Report for:

CITY OF WINNIPEG

-WATER AND WASTE DEPARTMENT-

--- Final Copy ---

WASTEWATER LIFT STATION CONDITION ASSESSMENT PHASE II

Document IV: Windsor Park Lift Station Assessment

Date: March 16, 2020
City File No.: S-1095
MPE Project No.: 8400-001-00

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MPE ENGINEERING LTD.

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1.0 Introduction

1.1 Background

MPE Engineering Ltd. (MPE) conducted a visual inspection of the Windsor Park Lift Station on April 17, 2019. City of Winnipeg (the City) staff accompanied MPE for the duration of the inspection. The purpose of the site inspection was to assess the current condition of the facility and identify components that will require replacement or maintenance. The condition assessment will assist the City in making informed decisions on short and long-term maintenance requirements of the facilities. The scope of the condition assessment includes the following:

- Detailed assessment of the following **Asset Categories**:
  - Facility (including site, structural, and HVAC systems),
  - Pumps and motors,
  - Electrical and communications,
  - Pipe work and valves,
  - Power, and
  - Force mains.
- Review of code compliance, occupant safety, and accessibility.
- Recommendations and cost estimates for rehabilitation projects.
- Recommendations on any follow up re-inspection work.

This document provides an assessment of the current infrastructure in terms of the performance and condition of individual lift station components, review of lift station components with respect to the latest codes and standards, as well as a hydraulic and capacity review. The assessment identifies components that require replacement or maintenance along with associated estimation of cost.

The assessments were based on **Condition Assessment Forms** that were developed from our site investigations, discussions with Operation Staff, and review of available documents. These forms were used to assign ratings to each component of the lift station in order to develop the cost estimates and recommendations.

1.2 Limitations

Inspections were limited to cursory visual review of lift station components. Analysis of below grade infrastructure that was not accessible has not been included. Buried pipelines were not exposed or reviewed. Assessment of below grade infrastructure has been based on operational comments from City staff and life cycle estimations. Destructive testing methods were not conducted.

1.3 Design Standards & Guidelines

MPE prepared this assessment in accordance to the standards and guidelines listed in **Appendix G.**

1.4 Methodology

The condition assessment consisted of the following:

- *Review of available documents and drawings.* Documents were reviewed to determine if any previously identified issues were unresolved or remain unaddressed. Drawings were examined in order to understand intent of design, design capacity, and to review component compliance with applicable codes.
- *Site inspections of each facility.* Qualified personnel conducted inspections. Photographs of each site were taken and field assessment forms were completed. City of Winnipeg staff accompanied MPE personnel and

provided operational information, background, and the history of each facility. Additionally, City staff identified the areas of operation and maintenance concern.

- *Informal interviews with Operations Staff.* Interviews were conducted to collect further information about each site and to identify issues that are of importance to the maintenance staff. Staff members were also able to provide valuable historical information about deficiencies identified at each site.
- *Completion of Condition Assessment Forms.* The collected information was compiled and reviewed to identify deficient items. A system of rating the condition of each component was developed. Estimated costs for correcting the deficiencies were assigned to each deficiency. Recommendations were developed based on the condition of the component, importance of the component, as well as safety and code compliance. Results were compiled into the Condition Assessment Forms.

1.5 Evaluation Criteria

The Asset Categories identified in Section 1.1 were evaluated based on the following Likelihood Indicators:

- ***Current Physical Condition*** – Assesses the actual condition of the component.
- ***Fitness for Purpose*** – Assesses the component's ability to deliver the design performance required consistently.
- ***Maintenance and Operability*** – Assesses whether optimal maintenance and operation practices occur.
- ***Third Party and Environmental Damage*** – Assesses vulnerability to external hazards.

Note: The "Demand Condition" indicator, used in previous assessments conducted by the City, was removed from this assessment and incorporated into Fitness for Purpose. The "Third Party and Environmental Damage" indicator was removed from Facility assessments but remains an indicator for force main assessments.

Table 1.1 provides a general overview of the scoring matrix that was used to asses each component. The scoring criteria was adjusted to suit each asset category, but generally utilized the following format:

Table 1.1 : CONDITION RATING LEGEND

SCORE	5	Emergency / Critical	Component is not functional or is causing an unsafe condition
	4	Poor / Unsatisfactory	Component has extensive deficiencies that may affect plant operations. High level of maintenance may be required
	3	Fair	Component is able to function for its intended use. Additional maintenance may be required
	2	Good	Only minor deficiencies. Routine maintenance should be sufficient for foreseeable future
	1	Excellent	Component is in new condition

1.6 Condition Assessment Forms

The Condition Assessment Forms are the basis of our assessment. The forms compile information gained through site visits, discussions with Operations staff, review of documents, and engineering experience. A sample form is shown in Figure 1.1. Individual assessment forms were generated for each piece of equipment assessed. The Condition Assessment Forms have been appended to this report.

Figure 1.1 – Condition Assessment Form Sample

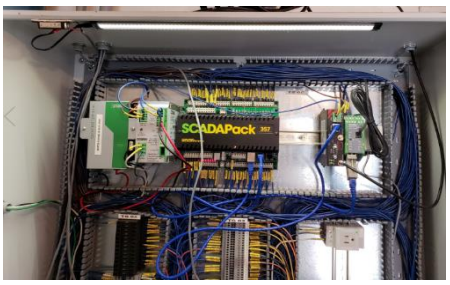
Project No.: 8400-001-00
Tag: **IC_101_Panel**
Facility: Metcalfe Lift Station
Assessment Page 1 of 1

CONTROL PANEL CONDITION ASSESSMENT FORM

Asset Category

Likelihood Indicators Scores

Assessor: Richard Ofstie
Date: 29-Jun-19
Populate Date
Asset ID: 14331

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose			Component Age: YEAR INSTALLED	Component Age: EXPECTED SERVICE LIFE	Component Age: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Panel Description: IC_101_Panel	GENERAL	Location:	Drywell, Main Level	3	1			2013	30	24
		Description:	IC_101_Panel							
		Function:	Station Monitoring							
		PLC Processor:	SCADAPack 357							
		UPS Protection:	Yes	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				5
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* Equipment appears to be in "Good" condition. Equipment is not rated for classified locations. Wiring methods do not follow provided raceway. Panduit cover is removed. No redundency.				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 4 (Non compliant - legacy code)	5	0.4					
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	3	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4					
	Fitness for Purpose	**Controls Functioning as Expected:** *Issues for Discussion:*	Rating 1 (Always) Rating 2 (More than half of time) Rating 3 (Half of the time) Rating 4 (Less often than half) Rating 5 (Never)	1	0.3	*RECOMMENDATIONS:* Incorporate redundent control for the lift station. Upgrade HVAC system. Install panduit cover.	*COST ESTIMATE* $ 45,000.00			
		Panel is Appropriately Designed: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	3	0.1					
		Control Logic is Appropriate for Installation: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3					
		Communications Equipment is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.2					
	PHOTOGRAPHS	  								

Likelihood Indicators

Asset Consideration

Notes & Comments

Assessor's Rating

Recommendations with Cost Estimates

Pre-Established Weighting

2.0 General Overview

2.1 Location

The Windsor Park Lift Station is located directly under the northeast pedestrian safety island of the intersection of Cottonwood Road and Autumnwood Drive in southeast Winnipeg. It is situated in a mixed commercial and residential area of the City.

2.2 General

The lift station, originally built in 1955, has undergone renovations and upgrades primarily in the 1970's and 1980's with some minor upgrades afterwards. A major renovation took place in 1976. The lift station services a large commercial / residential area. Table 2.1 provides a brief overview of the Station.

