
OCP Land Use Designations Included in Analysis**

OCP Designation	OCP Description	Comments
RR	Rural Residential	
CR	Cluster Residential	
RVR	Rural Village Residential	
VR	Village Residential	
MU	Mixed Use	Dwellings permitted
FV	Four-Ways Village	Dwellings permitted
KV	Koksilah Village	Accessory dwellings permitted
MV	Marine Village	Accessory dwellings permitted
MR	Marine Residential	
RC	Rural Commercial	Accessory dwellings permitted

**Table 2-2
OCP Land Use Designations Not Included in Analysis**

OCP Designation	OCP Description	Comments
MR	Marine Resources	No development possible
MI	Marine Industrial	Outside of CBWD
P	Parks	No development possible
MNC	Municipality of North Cowichan	Outside of CBWD
RUR	Rural Resource	No residential development possible
CI	Community Institutional	No residential development possible
IR	First Nations Reserve	Outside of CBWD
A	Agriculture Resource	Secondary suites are allowed but these are limited to farm help.



Memo To: Caroline Stillinger, Cowichan Bay Waterworks District
February 18, 2021

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Table 2-3
Analysis Results

Area	Value
Total area available for residential development within Electoral Area D	143.01 ha
Area available for residential development within CBWD and above 74 m elevation (AOI)	60.33 ha
Proportion of AOI within Electoral Area D	42%

3 ESTIMATING FUTURE GROWTH IN AOI

We reviewed the OCP for future population growth trends expected within the AOI. The OCP was published in 2011 and is intended to guide development in the area with a 25-year outlook (to 2036). This includes 25-year population growth projections. For the purposes of the 15-year term of the latecomer agreement, we prorated the growth projections from 2020 to 2035 to estimate the net population growth over this period. See Figure 3-1 below.

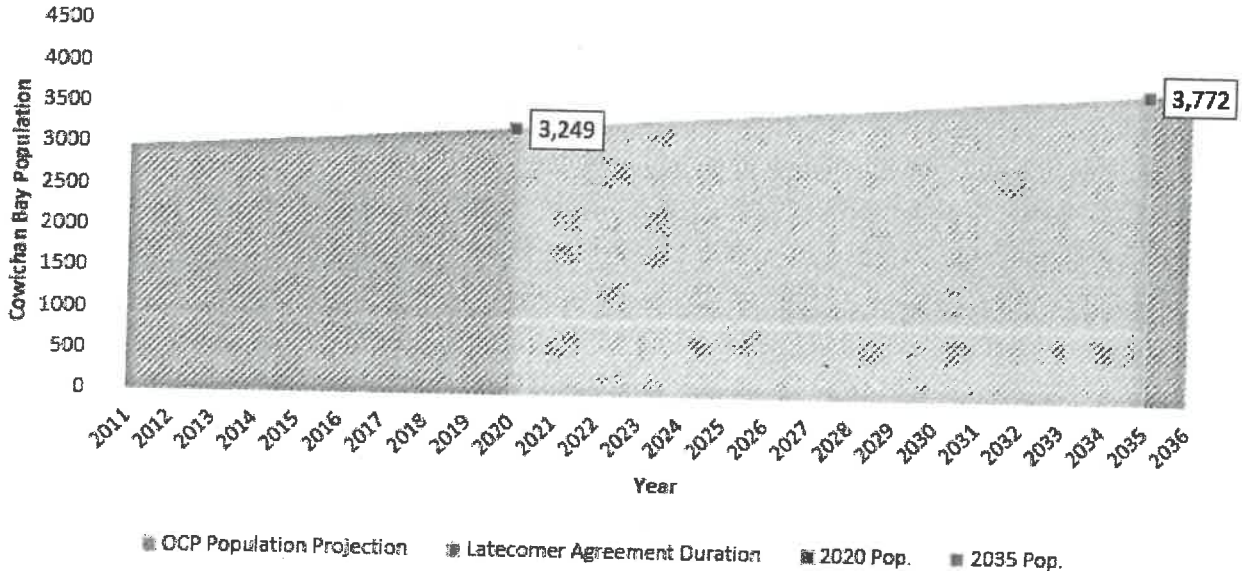


Figure 3-1
Total Population Growth Expected During Latecomer Agreement

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Memo To: Caroline Stillinger, Cowichan Bay Waterworks District
February 18, 2021
Page 5

