ADDENDUM #1
October 16, 2026

RFP No. ENG 26-05 – Devonshire Catchment Sanitary Sewer Upgrades

Please note the following Clarifications, Questions and Answers for the above noted RFP is to be known as Addendum #1. Bidders are to reference receipt of Addendum #1 in their submission.

Clarification:

All **tender submissions and inquiries** are to be directed to both of the following contacts:

- Kyla Kay – *kyla.kay@esquimalt.ca*

Bidder Questions and Township Answers:

Question #1: Can the Township provide any existing condition assessments for the included sewers and pump station?

Answer#1: Please find attached Urban Systems' Lift Station Condition Assessments as well as a spreadsheet and PDF map with more detailed info relating to the sanitary sewer main segments. Please note the Township is not expecting designs to be included in the proposals. Additionally, please refer to the GeoAdvice report (Appendix B) for more information.

Question #2: Please clarify the expected level of construction inspection for purposes of developing comparable Phase 4 fees.

Answer #2: Phase 4 – Contract Administration and Inspection Services will include the following,
CONTRACT ADMINISTRATION – The Consultant is to provide contract administration and certify progress payments for the construction services Phase. 15 hours / week is typically allocated for administrative services. An average of 6-month construction schedule will be assumed although it's unknown at this time. Actual level of effort to be discussed upon successfully retaining a contractor for the works.
INSPECTION – Provide full-time site inspection during construction to provide technical guidance, on-site project management, QA/QC and to ensure adherence to the contract specifications by the contractor as per requirements of most recent MMCD contract documents (the successful consultant will need an MMCD certified inspector).

Photo documentation, bi-weekly project updates and quantities variances should be a part of regular duties. An average of 20 hours / week should be allocated for inspection services conditional on the complexity of construction activities. A 6-month construction schedule will be assumed although it's unknown at this time.

Question #3: Due to multiple local municipalities releasing RFPs with the same due date would the Township consider a one-week extension?

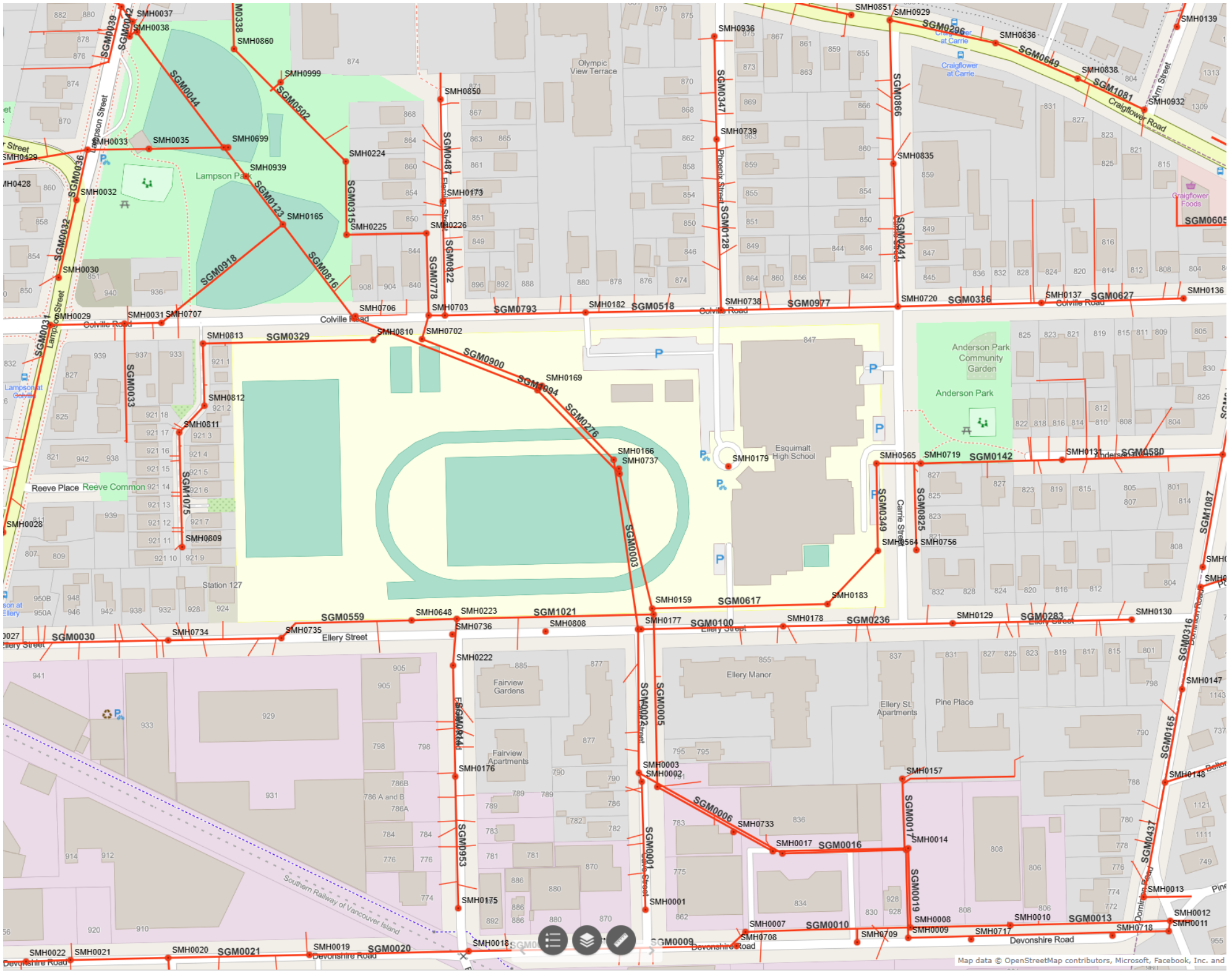
Answer #3: The Township is planning to present this contract award to Council in November and therefore an extension cannot be provided.

Question #4: Appendix E Sections 3.1 and 12.2 reference performance to the "satisfaction of the Township." As this standard is subjective and may be difficult to measure objectively, would the Township consider replacing "to the satisfaction of the Township" with "to the standard set out in Section 4.3" or another objectively defined performance standard?

Answer #4: This change will not be considered by the Township at this time. Further review can potentially take place with the successful proponent.

Question #5: Appendix E – As the reference to "not limited to all legal fees…. " is broad and not readily quantifiable, would the Township consider replacing the last sentence in Section 12.3 to "reasonable legal fees"?

Answer #5: The Township will consider the proposed change with the successful proponent.


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SGM0010
SGM0013
SGM0021
SGM0020
SGM0009
SGM0296
SGM0649
SGM1081
SGM0605
Olympic View Terrace
Lampson Park
Anderson Park Community Garden
Anderson Park
Esquimalt High School
Reeve Place
Reeve Common
Station 127
Fairview Gardens
Fairview Apartments
Ellery Manor
Ellery St. Apartments
Pine Place
Craigflower Road
Colville Road
Ellery Street
Devonshire Road
Lampson Street
Phoenix Street
Carrie Street
Southern Railway of Vancouver Island
Craigflower Foods
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ASSET ID	EXISTING_DIAMETER	FUTURE1_DIAMETER	MATERIAL	YEAR_INSTALLED	TAG	CAPACITY UPGRADE TYPE	ASSET_EXPECTED_LIFE	EXISTING_PIPE_AGE	EXISTING_PERCENT_DESIGN_LIFE	DEPTH	ROAD_CLASS	ROAD NAME	LENGTH	PACP LOF	EX_CAPACITY_HLOS
SGM0038	300	375	VIT	1961	GM	Upgrade	70	63	90%	1.25	collector	Lampson St	32.901007	3.004	D
SGM0019	375	375	CONC	1965	GM		50	59	118%	3.91	local	Devonshire Rd	42.591223	3.029	E
SGM0007	375	0	CONC	1965	GM	Abandon	50	59	118%	3.93	local	Cave St	70.732696	5.001	E
SGM0287	200	675	UNKNOWN	1965	GM	Upgrade	60	59	98%	4.32	0	0	11.980910		D
SGM1084	375	375	CONC	1965	GM		50	59	118%	1.08	0	0	19.469675	0	C
SGM0663	375	0	CONC	1965	GM	Abandon	50	59	118%	1.96	0	0	62.530014	2.001	D
SGM0011	375	675	CONC	1963	GM	Upgrade	50	61	122%	3.93	local	Devonshire Rd	53.719864	3.029	E
SGM0706	375	375	CONC	1986	GM		50	38	76%	3.63	local	Ellery St	3.542441	2.002	E
SGM0012	450	450	AC	1965	GM		85	59	69%	4.11	local	Devonshire Rd	139.702348	3.002	A
SGM0041	200	200	VIT	1953	GM		70	71	101%	1.62	collector	Lampson St	10.058544	0	B
SGM0014	450	450	AC	1965	GM		85	59	69%	4.18	local	Devonshire Rd	5.722954		A
SGM0502	300	450	VIT	1965	GM	Upgrade	70	59	84%	1.5	0	0	84.725191	0	E
SGM0226	375	0	VIT	1965	GM	Abandon	70	59	84%	1.28	collector	Colville Rd	13.019176	0	D
SGM0123	375	525	CONC	1965	GM	Upgrade	50	59	118%	0.99	0	0	32.436740	0	E
SGM0900	400	0	AC	1965	GM	Abandon	85	59	69%	1.23	0	0	69.037882	0	D
SGM1021	250	0	VIT	1986	GM	Abandon	70	38	54%	2.65	local	Ellery St	105.515248		D
SGM0005	375	675	CONC	1965	GM	Upgrade	50	59	118%	4.15	local	Cave St	92.048073	3.001	E
SGM0519	375	0	CONC	1965	GM	Abandon	50	59	118%	2.73	0	0	74.025424	3.001	E
SGM0778	300	300	RL	1965	GM		60	59	98%	2.37	local	Fleming St	44.011456	0	D
SGM0169	150	150	VIT	1965	GM		70	59	84%	1.31	0	0	32.731732	5.014	B
SGM0315	300	450	VIT	1965	GM	Upgrade	70	59	84%	1.45	0	0	39.353542	0	E
SGM0013	375	675	RL	1963	GM	Upgrade	60	61	102%	3.96	local	Devonshire Rd	85.528860	3.003	E
SGM0015	375	375	AC	1965	GM		85	59	69%	3.23	0	0	66.176318		D
SGM0042	200	200	PVC	1953	GM		80	71	89%	1.57	collector	Lampson St	6.588307	0	A
SGM0816	375	525	CONC	1965	GM	Upgrade	50	59	118%	1.01	collector	Colville Rd	63.088174	0	D
SGM0393	300	0	RL	1965	GM	Abandon	60	59	98%	2.13	local	Fleming St	43.027763	0	E
SGM0815	300	375	RL	1965	GM	Upgrade	60	59	98%	1	0	0	40.135058	3.002	D
SGM0918	200	200	AC	1995	GM		85	29	34%	1.35	collector	Colville Rd	83.615488	2.059	C
SGM0002	375	375	AC	1965	GM		85	59	69%	3.46	local	Cave St	77.005811	3.003	D
SGM0044	375	375	CONC	1965	GM		50	59	118%	1	collector	Lampson St	76.758916	0	C
SGM0338	300	300	AC	1965	GM		85	59	69%	2.36	0	0	43.672810	0	E
SGM0016	375	375	CONC	1965	GM		50	59	118%	3.48	0	0	72.627436	4.002	E
SGM0087	300	300	VIT	1985	GM		70	39	56%	2.87	collector	Lampson St	55.203911	3.001	E
SGM0045	300	0	VIT	1985	GM	Abandon	70	39	56%	2.38	collector	Lampson St	13.027044	2.008	E
SGM0018	375	375	AC	1965	GM		85	59	69%	3.75	local	Devonshire Rd	47.100776	2.034	D
GA-SGM0003	0	675			GM	New Main				4.32	0	0	211.465372		
GA-SGM0006	0	375			GM	New Main				1.28	0	0	39.883090		
SGM1094_P1	0	675			GM	New Main				1.46	0	0	168.987136		
SGM1094_P2	0	675			GM	New Main				1.48	0	0	24.293470		
SGM1094_P3	0	675			GM	New Main				2.65	0	0	106.189047		

MEMORANDUM

URBAN SYSTEMS

DATE	January 17, 2024	FROM	Mark Stafford, P.Eng
TO	Joel Clary, P.Eng	FILE	3275.0021.01
CC	Adrien d'Andrade, P.Eng	SUBJECT	Esquimalt –Lift Station Condition Assessments

1.0 INTRODUCTION

As part of the overall Sanitary Asset Management Plan project, Urban Systems Ltd. (USL) and PBX Engineering (PBX) completed field inspections of the thirteen (13) lift stations owned and/or operated by the Township of Esquimalt (Esquimalt) to assess their current condition and provide recommendations for upgrades and/or replacements as required. The field inspections were completed on October 25th & 26th, 2023 with Esquimalt Public Works to provide access and historical context of lift-station operations and maintenance. The following sections describe:

- The methodology employed during the field inspections and subsequent desktop review to determine an overall Likelihood of Failure for each station;
- Summaries of lift station condition ratings and identified components of concern;
- Class D Cost Estimates for upgrades identified; and
- Recommendations for priority upgrades;

2.0 METHODOLOGY

The condition analysis for each station has taken into account 33 sub-components typically found as part of a lift station system, across four functional disciplines, including civil, mechanical, structural, and electrical. A brief description of the types of components reviewed is detailed below:

- Civil components:
    - Station features that are generally visible from above ground and outside of the wet-well or any chambers and vaults
    - Including but not limited to bypasses, pig launches, site fencing, surfacing condition and drainage paths
- Mechanical components:
    - Station features that are generally contained within the wet-well or various station chambers
    - Including but not limited to piping, valving, pumps, meters, or guide-rails
- Structural components:
    - Station features that are considered as load-bearing

- Including but not limited to chambers, wet wells, vaults, platforms, ladders, hatches, benching
  - Not including a detailed assessment of external buildings
- Electrical components:
  - Station features that are energized or related to instrumentation or controls
  - Including but not limited to permanent or backup power supplies, illumination, communications, and controls.

Since not all station components are equally important in station operation, weightings were assigned to the individual components prior to determining a combined condition score for a station. The weights, ranging from 1 (lower importance) to 5 (higher importance) and outlined in Table 2.1, correspond to a component's criticality in station operation and in turn, the impact severity in the case of the component's failure .

TABLE 2.1 – COMPONENT WEIGHTING RATIONALE

Weight	Description
1	Component failure does not impact station operation
2	Component failure has minimal impact on station operation
3	Component failure moderately impacts station operation however repair can be completed in 1 hour
4	Component failure impacts station operation and repair can be completed in 1 day
5	Component failure impacts station operation and repairs greater than 1 day

As an example:

- Components that warrant a high importance weighting of 5 include, but are not limited to, pumps, power distribution and standby power, as they are critical to station operation and require significant, often urgent, repair efforts upon failure.
- Components that warrant a low importance weighting of 1 include, but are not limited to, site fencing, wet-well ladders, and pig launches, as they are non-critical to station operation and require minor, non-urgent repair efforts.

Table 2.2 below lists all components inspected per station and their importance weightings assigned for the condition scoring analysis.

URBAN SYSTEMS

TABLE 2.2 – COMPONENTS AND IMPORTANCE WEIGHTING IN CONDITION REVIEW

	CIVIL						MECHANICAL									STRUCTURAL						ELECTRICAL										
Component	Building	Fencing	Flow Meter Chamber	External Valve Chamber	Overflow Outlet	Pig Launch	Fittings and Appurtenances	Discharge Check Valves	Discharge Isolation Valves	Discharge Piping	Pumps	Agitator / Mixer	Header Air Valve	Flow Meter	Station Isolation Valve	Wet-well Guide Rails	Wet-well Ladder	Station Benching	Outlet Penetrations	Inlet Penetrations	Hatch	Station Wet-well	BC Hydro Service	Exterior Lighting	Power Distribution	Standby Power	Wet-well Electrical	Pumps and motors	Kiosk	Building	Controls	Communications	Remote Terminal Unit (RTU)
Weighting	5	1	5	5	3	1	4	5	5	5	5	1	3	1	3	2	2	2	5	5	2	5	5	1	5	3	5	5	5	5	4	3	3

During visual inspections, each component's current condition was scored from 1 (very poor) to 5 (very good). As part of the review, if any components did not exist or were decommissioned at a station, the maximum score a station could achieve was reduced proportionally, ensuring that simpler stations with fewer components were not misidentified as being in poor-condition. The condition grades considered during the inspections and general descriptions of each grade are provided in Table 2.3.

TABLE 2.3 – COMPONENT CONDITION GRADING

Grade	Condition	Description
5	Very Good	Sound physical condition designed to current standards. Operable and well-maintained. No work required. • Asset likely to perform adequately with routine maintenance for 10 years or more **(Mechanical / Electrical)** • Asset likely to perform adequately with routine maintenance for 25 years or more **(Civil / Structural)**
4	Good	Acceptable physical condition but not designed to current standards or showing minor wear. Deterioration has minimal impact on asset performance. Only minor work required (if any). • Minimal short-term failure risk but potential for deterioration or reduced performance in medium term (5-10 years) **(Mechanical / Electrical)** • Minimal short-term failure risk but potential for deterioration or reduced performance in long-term (10+ years). **(Civil / Structural)**
3	Fair	Functionally sound but showing some wear with minor failures and some diminished efficiency. Minor components or isolated sections of the asset need replacement or repair but asset still functions safely and at an adequate level of service. Deterioration beginning to be reflected in performance and higher attendance for maintenance. Work required but asset is still serviceable. • Failure unlikely within 2 years but further deterioration likely and major replacement required within next 5 years **(Mechanical / Electrical)** • Failure unlikely within next 5 years but further deterioration likely and major replacement likely within next 10 years **(Civil / Structural)**
2	Poor	Functioning but requires a high level of maintenance to remain operational. Likely to cause a notable/significant deterioration in performance in short-term. Likely need to replace most or all of asset within 2 years. No immediate risk to health or safety but work required within 2 years to ensure asset remains safe. Substantial work required in short-term, asset barely serviceable **(Mechanical / Electrical / Civil / Structural).**
1	Very Poor	Failed or failure imminent. Effective life exceeded and excessive maintenance costs incurred. A high risk of breakdown with a serious impact on performance. No life expectancy. Health and safety hazards exist which present a possible risk to public safety, or asset cannot be serviced/operated without risk to personnel. Major work or replacement required urgently. **(Mechanical / Electrical / Civil / Structural)**

Using the individual component condition scores and their importance weightings, an overall condition score was determined for each category (civil, mechanical, structural and electrical) by summing up the weighted scores of all present components and comparing this value to the total possible score a station could achieve. The condition scores across all

categories were then averaged and presented as an overall condition percentage out of 100%.

Finally, the condition score percentage was linked to a **Likelihood of Failure (LoF)** score ranging from 1 to 5, where **1 is the lowest LoF** (corresponding to a 100% condition rating) and **5 is the highest LoF** (corresponding to a 0% condition rating). Figure 2.1 below depicts this linkage visually.

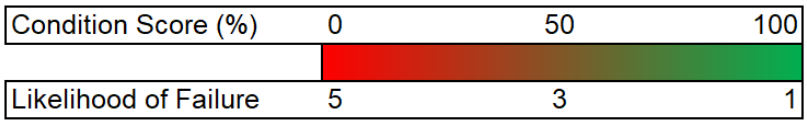


Figure 2.1 - Condition Score Corresponding to LoF Score

It is important to note that the condition investigation is limited to elements that could be inspected visually and that no testing was conducted in order to confirm actual condition. The outcomes of this report are intended to inform a capital investment strategy and do not replace the need for ongoing condition investigations and observations as part of regular operations and maintenance. It is important to update the analysis completed in this investigation on a regular interval and ideally not less frequent than once every 5 years.