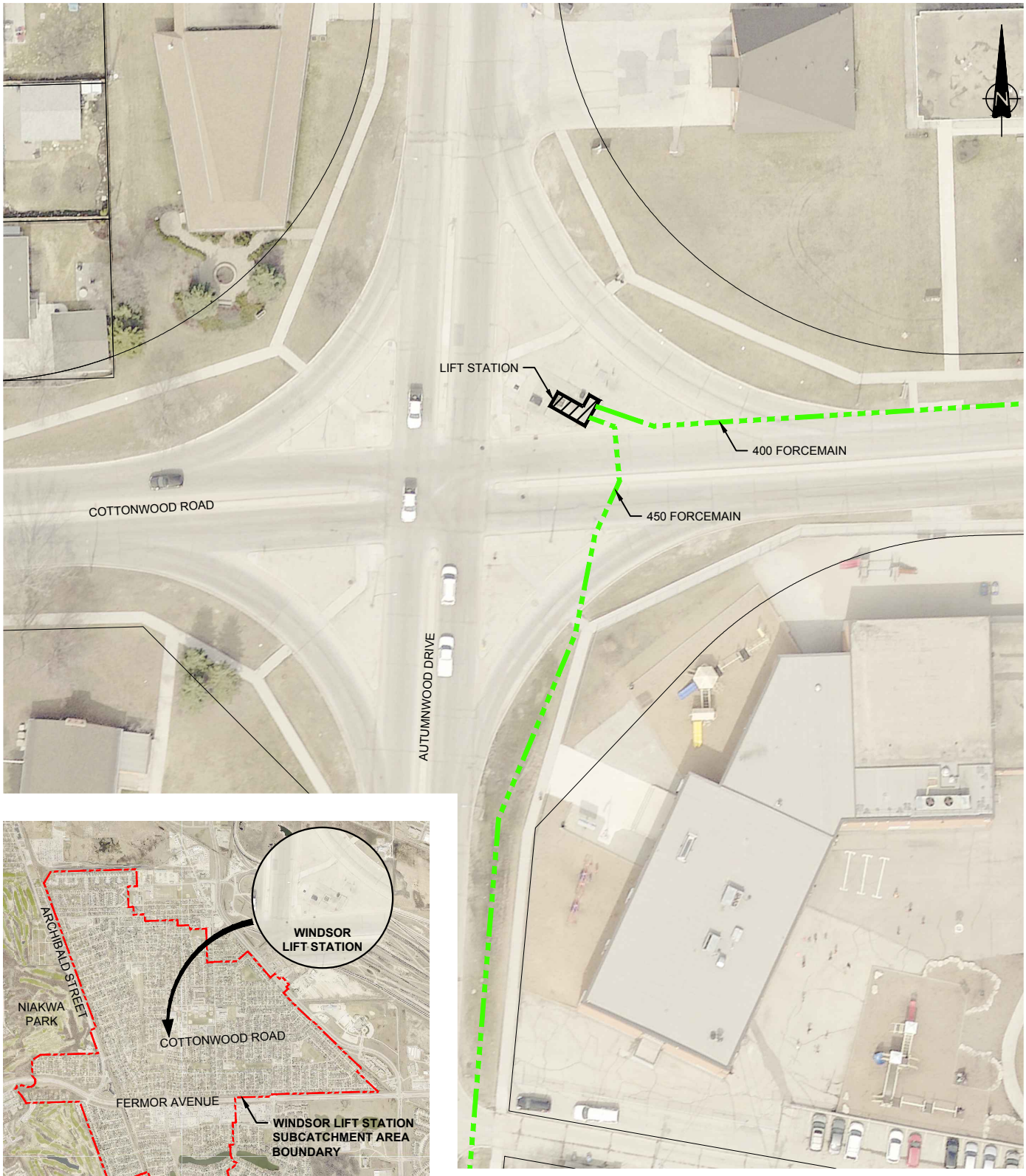
Table 2.1: Windsor Park Lift Station Overview

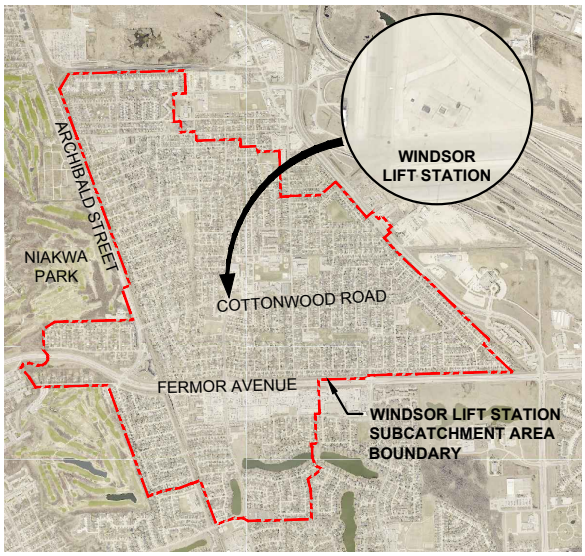
YEAR CONSTRUCTED	1955	Major Reno: 1997
LOCATION	945 Cottonwood Rd – Island at Cottonwood and Autumnwood	
CONFIGURATION	Wet Well / Dry Well	
PUMPING CAPACITY	209 L/sec	
TYPE OF PUMPS	Dry Pit Solids Handling	
PUMP HORSEPOWER	P1: 60 HP, P2: 60 HP	
BACKUP GENERATOR	Natural Gas, 325 kW	
VENTILATION	Dry Well: Intermittent, Wet Well: N/A	

The Station has a standby generator complete with a generator building situated northeast of the intersection where the Station is located. The generator building was added during the 1976 upgrades. It is recommended that the Windsor Park Station be replaced.

Windsor Park Site Location – Google Earth

Figure 2.1 provides an overall site location plan of the lift station facility.





NOTES:

1. FORCEMAIN ALIGNMENT IS BASED ON OUR INTERPRETATION OF THE DOCUMENTS AVAILABLE TO US AT THE TIME, AND IS INTENDED FOR CONCEPTUAL PURPOSES ONLY.

MPE Engineering Ltd.

CITY OF WINNIPEG

LIFT STATION ASSESSMENTS 2018-2019
WINDSOR PARK LIFT STATION
LOCATION PLAN

SCALE: 1:750	DATE: NOVEMBER 2019	JOB: 8400-001-00	FIGURE: 2.1

3.0 Information and Regulatory Review

3.1 Historical Data Review

3.1.1 Data Collection

The City of Winnipeg records estimated average and peak incoming flow into the lift station wet well. Estimated flows were provided by the City of Winnipeg.

3.1.2 Record Drawings, Reports, & Manuals

The following data, plans, reports, and manuals were compiled and reviewed to complete this report:

- Windsor Park Lift Station Renovations, Control Diagrams & Division of Responsibility – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976 Revised to 1986
- Windsor Park Lift Station Renovations, Distribution & Generator building Layout – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976 Revised to 1986
- Windsor Park Lift Station Renovations, Control Schematics, Pump and Control Annunciation – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976 Revised to 1986
- Windsor Park Lift Station New Generating Station, Plan Elevations Sections & Details Responsibility – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976
- Windsor Park Lift Station Renovations, Lift Station Layout & Details – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976 Revised to 1985
- Windsor Park Lift Station, Standby Generator building Plumbing and Ventilation Floor Plans – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976 Revised to 1986
- Windsor Park Sanitary Relief Sewer – Record Drawings; W.L.Wardrop and Associates Ltd.; 1976
- Ladco Development St. Boniface, Location and Details of DIP Service to Lift Station – Record Drawings; W.L.Wardrop and Associates Ltd.; 1955
- Ladco Development St. Boniface, Electrical Details Sewage Lift Station – Record Drawings; W.L.Wardrop and Associates Ltd.; 1955
- Ladco Development St. Boniface, Mechanical Layout of Sewage Lift Station – Record Drawings; W.L.Wardrop and Associates Ltd.; 1955
- Windsor Park Lift Station Upgrading, Electrical – City of Winnipeg; 1989
- Windsor Park Lift Station Upgrading, Plans & Sections – City of Winnipeg; 1989 Revised to 1992
- Windsor Park Wastewater Pumping Station, Pump Replacement Plans & Sections – City of Winnipeg; 1998
- LIFT_STN_SERVICE_AREAS.gws – Lift Station Catchment Areas

3.1.3 Missing or Conflicting Data

The following missing data was noted:

- The material of the piping on one section of the SEWPCC force main was not evident on the record drawings. Asbestos cement piping was used for the purposes of determining pipeline hydraulic losses in this report.
- Record information, including duty point and pump curve for the storm pump, was not available.

4.0 Sewage Production

4.1 General

The service area and design flows were generated based on discussion with the City of Winnipeg representatives along with the design criteria presented in the *City of Winnipeg Wastewater Flow Estimation and Servicing Guidelines; 2018.*

4.1.1 Catchment Area

The catchment area for the Windsor Park Lift Station was provided by the City from the LIFT_STN_SERVICE_AREAS.gws workspace and consists of primarily Single Family Dwellings with areas of Multi Family Dwellings, Apartments, Commercial areas, and Parks. The catchment area is located primarily east of Archibald, north of Fermor Avenue, and west of Lagimodière Boulevard. Figure 4.1 illustrates the sub-catchment area for the Windsor Park Lift Station.