Assuming the rate of population growth remains approximately linear, the net growth within the OCP boundaries is 523 people during the latecomer agreement. Distributing this growth uniformly across the AOI is then:

$$\text{Net population growth within AOI} = 43\% \times 523 \text{ people} = 221 \text{ people}$$

This suggests that over the term of the latecomer agreement, the total growth within the AOI will be 221 people.

Within Cowichan Bay Estates, there are 30 properties at or above 74 metres elevation. Using the CBWD standard of 2.6 persons/dwelling this represents 78 people or 35% of the growth within the AOI.

4 LATECOMER CHARGE FORMULA

Latecomer charges will be applied to all subsequent connections to the CBWD within the AOI for the term of the agreement. The charge should be derived according to the following formula:

$$\frac{\text{Total Construction Cost of BPS}}{\text{Estimated Population Growth}} = \text{Latecomer Charge per Person}$$

The charge per person would then be applied to a development according to the Engineering Specifications.

For example, given a total construction cost of \$800,000 and a proposed single-family house connection, the charge would be:

$$\frac{\$800,000}{221 \text{ People}} = \$3,619.91 \text{ per Person}$$

For a single-family house connection, the population per unit is 2.6, as per the engineering specifications:

$$\$3,619.91 \text{ per Person} \times 2.6 \frac{\text{population}}{\text{unit}} = \$9,411.77$$

The total cost for this connection would be \$9,411.77. This charge would be in addition to any other applicable charges (e.g. Capital Expenditure Charge, connection fee).

Some land uses permit commercial and retail uses in addition to residential ones. We expect there would be limited growth of this type, however, costs would be calculated in a similar way using the occupancy rate of 60 persons per 10,000 m² as outlined in the draft 2016 CBWD Water Master Plan. For example, a commercial property of 500 m² would have a cost of:

$$\$3,619.91 \text{ per Person} \times 60 \frac{\text{population}}{10,000 \text{ m}^2} \times 500 \text{ m}^2 = \$10,859.73$$

Memo To: Caroline Stilling, Cowichan Bay Waterworks District
February 18, 2021

Page 6

We note that the latecomer charge per person is dependant on the final construction cost of the BPS and may not be finalized until construction is complete.

Latecomer charges would be expected to be collected only in relation to lots within the AOI but outside of CBE; that is, the cost proportional to 35% of lots within both AOI and CBE is expected to be paid by the developer of CBE. This share can be calculated either as $30 \times \$9,411.77$ or equivalently $35\% \times \$800,000$.

5 ADDITIONAL CONSIDERATIONS

In addition to fire protection benefits, the CBWD distribution network will see water quality improvements as a result of the BPS. The benefit arises from the installation of new domestic demand pumps that are intended to meet the typical daily water usage demands using water from the Ordano Reservoir. This will help to circulate water in the system and reduce stagnation. However, since the domestic pump feature of the BPS is much less in terms of capital cost when compared to the fire protection features, we have not included this in the application of latecomer fees.

Prepared by:



