Addendum # 1

1 Changes:

The Tender Documents for this project shall be changed as follows:

1. **The following drawings have been re-issued:**

C01	Cover Sheet, Key Plan & Location Plan	Rev 01
C02	Pump Station General Arrangement Plan	Rev 01
C03	Pump Station Site Drainage Plan	Rev 01
C04	Watermain Plan/Profile Station 1+000 to 1+160	Rev 01
C05	Watermain Plan/Profile Station 1+160 to 1+320	Rev 01
C06	Watermain Plan/Profile Station 1+320 to 1+470	Rev 01
M01	Pump Station Floor Plan	Rev 01
M02	Pump Station Cross Sections (1 of 2)	Rev 01
M03	Pump Station Cross Sections (2 of 2)	Rev 01
E02	Site Plan	Rev 1
E04	Building Layout – Instrumentation and Controls	Rev 1
E05	Details (1 of 5)	Rev 1
E06	Details (2 of 5)	Rev 1
E10	Power Distribution Single Line Diagram	Rev 1
E11	Communication and Instrumentation Block Diagram	Rev 1
E13	Grundfos Control Center Controls (2 of 2)	Rev 1
E14	Controls (1 of 6)	Rev 1
E16	Controls (3 of 6)	Rev 1
E18	Controls (5 of 6)	Rev 1
E19	Controls (6 of 6)	Rev 1
E20	PLC I/O Arrangement	Rev 1

1.1 Form of Tender – Appendix 1

Remove the Schedule of Quantities contained in the original tender documents and replace with the Schedule of Quantities attached and noted as **"Form of Tender – Appendix 1 - Addendum 1"**

1.2 Revise Agreement, Article 1.2

Revise Article 1.2 to read as follows:

"…..and will achieve *Substantial Performance* of the *Work* on or before **March 31, 2019** subject to……"

1.3 Revise 4.0 Form of Agreement, Article 6 Notices

Revise the Owner's Address as follows:

"Regional District of Nanaimo, 6300 Hammond Bay Road, Nanaimo, BC V9T 6N2"

1.4 Revise 8.0 Supplementary General Conditions, Sub Section 5.0 Shop Drawings as follows:

Expand the list in 5.1.5 to include:

"- Proposed method to maintain Dimensional Control for installation of Pump Station pipework; and,

- Commissioning Plan"

6.1.2 – Delete this section in its entirety and replace with the following:

"The Owner has limited in-house programming resources and will rely on the Contractor to provide the expertise and resources required to configure, program and commission the control system for this project. The Owner will provide the contractor with the set points required to integrate the new works with their existing systems, as well as the make and model of existing components in the RDN's system.

1.5 Revise Supplementary General Conditions, Sub Section 18.6 Substantial Performance as follows:

Expand 18.6.3 to include:

"(3) A letter of Credit issued to the Regional District of Nanaimo for $20,000.00, in a form acceptable to the Owner, to be held by the Regional District of Nanaimo for the full duration of the Maintenance Period. This Letter of Credit will be held in addition to the Performance Bond and the Labour and Material Payment Bond described under the Form of Tender Section 5.1.1. The purpose of this Letter of Credit is to provide an additional guarantee for the Contractor's performance, and to provide a fund that can be drawn upon by the Owner, if the contractor fails to rectify deficiencies in the Work in a timely manner. More specifically, the Letter of Credit is intended to ensure that any issues related to trouble shooting and commissioning the Works are addressed in a timely manner by the Contractor during the Maintenance Period."

1.6 Revise 9.0 Supplementary Specifications, Sub Section 9.1 Measurement and Payment as follows:

Add:

"2.11 Cathodic Protection

Cathodic Protection shall be paid by each completed unit. Payment shall be made at the unit price bid as compensation in full for supply and installation of a

14.5-kilogram magnesium anode in general conformance with the arrangement provided on MMCD Drawing No. W119 complete with Joint Continuity Bonds (as required), and detailed on MMCD Drawing No. W106"

1.7 Revise 9.0 Supplementary Specifications, Sub Section 9.2 Special Provisions as follows:

- **Revise 9.4.4 Weekly Construction Meetings** as follows:

"**9.2.4 Bi-Weekly Construction Meetings**

Bi-Weekly Construction meetings shall be held…."

- **Revise 9.2.9 Watermain Highway Crossing** by addition of the following:

"….. This information must be verified by test excavation well in advance of watermain construction to confirm alignment, pipe and fitting requirements. The Contractor shall prepare a shop drawing of the proposed crossing installation based on the information collected. The contractor shall complete this work early in the construction schedule to allow sufficient time for re-design as warranted."

- **Add:**

"9.2.13 Owner Supplied Materials

The Owner will supply one Pump and one Pressure Reducing Valve to be used on this project.

The Owner Supplied Pump is new and is currently stored in the RDN's warehouse. The RDN will deliver this pump to Smith Cameron who will make any required modifications and supply it to the contractor along with the Pre-Selected Pumping Equipment.

The Owner Supplied Pressure Reducing Valve was removed from the existing pump station and is currently stored in the RDN's warehouse. The RDN intends to have this valve re-conditioned, calibrated and adjusted prior to installation. This valve will be available for pick-up by the contractor within 25 km of the site."

- **Add:**

"9.2.15 Commissioning Plan

The Contractor shall prepare a Commissioning Plan that outlines his procedures for bringing the new pump station on line. That plan shall be detailed and shall be broken down into sequential tasks and include a detailed schedule of the commissioning activities, personnel that will be present, and sample commissioning sheets.

The Commissioning Plan shall be submitted for review and acceptance using the process outlined for shop drawings. The contractor shall allow a minimum of two weeks for review."

- **Add:**

"9.2.16 Operation and Maintenance (O&M) Manual

The Contractor shall prepare and deliver three hard copies and one digital copy (in PDF format) of an Operation and Maintenance Manual for the completed works that includes, but is not limited to, the following information:

- Product Sheets for all electrical and mechanical equipment;
- Approved Shop Drawings;
- Warrantees, Guarantees, and associated bills of sale;
- Manuals;
- Construction Photographs that document the construction of key underground components; and,
- A record of system commissioning (Updated Commissioning Plan)."

- **Add:**

"9.2.17 RDN Training

The Contractor shall be responsible to provide staff training and orientation in conjunction with System Programming, Testing and Commissioning. The Contractor shall host a half-day, hands-on training session that includes, but is not limited to, the following:

- Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.

- Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

- Review contents of the O&M Manual in detail to explain all aspects of operation and maintenance.

- Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions."

- **Add**

"9.2.18 Phased Installation

The Works to be built under this contract will include installation of three pumps, with associated controls and Variable Frequency Drives. The pump station and pipework to be built under this contract includes provision to install up to 3 additional pumps, controls and VFD's in the future to meet increased demand."

1.8 Revise 9.0 Supplementary Specifications, Sub Section 9.3 Electrical Specifications

- **Add:**

26 54 00 – Heaters and Ventilation

1.9 Revise 9.0 Supplementary Specifications, add the following:

"Sub Section 9.5 Stainless-Steel Pipework and Fittings

All municipal Stainless-Steel piping to be Sched 10.

Submit mill certificates for all stainless piping showing mechanical and chemical properties and indicating compliance with the following steel pipe specification requirements:

- Stainless steel pipe shall be fabricated in accordance with ASTM A312/ASME SA312.
- Stainless steel fittings shall be fabricated in accordance with ASTM A403/ASME SA403. Fittings shall be Grade WP Class W or as otherwise approved.
- All stainless-steel pipe and fittings shall be grade 316L, Schedule 10S.
- Dimensions and wall thickness of pipe shall be to ASME B36.19.
- Dimensions and tolerances for fittings shall be to ASME B36.19.
- Slip on stainless steel flanges shall be to ASTM A182 and 316L material and welded to pipe inside and outside.

Pressure Testing of Stainless-Steel Piping Systems

All station piping and/or piping assemblies including pipe spools, valves, flanges, gaskets and related appurtenances shall be pressure tested after installation to 150 psi water pressure.

The pipe assembly will be deemed to have passed the pressure test when the pipe under test pressure maintains the 150 psi pressure without drop for a 1 hour period and does not require any make-up water to return the pressure to 150 psi.

Should the piping assembly fail to meet the pressure test requirements, the pipe shall be repaired where leakage may be occurring and then retested. This procedure shall be repeated until the pressure test requirements are met."

1.10 Revise 10.0 Supplementary Detail Drawings as follows:

Remove 10.3 RDN Drawing W-12, Revision 1 – Fire Hydrant Assemble and replace with City of Parksville Drawing No. W2 – Hydrant Connection Details.

1.11 Revise 11.0 Additional Information as follows:

- Remove 11.2 Control Philosophy & Operational Strategy contained in the original Tender Documents and replace with the attached document.
- Remove 11.3 Smith Cameron Quotation and replace with the attached document.
- Add 11.4 Chlorine Information from Smith Cameron
- Add 11.5 RDN Approved Products List

2 Attachments

2.1 Re-issued Drawings

2.2 Schedule of Quantities

2.3 26 54 00 Heaters and Ventilation

2.4 City of Parksville Drawing W2 – Hydrant Connection Detail

2.5 Appendix A – Control Philosophy & Operational Strategy

2.6 Smith Cameron Quotation

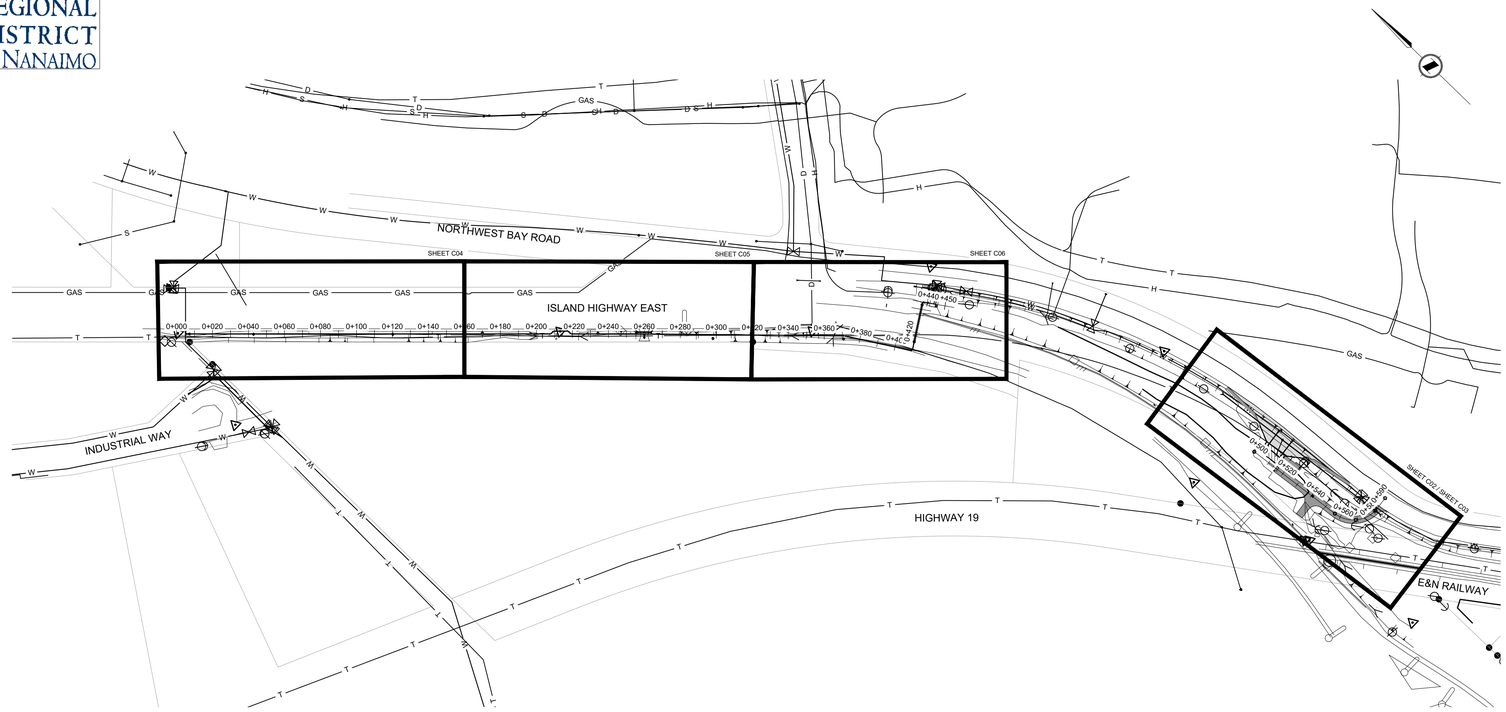
2.7 Chlorine Analyzer Specification

2.8 Regional District of Nanaimo Approved Products List

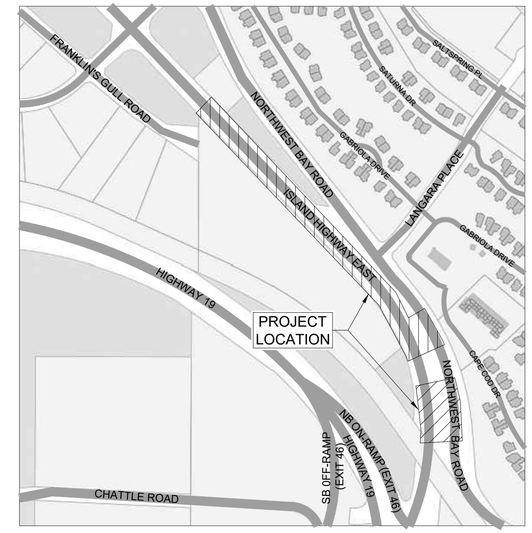
2.1 - Re-Issued Drawings

REGIONAL DISTRICT OF NANAIMO

12522-01 NANOOSE BAY PENINSULA PUMP STATION



KEY PLAN
N.T.S.



LOCATION PLAN
N.T.S.

DRAWING INDEX

DRAWING NO.	DESCRIPTION	REVISION
C01	COVER SHEET, KEY PLAN, & LOCATION PLAN	1
C02	PUMP STATION GENERAL ARRANGEMENT PLAN	1
C03	PUMP STATION SITE DRAINAGE PLAN	1
C04	WATERMAIN PLAN & PROFILE STA 0+000 TO 0+160	1
C05	WATERMAIN PLAN & PROFILE STA 0+160 TO 1+320	1
C06	WATERMAIN PLAN & PROFILE STA 0+320 TO 0+470	1
M01	PUMP STATION FLOOR PLAN	1
M02	PUMP STATION CROSS SECTIONS (1 OF 2)	1
M03	PUMP STATION CROSS SECTIONS (2 OF 2)	1
S01	STRUCTURAL GENERAL NOTES	0
S02	STRUCTURAL FOUNDATION AND ROOF PLAN	0
S03	STRUCTURAL BUILDING & WING WALL ELEVATIONS SECTIONS AND DETAILS	0
S04	STRUCTURAL TYPICAL SECTIONS AND DETAILS	0
E01	PUMP STATION LEGEND AND GENERAL NOTES	-
E02	PUMP STATION AND SITE PLAN	1
E03	PUMP STATION BUILDING LAYOUT - LIGHTING, SECURITY, HEATING, & VENTILATION	-
E04	PUMP STATION BUILDING LAYOUT - INSTRUMENTATION AND CONTROLS	1
E05	PUMP STATION DETAILS (1 OF 5)	1
E06	PUMP STATION DETAILS (2 OF 5)	1
E07	PUMP STATION DETAILS (3 OF 5)	-
E08	PUMP STATION DETAILS (4 OF 5)	-
E09	PUMP STATION DETAILS (5 OF 5)	-
E10	PUMP STATION POWER DISTRIBUTION SINGLE LINE DIAGRAM	1
E11	PUMP STATION COMMUNICATIONS AND INSTRUMENTATION BLOCK DIAGRAM	1
E12	PUMP STATION GRUNDFOS CONTROL CENTER CONTROLS (1 OF 2)	-
E13	PUMP STATION GRUNDFOS CONTROL CENTER CONTROLS (2 OF 2)	1
E14	PUMP STATION CONTROLS (1 OF 6)	-
E15	PUMP STATION CONTROLS (2 OF 6)	-
E16	PUMP STATION CONTROLS (3 OF 6)	1
E17	PUMP STATION CONTROLS (4 OF 6)	-
E18	PUMP STATION CONTROLS (5 OF 6)	1
E19	PUMP STATION CONTROLS (6 OF 6)	1
E20	PUMP STATION PLC I/O ARRANGEMENT	1
E21	PUMP STATION TYPICAL PLC/RTU CABINET WIRING TERMINATIONS (1 OF 2)	-
E22	PUMP STATION TYPICAL PLC/RTU CABINET WIRING TERMINATIONS (2 OF 2)	-

GENERAL NOTES:

1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE REGIONAL DISTRICT OF NANAIMO BYLAW NO. 500 SCHEDULE '4C1' AND MASTER MUNICIPAL CONSTRUCTION DOCUMENTS (MMCD LATEST EDITION). WHERE A CONFLICT EXISTS BETWEEN THE TWO DOCUMENTS, THE MORE STRINGENT STANDARD WILL GOVERN.
2. ALL LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED BY USE OF A PIPE LOCATOR AND MANUAL DIGGING PRIOR TO CONSTRUCTION. ALL OR ANY STRUCTURES AND SERVICES ARE NOT NECESSARILY SHOWN.
3. COORDINATES ARE GROUND LEVEL AND ALL ELEVATIONS ARE TO GEODETIC DATUM.
4. ANY ALTERNATIVES TO SPECIFIED MATERIALS OR APPURTENANCES TO BE APPROVED BY THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
5. THE LOCATIONS OF EXISTING SERVICES ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. ALL SURFACES TO BE RESTORED TO EXISTING CONDITION OR BETTER, AS PER CITY OF PARKSVILLE STANDARDS. CONTRACTOR TO ADHERE TO ALL CONDITIONS AND CRITERIA OUTLINED IN THIS PERMIT.
7. ALL WORKS TO BE IN ACCORDANCE WITH ISLAND HEALTH PERMIT NUMBER W-CN-XXXX.

WATERMAIN NOTES:

1. MAINTAIN A MINIMUM OF 1.2m COVER UNLESS OTHERWISE NOTED.
2. ALL WATERMAIN JOINTS WITHIN 3.0m HORIZONTAL OR 0.45m VERTICAL OF SANITARY OR STORM DRAIN MAINS TO BE PROTECTED BY SHRINK WRAP OR PETROLEUM TAPE. ALL UTILITY CROSSINGS TO HAVE A MINIMUM 0.45m CLEARANCE. IF 0.45m CLEARANCE IS NOT POSSIBLE, CONCRETE ENCASEMENT AS PER MMCD STANDARD DETAIL DRAWING G6 SHALL BE REQUIRED.
3. PRESSURE TESTS, CHLORINATION AND BACTERIOLOGICAL TESTING TO REGIONAL DISTRICT OF NANAIMO BYLAWS AT THE CONTRACTOR'S EXPENSE.
4. MAXIMUM PIPE DEFLECTION TO BE AS PER MANUFACTURER'S SPECIFICATIONS.

ISSUED FOR
TENDER

Rev	Date	Description	Drawn	Design	App'd
1	JUN. 5, 2018	ADDENDUM # 1	MCP	RI	RI
0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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McElhanney Consulting Services Ltd.
1351 Estevan Road
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Tel 250 716 3336

Approved Sealed

REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION

COVER SHEET, KEY PLAN, & LOCATION PLAN

Drawing No. C01

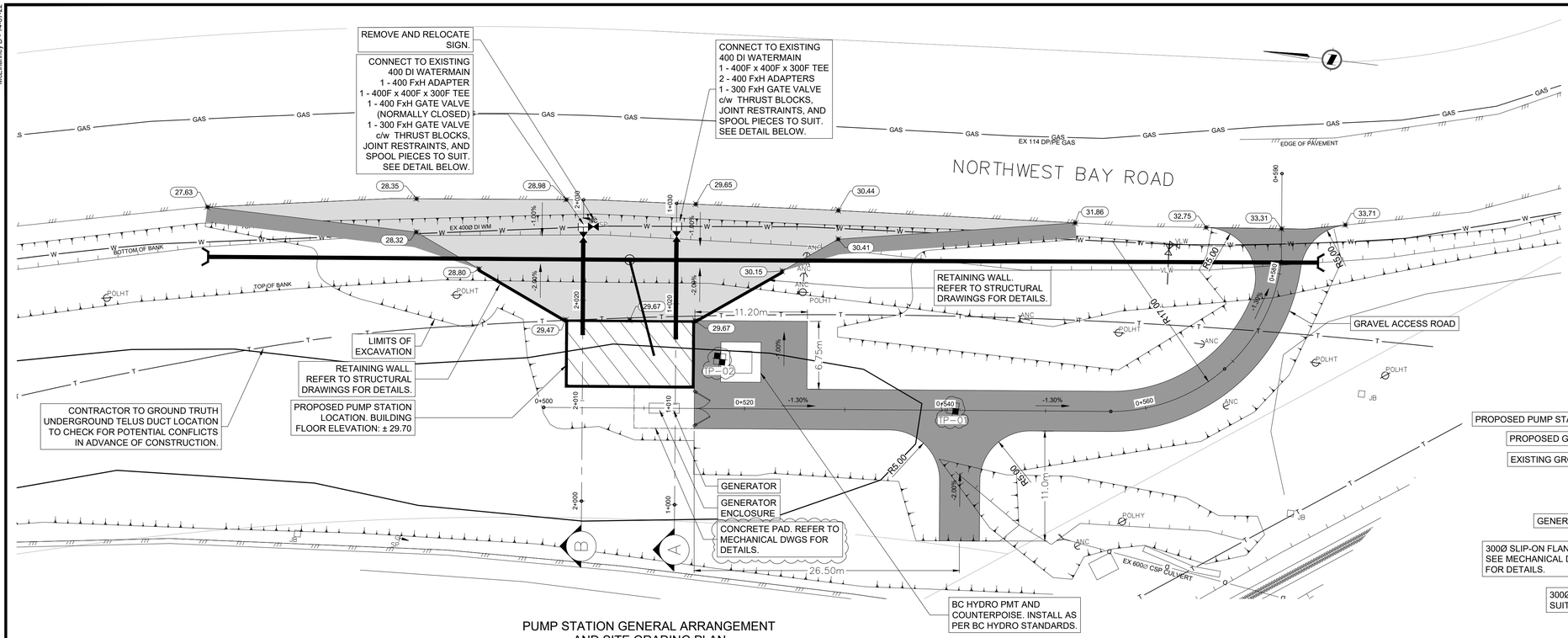
Project Number 2231-12522-01

Rev. 1

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2018-06-05, 17:42 FILE: Z:\Proj-Active\12522-01 RDN - Nanoose Bay Peninsula Pump Station Project\10.0 Drawings\1 - Active\12522-01-DESIGN.dwg

McElhanney D - 14-07-22



PUMP STATION GENERAL ARRANGEMENT AND SITE GRADING PLAN

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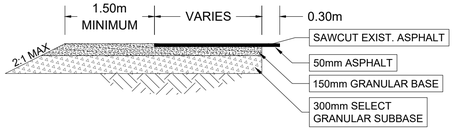

SURFACE TREATMENT TYPICAL DETAIL

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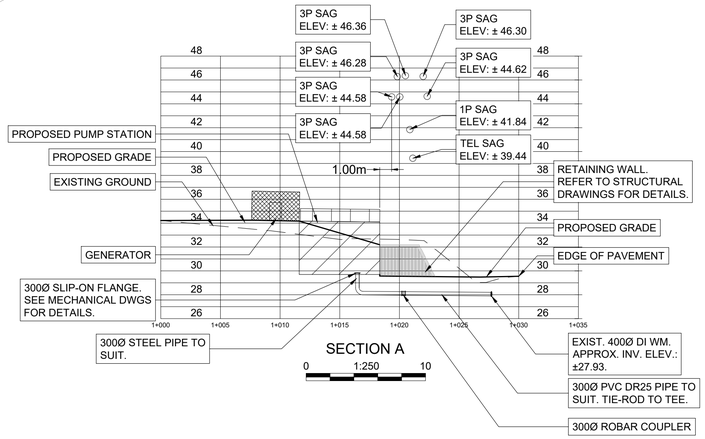

SECTION A

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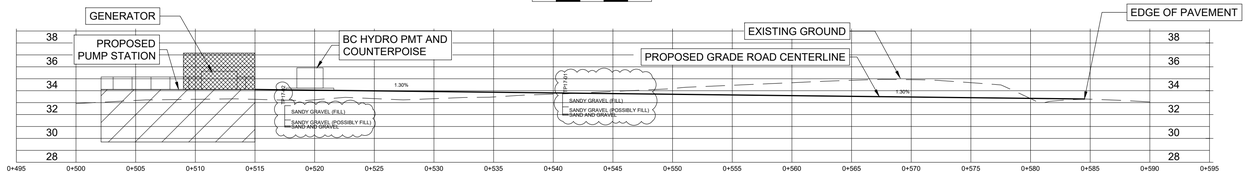

GRAVEL ACCESS ROAD

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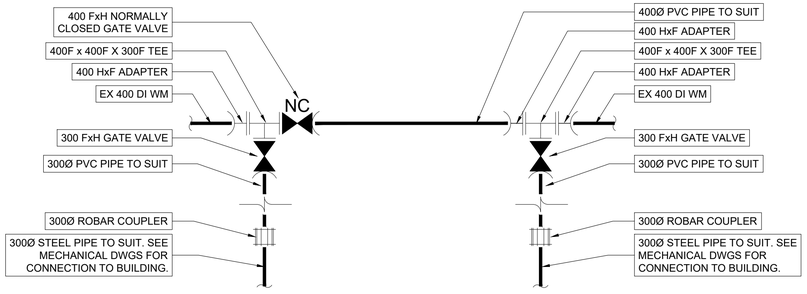

CONNECTION TO EXISTING WM FROM PROPOSED BLDG DETAILS

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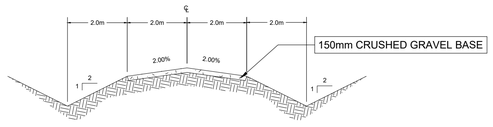

GRAVEL ACCESS ROAD CROSS-SECTION

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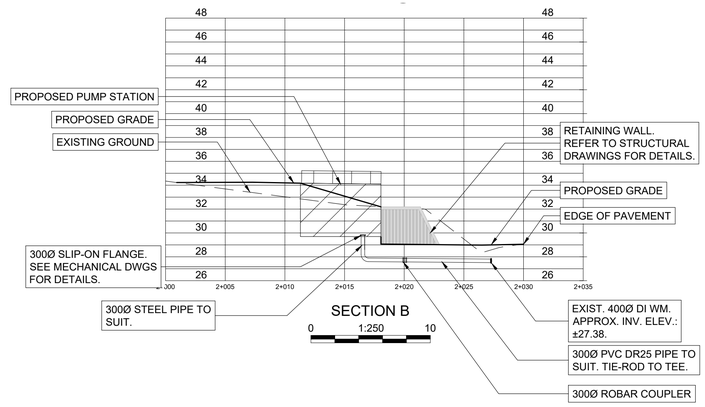

SECTION B

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TENDER

Rev	Date	Description	Drawn	Design	App'd
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0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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Canada V9S 3Y3
Tel 250 716 3336

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REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION

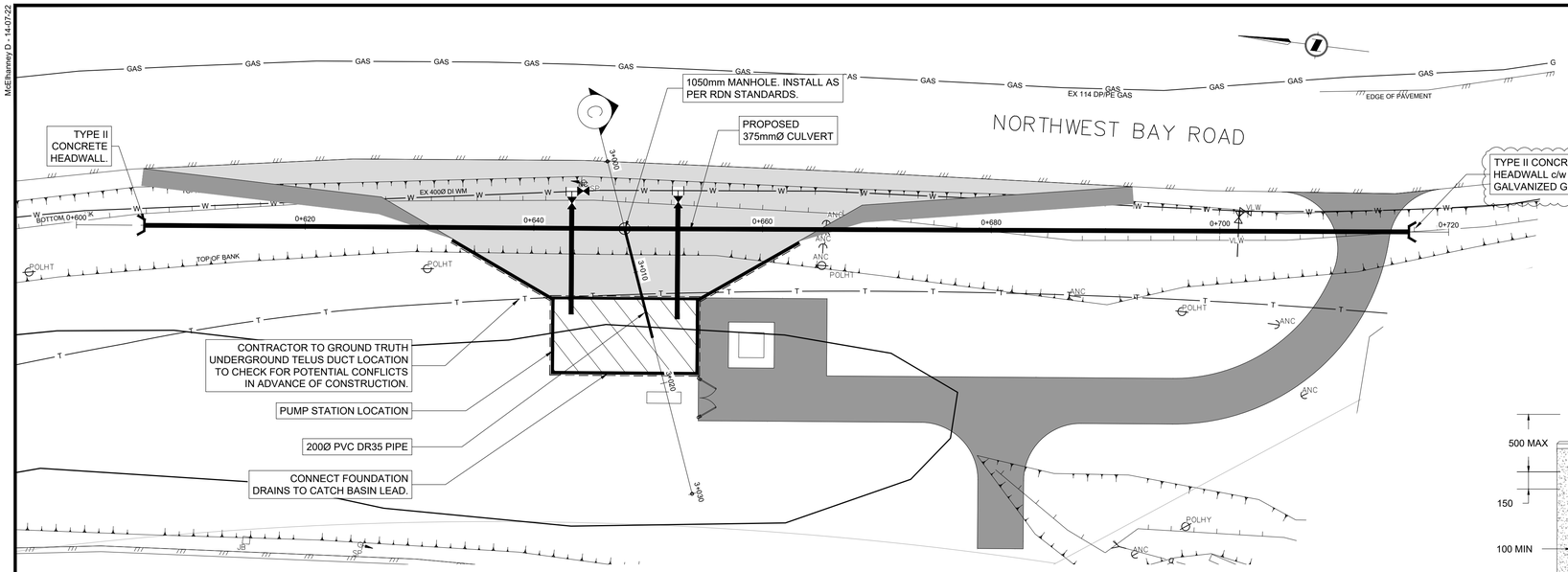
PUMP STATION GENERAL ARRANGEMENT PLAN

Drawing No. C02

Project Number 2231-12522-01

Rev. 1

DESTROY ALL PRINTS BEARING PREVIOUS REVISION



PUMP STATION SITE DRAINAGE PLAN

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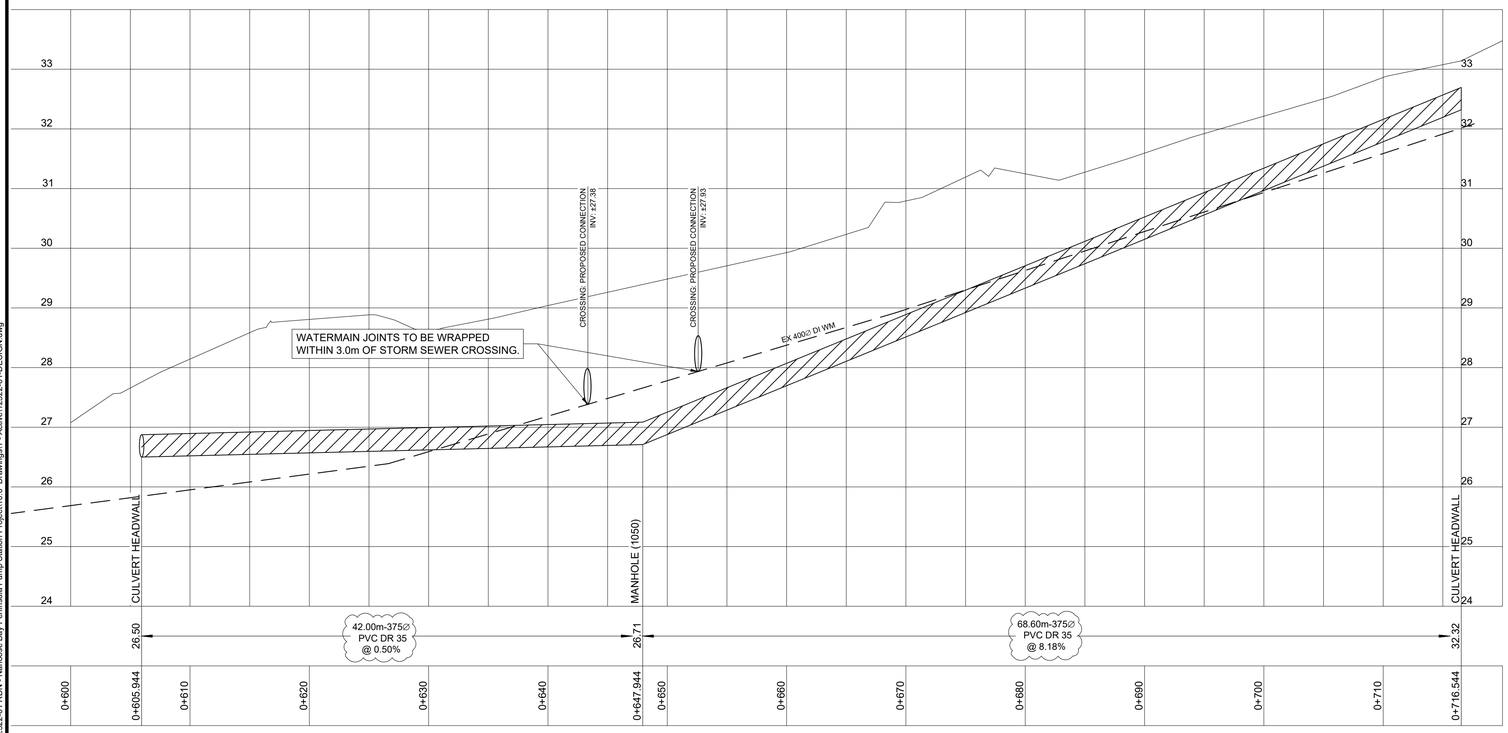

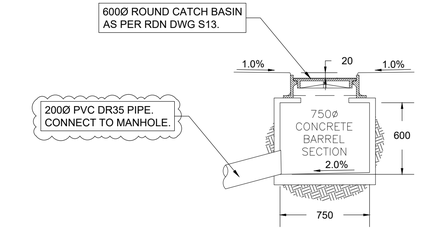

CATCH BASIN AND CONCRETE BARREL DETAILS

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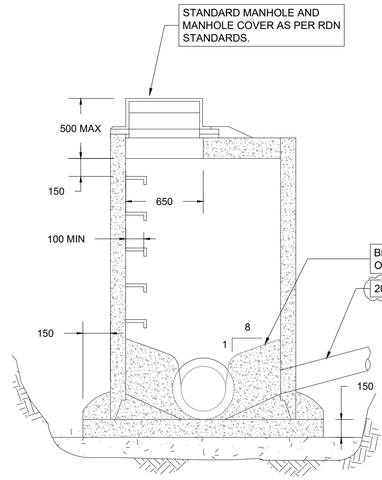

MANHOLE DETAILS

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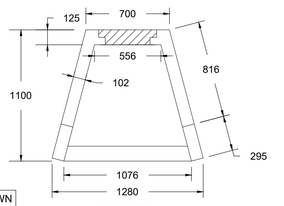
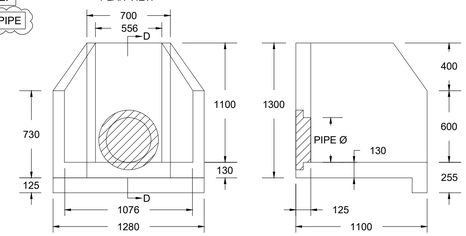


PLAN VIEW



ELEVATION VIEW SECTION D-D

CULVERT HEADWALL DETAILS

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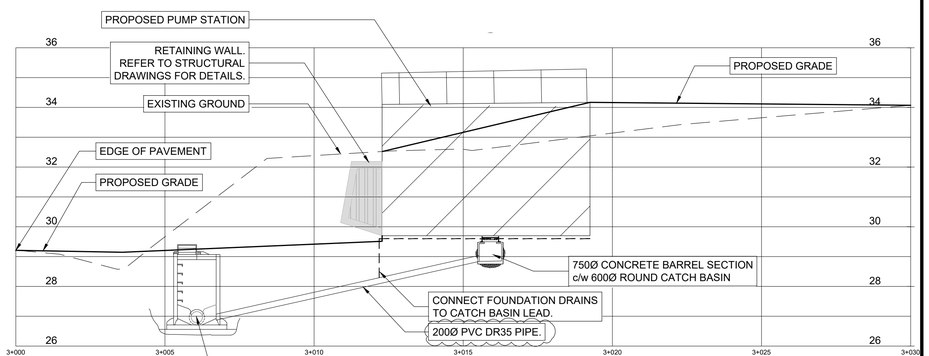

SECTION C

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ISSUED FOR
TENDER

Rev	Date	Description	Drawn	Design	App'd
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0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

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0 V 1:50 2

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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Tel 250 716 3336

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REGIONAL DISTRICT OF NANAIMO

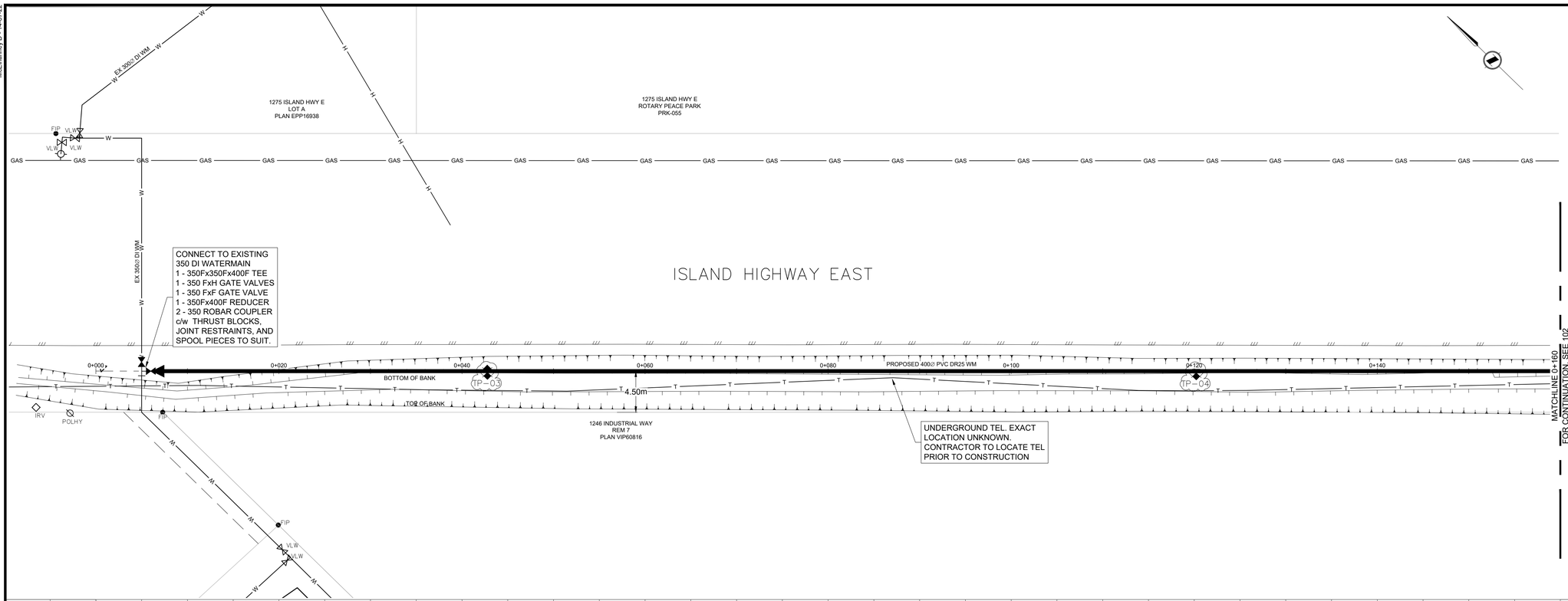
NANOOSE BAY PENINSULA PUMP STATION

PUMP STATION SITE DRAINAGE PLAN

Drawing No. C03

Project Number	Rev.
2231-12522-01	1

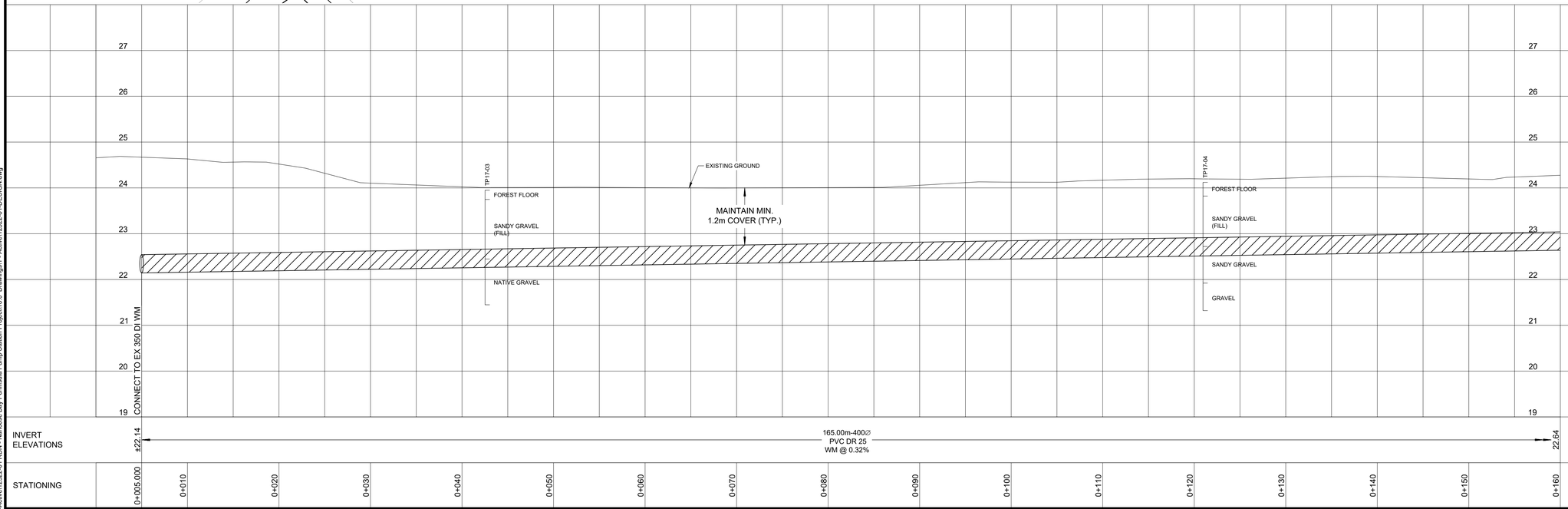
DESTROY ALL PRINTS BEARING PREVIOUS REVISION



NOTES:

1. EXISTING UTILITY LOCATIONS AND ELEVATIONS ARE SCHEMATIC ONLY AND HAVE BEEN INTERPRETED FROM AS-BUILT DRAWINGS WHICH ARE CONSIDERED INCOMPLETE/INACCURATE. CONTRACTOR IS TO LOCATE EXISTING UTILITIES PRIOR TO CONSTRUCTION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE CONTRACT ADMINISTRATOR.
2. CONTRACTOR IS TO EXPOSE PROPOSED CROSSINGS AND TIE-INS TO CONFIRM LOCATIONS AND ELEVATIONS PRIOR TO CONSTRUCTION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE CONTRACT ADMINISTRATOR.
3. COORDINATE SHUTDOWN AND TIE-IN WITH THE REGIONAL DISTRICT OF NANAIMO AND CITY OF PARKSVILLE PUBLIC WORKS.
4. REFER TO GEOTECHNICAL ASSESSMENT FOR GROUND CONDITIONS.
5. ANY AFFECTED UTILITY POLES ARE TO BE SUPPORTED AS REQUIRED TO THE SATISFACTION OF THE UTILITY POLE'S OWNER.

ISSUED FOR
TENDER



Rev	Date	Description	Drawn	Design	App'd
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0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

0 H 1:250 10
0 V 1:50 2

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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Tel 250 716 3336

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REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION

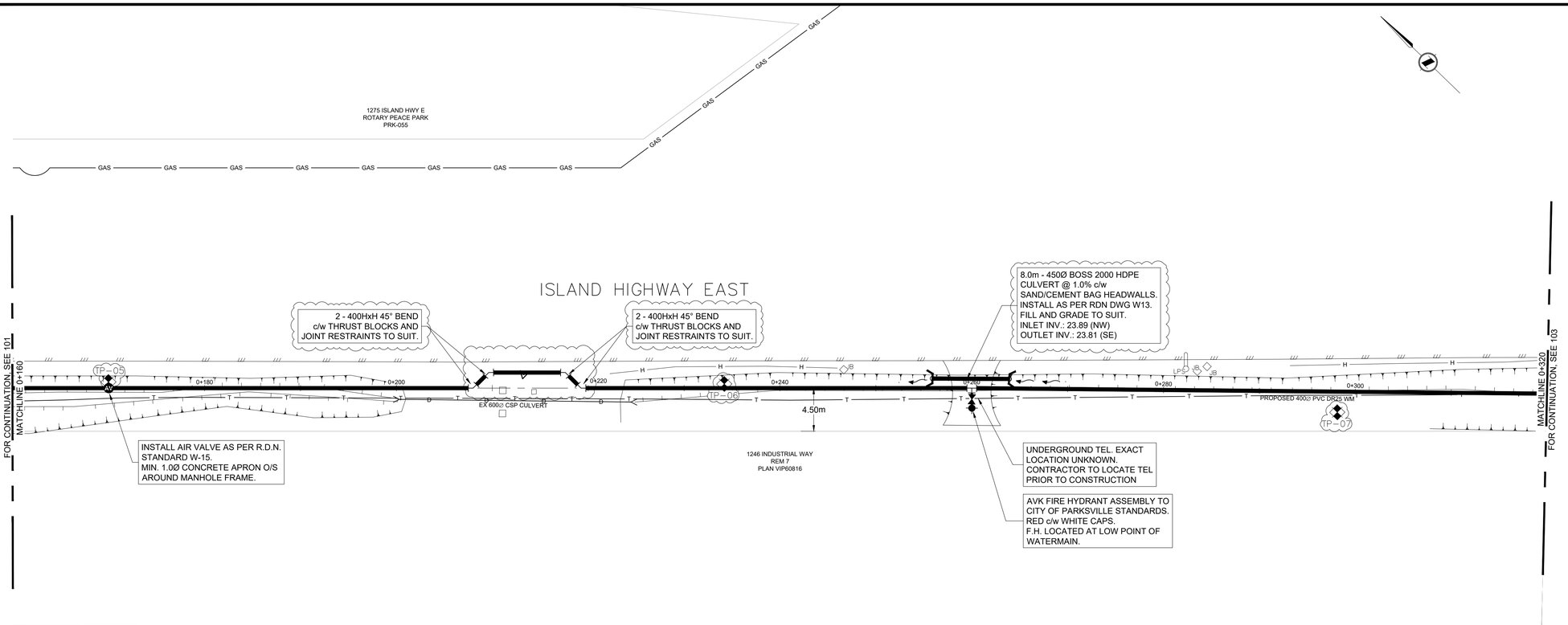
WATERMAIN PLAN AND PROFILE

STA. 0+000 TO 0+160

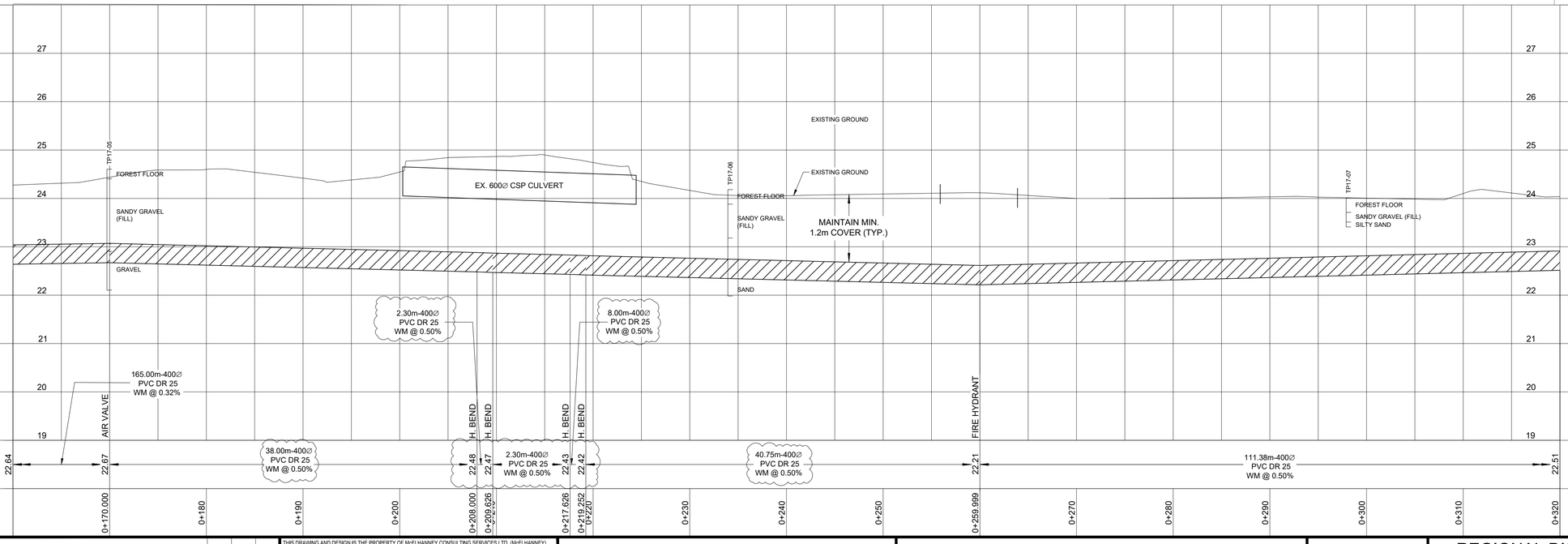
Drawing No. C04

Project Number 2231-12522-01

Rev. 1



ISSUED FOR
TENDER



Rev	Date	Description	Drawn	Design	App'd
1	JUN. 5, 2018	ADDENDUM # 1	MCP	RI	RI
0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

0 H 1:250 10
0 V 1:50 2

ORIGINAL DWG SIZE: ANSI D (22" x 34")

McElhanney
McElhanney Consulting Services Ltd.
1351 Estevan Road
Suite 1
Nanaimo BC
Canada V9S 3Y3
Tel 250 716 3336

Approved Sealed

REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION

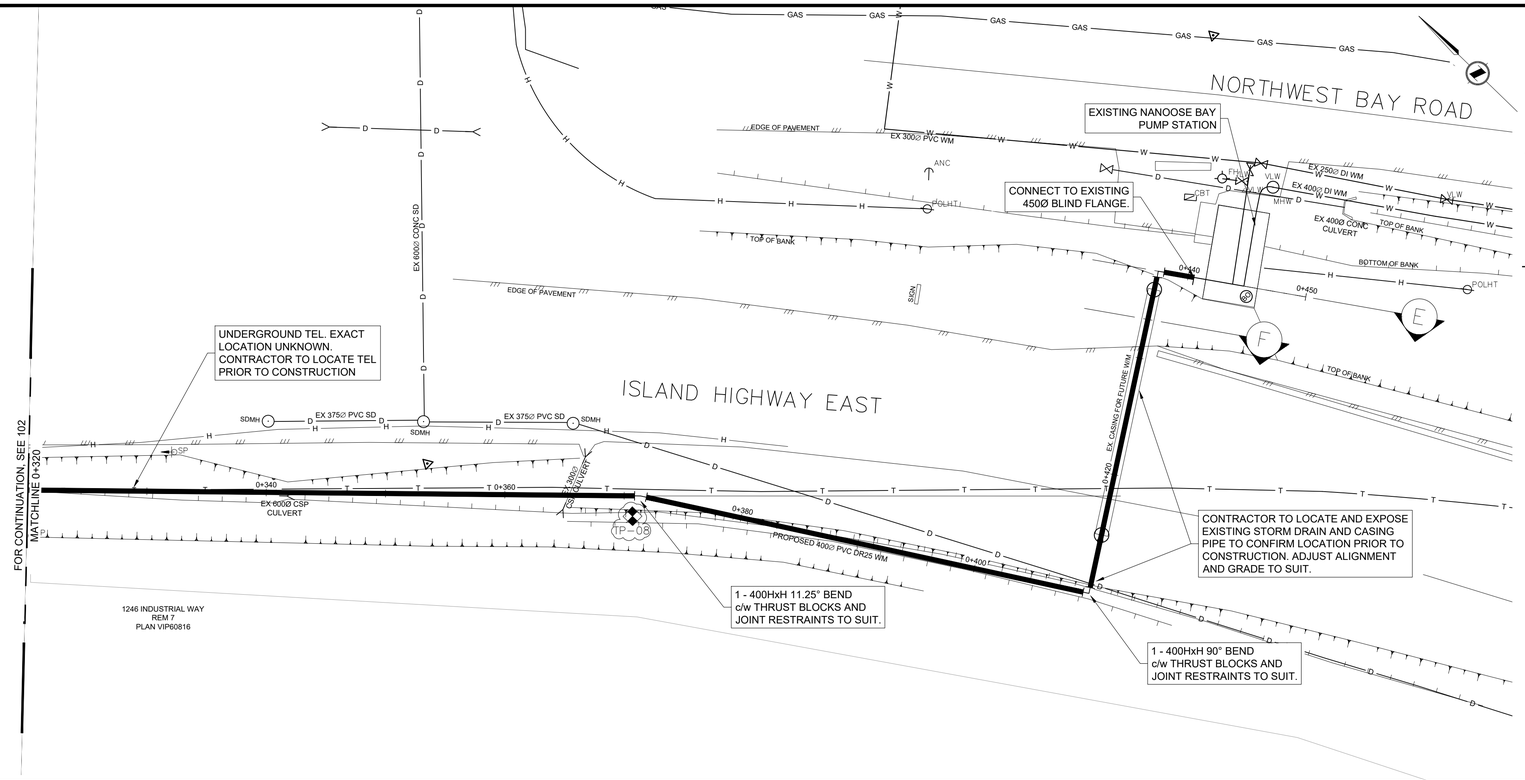
WATERMAIN PLAN AND PROFILE

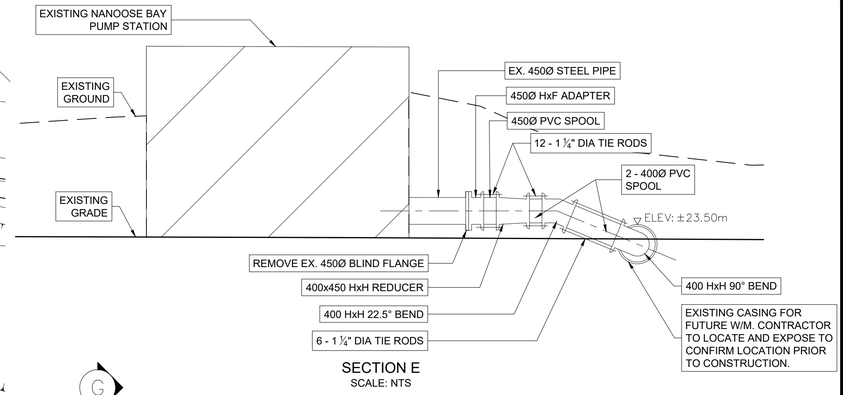
STA. 0+160 TO 0+320

Drawing No. C05

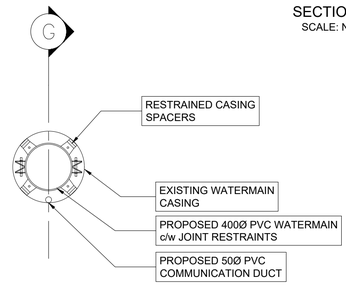
Project Number 2231-12522-01

Rev. 1

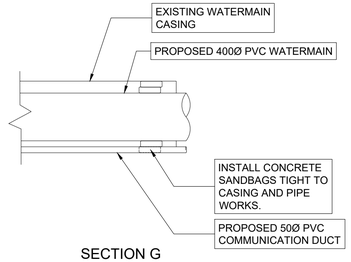




SECTION E
SCALE: NTS



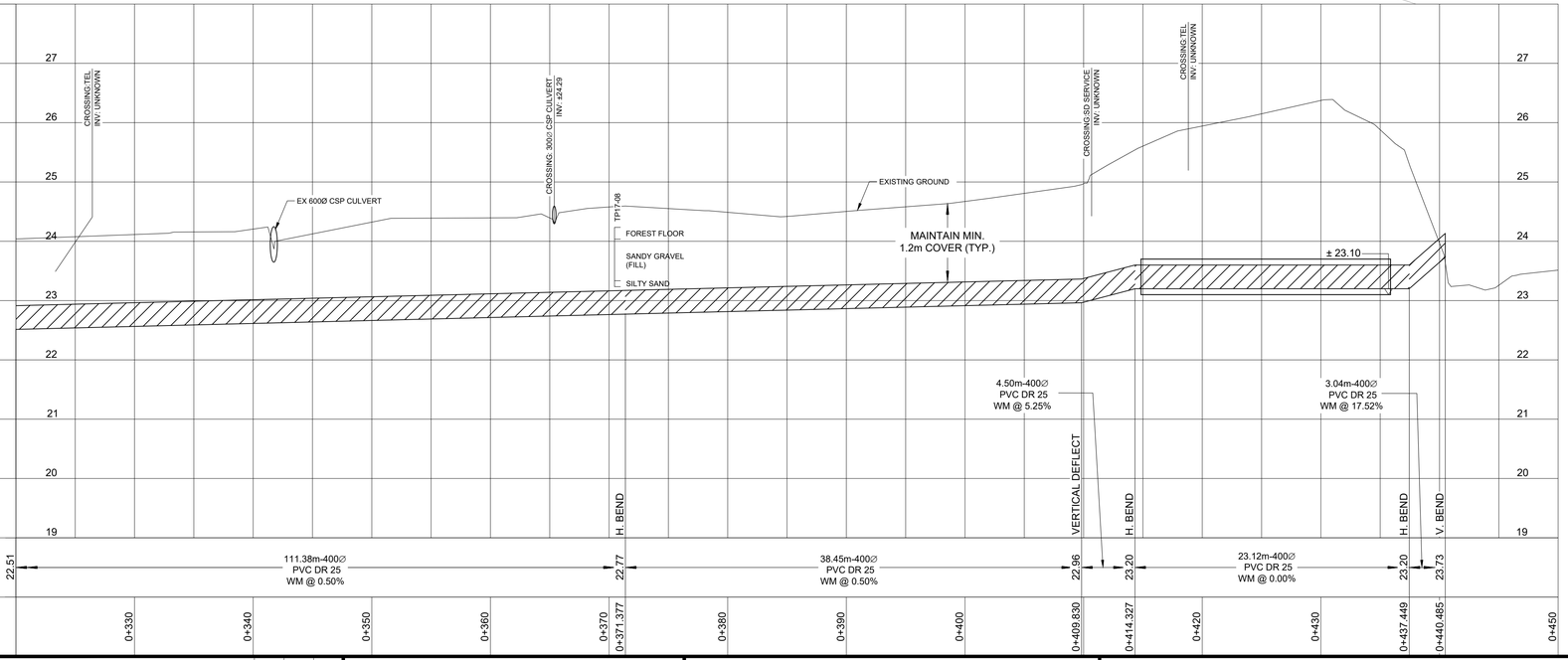
SECTION F
SCALE: NTS

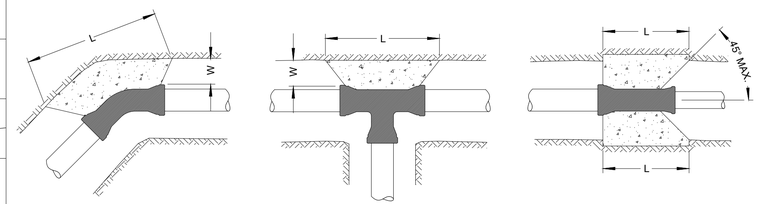


SECTION G
SCALE: NTS

NOTES:

1. PROVIDE JOINT CONTINUITY BONDS AS PER MMCD DWG W106 WHERE REQUIRED TO ENSURE CONTINUOUS ELECTRICAL CONDUCTIVITY.
2. PROVIDE A 14.5 KG MAGNESIUM ANODE CONSISTENT WITH MMCD DWG W119.
3. COAT ALL METAL COMPONENTS WITH DENSO TAPE OR APPROVED EQUIVALENT.