3.0 INSPECTION SUMMARIES

Table 3.1 summarizes the condition results determined from the field inspections and following desktop analysis. This information is discussed in further detail for each station in the following sub-sections.

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TABLE 3.1 – LIFT STATION CONDITION SCORES[1]

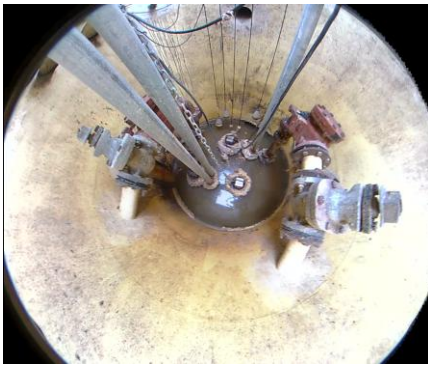
Lift Station Components			Lift Stations												
Discipline	**Description**	**Weighting**	Craigflower	Garthland	Uganda	Lampson	Canteen	Grafton	Constance	Kinver	Forshaw (Nursery)	Luscombe	Seahaven	Saxe Point	Gorge Park Pavilion
CIVIL	Building	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Fencing	1	5	N/A	N/A	5	N/A	N/A	N/A	N/A	5	N/A	N/A	N/A	N/A
	Flow Meter Chamber	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	External Valve Chamber	5	N/A	4	1	2	3	3	N/A	N/A	4	N/A	N/A	N/A	N/A
	Overflow Outlet	3	4	4	2	3	3	4	4	4	3	2	4	5	5
	Pig Launch	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A
MECHANICAL	Fittings and Appurtenances	4	2	4	2	2	3	1	4	3	4	3	3	5	4
	Discharge Check Valves	5	3	3	2	3	4	4	3	4	4	2	3	5	5
	Discharge Isolation Valves	5	2	4	2	2	3	4	3	3	3	2	4	5	5
	Discharge Piping	5	5	5	2	3	2	3	4	2	3	2	4	5	5
	Pumps	5	3	4	2	4	3	2	4	2	3	3	3	5	4
	Agitator / Mixer	1	3	N/A	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Header Air Valve	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Flow Meter	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Station Isolation Valve	3	2	4	2	2	3	N/A	3	3	3	2	2	5	5
	Wet-well Guide Rails	2	4	4	N/A	N/A	N/A	3	4	3	N/A	3	N/A	5	5
STRUCTURAL	Wet-well Ladder	2	N/A	N/A	2	N/A	3	4	N/A	N/A	3	2	3	N/A	5
	Station Benching	2	4	3	3	3	3	4	4	4	4	3	3	5	5
	Outlet Penetrations	5	5	4	3	3	3	3	4	3	4	3	3	5	4
	Inlet Penetrations	5	5	4	3	3	3	3	3	3	4	3	3	5	4
	Hatch	2	3	5	3	4	4	4	5	4	4	4	2	5	4
	Station Wet-well	5	3	4	3	3	3	3	4	3	4	2	4	5	4
ELECTRICAL	BC Hydro Service	5	4	3	3	4	4	4	2	4	4	4	4	N/A	N/A
	Exterior Lighting	1	2	3	3	3	3	3	2	3	3	3	2	N/A	N/A
	Power Distribution	5	4	4	2	4	4	4	4	3	3	4	4	N/A	N/A
	Standby Power	3	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Wet-well Electrical	5	4	4	2	3	2	2	3	3	2	4	4	N/A	N/A
	Pumps and motors	5	4	4	2	3	4	3	3	2	3	4	4	N/A	N/A
	Kiosk	5	4	3	2	3	3	3	3	3	2	3	3	N/A	N/A
	Building	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Controls	4	4	4	4	4	3	3	2	3	4	4	3	N/A	N/A
	Communications	3	3	3	3	3	4	4	3	2	3	4	4	N/A	N/A
	RTU	3	4	4	4	4	4	4	4	4	4	4	4	N/A	N/A
CONDITION SCORING	**Civil Condition Score**		4.25	4.00	1.38	2.67	3.00	3.38	4.00	3.75	3.78	2.00	4.00	5.00	5.00
	Mechanical Condition Score		3.00	4.00	2.00	2.74	3.00	3.21	3.55	2.83	3.33	2.38	3.26	5.00	4.69
	Structural Condition Score		4.16	4.00	2.90	3.11	3.10	3.29	3.84	3.21	3.90	2.76	3.14	5.00	4.19
	Electrical Condition Score		3.86	3.61	2.64	3.47	3.49	3.31	2.94	3.00	3.06	3.83	3.69	N/A	N/A
	Average Condition Score		3.82	3.90	2.23	3.00	3.15	3.29	3.58	3.20	3.52	2.74	3.52	5.00	4.63
	Normalized Condition Score		70.43	72.57	30.74	49.91	53.64	57.33	64.61	54.93	62.95	43.59	63.10	100.00	90.67
	Likelihood of Failure		2.18	2.10	3.77	3.00	2.85	2.71	2.42	2.80	2.48	3.26	2.48	1.00	1.37

[1] N/A indicates the component is not present within the station

3.1 CRAIGFLOWER STATION



Station Layout



Corroded Mechanical Components



Kiosk Power Cabinet

Craigflower Station is configured as a duplex submersible 3HP pump station with an electrical kiosk. There is no external valve chamber, flow meter, or generator on site. The wet-well is an FRP structure with Sch 40 steel piping internals inside.

Condition Summary

The Craigflower lift station was found to be in generally good to very good condition with the majority of components scoring a 4/5 or better. Overall, this station was assessed as having a *70.43%* condition grade, corresponding to a *2.18/5 LoF*.

Poor Condition Components

The following mechanical components at this station are considered to be in poor condition and in need of replacement: fittings and appurtenances; discharge isolation and check valves.

Cost Estimate

There are no urgent rehabilitation or upgrades recommended for this station. However, internal mechanical components (specifically, the isolation valves) should be considered for replacement in the coming years due to their corroded state, which may prevent their reliable operation in the near future. Mechanical upgrades to internal components (except for pumps) are anticipated to be in the range of approximately $1,500 per valve (subtotalling $6,000), and approximately $4,000 for replacement pipe spools and flanges.

Electrical components are generally in good condition as well, but it was noted that exterior lighting at the site is desired by operators and there is currently no backup power generator. Lighting and backup power are estimated to cost approximately $10,000 and $50,000 respectively.

If budget allows, some minor works unrelated to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) may be considered for completion. Class D cost estimates are appended to this memo for more detail.

3.2 GARTHLAND STATION



Station Layout



Mechanical Components



Dry Well Components

Garthland station is configured as a duplex 5HP pump station with an electrical kiosk. The station has no flowmeter on site. The pumps at Garthland are submersible pumps in the concrete wet-well chamber with stainless steel piping routed through an external valve chamber beside and the into the roadway. There is an additional overflow storage chamber available but does not appear to be utilized frequently.

Condition Summary and Components of Concern

The Garthland lift station was found to be in generally good to very good condition with the majority of components scoring a 4/5 or better. Overall, this station was assessed as having a *72.57%* condition grade, corresponding to a *2.10/5 LoF*.

Cost Estimate

There are no immediate rehabilitation or upgrades recommended for this station. The mechanical, civil and structural components are generally in good to very good condition.

Electrical components are generally in good condition as well, but it was noted that exterior lighting at the site is desired by operators and there is currently no backup power generator. Lighting and backup power are estimated to cost approximately $10,000 and $50,000 respectively.

If budget allows, some minor works unrelated to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

3.3 UGANDA STATION



Section Layout



Mechanical and Structural Components



Corrosion on Pump Body and Valving

Uganda Station is a duplex 20HP pump station with submerged pumps in a custom concrete wet-well structure down the road from McNaughton Viewpoint. There is an electrical kiosk on site that was replaced in the last 10 years, but with original mechanical and structural components generally still in operation. There are documents for quotes to replace the pumps in 2008 with dry-pumps from Flygt, but it does not appear that these were installed – suggesting the original 20HP hydromatic pumps from the July 1986 upgrade are still in service.

Condition Summary and Components of Concern

The Uganda lift station was found to be in moderate to poor condition with a large number of components, specifically mechanical and electrical, scoring at a 2/5. Overall, this station was assessed as having a *30.74%* condition grade, corresponding to a *3.77/5 LoF*. Uganda station is the poorest condition station operated by Esquimalt.

Age and exposure to corrosive / salty atmosphere is likely causing advanced degradation of the internal steel components, which are in poor to very poor condition. The operator mentioned that the flush-valve on one of the pumps no longer works and a replacement is unable to be obtained.

The structure of the wet-well itself is in generally acceptable to good condition, but station operators indicated they feel unsafe entering the station and ensure that the local fire department is on standby or present if entering of the station is required. This concern is primarily driven by the multi-floor/chamber configuration of the station and the difficulties associated with personnel rescue if an incident were to occur. Operators have not serviced the equipment at this station adequately in several years due to the significant health and safety risks required to enter the station and wet-well.

It is recommended that the internal steel / mechanical components, including piping, valving and pumps be prioritized for replacement as they are highly corroded, and likely don't have much lifespan remaining – some of the bolts on the valve flanges appear to have popped off already.

The electrical components at Uganda are in poor condition. The kiosk is antiquated with no ventilation or heating to provide sufficient temperature and moisture control. The interior of the kiosk is corroded and demonstrating a poor environment for housed electrical components. The ventilated compartment of the wet-well is permanently sealed. Electrical components within the wet-well were not observable and their condition could not be assessed.

Tangentially, information provided by the Public Works suggests that any rain events will increase starts per day by 50% (15/day compared to 6~10/day), and a sizeable rainstorm would increase starts by 200% (up to 30/day), suggesting upstream inflow and infiltration issues are present.

Cost Estimate

It is recommended that Uganda Station be prioritized for full replacement. The anticipated cost for a new 20HP (per pump) station is approximately $1.02M. Additional costs associated with land-acquisition, if required, for a new station are not included. This is summarized in greater detail in the appended cost estimate and PBX's inspection memo, attached.

3.4 LAMPSON STATION


Mechanical Components


Kiosk Controls Panel


Flooded Valve Chamber

Lampson stations is a duplex submersible 2.4HP pump station at Lampson Park and adjacent to the Lions Minor Baseball Association. The electrical kiosk and the pump station are located on the road with curbs and bollards to protect from vehicles. The wet-well is a concrete barrel structure with Sched 40 steel piping.

Condition Summary and Components of Concern

The Lampson lift station was found to be in moderate condition. Overall, this station was assessed as having a *49.91%* condition grade, corresponding to a *3.00 LoF*.

The internal mechanical appeared to be in generally moderate to acceptable condition, with some corrosion on the exterior of the steel piping present. The poorest condition components are the discharge valves (check and isolation) located in ~900mm diameter manhole barrels outside the station with significant ponding evident – the valves were showing advanced levels of corrosion and should be considered for replacement, complete with a better draining chamber, in the coming years to ensure reliability.

The surface area at the station and the structures of the concrete wet-well and valve chambers were in good condition at the time of inspection.

The electrical kiosk is in fair condition with some visible signs of deterioration. The electrical components in the wet-well are in good working condition. It was mentioned by operators that two instances of the kiosk producing large smoke clouds has occurred in recent years, but the cause was never determined.

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Cost Estimate

Replacement and consolidation of the valving into a single chamber is estimated to cost approximately $6000 for new valves, $4500 for piping, and $25,000 for a large precast concrete chamber – subtotalling $35,500.

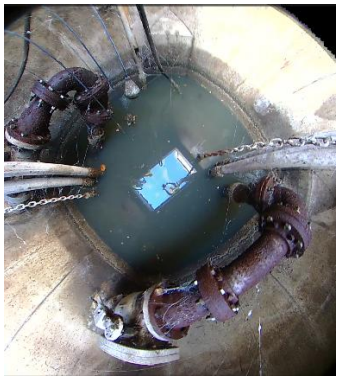
It was noted that exterior lighting at the site is desired by operators and there is currently no backup power generator. Lighting and backup power are estimated to cost approximately $10,000 and $50,000 respectively.

If budget allows, there are some minor works not relating to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

3.5 CANTEEN STATION


Station Layout


Hazardous Hatch Access


Wet-well Internals

Canteen pump station is a duplex submersible 10HP pump station configuration, located across from the Esquimalt Public Works Yard with access off Esquimalt Road. The station services a reasonable catchment and is considered as reliable by the operators.

Condition Summary and Components of Concern

The Canteen lift station was found to be in generally moderate condition with the majority of components scoring a 3/5. Overall, this station was assessed as having a *50.60%* condition grade, corresponding to a *2.98/5 LoF*.

Generally, the station is in adequate to good condition, but with moderate corrosion visible on the discharge piping in the wet-well between the pumps and check valves, which could be considered for upgrade to provide further longevity. The piping in this wet-well consists of non-standard bends and configuration in order to fit the pumps into the selected chamber. It was noted that there does not appear to be isolation valves present on either of the discharge lines.

The hatches and surface works at the station appear to be in good condition, but it is worth noting that the proximity of the kiosk panels to the station hatch makes it hazardous to access the kiosk with the hatch open – this would occur if running the pumps in manual mode with the hatch open to provide sight of the pumps and sewage level.

The electrical kiosk is relatively new, but shows significant deterioration. The wet-well ventilation fan has failed and requires immediate replacement for continued safe operation of the station. The electrical components in the wet-well are in good working condition. This station receives power, and backup power, from the adjacent public works building. There is no dedicated lighting at the site, which should be implemented.

URBAN SYSTEMS

Cost Estimate

Upgrades to mechanical piping is anticipated to cost approximately $2,500~$3,000 per discharge line, subtotalling $6,000.

Replacement of the ventilation fan is anticipated to cost approximately $2,400. Dedicated sight lighting is anticipated to cost approximately $10,000.

If budget allows, there are some minor works not relating to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

3.6 GRAFTON STATION



Station Layout



Repair Couplings on FRP Piping



Mechanical Components

Grafton pump station is a small, duplex submersible 20HP pump station with a concrete wet-well and electrical kiosk on-site.

Condition Summary and Components of Concern

The Grafton lift station was found to be in generally moderate to good condition with the majority of components scoring a 3/5 or better. Overall, this station was assessed as having a *56.90%* condition grade, corresponding to a *2.72/5 LoF*.

Generally, the surface and structural components at the station are in good condition. Similarly, the mechanical components are also in good condition, aside from the FRP discharge piping which was observed to have a repair coupling on each line – suggesting previous breaks have occurred.

Electrically, the station is relatively new, in good condition, with only minor wear and tear, but the local HMI has failed and requires replacement. The electrical components in the wet-well are in poor condition, as the level pressure sensor has failed and the station currently relies on float switches. There is no backup power or lighting present at this station and implementation of both should be considered for reliability and safety.

Cost Estimate

Upgrading the discharge piping to stainless steel piping would cost approximately $2,500~$3,000 per leg, and should be considered in the coming years.

Installation of a new HMI and pressure sensor are anticipated to cost approximately $4,100 and $4,900 respectively – subtotalling at $9,000. Backup power and sight lighting are anticipated to cost approximately $50,000 and $10,000 respectively.

If budget allows, there are some minor works not relating to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

3.7 CONSTANCE STATION



Station Layout



Mechanical Components



Forcemain Isolation Valve

Constance pump station is a small, duplex submersible 2.9HP pump station with a concrete wet-well and electrical kiosk on-site. The wet-well is located at the top of a residents' driveway presents moderate challenges if maintenance or upgrade works are being completed. Internal piping is stainless steel.

Condition Summary and Components of Concern

The Constance lift station was found to be in generally moderate to good condition with the majority of components scoring a 3/5 or better. Overall, this station was assessed as having a *64.61%* condition grade, corresponding to a *2.42/5 LoF*.

Generally, the surface, structural and mechanical components at the station are in good condition.

Electrically, the station is relatively new, in good condition, with only minor deterioration, but the local HMI has failed and requires replacement. Additionally, the station experiences frequent, unexplained motor starter potential relay burnouts, which may indicate a broader failure with the electrical system. The electrical components in the wet-well are in good condition. There is no backup power or lighting present at this station and implementation of both should be considered for reliability and safety – but the limited footprint available at the site could make this challenging to install. The BC Hydro meter socked is corroded and should be replaced.

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Cost Estimate

Installation of a new HMI is anticipated to cost approximately $4,100. Motor starter replacements are estimated at $7,500. Backup power and sight lighting, if spatially feasible, are anticipated to cost approximately $50,000 and $10,000 respectively.

If budget allows, there are some minor works unrelated to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

3.8 KINVER STATION



Station Layout



Mechanical Components



Pig Launch

Kinver pump station is a small, duplex submersible 20HP pump station with an electrical kiosk on-site. There is no valve chamber, flow metering, or generator on site. The wet-well is a concrete structure with ductile iron piping inside.

Condition Summary and Components of Concern

The Kinver lift station was found to be in generally moderate to good condition with the majority of components scoring a 3/5 or better.

Surface and structural components were in good to very good condition. Mechanically, however, it was noted that the pumps are nearing the end of their lifespan with one pump currently turned off due to leakage issues associated with a failed mechanical connection, with the only backup pump beginning to fail as well. There was also visible corrosion on the ductile iron discharge piping.

The electrical koisk is relatively new, in good condition with only minor wear and tear. The wet-well electrical components are in very poor condition. There are proximity issues with the communication mast and antenna with respect to the adjacent BC Hydro secondary lines.

Overall, this station was assessed as having a *57.08%* condition grade, corresponding to a *2.72/5 LoF*.

URBAN SYSTEMS

Cost Estimate

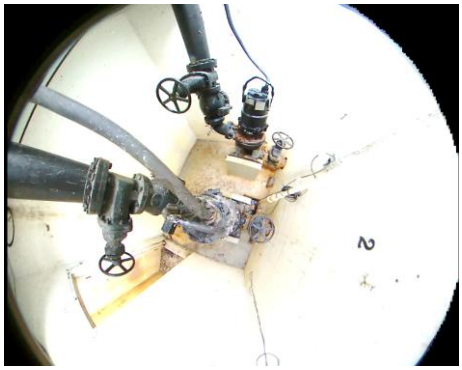
Replacement of the pumps (complete with associated electrical work) and discharge piping with new components is anticipated to cost approximately $51,000 and $3,000 for pumps and piping respectively per line – subtotalling approximately $108,000 for mechanical upgrades. If upgrades to the quick-connect discharge elbow / pump seat is required to improve the mechanical connection of the pump, structural upgrades to the benching may be required to re-fasten the seat and would require detailed structural review and inspection of the wet-well floor.

Relocation of the antenna/mast is anticipated to cost approximately $4,600, and backup power and site lighting are anticipated to cost approximately $50,000 and $10,000 respectively.

If budget allows, there are some minor works not relating to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

3.9 FORSHAW (NURSERY) STATION


Station Layout


Dry Well Mechanical


Wet-well Manhole Entry

Forshaw pump station is a small, duplex 20HP dry-pump and separate concrete wet-well station with electrical kiosk on-site – located in Public Works parks / nursery yard. There is no flow metering on site. The wet-well is a concrete structure with epoxy coated steel piping inside.

Condition Summary and Components of Concern

The Forshaw lift station was found to be in generally good condition with the majority of components scoring a 3/5 or better – but hosting a few electrical deficiencies.

The surface works and structural components appeared to be in very good condition, as well as the majority of the internal mechanical components downstream of the pumps. There is minor to moderate corrosion present on the pump bodies and upstream isolation valves between pumps and wet-well.

The electrical kiosk is in poor condition with notable deterioration, but the electrical components in the wet-well and dry-well are in good condition. The station does not have backup power, and the dedicated nearby luminaire provides poor lighting to the dry-well, wet-well and kiosk.

Overall, this station was assessed as having a *55.80%* condition grade, corresponding to a *2.77/5 LoF*.

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Cost Estimate

Backup power and site lighting are anticipated to cost approximately $50,000 and $10,000 respectively.