R. Casement

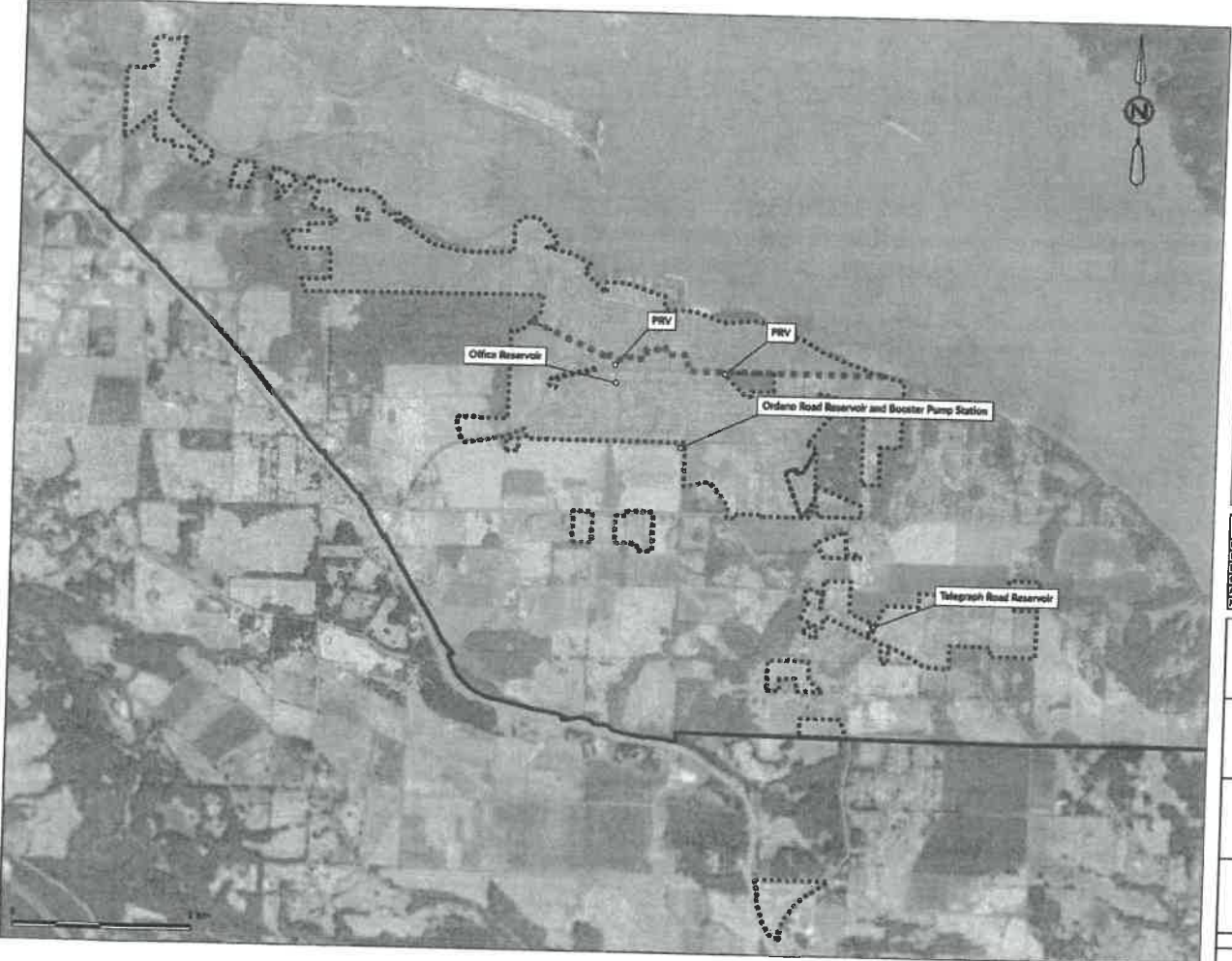
2021-02-19

Robyn Casement, P.Eng.
Water Engineer
RC/JM/rvw

Reviewed by:



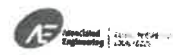
Jonathan Musser, M.A.Sc., P.Eng.
Project Manager



LEGEND

- Key Locations
- ▬ Pressure Zone Boundary
- ▬ Electoral Area D Boundary
- ▬ CBWD Boundary
- ▬ Watermarks
- ▬ Pressure Zone 1
- ▬ Pressure Zone 2

SCALE:		AS SHOWN	
PROJECT NO.	202-202-00	TRIAL	DATE
DRAWN	EP	20-11-20	
CHECKED			
APPROVED			
PROJECTION:	UTM ZONE 20N FAD 00		