HORIZONTAL BEND | TEE | REDUCER

TYPE OF FITTING	FITTING SIZE	OUTSIDE OF FITTING TO BEARING FACE	LENGTH	HEIGHT	RECESS IN TRENCH
	D	W	L	H	
90° BEND	400	400	1650	920	
25.5° BEND	400	400	920	460	
11.25° BEND	400	450	920	460	
TEE	400	450	1220	920	
REDUCER	400	450	1000	1000	300

THRUST BLOCK DETAILS
SCALE: NTS

ISSUED FOR
TENDER

Rev	Date	Description	Drawn	Design	App'd
1	JUN. 5, 2018	ADDENDUM # 1	MCP	RI	RI
0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

0 H 1:250 10
0 V 1:50 2

ORIGINAL DWG SIZE: ANSI D (22" x 34")

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Approved Sealed

REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION

WATERMAIN PLAN AND PROFILE

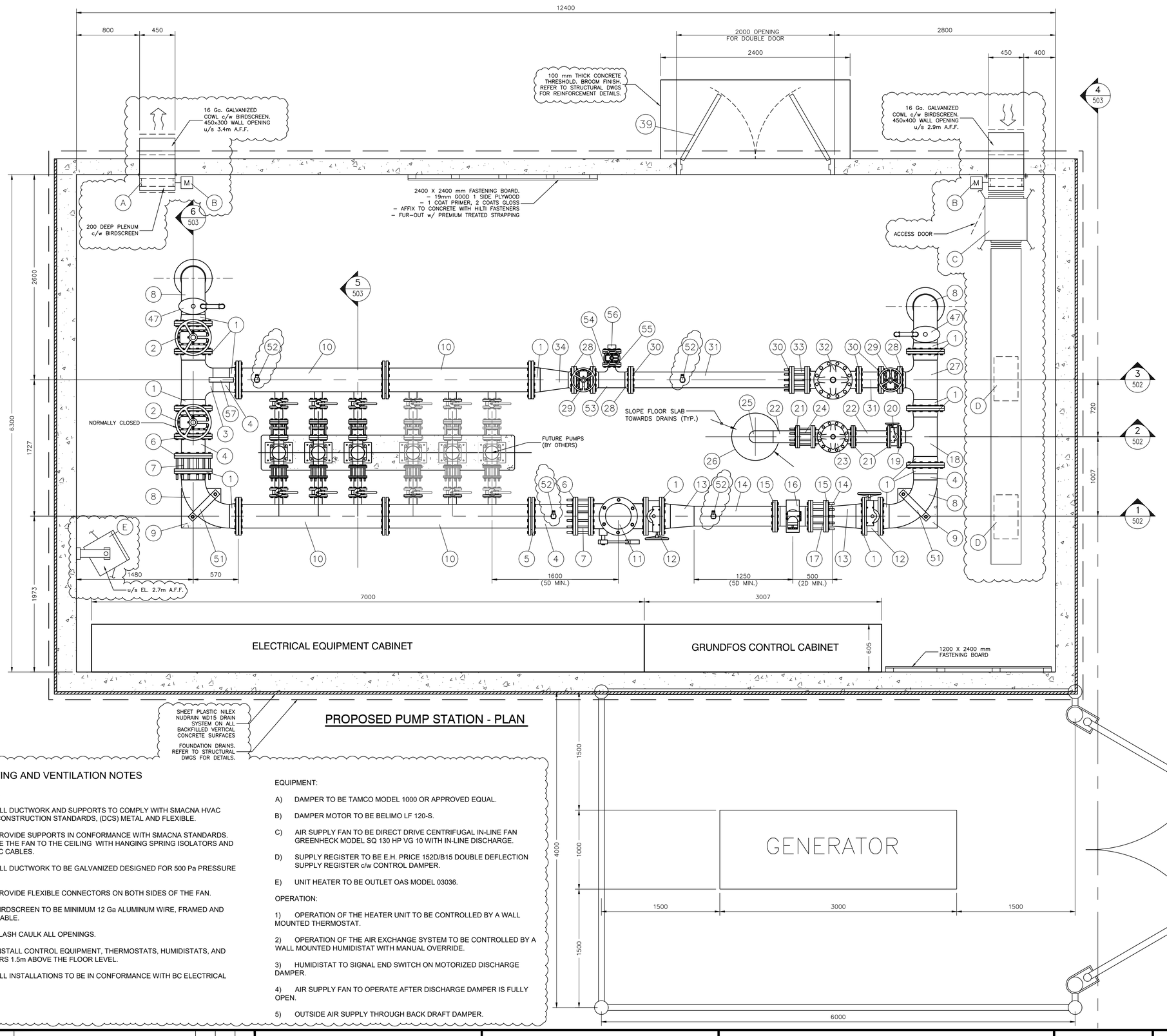
STA. 0+320 TO 0+470

Drawing No. C06

Project Number 2231-12522-01

Rev. 1

DESTROY ALL PRINTS BEARING PREVIOUS REVISION



PROPOSED PUMP STATION - PLAN

COMPONENTS LIST

ITEM NO.	DESCRIPTION	QUANTITY
1	WELD NECK FLANGE, 300 DIA., CL150	15
2	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 300 DIA.	2
3	TEE, STEEL, 300, CL150	1
4	PIPE, 300 DIA. STAINLESS STEEL	TO SUIT
5	LAP JOINT FLANGE, 300 DIA., CL150	1
6	SLIP-ON FLANGE, 300 DIA., CL150	3
7	DISMANTLING JOINT, BAKER, 300 DIA., CL150	2
8	90 DEG. ELBOW, STEEL, 300 DIA., CL150	4
9	90 DEG. ELBOW PEDESTAL	2
10	GRUNDFOS BOOSTERPAC PACKAGE	1
11	APCO FLANGED SWING CHECK VALVE WITH OUTSIDE LEVER WEIGHT, 300 DIA., CL150	1
12	FLANGED BUTTERFLY VALVE c/w HANDWHEEL ACTUATOR, 300 DIA.	2
13	REDUCER, 300 x 250, SCH 10S STAINLESS STEEL	2
14	PIPE, 250 DIA. STAINLESS STEEL	TO SUIT
15	SLIP-ON FLANGE, 250 DIA., CL150	2
16	PROLINE PROMAG E100 ELECTROMAGNETIC FLOWMETER, 250 DIA.	1
17	DISMANTLING JOINT, BAKER, 250 DIA., CL150	1
18	TEE, STEEL, 300 x 300 x 150, CL150	1
19	WELD NECK FLANGE, 150 DIA., CL150	1
20	FLANGED BUTTERFLY VALVE c/w HANDWHEEL ACTUATOR, 150 DIA.	1
21	SLIP-ON FLANGE, 150 DIA., CL150	3
22	PIPE, 150 DIA. STAINLESS STEEL	TO SUIT
23	CLA VAL MODEDL 52-03 PRESSURE RELEASE AND SURGE ANTICIPATION VALVE, 150 DIA.	1
24	DISMANTLING JOINT, BAKER, 150 DIA., CL150	1
25	90 DEG. ELBOW, STEEL, 150 DIA., CL150	1
26	ROUND CATCH BASIN DRAINAGE GRATE, 600 DIA.	1
27	TEE, STEEL, 300 x 300 x 200, CL150	1
28	WELD NECK FLANGE, 200 DIA., CL150	4
29	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 200 DIA.	2
30	SLIP-ON FLANGE, 200 DIA., CL150	4
31	PIPE, 200 DIA. STAINLESS STEEL	TO SUIT
32	OWNER SUPPLIED PRV	1
33	DISMANTLING JOINT, BAKER, 200 DIA., CL150	1
34	REDUCER, 300 x 200, SCH 10S STAINLESS STEEL	1
35	ROBAR COUPLER, 300 DIA.	2
36	W150 x 8000mm LONG. COAT WITH YELLOW URETHANE RAIL	1
37	YALE HAND CHAIN HOIST (MODEL VS111) WITH A 500KG WORKING LOAD LIMIT c/w A YALE HTP-A PUSH TROLLEY WITH A 500KG LOAD LIMIT (OR APPROVED EQUALS)	1
38	PIPE, 300 DIA. PVC	TO SUIT
39	STEEL DOUBLE DOOR. 2000MM WIDE x 2200 HIGH.	1
40	CONCRETE PUMP PEDESTAL	1
41	ADJUSTABLE PIPE SUPPORT	20
42	THREDOLET, 50FIPT, CL150	7
43	NIPPLE, STAINLESS STEEL, 50MIPT x 50MIPT, CL150	TO SUIT
44	BALL VALVE, STAINLESS STEEL, 50FIPT, CL2	2
45	PRESSURE GAUGE, 0-1380 Kpa (0-200 PSI IN 2 PSI INCREMENTS) c/w SNUBBER, STAINLESS STEEL SHUTOFF, STAINLESS STEEL NIPPLES, & REDUCING BUSHING ALL SIZED TO SUIT.	2
46	TEE, STAINLESSS, 50FIPT, CL150 w/ BALL VALVE	2
47	AIR VALVE, APCO 145C, 50FIPT	2
48	NIPPLE, STAINLESS STEEL, 50MIPT x 50MIPT, CL150	TO SUIT
49	90 DEG. ELBOW, STAINLESS STEEL, 50FIPT, CL150	4
50	NIPPLE, STAINLESS STEEL, 50 MIPTx PLAIN. CL150, TO FLOOR	2
51	STAINLESS STEEL THRUST STRAP	2
52	PRESSURE TRANSDUCER	4
53	TEE, STEEL, 200 x 200 x 100, CL150	1
54	SLIP-ON FLANGE, 100 DIA., CL150	1
55	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 100 DIA.	1
56	FLANGE x STORZ ADAPTER, 100 DIA., w/ LOCK w/ CAP	1
57	SMITH CAMERON FREE CHLORINE ANALYZER/Ph ANALYZER PACKAGE (Drawing B1599)	1

HEATING AND VENTILATION NOTES

NOTES:

1) ALL DUCTWORK AND SUPPORTS TO COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, (DCS) METAL AND FLEXIBLE.

2) PROVIDE SUPPORTS IN CONFORMANCE WITH SMACNA STANDARDS. SECURE THE FAN TO THE CEILING WITH HANGING SPRING ISOLATORS AND SEISMIC CABLES.

3) ALL DUCTWORK TO BE GALVANIZED DESIGNED FOR 500 Pa PRESSURE CLASS.

4) PROVIDE FLEXIBLE CONNECTORS ON BOTH SIDES OF THE FAN.

5) BIRDSCREEN TO BE MINIMUM 12 Ga ALUMINUM WIRE, FRAMED AND REMOVABLE.

6) FLASH CAULK ALL OPENINGS.

7) INSTALL CONTROL EQUIPMENT, THERMOSTATS, HUMIDISTATS, AND SENSORS 1.5m ABOVE THE FLOOR LEVEL.

8) ALL INSTALLATIONS TO BE IN CONFORMANCE WITH BC ELECTRICAL CODE.

EQUIPMENT:

A) DAMPER TO BE TAMCO MODEL 1000 OR APPROVED EQUAL.

B) DAMPER MOTOR TO BE BELIMO LF 120-S.

C) AIR SUPPLY FAN TO BE DIRECT DRIVE CENTRIFUGAL IN-LINE FAN GREENHECK MODEL SQ 130 HP VG 10 WITH IN-LINE DISCHARGE.

D) SUPPLY REGISTER TO BE E.H. PRICE 152D/B15 DOUBLE DEFLECTION SUPPLY REGISTER c/w CONTROL DAMPER.

E) UNIT HEATER TO BE OUTLET OAS MODEL 03036.

OPERATION:

1) OPERATION OF THE HEATER UNIT TO BE CONTROLLED BY A WALL MOUNTED THERMOSTAT.

2) OPERATION OF THE AIR EXCHANGE SYSTEM TO BE CONTROLLED BY A WALL MOUNTED HUMIDISTAT WITH MANUAL OVERRIDE.

3) HUMIDISTAT TO SIGNAL END SWITCH ON MOTORIZED DISCHARGE DAMPER.

4) AIR SUPPLY FAN TO OPERATE AFTER DISCHARGE DAMPER IS FULLY OPEN.

5) OUTSIDE AIR SUPPLY THROUGH BACK DRAFT DAMPER.

NOTES:

1) ALL PIPE FITTINGS, BOLTS AND CONNECTORS TO BE STAINLESS STEEL AS PER AWWA STANDARD.

2) CONTRACTOR TO PROVIDE SHOP DRAWINGS PRIOR TO FABRICATION.

ISSUED FOR TENDER

Rev	Date	Description	Drawn	Design	App'd
1	JUN. 5, 2018	ADDENDUM # 1	MCP	RI	RI
0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

0 1:25 1

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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Tel 250 716 3336

Approved Sealed

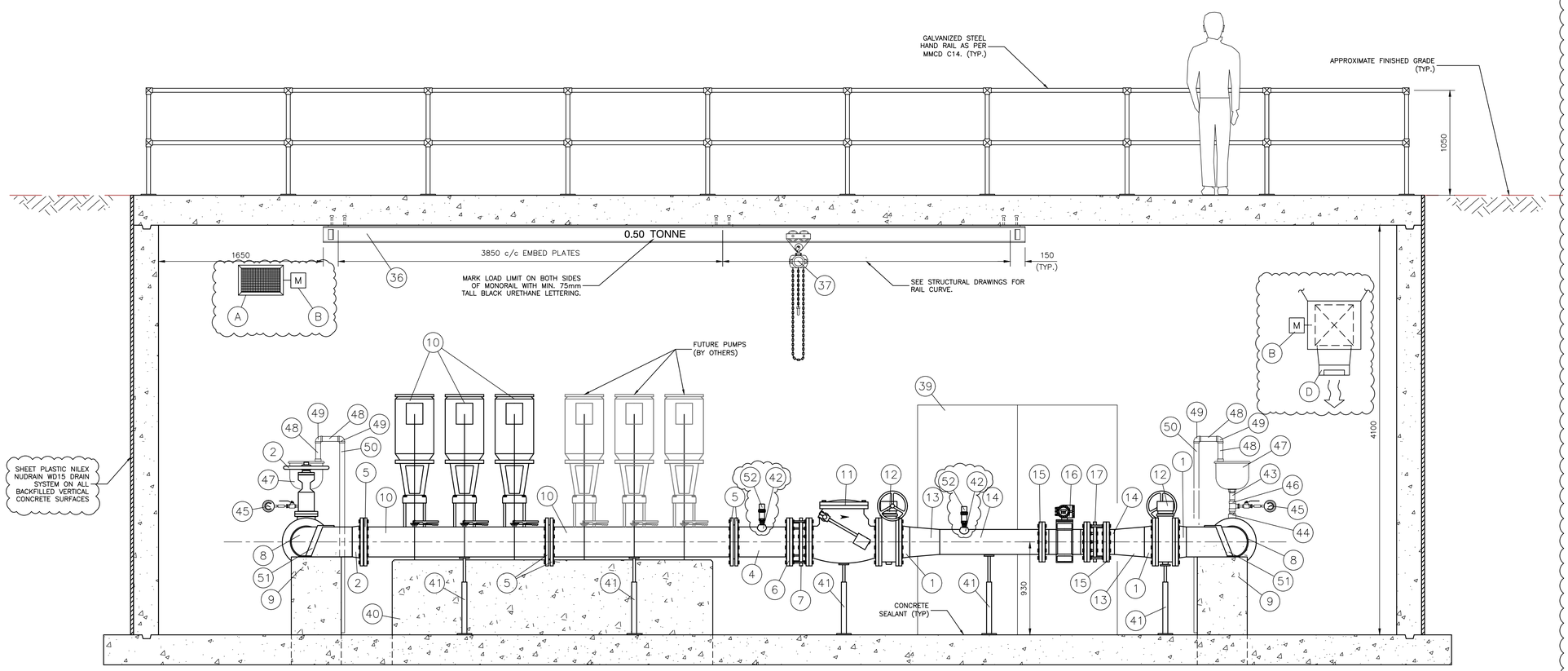
REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA
PUMP STATION
FLOOR PLAN

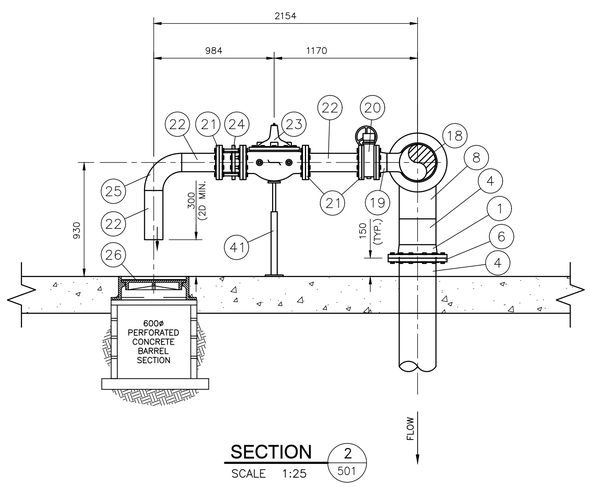
Drawing No. M01

Project Number 2231-12522-01

Rev. 1



SECTION 1
SCALE 1:25
501



SECTION 2
SCALE 1:25
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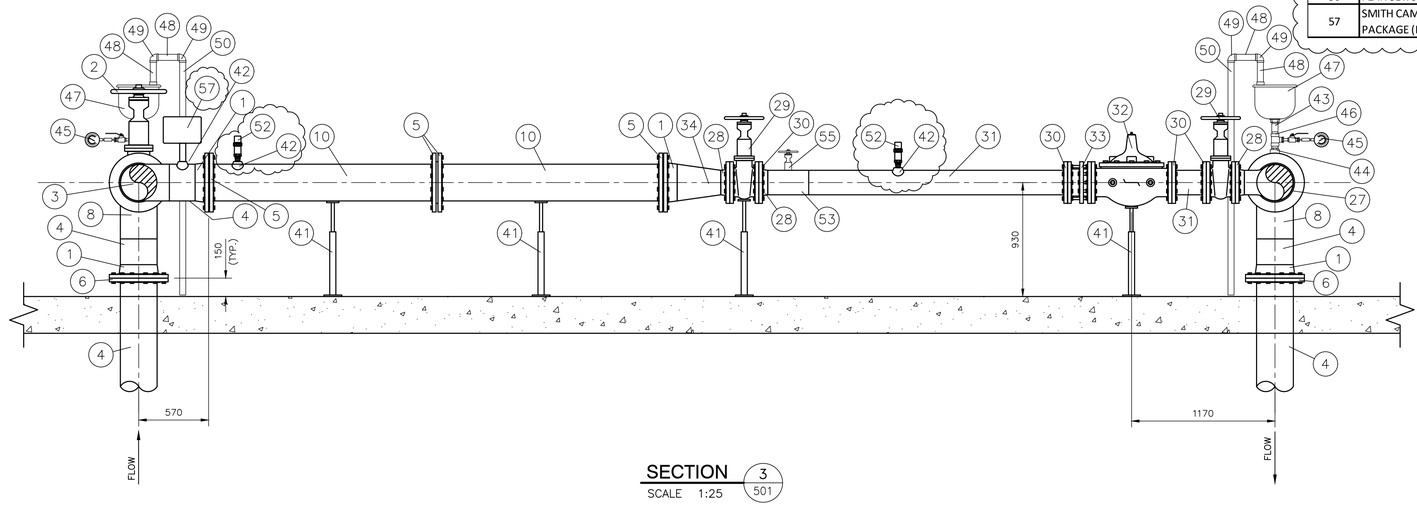

SECTION 3
SCALE 1:25
501

COMPONENTS LIST		
ITEM NO.	DESCRIPTION	QUANTITY
1	WELD NECK FLANGE, 300 DIA., CL150	15
2	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 300 DIA.	2
3	TEE, STEEL, 300, CL150	1
4	PIPE, 300 DIA. STAINLESS STEEL	TO SUIT
5	LAP JOINT FLANGE, 300 DIA., CL150	1
6	SLIP-ON FLANGE, 300 DIA., CL150	3
7	DISMANTLING JOINT, BAKER, 300 DIA., CL150	2
8	90 DEG. ELBOW, STEEL, 300 DIA., CL150	4
9	90 DEG. ELBOW PEDESTAL	2
10	GRUNDFOS BOOSTERPAC PACKAGE	1
11	APCO FLANGED SWING CHECK VALVE WITH OUTSIDE LEVER WEIGHT, 300 DIA., CL150	1
12	FLANGED BUTTERFLY VALVE c/w HANDWHEEL ACTUATOR, 300 DIA.	2
13	REDUCER, 300 x 250, SCH 10S STAINLESS STEEL	2
14	PIPE, 250 DIA. STAINLESS STEEL	TO SUIT
15	SLIP-ON FLANGE, 250 DIA., CL150	2
16	PROLINE PROMAG E100 ELECTROMAGNETIC FLOWMETER, 250 DIA.	1
17	DISMANTLING JOINT, BAKER, 250 DIA., CL150	1
18	TEE, STEEL, 300 x 300 x 150, CL150	1
19	WELD NECK FLANGE, 150 DIA., CL150	1
20	FLANGED BUTTERFLY VALVE c/w HANDWHEEL ACTUATOR, 150 DIA.	1
21	SLIP-ON FLANGE, 150 DIA., CL150	3
22	PIPE, 150 DIA. STAINLESS STEEL	TO SUIT
23	CLA VAL MODEDL 52-03 PRESSURE RELEASE AND SURGE ANTICIPATION VALVE, 150 DIA.	1
24	DISMANTLING JOINT, BAKER, 150 DIA., CL150	1
25	90 DEG. ELBOW, STEEL, 150 DIA., CL150	1
26	ROUND CATCH BASIN DRAINAGE GRATE, 600 DIA.	1
27	TEE, STEEL, 300 x 300 x 200, CL150	1
28	WELD NECK FLANGE, 200 DIA., CL150	4
29	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 200 DIA.	2
30	SLIP-ON FLANGE, 200 DIA., CL150	4
31	PIPE, 200 DIA. STAINLESS STEEL	TO SUIT
32	OWNER SUPPLIED PRV	1
33	DISMANTLING JOINT, BAKER, 200 DIA., CL150	1
34	REDUCER, 300 x 200, SCH 10S STAINLESS STEEL	1
35	ROBAR COUPLER, 300 DIA.	2
36	W150 x 8000mm LONG. COAT WITH YELLOW URETHANE RAIL	1
37	YALE HAND CHAIN HOIST (MODEL VS111) WITH A 500KG WORKING LOAD LIMIT c/w A YALE HTP-A PUSH TROLLEY WITH A 500KG LOAD LIMIT (OR APPROVED EQUALS)	1
38	PIPE, 300 DIA. PVC	TO SUIT
39	STEEL DOUBLE DOOR. 2000MM WIDE x 2200 HIGH.	1
40	CONCRETE PUMP PEDESTAL	1
41	ADJUSTABLE PIPE SUPPORT	20
42	THREDOLET, 50FIPT, CL150	7
43	NIPPLE, STAINLESS STEEL, 50MIPT x 50MIPT, CL150	TO SUIT
44	BALL VALVE, STAINLESS STEEL, 50FIPT, CL2	2
45	PRESSURE GAUGE, 0-1380 Kpa (0-200 PSI IN 2 PSI INCREMENTS) c/w SNUBBER, STAINLESS STEEL SHUTOFF, STAINLESS STEEL NIPPLES, & REDUCING BUSHING ALL SIZED TO SUIT.	2
46	TEE, STAINLESSS, 50FIPT, CL150 w/ BALL VALVE	2
47	AIR VALVE, APCO 145C, 50FIPT	2
48	NIPPLE, STAINLESS STEEL, 50MIPT x 50MIPT, CL150	TO SUIT
49	90 DEG. ELBOW, STAINLESS STEEL, 50FIPT, CL150	4
50	NIPPLE, STAINLESS STEEL, 50 MIPTx PLAIN. CL150, TO FLOOR	2
51	STAINLESS STEEL THRUST STRAP	2
52	PRESSURE TRANSDUCER	4
53	TEE, STEEL, 200 x 200 x 100, CL150	1
54	SLIP-ON FLANGE, 100 DIA., CL150	1
55	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 100 DIA.	1
56	FLANGE x STORZ ADAPTER, 100 DIA., w/ LOCK w/ CAP	1
57	SMITH CAMERON FREE CHLORINE ANALYZER/Ph ANALYZER PACKAGE (Drawing B1599)	1

NOTES:

1) ALL PIPE FITTINGS, BOLTS AND CONNECTORS TO BE STAINLESS STEEL AS PER AWWA STANDARD.

2) CONTRACTOR TO PROVIDE SHOP DRAWINGS PRIOR TO FABRICATION.