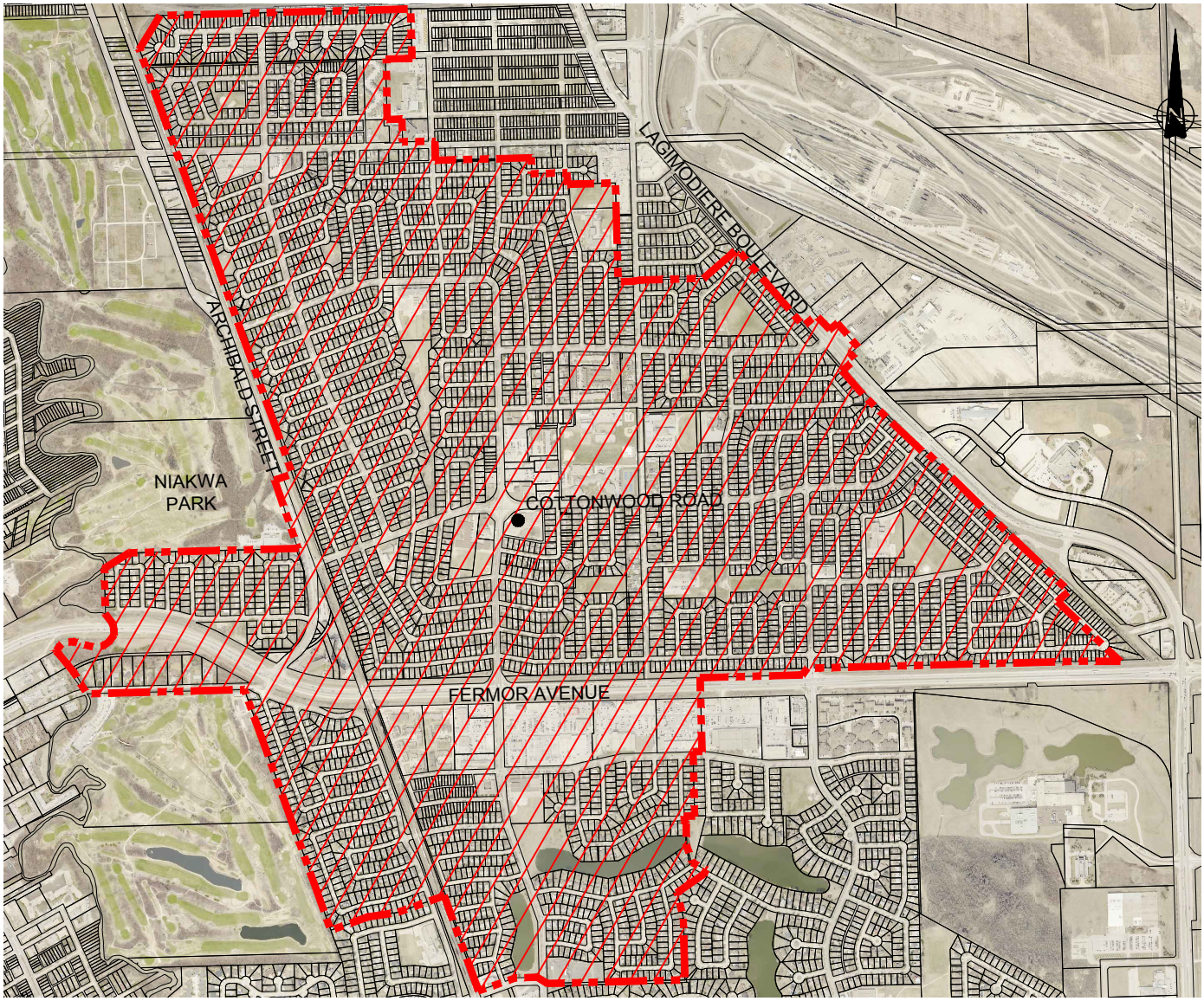
4.1.2 Peaking Factor

To account for the diurnal fluctuations in sewage flows, peak hourly flows are calculated based on the peaking factor derived from the Harmon equation:

$$\text{Harmon's Peaking Factor} = 1 + 14 / (4 + P^{1/2})$$

where: P = design contributing population in thousands

Windsor Park Wet Well



WINDSOR PARK	
ROW LABELS	COUNT
APARTMENTS	12
CHURCH	8
COMMERCIAL ROW HOUSE	4
COMMUNITY CENTRE	1
COMMUNITY SHOP CENTRE	1
CONVENIENCE STORE	1
DETACHD SNGL DWELLING	3679
DUPLEX	16
GOLF COURSE	2
HYDRO SUB-STATIONS	1
MULTI FAMILY CONVRSN	2
MULTI RES BLDGS	12
NGHBRHD SHOP CENTRE	8
OFFICE	2
PARK WITH BUILDING	2
POLICE/FIRE	1
PUMP/SEWAGE/LIFTSTNS	1

WINDSOR PARK	
ROW LABELS	COUNT
RAILROAD	1
RES GROUP CARE	8
RESIDENTIAL OUT BLDG	1
RESTAURANT	3
SCHOOL	10
SIDE BY SIDE	527
STORE	2
SUPER MARKET	1
VACANT COMMERCIAL	2
VACANT INDUSTRIAL	4
VACANT PARK	28
VACANT RESIDENTIAL 1	17
VACANT RESIDENTIAL 2	3
VEHICLE SERV RELATED	4
WAREHOUSE	3
GRAND TOTAL	4367

LEGEND

WINDSOR PARK SUBCATCHMENT
AREA=457.5 ha (1130.5 acres)
LIFT STATION

MPE Engineering Ltd.

CITY OF WINNIPEG

LIFT STATION ASSESSMENTS 2018-2019
WINDSOR PARK LIFT STATION
SUBCATCHMENT AREA

SCALE: 1:20 000	DATE: AUGUST 2019	JOB: 8400-001-00	FIGURE: 4.1

4.2 Wastewater Flows

4.2.1 Historical Flows

Historical wastewater flow data was not available for the Windsor Park Lift Station. Therefore, the following assumptions have been used to estimate the current and projected ultimate capacities for the facility:

- Land use consists of Single Family Dwellings, Multi Family Dwellings, and Commercial Areas.
- Catchment area is approximately 457.5 ha.
- Average dry weather wastewater flow as follows:
  - Residential areas – 270 litres per capita day (Lpcd).
  - Commercial areas – 16,800 L/ha/day.
- Extraneous flow allowance as follows:
  - Groundwater infiltration – 2,200 L/ha/day.
  - Manhole infiltration – 12 L/min/manhole.
    - Residential manhole density – 1.6 manholes/ha.
    - Commercial/industrial manhole density – 1.0 manholes/ha.
  - Weeping tile flow – 4.55 L/min/service connection.
    - Only included in residential areas constructed prior to 1990.
- No anticipated future developments to be serviced by the lift station.

Table 4.1 illustrates the estimated wastewater flows.

TABLE 4.1: ESTIMATED WASTEWATER FLOWS

SUBCATCHMENT DESIGN FLOW

LAND USE	AREA (HA)	DWELLING DENSITY (DWELLINGS/HA)	DWELLINGS (NO.)	POPULATION DENSITY (PPL/DWELLING)	EQUIVALENT POPULATION	HARMON PEAKING FACTOR	AVERAGE DRY WEATHER FLOW (LPCD)	AVERAGE DRY WEATHER FLOW (L/SEC)
Single Family Dwelling	410.5	12.29	5,045.0	3.05	15,387	-	270	48.1
Multi-Family Dwelling	17.0	74.13	1,260.2	2.30	2,898	-	270	9.1
Subtotal	427.5				18,286	2.692	270	57.1
							(L/HA/DAY)	(L/SEC)
Commercial	30.0	-	-	-	-	-	16,800	5.8
Subtotal	30.0						16,800	5.8
Total:	**457.5**	-	-	-	-	-	-	**63.0**

LAND USE	PEAK DRY WEATHER FLOW (LPCD)	PEAK DRY WEATHER FLOW (L/SEC)	EXTRANEOUS FLOW CONTRIBUTIONS: GROUNDWATER (L/SEC)	MANHOLE (MH/HA)	MANHOLE (L/SEC)	WEEPING TILE (L/SEC)	PEAK WET WEATHER FLOW (L/SEC)
Single Family Dwelling	-	-	10.5	1.6	131.4	382.6	-
Multi-Family Dwelling	-	-	0.4	1.6	5.4	-	-
Subtotal	727	153.8	10.9	-	136.8	382.6	684.1
	(L/HA/DAY)	(L/SEC)	(L/SEC)	(MH/HA)	(L/DAY)	(L/SEC)	(L/SEC)
Commercial	28,100	9.8	0.8	1.0	6.0	-	-
Subtotal	28,100	9.8	0.8	-	6.0	-	9.8
Total:	-	**163.6**	**11.6**	-	**142.8**	**382.6**	**693.8**

The estimated average dry weather flow is 63.0 L/sec, the peak dry weather flow is 163.6 L/sec, and the peak wet weather flow is estimated to be 693.8 L/sec.