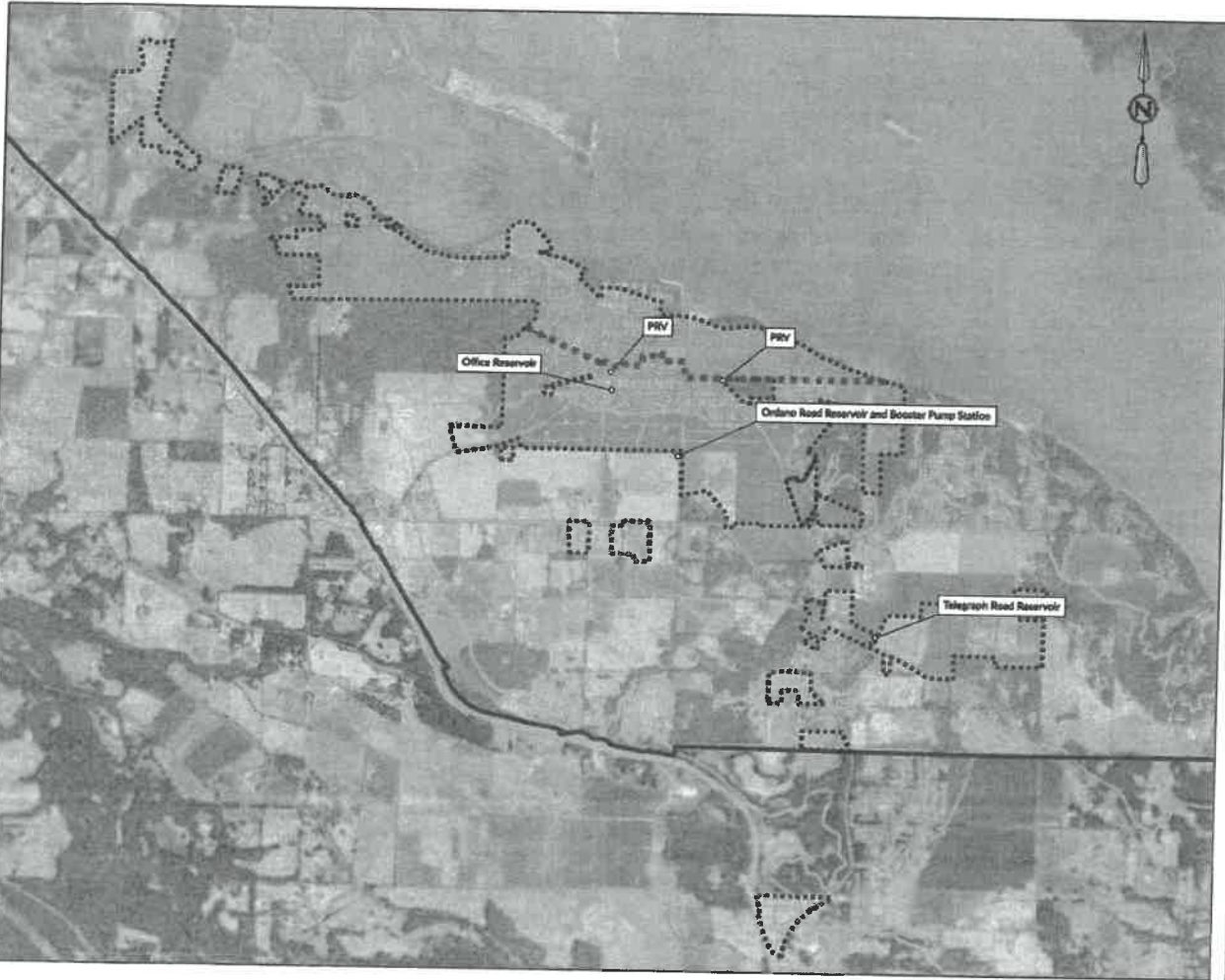


CBWD LATECOMER AGREEMENT

OVERVIEW MAP

DRAWING NUMBER	REV. NO.	SHEET
FIGURE 2-1		

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LEGEND

- Key Locations
- ▬ Pressure Zone Boundary
- ▬ Electrical Area D Boundary
- ▬ CBWD Boundary
- ▬ 74 m Elevation Contour Line
- ▬ Watermains
- ▬ Area of Interest
- ▬ Pressure Zone 1