ISSUED FOR
TENDER

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1	JUN. 5, 2018	ADDENDUM # 1	MCP	RI	RI
0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

0 1:25 1

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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Approved Sealed

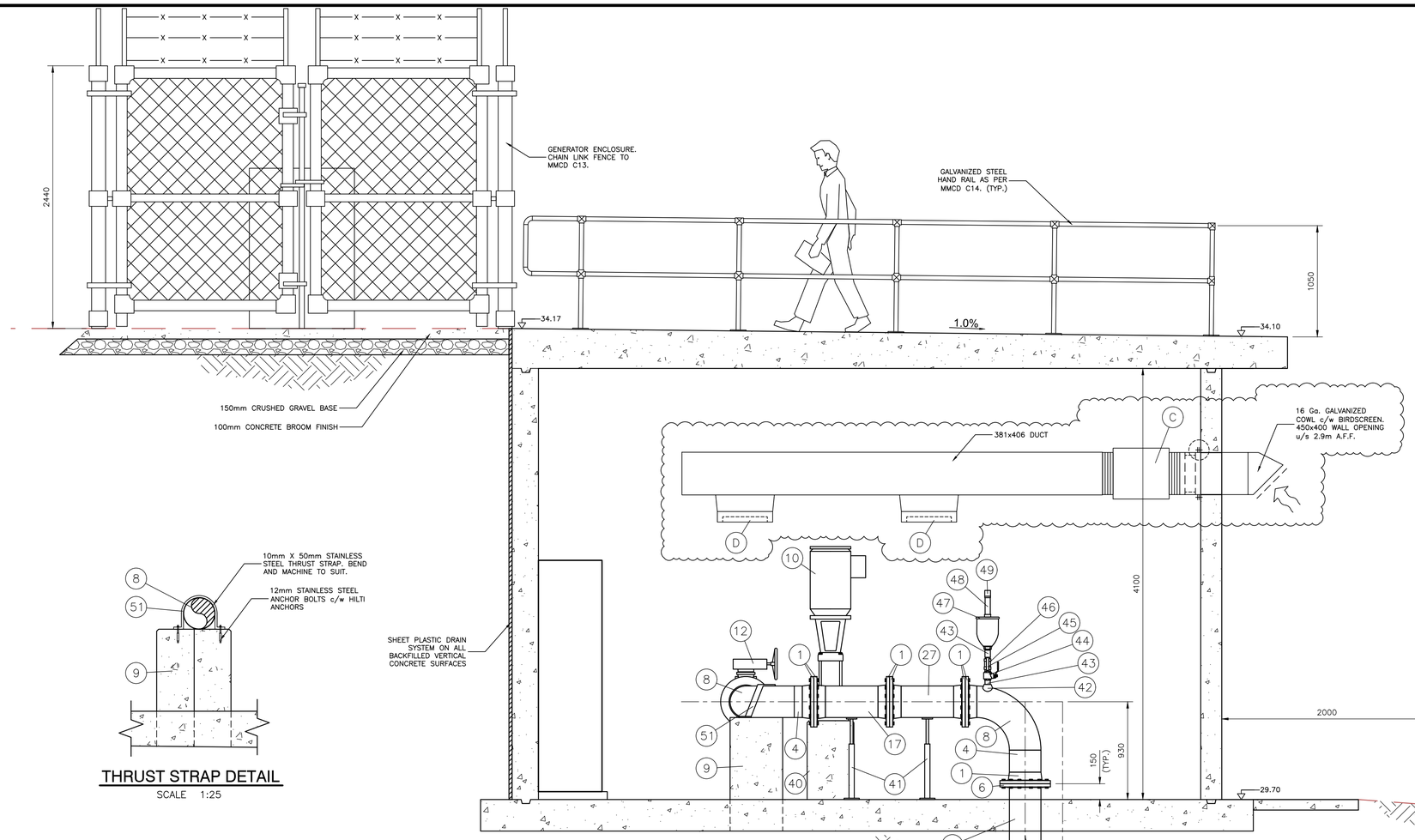
REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA
PUMP STATION
CROSS SECTIONS (1 of 2)

Drawing No.
M02

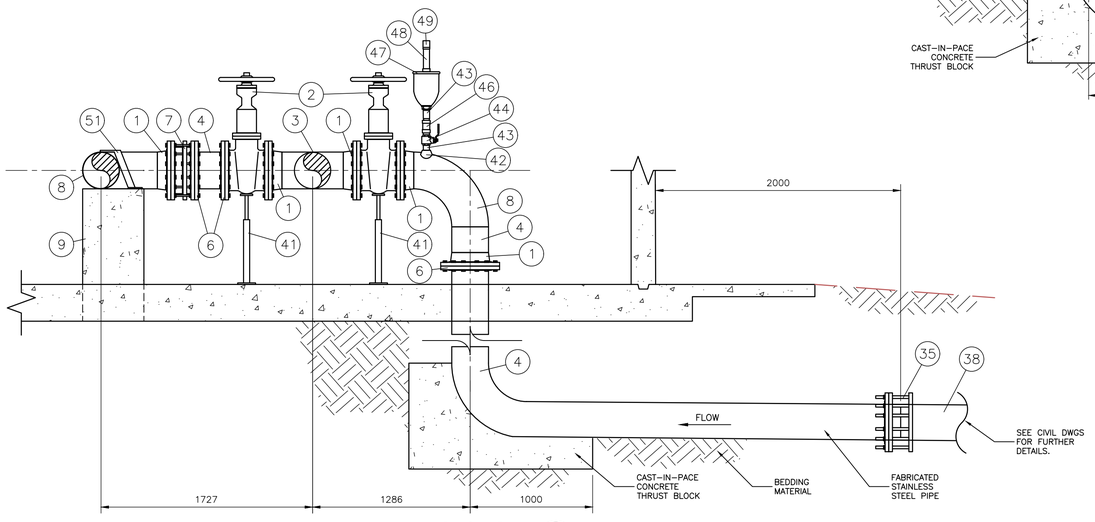
Project Number
2231-12522-01

Rev.
1

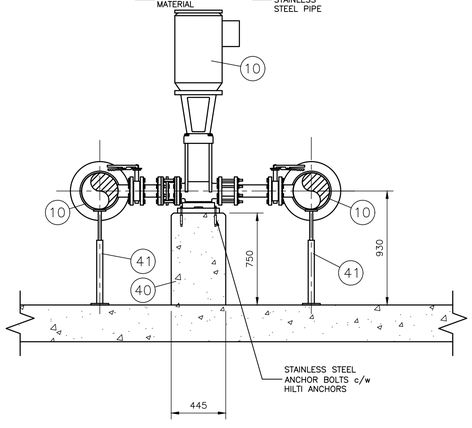


THRUST STRAP DETAIL
SCALE 1:25

SECTION 4 / 501
SCALE 1:25



SECTION 6 / 501
SCALE 1:25



SECTION 5 / 501
SCALE 1:25

COMPONENTS LIST		
ITEM NO.	DESCRIPTION	QUANTITY
1	WELD NECK FLANGE, 300 DIA., CL150	15
2	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 300 DIA.	2
3	TEE, STEEL, 300, CL150	1
4	PIPE, 300 DIA. STAINLESS STEEL	TO SUIT
5	LAP JOINT FLANGE, 300 DIA., CL150	1
6	SLIP-ON FLANGE, 300 DIA., CL150	3
7	DISMANTLING JOINT, BAKER, 300 DIA., CL150	2
8	90 DEG. ELBOW, STEEL, 300 DIA., CL150	4
9	90 DEG. ELBOW PEDESTAL	2
10	GRUNDFOS BOOSTERPAC PACKAGE	1
11	APCO FLANGED SWING CHECK VALVE WITH OUTSIDE LEVER WEIGHT, 300 DIA., CL150	1
12	FLANGED BUTTERFLY VALVE c/w HANDWHEEL ACTUATOR, 300 DIA.	2
13	REDUCER, 300 x 250, SCH 10S STAINLESS STEEL	2
14	PIPE, 250 DIA. STAINLESS STEEL	TO SUIT
15	SLIP-ON FLANGE, 250 DIA., CL150	2
16	PROLINE PROMAG E100 ELECTROMAGNETIC FLOWMETER, 250 DIA.	1
17	DISMANTLING JOINT, BAKER, 250 DIA., CL150	1
18	TEE, STEEL, 300 x 300 x 150, CL150	1
19	WELD NECK FLANGE, 150 DIA., CL150	1
20	FLANGED BUTTERFLY VALVE c/w HANDWHEEL ACTUATOR, 150 DIA.	1
21	SLIP-ON FLANGE, 150 DIA., CL150	3
22	PIPE, 150 DIA. STAINLESS STEEL	TO SUIT
23	CLA VAL MODEDL 52-03 PRESSURE RELEASE AND SURGE ANTICIPATION VALVE, 150 DIA.	1
24	DISMANTLING JOINT, BAKER, 150 DIA., CL150	1
25	90 DEG. ELBOW, STEEL, 150 DIA., CL150	1
26	ROUND CATCH BASIN DRAINAGE GRATE, 600 DIA.	1
27	TEE, STEEL, 300 x 300 x 200, CL150	1
28	WELD NECK FLANGE, 200 DIA., CL150	4
29	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 200 DIA.	2
30	SLIP-ON FLANGE, 200 DIA., CL150	4
31	PIPE, 200 DIA. STAINLESS STEEL	TO SUIT
32	OWNER SUPPLIED PRV	1
33	DISMANTLING JOINT, BAKER, 200 DIA., CL150	1
34	REDUCER, 300 x 200, SCH 10S STAINLESS STEEL	1
35	ROBAR COUPLER, 300 DIA.	2
36	W150 x 8000mm LONG. COAT WITH YELLOW URETHANE RAIL	1
37	YALE HAND CHAIN HOIST (MODEL VS111) WITH A 500KG WORKING LOAD LIMIT c/w A YALE HTP-A PUSH TROLLEY WITH A 500KG LOAD LIMIT (OR APPROVED EQUALS)	1
38	PIPE, 300 DIA. PVC	TO SUIT
39	STEEL DOUBLE DOOR. 2000MM WIDE x 2200 HIGH.	1
40	CONCRETE PUMP PEDESTAL	1
41	ADJUSTABLE PIPE SUPPORT	20
42	THREDOLET, 50FIPT, CL150	7
43	NIPPLE, STAINLESS STEEL, 50MIPT x 50MIPT, CL150	TO SUIT
44	BALL VALVE, STAINLESS STEEL, 50FIPT, CL2	2
45	PRESSURE GAUGE, 0-1380 Kpa (0-200 PSI IN 2 PSI INCREMENTS) c/w SNUBBER, STAINLESS STEEL SHUTOFF, STAINLESS STEEL NIPPLES, & REDUCING BUSHING ALL SIZED TO SUIT.	2
46	TEE, STAINLESSS, 50FIPT, CL150 w/ BALL VALVE	2
47	AIR VALVE, APCO 145C, 50FIPT	2
48	NIPPLE, STAINLESS STEEL, 50MIPT x 50MIPT, CL150	TO SUIT
49	90 DEG. ELBOW, STAINLESS STEEL, 50FIPT, CL150	4
50	NIPPLE, STAINLESS STEEL, 50 MIPTx PLAIN. CL150, TO FLOOR	2
51	STAINLESS STEEL THRUST STRAP	2
52	PRESSURE TRANSDUCER	4
53	TEE, STEEL, 200 x 200 x 100, CL150	1
54	SLIP-ON FLANGE, 100 DIA., CL150	1
55	FLANGED GATE VALVE c/w HANDWHEEL ACTUATOR, 100 DIA.	1
56	FLANGE x STORZ ADAPTER, 100 DIA., w/ LOCK w/ CAP	1
57	SMITH CAMERON FREE CHLORINE ANALYZER/Ph ANALYZER PACKAGE (Drawing B1599)	1

NOTES:

1) ALL PIPE FITTINGS, BOLTS AND CONNECTORS TO BE STAINLESS STEEL AS PER AWWA STANDARD.

2) CONTRACTOR TO PROVIDE SHOP DRAWINGS PRIOR TO FABRICATION.

3) SECTION 4 END WALL NOT SHOWN FOR CLARITY.

ISSUED FOR
TENDER

Rev	Date	Description	Drawn	Design	App'd
1	JUN. 5, 2018	ADDENDUM # 1	MCP	RI	RI
0	MAY 22, 2018	ISSUED FOR TENDER	MCP	RI	RI

0 1:25 1

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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Approved Sealed

REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA
PUMP STATION
CROSS SECTIONS (2 of 2)

Drawing No.
M03

Project Number	Rev.
2231-12522-01	1

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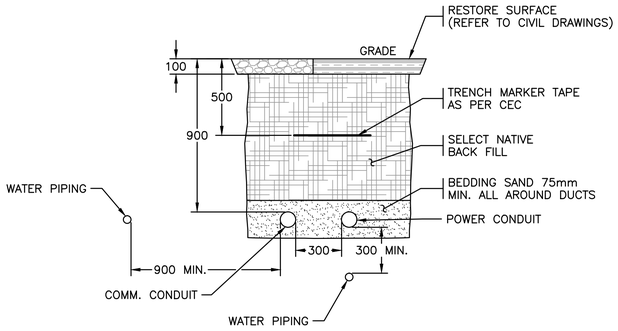
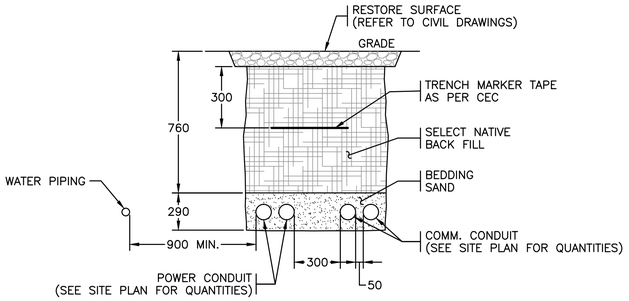
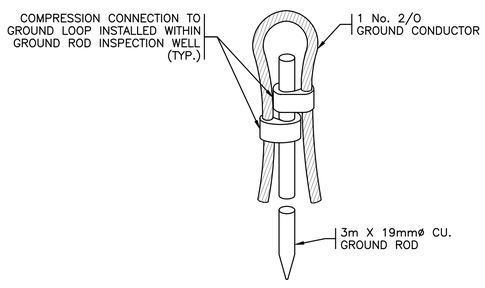


SECTION A – TYPICAL TRENCH SECTION
N.T.S.

4 1



SECTION B – TYPICAL TRENCH SECTION
N.T.S.



DETAIL 1
N.T.S.

NOTES:

1 CONTRACTOR TO PICK–UP AND DELIVER BC HYDRO SUPPLIED PILASTER AND MECHANICAL GUARD TO CONSTRUCTION SITE. CONTRACTOR TO INSTALL PILASTER AND MECHANICAL GUARD. CONTRACTOR TO COORDINATE INSTALLATION SCHEDULE WITH BC HYDRO. ALLOW FOR SUPPLY AND INSTALLATION OF TELECOMMUNICATIONS PILASTER AND MECHANICAL CABLE GUARD.

2 REFER TO CIVIL DRAWINGS FOR GENERATOR CONCRETE PAD REQUIREMENTS. CONTRACTOR TO CONFIRM ALL GENERATOR STUB–UP AREAS PRIOR TO POURING CONCRETE PAD. REFER TO SPECIFICATIONS FOR ENCLOSURE REQUIREMENTS.

3 BC HYDRO PAD MOUNTED TRANSFORMER IS SUPPLIED AND INSTALLED BY BC HYDRO AT OWNER'S COST. SECONDARY CONDUITS ON PRIVATE PROPERTY SUPPLIED AND INSTALLED BY CONTRACTOR IN ACCORDANCE WITH BC HYDRO STANDARDS.

4 BC HYDRO CONDUIT DEPTH SHALL BE ADJUSTED TO SUIT CONDUIT ENTRY TO BUILDING, AS REQUIRED. 1

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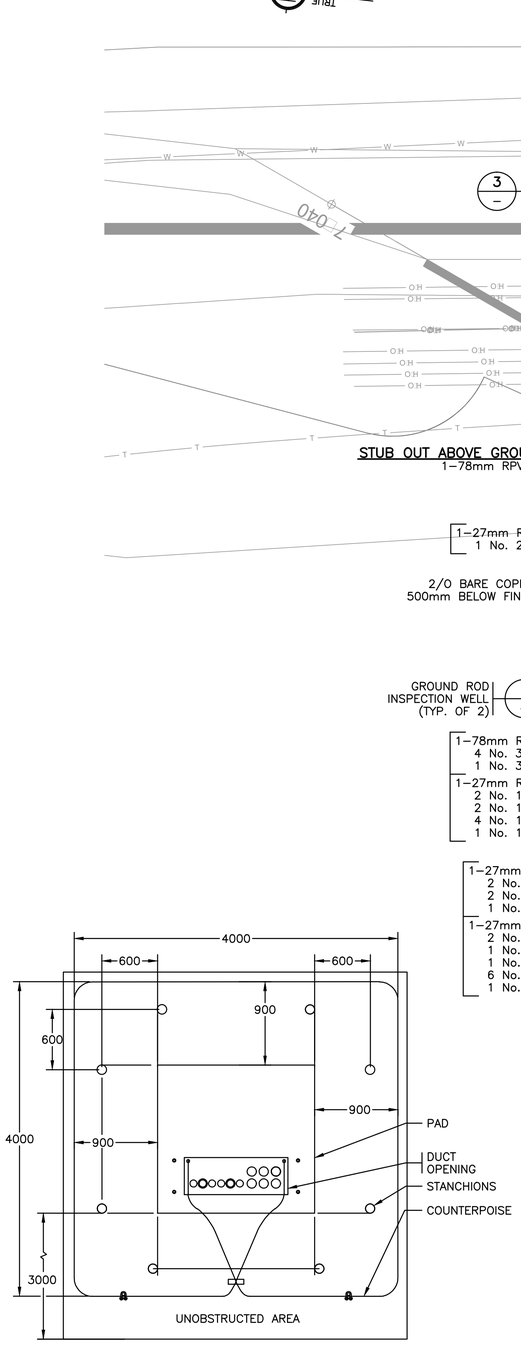
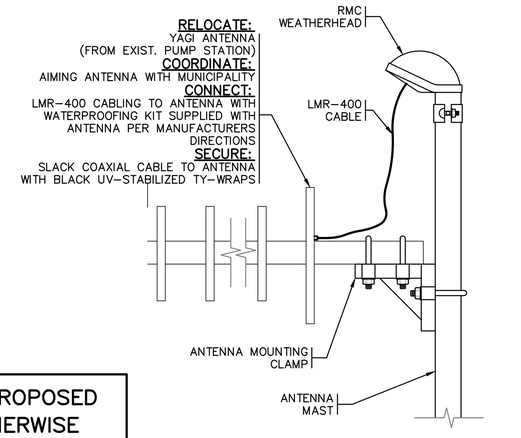


NOTES:

1. ABOVE DETAIL IS FOR GUIDANCE PURPOSES ONLY. CONTRACTOR TO VERIFY INSTALLATION REQUIREMENTS WITH UTILITY AND ES54 HYDRO CIVIL STANDARDS PRIOR TO COMPLETING ANY WORK.

DETAIL 2 – PAD–MOUNTED TRANSFORMER & STANCHION DETAIL
N.T.S.

SITE PLAN
0 1:100 5



DETAIL 3
1:5

0 1:5 250mm

NOTES:

1 ANTENNA TO MOUNT TO BUILDING SIDE WITH 3048mm MAST. CONTRACTOR TO COORDINATE.

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BC OneCall Call before you dig

CHECK BEFORE YOU DIG

CONTRACTOR SHALL CONFIRM THE LOCATIONS OF ALL UNDERGROUND UTILITIES.

FOR TENDER

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1	2018-06-05	ADDENDUM 1	PBX	IN/MS	AT
-	2018-05-22	FOR TENDER	PBX	IN/MS	AT

SCALE – AS SHOWN

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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NANOOSE BAY PENINSULA PUMP STATION SITE PLAN

NANOOSE BAY, B.C.

Drawing No. E02

Project Number 2243-17098-0

Rev. 1

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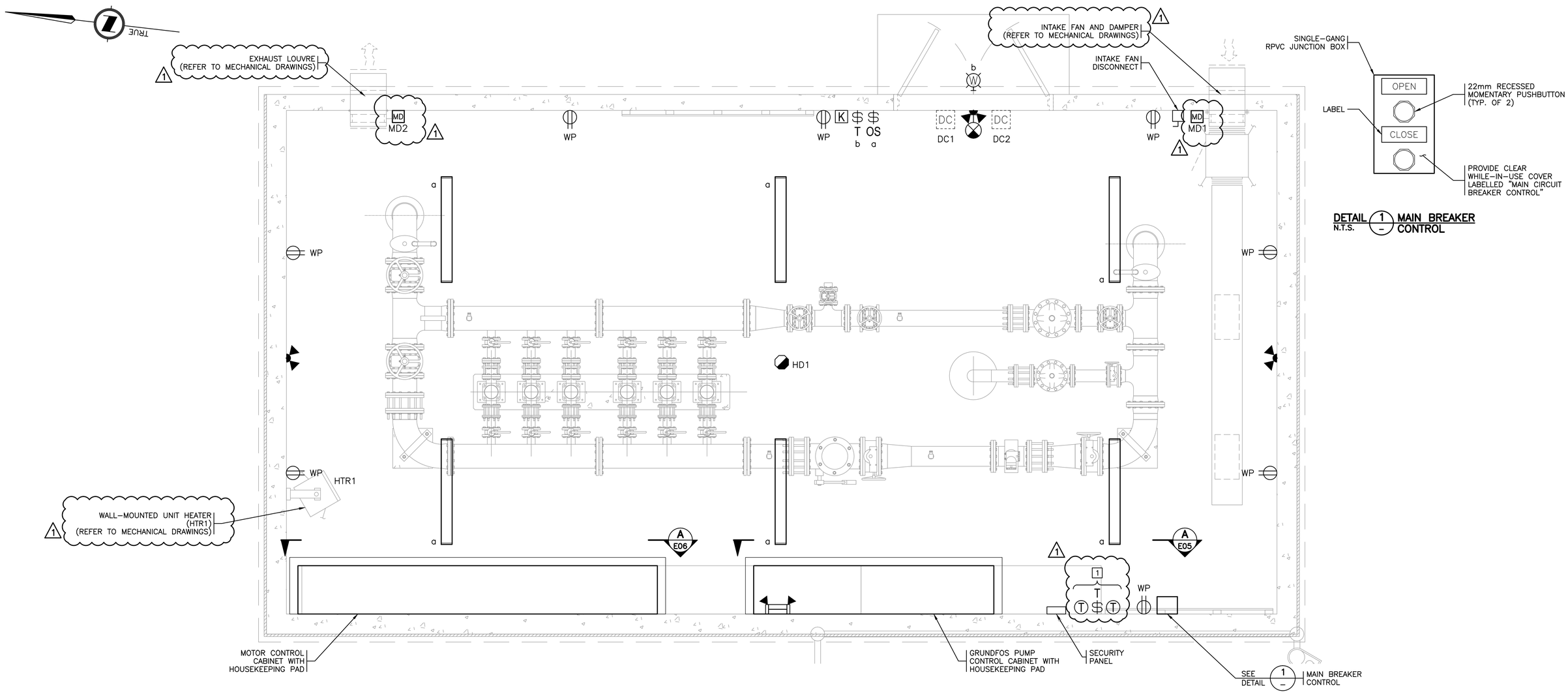

DETAIL 1 – MAIN BREAKER CONTROL
N.T.S.

DETAIL 1 – BUILDING LAYOUT
1:25

0 1:25 1

LIGHTING DESIGN CRITERIA		
APPLICATION	INDUSTRIAL – INTERIOR	
TASK	PUMPS, TANKS, COMPRESSORS, AND GAUGE AREAS	
WATTAGE/TYPE/ LUMINAIRE MANUFACTURER/ MODEL NUMBER	CREE-WS4-64L-57K-FD	
	RECOMMENDED ILLUMINANCE	ACHIEVED ILLUMINANCE
PUMP ROOM ILLUMINATION LEVEL (AVG.)	150 LUX	275 LUX
UNIFORMITY RATIO (MAX:MIN)	5.0:1	1.60:1

NOTE: BASED ON IESNA TABLE 30.2 | INDUSTRIAL LIGHTING RECOMMENDATIONS

NOTES:

1. [1] THERMOSTAT (HEATING), HUMIDSTAT (VENTILATION), ASTRONOMICAL TIME SWITCH (VENTILATION). (1)
2. CONDUIT ROUTING NOT SHOWN FOR MAIN BREAKER CTRL., HEATING, VENTILATION, LIGHTING, AND SECURITY SYSTEMS. CONTRACTOR SHALL FIELD FIT CONDUIT. CONTRACTOR SHALL INSTALL CONDUIT BELOW SLAB WHEREVER POSSIBLE.
3. CONDUITS SHALL BE RPVC FOR UNDERGROUND/UNDER SLAB. RPVC CONDUIT SHALL BE USED BETWEEN SLAB AND DEVICE OR WALL MOUNTED JUNCTION BOX. FLEX CONDUIT SHALL BE USED BETWEEN JUNCTION BOX AND DEVICE, AS REQUIRED. RPVC CONDUIT IS INTENDED FOR ALL OTHER CONDUIT WITHIN THE BUILDING.

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1	2018-06-05	ADDENDUM 1	PBX	IN/MS	AT
-	2018-05-22	FOR TENDER	PBX	IN/MS	AT

SCALE – AS SHOWN

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NANOOSE BAY PENINSULA PUMP STATION
BUILDING LAYOUT - LIGHTING, SECURITY, HEATING, □ VENTILATION
NANOOSE BAY, B.C.

Drawing No. E03

Project Number 2243-17098-0

Rev. 1

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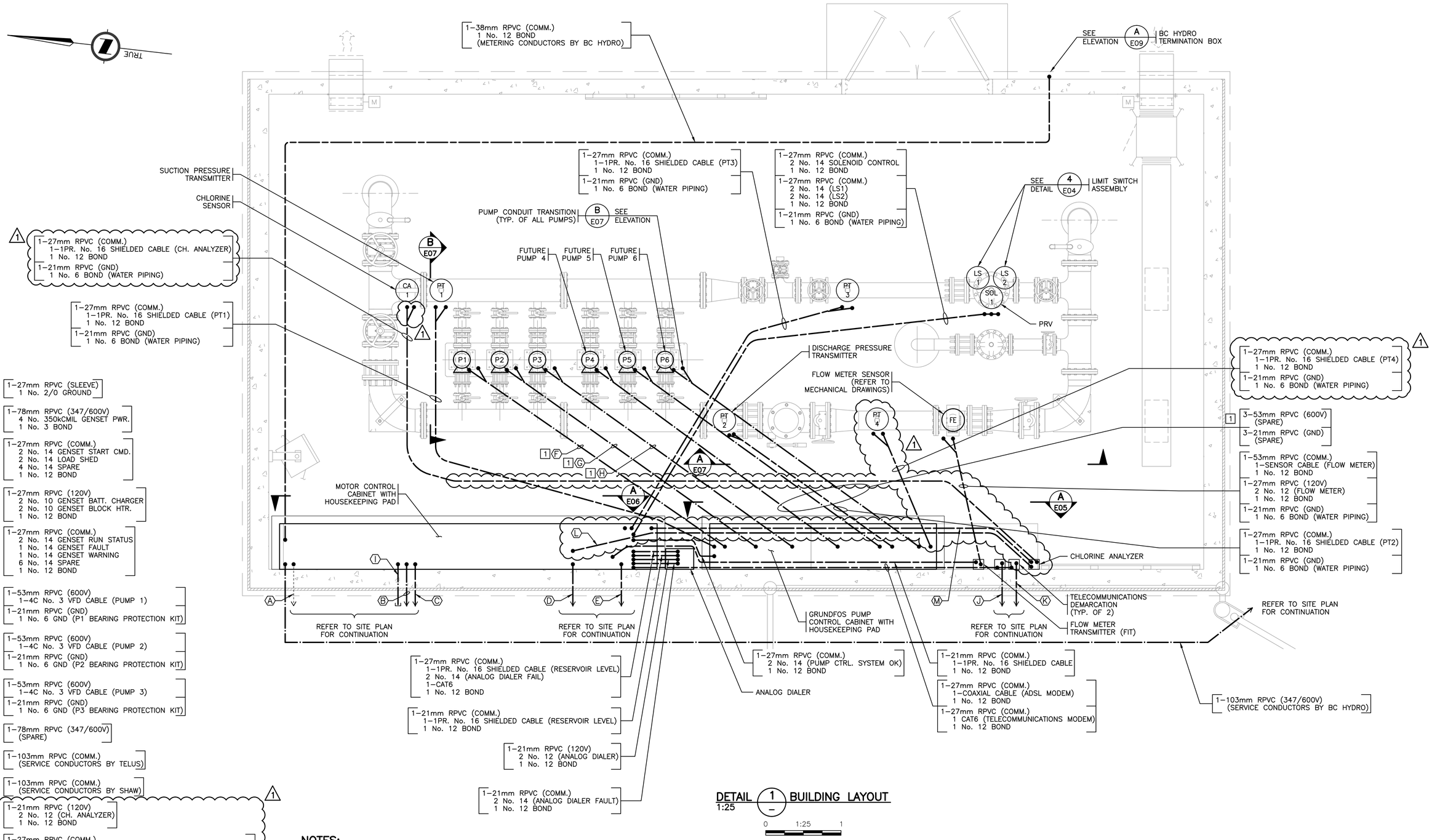

Ⓐ 1-27mm RPVC (SLEEVE)
1 No. 2/0 GROUND

Ⓑ 1-78mm RPVC (347/600V)
4 No. 350kCMIL GENSET PWR.
1 No. 3 BOND

Ⓒ 1-27mm RPVC (COMM.)
2 No. 14 GENSET START CMD.
2 No. 14 LOAD SHED
4 No. 14 SPARE
1 No. 12 BOND

Ⓓ 1-27mm RPVC (120V)
2 No. 10 GENSET BATT. CHARGER
2 No. 10 GENSET BLOCK HTR.
1 No. 12 BOND

Ⓔ 1-27mm RPVC (COMM.)
2 No. 14 GENSET RUN STATUS
1 No. 14 GENSET FAULT
1 No. 14 GENSET WARNING
6 No. 14 SPARE
1 No. 12 BOND

Ⓕ 1-53mm RPVC (600V)
1-4C No. 3 VFD CABLE (PUMP 1)
1-21mm RPVC (GND)
1 No. 6 GND (P1 BEARING PROTECTION KIT)

Ⓖ 1-53mm RPVC (600V)
1-4C No. 3 VFD CABLE (PUMP 2)
1-21mm RPVC (GND)
1 No. 6 GND (P2 BEARING PROTECTION KIT)

Ⓗ 1-53mm RPVC (600V)
1-4C No. 3 VFD CABLE (PUMP 3)
1-21mm RPVC (GND)
1 No. 6 GND (P3 BEARING PROTECTION KIT)

Ⓘ 1-78mm RPVC (347/600V)
(SPARE)

Ⓙ 1-103mm RPVC (COMM.)
(SERVICE CONDUCTORS BY TELUS)

Ⓚ 1-103mm RPVC (COMM.)
(SERVICE CONDUCTORS BY SHAW)

Ⓛ 1-21mm RPVC (120V)
2 No. 12 (CH. ANALYZER)
1 No. 12 BOND

Ⓜ 1-27mm RPVC (COMM.)
1-1PR. No. 16 SHIELDED CABLE (CH. ANALYZER CONDUCTIVITY)
2 No. 14 (CH. ANALYZER ALARM)
1 No. 12 BOND

DETAIL 1 BUILDING LAYOUT
1:25

0 1:25 1

NOTES:

1. 1 No. 4 BOND INCLUDED IN VFD CABLE.
2. CONDUIT ROUTING SHOWN IS CONCEPTUAL ONLY. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO ENSURE MINIMUM UTILITY CLEARANCE REQUIREMENTS ARE MET AND THAT CONDUIT STUB UP LOCATIONS ALIGN WITH DEVICE MOUNTING LOCATIONS.
3. CONDUITS SHALL BE RPVC FOR UNDERGROUND/UNDER SLAB. RPVC CONDUIT SHALL BE USED BETWEEN SLAB AND DEVICE OR WALL MOUNTED JUNCTION BOX. FLEX CONDUIT SHALL BE USED BETWEEN JUNCTION BOX AND DEVICE, AS REQUIRED. RPVC CONDUIT IS INTENDED FOR ALL OTHER CONDUIT WITHIN THE BUILDING.
4. LOCATION OF PT4 TO BE CONFIRMED.

1 REFER TO MECHANICAL PLAN FOR FINAL INSTRUMENTATION LOCATIONS

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1	2018-06-05	ADDENDUM 1	PBX	IN/MS	AT
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SCALE – AS SHOWN

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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2018-06-05
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RDN
REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION
BUILDING LAYOUT - INSTRUMENTATION AND CONTROLS
NANOOSE BAY, B.C.