4.2.2 Projected Flows

No further expansion is anticipated for the catchment area for the Windsor Park Lift Station.

5.0 Lift Station Hydraulic & Capacity Review

5.1 Background

The lift station houses two (2) dry pit solids handling pumps. The primary pump cycles between the two pumps on a pump operational basis. Only one pump will operate under normal conditions and the pumping control system will allow for a second pump to be called into operation if required based on the level in the wet well. The primary pump starts at a level of 4500 mm and the secondary pump starts if it exceeds 5000 mm. The lift station also houses a vertical turbine storm pump that is used to discharge combined sewage and storm water to the outfall system during heavy rainfall events when the wet well level exceeds 6600 mm. Record information was not available for the storm pump and the pump does not contribute to the lift station's sewage pumping capacity. Table 5.1 provides a summary of the sewage pumps utilized at the Windsor Park Lift Station.

TABLE 5.1: WINDSOR PARK LIFT STATION PUMPING SUMMARY

PUMP	Pump Type	MANUFACTURER	MODEL	POWER (HP)	YEAR OF INSTALL	DUTY POINT		DISCHARGE SIZE (mm)
						FLOW (L/sec)	TDH (m)	
PUMP 1 - P-101	DRY PIT SOLIDS HANDLING	AURORA	612A	60	1998	210.0	15.2	250
PUMP 2 - P-102	DRY PIT SOLIDS HANDLING	AURORA	612A	60	1998	210.0	15.2	250

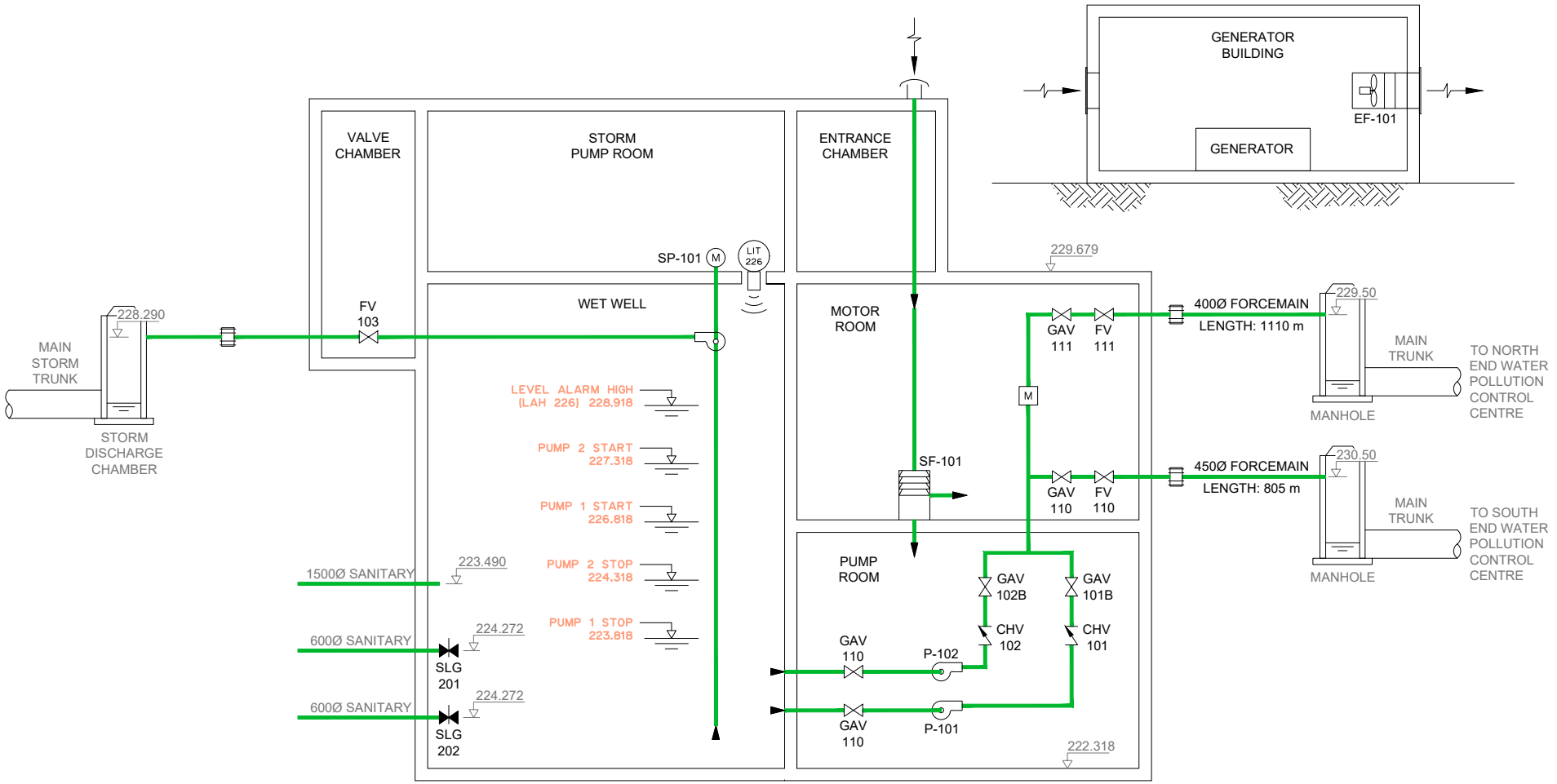
*Based on duty point in Pump Manufacturer's datasheet

P-101 and P-102 are identical Aurora 612A pumps rated for 210.0 L/sec at a Total Dynamic Head (TDH) of 15.2 m and operate at a constant speed.

The Windsor Park Lift Station includes two force mains that are used to direct sewage to either the South End Water Pollution Control Centre (SEWPCC) or the North End Water Pollution Control Centre (NEWPCC). A 450 mm diameter force main constructed of asbestos cement and steel is used to discharge sewage to the SEWPCC. A 400 mm diameter force main constructed of asbestos cement and cast iron is used to discharge sewage to the NEWPCC. Sewage is directed to the SEWPCC in the summer months and to the NEWPCC in the winter months.

5.1.1 Process Flow Diagram

Figure 5.1 provides an overall process flow diagram of the Windsor Park Lift Station.



P-101
- DUTY POINT: 210 L/s @ 15.2 m
- 60 HP. 1185 RPM
- 575 VAC/3 PH/60 Hz

P-102
- DUTY POINT: 210 L/s @ 15.2 m
- 60 HP. 1185 RPM
- 575 VAC/3 PH/60 Hz

SP-101
- 150 HP. 1760RPM
- 575 VAC/3 PH/60 Hz

Winnipeg

MPE Engineering Ltd.

LIFT STATION ASSESSMENTS 2018-2019

WINDSOR PARK
PROCESS FLOW DIAGRAM

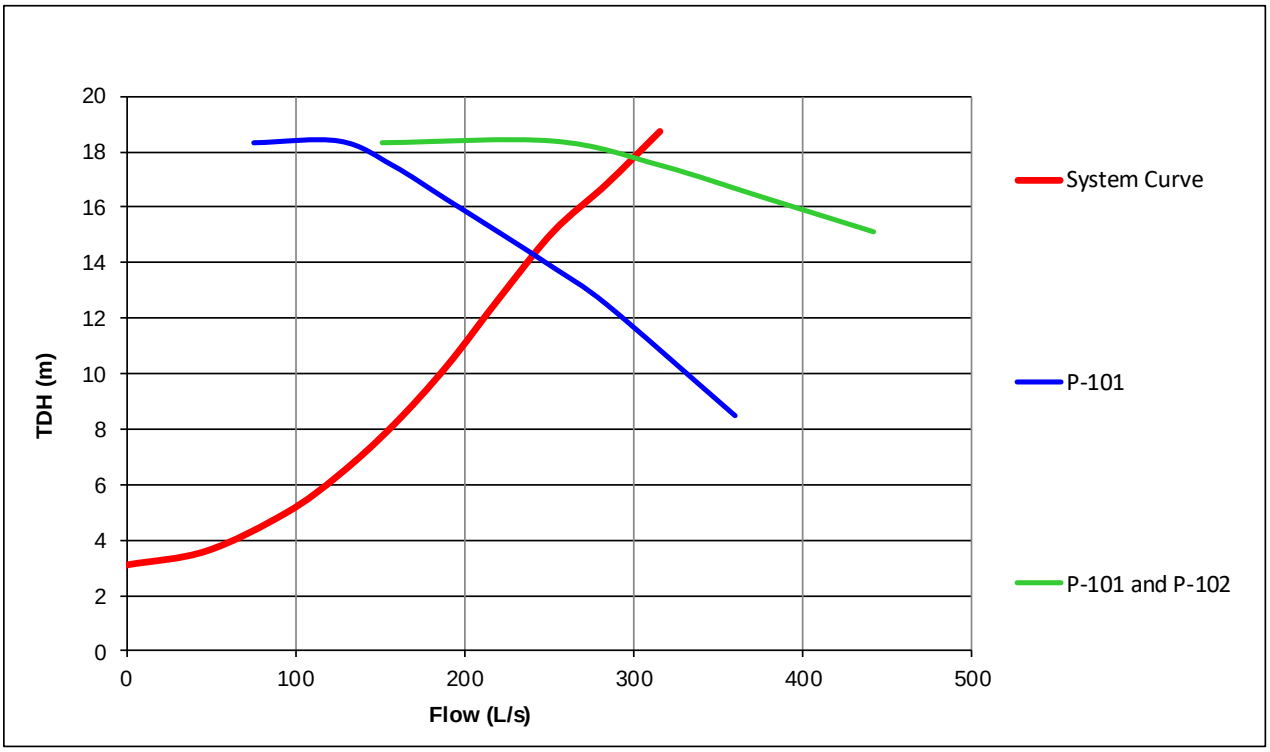
SCALE: NTS	DATE: SEPT 2019	JOB: 8400-001-00	FIGURE: 5.1