SCALE:	AS SHOWN
PROJECT NO.	2009-1010-00 INITIAL DATE
DRAWN	SP 10-11-07
DESIGNED	
CHECKED	
APPROVED	
PROJECTION:	UTM ZONE 50N 1983 UTM



CBWD LATECOMER AGREEMENT

AREA OF INTEREST MAP

DRAWING NUMBER	REV. NO.	DATE
FIGURE 2-2		

Map File: 2010-08-01\Projects\2009-1010-00\Drawings\Area_of_Interest_Map.dwg

SCHEDULE "D"

Cost Estimate

Vendor	Cost
Cowichan Bay Waterworks District	\$20,162.78
Associate Engineering	\$52,934.80
Ridgway & Company	\$18,000.00
Cowichan Engineering	\$97,000.00
Applied Engineering	\$13,100.00
GC Engineering	\$4,500.00
Avalon Engineering	\$8,500.00
Superior Excavating	\$855,000.50
Value of Works (Before Taxes)	\$1,069,198.08

SCHEDULE "E"

Latecomer Charge Formula per Person

$$\frac{\text{Booster Station Capital Cost} \times \text{Cost Split}}{(\text{Pop. Growth Estimate} - \text{Development Pop.})} = \text{Latecomer Charge (per person)}$$

Booster Station Capital Cost	\$1,069,198.08
Cost Split	65% ¹
Pop. Growth Estimate	221 people ²
Development Pop.	78 people ³
Latecomer Charge (per person)	\$4,859.99

The following Engineering Specifications will be used to calculate the Latecomer Charge:

Land Use	Description	Average Occupancy
Low Density	Any residential with a gross density of less than 20 units/hectare	2.6 persons/unit
Medium Density	Any residential with a gross density of greater than 20 units/hectare and less than 50 units/hectare	2.0 persons/unit
High Density	Any residential with a gross density of greater than 50 units/hectare	1.4 persons/unit

The above Engineering Specifications will correspond to the following Latecomer Charges:

Type of Lot	Number of People	Latecomer Charge
Single Family Home	2.6 persons per lot	\$12,635.98 per lot
Secondary Dwelling	2.6 persons per secondary dwelling	\$12,635.98 per dwelling
Apartment	2.0 persons per unit	\$9,719.98 per unit
Townhouse	2.0 persons per unit	\$9,719.98 per unit
Commercial / Retail	60 persons / 10,000 m ² of commercial area	\$29.16 per m ²

¹ Based on an estimated capital cost split of 35% to the Development, and 65% as excess or extended services.

² Based on the 15 year Cowichan Bay population growth for lots above 74 m elevation estimated in the Memorandum.

³ Based on 30 development lots above 74 meters elevation and engineering specifications for a single-family home connection of 2.6 people per lot.