Drawing No. E04

Project Number 2243-17098-0

Rev. 1

DATE: 2018-06-05, 14:12 FILE: P:\17270_RDN Nanoose Bay PS\01 - Detailed Design\Drawings\ACAD\E04-1.dwg

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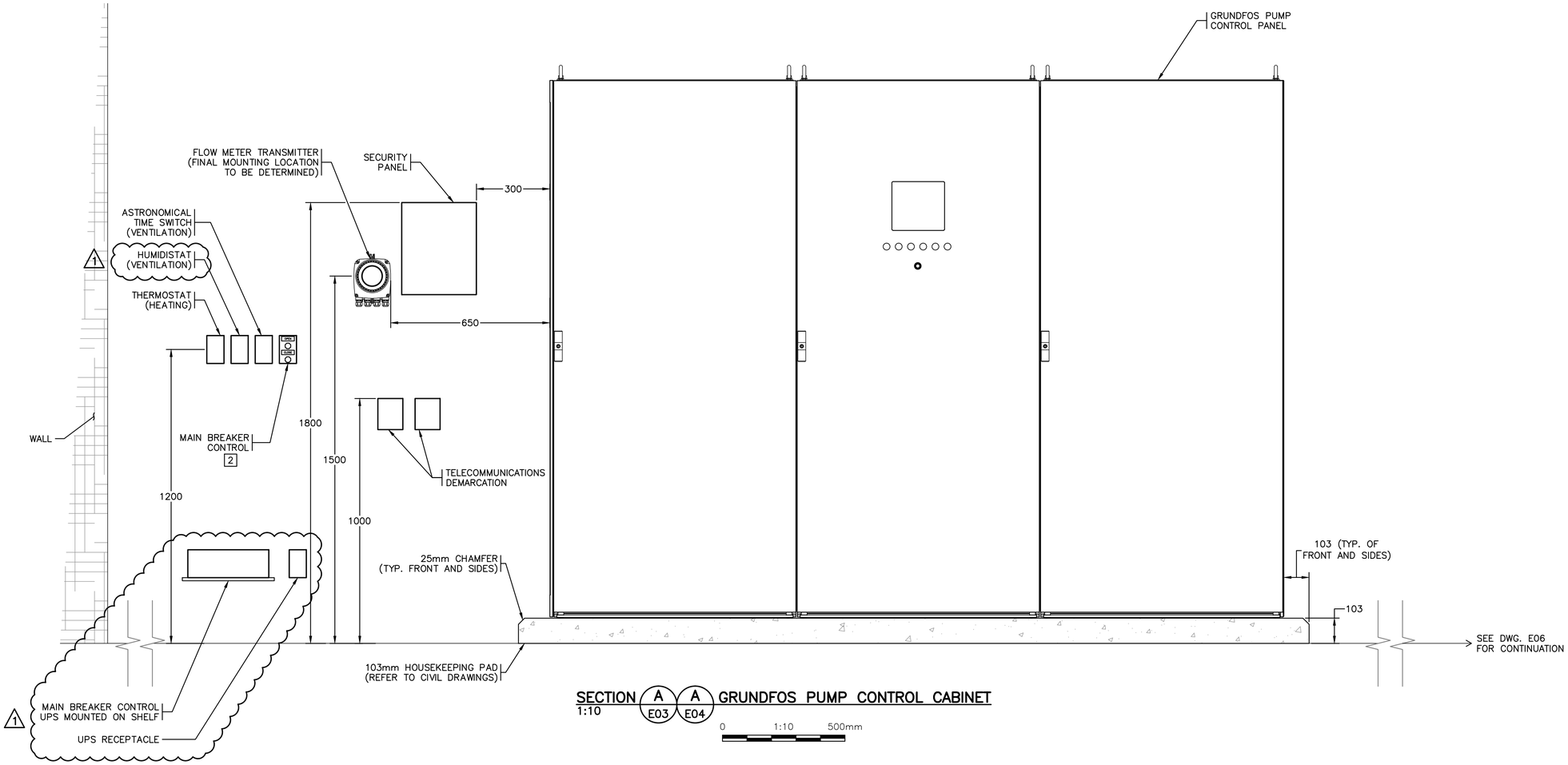

SECTION A E03 / A E04 GRUNDFOS PUMP CONTROL CABINET
1:10

0 1:10 500mm

NOTES:

1. CONTRACTOR TO CONFIRM ALL CONDUIT STUB–UP AREAS PRIOR TO POURING CONCRETE HOUSEKEEPING PAD.

2. RPVC SINGLE–GANG SURFACE MOUNT BOX WITH FRONT MOUNTED 22mm RECESSED "OPEN" AND 22mm RECESSED "CLOSE" MOMENTARY PUSHBUTTONS. INCLUDE CLEAR COVER TO PREVENT INADVERTENT OPERATION. LABEL PUSHBUTTONS. LABEL COVER AS "MAIN CIRCUIT BREAKER CONTROL."

ALL EQUIPMENT IS PROPOSED UNLESS NOTED OTHERWISE

FUNCTIONAL DESIGN ONLY
CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ENGINEER'S APPROVAL PRIOR TO FABRICATION

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ORIGINAL DWG SIZE: A1 (594 x 841mm)

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NANOOSE BAY PENINSULA PUMP STATION DETAILS (1 OF 5)

NANOOSE BAY, B.C.

Drawing No. E05

Project Number 2243-17098-0

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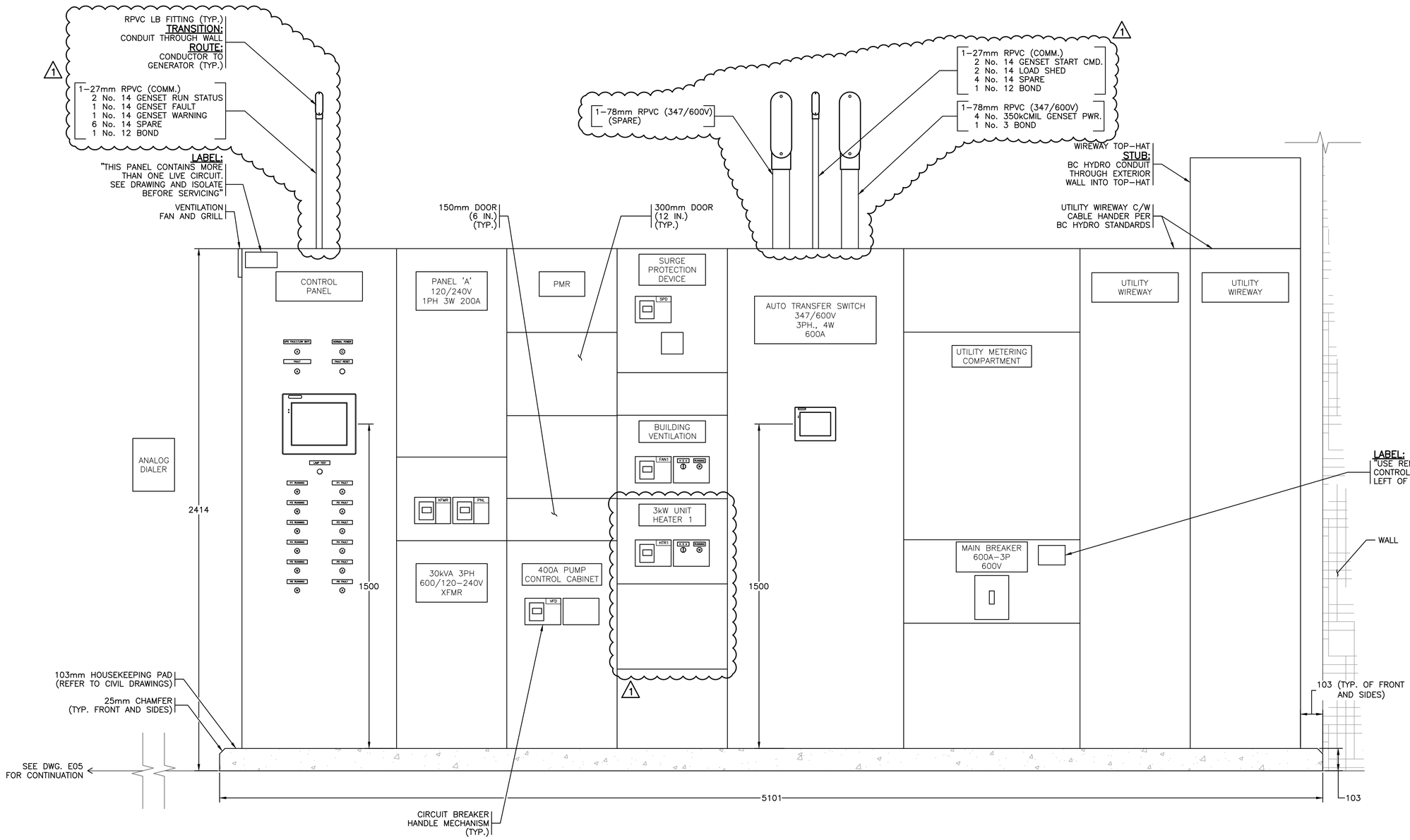

SECTION A E03 / A E04 MOTOR CONTROL CABINET
1:10

0 1:10 500mm

NOTES:

1. MCC SHALL BE CSA TYPE 1 GASKETED.
2. CONTRACTOR SHALL COORDINATE WITH MCC SUPPLIER TO ENSURE SERVICE ENTRANCE IS PER BC HYDRO STANDARDS.
3. CONTRACTOR TO PROVIDE DETAILED SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION. INTERIOR LAYOUT, EXTERIOR LAYOUT, AND WIRING DIAGRAMS TO BE PROVIDED AS PART OF THE SUBMISSION. REFER TO SPECIFICATIONS FOR SPECIFIC DETAILS EQUIPMENT REQUIREMENTS.
4. CONTRACTOR TO CONFIRM ALL CONDUIT STUB–UP AREAS PRIOR TO POURING CONCRETE HOUSEKEEPING PAD.
5. CONTROL PANEL SHALL INCLUDE PROVISIONS FOR 25 PERCENT FUTURE EXPANSION.

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NANOOSE BAY PENINSULA PUMP STATION DETAILS (2 OF 5)

NANOOSE BAY, B.C.

Drawing No. E06

Project Number	Rev.
2243-17098-0	1

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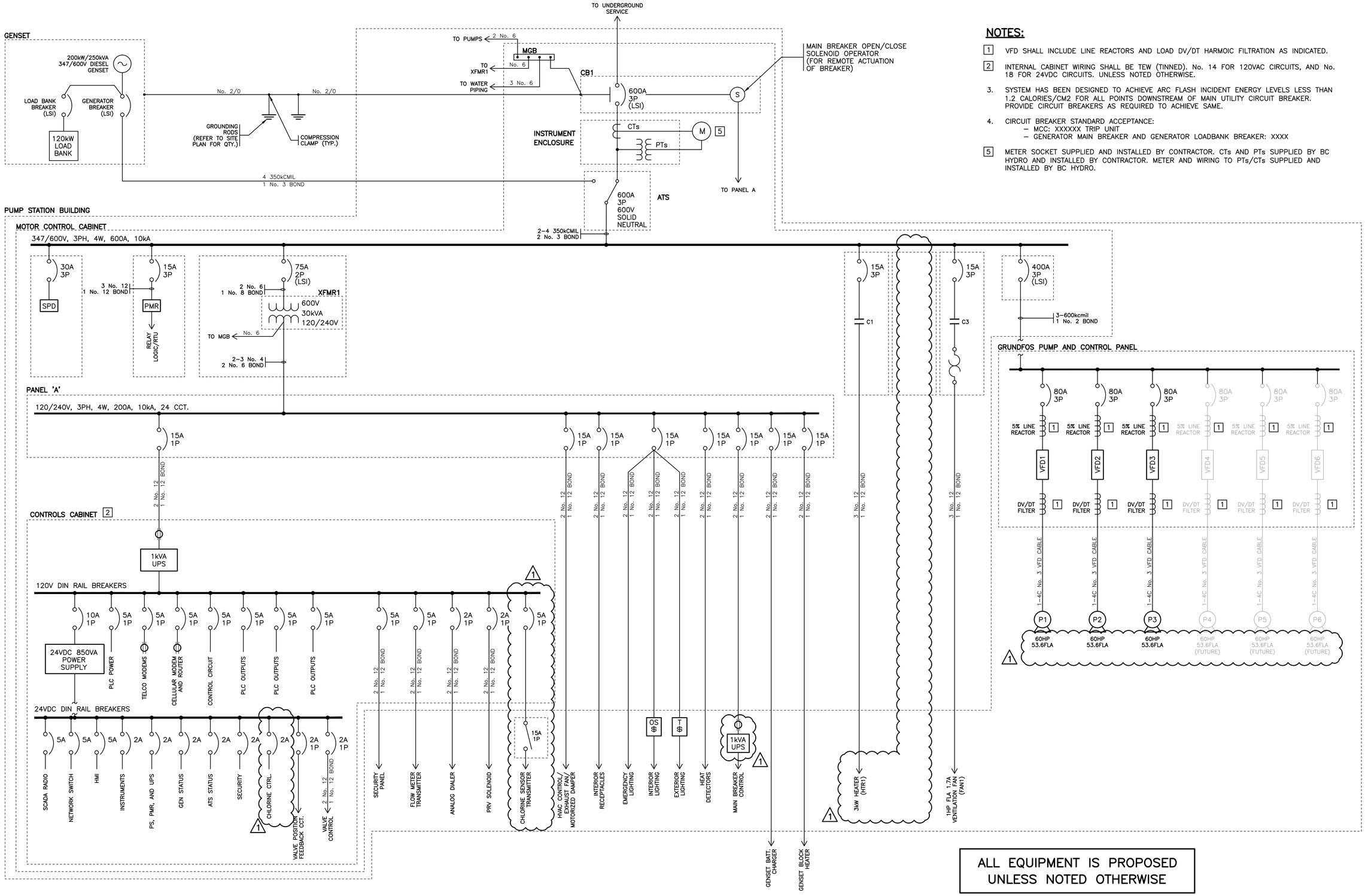

NOTES:

1. VFD SHALL INCLUDE LINE REACTORS AND LOAD DV/DT HARMOIC FILTRATION AS INDICATED.
2. INTERNAL CABINET WIRING SHALL BE TEW (TINNED). No. 14 FOR 120VAC CIRCUITS, AND No. 18 FOR 24VDC CIRCUITS. UNLESS NOTED OTHERWISE.
3. SYSTEM HAS BEEN DESIGNED TO ACHIEVE ARC FLASH INCIDENT ENERGY LEVELS LESS THAN 1.2 CALORIES/CM2 FOR ALL POINTS DOWNSTREAM OF MAIN UTILITY CIRCUIT BREAKER. PROVIDE CIRCUIT BREAKERS AS REQUIRED TO ACHIEVE SAME.
4. CIRCUIT BREAKER STANDARD ACCEPTANCE:
   - MCC: XXXXXX TRIP UNIT
   - GENERATOR MAIN BREAKER AND GENERATOR LOADBANK BREAKER: XXXX
5. METER SOCKET SUPPLIED AND INSTALLED BY CONTRACTOR. CTs AND PTs SUPPLIED BY BC HYDRO AND INSTALLED BY CONTRACTOR. METER AND WIRING TO PTs/CTs SUPPLIED AND INSTALLED BY BC HYDRO.

LEGEND:

PROPOSED

FUTURE

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2018-06-05

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NANOOSE BAY PENINSULA PUMP STATION
POWER DISTRIBUTION SINGLE LINE DIAGRAM

NANOOSE BAY, B.C.

Drawing No. E10

Project Number 2243-17098-0

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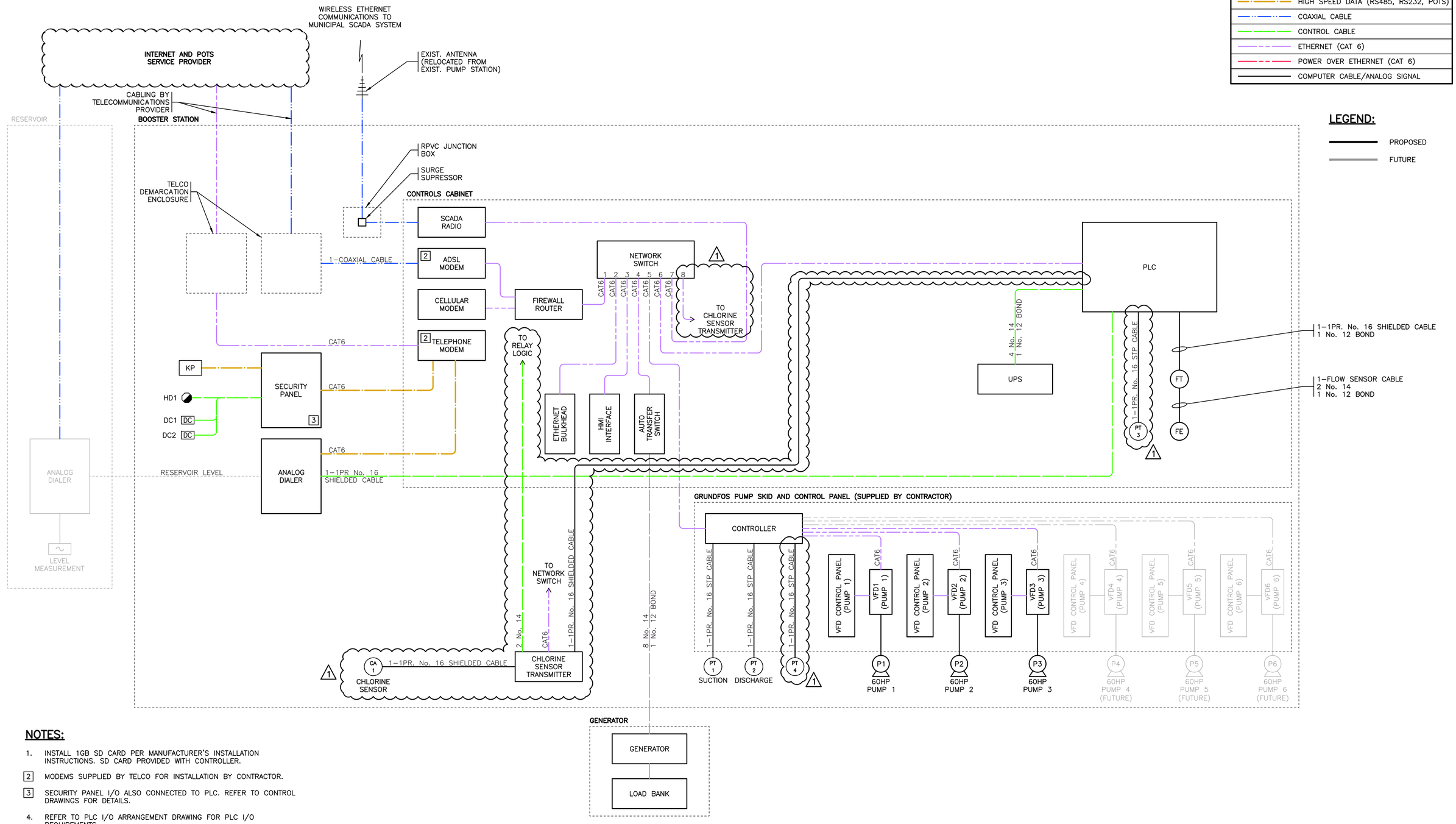
CABLE LEGEND	
	HIGH SPEED DATA (RS485, RS232, POTS)
	COAXIAL CABLE
	CONTROL CABLE
	ETHERNET (CAT 6)
	POWER OVER ETHERNET (CAT 6)
	COMPUTER CABLE/ANALOG SIGNAL

LEGEND:

- PROPOSED
- FUTURE



NOTES:

1. INSTALL 1GB SD CARD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. SD CARD PROVIDED WITH CONTROLLER.
2. MODEMS SUPPLIED BY TELCO FOR INSTALLATION BY CONTRACTOR.
3. SECURITY PANEL I/O ALSO CONNECTED TO PLC. REFER TO CONTROL DRAWINGS FOR DETAILS.
4. REFER TO PLC I/O ARRANGEMENT DRAWING FOR PLC I/O REQUIREMENTS.

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2018-06-05
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NANOOSE BAY PENINSULA PUMP STATION COMMUNICATIONS AND INSTRUMENTATION BLOC□ DIAGRAM

NANOOSE BAY, B.C.

Drawing No. E11

Project Number 2243-17098-0

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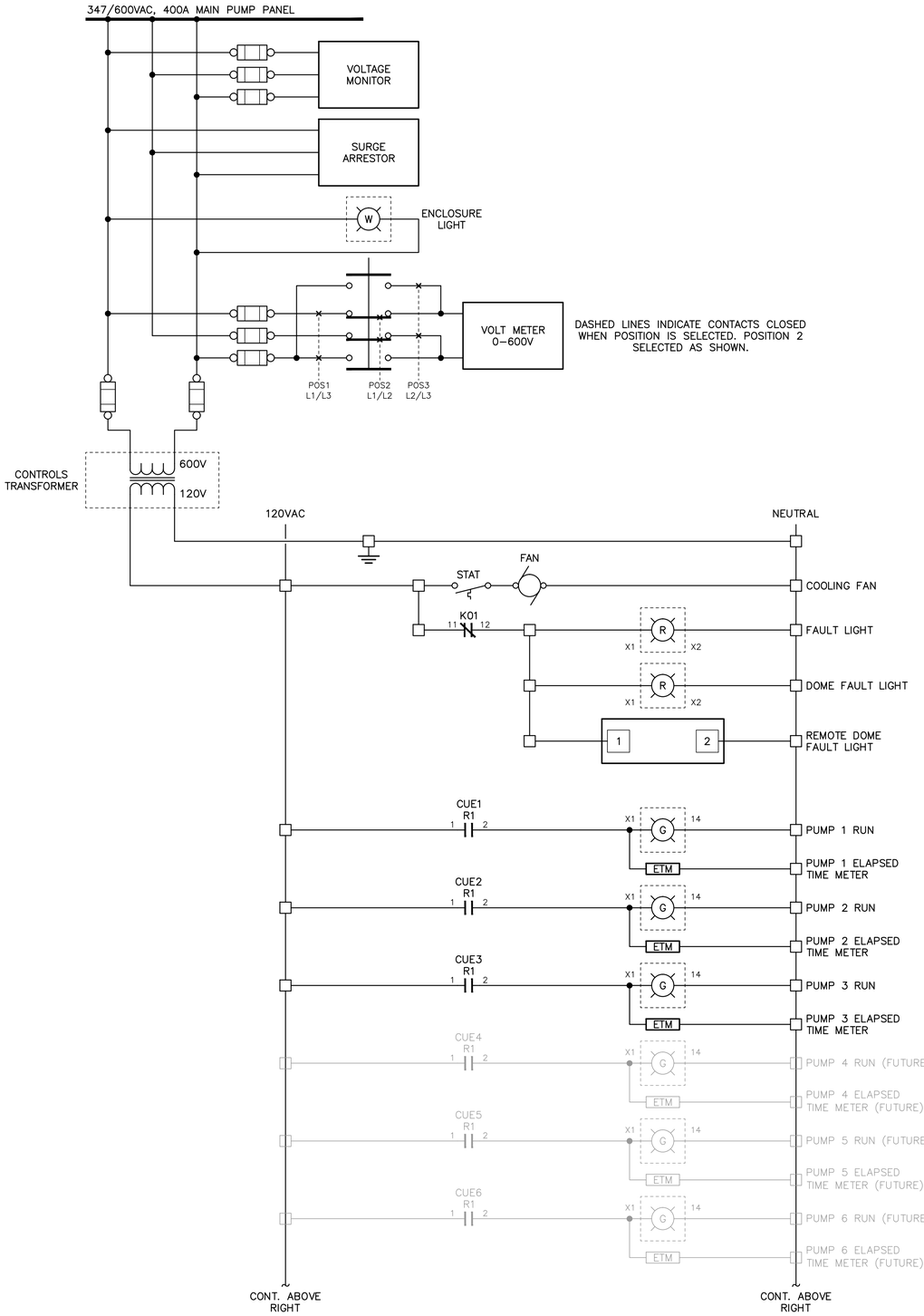

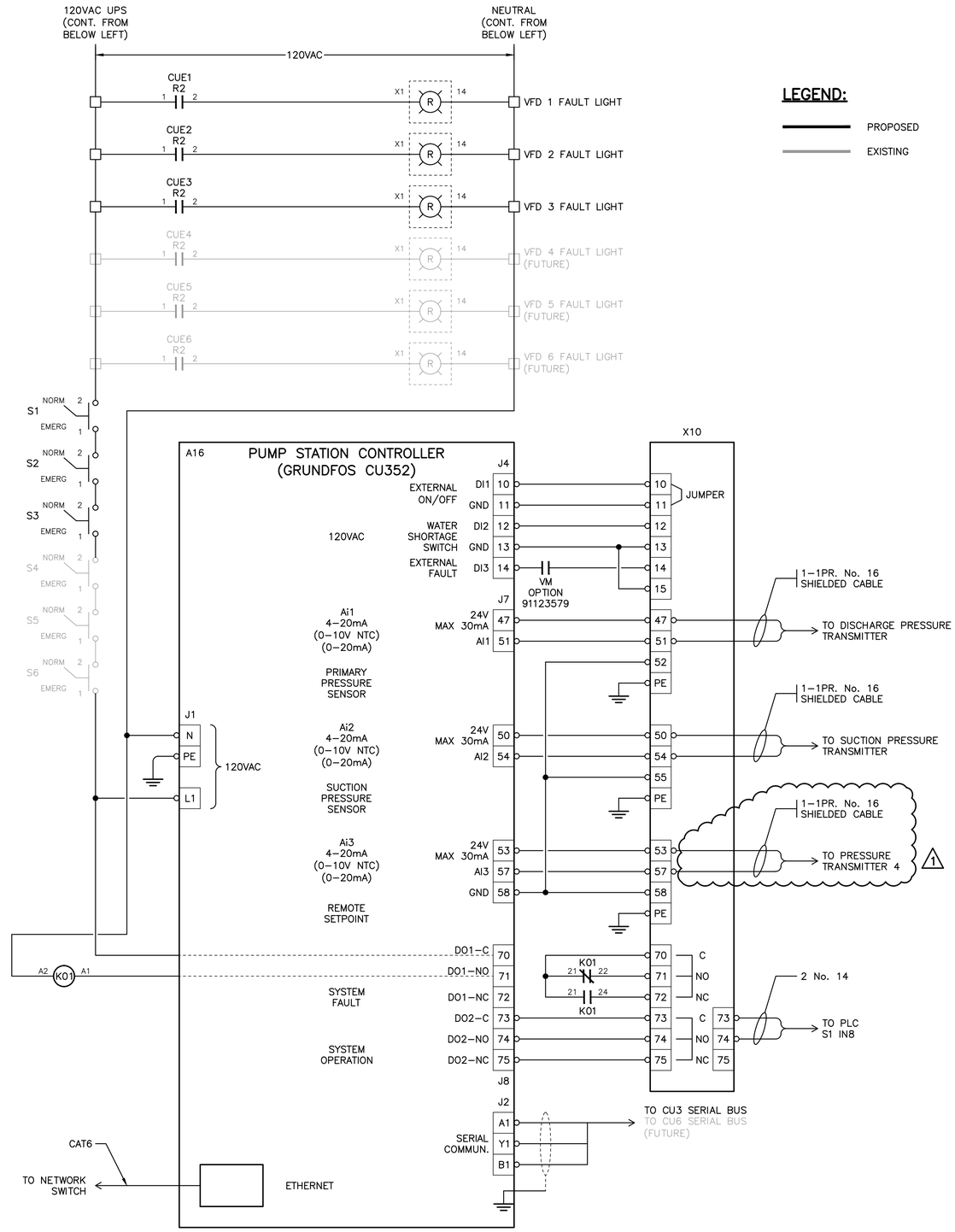

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NANOOSE BAY PENINSULA PUMP STATION
GRUNDFOS CONTROL CENTER CONTROLS (2 OF 2)
NANOOSE BAY, B.C.