5.2 Hydraulic Analysis

5.2.1 Pump Capacity Review

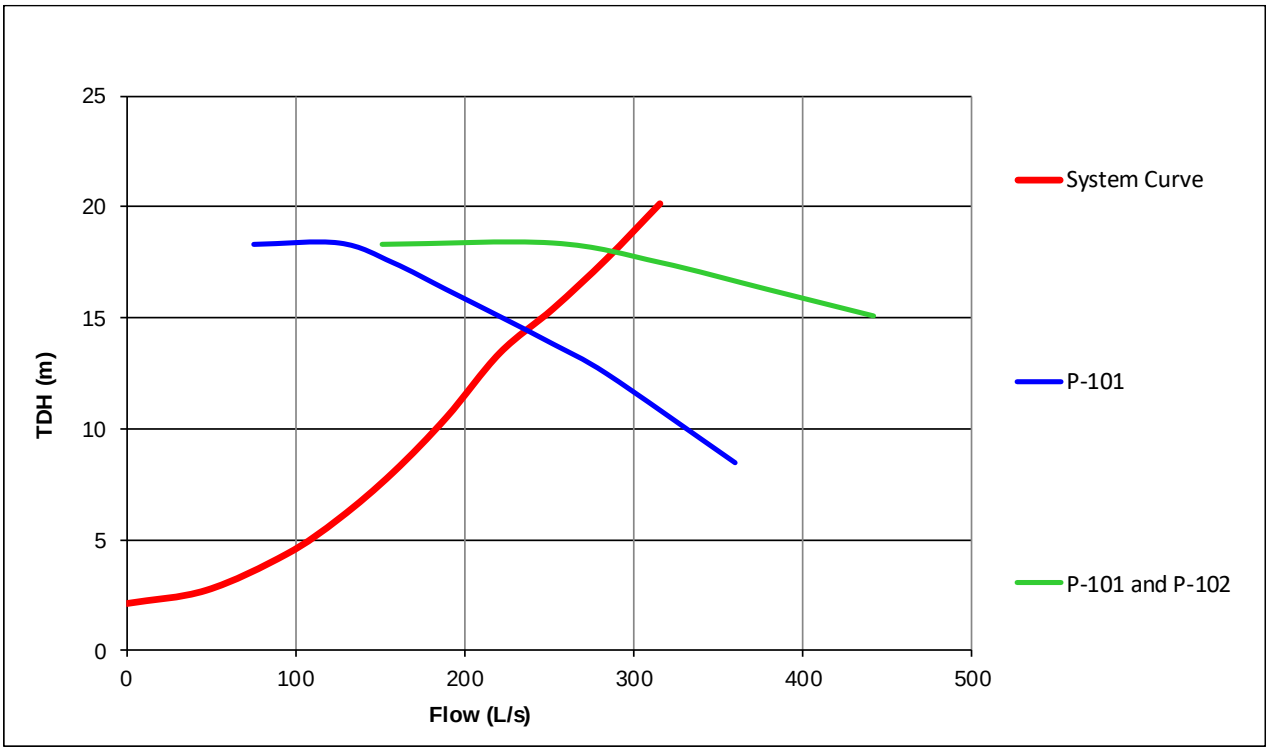
To develop the lift station system curve, the piping system was analyzed using the Darcy – Weisbach formula. The anticipated pump flows are determined by the intersection of the system curve with the respective pump curves. Two separate system curves were developed to model the two force mains. The lift station system curve versus theoretical pump performance chart is illustrated below in Figure 5.2 and 5.3.

Figure 5.2: Lift Station Curve vs. Pump Performance Curve (SEWPCC Force Main)



The theoretical flows that can be obtained with one pump and two pumps in operation through the SEWPCC force main are 241 L/s and 299 L/s, respectively.

Figure 5.3: Lift Station Curve vs. Pump Performance Curve (NEWPCC Force Main)



The theoretical flows that can be obtained with one pump and two pumps in operation through the NEWPCC force main are 237 L/s and 287 L/s, respectively.

5.2.2 Pumping Requirements Review

The design of the lift station pumping system must incorporate standby capacity such that, when the largest pump is out of service, the station is capable of handling the peak inflow rate. The rated capacity should be equal to or greater than the peak wet weather flow rate of 693.8 L/sec. The maximum pumping capacity of the lift station to the SEWPCC force main and NEWPCC force main is approximately 299 L/s and 287 L/s, respectively, with both pumps in operation. The 'rated' capacity of the lift station with the largest pump being out of service to the SEWPCC force main and NEWPCC force main is currently 241 L/sec and 237 L/s, respectively. Based on the estimated peak wet weather flow, the pumping system is not currently capable of meeting the peak influent flow requirements. However, the pumping system is capable of meeting the peak dry weather flow of 163.6 L/sec.

5.2.3 NPSHA Analysis

A Net Positive Suction Head Available (NPSHA) analysis was performed to review the lift station suction piping system. NPSHA is the maximum absolute pressure available at the suction port of the pump above vapour pressure. Centrifugal pumps are not capable of handling large quantities of vapour, so it is critical that there is sufficient absolute pressure on the suction side of the pump to prevent vaporization or flashing in the impeller.

An NPSHA analysis was performed at various levels in the lift station wet well. The analysis indicated that there is sufficient NPSHA to prevent cavitation. The results of the analysis are summarized in Table 5.2.

TABLE 5.2: SUCTION LINE NPSHA ANALYSIS							
CONDITION	WET WELL LEVEL (mm)	PUMP SPEED (%)	FLOW (L/s)	SUCTION LINE TOTAL DYNAMIC HEAD (m)	NPSH REQUIRED (m)	NPSH AVAILABLE AT PUMP INLET (m)	NPSH EXCESS AVAILABLE (m)
PUMP 1 STOP	1500	100	237	0.97	7.32	9.72	2.41
PUMP 2 STOP	2000	100	237	0.97	7.32	10.22	2.91
PUMP 1 START	4500	100	237	0.97	7.32	12.72	5.41
PUMP 2 START	5000	100	237	0.97	7.32	13.22	5.91

5.2.4 Force Main Review

Two force mains are used to convey sewage from the Windsor Park Lift Station. The SEWPCC force main has a diameter of 450 mm and a length of 805 m and consists of a combination of asbestos cement and steel. Sections of the force main were constructed in 1961, 1971, and 1976. The NEWPCC force main has a diameter of 400 mm and a length of 1110, consisting of a combination of asbestos cement and cast iron. Sections of the force main were constructed in 1955 and 1976. The SEWPCC and NEWPCC force mains have a volume of approximately 116 m^3 and 400 m^3, respectively. Based on the estimated average and peak dry weather flows of 63.0 L/s and 163.6 L/s, the average retention time in the SEWPCC and NEWPCC force mains range from 12 to 31 minutes and 14 to 37 minutes, respectively, which is below the maximum recommended retention time of 4 hours.

An analysis of the force main was performed to confirm whether the force main piping is adequate to carry the flow rates from the lift station. Velocities were calculated for theoretical pumping rate scenarios at the Windsor Park Lift Station. The results are summarized in Table 5.3.