If budget allows, there are some minor electrical works not relating to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates and PBX's inspection memo are appended to this memo for more detail.

3.10 LUSCOMBE STATION



Station Layout



Hatches and Guiderails



Headworks and Wet-well

Luscombe pump station is a small, duplex submersible 10HP pump station with a concrete wet-well and electrical kiosk on-site. There is no valve chamber, flow metering, lighting or generator on site. The wet-well is a concrete structure with ductile / cast iron piping inside.

Condition Summary and Components of Concern

The Luscombe lift station was found to be in generally poor-to-moderate condition with the majority of number of components – specifically mechanical – scoring a 2/5. Overall, this station was assessed as having a *43.59%* condition grade, corresponding to a *3.26/5 LoF*.

The mechanical components such as discharge piping, check valves, and isolation valves are starting to show significant levels of corrosion. This station appears to employ a similar configuration as the Seahaven station, with apparent bypass piping rising to goosenecks that penetrate through the hatch lid. It is uncertain how these bypass pipe risers may operate, as there were no valves on the lines or flanges on the ends of the goose-necks – it is assumed that they may be blinded off from the connection point to the headworks, suggesting they are superficial or some kind of thrust restraint instead. Regardless – these risers exhibit significant corrosion and may be a point of failure in the future.

The electrical kiosk and internal electrical components are in good working condition.

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Cost Estimate

Minimal upgrades / remediation work of confirming the connectivity of the apparent discharge risers should be undertaken to determine if these are a potential failure point or if these corroded risers are functioning only as surge protectors / pipe supports. If flows are present through these risers, they should be removed and the connections terminated with blind flanges – costs associated with these works are minimal and estimated to be approximately $1000. Backup power and site lighting are anticipated to cost approximately $50,000 and $10,000 respectively.

If budget allows, there are some minor electrical works not relating to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates and PBX's inspection memo are appended to this memo for more detail.

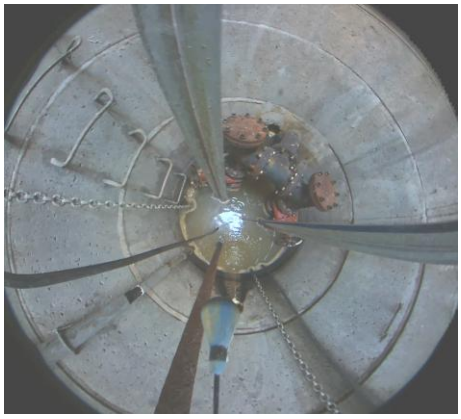
3.11 SEAHAVEN STATION



Station Layout



Corroded Steel Hatch



Piping and Headworks.

Seahaven pump station is a small, duplex, submersible 10HP pump station with a concrete wet-well and electrical kiosk on-site. There is no valve chamber, flow metering, or generator on site. The wet-well is a concrete structure with Sch 40 steel piping internals inside.

Condition Summary and Components of Concern

The Seahaven lift station was found to be in generally good condition with the majority of components scoring a 3/5 or better. However, visual inspection revealed that sewage levels appear to frequently reach high enough to submerge the check valves, as the sewage level was just below the isolation valves at the time of inspection. Exposure to sewage would unnecessarily expose mechanical equipment to grit and other debris, potentially leading to clogging, jamming or otherwise failure of moving parts on the isolation and check valves. Consideration should be given to revising the operating levels of the station to prevent submergence of valves. Otherwise, the headworks seemed to be in moderate to good condition, with minor corrosion of the blind-flanges on the top side of the headworks.

The electrical kiosk is in relatively new, good condition with only minor deterioration. The electrical components in the wet-well are in good condition.

Overall, this station was assessed as having a *58.71%* condition grade, corresponding to a *2.65/5 LoF*.

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Cost Estimate

No immediate capital projects other than a backup power generator and site lighting are proposed – estimated at $50,000 and $10,000 respectively. If budget allows, there are some minor works unrelated to the condition of the station (such as image wrapping the kiosk, installing bug screens, completing an Arc Flash study, etc) that may be considered. Class D cost estimates are appended to this memo for more detail.

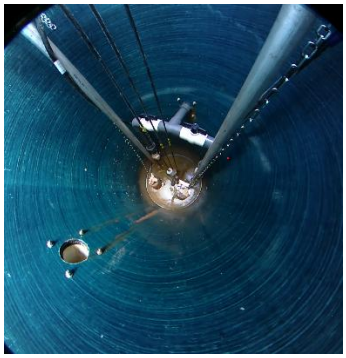
3.12 SAXE POINT STATION



Wet-well Hatch



Mechanical Components



Wet-well Interior

Saxe Point pump station is a new, small, duplex submersible 10HP grinder pump station with an FRP wet-well and small electrical panel mounted to the side of the washroom facility that it services. The station is simple, as it only services the washroom at Saxe Point Park. The piping and valving are PVC.

Condition Summary and Components of Concern

The Saxe Point lift station was found to be in very good condition with all of the components scoring a 5/5. Overall, this station was assessed as having a *100.00%* condition grade, corresponding to a *1.00/5 LoF*.

The electrical components at this station were not assessed as part of this assignment.

Cost Estimate

No upgrades are proposed, as the station is like-new.

3.13 GORGE PARK PAVILION STATION



Station Layout



Mechanical Components



Kiosk Controls Section

Gorge Park Pavilion pump station is a small, duplex submersible 5HP pump station with a concrete wet-well and minimal electrical panel on-site, constructed around the same time as Saxe Point. There is no valve chamber, flow metering, or generator on site. The wet-well is a concrete structure with Sch 40 steel piping internals inside.

Condition Summary and Components of Concern

The Gorge Park Pavilion lift station was found to be in very good condition with the majority of components scoring a 4/5 or better.

At the time of inspection, a grease-trap upstream of the lift-station became clogged from an ongoing event being hosted that had significant food prep and kitchen use. It is uncertain what the demarcation point between Pavillion infrastructure and Esquimalt Infrastructure is, as public works crews were called to assist with the ongoing spill.

The electrical components at this station were not assessed as part of this assignment.

Overall, this station was assessed as having a *90.67%* condition grade, corresponding to a *1.37/5 LoF*.

Cost Estimate

No upgrades are proposed, as the station is like-new.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Of the thirteen sanitary lift stations owned and operator by the Township of Esquimalt:

- **Generally, all stations operated by Esquimalt do not currently have any backup power generators on dedicated site lighting**. It is recommended that eventually, each station be equipped with these components to improve reliability of operations, and safety for operators when visiting sites in the dark
    - Class D cost estimates for this equipment are $10,000 and $50,000 for lighting and backup generators respectively, prior to engineering and contingency allowances. Accounting for **15% engineering and 30% contingency** (E&C), this amounts to approximately **$87,000 per station to affect these upgrades**.
- Similarly, **minor electrical works and studies can be completed at each station** and should be considered if personnel and budget resources allow. A detailed breakout of these tasks for each station are included in PBXs electrical inspection summary, appended to this memo. These generally include upgrades or studies such as:
    - UPS replacements ($750 before E&C);
    - Wet-well intrusion detection ($1600 before E&C);
    - Neoprene gasket repairs ($700 before E&C);
    - Arc Flash Studies ($3000 before E&C);
    - Polyphasor Bonding for surge protection ($150 before E&C);
    - Bug Screen Replacements ($370 before E&C);
    - Kiosk Insulation ($1400 before E&C);
- **6 stations (Saxe Point, Gorge Park Pavillion, Seahaven, Luscombe, Forshaw/Nursery and Garthland) are in generally acceptable condition and are not recommended for upgrading** aside from the recommendations for backup power and site lighting;
- **4 stations are recommended to receive minor-to-moderate upgrades**:
    - **Constance station requires a new HMI panel and motor starters** – approximately $4,100 and $7,500 respectively before E&C. After accounting for E&C, this is **estimated to cost approximately $16,850**;
    - **Grafton station should have the discharge piping between the pumps and valving replaced** ($6,000) as the FRP piping has previously failed and been repaired. The **HMI** ($4,100) and **pressure level sensor** ($4,900) **have failed and the station relies on the floats for operation**. After E&C, these upgrades are anticipated to **cost approximately $21,750**.
    - **Canteen station requires a new ventilation fan** ($2,400) to replace the one that has failed, **and new discharge piping** ($6,000) to replace the corroded

piping would extend the longevity of this station. After E&C, these upgrades are anticipated to **cost approximately $12,180**

- **Craigflower station** could have the stations longevity improved by **replacing the valving** ($6,000) **and discharge piping** ($4,000) in the wet-well. After E&C, these upgrades are anticipated to **cost approximately $14,500**.

- **2 stations are recommended to received moderate-to-significant upgrades**:
  - Kinver station requires issues with the pumps to be resolved as soon as possible, as one pump has already failed (mechanical / sealing issues) and the other has begun to fail in a similar fashion.
    - **New 20HP pumps from Flygt are anticipated to cost approximately $51,000/ea**.
    - However, **given that these pumps are experiencing failures with the mechanical seals, it is anticipated that issues may be present with the discharge elbow mounted to the wet-well base. The stations should be pumped down as low as possible, and the quick-connect pump discharge elbows and wet-well base should be inspected for stability prior to acquiring new pumps**. Supply of new discharge elbows and/or guide-rails would cost approximately $2000/set if required, but there may be an opportunity to simply re-fasten something that has loosened.
    - **Structural assessment of the wet-well base may be required if new discharge elbows and new mounting points are required**.
    - **The communications antenna is also in close proximity to BC Hydro overhead lines and should be relocated** ($4,100)
  - **Lampson station is recommended to have a more robust valve chamber constructed** to alleviate the current flooding and accelerated decay of valving that is present.
    - **New check and isolation valves** (2/ea) are anticipated to cost approximately $1,500/ea. **Piping upgrades and a new valve chamber** are anticipated to cost approximately $4500 and $25,000 respectively.
    - After E&C, this upgrade is anticipated to **cost approximately $51,475**.
- **1 station, Uganda, is recommended for complete replacement due to poor condition components and a cumbersome configuration that makes regular servicing and maintenance challenging and hazardous for public works teams**.
  - **A class D cost estimate for a new station build, not including any land-acquisition costs**, is **approximately $1.02M for a station employing 20HP pumps**.

Sincerely,

URBAN SYSTEMS LTD.



Mark Stafford, P.Eng
Project Engineer

cc: Adrien d'Andrade, P.Eng
U:\Projects_VIC\3275\0021\01\R-Reports-Studies-Documents\R1-Reports\Lift Station Condition Assessment\2024-01-17 - Lift Station Condition Assessments.docx

Site Information			
Inspection Date:	2023-10-25	Station Name:	Craigflower
Lift station location:	101 Island Highway		
Current weather conditions:	Windy/overcast		
Maintenance / Historical information:	- Aging infrastructure – no plan for renewal. - Rely on contractors for repairs. - Maintenance programs – no defined tasks/actions, only simple tasks performed daily/weekly. - Need for proactive program/schedule for maintenance.		

Equipment Summary:				
	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Asphalt with metal lids
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	Sloped towards waterway
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	Yes
Site fencing type:	Chain-link
Site fencing condition (if applicable):	5 (good)
Security	
Is the site lockable:	Yes
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No (just wet well)
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	Yes
Water service details:	Backflow prevention, contained in stainless steel box
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Gate
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	2
Orientation of inlets:	
Inlet clogging (%):	Unknown, submerged inlets
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No, use crane truck
Pipe support condition:	
Guide rails present:	Yes
Guide rail condition (if applicable):	4 (good – no corrosion)
Ladder	
Ladder present:	No
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	No
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	No
Gate / shutoff valve(s) condition (if applicable):	
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes (standard pump seats)
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3-4 (Covered w/ FOG)
Age of pump:	
Discharge pipe diameter (mm):	
Discharge pipe material:	FRP
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	3 (some corrosion)
Appurtenance:	
Appurtenance condition:	
Appurtenance material type:	
Describe 'Other' appurtenance material type (if applicable):	2 gate valves
Number of check valves:	2 (swing)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy (new)

Check valve condition:	
Number of isolation valves:	2
Isolation valve type:	Gate valves
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	2-3 (rusty bolts, not exercised)
Header connection type:	Buried/unknown
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	NO
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	
Discharge header material type:	
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	
Agitator / Mixer	
Agitator / mixer present:	Yes – flush valve on 1 pump (from tag)
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	3 (some rust on underside)
Wet Well	
Wet well material:	FRP
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3-4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	
Penetration(s) condition:	5
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	
Penetration(s) condition:	5
Benching	
Sump benching present:	Yes (at sides)
Benching depth:	
Benching condition:	4
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No – use tripod
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	no
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No ladder
Ladder handrails at valve chamber:	
Ladder handrails at flow meter chamber:	
Ventilation	
Ventilation in lift station:	Vent pipe

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information			
Inspection Date:	2023-10-25	Station Name:	Garthland
Lift station location:	948 Garthland Road		
Current weather conditions:	Windy/overcast		
Maintenance / Historical information:			

Equipment Summary:				
	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	asphalt
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	Sloped towards catch basin
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No – well, kiosk & valve chamber locked
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	Yes
Valve chamber configuration:	Below ground
Describe 'Other' valve chamber configuration (if applicable):	Swing check valve/ knife gate
Valve chamber sump drain present:	Yes
Valve chamber condition:	4 (bottom in rougher state)

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	Yes
Water Service	
Water service on site:	Yes
Water service details:	Back flow preventer – want larger water service
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Curb/gutter
Describe 'Other' vehicle protection (if applicable):	Bollards in front of kiosk
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	2
Orientation of inlets:	
Inlet clogging (%):	
Pig Launch	
Pig launch present:	
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No
Pipe support condition:	
Guide Rails	
Guide rails present:	Yes (2)
Guide rail condition (if applicable):	3-4
Ladder	
Ladder present:	No
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	N.A.
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	No
Gate / shutoff valve(s) condition (if applicable):	
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes
Pump seating condition:	4
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3-4
Age of pump:	
Discharge pipe diameter (mm):	100mm (4")
Discharge pipe material:	Stainless steel
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	5
Appurtenance:	4"-6" increasers (in well)
Appurtenance condition:	2
Appurtenance material type:	Ductile iron
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (swing)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	
Check valve coating:	Epoxy

Check valve condition:	3&4
Number of isolation valves:	2
Isolation valve type:	Kinfe gate valve
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	4
Header connection type:	barried
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	150
Discharge header material type:	
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	3
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	no
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	5
Wet Well	
Wet well material:	Concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	3
Penetration(s) condition:	3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	2
Penetration(s) condition:	4
Benching	
Sump benching present:	yes
Benching depth:	
Benching condition:	submerged
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	
Ladder handrails at flow meter chamber:	
Ventilation	
Ventilation in lift station:	Yes

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information				
Inspection Date:	2023-10-25		Station Name:	Lampson
Lift station location:	1883 Lampson St.			
Current weather conditions:	Windy/overcast			
Maintenance / Historical information:				
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	concrete
Describe 'Other' surface treatment (if applicable):	grass
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	Yes
Site fencing type:	Chain-link
Site fencing condition (if applicable):	5 (good)
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	Yes
Valve chamber configuration:	Below ground (manholes)
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	No
Valve chamber condition:	2

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	Yes
Water Service	
Water service on site:	Yes
Water service details:	Backflow prevention, contained in stainless steel box
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Bollards
Describe 'Other' vehicle protection (if applicable):	Curb/gutter
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1
Orientation of inlets:	
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No
Pipe support condition:	
Guide rails present:	Yes
Guide rail condition (if applicable):	3
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	steel
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	2
Inlet Baffle	
Inlet baffle type:	Square (steel)
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	Yes
Gate / shutoff valve(s) condition (if applicable):	2-3
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes (standard pump seats)
Pump seating condition:	4 (good)
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3-4 (Covered w/ FOG)
Age of pump:	
Discharge pipe diameter (mm):	
Discharge pipe material:	FRP
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	
Appurtenance:	flange
Appurtenance condition:	2
Appurtenance material type:	Ductile iron
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (swing)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy (new)

Check valve condition:	3
Number of isolation valves:	2
Isolation valve type:	Plug type
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy (maybe)
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	2-3 (rusty bolts, not exercised)
Header connection type:	Buried/unknown
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	100mm (4”)
Discharge header material type:	Ductile iron
Describe ‘Other’ discharge header material type (if applicable):	
Discharge header condition:	3
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4
Wet Well	
Wet well material:	Concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3-4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	1
Penetration(s) condition:	3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	3-4
Benching	
Sump benching present:	Yes
Benching depth:	shallow
Benching condition:	4
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No – use tripod
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	no
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	
Ladder handrails at flow meter chamber:	
Ventilation	
Ventilation in lift station:	Yes

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information				
Inspection Date:	2023-10-25		Station Name:	Uganda
Lift station location:	308 Uganda Ave.			
Current weather conditions:	Windy/overcast			
Maintenance / Historical information:				
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Asphalt with metal lids
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	Yes – deep underground, inaccessible
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	No
Valve chamber condition:	1-2 (bypass chamber present – 2 rating
Flow Meter	

Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	Yes
Water service details:	Backflow prevention, water meter
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Curb
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	3
Orientation of inlets:	
Inlet clogging (%):	Unknown, submerged inlets
Pig Launch	
Pig launch present:	No – bypass chamber
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No – dangerous entry
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	No
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	Yes (old)
Gate / shutoff valve(s) condition (if applicable):	1-2
Configuration	
Pump station configuration: (above ground / below ground)	Below ground, non-submerged pumps
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	No (suction pipe)
Pump seating condition:	2-3
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3 – some corrosion
Age of pump:	
Discharge pipe diameter (mm):	150
Discharge pipe material:	Ductile iron
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	
Appurtenance:	
Appurtenance condition:	
Appurtenance material type:	
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	
Check valve material type:	
Describe 'Other' check valve material type (if applicable):	
Check valve coating:	

Check valve condition:	
Number of isolation valves:	
Isolation valve type:	
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	
Header connection type:	
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Need to go through video for above sections.