Drawing No. E13

Project Number 2243-17098-0

Rev. 1

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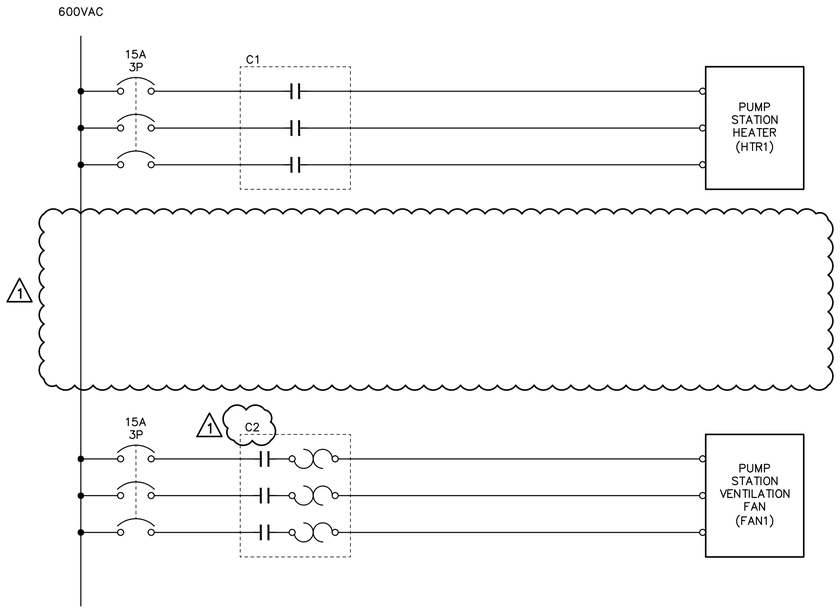

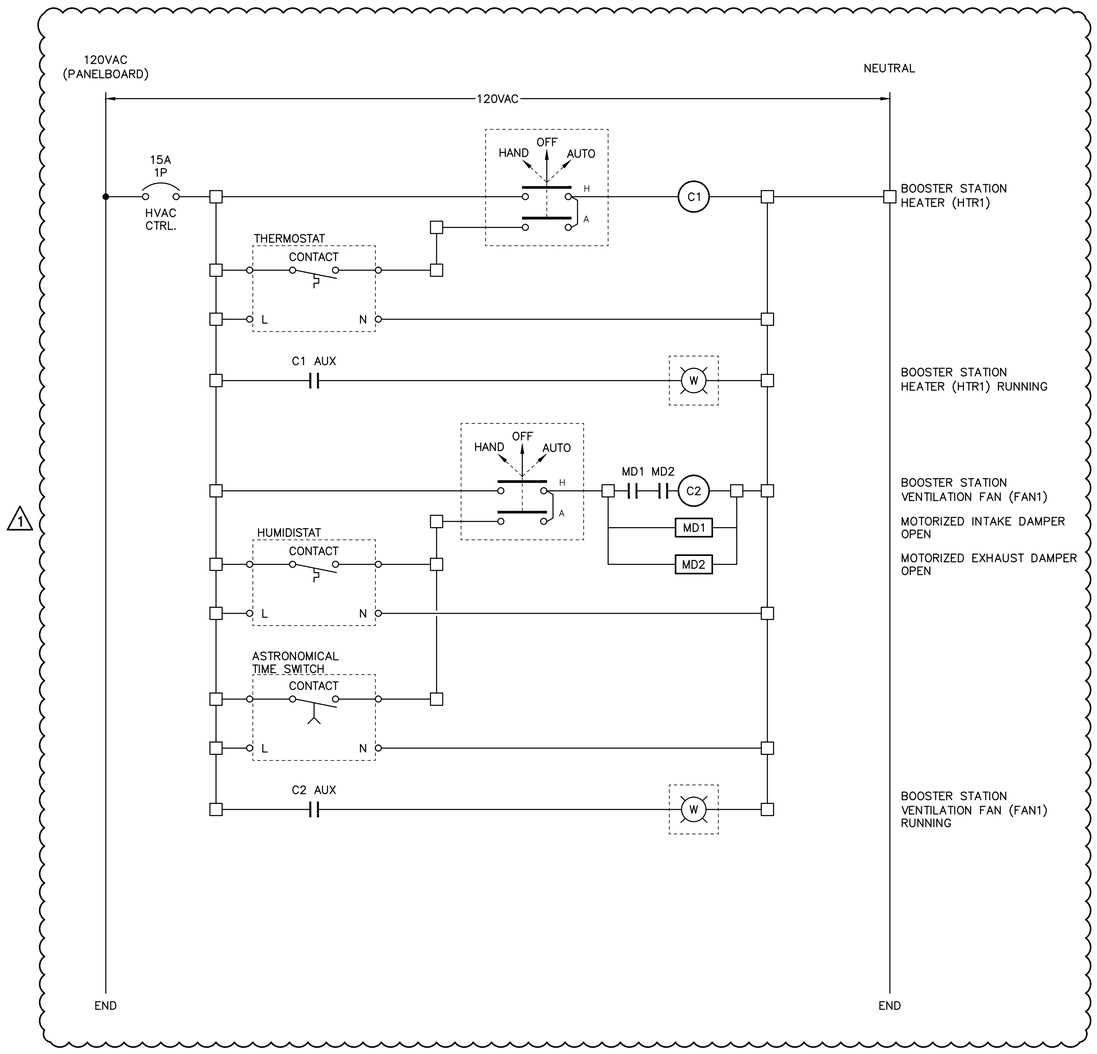

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1	2018-06-05	ADDENDUM 1	PBX	IN/MS	AT
-	2018-05-22	FOR TENDER	PBX	IN/MS	AT

SCALE – AS SHOWN

ORIGINAL DWG SIZE: A1 (594 x 841mm)

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Suite 1
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33979
2018-06-05

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RDN
REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION CONTROLS (1 OF 6)

NANOOSE BAY, B.C.

Drawing No.
E14

Project Number	Rev.
2243-17098-0	1

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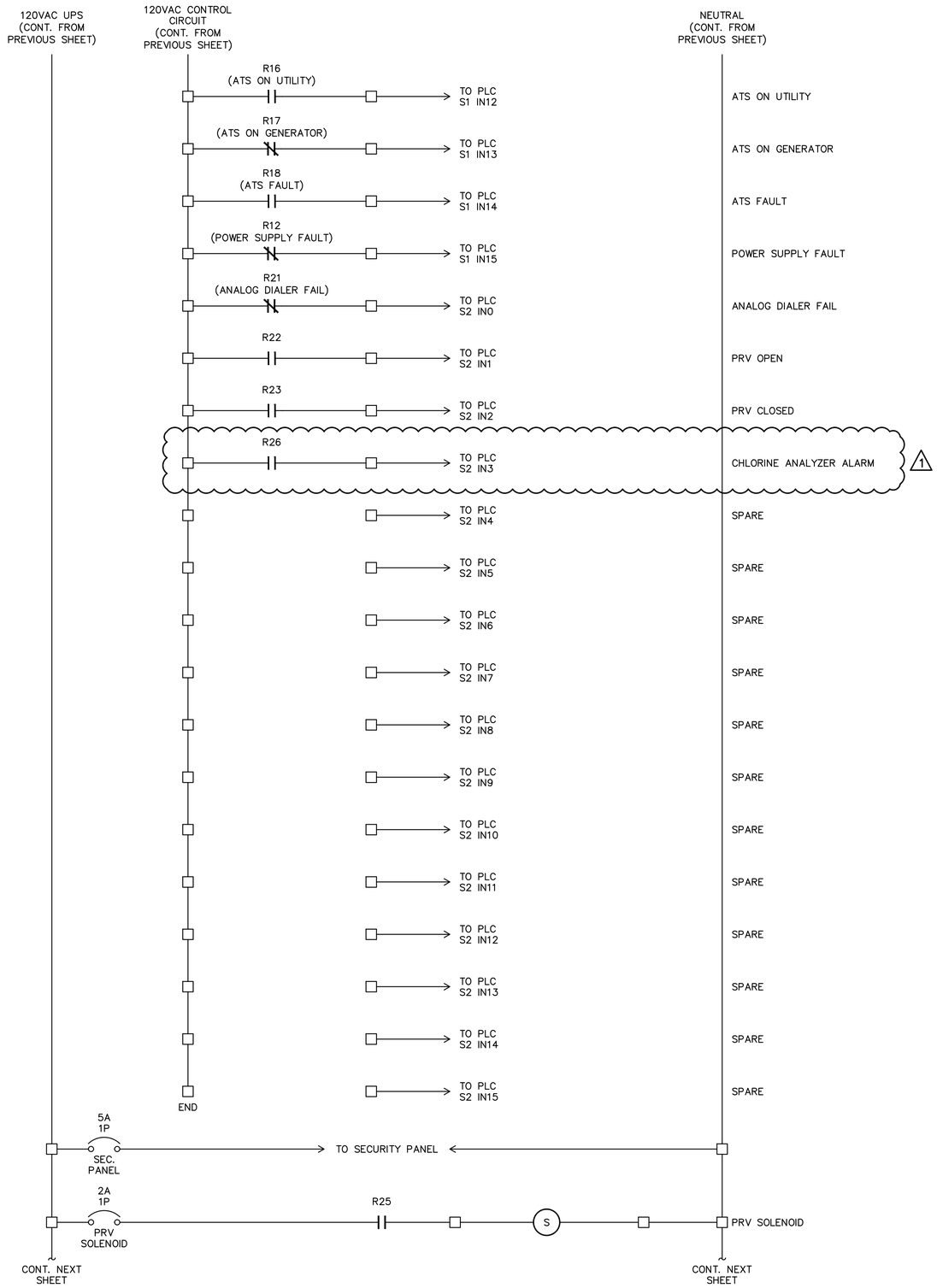
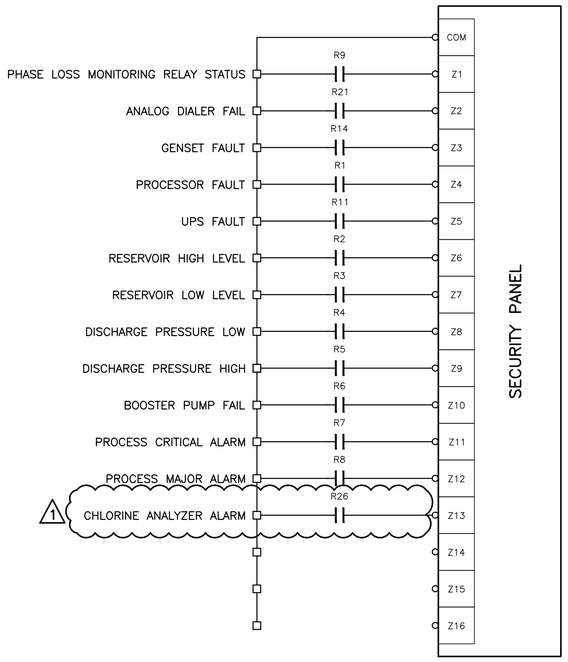
DATE: 2018-06-05, 14:13 FILE: P:\17370 RDN Nanoose Bay PS\01 - Detailed Design\Drawings\ACAD\E14-1.dwg





DETAIL 1 – SECURITY PANEL
N.T.S.

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NANOOSE BAY PENINSULA PUMP STATION CONTROLS (3 OF 6)

NANOOSE BAY, B.C.

Drawing No. E16

Project Number 2243-17098-0

Rev. 1

DATE: 2018-06-05, 14:13, FILE: P:\17320 RDN Nanoose Bay PS\01 - Detailed Design\Drawings\ACAD\E16-1.dwg

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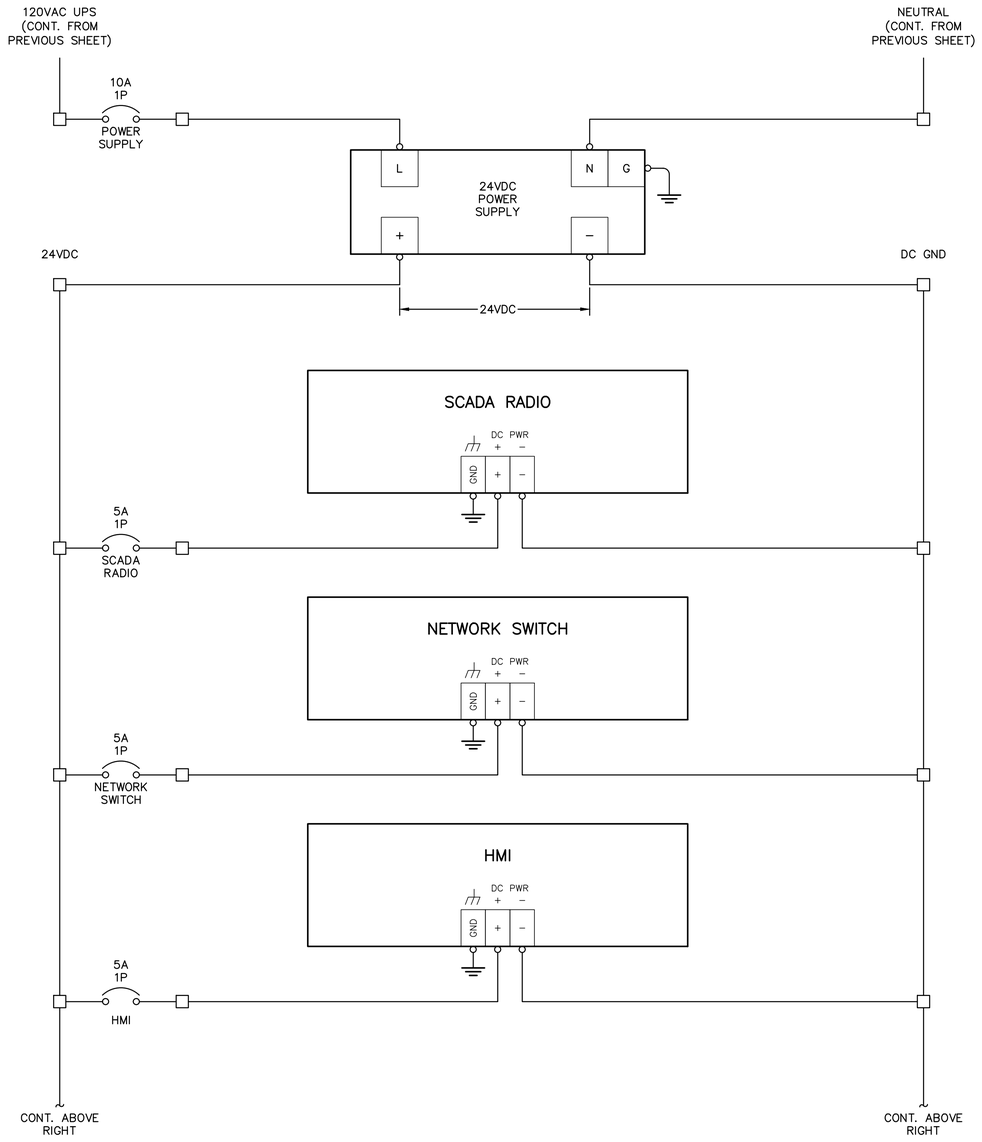

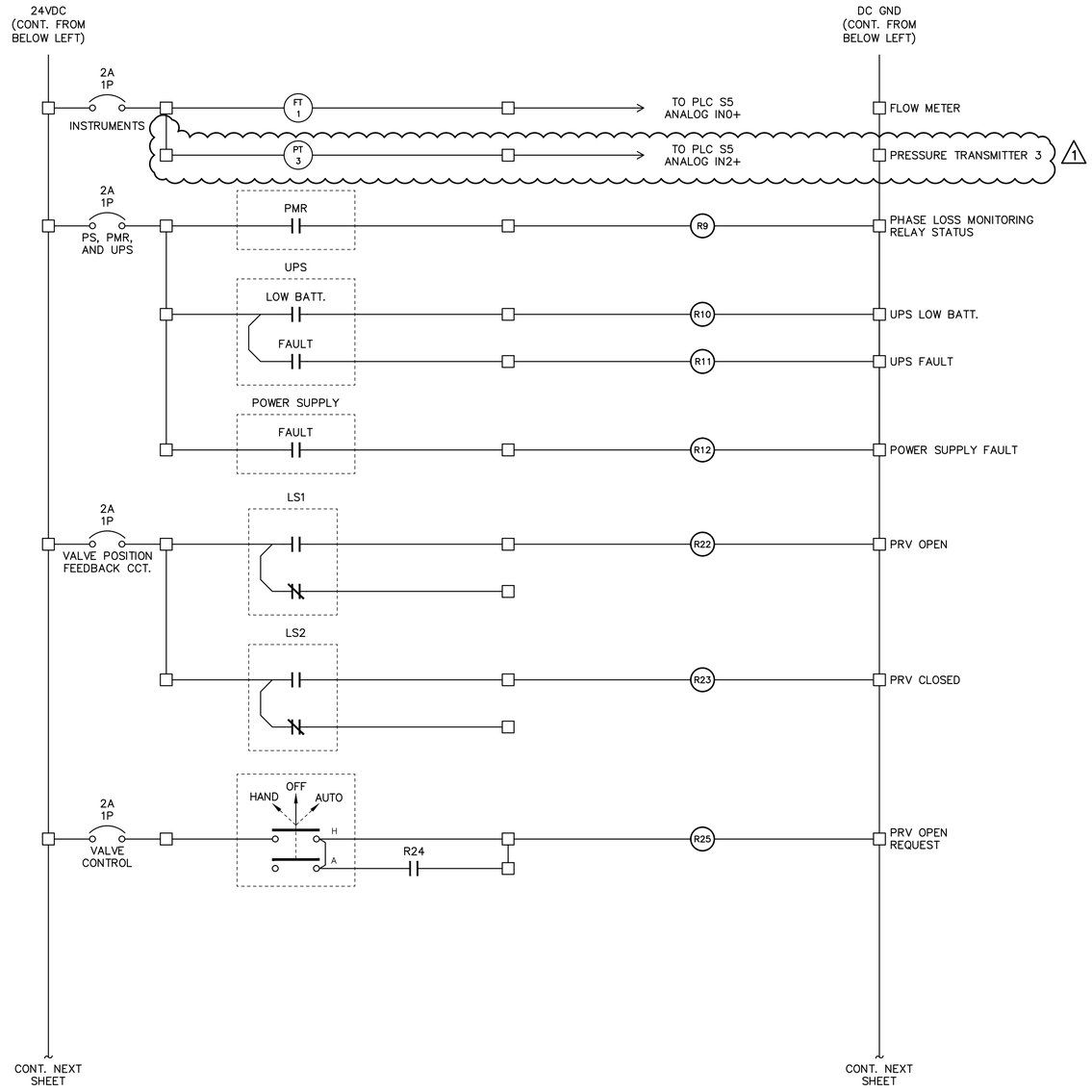

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NANOOSE BAY PENINSULA PUMP STATION CONTROLS (5 OF 6)

NANOOSE BAY, B.C.

Drawing No.
E18

Project Number	Rev.
2243-17098-0	1

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

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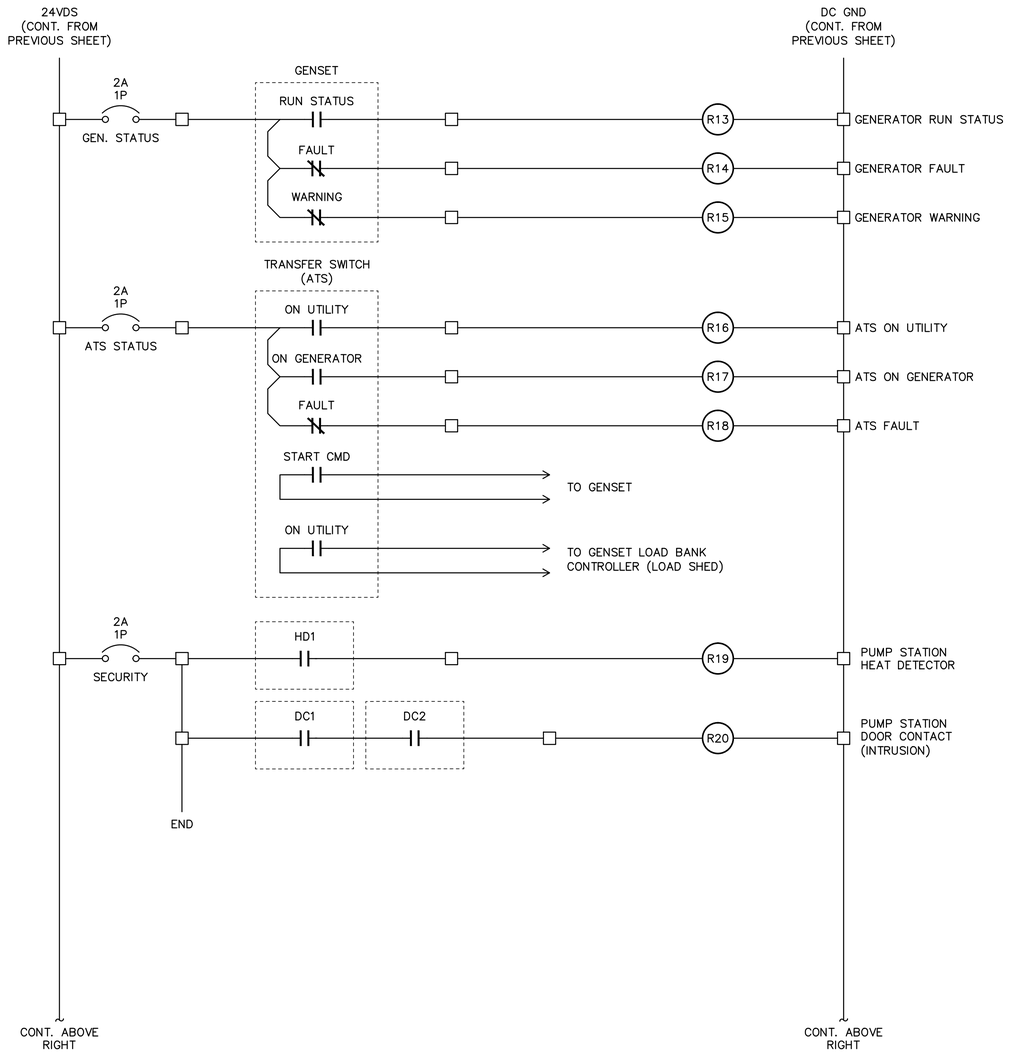

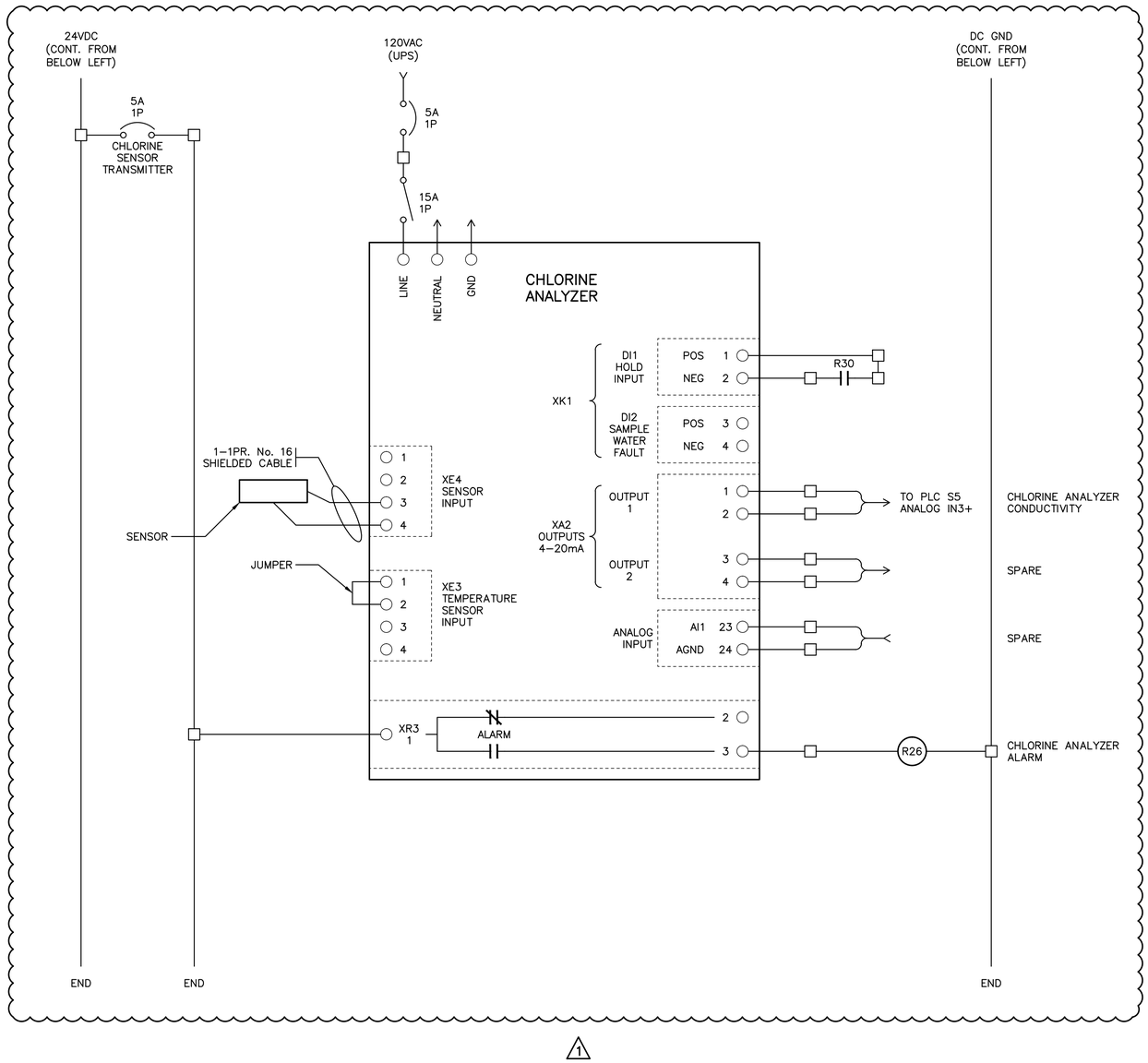

1

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REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION CONTROLS (6 OF 6)

NANOOSE BAY, B.C.

Drawing No.
E19

Project Number
2243-17098-0

Rev.
1

DATE: 2018-06-05, 14:13 FILE: P:\17370\RDN Nanoose Bay PS\01 - Detailed Design\Drawings\ACAD\E19-1.dwg

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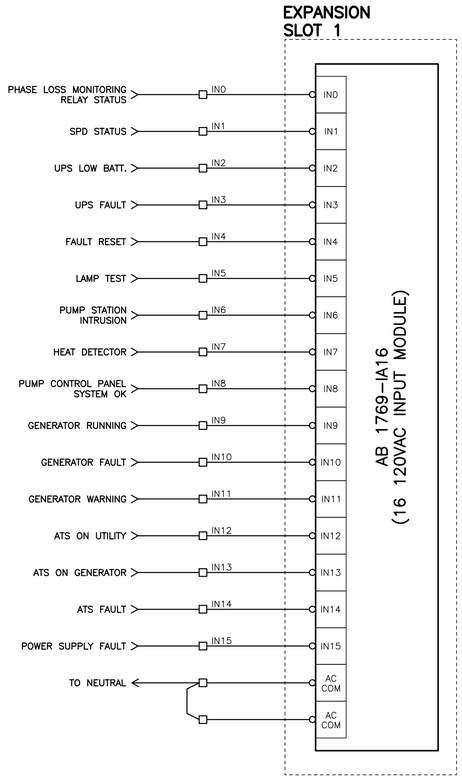

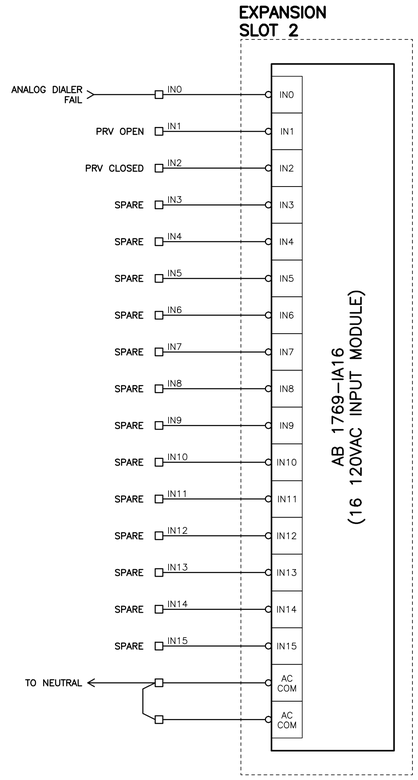

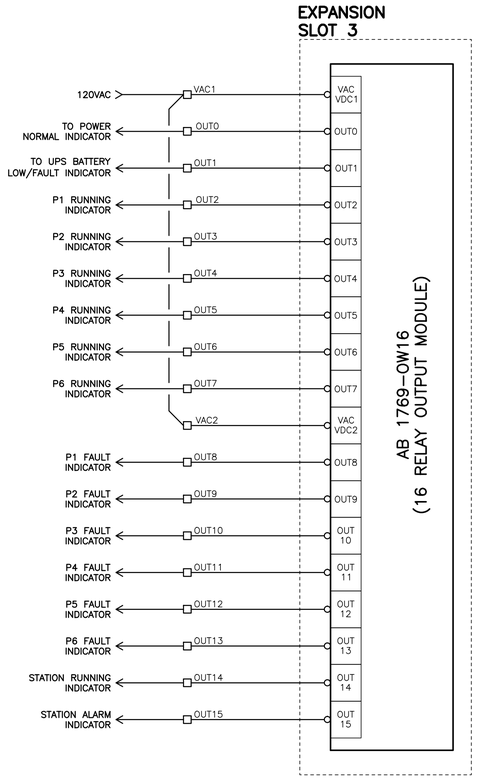

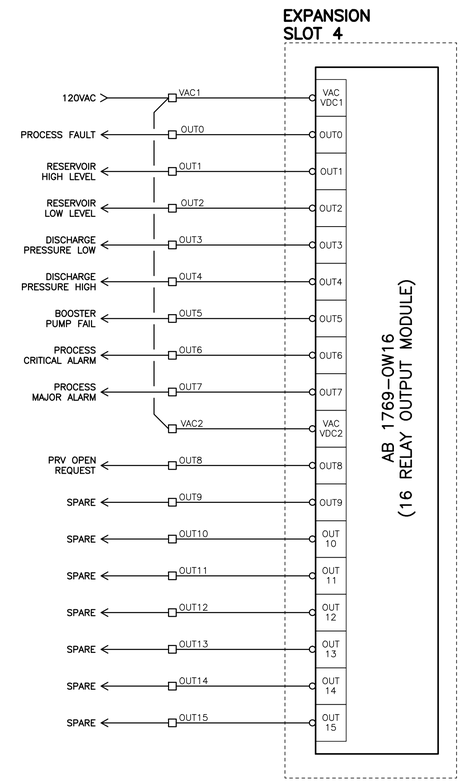

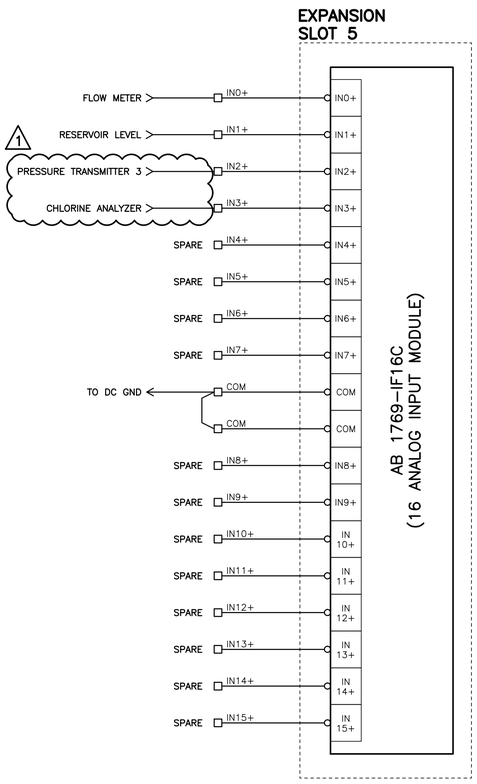

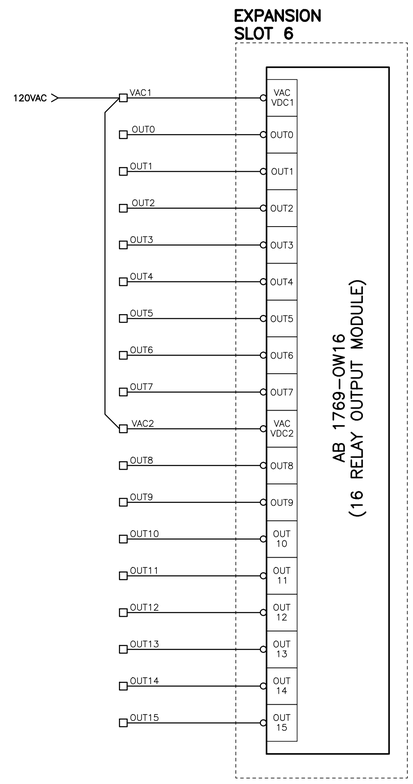

NOTES:

1. ALL 120V CONTROL WIRING SHALL BE No. 14 AWG. STRANDED COPPER CABLES.
2. CONTRACTOR TO PROVIDE DETAILED SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION. INTERIOR AND EXTERIOR PANEL LAYOUTS AND WIRING DIAGRAMS TO BE PROVIDED AS PART OF THE SUBMISSION. REFER TO SPECIFICATIONS FOR ALL LAYOUT DETAILS AND EQUIPMENT REQUIREMENTS.
3. FERRULES SHALL BE USED ON CONTROL CABLING AT ALL TERMINAL BLOCKS.
4. ALL CABLE SHIELDS SHALL BE GROUNDED WITHIN THE PLC CABINET ONLY. THE CABLE SHIELD AT THE FIELD DEVICE LOCATIONS SHALL BE CUT AND TAPED.