TABLE 5.3: FORCE MAIN VELOCITY		
DESCRIPTION	ONE PUMP THEORETICAL	TWO PUMPS THEORETICAL
SEWPCC Force Main		
FLOW (L/s)	241.0	299.0
FORCE MAIN VELOCITY (m/s)	1.67	2.07
NEWPCC Force Main		
FLOW (L/s)	237.0	287.0
FORCE MAIN VELOCITY (m/s)	1.89	2.29

The Windsor Park force mains were found to be undersized for the majority of flows from the lift station and the velocities are above the acceptable range of 0.6 m/sec to 1.6 m/sec.

5.3 Wet Well Sump Analysis

The fill time of the wet well from the pump stop level to the pump start level is approximately 16 minutes. Best industry practices state that the filling time based on average flow should not exceed 30 minutes to avoid anaerobic conditions. The existing wet well meets the maximum fill time requirements and is adequately sized for the incoming flows.

5.3.1 Pump Cycling Review

The wet well size was modeled for tank level versus pump cycle time. Average dry day flow results in approximately three (3) pump cycles per hour. Peak dry day flow results in approximately two (2) pump cycles per hour. The maximum allowable starting and stopping intervals for a 60 HP pump are 6.3 cycles per hour. The pump cycles are within the allowable limits and the pump capacity is acceptable for the volume of the wet well. If it is determined that pump cycles were more than the allowable motor starts per hour, variable frequency drives (VFD's) can be fitted to the pumps to mitigate this issue.

5.4 Wet Well Flow Path Review

Sewage enters the south side of the wet well through two 600 mm diameter concrete pipelines, and on the west side of the wet well through a 1500 mm diameter concrete pipeline. Sewage is then directed to the pump suction lines located on the north side of the wet well. Concrete benching has been installed on all sides of the wet well. The benching is 150 mm high by 1650 mm long and is used to prevent solids build up in the edges of the wet well. The 250 mm diameter pump suction lines are installed flush to the wall of the wet well and are located approximately 75 mm from the bottom of the wet well. Operational staff noted that there have been no issues with solids accumulation in the wet well and the well rarely needs to be cleaned.

5.5 Pump Control Strategy Review

The following provides a brief outline of the control narrative for the lift station:

5.5.1 General

- Typically, the facility is operated in Automatic mode.
- Pumps can be operated either in Manual or Automatic mode.
- There are no local motor emergency stops in the dry well lower level.

5.5.2 Manual Mode

- The pumps can operate manually through a hand/off/auto switch that can bypass the controller.

5.5.3 Automatic Mode

- In the Automatic mode, the station pump controller operates the pumps based on level.
- The duty pump will start when the level in the wet well rises above the "Pump 1 Start Level" of 4500 mm.
- Should the sewage level rise above the "Pump 2 Start Level" of 5000 mm, the second pump will start.
- If any pump fails to operate correctly in Automatic mode, then a pump failure alarm will be triggered, the failed pump will automatically shut down, and the alternate pump will automatically start to replace the failed pump.
- The second pump shuts down at the "Pump 2 Stop Level" of 2000 mm and the duty pump shuts down at the "Pump 1 Stop Level" of 1500 mm.

The control strategy used at the Windsor Park Lift Station is similar to the control strategy used at other lift stations throughout the City. The control strategy is well understood by the Operators and has proven to be a successful method of operation.

5.6 Conclusions and Recommendations

The hydraulic and capacity assessment of the Windsor Park Lift Station yielded the following conclusions:

- There are no issues with NPSHA or excessive pump cycling in the pumping system.
- The pumping system is capable of meeting the peak dry weather influent flow requirements; however, the pumping system is not currently capable of meeting the peak wet weather influent flow requirements.
- The force mains were found to be undersized for the majority of flows from the lift station.
- The existing wet well meets the maximum fill time requirements and is adequately sized for the incoming flows.

6.0 Facility Condition Assessment

6.1 Background

The following provides a condition assessment of the building facility for the Windsor Park Lift Station in terms of the condition of individual system components and code and regulation compliance. The assessment identifies existing infrastructure that requires replacement, maintenance, or upgrades. A condition rating has been given to the components to identify the condition and cost estimates have been developed. Recommendations have been developed in order to assist the City in prioritizing future projects. The Condition Assessment Forms have been appended to this report.

6.2 Code Review

A review of the lift station was undertaken to verify compliance with the National Building Code. Table 6.1 provides a summary of the code review.

TABLE 6.1: WINDSOR PARK LIFT STATION - Code Review

YEAR CONSTRUCTED	1955
BUILDING FOOTPRINT AREA (m2)	UG Structure - < 35m2
LOCATION	Autumnwood & Cottonwood
BUILDING CLASSIFICATION	Non Combustible (LS)
ROOFING MATERIAL	Concrete
MAJOR OCCUPANCY CLASSIFICATION	F-3 - Low Hazard Industrial
OCCUPANT LOADING	5 max.

ITEM	REQUIREMENT	CODE COMPLIANCE	CODE REFERENCE / NOTES
BARRIER FREE ACCESS	Not Required	n/a	*NBC - 3.8- A3.8.1.1*
MAIN FLOOR EXITS	1 required	Yes	*NBC - 3.4.2.1 (A) - Floor area < 200m2*
TRAVEL DISTANCES	Less than 15 m	Yes	*NBC - 3.4.2.1 (A) - F-3 Occupancy*
MEZZANINE EXIT	Less than 15 m	n/a	*NBC - 3.4.2.2*
GUARDRAILS	0.75 kN/m lateral load	Yes	*NBC - 4.1.5.14 -*
IMPORTANCE FACTOR	Post Disaster	No	*NBC - 4.1.2*
EGRESS PATHS	1100mm min. width	No	*NBC - 3.4.3.2 - Narrow exit stairway < 1100*
NOISE DECIBLE	< 85 dBA	Yes	*OH&S Part 8. -*
SPRINKLER SYSTEM	Not Required	n/a	*NBC - 3.2.2*
EMERGENCY LIGHTING	Required	Yes	*NBC - 3.2.7.3*
EXIT SIGNAGE	Illuminated over door	Yes	*NBC - 3.4.5.1 (2)*
SMOKE ALARM	Not Required	n/a	*NBC - 3.2.4.11*
FIRE ALARM	Not Required	n/a	*NBC - 3.2.4*
HAZARDOUS SUBSTANCE	**CAPACITY (Litres)**	**REGESTERED**	**CODE REFERENCE / NOTES**
DEISEL (Fuel Oil) - Generator Room		n/a	*Registration with Ministry of Environment is not required*
DEISEL (Fuel Oil) - Pump Station		n/a	*Registration with Ministry of Environment is not required*
CHLORINE		n/a	
-Hazardous Substances and Waste Dangerous Goods Regulations recommends registration for tank capacity > 4000 Litres-			
SECURITY	**SITE SECURE**	**BUILDING SECURE**	**NOTES**
PUMP STATION	NO	NO	*Located in intersection*

6.3 Site Conditions

The Windsor Park Lift Station is located below the northeast island of the intersection of Cottonwood Road and Autumnwood Drive. An external generator building is located northeast of the lift station. This station is old and the configuration is unconventional and not suitable for safe access and functionality.

6.3.1 Site Access and Parking Lot

The lift station can be accessed from Cottonwood Road and Autumnwood Drive. These are busy routes and access can be difficult and dangerous. There is no designated parking for the lift station; however, nearby public parking can be used. The generator building is easily accessed near a large public parking area.

6.3.2 Site Grading & Landscaping

The lift station access exists in a concrete pedestrian safety island. Grading at this location is not an issue. The grading at the generator building is adequate. A nearby tree is in contact with the wires servicing the generator building. This tree should be trimmed back.

6.3.3 Security and Signage

The access hatches to the lift station are protected primarily by guard rails. One (1) of the hatches is protected by bollards. Guardrails are not sufficient protection from vehicle damage. The hatches are properly locked. The lift station structure is considered secure.

There is no perimeter fencing around the generator building. The building does not have windows and is secure. Signage identifies the building as a City of Winnipeg facility, but does not provide emergency contact information.

6.4 Foundations

6.4.1 Foundation Slab

The Windsor Park Lift Station foundation consists of a cast-in-place concrete wet well/dry well configuration. The base is approximately 10.5m below grade. The concrete base slab shows signs of cracking and deterioration but remains in sound condition with no structural concerns. The sump pit is functional though pooling was noted nearby. The generator building base slab is in “Good” condition with minor surface cracking.

6.4.2 Foundation Walls, Columns, and Beams

The concrete foundation walls show signs of moisture infiltration. This has caused commonplace surface damage. Rebar is exposed in many places on walls and ceilings. This exposed rebar has corroded and caused further surface damage to the concrete. Surface deterioration is otherwise evident and paint is peeling off in many areas. There is also heavily damaged concrete in the northeast wall of the wet well access (slide gate operation) chamber. A column near the entrance is also damaged.