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	
Discharge header material type:	
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	
Agitator / Mixer	
Agitator / mixer present:	No – manually mix
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	3-4
Wet Well	
Wet well material:	Concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3-4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	
Penetration(s) condition:	3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	
Penetration(s) condition:	1
Benching	
Sump benching present:	Yes
Benching depth:	Shallow
Benching condition:	3 max – poor confirguration
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	
Ladder handrails at flow meter chamber:	
Ventilation	
Ventilation in lift station:	Yes

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information
- Dangerous configuration, team requires fire department present (for potential rescue) - Small confined and deep chambers

Site Information				
Inspection Date:	2023-10-25		Station Name:	Canteen
Lift station location:	601 Canteen Road			
Current weather conditions:	Windy/overcast			
Maintenance / Historical information:				
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Asphalt with metal lids
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No – components are
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	Yes
Valve chamber configuration:	Below ground
Describe 'Other' valve chamber configuration (if applicable):	Only one isolation valve – can shut entire line off, but not just one discharge
Valve chamber sump drain present:	
Valve chamber condition:	3
Flow Meter	

Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	No
Water service details:	
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Bollards & curb
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1
Orientation of inlets:	
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No, use crane truck
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	No
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	No
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	1 on the discharge
Gate / shutoff valve(s) condition (if applicable):	2/3 (not seen)
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes (standard pump seats)
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3-4 (Covered w/ FOG)
Age of pump:	Installed in 2000
Discharge pipe diameter (mm):	
Discharge pipe material:	
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	2/3 (some corrosion)
Appurtenance:	Increasers – upstream of check-valves
Appurtenance condition:	2/3 (weathered)
Appurtenance material type:	
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy/paint

Check valve condition:	4
Number of isolation valves:	1
Isolation valve type:	Buried (plug valve?)
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	Buried/unknown
Header connection type:	Buried/unknown
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	Pressure bleed line on one pump – b/w check valve @ isolation valve

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	buried
Discharge header material type:	
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4 (good)
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	1
Penetration(s) condition:	3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	2
Penetration(s) condition:	
Benching	
Sump benching present:	Yes – as per as-builts
Benching depth:	shallow
Benching condition:	3
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No – use tripod
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	
Ladder handrails at flow meter chamber:	
Ventilation	
Ventilation in lift station:	Yes (?) – confirm as-builts

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information				
Inspection Date:	2023-10-26		Station Name:	Constance
Lift station location:	396 Constance Ave.			
Current weather conditions:	Sunny/slight clouds			
Maintenance / Historical information:				
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Concrete (small cracks)
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	Yes – down residents driveway
Odour	
Odour concerns:	mild
Odour control present:	No
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	
Flow Meter	

Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	Yes
Water service details:	Typical metal enclosure
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Elevated concrete slab
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No, use crane truck
Pipe support condition:	
Guide rails present:	Yes
Guide rail condition (if applicable):	4
Ladder	
Ladder present:	No
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	Rectangular/steel
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	Yes
Gate / shutoff valve(s) condition (if applicable):	3
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes (standard pump seats)
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	4
Age of pump:	
Discharge pipe diameter (mm):	100mm (4")
Discharge pipe material:	Steel
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	4
Appurtenance:	Yes
Appurtenance condition:	4
Appurtenance material type:	steel
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy

Check valve condition:	3
Number of isolation valves:	1
Isolation valve type:	Knife gate valve
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	3
Header connection type:	Possibly T (can't see)
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	Can't see
Discharge header material type:	
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	5
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3/4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	1
Penetration(s) condition:	3/4
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	
Benching	
Sump benching present:	Can't see (check as-builts)
Benching depth:	
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	Yes
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	No

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information			
Inspection Date:	2023-10-26	Station Name:	Forshaw (Fraser)
Lift station location:	1100 Craigflower St.		
Current weather conditions:	Sunny/slight clouds/cold		
Maintenance / Historical information:			

Equipment Summary:				
	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Asphalt/concrete
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	Yes
Site fencing type:	chain-link
Site fencing condition (if applicable):	Lot access gate – public works yard
Security	
Is the site lockable:	Yes
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	Yes
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	
Flow Meter	

Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	No
Water service details:	
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	curb
Describe 'Other' vehicle protection (if applicable):	Rails outside ladder
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No, use crane truck
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	Aluminum
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	3
Inlet Baffle	
Inlet baffle type:	N.A.
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	No
Gate / shutoff valve(s) condition (if applicable):	
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	No
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3/4
Age of pump:	
Discharge pipe diameter (mm):	150mm (6")
Discharge pipe material:	Ductile iron
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	3
Appurtenance:	T's connecting to header pipe – 150mm fxfxft
Appurtenance condition:	2/3
Appurtenance material type:	Ductile iron
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy

Check valve condition:	2/3
Number of isolation valves:	4
Isolation valve type:	Hand wheel (Typ.)
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	3
Header connection type:	T connection – some corrosion on header pipe
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	150mm (6”)
Discharge header material type:	Ductile iron
Describe ‘Other’ discharge header material type (if applicable):	
Discharge header condition:	3
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	2 – lots of grease
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	2
Penetration(s) condition:	2/3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	2/3
Benching	
Sump benching present:	Yes – in dry well (assume yes in wet well)
Benching depth:	
Benching condition:	4
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	No

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information			
Inspection Date:	2023-10-26	Station Name:	Gorge Park
Lift station location:	1070 Tillicum		
Current weather conditions:	Sunny/cold		
Maintenance / Historical information:	- New electrical equipment		

Equipment Summary:				
	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Gravel/asphalt
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	Sloped towards water
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No (all one)
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	Yes
Water service details:	In green box in front of electrical equipment
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Curb and sidewalk
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	Appears inaccessible
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	Yes – drop pipe structure
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	2 – blue valves
Gate / shutoff valve(s) condition (if applicable):	5 (new)
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	Pump tags
Pump type:	
Pump submerged:	Yes
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	5
Age of pump:	
Discharge pipe diameter (mm):	80mm (3")
Discharge pipe material:	Stainless steel
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	4
Appurtenance:	90° bend going into header pipe
Appurtenance condition:	4
Appurtenance material type:	Stainless steek
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2
Check valve material type:	Iron
Describe 'Other' check valve material type (if applicable):	
Check valve coating:	Epoxy

Check valve condition:	5 – new
Number of isolation valves:	2
Isolation valve type:	Plug valve
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	5 - new
Header connection type:	Two 90° bends
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	80mm (3”)
Discharge header material type:	Stainless steel
Describe ‘Other’ discharge header material type (if applicable):	
Discharge header condition:	3/4 – some rust
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4/5 (good)
Wet Well	
Wet well material:	Concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	4/5
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	1
Penetration(s) condition:	5
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	5
Benching	
Sump benching present:	Yes – assumed
Benching depth:	submerged
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	Yes – ventilation pipe present

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information				
Inspection Date:	2023-10-25	Station Name:	Grafton	
Lift station location:	436 Grafton St.			
Current weather conditions:	Windy/overcast			
Maintenance / Historical information:				
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Asphalt with metal lids
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	Yes
Valve chamber configuration:	Below ground - buried
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	Yes
Valve chamber condition:	N.A.
Flow Meter	

Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	Yes
Water service details:	Metal casing
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Bollards & curb
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1
Orientation of inlets:	
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No, use crane truck
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	steel
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	3
Inlet Baffle	
Inlet baffle type:	
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	Yes
Gate / shutoff valve(s) condition (if applicable):	4
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes (standard pump seats)
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	
Age of pump:	
Discharge pipe diameter (mm):	150mm (6")
Discharge pipe material:	Steel
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	
Appurtenance:	Yes
Appurtenance condition:	1/2
Appurtenance material type:	FRP
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	steel
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy

Check valve condition:	4
Number of isolation valves:	2
Isolation valve type:	PVC
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	3
Header connection type:	Buried/unknown (T typ.)
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	150mm (6”)
Discharge header material type:	FRP riser – stainless
Describe ‘Other’ discharge header material type (if applicable):	
Discharge header condition:	2&4
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4 (good)
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3/4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	1
Penetration(s) condition:	
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	
Benching	
Sump benching present:	Yes
Benching depth:	shallow
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No – use tripod
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	Ladder with no handrails
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	Yes

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information				
Inspection Date:	2023-10-26		Station Name:	Kinver
Lift station location:	325 Kinver St.			
Current weather conditions:	Sunny/slight clouds/cold			
Maintenance / Historical information:	- I&I concerns - Leakage issues – pumps near end of life			
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Grass/asphalt
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	Sloped towards water (south)
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	
Flow Meter	

Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	Yes – tank in road
Water Service	
Water service on site:	Yes
Water service details:	Typical metal/steel enclosure
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Yellow curb
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	2
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	Yes
Pig launch condition:	3 – new bolts, remainder of components are older

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No, use crane truck
Pipe support condition:	
Guide rails present:	Yes
Guide rail condition (if applicable):	3
Ladder	
Ladder present:	No
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	Rectangular/steel
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	Yes
Gate / shutoff valve(s) condition (if applicable):	3 – some epoxy chipping
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes (standard pump seats)
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	2/5 & 1/5 – one pump turned off
Age of pump:	
Discharge pipe diameter (mm):	200mm
Discharge pipe material:	PVC
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	3
Appurtenance:	T's connecting to header pipe – 150mm fxfxft
Appurtenance condition:	3/4
Appurtenance material type:	Ductile iron
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy

Check valve condition:	4
Number of isolation valves:	2
Isolation valve type:	Ball valves
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	3
Header connection type:	T connection – some corrosion on header pipe
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	150mm
Discharge header material type:	Iron
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	2/3 – some rust/corrosion
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	3
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	2
Penetration(s) condition:	3/4
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	
Benching	
Sump benching present:	Can't see (check as-builts)
Benching depth:	
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	No

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information				
Inspection Date:	2023-10-26		Station Name:	Luscombe
Lift station location:	705 Luscombe Pl.			
Current weather conditions:	Sunny/cold			
Maintenance / Historical information:	- No water service - Steel framing creates cleaning challenges			
Equipment Summary:	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Leaves/grass/dirt
Describe 'Other' surface treatment (if applicable):	
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	Yes – overflow towards fence
Water Service	
Water service on site:	No
Water service details:	
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	See accessibility
Describe 'Other' vehicle protection (if applicable):	Undrivable path between houses
Accessibility	
Lift station accessible by truck:	No
Inlets	
Number of inlets:	2
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	Yes
Pipe support condition:	2/3 – some rust
Guide rails present:	Yes
Guide rail condition (if applicable):	3
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	Steel
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	2 – corrosion
Inlet Baffle	
Inlet baffle type:	No
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	2
Gate / shutoff valve(s) condition (if applicable):	
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	
Pump type:	
Pump submerged:	Yes
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	2-3
Age of pump:	
Discharge pipe diameter (mm):	
Discharge pipe material:	Iron
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	3 (max)
Appurtenance:	T off of header pipe
Appurtenance condition:	3 (max)
Appurtenance material type:	Iron
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy

Check valve condition:	2/3 - corrosion
Number of isolation valves:	2
Isolation valve type:	Gate valve (typ.)
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	2-3 – corrosion
Header connection type:	T connection
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	100mm (4") @ T – 150mm (6") after
Discharge header material type:	Ductile iron
Describe 'Other' discharge header material type (if applicable):	
Discharge header condition:	2/3 – corrosion
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	4
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	2 – cracking (3 max)
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	2
Penetration(s) condition:	3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	video
Benching	
Sump benching present:	Yes
Benching depth:	
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	Yes
Man lift davit sockets at valve chamber:	No VC
Davit arm present:	Yes
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	Yes – not sure if effective or where opening in wet well is

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information			
Inspection Date:	2023-10-26	Station Name:	Saxe Point
Lift station location:	End of Fraser Road (No direct address)		
Current weather conditions:	Sunny/cold		
Maintenance / Historical information:	- One of the two newer pump stations - All PVC, just from public washroom		

Equipment Summary:				
	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	asphalt
Describe 'Other' surface treatment (if applicable):	Concrete pad
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No (all one)
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	No
Water service details:	
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	High curb
Describe 'Other' vehicle protection (if applicable):	Landscape/asphalt path
Accessibility	
Lift station accessible by truck:	Yes
Inlets	
Number of inlets:	1 (public washroom)
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	No
Ladder depth (if applicable):	
Ladder material (if applicable):	
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	
Inlet Baffle	
Inlet baffle type:	None
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	No
Gate / shutoff valve(s) condition (if applicable):	
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	Pump tags
Pump type:	
Pump submerged:	Yes
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	5
Age of pump:	
Discharge pipe diameter (mm):	80mm (3")
Discharge pipe material:	PVC
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	5
Appurtenance:	T (typ. Flange)
Appurtenance condition:	5
Appurtenance material type:	PVC
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	0
Check valve material type:	
Describe 'Other' check valve material type (if applicable):	
Check valve coating:	

Check valve condition:	
Number of isolation valves:	2
Isolation valve type:	Plastic
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	5
Header connection type:	PVC flange
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	80mm (3”)
Discharge header material type:	PVC
Describe ‘Other’ discharge header material type (if applicable):	
Discharge header condition:	5
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	HDPE lid (fibre)
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	5
Wet Well	
Wet well material:	FRP
Describe 'Other' wet well material (if applicable):	
Wet well condition:	5
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	1
Penetration(s) condition:	5
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	5
Benching	
Sump benching present:	Yes – assumed
Benching depth:	submerged
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	No

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Site Information			
Inspection Date:	2023-10-26	Station Name:	Seahaven
Lift station location:	897 Admirals Road (@ back access)		
Current weather conditions:	Sunny/cold		
Maintenance / Historical information:	- No I&I issues		

Equipment Summary:				
	Valve Chamber: ☐	Dry Well: ☐	Flow Meter: ☐	Fencing: ☐
	Water Service: ☐	Overflow: ☐	Pig Launch: ☐	Agitator: ☐
	LS Man Lift Davit: ☐	VC Man Lift Davit: ☐	Davit Arm: ☐	Safety Grating: ☐
	Kiosk: ☐	Exterior Lighting: ☐	Flow Meter: ☐	SCADA System: ☐
	Genset: ☐	Dry Well Elec: ☐	VC Elec: ☐	SCADA Antenna: ☐
	Telco Service: ☐	Cellular: ☐		

Summary of Poor Condition Components

Civil Asset Condition Overview				Mechanical Asset Condition Overview			
Odour Control:		Fencing:		Pipe Supports:		Guide Rails:	
Valve Chamber:		Flow Meter Vault:		External Isolation Valve:		Ladder:	
Pig Launch:				Pump Seat:		Pumps:	
Structural Asset Condition Overview				Fittings:		Discharge Pipes:	
Inlet Piping Penetrations:		Discharge Piping Penetrations:		Isolation Valve(s):		Check Valve(s):	
Lid / Hatch:		Wet Well:		Flow Meter:		Air Valve:	
Benching:		Pump House Building:		Agitator/Mixer:		Header:	
Electrical Asset Condition Overview							
BC Hydro Service:		Exterior Lighting:		Power Distribution:		Wet Well:	
Pumps and Motors:		Kiosk:		Controls:		Communications:	
RTU		Standby Power:					

†Condition rating of 1->5 where 1 is high likelihood (poor condition) and 5 is a low likelihood of failure (good condition). "/" if non-existing.

Civil Considerations	
Surface	
Surface treatment type: (pavement /gravel / etc)	Concrete
Describe 'Other' surface treatment (if applicable):	Landscape
Surface drainage:	
Odour	
Odour concerns:	No
Odour control present:	
Odour control condition (if applicable):	
Fencing	
Site fencing present:	No
Site fencing type:	
Site fencing condition (if applicable):	
Security	
Is the site lockable:	No
Pump Station Enclosure / Building	
Pump station enclosure / building present:	No
Pump station enclosure / building condition (if applicable):	
Pump station enclosure building comments (if applicable)	
Valve Chamber	
Valve chamber present:	No (all one)
Valve chamber configuration:	
Describe 'Other' valve chamber configuration (if applicable):	
Valve chamber sump drain present:	
Valve chamber condition:	

Flow Meter	
Flow meter vault:	No
Flow meter vault sump drain:	
Flow meter vault condition:	
Overflow Storage	
Overflow storage present:	No
Water Service	
Water service on site:	No
Water service details:	
Vehicle Protection	
Protection from vehicles present:	Yes
Type of protection from vehicles:	Curb/trees
Describe 'Other' vehicle protection (if applicable):	
Accessibility	
Lift station accessible by truck:	Indirectly – yes
Inlets	
Number of inlets:	2
Orientation of inlets:	underground
Inlet clogging (%):	
Pig Launch	
Pig launch present:	No
Pig launch condition:	

Civil Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Mechanical Considerations	
Pump Sockets & Pipes	
Pump davit sockets present:	No
Pipe support condition:	
Guide rails present:	No
Guide rail condition (if applicable):	
Ladder	
Ladder present:	Yes
Ladder depth (if applicable):	
Ladder material (if applicable):	Steel
Describe 'Other' ladder material (if applicable):	
Ladder condition (if applicable):	3
Inlet Baffle	
Inlet baffle type:	None
Describe 'Other' inlet baffle type (if applicable):	
Gate / Shutoff Valve(s)	
Gate / shutoff valve(s) to isolate lift station:	No
Gate / shutoff valve(s) condition (if applicable):	
Configuration	
Pump station configuration: (above ground / below ground)	Below ground
Pump configuration: (duplex / triplex)	Duplex

Pump Station Details	
# of duty pumps:	1
# of lag pumps:	1
Pump model:	Pump tags
Pump type:	
Pump submerged:	Yes
Pump seating condition:	
Describe 'Other' pump seating condition (if applicable):	
Pump condition:	3 – fair
Age of pump:	
Discharge pipe diameter (mm):	150mm
Discharge pipe material:	PVC
Describe 'Other' discharge pipe material (if applicable):	
Discharge pipe condition:	3
Appurtenance:	Yes
Appurtenance condition:	2/3 – corrosion
Appurtenance material type:	Iron
Describe 'Other' appurtenance material type (if applicable):	
Number of check valves:	2 (one on each line)
Check valve material type:	Ductile iron
Describe 'Other' check valve material type (if applicable):	- Valves not exercised
Check valve coating:	Epoxy

Check valve condition:	3/4
Number of isolation valves:	2
Isolation valve type:	Wheel
Describe 'Other' isolation valve type (if applicable):	
Isolation valve coat:	Epoxy
Describe 'Other' isolation valve coat (if applicable):	
Isolation valve condition:	2
Header connection type:	T connection/flange
Describe 'Other' header connection type (if applicable):	
Additional discharge line comments / observations:	

Air Valves	
Air valve present:	No
Air valve condition:	
Air valve plumbed to sump / drain:	
Discharge Header	
Discharge header diameter (mm):	150mm (6”) @ T – 200mm (8”) after
Discharge header material type:	PVC
Describe ‘Other’ discharge header material type (if applicable):	
Discharge header condition:	3/4
Agitator / Mixer	
Agitator / mixer present:	No
Agitator / mixer condition:	
Flow Meter	
Flow meter present:	No
Flow meter model:	
Flow meter condition:	

Mechanical Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Structural Considerations	
Lid / Hatch	
Lid / hatch material:	Steel
Describe 'Other' lid / hatch material (if applicable):	
Lid / hatch is H^2O rated:	No
Lid / hatch condition:	2 – lots of corrosion
Wet Well	
Wet well material:	concrete
Describe 'Other' wet well material (if applicable):	
Wet well condition:	4
Inlet Piping Wall Penetrations	
Number of inlet piping wall penetrations:	2
Penetration(s) condition:	3
Discharge Piping Wall Penetrations	
Number of discharge piping wall penetrations:	1
Penetration(s) condition:	3
Benching	
Sump benching present:	Yes – assumed
Benching depth:	submerged
Benching condition:	
Benching sedimentation:	

Structural Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

Safety Considerations	
Man Lift Davit Sockets	
Man lift davit sockets at lift station:	No
Man lift davit sockets at valve chamber:	
Davit arm present:	
Safety Grating	
Safety grating in lift station hatch:	No
Safety grating in valve chamber hatch:	
Ladder Handrails	
Ladder handrails at wet well:	No
Ladder handrails at valve chamber:	No
Ladder handrails at flow meter chamber:	No
Ventilation	
Ventilation in lift station:	Yes – however, appears to do nothing and has no connections

Safety Considerations: Photos / Comments

Site Photo

Photo Description

Additional Information

PBX Engineering Ltd.

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www.pbxeng.com

Technical Memorandum

Project Name:	Esquimalt Sanitary Asset Management Plan		
Owner:	Township of Esquimalt		
Prime Consultant:	Urban Systems	**Date:**	December 1, 2023
Attention:	Mark Stafford <mstafford@urbansystems.ca>		
Subject:	Esquimalt Sanitary Lift Station Assessments		

1 Introduction

The following technical memorandum was prepared to summarize the findings from the investigations of 11 lift stations for the Township of Esquimalt. It is understood that the information herein will be used by the Township as a reference guide to develop a master plan for a development and maintenance strategy. PBX Engineering Ltd. (PBX) coordinated with the Township of Esquimalt, Urban Systems, and referenced information collected from site, including photos and sketches, to prepare a condition ranking and overall condition summary for each lift station.

2 Supporting Information

Information used to support this technical memorandum was obtained from the following sources:

- General Information (applicable to all sites):
  - C22.1-21, Canadian Electrical Code, Part I.
  - Requirements for Secondary Voltage Revenue Metering (750 V and less), June 2022, BC Hydro.
  - ES54 Underground Civil Manual, November 2023, BC Hydro.
  - NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities, 2020 Edition.