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RDN
REGIONAL DISTRICT OF NANAIMO

NANOOSE BAY PENINSULA PUMP STATION PLC I/O ARRANGEMENT

NANOOSE BAY, B.C.

Drawing No. E20

Project Number 2243-17098-0

Rev. 1

DATE: 2018-06-05, 14:13 FILE: P:\17370 RDN Nanoose Bay PS\01 - Detailed Design\Drawings\ACAD\E20_1.dwg

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

2.2 – Schedule of Quantities

Form of Tender - Appendix 1 - Addendum 1

Regional District of Nanaimo
Nanoose Bay Peninsula Pump Station

SCHEDULE OF QUANTITIES AND PRICES

(See paragraph 5.3.1 of the Instructions to Tenderers - Part II)

(All prices and *Quotations* including the *Contract Price* shall include all *Taxes*, but shall not include *GST*. *GST* shall be shown sepa

Summary Sheet

1.0 SUBTOTAL GENERAL AND SITEWORK _____

2.0 SUBTOTAL WATERWORKS _____

3.0 SUBTOTAL BUILDING AND MECH EQUIP. _____

4.0 SUBTOTAL ELECTRICAL _____

TENDER PRICE _____

GST _____

TENDER PRICE _____

Form of Tender - Appendix 1 - Addendum 1

Regional District of Nanaimo

ITEM	MMCD REF.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1.0	**GENERAL AND SITE WORKS**					
1.1		Mobilization / Demobilization	LS	1		
1.2	01 55 00	Traffic Management	LS	1		
1.3	01 57 01	Sediment and Erosion Control	LS	1		
1.4	31 11 01	Clearing and Grubbing	LS	1		
1.5	31 22 01/31 23 01	Cut to Off-site Disposal	m3	800		
1.6	31 22 01/31 23 01	Cut to On-site Fill	m3	800		
1.7.1	33 40 01	375 mm PVC Storm Sewer	m	116		
1.7.2	33 40 01	200 mm PVC Catch Basin Lead	m	9		
1.8	33 44 01	1050 mm Manhole	each	1		
1.9	33 44 01	Catch Basin	each	1		
1.10	03 40 01	Headwall	each	2		
1.12	31 05 17/32 12 16	Asphalt Pavement	m2	500		
1.11	31 05 17/31 24 13	Access Road	LS	1		
SUBTOTAL GENERAL AND SITEWORK						
2.0	**WATERWORKS**					
2.1	33 11 01	400 Dia PVC Watermain	m	415		
2.2.1	33 11 01	400 Dia Gate Valve	m	1		
2.2.2	33 11 01	350 Dia Gate Valve	each	2		
2.2.3	33 11 01	300 Dia Gate Valve	each	2		
2.3.1	33 11 01	350 x 350 x 400 Cast Tee Fitting	each	1		
2.3.2	33 11 01	400 x 400 x 300 Cast Tee Fitting	each	2		
2.3.3	33 11 01	450 x 400 Cast Reducer Fitting	each	1		
2.3.4	33 11 01	400 x 350 Cast Reducer Fitting	each	1		
2.3.5	33 11 01	400 x 400 Cast Bend Fitting	each	8		
2.4	33 11 01	Hydrant	each	1		
2.5	33 11 01	Hydrant Access Culvert	each	1		
2.6	33 11 01	Air Valve	each	1		
2.7	33 11 01	Highway Crossing	LS	1		
2.8	33 11 01	Tie-In at Industrial Park	LS	1		
2.9	33 11 01	Tie-in Existing at Pump Station	LS	1		
2.1	33 11 01	Tie-in at New Pump Station	LS	1		
2.11	26 42 13	Cathodic Protection	each	1		
SUBTOTAL WATERWORKS						

Form of Tender - Appendix 1 - Addendum 1

Regional District of Nanaimo

3.0	**BUILDING AND MECHANICAL EQUIPMENT**					
3.1	03 20 01/03 30 53	Pump Station Structure	LS	1		
3.2	03 20 01/03 30 53	Retaining Walls	LS	1		
3.3	33 11 01	Welded Stainless-Steel Pipework	LS	1		
3.4	33 11 01	Pre-Selected Pumping Equipment	LS	1		
3.5.1	33 11 01	150 mm Gate Valve	each	1		
3.5.2	33 11 01	200 mm Gate Valve	each	2		
3.5.3	33 11 01	300 mm Gate Valve	each	2		
3.5.4	33 11 01	150 mm Butterfly Valve	each	1		
3.5.5	33 11 01	300 mm Butterfly Valve	each	2		
3.5.6	33 11 01	150 mm Surge Anticipation Valve	each	1		
3.5.7	33 11 01	300 mm Check Valve	each	1		
3.6	33 11 01	250 mm Flow Meter	each	1		
3.8	33 11 01	Pump (Owner Supplied)	each	1		
3.9	33 11 01	Pressure Reducing Valve (Owner Supplied)	LS	1		
SUBTOTAL BUILDING AND MECH EQUIP.						
4.0	**ELECTRICAL**					
4.1		BC Hydro and Telus Connections	LS	1		
4.2		Standby Generator and Load Bank	LS	1		
4.3		Motor Control Center	LS	1		
4.4		Controls and Instrumentation	LS	1		
4.5		Building Electrical	LS	1		
4.6		Underground Electrical	LS	1		
4.7		System Programming, Testing and Commissioning	LS	1		
SUBTOTAL ELECTRICAL						

2.3 - 26 54 00 Heaters and Ventilation

1. GENERAL

1.1 DOCUMENTS

.1 This Section of the Specification forms a part of the Contract Documents and is to be read, coordinated and implemented in conjunction with all other parts.

1.2 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results – Electrical

.2 Section 26 05 10 – Testing and Commissioning

.3 Section 26 05 31 – Splitters, Junction, Pull Boxes and Cabinets

1.3 PRODUCT DATA

.1 Submit product data in accordance with Submittal Procedures - Section 26 05 00 - Common Work Results – Electrical

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 26 05 00 – Common Work Results – Electrical.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for unit heaters, ventilation unit and all controls for incorporation into manual specified in Closeout Submittals - Section 26 05 00 – Common Work Results - Electrical.

2. PRODUCTS

2.1 UNIT HEATERS

.1 Refer to mechanical specifications.

.2 Element: stainless steel, factory sealed.

.3 Manufacturing: heavy-duty, 18-gauge steel cabinet; adjustable louvers and protective screen; thermal protection with automatic reset

.4 Finish: epoxy-polyester powder coat

.5 Warranty: 10 years for the element and 1 year for other components

.6 Installation: wall or ceiling-mounted with universal mounting bracket (included)

.7 Motor: permanently lubricated ball bearing motor for long lasting operation

.8 Thermally-protected motor.

.9 Wattage & voltage: per drawings

.10 Control: per drawings

.11 Standard of acceptance: Refer to mechanical specifications.

2.2 VENTILATION

.1 Refer to mechanical specifications.

.2 All fans and damper units shall include disconnect switches.

2.3 CONTROLS

.1 Refer to electrical drawings for details on heating and ventilation control.

.2 Provide control equipment as shown on electrical drawings. Devices to be industrial quality, line voltage (120/240 volts), single-pole, white.

.3 Provide clear plastic thermostat guard for all heating/cooling wiring devices: thermostats, humidistats, astronomical time switch.

3. EXECUTION

3.1 INSTALLATION

.1 Mount heaters on walls or ceilings as indicated.

.2 Electrically connect ventilation as shown in Manufacturers Installation Instructions.

.3 Install control equipment in locations indicated on drawings.

.4 Make power and control connections.

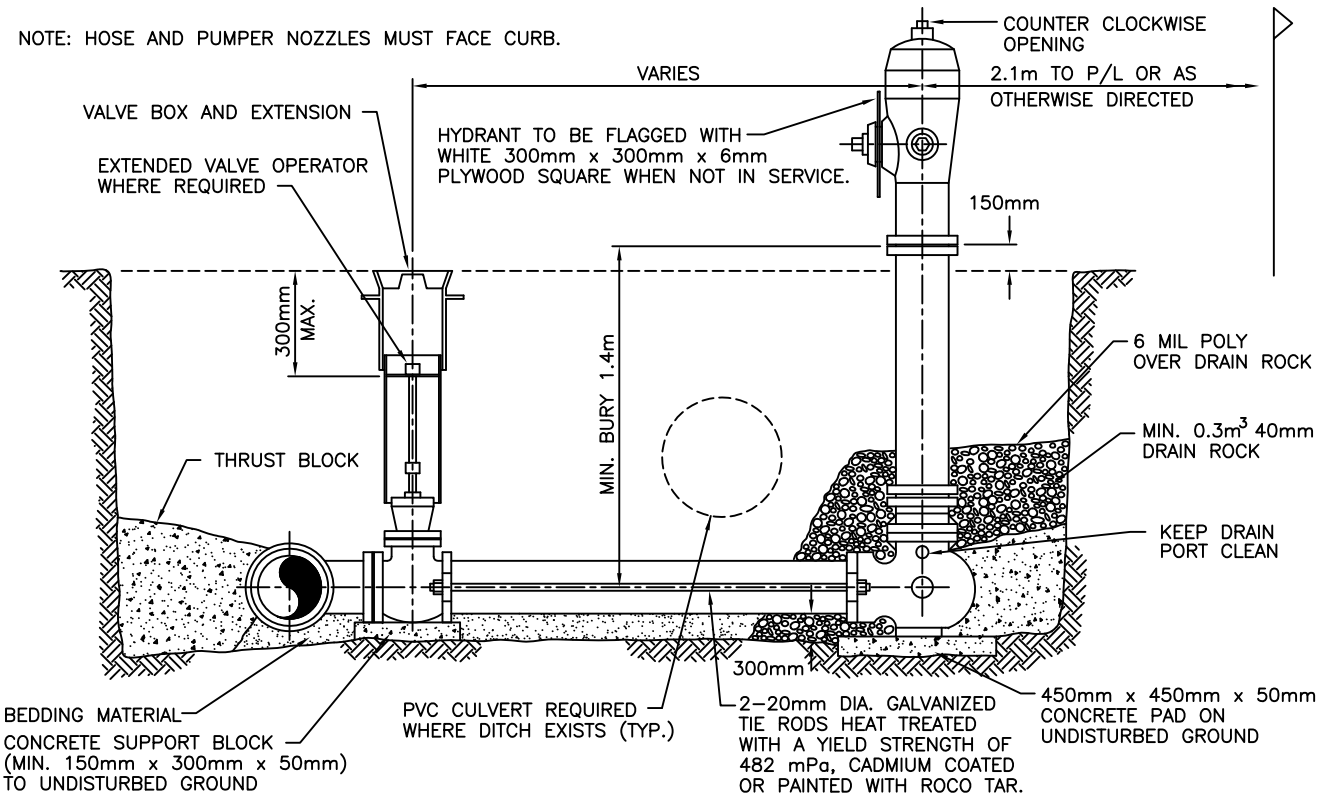
3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 10 – Testing and Commissioning.

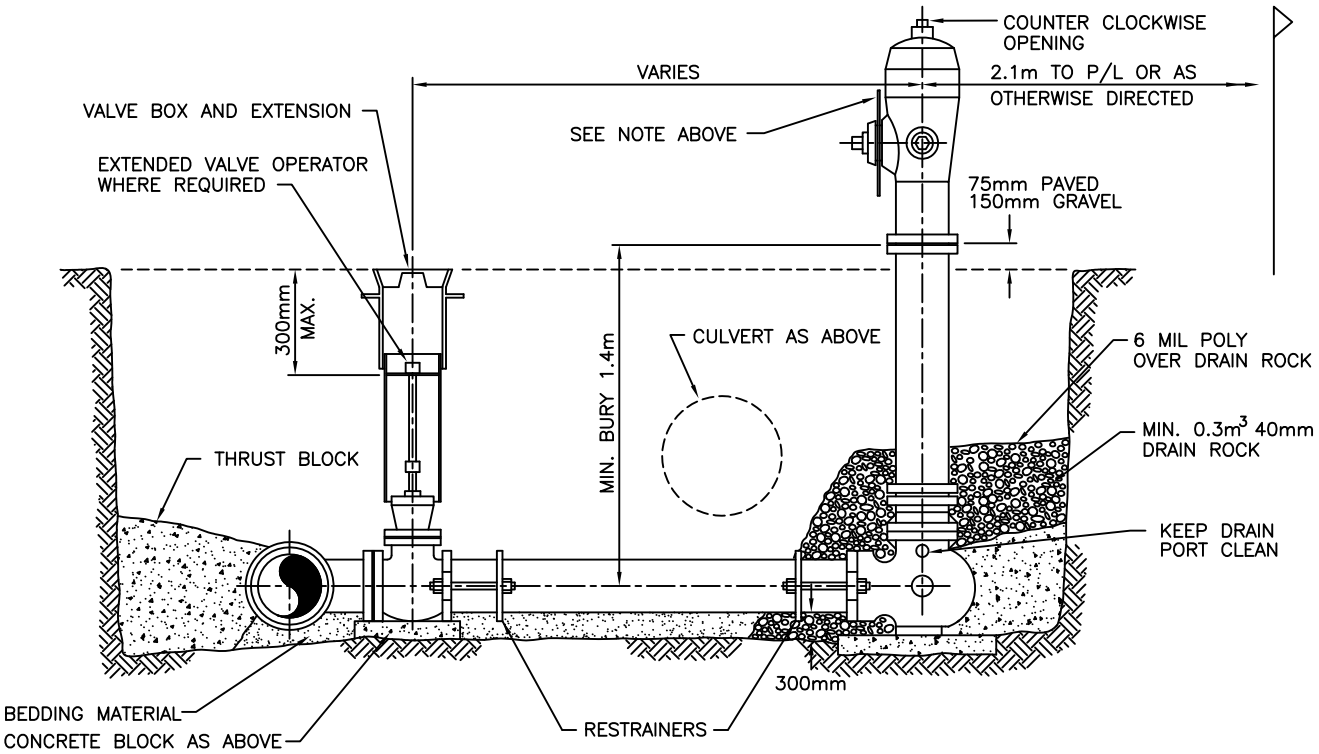
.2 Ensure that heaters, ventilation and controls operate correctly.

END OF SECTION

2.4 - City of Parksville Drawing W2 – Hydrant Connection Detail



HYDRANT CONNECTION WITH TIE RODS



HYDRANT CONNECTION WITH RESTRAINERS

City of Parksville

HYDRANT CONNECTION DETAILS

Scale	N.T.S.
Drawn	B.B.S.
Date:	JAN 2017
Dwg. No.	W2

2.5 - Appendix A – Control Philosophy & Operational Strategy

1.0 GENERAL

1.1 SCOPE

.1 This section provides information and details of the proposed Control and Operational Strategy to assist the Contractor with the PLC Programming.

1.2 DEFINITIONS

.1 Master Control Panel (MCP): The General Contractor shall provide a PLC control panel complete with HMI which will coordinate the operation of the individual pump station. The MCP will integrate with the Pump Control Panel (PCP).

.2 Pump Control Panel (PCP): The General Contractor shall provide a motor control panel housing VFDs which operate the station's pumps. The pump control panel will include a Pump System Controller (PSC).

1.3 PROGRAMMING AND CONFIGURATION

.1 Programming and configuration of the MCP PLC and HMI shall be by the General Contractor.

.2 Programming and configuration of the PCP VFDs and PSC shall be by the General Contractor.

.3 A detailed control philosophy shall be prepared by the General Contractor for review by the Owner's representative and Owner.

1.4 NOTIFICATION AND ALARMING

.1 Integration with RDN SCADA or Parksville SCADA is not included in the contract.

.2 Alarms and notifications shall be available on the local MCP HMI.

.3 Programming and exchange tables shall be provided to the RDN and to Parksville for integration with the respective SCADA systems.

1.5 RELATED WORK

.1 This document should be read in conjunction with the contract drawings and process design brief.

2.0 SYSTEM OPERATION

.1 The complete system will consist of the following major processes:

- .1 Pump Control
- .2 Other Systems

2.1 PUMP CONTROL PANEL (PCP) – PUMP SYSTEM CONTROLLER (PSC)

.1 Description:

- .1 The PSC shall operate variable speed pumps to allow for the filling of the system reservoir. The system controller shall receive the following signals from an exterior source:
  - .1 Lead Pump Start

.2 Lag Pump Start

.3 Lead Pump Stop

.4 Lag Pump Stop

.2 Upon receipt of a pump start signal, the PSC shall:

.1 Soft start a pump via the VFD up to a user-defined frequency.

.2 Continue operating a pump until receipt of the associated pump stop signal, or until receipt of an associated fault signal.

.3 All three pumps in the system (lead, lag, standby) shall alternate automatically based on demand, time and fault. If flow demand is continuous (no flow shut-down does not occur), the system controller shall have the capability to alternate the pumps every 24 hours, every 48 hours or once per week. The interval and actual time of the pump change-over shall be field adjustable.

.2 Instrumentation:

.1 The following instrumentation will be provided by the General Contractor and integrated with the PCP:

.1 Suction Pressure Transducer

.2 Discharge Pressure Transducers (redundant pair – two transducers total)

.3 VFDs

.3 Programmable Logic Control:

.1 The PSC shall be integrated with the MCP using Modbus over TCP/IP.

.2 The PSC manufacturer shall provide complete exchange table for I/O point integration with MCP PLC.

.3 Alarms:

.1 High System Pressure - pump shutdown

.2 High System Pressure

.3 Low system pressure

.4 Low system pressure – pump shutdown

.5 Low suction pressure (warning and alarm)

.6 Individual pump failure

.7 VFD trip/failure

.8 Loss of sensor signals (for each 4-20mA sensor)

.9 System power loss

.4 Setpoints:

.1 Transducer Settings (Suction and Discharge Analog supply/range)

.2 High system pressure alarm indication and shut-down

.3 High system pressure pump shut-down

.4 Low system pressure alarm indication

.5 Low system pressure pump shut-down

.6 Low suction pressure/level warning

.7 Low suction pressure/level shutdown

2.2 MASTER CONTROL PANEL PLC/HMI PUMP SYSTEM OPERATIONS

.1 Description:

.1 The Master Control Panel will be used to provide pump skid start/stop commands to the PSC based on the fill level of the reservoir. Setpoints will be used to stipulate the starting and stopping levels for the lead and lag pumps. The lead pump will be triggered when the reservoir reaches a low water setpoint (lead pump start level). Should the lead pump be operating and the reservoir level continue dropping, the lad pump will be triggered when the reservoir reaches a second low water setpoint (lag pump start level). With the reservoir filling, the pumps will be requested to stop once associated lead and lag stop levels have been reached.

.2 The MCP will also be used to control the operation of the pressure reducing valve, which will be set to open on a low-level pressure setpoint and close on a high-level pressure setpoint. When the pressure reducing valve is open, the system shall be programmed such that pump motor operation will not be permitted.

.3 The MCP will also connect to a chlorine analyzer for the purposes of viewing residual chlorine levels and alarm states.

.2 Instrumentation:

.1 The following instrumentation will be provided by the General Contractor and integrated with the MCP:

.1 Flow Meter

.2 Reservoir Level (via dialer)

.3 PRV pressure transducer

.4 Chlorine analyzer

.3 Programmable Logic Control:

.1 The MCP shall be integrated with the PSC using Modbus over TCP/IP.

.2 The PSC manufacturer shall provide complete exchange table for I/O point integration with MCP PLC.

.3 Digital Inputs:

.1 Booster Pump Skid OK

.2 PRV Open

.3 PRV Closed

.4 Alarms:

.1 All alarms configured in the PSC (via Modbus TCP)
.2 Reservoir High Level
.3 Reservoir Low Level
.4 Low Flow
.5 High Flow
.6 Loss of sensor signals (for each 4-20mA sensor)
.7 High Chlorine Level
.8 Low Chlorine Level
.9 Chlorine System Fault
.10 PRV Failed to Open
.11 PRV Failed to Close
.12 Booster Skid Failure
.13 Process Critical Alarm
.14 Process Failure Alarm

.5 Setpoints:

.1 All setpoints configured in the PSC (via Modbus TCP)
.2 Transducer Settings (Flow and Reservoir supply/range)
.3 Reservoir High Level
.4 Reservoir Low Level
.5 Lead Pump Start Level
.6 Lead Pump Stop Level
.7 Lag Pump Start Level
.8 Lag Pump Stop Level
.9 PRV Low Pressure Open
.10 PRV High Pressure Close
.11 PRV Actuation Time (for determining failed to open/close alarms)
.12 High Chlorine Level
.13 Low Chlorine Level
.14 Low Flow
.15 High Flow

.4 Human/Machine Interface:

.1 The following parameters will be monitored and graphically displayed at the MCP HMI:

.1 All setpoints (read and write; local and via PSC Modbus TCP)

.2 Booster skid OK

.3 Booster Skid Failure

.4 PSC status points and alarms (via Modbus TCP)

.5 Flow

.6 Reservoir Level

.7 All alarms configured in the PSC (via Modbus TCP)

.8 Reservoir High Level

.9 Reservoir Low Level

.10 Low Flow

.11 PRV Opened

.12 PRV Closed

.13 PRV Failed to Open

.14 PRV Failed to Close

.15 Chlorine System Fault

.16 Residual Chlorine Level

.17 High Chlorine Level

.18 Low Chlorine Level

.19 Low Flow

.20 High Flow

.21 Process Critical Alarm

.22 Process Failure Alarm

2.3 OTHER SYSTEMS

.1 Description:

.1 Other system parameters unrelated to the treatment process will be monitored and displayed on at the MCP PLC/HMI.

.2 Programmable Logic Control:

.1 Digital Inputs:

.1 Generator running, fault and warning signals

.2 Automatic transfer switch on-utility, on-genset and fault signals

.3 Power Supply, UPS, and Surge Protection Device status

.4 Building Intrusion

.5 Building Heat Detection

.6 Analog Dialer Fail

.7 Buttons:

.1 Fault Reset

.2 Lamp Test

.2 Alarms:

.1 Generator Fault

.2 Generator Warning

.3 Automatic Transfer Switch Fault

.4 Power Supply Fault

.5 UPS Fault

.6 Surge Protection Device Fault

.7 Building Intrusion

.8 Building Heat Detection

.9 Analog Dialer Fail

.3 Human/Machine Interface:

.1 The following parameters will be monitored and graphically displayed at the HMI:

.1 Generator running, fault and warning signals

.2 Automatic transfer switch on-utility, on-genset and fault signals

.3 Power Supply, UPS, and Surge Protection Device status

.4 Building Intrusion

.5 Building Heat Detection

.6 Analog Dialer Fail

2.6 - Smith Cameron Quotation

SMITH CAMERON
PROCESS SOLUTIONS

CUSTOMER NAME		PROJECT REFERENCE
June-1-18	Page 1	Smith Cameron Quote # CL0406

Nanoose Bay Peninsula Pump Station – Booster Pump Package
McElhanney Engineering

Smith Cameron Quote CL0406

Smith Cameron Process Solutions
#1- 13478 78th Ave
Surrey BC V3W 8J6
800.663.5841

Coordinated By:
Chris Lawlor
o: 778-218-2156 | c: 604-349-7567
clawlor@smithcameron.com

SMITH CAMERON
PROCESS SOLUTIONS

CUSTOMER NAME		PROJECT REFERENCE
June-1-18	Page 2	Smith Cameron Quote # CL0406

Good day

We are pleased to present the following proposal for your consideration

With our extensive product line, fully trained and knowledgeable staff and our 30+ years of experience behind us, Smith Cameron can be your one-stop partner for all pump, process and blower equipment sales, servicing and repair needs.

We are able to give you complete application and equipment selection support and provide you with a true lifetime partnership. From initial consultation and installation of your equipment, through its maintenance and servicing requirements, Smith Cameron will assist you in every conceivable manner.

A summary of the system costing can be found below. Details on each system will be outlined in the attached documentation.

Costing Summary

Section 1 – Grundfos Custom Boosterpaq

Material	Qty	Unit Net Price	Ext Price
MPC(E)-6(2)CR90-4-1-60HP-CUS	**1**	**$262,678**	**$262,678**

Section 2 – Chlorine Analyzer Package

Material	Qty	Unit Net Price	Ext Price
SCPS-Cl-PCM	**1**	**$5,710**	**$5,710**

Section 3 – Equipment Startup

Material	Qty	Unit Net Price	Ext Price
PR-StartUp	**1**	**$4,500**	**$4,500**

Terms & Conditions

Payment: 100% with Order or Net 30 days, on Approved Credit
Price: Quoted NET in Canadian funds, F.C.A. Surrey
GST & PST: Extra (if applicable)
Delivery: Drawings – 3 Weeks | Equipment – 16 Weeks after approvals
Offer Validity: 60 days

We appreciate the opportunity to offer our quality products and look forward to working with you on this project. Should you have any questions concerning this proposal or require any additional information, please feel free to contact me at 778-218-2156

Best Regards,
Chris Lawlor

Section 1 **– Grundfos Custom Boosterpaq**

Hexaplex CR90-4-1 Custom System
Suction/Discharge Manifold - 12" 150# ANSI SS
2x CR90-4-1 Pumps supplied in quoted scope
Skid to fit 6x pumps with 4x slots blocked off for future pumps
Motors - 3600RPM 60HP – **SPECIFY VOLTAGE**
Service Voltage – **SPECIFY VOLTAGE**
Components/Valving Materials –304SS
Pressure Transducer – Included (0-145PSI)
Dry Run Protection – Suction Side Level Transducer
Base/Frame - AISI 304SS

Starter Panel – INCLUDED c/w HMI/3x VFDs/etc | Nema 12 Enclosure
Panel Option Package includes:
- N/E Switches
- Service Disconnect Switches
- Surge Protection
- Pump Run lights
- Alarm Circuit
- IO351B Input/output module (Additional Digital Outputs)
- 3x dU/dt filter
- 3x Line Reactors

Material Upgrades and Testing available as per below

Material:	**Qty:**
MPC(E)-6(2)CR90-4-1-60HP-CUS	1

Section 2 – Chlorine Analyzer Package

DiaLog DACb multi-parameter controller
Options Included:
- Installation W wall mounting
- 00 Prominent logo RAL 5003/2003
- Operation voltage 6 100 - 230 VAC, 50/60 Hz
- Based metrics VA mV / mA measurement input
- Function extension (IOS) 0 no
- Software pre-setting 0 no pre-setting
- Connector of the measured variable. 1 1x mV input on SN 6 connection
- Connection of digital sensors 0 without
- Communication interface 0 no
- Data in-giver 1 with data in-giver
- Hardware extension 0 without
- Certificate 0 without
- docu-language acc. ISO 639-1 EN english

DGMa Sensor Holder
- In-line modular sensor holder made of clear PVC/Viton.
- Maximum inlet pressure 87 psig.
- Maximum temperature 140 degrees F.
- Recommended sample flow is 10.5 gph.
- Includes wall mount brackets and flow control valve.