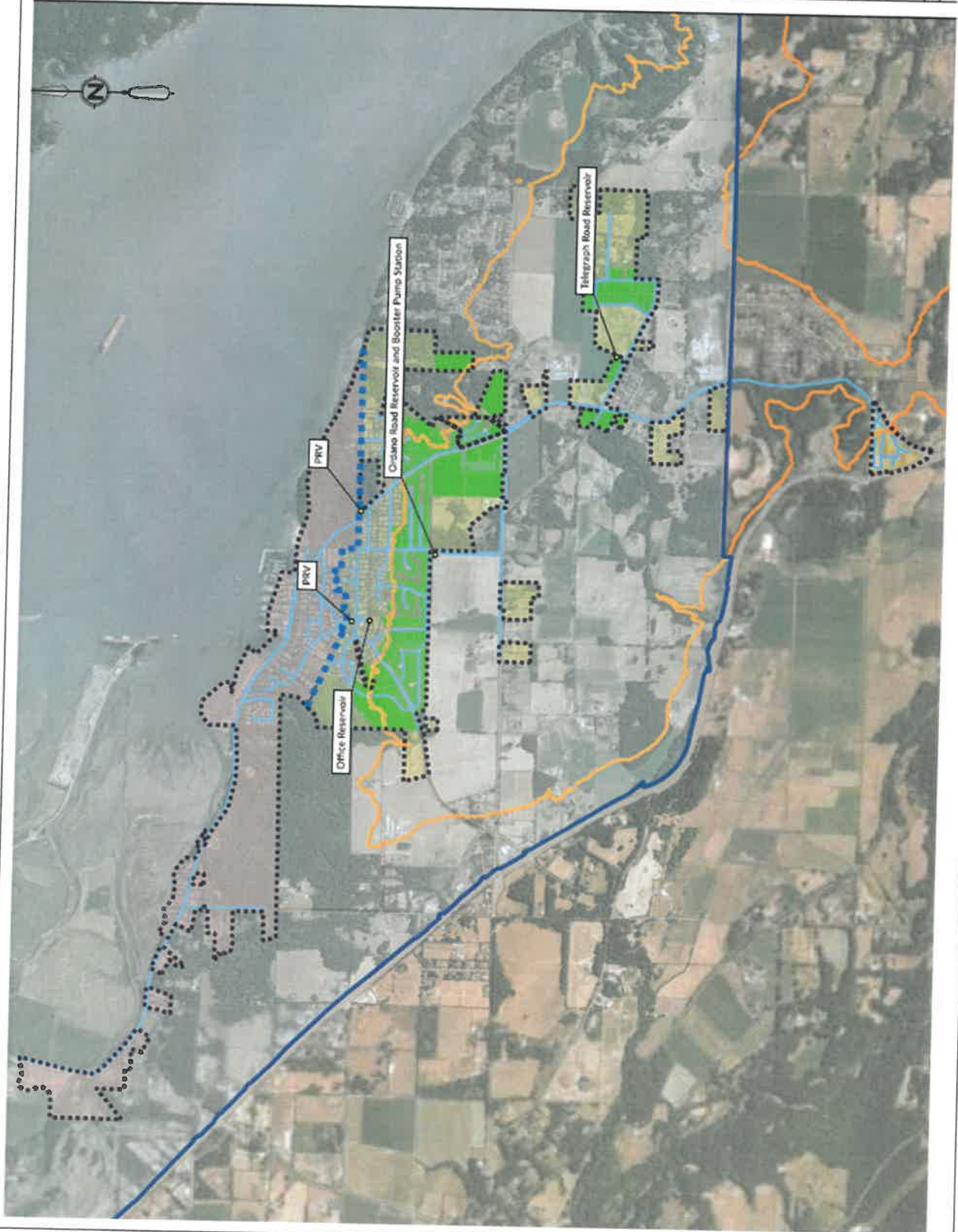
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Each Latecomer Charge will include the following additional charges:

1. An administration fee for CBWD of **\$250.00**; and
2. Interest at an annual simple interest rate equal to **the Prime Lending Rate of the banker to the BC government⁴, minus 0.75%** (the "Interest Rate"), calculated from the date this Agreement is signed to the date the applicant connects to the Water System.
 - a. During the first 6 months of a year interest will be calculated at the Interest Rate as at January 1.
 - b. During the last 6 months of a year interest will be calculated at the Interest Rate as at July 1.

⁴ The current and historical Prime Lending Rate is published by the BC Supreme Court at the following website:
https://www.bccourts.ca/supreme_court/about_the_supreme_court/Court_Order_Interest_Rates.aspx

Schedule 2 to Bylaw 347 – Latecomer Agreement Area of Interest Map



- Key Locations**
- Pressure Zone Boundary
 - Electoral Area D Boundary
 - CBWD Boundary
 - 74 m Elevation Contour Line
 - Watermarks
 - Area of Interest
 - Pressure Zone 1

SCALE:		AS SHOWN	
PROJECT NO.	2008-210-00	INITIAL	DATE
DRAWN		EF	10/1/07
DESIGNED			
CHECKED			
APPROVED			
PROJECTION:	UTM ZONE 18N MD 83		



CBWD LATECOMER AGREEMENT	
AREA OF INTEREST MAP	
DRAWING NUMBER	REV. NO.
FIGURE 2-2	
	SHEET

103 END.