- Site specific information:
  - Canteen Station:
    - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
    - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
    - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
    - Pump name plates – Photos taken on site of both pump name plates.
    - Record Drawings – Lift station and kiosk drawings in PDF format, received from Urban Systems on October 18, 2023.
    - Replacement pump quote – Fax message in PDF format discussing the quote and sizing for a replacement pump in 2000. Received from Urban Systems on October 18, 2023.

- Repair invoices – Invoices from FLYGT in PDF format listing repair costs to station equipment in 1983 and 1988. Received from Urban Systems on October 18, 2023.
- Shipping information – Order receipt for station equipment purchased on May 14, 1998. Received from Urban Systems on October 18, 2023.
- Repair estimate – Quote from Duncan Electric Motor Ltd. for repairs on a station pump issued on February 11, 2016. Received from Urban Systems on October 18, 2023.
- Kiosk maintenance – Test sheet in PDF format summarizing testing of the station kiosk and pump VFDs. Received from Urban Systems on October 18, 2023.
- P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
- Site photos – Photos taken on site by PBX on October 25, 2023.
- Site notes/sketches – Notes/sketches taken on site by PBX on October 25, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.

- Constance Station:
  - Wet Well Schematics - Received from Urban Systems on October 18, 2023.
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump name plates – Photos taken on site of both station pump name plates.
  - Site accident photo – Photo taken on site on April 21, 1989 of the damaged lift station following an accident. Received from Urban Systems on October 18, 2023.
  - BC Hydro Billing Summary – Summary of kWs consumed by lift station from August 1987 to August 1988. Received from Urban Systems on October 18, 2023.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - Pump update quote – Fax messages in PDF format from ITT Industries including the quote, purchase order, and design of a pump system update in 2001. Received from Urban Systems on October 18, 2023.
  - Pump replacement quote and correspondence – Letters to and from FLYGT discussing pump replacements. Dated December 8, 1986. Quote for items in pump system from FLYGT. Dated December 18, 1986. Received from Urban Systems on October 18, 2023.
  - Pump replacement sales order – Sales order from FLYGT for the pump replacement. Dated June 6, 1987. Received from Urban Systems on October 18, 2023.
  - Pump guidebar schematics - Received from Urban Systems on October 18, 2023.

- Flow hand calculations – Hand calculations in PDF format calculating the pump flow rate for the station. Dated December 5, 1986. Received from Urban Systems on October 18, 2023.
- Pump energy consumption data – Spreadsheet in PDF format summarizing the kW usage of each pump in the station. Received from Urban Systems on October 18, 2023.
- Notice of electrical enclosure replacement – Notice to the public works department discussing the replacement of an electrical enclosure. Dated 1994. Received from Urban Systems on October 18, 2023.
- Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
- P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
- Site photos – Photos taken on site by PBX on October 25, 2023.
- Site notes/sketches – Notes/sketches taken on site by PBX on October 26, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 26, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 26, 2023.

- Craigflower Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
  - Lift station vehicle access change – Correspondence in PDF format discussing eliminating parking spaces beside the lift station so maintenance vehicles can access the lift station more reliably. Received from Urban Systems on October 18, 2023.
  - Vendor correspondence – Letters to and from FLYGT, ITT Industries regarding pump replacement. Received from Urban Systems on October 18, 2023.
  - P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site by PBX on October 25, 2023.

- Site notes/sketches – Notes/sketches taken on site by PBX on October 25, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.

- Garthland Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.
  - Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - Water issues report – .docx describing the discovery and resolution of blockages causing high wet well levels during heavy rain events.
  - Staff reports and hand sketches – Township of Esquimalt field reports, kiosk dimensional sketches, and internal correspondence. Received from Urban Systems on October 18, 2023.
  - Vendor correspondence – Letters to and from FLYGT, ITT Industries regarding pump replacement. Received from Urban Systems on October 18, 2023.
  - P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site by PBX on October 25, 2023.
  - Site notes/sketches – Notes/sketches taken on site by PBX on October 25, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
  - Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
- Grafton Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.

- Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
- Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
- Pipe repair schematic and invoice – Schematic and invoice in PDF form from Stantec showing the planned pipe repair and associated cost. Dated July 17, 2009. Received from Urban Systems on October 18, 2023.
- Operating Guidelines – Summary of equipment, operating parameters, set points, notes, and maintenance in PDF format, received from Township of Esquimalt on February 9, 2021.
- BC Hydro single to three phase design estimate – Correspondence from BC Hydro providing a cost estimate for the electrical design of a conversion of the station's service from 120/240V to 120/208V. Received from Urban Systems on October 18, 2023.
- Vendor correspondence – Letters to and from FLYGT, ITT Industries regarding pump replacement. Received from Urban Systems on October 18, 2023.
- Staff reports and hand sketches – Township of Esquimalt field reports, kiosk dimensional sketches, and internal correspondence. Received from Urban Systems on October 18, 2023.
- P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
- Site photos – Photos taken on site by PBX on October 25, 2023.
- Site notes/sketches – Notes/sketches taken on site by PBX on October 25, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.

- Kinver Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014 and May 23, 2019. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.
  - Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - Operating Guidelines – Summary of equipment, operating parameters, set points, notes, and maintenance in PDF format, received from Township of Esquimalt on February 9, 2021.

- Vendor correspondence – Letters to and from FLYGT, ITT Industries regarding pump replacement. Received from Urban Systems on October 18, 2023.
- Staff reports and hand sketches – Township of Esquimalt field reports, kiosk dimensional sketches, and internal correspondence. Received from Urban Systems on October 18, 2023.
- P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
- Site photos – Photos taken on site by PBX on October 26, 2023.
- Site notes/sketches – Notes/sketches taken on site by PBX on October 26, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 26, 2023.

- Lampson Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.
  - Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
  - Vendor correspondence – Letters to and from Duncan Electric regarding pump maintenance and replacement. Received from Urban Systems on October 18, 2023.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site by PBX on October 25, 2023.
  - Site notes/sketches – Notes/sketches taken on site by PBX on October 25, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
  - Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
- Luscombe Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.

- Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
- Pump plates – Photos taken on site of both station pump name plates.
- Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
- Vendor correspondence – Letters to and from Duncan Electric regarding pump maintenance and replacement. Received from Urban Systems on October 18, 2023.
- P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
- Site photos – Photos taken on site by PBX on October 26, 2023.
- Site notes/sketches – Notes/sketches taken on site by PBX on October 26, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 26, 2023.

- Nursery Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.
  - Generator operating guide – .docx outlining all procedures for operating the Township of Esquimalt's portable generator. Received from Urban Systems on October 18, 2023.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - Flow hand calculations – Hand calculations in PDF format calculating the pump flow rate for the station. Received from Urban Systems on October 18, 2023.
  - P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site by PBX on October 26, 2023.
  - Site notes/sketches – Notes/sketches taken on site by PBX on October 26, 2023.
  - Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 26, 2023.
- Sea Haven Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.

- Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
- Pump plates – Photos taken on site of both station pump name plates.
- Operating Guidelines – Summary of equipment, operating parameters, set points, notes, and maintenance in PDF format, received from the Township of Esquimalt on February 9, 2021.
- Vendor correspondence – Letters to and from Duncan Electric regarding pump maintenance and replacement. Received from Urban Systems on October 18, 2023.
- P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
- Site photos – Photos taken on site by PBX on October 26, 2023.
- Site notes/sketches – Notes/sketches taken on site by PBX on October 26, 2023.
- Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 26, 2023.

- Uganda Station:
  - Hours – Service check sheets in PDF format outlining the total running hours of both station pumps between October 2018 – February 2022. Received from Urban Systems on October 18, 2023.
  - Lockout procedure – Instructions for shutoff procedure of the station in PDF format. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site May 6, 2014. Received from Urban Systems on October 18, 2023.
  - Pump plates – Photos taken on site of both station pump name plates.
  - Kiosk maintenance – Test sheet in PDF format summarizing testing of the station kiosk and pump VFDs. Received from Urban Systems on October 18, 2023.
  - Operating Guidelines – Summary of equipment, operating parameters, set points, notes, and maintenance in PDF format, received from the Township of Esquimalt on February 9, 2021.
  - Record Drawings – Lift station and kiosk drawings in PDF format. Received from Urban Systems on October 18, 2023.
  - P&ID Schematic Diagram – Process description diagram of the pump station instrumentation and pump components. Received from Urban Systems on October 18, 2023.
  - Site photos – Photos taken on site by PBX on October 25, 2023.
  - Site notes/sketches – Notes/sketches taken on site by PBX on October 25, 2023. Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.
  - Site Discussion – Discussion on site between PBX, Urban Systems, and the Township of Esquimalt's Operator on October 25, 2023.

3 Background Information

The following station evaluations have been prepared to summarize the electrical assessments performed by PBX for the Esquimalt Sanitary Master Plan initiative. PBX was hired by Urban Systems to collaborate on the assignment.

The objective of the assignment is to summarize for each of the lift station sites, at a high-level, the findings and conditions of the electrical systems, and an opinion of cost for the short-term and long-term capital expenditures for system and/or equipment replacement.

3.1 Emergency Power and Standby Generator Considerations

In the event of utility power loss, sewer lift stations must be provided with back-up power to continue operation. Failure to provide lift stations with timely backup power may result in sewage overflow, as well as property and environmental damage. The Township of Esquimalt presently maintains one portable generator and must otherwise rely on contracted septic pump trucks to support the sewer system in the event of widespread utility power loss.

Permanent standby generators ensure reliable operation of lift stations during critical incidents, when the likelihood of sewage overflow is greatest. Several Esquimalt pump station sites are ideal candidates for permanent standby generator installation. A standby generator installation plan would gradually reduce the number of lift stations which would require manual intervention by operators during critical incidents. Each site was assessed for the suitability of standby generator installation as a component of the sewer system assessment.

3.2 Site Lighting Considerations

Lift station operators are frequently required to perform critical repair, maintenance and assessment tasks during darkness or low-light conditions. Suitable site lighting is imperative to ensure safe and efficient operation of lift stations, and even more so when operations require access to the wet well or other confined spaces. The Township of Esquimalt does not presently employ wet well fall protection at any of the assessed sites. Health and safety risk is elevated for operators working near an open, unprotected wet well without suitable area lighting.

Site lighting was examined at each lift station as a part of the sewer assessment. In cases where insufficient lighting was available for safe operation of the lift station, the feasibility of adding site lighting to the existing electrical distribution infrastructure was assessed.

3.3 SCADA System Utilization Considerations

Lift station operators must respond to rapidly emergent conditions at lift stations to ensure the sanitary sewer system can reliably protect municipalities from property and environmental damage. A keystone to effective utilization of operators' limited resources is an accurate and accessible SCADA system. SCADA systems provide condition monitoring of system assets and relay this information to operators in real-time.

In addition to the emergency response capabilities provided by a SCADA system, historical asset data trends may be collected and analyzed to inform maintenance practices. Ineffective maintenance is often only performed reactively and/or on a round-robin schedule. Historical data tracking and analysis of sanitary assets empowers operators to perform maintenance based on observed trends and notable anomalies.

Site connectivity to the CRD SCADA system was considered at each station as a part of the sewer assessment. The assessment makes note of cases where sites have historically experienced SCADA connectivity disruptions. Additionally, the assessment provides recommendations for improving utilization of the CRD SCADA system.

3.4 Service Life Considerations

As part of the on-site and post-site visit analysis, service life of existing equipment was taken into consideration. Projections of the expected useful service life of equipment are available from multiple sources. These projections are typically based on failures per year data collected from Owners of installed equipment. The expected life of equipment as obtained from multiple sources is summarized below. However, actual equipment life depends on many factors which may not be accounted for by historical equipment failure metrics. These factors include operating environment (temperature, humidity, corrosive gasses, etc.), number of switching operations, maintenance practices, and availability of spare parts and manufacturer support. All these factors must be considered when evaluating the overall expected service life of electrical and mechanical equipment.

The following tables provide references for the life expectancy for various pieces of equipment:

Table 1: Expected Service Life

Source	Equipment													
	LV Molded Case Circuit Breakers	LV Power Circuit Breakers	Motors and Starters	Dry Type Transformers	Switchboards	Bus Duct	Pumps – Base Mounted	Pumps – Sump and Well	Electric Motors	Motor Starters	Fans (Propeller)	Unit Heaters Electric	Dampers	Controls (Electric/Electronic)
IEEE Gold Book	20	15-20	20-30	20	-	-	-	-	-	-	-	-	-	-
RSMeans Facilities Standards	-	-	-	15	20	25	-	-	-	-	-	-	-	-
ASHRAE	-	-	-	30	-	-	20	10	18	17	15	13	20	15

3.5 Asset Condition Considerations

Assets were assigned condition ratings in line with the table below to determine the importance certain components have on the operation of the station:

Table 2: Asset Condition Rating

Grade	Condition	Description
1	Very Poor	Failed or failure imminent. Effective life exceeded and excessive maintenance costs incurred. A high risk of breakdown with a serious impact on performance. No life expectancy. Health and safety hazards exist which present a possible risk to public safety, or asset

		cannot be serviced/operated without risk to personnel. Major work or replacement required urgently.
2	Poor	Functioning but requires a high level of maintenance to remain operational. Likely to cause a marked deterioration in performance in short-term. Likely need to replace most or all of asset within 2 years. No immediate risk to health or safety but work required within 2 years to ensure asset remains safe. Substantial work required in short-term, asset barely serviceable.
3	Fair	Functionally sound but showing some wear with minor failures and some diminished efficiency. Minor components or isolated sections of the asset need replacement or repair, but asset still functions safely and at an adequate level of service. Deterioration beginning to be reflected in performance and higher attendance for maintenance. Work required but asset is still serviceable. Failure unlikely within 2 years but further deterioration likely and major replacement required within next 5 years.
4	Good	Acceptable physical condition but not designed to current standards or showing minor wear. Deterioration has minimal impact on asset performance. Only minor work required (if any). Minimal short-term failure risk but potential for deterioration or reduced performance in medium term (5-10 years).
5	Very Good	Sound physical condition designed to meet current standards. Operable and well-maintained. No work required. Asset likely to perform adequately with routine maintenance for 10 years or more.

3.6 Code and Standard Considerations

Part of the analysis performed within this memorandum includes consideration of code violations identified on site. There may be several reasons that certain equipment does not meet code, across the assessed sites. Some equipment may be in violation of code due to being installed before certain codes were put into place. A summary of clauses from codes and standards referenced for this memorandum are provided below. While it is recommended that all electrical equipment is up to current code, it is noted that some code infractions may have more operational and safety consequences than others.

Requirements for C22.1-21, Canadian Electrical Code, Part I:

- Per Section 2-306.1, electrical equipment such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centres that are installed in other than dwelling units and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn persons of potential electric shock and arc flash hazards.
- Per Section 2-308.1, minimum working space of 1m with secure footing shall be provided and maintained about electrical equipment.
- Per Section 64-802, storage-battery rooms or areas shall be adequately ventilated and not subjected to ambient temperatures greater than 45° Celsius.
- Per Section 28-604.3, the motor and motor starter or controller disconnecting means shall be located within sight of and within 9 m of the motor and the machinery driven by it; and within sight of and within 9 m of the motor starter and controller.

- Per Section 22-704, wet well provided with adequate continuous positive pressure ventilations shall be considered Zone 2.
- Per Section 22-706.4, conduits installed from the wet well to an electrical enclosure shall be sealed with a suitable compound to prevent the entrance of moisture, vapour, or gases into the enclosure.
- Per Section 18-076, there shall be no uninsulated exposed parts of an electrical installation or of electrical equipment such as electrical conductors, buses, terminals, or components.

Requirements for Secondary Voltage Revenue Metering (750 V and less), June 2022, BC Hydro:

- Per Section 3.2.1.10, provide minimum 0.3m separation distance between the meter base and closest obstruction/equipment.
- Per Section 3.4, when metering equipment is installed indoors, i.e. meter room, power shed, service closet, Indoor Meter Closet, etc., lighting fixture(s) shall be installed in the same space containing the metering equipment and shall be controlled by a wall switch at the room entrance.
- Per Section 3.9, Metering Type and Location Summary Table: services 200A or less, with over 10kA fault current, the meter location shall be located on the load side.
- Per Section 4.2.3.c, municipal kiosk meter's centre line is permitted to be 915mm to 1800mm above finished grade.

Requirements for ES54 Underground Civil Manual, November 2023, BC Hydro.

- Per Section ES54 S0-04, Interrupting Capacity, main service protective device shall be capable of interrupting the available fault current as follows:
  - 120/240V up to 600A, 22kA
  - 120/208V up to 1600A, 45kA
  - 347/600V up to 1600A, 45kA
- Per Section S2-01.05, minimum service conduit size is 103mm, minimum pull box size is 800mm x 500mm, and minimum wireway size is 300mm x 300mm, and minimum height is 1500mm.

NFPA 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities, 2016 Edition.

- Per Table 4.2.2 Collection Systems, a Wastewater Pumping Station Wet Well is classified as either a Class 1 Division 1 rated hazardous area or a Class 1 Division 2 rated hazardous area depending on the number of air changes per hour. Less than 12 air changes an hour defines the hazardous area Division 1, greater than 12 air changes per hour define a Division 2 area. If the electrical kiosk if not sufficiently sealed off from the wet well, this hazardous area extends to the kiosk.

EGBC Practice Advisory: IEEE Guide for Performing Arc-Flash Hazard Calculations

- Per CSA Z462 Workplace Electrical Safety standard, incident energy analysis should be reviewed for accuracy every five years, or updated whenever changes to the electrical system occur that could affect the analysis.
- PBX recommends that Owners perform Arc Flash Analysis on their existing stations and obtain Arc Flash and Shock equipment labels to apply to electrical equipment.

3.7 Financial Evaluation

Budgetary cost estimates for planning purposes have been provided. The estimates are rough order of magnitude for the repair or replacement of equipment identified in the condition assessments. Each line item in the estimates

may be considered separate and not all items need to be addressed concurrently. The following assumptions were made in preparation of the estimates:

- 20% contingency allowed.
- 2023 dollars used.
- No tax included.
- Labour rate of $110/hr used.
- Estimates based on visual condition review only.

4 Station Assessments

4.1 Canteen Station

4.1.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.1.2 General Condition Notes

The Canteen lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. The station receives electrical utility and standby generator power from the nearby Esquimalt Public Works building. Canteen is in fair condition. The electrical kiosk is relatively new, but shows significant wear and tear. The wet well ventilation fan has failed and requires immediate replacement for continued safe operation of the station. The electrical components in the wet well are in good working condition.

4.1.3 Specific Condition Notes

- Wet well ventilation fan motor has failed. The wet well ventilation fan and motor must be immediately replaced to ensure safe operation of the lift station. The ventilation fan provides the positive ventilation pressure required to derate the wet well to a Class I Zone II location.
- Electrical kiosk controls compartment does not have adequate working space for safe operation when the wet well hatch is open.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Wet well ventilation fan lacks protective mechanical grate. When the kiosk wet well ventilated compartment is open the fan blades pose a safety risk to operators. The additional of a fan mechanical guard would reduce the risk of operator injury.
- Electrical kiosk lacks heater(s) to regulate internal temperature. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range. The effective lifespan of electrical equipment may be educed. The installation of base-board heaters (radiant) is recommended.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more

liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.

- Water ingress was observed in the base of the kiosk electrical section. The water ingress was not severe but may indicate failure of the seal between the kiosk and concrete pad.
- Kiosk electrical section ventilation grille is damaged and heavily corroded. Ventilation grilles provide mechanical protection for kiosk components and facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Bug screens installed on the kiosk ventilation louvres are damaged and must be replaced. Bug screens ensure pests, dirt and debris do not accumulate within electrical kiosk.
- Kiosk anti-graffiti wrap is cracking and shows signs of degradation. Anti-graffiti wrap may require replacement in several years.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to maintain an electrical single line diagram and controls information on-site for troubleshooting.
- UPS batteries installation date is unknown. Based on similar stations, it is assumed the batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- Kiosk electrical section interior lighting is in poor condition. Existing fluorescent bulbs have failed, and light fixture may require repair.
- See Appendix A – Condition Assessment Table for additional details.