Selected options:
- Module for flow measurement: With flow sensor, scale l/h (recommended)
- Number of modules Pg 13.5: None
- Number of modules 25mm: One
- Material: PVC-transparent
- Sealing material: Viton
- Connection: 1/2" X 3/8" tubing adapters
- Version: Standard

Chlorine Sensor
Chlorine-bromine sensor CBR 1-mA-5 ppm

Pressure Regulating Manifold
- Pressure Regulating Valve
- Pressure Gauge
- Isolation Valve
- Lot Equipment Mounted to a single backboard

Material:	**Qty:**
SCPS-CL-PCM	1

Section 3 – Start Up and Commissioning

Start up and commissioning for Equipment in Section 1 & 2 including:

- Travel to/from site
- Mileage
- 1x Day on Site
- Living Expenses

Extra Time and Materials billed at extra cost

SMITH CAMERON
PROCESS SOLUTIONS

CUSTOMER NAME		PROJECT REFERENCE
June-1-18	Page 5	Smith Cameron Quote # CL0406

TERMS AND CONDITIONS 1. EFFECT: These terms and conditions form part of every contract entered into by Smith Cameron Pump Solutions Inc, d.b.a. Smith Cameron Process Solutions (the "Company") with a purchaser (the "Purchaser"). If the Purchaser authorizes the Company to supply labour ("Services"), products, parts, materials, or equipment ("Equipment"), then these terms and conditions shall apply, unless an authorized representative of the Company agrees in writing to different terms and conditions. Any variation will affect only those terms and conditions specified, and the remainder will remain in force without amendment.

2. LAW: The contract between the Company and the Purchaser shall be construed under and governed by the laws of the Province of British Columbia and Canada, regardless of where the contract is made or performed. Subject to paragraph 15, the courts of the Province of British Columbia shall have exclusive jurisdiction over any dispute arising from or regarding this Agreement. Compliance with local laws or standards relating to the location, use or operation of the Equipment, by itself or in conjunction with other equipment, and including any fines or penalties, shall be the sole responsibility of the Purchaser.

3. TITLE AND RISK: Title and risk of loss of or damage to the Equipment shall pass to the Purchaser when the Equipment is shipped, whether from the manufacturing facility or the Company's premises. The Purchaser agrees to insure the Equipment with the Company named as loss payee until the Company has been paid in full.

4. CREDIT AND PAYMENT TERMS: The Purchaser shall furnish to Company all financial information reasonably requested by Company from time to time for the purpose of establishing or continuing Purchaser's credit limit. The Purchaser agrees that the Company shall have the right to decline to extend credit to Purchaser and to require that the applicable purchase price be paid prior to shipment. The Purchaser shall promptly notify the Company of all changes to the Purchaser's name, address, or the sale of substantially all of its assets. The Company shall have the right from time to time, without notice, to change or revoke the Purchaser's credit limit on the basis of changes in the Company's credit policies or the Purchaser's financial conditions and/or payment record.

Unless the Company has made a contrary agreement in writing, payment for the Services and Equipment is due within 30 days following the earliest of:
a. Shipment or offer to ship the Equipment to the Purchaser;
b. Substantial completion of the Services;
c. The date of the Company's invoice to the Purchaser.

Overdue amounts will bear interest at 2% per month, compounded monthly (26.82% per annum) until paid. Payment is due without set off or counter-claims for any amounts claimed by the Purchaser or any affiliate of the Purchaser from the Company, whether or not such claim arises out of this agreement.
5. SECURITY INTEREST: The Company retains a security interest in the Equipment, and any proceeds derived from the sale or exchange of the Equipment, until the price has been paid in full. The Purchaser agrees to notify the Company immediately of any change in the location of the Equipment, and to take all steps requested by the Company to establish, perfect, continue, and enforce the security interest. The Purchaser waives the right to receive copies of any financing statement, financing change statement, or verification statement.

6. DELIVERY: Any delivery date specified is an estimate only, and subject to delay caused by labour disputes, acts of God, shortages of material, transportation or manufacturing delays, or other cause beyond the reasonable control of the Company. The Company will take commercially reasonable steps to meet any delivery date specified, but will not be liable for the consequences of delay in delivery.

7. TAXES AND DUTIES: The price does not include any present or future federal, provincial, state or local licenses, permits, sales taxes or assessments which may be applicable to or result from the sale of Equipment or Services. Unless otherwise stated, the price does include customs or import duties. Tax exemptions must be clearly noted on Purchase orders or the appropriate documentation must be presented to Company.

8. PRICES: Unless specified on the Quote, prices are only guaranteed for 30 days from date of Quote.

9. CANCELLATION POLICY: Order cancellation requires written consent from Company. Cancellation of standard product normally stocked and without modification will incur a 25% cancellation charge. Non-standard or modified product cannot be cancelled without written consent. The Purchaser will agree to pay for all cancellation costs, expenses, commitments, liabilities, and other costs including overhead incurred with respect to all uncompleted goods.

10. RETURNS: The Purchaser shall not return any Equipment to the Company without prior written authorization. Any authorized returns will be subject to a minimum 20% re-stocking charge. Returns must be prepaid, unopened, unused and ready for resale. Product shall be deemed suitable and not returnable after 60 days from delivery or installation date.

11. WARRANTY: The Company warrants that the Equipment and Services will be free of defects in material and workmanship for a period of twelve months from the date the Purchaser begins to operate the Equipment, or eighteen months from the date of shipment to the Purchaser, whichever shall first occur. The Company may, at its option, repair or replace the Equipment and Services. This warranty specifically excludes:
a. any claim where the Purchaser has not stored, installed, maintained or operated the Equipment in accordance with good industry practices;
b. the cost of any repairs, replacements, or adjustments (including labour) to the Equipment performed by the Purchaser or others;
c. the effects of corrosion, erosion, or normal wear and tear;
d. any claim which the Purchaser has not immediately reported, in writing, to the Company;
e. any claim where the Purchaser has not complied with specific recommendations of the Company or the manufacturer of the Equipment;
f. any warranty with respect to the performance of the Equipment, unless given by the Company in writing, and in that event, the Company's sole obligation shall be as specified in this paragraph 11, as limited by paragraph 12.
12. LIMITATION OF LIABILITY: The warranty given in paragraph 11 excludes all other warranties, whether express, implied, contractual, statutory or otherwise. All implied warranties, including any warranty of merchantability or fitness for a particular purpose, are hereby disclaimed. The Company makes no other warranty or representation of any kind whatsoever, except as to title to the Equipment. The maximum liability of the Company with respect to this contract, the Equipment and the Services, whether based on contract, warranty, negligence, indemnity, strict liability or otherwise, shall not exceed the price of the Equipment or Services upon which such liability is based. The Company shall in no event be liable to the Purchaser for any consequential, incidental, indirect, special or punitive damages arising out of this contract, any breach thereof, any defect in, failure or malfunction of the Equipment and Services, whether based upon lost goodwill, lost profits or revenue, interest, work stoppage, impairment of other goods, loss by reason of shutdown or non-operation, increased expenses of operation of the Equipment, loss of use of electrical systems, cost of purchase of replacement power, claims of the Purchaser or customers of the Purchaser for service interruption, or otherwise, and whether or not such loss or damage is based on contract, warranty, negligence, indemnity, strict liability or otherwise.

13. SURVIVAL OF AGREEMENT: The effect of these terms and conditions shall survive the delivery and completion of the purchase contemplated by this agreement.

14. SEVERABILITY: If any provision in these terms and conditions is held by a court of competent jurisdiction to be contrary to law, the remaining provisions will remain in full force and effect.

15. FORCE MAJEURE: The Company shall be excused from performance of its obligations under this agreement to the extent and for such period of time as such performance is prevented by an act of God, fire, flood, earthquake, transportation disruption, labour dispute, war, insurrection, failure of computers or manufacturing equipment, or other cause beyond the reasonable control the Company.

16. NO WAIVER: Failure of the Company to enforce these terms and conditions, on any occasion, shall not operate as a waiver of such provisions or rights on future occasions.

17. ARBITRATION: Any dispute between the Company and the Purchaser concerning the purchase of Services or Equipment, or these terms and conditions, shall be resolved by a single arbitrator appointed and acting under the British Columbia Commercial Arbitration Act; the arbitrator's decision shall be final and binding upon the parties. The arbitration shall be held in Vancouver, British Columbia.

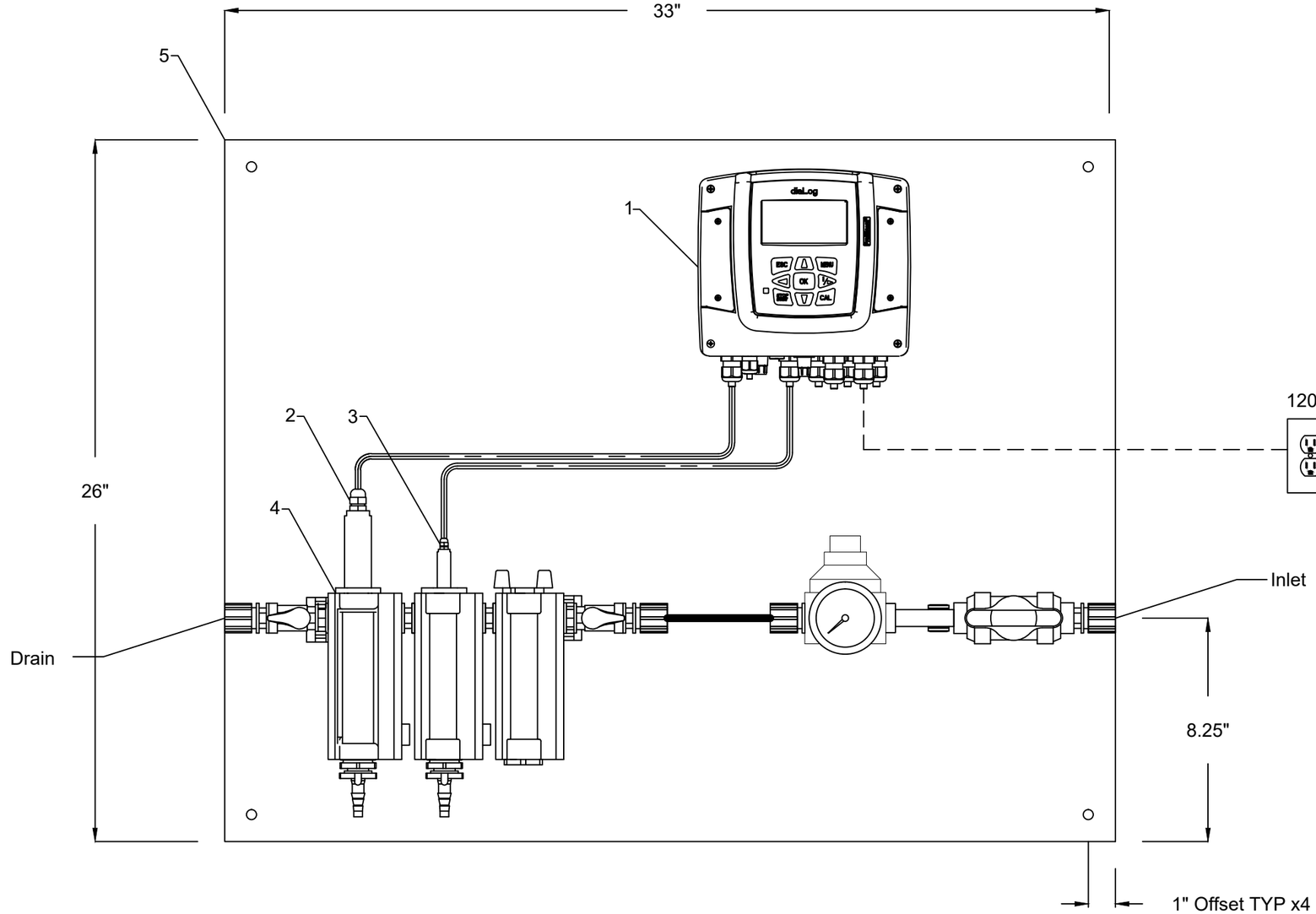
18. ENTIRE AGREEMENT: These terms and conditions and the Company's order confirmation contain the entire agreement between the parties, and supersede all prior contracts or negotiations. There are no representations, warranties, conditions, collateral agreements, understandings, or inducements which are not contained in these terms and conditions, or the order confirmation.

19. ASSIGNMENT: The Purchaser may not assign its interest in this contract without the written consent of the Company.

20. GENERAL: These terms and conditions, as published on Company's web site located at www.smithcameron.com at the time of sale, are the official terms and conditions for sale between the Company and Purchaser and may be amended from time to time without notice at Company's sole discretion.

2.7 - Chlorine Analyzer Specification

REV.	ECN	ZONE	CHANGE DESCRIPTION	BY	APPROVED	DATE
-	-	-	-	-	-	-



Item	QTY	Part Number	Description
1	1	DACBW006VA0010010010EN	Prominent DiaLog DACb Multi-Parameter Controller - Free Chlorine □ pH
2	1	1052138	CHLORINE-BROMINE SENSOR CBR 1-mA-5 ppm
3	1	305096	SENSOR PHEX 112 SE pH
4	1	DGMA111T010	In-Line Modular Sensor Holder Clear PVC□Viton- 1x 1" Holder □1x ½" Holder
5	1	SCPS-PCM	Pressure Regulating Manifold - Isolation valve, gauge and pressure regulator

PRODUCT LINE	-				
TYPE □FRAME	-				
B.O.M.	-				
SCPS □UOTE NO.					
SCPS J.O. NO.					
SCALE	NTS				
DRAWN	CHRIS	DATE	12□06□2012		
CH□D.	-	DATE	-		
APPVD.	-	DATE	-		
REPLACES	-				

SMITH CAMERON PUMP SOLUTIONS

TITLE	DRAWING NO.	REV.
Free Chlorine□pH Analy□er Pac□age	B1599	A
REPLACED BY -	SHEET 1 OF 1	

MASTER SPECIFICATION
SECTION 40 91 13.13
CHLORINE PROCESS MEASUREMENT DEVICES

- This is a Master Specification and is subject to minor editing for use in a full engineering project specification.
- Placeholders of "XX" or < > have been included to indicate where application or project data needs to be included.
- Specification numbering is based upon the most current CSI specification numbering practice. Use of older CSI number styles can also be accommodated by substituting the applicable numbers where required.

SECTION 40 91 13.13 - CHLORINE PROCESS MEASUREMENT DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. The chlorine sensor shall be an amperometric type, providing continuous measurement of residual chlorine without use of any reagents or buffers in the sample stream. A membrane shall protect the electrodes from flow, pressure, and conductivity-based interferences.

B. The Chlorine Measurement Device(s) shall be the standard equipment of the supplier involved in the manufacture of similar type equipment and shall be as manufactured by ProMinent Fluid Controls, Inc. or Engineer Approved Equal.

C. Equipment of a different type, size, weight or design of that specified herein can be offered. However, such equipment shall be acceptable only on the basis of the following:

1. Any revisions in the design and/or construction of the structure, piping, appurtenant equipment, electrical work, etc., required to accommodate such a substitution shall be made at no additional cost to the Owner.

2. Changes in scope of equipment shall be the responsibility of the Contractor.

3. All modifications to the scope shall be approved by the Engineer and must be determined to be equal of that specified.

1.03 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation, and workmanship shall comply with the applicable requirements and standards addressed within the following references:

1. American National Standard Institute (ANSI)

2. Occupational Safety and Health Administration (OSHA)

3. National Electrical Manufacturers Association (NEMA)

4. National Electrical Code (NEC)

5. NSF International (NSF)

6. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 RELATED WORK SPECIFIED ELSEWHERE

A. Section 46 33 41 - Liquid Chemical Feed System Coordination and Integration

B. Section 40 20 00 - Liquids Process Piping

1.05 SUBMITTALS

A. Contractor shall provide all submittals in accordance with the requirements of Section 01 33 00, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data and Samples.

B. Product Data:

1. One (1) electronic copy of submittal data will be supplied for the system.

2. Component data and shop drawings of the system will be supplied, including dimensions, weight, and parts list.

3. When applicable, control panel elevation, control schematics, and component data will be supplied.

C. Record Documents:

1. Manufacturer's warranty form in which manufacturer agrees to repair or replace components exhibiting failures in materials or workmanship within specified warranty period.

D. Operation and Maintenance Manuals:

1. Provide complete operation and maintenance manuals for all equipment, in accordance with the requirements of Section 01 78 00, Closeout Submittals.

1.06 QUALITY ASSURANCE

A. The pump Manufacturer shall have equipment of a similar type in satisfactory operating condition for not less than ten (10) years. Installations shall be of similar size and type to the specified equipment.

B. All equipment provided under this section shall be obtained from a single supplier or manufacturer who shall assume full responsibility for the completeness and proper installation of the Chlorine Process Measurement Device(s).

C. To ensure quality and unit responsibility, the Chlorine Process Measurement Device(s) must be assembled and tested by the manufacturer at its facility and be a standard regularly marketed product of that manufacturer. The manufacturer must have a physical plant, technical and design staff, and fabricating personnel to complete the work specified.

D. Prior to shipment the Chlorine Process Measurement Device(s) shall be inspected for quality of construction verifying all fasteners and fittings are tight, all wires are secure, and connections whisker-free.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. The vendor shall supply all components necessary for a functional system: sensor(s), sensor holder with flow meter, flow control valve and mounting brackets, chlorine monitor, and all required cables and spare parts. The sensor, holder, and monitor shall all be made by the same manufacturer to ensure compatibility and provide sole source responsibility.

2.02 CHLORINE PROCESS MEASUREMENT DEVICES REQUIRED

System Tag No.		XX	XX	XX
Qty		XX	XX	XX
Measured Parameter	Free Cl or Total Cl	XX	XX	XX
Normal Monitored Concentration	ppm	XX	XX	XX
Maximum Monitored Concentration	ppm	XX	XX	XX
Minimum Monitored Concentration	ppm	XX	XX	XX

2.03 SYSTEM DESCRIPTION

A. The Chlorine Process Measurement Device(s) shall be a diaLog DACa analyzer package as manufactured by ProMinent Fluid Controls, Pittsburgh, PA.

2.04 TECHNICAL DATA

A. Analyzer

1. The analyzer shall be microprocessor-based, with illuminated LCD display of measured value, status, and error annunciation. Unit shall feature non-volatile memory to retain settings in the event of power failure: menu-driven calibration, limit and control settings; sensor monitoring to alarm upon sensor failure or loss of sensitivity; programmable access code allowing calibration but not unauthorized adjustment of limits and outputs.

2. The device shall have the provision to be configured with a second independent channel for control of a second application parameter.

3. The unit shall have the ability to control via proportional or PID loop control functions.

4. In Free Chlorine applications the analyzer shall allow for pH compensation of the Free Chlorine reading via a pH probe installed in the sample stream and wired to the analyzer.

5. The controller shall have the provision of saving data (datalogging) to an SD card.

6. If required by the application the unit shall be able to accept a process flow rate disturbance variable and shall adjust its corresponding chemical feed output based on this variable.

7. In addition to the above requirements the analyzer shall have the following capabilities and specifications:

   a. Resolution – 0.01 ppm (Chlorine) / 0.01 (pH) / 1 mV (ORP)

   b. Accuracy – 0.3% based on the full-scale reading

   c. pH Compensation Range for Chlorine – 6.5 to 8.5

   d. Disturbance Signal – Flow via mA or Frequency

   e. Current Outputs – Two (2) 0/4-20mA electrically isolated (measured value, correction value and/or control variable selectable)

   f. Control Outputs

      1) Two (2) Pulse Frequency Outputs for metering pump control

      2) Two (2) Relays (limit value, 3-point step or pulse length control)

   g. Alarm Relay – 250 Volt, 3 Amp, 700 VA (maximum)

   h. Enclosure – IP67

   i. Tests and Approvals – CE, MET (Corresponding to UL according to IEC 61010)

B. Sensor

1. The chlorine sensor shall be an amperometric type, providing continuous measurement of residual chlorine without use of any reagents or buffers in the sample stream. A membrane shall protect the electrodes from flow, pressure, and conductivity-based interferences.

2. The measured value shall be either free chlorine or total chlorine as specified in 2.02 above. Specific sensor model selection shall be per the best recommendation of the analyzer manufacturer or their – Authorized Manufacturer's Representative. Selection shall be made to best meet the application requirements.

3. Signal response time to 90% of measured value shall be better than two minutes. Drift shall be less than 2% per month.

4. The sensor shall include integral automatic temperature compensation. The signal to the monitor shall be 4-20mA via 2-wire technology. The sensor shall feature a terminal block with watertight cable gland for field connection of any length cable to the monitor.

5. For applications calling for Free Chlorine measurement automatic pH compensation shall be provided by means of a double junction pH sensor with signal converter to provide 4-20mA signal to the monitor via 2-wire technology. The signal converter shall feature a terminal block with watertight cable gland for field connection of any length cable to the monitor.

C. Sensor Holder

1. The sensor holder shall be transparent PVC material with integral flow control valve and rotameter for setting the sample flow rate between 8 and 15 gph. The flow shall be directed at the sensor membrane to provide continuous cleaning action. Mounting brackets for wall mounting shall be included.

2. A flow switch shall be provided as part of the rotameter. This switch shall be wired to the controller which shall be able to initiate a pause to chemical feed if a loss of sample flow is detected.

D. Analyzer Package

1. The analyzer, sensor, and sensor holder specified herein shall be installed on a single backpanel and shall be fully wired and ready for installation with sample tubing or piping connections as specified by the customer.

2. The analyzer backpanel shall be made of Polyethylene/Polypropylene sheet material of at least 3/8" thickness and shall be UV resistant.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. The equipment shall be installed per the contract documents and manufacturer's recommendations.

1. Provide a manufacturer's certificate showing the equipment has been satisfactorily calibrated and tested.

2. An Authorized Manufacturer's Representative shall inspect the installation of all work furnished under this section and shall provide a certificate of proper installation.

3.02 MANUFACTURER'S SERVICES

A. The manufacturer, or manufacturer's representative, shall provide the services of an experienced, authorized representative for the equipment specified herein and shall be present at the jobsite and/or classroom designated by the City/District for the minimum man-days listed for the services shown below.

1. One man-day per site for inspection, start-up, functional testing and certificate of proper installation.

2. One man-day per site for training and commissioning.

3. The vendor shall clearly define in their proposal whether or not time and travel costs are included in their bid so that the engineer can make an informed decision of the value of the proposed offer.

3.03 WARRANTY

A. Chlorine Process Measurement Devices shall have a 12 month warranty from the date of start-up by Authorized Manufacturer's Representative.

B. Damage due to water particulate build up in sampling equipment will not be considered as a warranty defect and will be the responsibility of the owner.

END OF SECTION 40 91 13.13

2.8 - Regional District of Nanaimo Approved Products List

----------END----------

Regional District of Nanaimo - Approved Products List - Public Water Systems

Section	Product	Manufacturer	Model	Size	Comments
2.8	**Pipe - Ductile Iron**	Canada Pipe Canron Stanton			
2.8	**Pipe - PVC**	Diamond Flexlox Ipex Northern Pipe Rehau	 C900	 4"-12"	Pipes to meet colour requirements of RDN
2.9	**Ball Valve**	Kits Red and White			
2.9	**Detector Check Valve**	Ames Febco Hersey Kennedy Watts Industries	10000CV 800DC EDC III B2 Series 07F	6"-10" 6"-10" 6"-10" 6"-10" 6"-10"	UL/FM UL/FM UL/FM UL/FM UL/FM
2.9	**Bronze Compression Fittings**	A.Y. McDonald Cambridge Brass Ford Jones Mueller	Q-Series Only H-Series Only Q-Fittings Only SG Fittings Only H-Series Only	3/4"-2" 3/4"-2"	Full Flow Only Full Flow Only Full Flow Only Full Flow Only Full Flow Only
2.9	**Curb Stop**	A.Y. McDonald Cambridge Brass Ford Jones Mueller	Q-Series Only H-Series Only Q-Fittings Only SG Fittings Only H-Series Only	3/4"-2" 3/4"-2"	Full Flow Only Full Flow Only Full Flow Only Full Flow Only Full Flow Only
2.9	**Meter Box (Plastic)**	Ametek-Plymouth Ametek-Plymouth Ametek-Plymouth Brooks Products	10-170-003 (extension) 10-171-001 (cover) 10-170-001 (box) 37	300x500 300x500 300x500 300x500	Only for use where approved Only for use where approved Only for use where approved
2.9	**Pipe Saddles (For DI)**	Robar Romac (Rockwell) Smith-Blair	 STYLE 313	4"-12" 4"-12" 4"-12"	

Section	Product	Manufacturer	Model	Size	Comments
2.9	**Pipe Saddles (For PVC)**	Canpac Mueller Robar Rockwell		4"-12" 4"-12" 4"-12" 4"-12"	
2.9	**Service Pipe - Copper**	Cerro Wolverine Tube	Type K Soft Type K Soft		
2.9	**Water Meters**	Schlumberger (Neptune) Sensus		5/8"-3/4"	Domestic DIRECT READ Meters Only
2.9	**Pipe - Copper**	(None Listed)			
2.9	**Service Box (Concrete)**	Brooks Products Brooks Products	37 66	300x500 425x750	
2.10	**Hydrants**	AVK Mueller	2780 Super Centurion 250		See below for Paint Colour See below for Paint Colour
2.11	**Valves - Butterfly**	Dezuirk Pratt Pratt	AWWA HP250 (250 PSI) Groundhog (150 PSI)	4"-12" 4"-12" 4"-12"	Complete with LA-Series operator
2.11	**Valves - Gate**	Mueller Jenkins	A-2380 Bronze Seat	2"-12" 2"-12"	
2.11	**Valves - Resilient Wedge**	AVK Clow Mueller	Series 25 Model 2630 A-2360	2"-12" 4"-12" 4"-12"	Stainless Steel Stem UL/FM UL/FM
2.11	**Valves - Box**	Alfs Castings Terminal City Terminal City	D7 (Nelson Type) Nelson Type MR Style (Robar)		For use outside of paved areas For use outside of paved areas Paved Areas c/w Parsons Lid
2.11	**Air Valves**	Apco Crispin GA Industries Terminal City Valmatic	143-C 945 201C		
2.12	**Repair Coupling**	Robar Rockwell Romac Smith-Blair		4"-12" 4"-12" 4"-12" 4"-12"	

Section	Product	Manufacturer	Model	Size	Comments
2.12	**Silent Check Valve**	Valmatic			
2.12	**Pressure Reducing Valves**	Clayton Valve (CLA-VAL CO.)		4"-12"	
		Singer Valve		4"-12"	
2.12	**Fittings - Cast Iron**	Metalfit		4"-12"	Cement mortar lined only.
		Norwood Foundary		4"-12"	Cement mortar lined only.
		Sigma Corporation		4"-12"	Cement mortar lined only.
		Terminal City		4"-12"	Cement mortar lined only.
2.12	**Fittings - Ductile Iron**	Bibby/Acs		4"-12"	
		Sigma Corporation		4"-12"	
		Terminal City		4"-12"	Imported fittings-CHINA A-1 only
2.12	**Pressure Gauges**	Ametek - Plymouth			
		Clayton			
		Marsh			
2.12	**Strainers**	BCA			Approvals on a per project basis.
2.12	**Flange Adaptor**	EBAA Iron	Series 2100 Megaflange	3"-12"	Ductile iron pipe only (UL)
		EBAA Iron	Megaflange	3"-10"	Ductile iron pipe only (UL/FM)
		EBAA Iron	Series 1000 E-Z flange	3"-10"	Ductile iron pipe only (UL/FM)
		Uni-Flange	Series 400	3"-8"	Ductile iron pipe pnly (FM)
2.12	**Repair Clamps**	Mueller	530	4"-12"	Two Section Clamp
		Romac	SS2	4"-12"	Two Section Clamp
2.12	**Thrust Restraint - Ductile Iron (Wedge-Action)**	EBAA Iron	Series 1100 Mega-Lug	3"-12"	Ductile Iron Pipe (UL/FM)
		Sigma	One Lok	4"-12"	Ductile Iron Pipe (UL/FM)
		Uni-Flange	Series 1300C	4"-12"	Ductile Iron Pipe (UL/FM)
		Uni-Flange	Series 1400D/1450D	4"-12"	Ductile Iron Pipe (UL/FM)
2.12	**Thrust Restraint (PVC)**	EBAA Iron	Series 2000		For Class 150 PVC pipe (UL/FM)
		EBAA Iron	Series 1500PF		For Class 150 PVC pipe (FM)
		EBAA Iron	Series 1600		For Class 150 PVC pipe (FM)
		Romac	600 Series		PVC (UM/FM)
		Sigma	PV - Lok; PVP Series		PVC Pipe (FM)
		Uni-Flange	Series 1350		For Class 150 PVC pipe (FM)
		Uni-Flange	Series 1390		For Class 150 or 200 PVC pipe only (FM)
		Uni-Flange	Series 1300		For Class 150 or 200 PVC pipe only (FM)

Section	Product	Manufacturer	Model	Size	Comments
2.12	**Sump Drainer**	BCA	A174		
2.12	**Manhole Cover and Frames - Heavy Duty**	Alfs Castings Dobney Foundary TR Castings	C18 C18		
2.12	**Manhole Cover and Frames - Utility Chamber**	Alfs Castings Dobney Foundary Sigma Corporation TR Castings	C-22 C-22		
3.4	**Concrete**	Bedrock Concrete Mayco-Mix Ocean Construction			
3.5	**Gravel - Bedding Type 2**	Hub City Paving Lussier and Son			
3.5	**Gravel - Base**	Haylock Bros. Paving Ltd Hazelwood Consruction Hub City Paving Lussier and Son	Alberni Highway Pit Timberlands Pit	25mm	Blended with Rap <10%
3.5	**Manhole Sections**	Lombard Precast Ocean Construction			
3.5	**Manhole Steps**	Lombard Precast Ocean Construction			
3.5	**Manhole Tops**	Lombard Precast Ocean Construction			
3.6	**Gravel - Imported Granular**	Hub City Paving Lussier and Son			
3.6	**Concrete - Controlled Density Fill**	Bedrock Concrete			