6.4.3 Wet Well

The wet well concrete surface appears to be in "Fair" to "Poor" condition. The drawings provided by the city indicate that the original 1955 structure did not include the 1.5 meter inlet pipe / storage chamber that is currently connected to the west side of the wet well. It was noted during the wet well inspection that the inlet looks to have been poorly cut or hammered when this connection was installed. The concrete around this inlet is in "Poor" condition. The storm pump was also installed after original construction. The storm pump is heavily corroded and no longer usable. The wet well has no ventilation system and the environment is very corrosive. The ladder in one side of the wet well has corroded through its supports and fallen into the wet well. It appears as though a metal rack has also fallen in. One if the wet well inlet gates appears to be seized closed.

6.5 Primary Structural Systems

6.5.1 Loadbearing Walls, Columns and Beams

There are no structural concerns with the generator building. The walls, and roof system are in "Good" condition. The steel beam ends for the generator building are covered in plywood on the exterior of the building. The plywood has started to deteriorate. The plywood should be removed so that the beam ends can be checked.

6.5.2 Suspended Floors, Trusses, and Joists

The suspended slabs in the lift station are in "Poor" condition. Many pipe penetrations have been cut following original design and construction. The structural integrity of the floors is compromised. The damage is compounded by the corrosion of the exposed rebar in these penetrations. Structural analysis should be performed to confirm the modified capacity of the floors should the station remain in operation. The floor finishes have exceeded their service life.

6.6 Secondary Structural Systems

6.6.1 Stairs, Ladders, Catwalks, Hatches, Rails

There are numerous Code compliance and safety issues with the ladders, stairs, and rails in the lift station. These can be found in greater detail in **Appendix A**. The stair and ladder systems are extensively corroded and are not considered safe for use. Rails around floor openings do not have swing gates and are not Code compliant. The surface-level entrance hatches are in "Good" condition; however, the main entrance hatch it is not Code compliant. A small metal catwalk that extends into the valve room has begun to corrode. The valve room is considered an unsafe work area.

The wet well access (slide gate operation) chamber is in "Poor" condition. There are signs of heavy corrosion on the metal components. The hatches are square and lids are susceptible to falling through the opening. One of the hatch lids is plywood. The ladder extending down into the wet well is not fit for use.

6.6.2 Interior Walls, Ceilings, Support Members, Equipment Pads

There is extensive corrosion of the pipe support member in the valve room. There is damage to the corners of some of the equipment pads, but they are generally in "Good" condition.

6.6.3 Finishes

The paint on the floor surfaces has worn off on all levels. The wall and ceiling finishes have exceeded their service life. An epoxy coating on the floor would be ideal for durability, but will require additional prep work in the lower pump room due to the age of the concrete and the surface deterioration. Walls can be surfaced with a latex or suitable acrylic-latex paint to improve aesthetics and protect the surfaces.

6.6.4 Monorails and Hoists

MPE was unable to obtain a copy of the third party monorail and hoist certification.

6.7 Building Envelope

6.7.1 Exterior Siding, Roofing, Doors

There is infiltration through the exterior walls of the lift station causing minor moisture damage. There is significant infiltration through a penetration in the pump room. The exterior walls of the generator building are in "Good" condition, though there are minor cracks.

6.7.2 Insulation, Vapour Barrier, Interior Liner

Rigid insulation has been installed on the upper level interior walls of the lift station; however, condensation and frost penetration still occur. Condensation and moisture infiltration have deteriorated the insulation. There is no vapour barrier or liner.

6.7.3 Flashings, Soffits, Sealants, Weather-stripping

The plywood beam-end coverings for the generator building are deteriorating. The door is in "Good" condition.

6.8 Roofing

6.8.1 Roof Membrane, Insulation, Decking

The generator building roof is in "Good" condition and no leaks have been noted. The rock ballast is eroding and should be corrected in order to preserve the roof membrane.

6.8.2 Skylights, Hatches, Penetrations

The roofing penetrations were not able to be reviewed at the time of the site visit.

6.8.3 Flashings, Trim, Gutters, Downspouts

The trim and soffit for the generator building are deteriorating.

6.9 Building Mechanical

6.9.1 Heating

The generator building includes two wall mount electric unit heaters that are in "Good" condition. The heater located in the building lower levels that are in "Fair" operational condition. The dry well includes a wall fan heater and a wall mount electric unit heater. The heaters have exceeded their expected service life and should be replaced.

6.9.2 Interior Plumbing

The generator building domestic plumbing system consists of PVC and copper piping and includes a water meter, reduced pressure zone assembly, pressure tank, and a pressure reducing valve. The plumbing system is used to supply cooling water to the natural gas generator. Drain lines from the building are directed to a sanitary sewer line located outside the building. The generator building plumbing and drainage systems are in "Good" condition and no operational concerns were noted.

The dry well domestic plumbing system consists of PVC and copper piping, including a water meter and double check valve assembly. The plumbing system is used to supply hose bibs in the lift station. Drain lines from the vault are directed to a sump in the drywell lower level. A sump pump is used to discharge water from the sump to the wet well. The dry well plumbing and drainage systems are in "Fair" condition and no operational concerns were noted.

6.9.3 Fire Suppression Systems

The generator building includes a handheld ABC fire extinguisher installed by the entrance. The fire extinguisher is in "Good" physical condition, is adequately labeled, and is inspected regularly. The dry well has no apparent fire suppression system. It is recommended that a handheld ABC fire extinguisher be installed by the dry well entrance.

6.9.4 Gas Distribution

Standard weight carbon steel is used for the natural gas distribution system in the generator building. The system is used to supply the natural gas generator. The generator building gas distribution system is in "Good" operational condition. There is no gas distribution system in the dry well.

6.10 Facility Assessment Cost Summary

Table 6.2 summarizes the cost estimates and recommended Action time for each recommendation.

TABLE 6.2: WINDSOR PARK FACILITY IMPROVEMENT COST ESTIMATES

Item	Facility Section	Action	Cost
1	Site Conditions	Short Term	$ 500.00
2	Foundations	-	$ -
3	Primary Structural Systems	Mid Term	$ 20,000.00
4	Secondary Structural Systems	Mid Term	$ 113,700.00
5	Building Envelope	Mid Term	$ 5,000.00
6	Roofing	Short Term	$ 1,500.00
7	Building Mechanical	Mid Term	$ 3,500.00
		Total:	**$ 144,200.00**

The capital costs for the recommended improvements have been ***estimated in 2019 dollars***. The cost estimate provided is an opinion of probable cost and is a function of many factors that can change with time and hence must not be relied upon as the actual cost. Construction equipment and methods that are commonly used in the industry are assumed for estimating purposes. The estimates have been provided to assist the City with budgetary planning purposes only and should not be used as actual quotes. The cost estimates are exclusive of taxes.

6.11 Conclusions & Recommendations

The major findings of the facility assessment of the Windsor Park Lift Station are summarized as follows:

- The lift station location and orientation is unsuitable for safe entry and functionality.
- There is excessive corrosion on metal components in the wet well and no wet well ventilation system.
- There is evidence of moisture infiltration through the lift station walls.
- There are multiple modifications to the suspended slabs, compromising their structural integrity. Rebar is exposed and corroding in many locations.
- There are many Code compliance and safety issues regarding the secondary structural systems. Corrosion is commonplace.
- There is no apparent Fire Suppression System.

A detailed breakdown of the recommendations and associated costs can be found in **Appendix A**. The recommendations are summarized in Table 6.3.

TABLE 6.3: WINDSOR PARK FACILITY RECOMMENDATIONS

COMPONENT	RECOMMENDATION
GENERAL	***Continued usage is not recommended due to safety issues and end of service life components. Restoration work at existing site is not recommended.***
SITE CONDITIONS	Prune back tree from contacting electrical service
FOUNDATION / WET WELL	Remove corroded ladder from wet well
PRIMARY STRUCTRUAL SYSTEMS	Compete a structural assessment of the concrete capacity if operation is to continue. Assessment should include surcharge loading from vehicles
SECONDARY STRUCTURAL MEMBERS	Replace corroded stairs and landings
	Install swing gates on guard rails at floor openings
	Install device to hold open exterior hatch - to prevent wind or accidental closure
	Re finish all floor and wall surfaces
	Replace ladders to meet code
	Seal Infiltration Issues
BUILDING ENVELOPE	Replace or re-paint facia, trim, and soffit on generator building
ROOFING	Add additional rock ballast to protect exposed areas of roof membrane on generator building
BUILDING MECHANICAL	Install handheld fire extinguisher
	Replace heaters in vault

7.0 Mechanical Equipment Condition Assessment

7.1 Background

This section provides an assessment of the process mechanical equipment in terms of the condition of individual system components and code and regulation compliance. The assessment identifies existing infrastructure that will require replacement or maintenance. A condition rating and priority has been given to the equipment to identify priority of future upgrades. Recommendations and project time frames have been developed in order to assist the City in prioritizing future projects. The Condition Assessment Forms have been appended to this report.