4.1.4 Generator Consideration

The station receives utility and standby power from the nearby Esquimalt Public Works building. Located in the public works electrical room, the building's main electrical service, automatic transfer switch, and standby generator are used to sub-feed the pump station electrical distribution equipment. Unlike other Esquimalt stations, Canteen is capable of operation without intervention during utility power failure.

4.1.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.1.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.1.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	**Canteen Lift Station**		
1.01	Wet well ventilation fan and motor (with mechanical guard)	**$**	**2410.00**
1.02	HMI Replacement	**$**	**4180.00**
1.03	UPS Replacement Battery	**$**	**720.00**
1.04	Kiosk electrical section baseboard heaters	**$**	**570.00**
1.05	Neoprene gasket repair	**$**	**670.00**
1.06	Ventilation grille replacement	**$**	**370.00**
1.07	Bug screen replacement	**$**	**370.00**
1.08	Insulation installation	**$**	**1380.00**
1.09	Engineering services for Arc flash / ETAP services	**$**	**3000.00**
1.10	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**28, 404.00**

4.2 Constance Station

4.2.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.2.2 General Condition Notes

The Constance lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Constance Station is in fair condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The local human machine interface (HMI) has failed and must be replaced. Additionally, the station experiences frequent, unexplained motor starter potential relay burnouts, which may indicate a broader failure within the electrical system. The electrical components in the wet well are in good working condition. No code violations were observed.

4.2.3 Specific Condition Notes

- The lift station radio system utilizes a polyphaser for surge protection. The polyphaser body is not bonded directly to the station's master ground bus. The polyphaser must be suitably grounded to operate as intended.
- Electrical kiosk controls compartment does not have adequate working space for safe operation when the wet well hatch is open.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Wet well ventilation fan lacks protective mechanical grate. When the kiosk wet well ventilated compartment is open, the fan blades pose a safety risk to operators. The additional of a fan mechanical guard would reduce the risk of operator injury.
- Odour control issues at this station. The station suffers from a notable odour control problem, which operators attribute to limited station flow and stagnation within the wet well. The addition of passive odour control component may reduce the severity of the odour at this station.
- Electrical kiosk lacks heater(s) to regulate internal temperature. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range. The effective lifespan of electrical equipment may be reduced. The installation of base-board heaters (radiant) is recommended.
- The method for mounting insulation on the kiosk doors is failing. Insulation not installed correctly may prevent the kiosk from regulating its internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- Kiosk electrical section ventilation grilles are damaged and heavily corroded. Ventilation grilles provide mechanical protection for kiosk components and facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation

build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.

- Kiosk electrical section ventilation fan has failed and must be replaced. Kiosk ventilation fans facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- BC Hydo meter socket is heavily corroded and should be replaced. The existing BC Hydro meter does not possess sufficient clearance from the electrical kiosk and foliage to meet BC Hydro meter clearance standards.
- Kiosk electrical section door latches are heavily corroded and will require replacement. Failure of door latches may introduce unnecessary complexity to operators' work during critical incidents.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The Operator noted the station is experiencing frequent failure/burnout of motor starter potential relays (part no. 3ARR3J19V4A). The operators carry several spares on-site and must frequently replace them. The cause of this component failure could not be determined on-site. PBX recommends replacement of the entire motor starter and peripheral equipment to ensure all components are rated appropriately.
- The neoprene gaskets lining the kiosk doors have failed in some locations. Debris and water ingress was observed in the base of the kiosk electrical section.
- Motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to higher inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to have a single line diagram and controls information available on-site for trouble shooting.
- UPS batteries installation date is unknown. Based on similar stations, it is assumed the batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- The lift station human machine interface (HMI) has failed and requires frequent power cycling to operate. The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.2.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

Due to the limited site footprint, installation of a standby generator at Constance station is not feasible. The station will continue to require manual intervention by operators during utility power failure incidents.

4.2.5 Lighting Consideration

The station has no dedicated area lighting, which increases risk to operators when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Due to the limited site footprint, installation of site lighting at this location may not be feasible. Installation of permanent site lighting would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties, which surround the lift station. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.2.6 SCADA Consideration

Operators noted the station's SCADA connection has historically been unreliable. Recent antenna upgrades have improved the performance of the radio communication path. Operators should continue to monitor the reliability of the SCADA communication during poor radio communications conditions (ie. Heavy rain, fog, etc.) to ensure connectivity concerns have been alleviated.

Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.2.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	Constance Lift Station		
1.01	Polyphaser Bonding	$	150.00
1.02	HMI Replacement	$	4180.00
1.03	UPS Replacement Battery	$	720.00
1.04	Wet well ventilation fan mechanical guard	$	520.00
1.05	Neoprene gasket repair	$	670.00
1.06	Kiosk electrical section ventilation fan replacement	$	270.00
1.07	Insulation repair	$	740.00
1.08	Kiosk electric baseboard heaters	$	570.00
1.09	Ventilation grille replacement	$	370.00
1.10	Motor starter replacements	$	7500.00
1.11	Engineering services for Arc flash / ETAP services	$	3000.00
1.12	Site lighting (luminaire, pole, base, conductors)	$	10000.00
Total	(with 20% Contingency)	$	25, 428.00

4.3 Craigflower Station

4.3.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.3.2 General Condition Notes

The Craigflower lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Craigflower Station is in good condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The electrical components in the wet well are in good working condition. No code violations were observed.

4.3.3 Specific Condition Notes

- The lift station radio system utilizes a polyphaser for surge protection. The polyphaser body is not bonded directly to the station's master ground bus. The polyphaser must be suitably grounded to operate as intended.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the

manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.

- Wet well ventilation fan lacks protective mechanical grate. When the kiosk wet well ventilated compartment is open, the fan blades pose a safety risk to operators. The additional of a fan mechanical guard would reduce the risk of operator injury.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Water ingress was observed in the base of the kiosk electrical section. The water ingress was not severe but may indicate failure of the seal between the kiosk and concrete pad.
- Bug screens installed on the kiosk ventilation louvres are damaged and must be replaced. Bug screens ensure pests, dirt and debris do not accumulate within electrical kiosk.
- The method for mounting insulation on the kiosk doors is failing. Insulation not installed correctly may prevent the kiosk from regulating its internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.3.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The lift station site has ample room for the installation of a permanent standby generator, and PBX has identified the area adjacent to the existing portable generator receptacle as a candidate location.

Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch (ATS).

4.3.5 Lighting Consideration

The station has no dedicated area lighting, which increases risk to operators when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.3.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.3.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	**Craigflower Lift Station**		
1.01	Polyphaser Bonding	**$**	**150.00**
1.02	HMI Replacement	**$**	**4180.00**
1.03	UPS Replacement Battery	**$**	**720.00**
1.04	Wet well ventilation fan mechanical guard	**$**	**520.00**
1.05	Neoprene gasket repair	**$**	**670.00**
1.06	Bug screen replacement	**$**	**370.00**
1.07	Insulation repair	**$**	**740.00**
1.08	Engineering services for Arc flash / ETAP services	**$**	**3000.00**
1.09	Permanent standby generator	**$**	**50000.00**
1.10	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**84, 420.00**

4.4 Garthland Station

4.4.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.4.2 General Condition Notes

The Garthland lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Garthland Station is in good condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The electrical components in the wet well are in good working condition. No code violations or conditions requiring immediate action were observed.

4.4.3 Specific Condition Notes

- BC Hydro secondary service overhead lines near the lift station are obstructed by tree growth. While the obstructed overhead secondary service does not appear to be the source of lift station's power, it may present a hazard to operators and the reliability of lift station operation. BC Hydro should be contacted to coordinate an arborist to improve the overhead secondary path.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Lift station alarm light enclosure is corroded and may require replacement in a few years. The lift station alarm light provides an area indication of pump station failure or critical events.
- Electrical kiosk utilizes a small, forced air heater to regulate internal temperature. The heater is not preferred by operations due to the presence of moving parts and reliability concerns. The installation of base-board heaters (radiant) is recommended.
- Wet well and valve chamber do not utilize intrusion detection. The wet well and valve chambers are hazardous locations, which should be monitored for intrusion by operators and the public. Additionally, to improve ventilation in the wet well while workers are present, the intrusion detection signal may be used to control the output of the wet well ventilation fan.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- The neoprene gaskets lining the kiosk doors have failed in some locations. Minor debris and water ingress was observed. Neoprene gaskets ensure screens ensure pests, dirt, moisture, and debris do not accumulate within electrical kiosk.

- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to have a single line diagram and controls information available on site for trouble shooting.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- No bug screens are installed on the kiosk ventilation louvres. Bug screens ensure pests, dirt and debris do not accumulate within electrical kiosk.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.4.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The site has a restricted footprint, which limits the potential standby generator location to a narrow region between the kiosk and wet well.

Installation of a generator at this location may not be feasible and would require further investigation. Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch (ATS).

4.4.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.4.6 SCADA Consideration

Operators noted the station's SCADA connection is unreliable. The radio antenna has intermittently experienced obstruction by nearby tree growth, which requires frequent arborist attention during summer months. Additionally, Nursery lift station functions as a store and forward (SAF) site for Garthland lift station. Nursery lift station has historically experienced SCADA connectivity issues, which have cascaded to the dependent Garthland station. Regular attention to the Garthland site by an arborist, and improvements to the Nursery lift station radio path should alleviate connectivity issues at this station.

Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.4.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station

1	Garthland Lift Station		
1.01	HMI Replacement	$	4180.00
1.02	UPS Replacement Battery	$	720.00
1.03	Wet well and valve chamber intrusion detection	$	2720.00
1.04	Wet well ventilation fan mechanical guard	$	520.00
1.05	Neoprene gasket repair	$	670.00
1.06	Kiosk electric baseboard heaters	$	570.00
1.07	Bug screen replacement	$	370.00
1.08	Insulation repair	$	740.00
1.09	Engineering services for Arc flash / ETAP services	$	3000.00
1.10	Permanent standby generator	$	50000.00
1.11	Site lighting (luminaire, pole, base, conductors)	$	10000.00
Total	(with 20% Contingency)	$	88, 188.00

4.5 Grafton Station

4.5.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.5.2 General Condition Notes

The Grafton lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Grafton Station is in fair condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The local human machine interface (HMI) has failed and must be replaced. The electrical components in the wet well are in poor condition, as the hydrostatic pressure sensor has failed, and the station operation is governed by float switches only. No code violations were observed.

4.5.3 Specific Condition Notes

- Hydrostatic pressure sensor has failed and may require replacement or maintenance. The hydrostatic pressure sensor currently reads a single value, regardless of changes to the wet well conditions. The pressure sensor may require cleaning, re-seating or replacement. The hydrostatic pressure sensor is the primary source for sewage level data used to operate the lift station.
- Wet well ventilation fan and motor are heavily corroded and generally in poor condition. The wet well ventilation fan and motor will require replacement within a few years to ensure safe operation of the lift station. The ventilation fan provides the positive ventilation pressure required to derate the wet well to a Class I Zone II location.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Kiosk electrical section ventilation grille is damaged and heavily corroded. Ventilation grilles provide mechanical protection for kiosk components and facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- Wet well does not utilize intrusion detection. The wet well is a hazardous location, which should be monitored for intrusion by operators and the public. Additionally, to improve ventilation in the wet well while workers are present, the intrusion detection signal may be used to control the output of the wet well ventilation fan.
- Electrical kiosk ventilated compartment lacks intrusion detection. The kiosk ventilated compartment contains critical equipment required for pump station operation and must be monitored for intrusion.

- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The Pump 2 motor overload reset bar within the motor control enclosure is missing. The overload rest bar allows operators to reset the motor break from exterior of panel, reducing health and safety risk. The overload reset bar should be replaced at the earliest available opportunity.
- The neoprene gaskets lining the kiosk doors have failed in some locations. Minor debris and water ingress was observed. Neoprene gaskets ensure screens ensure pests, dirt, moisture, and debris do not accumulate within electrical kiosk.
- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to have a single line diagram and controls information available on site for trouble shooting.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- The lift station human machine interface (HMI) has failed and requires frequent power cycling to operate. The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.5.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The site has a restricted footprint, which limits the potential standby generator location to a narrow region behind the kiosk and wet well.

Installation of a generator at this location may not be feasible and would require further investigation. Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch

(ATS).

4.5.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street and park lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.5.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.5.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	**Grafton Lift Station**		
1.01	HMI Replacement	**$**	**4180.00**
1.02	UPS Replacement Battery	**$**	**720.00**
1.03	Wet well intrusion detection	**$**	**1580.00**
1.04	Wet well ventilation fan and motor replacement (with mechanical guard)	**$**	**2410.00**
1.05	Neoprene gasket repair	**$**	**670.00**
1.06	Hydrostatic pressure sensor replacement	**$**	**4880.00**
1.07	Ventilation grille replacement	**$**	**150.00**
1.08	Insulation installation	**$**	**1380.00**
1.09	Engineering services for Arc flash / ETAP services	**$**	**3000.00**
1.10	Permanent standby generator	**$**	**50000.00**
1.11	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**95, 028.00**

4.6 Kinver Station

4.6.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.6.2 General Condition Notes

The Kinver lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Kinver Station is in poor condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The electrical components in the wet well are in very poor working condition. One of the pumps is offline due to a failed mechanical connection, and the second pumps mechanical connection is failing. Additionally, the radio communication mast and yagi antenna are adjacent to the overhead telecommunications lines and near the overhead BC Hydro secondary lines. The proximity of the antenna mast to the utility lines presents a hazard to nearby personnel, and may violate the 1-meter minimum clearance standard for BC Hydro overhead secondary lines.

4.6.3 Specific Condition Notes

- Kiosk antenna mast and yagi antenna are directly adjacent to overhead telecommunications span and in close proximity to BC Hydro secondary overhead span. The mast may come into contact with BC Hydro distribution lines in high wind conditions. The proximity of the antenna mast to the overhead secondary lines may violate the 1-meter minimum clearance required by BC Hydro.
- Lift station pumps are critically close to failure. One of the two lift station pumps has failed due to a poor mechanical connection to the discharge pipe. The second pump has begun to experience the same mechanical failure of the discharge pump connection. Lift station pumps require immediate repair to ensure continued operation of the station.
- Kiosk electrical section ventilation grilles are damaged and heavily corroded. Ventilation grilles provide mechanical protection for kiosk components and facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Electrical kiosk lacks heater(s) to regulate internal temperature. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range. The effective lifespan of electrical equipment may be reduced. The installation of base-board heaters (radiant) is recommended.
- Kiosk electrical section does not contain a ventilation fan. Kiosk ventilation fans facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The

addition of fall protection grates would reduce the health and safety risk to operators.

- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- Graffiti present on kiosk exterior. The township may consider applying anti-graffiti image wraps to the kiosk shell to discourage future vandalism.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.6.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The lift station site has ample room for the installation of a permanent standby generator, and PBX has identified the area adjacent to the existing portable generator receptacle as a candidate location.

Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch (ATS).

4.6.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional

guards or barriers are present.
Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.6.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.6.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	Kinver Lift Station		
1.01	Relocation of kiosk antenna mast	$	4640.00
1.02	HMI Replacement	$	4180.00
1.03	UPS Replacement Battery	$	720.00
1.04	Kiosk electrical section ventilation fan	$	270.00
1.05	Wet well ventilation fan mechanical guard	$	520.00
1.06	Ventilation grille replacement	$	370.00
1.07	Engineering services for Arc flash / ETAP services	$	3000.00
1.08	Permanent standby generator	$	50000.00
1.09	Site lighting (luminaire, pole, base, conductors)	$	10000.00
Total	(with 20% Contingency)	$	88, 440.00

4.7 Lampson Station

4.7.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.7.2 General Condition Notes

The Lampson lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. The Lampson Station is in fair condition. The electrical kiosk is relatively in fair condition, with some visible wear and tear. The electrical components in the wet well are in good working condition. The station Operator noted that this

station has experienced two unexplained incidents in the last several years, when the electrical kiosk produced several large smoke clouds. The cause of these incidents has not been determined. No code violations or conditions requiring immediate action were observed.

4.7.3 Specific Condition Notes

- Operator noted two occasions in the last several years where clouds of smoke was observed to originate from the electrical kiosk. The most recent incident was approximately 1.5 years ago. Emery Electric has investigated the site and performed annual maintenance, with no apparent cause found. The kiosk interior and electrical equipment do not appear damaged nor do they shows signs of exposure to excessive heat. PBX recommends the operators continue to closely monitor the station. If an additional incident occurs, a detailed fault investigation should be undertaken, including on-site testing and component verification, as well as a detailed short circuit analysis and arc flash study.
- The lift station radio system utilizes a polyphaser for surge protection. The polyphaser body is not bonded directly to the station's master ground bus. The polyphaser must be suitably grounded to operate as intended.
- Odour control issues at this station. The station suffers from a notable odour control problem, which operators attribute to limited station flow and stagnation within the wet well. The addition of passive odour control component may reduce the severity of the odour at this station.
- Electrical kiosk lacks heater(s) to regulate internal temperature. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range. The effective lifespan of electrical equipment may be reduced. The installation of base-board heaters (radiant) is recommended.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Electrical kiosk ventilated compartment lacks intrusion detection. The kiosk ventilated compartment contains critical equipment required for pump station operation and must be monitored for intrusion.
- Wet well does not utilize intrusion detection. The wet well is a hazardous location, which should be monitored for intrusion by operators and the public. Additionally, to improve ventilation in the wet well while workers are present, the intrusion detection signal may be used to control the output of the wet well ventilation fan.
- Water ingress was observed in the base of the kiosk electrical section. The water ingress was not severe but may indicate failure of the seal between the kiosk and concrete pad.
- Bug screens installed on the kiosk ventilation louvres are damaged and must be replaced. Bug screens ensure pests, dirt and debris do not accumulate within electrical kiosk.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk

shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.

- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to have a single line diagram and controls information available on site for trouble shooting.
- Graffiti present on the kiosk shell, despite presence of anti-graffiti wrap.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- Kiosk electrical section interior lighting is in poor condition. Existing fluorescent bulbs have failed, and light fixture may require repair.
- See Appendix A – Condition Assessment Table for additional details.

4.7.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The lift station site has ample room for the installation of a permanent standby generator, and PBX has identified the area adjacent to the existing portable generator receptacle as a candidate location.

Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch (ATS).

4.7.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.7.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.7.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	**Lampson Lift Station**		
1.01	Polyphaser Bonding	**$**	**150.00**
1.02	HMI Replacement	**$**	**4180.00**
1.03	UPS Replacement Battery	**$**	**720.00**
1.04	Wet well and ventilated compartment intrusion detection	**$**	**2720.00**
1.05	Neoprene gasket repair	**$**	**670.00**
1.06	Bug screen replacements	**$**	**370.00**
1.07	Insulation installation	**$**	**1380.00**
1.08	Engineering services for Arc flash / ETAP services	**$**	**3000.00**
1.09	Permanent standby generator	**$**	**50000.00**
1.10	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**87, 828.00**

4.8 Luscombe Station

4.8.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.8.2 General Condition Notes

The Luscombe lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Luscombe Station is in good condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The electrical components in the wet well are in good working condition. No code violations or conditions requiring immediate action were observed.

4.8.3 Specific Condition Notes

- Wet well ventilation fan lacks protective mechanical grate. When the kiosk wet well ventilated compartment is open, the fan blades pose a safety risk to operators. The additional of a fan mechanical guard would reduce the risk of operator injury.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- Electrical kiosk ventilated compartment lacks intrusion detection. The kiosk ventilated compartment contains critical equipment required for pump station operation and must be monitored for intrusion.
- Wet well does lacks intrusion detection. The wet well is a hazardous location, which should be monitored for intrusion by operators and the public. Additionally, to improve ventilation in the wet well while workers are present, the intrusion detection signal may be used to control the output of the wet well ventilation fan.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to have a single line diagram and controls information available on site for trouble shooting.
- Bug screens installed on the kiosk ventilation louvres are damaged and must be replaced. Bug screens ensure pests, dirt and debris do not accumulate within electrical kiosk.
- Water ingress was observed in the base of the kiosk electrical section. The water ingress was not

severe but may indicate failure of the seal between the kiosk and concrete pad.

- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.8.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The lift station site has ample room for the installation of a permanent standby generator, and PBX has identified the area adjacent to the existing portable generator receptacle as a candidate location.

Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch (ATS).

4.8.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or

kiosk wall for conduit/cable management must be considered as part of the design.

4.8.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.8.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	Luscombe Lift Station		
1.01	Polyphaser Bonding	$	150.00
1.02	HMI Replacement	$	4180.00
1.03	UPS Replacement Battery	$	720.00
1.04	Wet well ventilation fan mechanical guard	$	520.00
1.05	Wet well and ventilated compartment intrusion detection	$	2720.00
1.06	Neoprene gasket repair	$	670.00
1.07	Bug screen replacements	$	370.00
1.08	Insulation installation	$	1380.00
1.09	Engineering services for Arc flash / ETAP services	$	3000.00
1.10	Permanent standby generator	$	50000.00
1.11	Site lighting (luminaire, pole, base, conductors)	$	10000.00
Total	(with 20% Contingency)	$	88, 452.00

4.9 Nursery Station

4.9.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.9.2 General Condition Notes

The Nursery lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Nursery Station is in fair condition. The electrical kiosk is in poor condition, with notable wear and tear. The electrical components in the wet well and dry well are in good working condition.

4.9.3 Specific Condition Notes

- Conductors from the wet well terminate to surface-mounted din rail terminal blocks within the kiosk's termination/ventilation fan compartment. Uninsulated exposed electrical components within the classified area is a code violation. PBX recommends the terminal blocks be encased in a RPVC junction box. Use of junction boxes to enclose the terminations would also protect conductors against the corrosive and moist wet well environment.
- The lift station radio system does not employ a polyphaser for surge protection. Polyphasers provides protection for electrical equipment in the event of electrical surge or lightening strike. The yagi antenna for radio SCADA communication is mounted on the nearby site luminaire pole, much higher than similar Esquimalt lift stations. The additional height of the yagi antenna at this station presents additional risk of lighting strikes at this location.
- Electrical kiosk heater has nearly failed. Electric heaters regulate internal temperature kiosk internal temperature and reduce moisture build-up. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range. The effective lifespan of electrical equipment may be reduced. The installation of base-board heaters (radiant) is recommended.
- Severe condensation observed on kiosk interior. Kiosk electrical section does not contain a ventilation fan, ventilation grilles, or bug screens. Kiosk ventilation facilitates kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Flexible conduit for intrusion detection in kiosk power distribution section is not suitably secured to the kiosk shell. The flexible conduit hangs loose, and can become caught in the kiosk door, which may permanently damage the conduit, conductors, and intrusion switch.
- The kiosk utility service sub-feeds the nearby parks building, in addition to the lift station loads. Operators noted the parks department has expressed interest in the addition of five electric vehicle (EV) chargers to the existing lift station electrical loads. PBX does not recommend the addition of five electric vehicle chargers to the existing utility service. Installation of electric vehicle chargers at this location would require detailed electrical design for utility service sizing, coordination with electrical utility, as well as installation of adequately rated supporting electrical equipment, underground conduit, and cabling.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Wet well and dry well do not utilize intrusion detection. The wet well is a hazardous location, which should be monitored for intrusion by operators and the public. The dry well contains critical equipment for the operation of the lift station.
- Water ingress was observed in the base of the kiosk electrical section. The water ingress was significant and may a indicate failure of the seal between the kiosk and concrete pad.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately

regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.

- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The neoprene gaskets lining the kiosk doors have failed in many locations. Severe debris and water ingress was observed. Evidence of wasp nest on interior of kiosk.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- Dry well lighting is operated from the electrical kiosk but provides inadequate lighting in the dry well for operators to perform work safely and effectively.
- See Appendix A – Condition Assessment Table for additional details.

4.9.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The lift station site has room for the installation of a permanent standby generator in the nearby parks work-yard or adjacent to the existing dry well access hatch.

Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic transfer switch (ATS).

4.9.5 Lighting Consideration

The station has a dedicated luminaire, located on a nearby roadway. The luminaire is operated from a switch in the electrical kiosk, although it offers poor lighting to the dry well, wet well and electrical kiosk. The poor lighting around the lift station increases risk to operators when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the dry well hatch or wet well manhole is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require design to perform lighting calculations to specify a luminaire fixture with appropriate illuminance, specification of a luminaire pole and luminaire mounting height, and specification of a concrete base for the pole assembly. The existing 120V panelboard does not have space and capacity to accommodate future site lighting and must be replaced. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.9.6 SCADA Consideration

Operators noted the station's SCADA connection is unreliable. The Nursery station functions as a store and forward (SAF) site for Garthland lift station, and both Garthland and Nursery have experienced intermittent SCADA connectivity issues. Any effort to develop a more reliable radio path between Nursery and the receiving base station will improve the overall reliability of the SCADA network.

Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.9.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	Nursery Lift Station		
1.01	Polyphaser Bonding	$	150.00
1.02	Kiosk ventilated compartment junction boxes	$	1720.00
1.03	HMI Replacement	$	4180.00
1.04	UPS Replacement Battery	$	720.00
1.05	Wet well and dry well intrusion detection	$	2720.00
1.06	Neoprene gasket repair	$	670.00
1.07	Flex conduit repair	$	490.00
1.08	Insulation installation	$	1380.00
1.09	Engineering services for Arc flash / ETAP services	$	3000.00

1.10	Permanent standby generator	**$**	**50000.00**
1.11	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**90, 036.00**

4.10 Sea Haven Station

4.10.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.10.2 General Condition Notes

The Sea Haven lift station is comprised of an electrical kiosk and wet well in a duplex pump configuration. Sea Haven Station is in good condition. The electrical kiosk is relatively new, in good condition, with only minor wear and tear. The electrical components in the wet well are in good working condition. No code violations or conditions requiring immediate action were observed.

4.10.3 Specific Condition Notes

- Electrical kiosk controls compartment does not have adequate working space for safe operation when the wet well hatch is open.
- Wet well ventilation fan lacks protective mechanical grate. When the kiosk wet well ventilated compartment is open, the fan blades pose a safety risk to operators. The additional of a fan mechanical guard would reduce the risk of operator injury.
- Spare conduit stubbed-up into kiosk electrical section is not capped. Conduit is covered with duct tape, which is not a suitable seal to prevent the conduit from experiencing water or debris ingress.
- Kiosk electrical section ventilation grille is damaged and heavily corroded. Ventilation grilles provide mechanical protection for kiosk components and facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Kiosk electrical section ventilation fan has failed and must be replaced. Kiosk ventilation fans facilitate kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Kiosk electrical section interior lighting is in poor condition. Existing fluorescent bulbs have failed, and light fixture may require repair.
- Wet well lacks protective guards or barriers. Operators must frequently open the wet well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. In addition, the electrical kiosk orientation places the operator at greater risk when operating the kiosk control panel with the wet well hatch open. The addition of fall protection grates would reduce the health and safety risk to operators.
- Electrical kiosk ventilated compartment lacks intrusion detection. The kiosk ventilated compartment contains critical equipment required for pump station operation and must be

monitored for intrusion.

- Wet well does not utilize intrusion detection. The wet well is a hazardous location, which should be monitored for intrusion by operators and the public. Additionally, to improve ventilation in the wet well while workers are present, the intrusion detection signal may be used to control the output of the wet well ventilation fan.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.10.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

The installation of a permanent standby generator would allow the station to continue operation in the event of utility power failure without intervention by operators. The lift station site has ample room for the installation of a permanent standby generator, and PBX has identified the area adjacent to the existing portable generator receptacle or between the kiosk and nearby pad mounted transformer as a candidate location.

Installation of a permanent standby generator at this location would require detailed electrical design for generator sizing, structural design of a suitable concrete slab, as well as installation of supporting underground conduit and cabling. In addition, the layout of components in the electrical distribution compartment of the kiosk may need to be adjusted to accommodate the replacement of the manual transfer switch (MTS) with an automatic

transfer switch (ATS).

4.10.5 Lighting Consideration

The station has no dedicated area lighting, which increases risk to operators when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard has space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.10.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.10.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	**Sea Haven Lift Station**		
1.01	HMI Replacement	**$**	**4180.00**
1.02	UPS Replacement Battery	**$**	**720.00**
1.03	Wet well intrusion detection	**$**	**1580.00**
1.04	Wet well ventilation fan mechanical guard	**$**	**520.00**
1.05	Neoprene gasket repair	**$**	**670.00**
1.06	Cap spare conduit	**$**	**160.00**
1.07	Ventilation grille replacement	**$**	**370.00**
1.08	Kiosk electrical section ventilation fan	**$**	**1380.00**
1.09	Insulation installation	**$**	**1380.00**
1.10	Engineering services for Arc flash / ETAP services	**$**	**3000.00**
1.11	Permanent standby generator	**$**	**50000.00**
1.12	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**87, 420.00**

4.11 Uganda Station

4.11.1 Inventory of Assets

Reference to Appendix A for Condition Assessment Tables and a summary of electrical equipment at each site.

4.11.2 General Condition Notes

The Uganda lift station is comprised of an electrical kiosk, dry well, and wet well in a duplex pump configuration. Uganda Station is in poor condition. The electrical kiosk is antiquated, with no ventilation or heating to provide sufficient temperature and moisture control. The interior of the kiosk is corroded, demonstrating the poor working environment for housed electrical components. The electrical components in the wet well were not observable, and their condition could not be assessed. The wet well-ventilated compartment is permanently sealed, and its contents could not be assessed. Operators have not serviced the equipment at this station in several years, due to the severe health and safety risk required to access the wet well.

4.11.3 Specific Condition Notes

- Pump condition unknown. The station pumps were installed in 1968 and have not been serviced in many years. Their condition could not be assessed but is assumed to be very poor.
- Severe condensation observed on kiosk interior. Kiosk electrical sections do not contain ventilation fans, ventilation grilles, or bug screens. Kiosk ventilation facilitates kiosk internal environment control. Inadequate airflow between the kiosk and external environment results in condensation build-up in the kiosk interior, which may degrade electrical component reliability and lifespan.
- Electrical kiosk lacks heater(s) to regulate internal temperature. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range. The effective lifespan of electrical equipment may be reduced. The installation of base-board heaters (radiant) is recommended.
- The kiosk ventilated compartment is bolted shut and could not be assessed for component condition or adherence to the Canadian Electrical Code (CEC). The kiosk ventilated compartment provides an entry point for instrumentation and pump conductors from the wet well to the controls kiosk.
- Kiosk wet well ventilated compartment does not contain a wet well ventilation fan. The ventilation fan provides the positive ventilation pressure required to derate the wet well to a Class I Zone II location.
- The existing electrical panelboard is at capacity and appears to be in poor condition. The electrical panelboard interrupt rating could not be determined due to degradation of the manufacturer provided labels on panel and breakers. The consultant team assumes the panelboard does not conform to recent changes to BC Hydro service entrance panel interrupt rating requirement of 45kA for a 120/208V service. Electrical equipment with insufficient short circuit interrupt ratings does not adequately protect operators and downstream equipment in the event of an electrical fault.
- Kiosk manual transfer switch (MTS) and BC Hydro meter compartments lack lighting. Operators

safe and efficient use of this equipment may be degraded during dark or low light conditions.

- The lift station radio system does not employ a polyphaser for surge protection. Polyphasers provides protection for electrical equipment in the event of electrical surge or lightening strike.
- Dry well lacks protective guards or barriers. Operators may open the dry well hatch to perform maintenance or diagnose station incidents. Health and safety risk is elevated for operators working near an open, unprotected wet well. The addition of fall protection grates would reduce the health and safety risk to operators.
- Dry well does not utilize intrusion detection. The dry well is a hazardous location, which should be monitored for intrusion by operators and the public. The dry well contains critical equipment for the operation of the lift station.
- Water ingress was observed in the base of the kiosk electrical section. The water ingress was notable and may indicate a failure of the seal between the kiosk and concrete pad.
- The kiosk interior lacks appropriate insulation. Kiosks without insulation cannot adequately regulate their internal temperature during extreme weather conditions. Condensation is more liable to build up without adequate kiosk insulation due to temperature gradient across the kiosk shell. Electrical equipment may have an increased chance of failure if operating outside of its rated temperature range.
- Pump motors are operated with across-the-line starters. The contactors appear to be in good condition. However, across-the-line starters decrease motor lifespan due to high inrush current on motor start-up when compared to alternative motor starters, such as variable frequency drives (VFDs) or soft-starters.
- The neoprene gaskets lining the kiosk doors has failed in some locations. Debris and water ingress was observed.
- There is a lack of record documentation available for the station. At a minimum, it would be beneficial to have a single line diagram and controls information available on site for trouble shooting.
- Anti-graffiti Image wraps have only been applied to kiosk sides. The control and distribution compartment of the single sided kiosk lack an image wrap to discourage vandalism.
- The lift station utilizes a SCADAPack Vision 10 human machine interface (HMI), which has failed at several Esquimalt lift station sites with similar installation dates. The HMI provides operators with local control of lift station equipment and is vital to local station operation.
- UPS batteries were installed in February 2015 and are overdue for replacement per the manufacturer's 3-5 year life expectancy. The UPS ensures the communication equipment will continue to operate during utility power failure. There is no back-up power for the station controller, which reverts to float control upon power loss.
- No arc flash labels present on equipment as required per CEC Section 2-306. The Township may consider an arc flash study to inform the creation of arc flash labels and breaker settings (where applicable).
- See Appendix A – Condition Assessment Table for additional details.

4.11.4 Generator Consideration

The station has a cast, pin and sleeve type receptacle mounted on the exterior of the kiosk to connect a portable generator should there be a loss of power to the electrical utility service. A draw-back to pin and sleeve type receptacles is the need to have a cabling assembly with the correct mating plug to connect a temporary standby generator. In the future, the Township may wish to consider a more standard Cam Lock style connection panel should the existing pin and sleeve receptacle require replacement.

Due to the limited site footprint, installation of a standby generator at Uganda Station is not feasible. The station will continue to require manual intervention by operators during utility power failure incidents.

4.11.5 Lighting Consideration

The station has no dedicated area lighting, but nearby street lighting provides limited visibility around the wet well in low light conditions. Operators are at risk when working around the wet well and electrical kiosk in dark conditions. The health and safety risk to operators is heightened when the wet well hatch is open, as no additional guards or barriers are present.

Installation of permanent site lighting at this location would require detailed design to specify a luminaire fixture with appropriate illuminance, a luminaire pole and luminaire mounting height, and a concrete base for the pole assembly. Consideration should be given to light trespass and glare onto neighbouring properties. The existing 120V panelboard does not have sufficient space and capacity to accommodate future site lighting. Traversal of the kiosk foundation or kiosk wall for conduit/cable management must be considered as part of the design.

4.11.6 SCADA Consideration

Operators noted the station's SCADA connection is reliable. Although the station is monitored over SCADA, the accessibility and transparency of the SCADA monitoring platform is limited. Additional training and/or a refresher of the CRD SCADA platform's capabilities may provide an opportunity for greater preventative maintenance.

4.11.7 Financial Evaluation

The following is a summary of the estimated costs for maintenance, repair, and replacement of equipment in today's dollars. Unless explicitly stated, engineering services such as detailed design, programming and commissioning are not included in these estimates. Each line item in the estimate is mutually exclusive for this station.

1	Uganda Lift Station		
1.01	Polyphaser Bonding	**$**	**150.00**
1.02	Refit of kiosk ventilated compartment to meet CEC (fan, JBs)	**$**	**6760.00**
1.03	HMI Replacement	**$**	**4180.00**

1.04	UPS Replacement Battery	**$**	**720.00**
1.05	Dry well intrusion detection	**$**	**4560.00**
1.06	Kiosk electric baseboard heaters	**$**	**570.00**
1.07	Neoprene gasket repair	**$**	**670.00**
1.08	Electrical Panel (120/208V, 45kAIC) Replacement	**$**	**6320.00**
1.09	Insulation installation	**$**	**1380.00**
1.10	Engineering services for Arc flash / ETAP services	**$**	**3000.00**
1.11	Permanent standby generator	**$**	**50000.00**
1.12	Site lighting (luminaire, pole, base, conductors)	**$**	**10000.00**
Total	(with 20% Contingency)	**$**	**105, 972.00**

5 Conclusion

Lift station assessments for the Esquimalt Sanitary Asset Management Plan have been provided using previous record information and site information obtained from October 25-26, 2023. The resultant Condition Assessments and Financial Evaluations have been summarized in Section 4 of the memo and provided in greater detail in Appendix A.

6 Closure

This document has been prepared based upon the information referenced herein and on-site findings. It has been prepared in a manner consistent with good engineering judgement. Should new information come to light, PBX Engineering Ltd. requests the opportunity to review this information and our conclusions contained in this report. This document has been prepared for the exclusive use of Urban Systems, and the Township of Esquimalt, and there are no representations made by PBX Engineering Ltd. to any other party. Any use that a third party makes of this document, or any reliance on or decisions made based on it, are the responsibility of such third parties.

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APPENDIX A: Condition Assessment Table

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Canteen Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	601 Canteen St.		**Year Built:**	2007
Record Drawings:	No Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☑	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks:		- 4 Float switches	
- HMI past end of life and will require replacement soon.			

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks:		
- SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present and is seperately grounded.		

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	KOHLER
Type (overhead, underground)	Underground	**Model:**	
		Portable/Permanent:	Permanent
Voltage:	120/208V	**Priority Identification:**	
Phase:	3	**Fuel Type:**	Diesel
Remarks: Kiosk is fed from Esquimalt Public Works building Electrical Distribution Room, across Canteen Rd. No arc flash labels present as required per CEC Section 2-306		**Remarks:** Kiosk backup power from Esquimalt Public Works building standby generator, across Canteen Rd. ATS present in Esquimalt Public Works Electrical Room.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**Pump 1**	**Pump 2**	**Wet Well Vent. Fan**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	N 3127	N 3127	Unknown (L5001A)	
Voltage:	208 V	208 V	Unknown (208 V)	
FLA:	28	28	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	7.5 kW/ 10 HP	7.5 kW/ 10 HP	Unknown (0.33HP)	
Power Factor:	0.88	0.88	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 45A	Motor Starter 45A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	50A Breaker w/ Disconn	50A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet welll ventilation fan motor is inoperable and must be replaced. Wet well ventilation fan motor nameplate is heavily corroded and unreadable. - Wet well ventilation fan lacks mechanical guard.				

General

General Site Conditions			
Lighting		**Security**	
Type:		**Intrusion Monitoring:**	Yes
Explosion Proof		**Type:**	Door Switch
Control:		**Locations:**	See observations below

Observations:

- Two door switches provided intrusion detection. door switches are present on the Kiosk Electrical Section and Ventilated Compartment
- No site lighting

Additional Comments
- Site has no water service. - Operator controls are dangerously close to wet well, when wet well hatch is open. Wet well has no protective grate for Operator safety. - Kiosk shows signs of minor water ingress - Kiosk Electrical Section ventilation fan grill is damaged and requires replacement. Bug screen requires replacement. - Kiosk Electrical seciton does not have heater. Electric baseboard heater preferred by operators. - Kiosk anti-graffiti wrap is cracking. May require replacement in the near to medium term - UPS Batteries are unlabelled. Presumed date of installation February 2016. UPS Batteries must be replaced. - Kiosk lights are failing. Bulbs require replacement.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 25th, 2023	**1:00pm**	Name: Justin Boechler Signature: 	Name: Michael Scopick Signature: 

Constance Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	396 Constance Ave.		**Year Built:**	2007
Record Drawings:	No Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPack 474		
SCADA Compatible:	Yes	**Remarks:**	
Remarks:		- 3 Floats:	
- HMI frequently freezes and must be power cycled to resume operation. HMI past end of life and requires replacement		- High-High level, High level, Low level	
		Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks:		
- SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present but not seperately grounded. - Intermittent SCADA communication issues at this station. Distance, nearby trees, and poor connectivity at recieving node are likely causes.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/240V	**Priority Identification:**	None
Phase:	1	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306. - BC Hydro meter box enclosure is corroded, and may require replacement		**Remarks:** - Portable generator receptacle: Crouse Hinds AR1047 - 100A Manual Transfer Switch (MTS) - No standby generator present. No potential locations for permananent standby generator.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Baldor	
Model:	3085	3085	L5001A	
Voltage:	230 V	230 V	208 V - 230V	
FLA:	12	12	3.3A	
Duty:	Lead/Lag	Lead/Lag	Continuous	
W/HP:	2.2 kW / 2.9 HP	2.2 kW / 2.9 HP	0.33HP	
Power Factor:	1	1	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 27A	Motor Starter 27A		
Make/Model:	Eaton AN1GN0	AN1GN0		
Motor Protection				
Type/Rating:	30A Breaker w/ Disconn	30A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet well ventilation fan lacks mechanical guard.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Three door switches provided intrusion detection. door switches are present on the Kiosk Electrical Section (x2) and Ventilated Compartment
- No site lighting
- Kiosk has minor water ingress
- Kiosk door latches are heavily corroded
- Wet well hatch directly behind operator when kiosk is opened. No wet well guard.

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Operator controls are dangerously close to wet well, when wet well hatch is open. Wet well has no protective grate for Operator safety. - Kiosk electrical section ventilation fan is inoperable and requires replacement. - Kiosk Electrical Section ventilation fan grill is corroded and requires replacement. Bug screen requires replacement. - Kiosk Electrical section does not have heater. Electric baseboard heater preferred by operators. - UPS Batteries are unlabelled. Presumed date of installation February 2016, aligning with other lift stations. UPS Batteries past end of life and must be replaced. - Station experiencing frequent component failure/burnout of ZETTLER 3ARR3J19V4A motor starter relays. Several spares are permanently kept on-site. Cause of component failure requires additional investigation.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 26th, 2023	**8:30am**	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Craigflower Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	101 Island Hwy #100, via Portage West Apts.		**Year Built:**	2007
Record Drawings:	Single line diagram present at site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks: - HMI past end of life and may require replacement soon.		- 5 Floats: - HH, Lead Start, Lag Start, Stop, Low level Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks: - SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present but not seperately grounded.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 100A Manual Transfer Switch (MTS) - No standby generator present. Several good locations for permananent standby generator install.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3085	3085	Unknown (L5001A)	
Voltage:	230 V	230 V	Unknown (208 V)	
FLA:	8.7	8.7	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	2.2 kW / 3 HP	2.2 kW / 3 HP	Unknown (0.33HP)	
Power Factor:	0.83	0.83	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 18A	Motor Starter 18A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	30A Breaker w/ Disconn	30A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet well ventilation fan lacks mechanical guard. - Wet well ventilation fan nameplate is heavily corroded and unreadable.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Three door switches provided intrusion detection. door switches are present on the Kiosk Electrical Section (x2) and Ventilated Compartment
- No site lighting
- Kiosk has minor water ingress

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Kiosk Electrical Section ventilation fan bug screen is severly damaged and requires replacement. - Kiosk Electrical section has heater that utilizes movable parts. Electric baseboard heater preferred by operators. - UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 26th, 2023	**9:00am**	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Garthland Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	948 Garthland Rd.		**Year Built:**	2007
Record Drawings:	Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☑	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks: - HMI past end of life and will require replacement soon.		- 3 Floats: - High-High level, High level, Low level Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks: - SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present and is seperately grounded.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306.		**Remarks:** - Portable generator receptacle: Crouse Hinds AR2041 - 100A Manual Transfer Switch (MTS) - No standby generator present. Limited potential locations for permananent standby generator.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3085	3085	Unknown (L5001A)	
Voltage:	230 V	230 V	Unknown (208 V)	
FLA:	13	13	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	3.7 kW / 5 HP	3.7 kW / 5 HP	Unknown (0.33HP)	
Power Factor:	0.88	0.88	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 27A	Motor Starter 27A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	30A Breaker w/ Disconn	30A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet well ventilation fan lacks mechanical guard. - Wet well ventilation fan nameplate is heavily corroded and unreadable.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Three door switches provided intrusion detection. door switches are present on the Kiosk Electrical Section (x2) and Ventilated Compartment
- No site lighting
- No wet well intrusion detection, no valve chamber intrusion detection.
- Arborist required at site. Branches in immediate proximity to overhead telecommunictions and electrical utility spans. Branches encroaching on yagi antennae line of site.

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Kiosk Electrical section has heater that utilizes movable parts. Electric baseboard heater preferred by operators. - UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Kiosk alrm light (kiosk roof) has corroded at base.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 25th, 2023	10:00 AM	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Grafton Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	436 Grafton St.		**Year Built:**	2007
Record Drawings:	No Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☑	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☑	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks:		- 4 Floats: - Hydrostatic pressure sensor is faulty. Does not register level change after pump down.	
- HMI frequently freezes and must be power cycled to resume operation. HMI past end of life and requires replacement		Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks:		
- SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present and is seperately grounded.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	200A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 200A Manual Transfer Switch (MTS) - No standby generator present. One potential generator location behind wet well. Limited space.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3153 HT	3153 HT	Unknown (L5001A)	
Voltage:	230 V	230 V	Unknown (208 V)	
FLA:	13	13	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	14.9 kW / 20 HP	14.9 kW / 20 HP	Unknown (0.33HP)	
Power Factor:	0.83	0.83	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 90A	Motor Starter 90A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	100A Breaker w/ Discon	100A Breaker w/ Disco	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet well ventilation fan lacks mechanical guard. - Wet well ventilation fan nameplate is heavily corroded and unreadable. - Missing arm on overload reset for Motor 2 from exterior of the control panel.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Two door switches provided intrusion detection. Door switches are present on the Kiosk Electrical Section (x2).
- No intrusion detection on kiosk ventilated compartment.
- Inadequete site lighting.
- No wet well intrusion detection.

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Kiosk Electrical section has heater that utilizes movable parts. Electric baseboard heater preferred by operators. - UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Kiosk Electrical Section ventilation fan grill is corroded and requires replacement. - Kiosk roof finish is cracked and may require replacement in the near to medium term.

Review Details			
Complete Date:	**Time:**	**Field**	**Field**
October 25th, 2023	1:30 AM	Name: Justin Boechler	Name:
		Signature: 	Signature: 

Kinver Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	325 Kinver St.		**Year Built:**	2007
Record Drawings:	Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐ X	Flow Meter ☐	SCADA System ☑
	Genset ☐ X	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks: - HMI past end of life and will require replacement soon.		- 2 Floats: - High level (Start), Low level (Stop) Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks: - SCADA Communication through MDS Radio with Yagi Antenna. -Yagi antenna is adjacent to telecom line and in close proximity yo BC Hydro secondary line. - Polyphaser is present and is seperately grounded.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	200A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306. - Two step-up auto transformers, one for each pump. - Pump #1 offline, due to a bad connection.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 200A Manual Transfer Switch (MTS) - No standby generator present. Several potential locations for permanent standby generator.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	NP 3153 HT	NP 3153 HT	Unknown (L5001A)	
Voltage:	230 V	230 V	Unknown (208 V)	
FLA:	26 / 52	26 / 52	Unknown	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	14.9 kW / 20 HP	14.9 kW / 20 HP	Unknown (0.33HP)	
Power Factor:	0.83	0.83	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 80A	Motor Starter 80A	VFD 0.55hp 2.4A	
Make/Model:	LC1 D6511	LC1D65	ATV12H037M3	
Motor Protection				
Type/Rating:	60A Overload Relay	60A Overload Relay		
Make/Model:	Telemecanique	Telemecanique		
Remarks: - Wet well ventilation fan nameplate is heavily corroded and unreadable.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Three door switches provided intrusion detection. door switches are present on the Kiosk Electrical Section (x2) and Ventilated Compartment
- No site lighting
- No wet well intrusion detection. Three wet well hatches.
- No heater or ventilation fan in kiosk
- Kiosk base near control cabinet is corroded

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Kiosk ventilation louvres are corroded.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 26th, 2023	9:00 AM	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Lampson Pump Station

Station Details				
Location:	Esquimalt, BC	**Function:**	Sewer Lift Station	
Address:	883 Lampson St.	**Year Built:**	2007	
Record Drawings:	Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks:		- 3 Floats:	
- HMI past end of life and will require replacement soon.		- High-high level, High level (Start), Low level (Stop)	
		Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks:		
- SCADA Communication through MDS Radio with Yagi Antenna.		
- Polyphaser is present, but is not seperately grounded.		
		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/240V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 100A Manual Transfer Switch (MTS) - No standby generator present. Several potential locations for permanent standby generator.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3085	3085	Unknown (L5001A)	
Voltage:	230 V	230 V	Unknown (208 V)	
FLA:	10	10	Unknown	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	1.8 kW / 2.4 HP	1.8 kW / 2.4 HP	Unknown (0.33HP)	
Power Factor:	0.94	0.94	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 27A	Motor Starter 27A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	30A Breaker w/ Disconn	30A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer		
Remarks: - Wet well ventilation fan lacks mechanical guard. - Wet well ventilation fan nameplate is heavily corroded and unreadable.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Two door switches provided intrusion detection. door switches are present on the Kiosk Electrical Section (x2)
- No intrusion detection on ventilation fan
- No site lighting. Kiosk control section lighting has failed.
- No wet well intrusion detection. Three wet well hatches.
- No heater
- Kiosk electrical section ventilation fan not operational.

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Griffiti on exterior of kiosk. - Odour complaints at this station - Water ingress at kiosk base - Smoke has been observed to be coming from the kiosk on two occasions, roughly eighteen months ago. - The kiosk has been inspected by Emery since the events. - Bug screen on ventilation louvres damaged.

Review Details			
Complete Date:	**Time:**	**Field**	**Field**
October 25th, 2023	11:15 AM	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Luscombe Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	705 Luscombe Place		**Year Built:**	2007
Record Drawings:	Record Drawings on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks: - HMI past end of life and will require replacement soon.		- 3 Floats: - High-High level, High level, Low level Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks: - SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present and is seperately grounded.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 100A Manual Transfer Switch (MTS) - No standby generator present. One potential generator location behind wet well. Limited space.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3127	3127	Unknown (L5001A)	
Voltage:	208 V	208 V	Unknown (208 V)	
FLA:	28	28	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	7.5 kW / 10 HP	7.5 kW / 10 HP	Unknown (0.33HP)	
Power Factor:	0.88	0.88	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 45A	Motor Starter 45A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	50A Breaker w/ Disconn	50A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet well ventilation fan lacks mechanical guard. - Wet well ventilation fan nameplate is heavily corroded and unreadable.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Two door switches provided intrusion detection. Door switches are present on the Kiosk Electrical Section (x2)
- No intrusion detection for Kiosk Ventilated Compartment
- No site lighting
- No wet well intrusion detection
- Kiosk has minor water ingress
- Kiosk electrical section ventilation fan exhaust grill is corroded.

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Kiosk Electrical section has heater that is not in use. Electric baseboard heater preferred by operators. - UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Wet well site access if poor

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 26th, 2023	10:50 AM	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Nursery Pump Station

Station Details					
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station	
Address:	Gorge Park - Parks Department Yard		**Year Built:**	2007	
Record Drawings:	Record Drawings on site				
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑	
	Genset ☐	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑	
	Telco Service ☐	Cellular ☐	**Dry Well**		

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks:		- 3 Floats:	
- HMI past end of life and will require replacement soon.		- High-High level, High level, Low level	
		Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks:		
- SCADA Communication through MDS Radio with Yagi Antenna atop a luminaire pole.		
- Polyphaser not present.		
		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	200A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306. - Nearby parks building power fed from kiosk. - Five electric vehicle charges are to be installed onsite		**Remarks:** - Portable generator receptacle: Crouse Hinds - 200A Manual Transfer Switch (MTS) - No standby generator present. Limited potential locations for permananent standby generator.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3152	3152	Unknown (L5001A)	
Voltage:	208 V	208 V	Unknown (208 V)	
FLA:	56	56	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	14.9 kW / 20 HP	14.9 kW / 20 HP	Unknown (0.33HP)	
Power Factor:	0.85	0.85	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 90A	Motor Starter 90A	VFD 0.5HP	
Make/Model:	Moeller	Moeller	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	100A Breaker w/ Discon	100A Breaker w/ Disco	30A Breaker	
Make/Model:	Moeller	Moeller	Cutler-Hammer	
Remarks: - Dry well ventilation fan lacks mechanical guard. - Dry well ventilation fan nameplate is heavily corroded and unreadable. - Wet well not ventilated - Sump pump in dry well				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Thre door switches provided intrusion detection. Door switches are present on the Kiosk Electrical Section (x2) And kiosk ventilated compartment.
- Nearby luminaire pole provides site lighting. Light in dry well.
- No dry well intrusion detection.
- Power compartment intrusion flex conduit hangs unsupported. Easily caught in door.
-10kA panels

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Kiosk Electrical section has heater that utilizes movable parts. Electric baseboard heater preferred by operators. - UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Open terminals in the termination compartment. No explosion proof junction boxes. - Heater operational, but in poor condition. - Interior of kiosk is corroded, evidence of heavy condensation. - Kiosk door gasket is failing. - Evidence of wasp nest on interior of kiosk - Kiosk lacks ventilation and ventilation fan.

Review Details			
Complete Date:	**Time:**	**Field**	**Field**
October 25th, 2023	9:45 AM	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Sea Haven Pump Station

Station Details					
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station	
Address:	897 Admirals Rd (Housing Complex) Near E&N Trail		**Year Built:**	2007	
Record Drawings:	Record Drawings present on site				
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑	
	Genset ☐	Wet Well ☑	Valve Chamber ☐	SCADA Antenna ☑	
	Telco Service ☐	Cellular ☐			

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks: - HMI past end of life and will require replacement soon.		- 3 Floats: - High-High level, High level, Low level -Low level float is not operating correctly. Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks: - SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser is present and is seperately grounded.		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	100A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 100A Manual Transfer Switch (MTS) - No standby generator present. Several generator locations available.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Flygt	Flygt	Unknown (Baldor)	
Model:	3127	3127	Unknown (L5001A)	
Voltage:	208 V	208 V	Unknown (208 V)	
FLA:	28	28	Unknown (3.3A)	
Duty:	Lead/Lag	Lead/Lag	Unknown (Cont.)	
W/HP:	7.5 kW / 10 HP	7.5 kW / 10 HP	Unknown (0.33HP)	
Power Factor:	0.88	0.88	Unknown	
Motor Controller				
Type/Rating:	Motor Starter 45A	Motor Starter 45A	VFD 0.5HP	
Make/Model:	AN1GN0	AN1GN0	MITSUBISHI S520E	
Motor Protection				
Type/Rating:	50A Breaker w/ Disconn	50A Breaker w/ Discon	30A Breaker	
Make/Model:	Cutler-Hammer	Cutler-Hammer	Cutler-Hammer	
Remarks: - Wet well ventilation fan lacks mechanical guard. - Wet well ventilation fan nameplate is heavily corroded and unreadable.				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Two door switches provided intrusion detection. Door switches are present on the Kiosk Electrical Section (x2)
- No intrusion detection for Kiosk Ventilated Compartment
- No site lighting. Kiosk interior bulbs require repalcement.
- No wet well intrusion detection
- Kiosk has minor water ingress
- Kiosk electrical section ventilation fan exhaust grill is corroded.

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- Kiosk Electrical section has heater that is not in use. Electric baseboard heater preferred by operators. - UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - Kiosk padlock eyes are heavily corroded - Electrical section PRVC conuit seal with duct tape. - Kiosk electrical section ventilation fan has failed and does not operate.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 26th, 2023	11:20 AM	Name: Justin Boechler Signature:	Name: Michael Scopick Signature:

Uganda Pump Station

Station Details				
Location:	Esquimalt, BC		**Function:**	Sewer Lift Station
Address:	308 Uganda Ave		**Year Built:**	2007
Record Drawings:	No Record Drawings present on site			
Equipment:	Kiosk ☑	Exterior Lighting ☐	Flow Meter ☐	SCADA System ☑
	Genset ☐	Wet Well ☑	Valve Chamber ☑	SCADA Antenna ☑
	Telco Service ☐	Cellular ☐	**Dry Well**	

Controls

Controls			
PLC		**Levels**	
Manufacturer:	Schneider Electric	**Level Sensor Type:**	Hydrostatic Pressure Sensor
Part No. :	SCADAPACK 32		
SCADA Compatible:	Yes	**Remarks:**	
Remarks: - HMI past end of life and will require replacement soon.		- 4 Floats: - High-High level, High level (Start pump), Low level (stop pump, Low Low Level. Unclear, as this could not be easily verified. Comment on the levels provided	

Communications

Communications		
Telecommunications Provider		**Alarms**
Provider	N/A	**Alarm Conditions:**
Part No. :	N/A	
Demarcation Location:	N/A	
Remarks: - SCADA Communication through MDS Radio with Yagi Antenna. - Polyphaser not present		Comment on instances when alarms are reported

Power

Power			
Primary Power		**Backup Power**	
Service:	200A	**Manufacturer:**	None
Type (overhead, underground)	Underground	**Model:**	None
		Portable/Permanent:	None
Voltage:	120/208V	**Priority Identification:**	None
Phase:	3	**Fuel Type:**	None
Remarks: - No arc flash labels present as required per CEC Section 2-306. - Panelboard is at capacity.		**Remarks:** - Portable generator receptacle: Crouse Hinds - 100A Manual Transfer Switch (MTS) - No standby generator present. No generator locations available.	

Pumps and Motors

Pumps and Motors				
Pumps No.	**1**	**2**	**3**	**4**
Manufacturer:	Hydrostatic	Hydrostatic		
Model:	Unknown	Unknown		
Voltage:	Unknown (208 V)	Unknown (208 V)		
FLA:	Unknown	Unknown		
Duty:	Lead/Lag	Lead/Lag		
W/HP:	14.9 kW / 20 HP	14.9 kW / 20 HP		
Power Factor:	Unknown	Unknown		
Motor Controller				
Type/Rating:	Motor Starter 90A	Motor Starter 90A		
Make/Model:	AN1GN0	AN1GN0		
Motor Protection				
Type/Rating:	100A Breaker w/ Discon	100A Breaker w/ Discor		
Make/Model:	Cutler-Hammer	Cutler-Hammer		
Remarks: - Pump condition unknown, but presumed near failure (1968 install date)				

General

General Site Conditions			
Lighting		**Security**	
Type:	Flourescent Tube	**Intrusion Monitoring:**	Yes
Explosion Proof	No	**Type:**	Door Switch
Control:	Light switch	**Locations:**	See observations below

Observations:

- Three door switches provided intrusion detection. Door switches are present on the Kiosk Electrical Section (x3)
- No site lighting
- No dry well intrusion detection
- Kiosk interior is corroded
- Kiosk lacks heat or ventilation.
- Kiosk has observable water ingress

Comment on age and condition of equipment. If any repairs/upgrades are needed. Etc.

Additional Comments
- UPS Batteries installed February 2016. UPS Batteries past end of life and must be replaced. - No safe access to wet well. Operators have no accessed wet well in many years. - Dangerous confined space leads to wet well. - Kiosk is steel. -Kiosk anti-graffiti wrap applied to sides of kiosk only.

Review Details			
Complete Date:	**Time:**	**Head End**	**Field**
October 25th, 2023	10:45 AM	Name: Justin Boechler Signature: 	Name: Michael Scopick Signature: 