The Windsor Park Lift Station houses sewage pumping equipment and associated piping and valves located in the dry well lower level. The lift station also includes a natural gas driven auxiliary power generator in the generator building.

TABLE 7.1 : WINDSOR PARK LIFT STATION MECHANICAL OVERVIEW

YEAR CONSTRUCTED	1955
PUMPING CAPACITY	237 L/sec
LOCATION	945 Cottonwood Road
NUMBER OF PUMPS	Two (2)
PUMP HORSEPOWER	P1: 60 HP, P2: 60 HP
TYPE OF PUMPS	Dry Pit Solids Handling
PIPING MATERIAL	Carbon Steel

Several major upgrades have been conducted at the lift station since its construction in 1955, including upgrades in 1976, 1989, and 1998, which included the addition of the generator building and replacement of pumps, piping, and valves. The City Operations and Maintenance Staff have performed tasks to prolong the usable life of the equipment, including routine servicing, preventative maintenance, and building cleanup. In general, the equipment is in “Fair” to “Poor” physical condition.

7.2 Code Review

A review of the lift station equipment was undertaken to verify compliance with current ANSI and Hydraulic Institute design standards. Table 7.2 provides a summary of the code review.

TABLE 7.2: MECHANICAL CODE REVIEW			
YEAR CONSTRUCTED	1955		
LOCATION	945 Cottonwood Road		
PUMPS			
TYPE	Dry Pit Solids Handling		
PUMP LOCATION	Dry Well		
SUCTION SOURCE	Wet Well - Direct Piped		
PIPING			
SUCTION/DISCHARGE DIAMETER	300 mm / 250 mm		
MATERIAL	Carbon Steel		
ITEM	**REQUIREMENT**	**CODE COMPLIANCE**	**CODE REFERENCE / NOTES**
SUCTION INTAKE SUBMERGENCE	250 mm	YES	*ANSI/HI 9.8-2012 Section 9.8.7*
SUCTION INTAKE FLOOR CLEARANCE	100 mm	YES	*ANSI/HI 9.8-2012 Section 9.8.3.2.3.2*
SUCTION INTAKE WALL CLEARANCE	75 mm	YES	*ANSI/HI 9.8-2012 Section 9.8.3.2.3.1*
SUCTION BELL	Required	NO	*ANSI/HI 9.6.6-2016 Section 9.6.6.3.6*
SUCTION PIPING VELOCITY	2.4 m/s	NO	*ANSI/HI 9.6.6-2016 Section 9.6.6.3.1*
SUCTION STRAIGHT PIPE LENGTHS	5	YES	*ANSI/HI 9.6.6-2016 Section 9.6.6.3.3*
PUMP VIBRATION	0.15 in/sec	NO	*ANSI/HI 9.6.4-2016 Section 9.6.4.2.5*
PUMP TEMPERATURE	160 F	YES	*ANSI/HI 9.6.5-2016 Section 9.6.5.2.6*
DISCHARGE PIPING VELOCITY	4.5 m/s	YES	*ANSI/HI 9.6.6-2016 Section 9.6.6.4.1*
VALVES	Isolation / check	YES	*ANSI/HI 9.6.6-2016 Section 9.6.6.4.3*

7.3 Pumps

The lift station houses two (2) dry pit solids handling pumps. P-101 and P-102 are identical Aurora Model 612A pumps. Each is equipped with a 60 HP, 575 VAC, 3 phase, 60 Hz electric motor. Both pumps are rated for 210.0 L/sec at a TDH of 15.2 m and operate at constant speed. P-101 and P-102 were installed in 1998 and are used regularly. Operational staff noted that there have been no issues with the pumps clogging.

The lift station also houses a vertical turbine storm pump (SP-101) that is used to discharge combined sewage and storm water to the outfall system during heavy rainfall events. SP-101 is a Johnston Model JX-17378 pump equipped with a 150 HP, 575 VAC, 3 phase, 60 Hz electric motor. Record information including the design duty point was not available for the storm pump. SP-101 was installed in 1976 and was not functional during the time of inspection.

Overall the pumps are in “Fair” to “Poor” condition. Table 7.3 provides a summary of the condition of the pumps at the Windsor Park Lift Station.

TABLE 7.3: WINDSOR PARK LIFT STATION PUMP CONDITION ASSESSMENT

PUMP	DESCRIPTION	MAKE	MODEL	CONDITION	IMPORTANCE	ACTION
P-101	60 HP DRY PIT SOLIDS HANDLING	AURORA	612A	FAIR	Important	Mid Term
P-102	60 HP DRY PIT SOLIDS HANDLING	AURORA	612A	FAIR	Important	Mid Term
P-103	150 HP VERTICAL TURBINE	JOHNSTON	JX-17378	POOR	Important	Short Term

7.3.1 Vibration and Temperature

MPE collected onsite pump vibration and temperature measurements when the pumps were in operation. Temperature measurements were recorded on the pump motor and volute using an infrared thermometer. Vibration readings were recorded in the x, y, and z axis on the pump motor and volute using a Digital Measurement Metrology Digital Vibration Meter. Table 7.4 provides a summary of the vibration and temperature readings.

TABLE 7.4: WINDSOR PARK LIFT STATION PUMP VIBRATION AND TEMPERATURE

PUMP	VIBRATION (in/s)			TEMPERATURE (F)
	x	y	z	
P-101				
Motor	0.12	0.08	0.18	51
Volute	0.08	0.30	0.05	76
P-102				
Motor	0.17	0.20	0.24	53
Volute	0.03	0.02	0.04	76
SP-101				
Pump not running. No vibration or temperature readings recorded.				

The temperature readings were found to be within the required tolerances as set out in *ANSI/HI 9.6.5-2009 Rotodynamic Pumps – Guideline for Condition Monitoring*. Vibration readings for Pump 1 were found to be above the 0.15 in/s tolerance as set out in *ANSI/HI 9.6.4-2009 Rotodynamic Pumps for Vibration Measurements and Allowable Values.*

7.4 Valves

The majority of the valves were installed in 1998, with the exception of the force main isolation valves and the storm pump discharge valve which were installed in 1976. The manual and pneumatic force main isolation valves are regularly exercised. Operational staff noted that the force main isolation valves are not seating completely. The manually actuated gate valves that are used for isolation of equipment for maintenance and are not regularly exercised. The check valves are critical to the operation of the lift station and are exercised regularly through operation. In general, valves are in “Fair” to “Poor” condition. Table 7.5 provides a summary of the condition of the valves at the station.

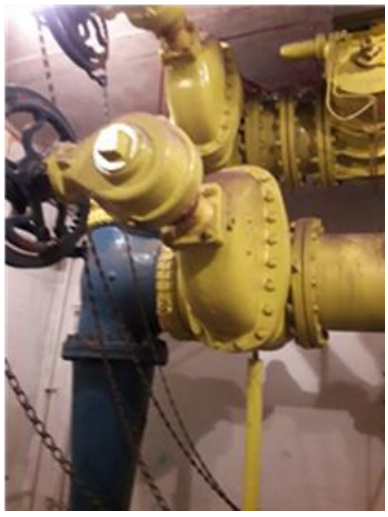


TABLE 7.5: WINDSOR PARK LIFT STATION VALVE CONDITION ASSESSMENT					
VALVE	DESCRIPTION	SIZE	CONDITION	IMPORTANCE	ACTION
GAV-101A	Gate Valve	300 mm	FAIR	Intermediate	Mid Term
GAV-101B	Gate Valve	250 mm	FAIR	Intermediate	Mid Term
GAV-102A	Gate Valve	300 mm	FAIR	Intermediate	Mid Term
GAV-102B	Gate Valve	250 mm	FAIR	Intermediate	Mid Term
GAV-110	Gate Valve	450 mm	POOR	Important	Short Term
GAV-111	Gate Valve	450 mm	POOR	Important	Short Term
CHV-101	Swing Check Valve	250 mm	FAIR	Important	Mid Term
CHV-102	Swing Check Valve	250 mm	FAIR	Important	Mid Term
FV-103	Gate Valve	450 mm	POOR	Intermediate	Short Term
FV-110	Gate Valve	450 mm	POOR	Important	Mid Term
FV-111	Gate Valve	450 mm	POOR	Important	Mid Term

7.5 Piping & Fittings

The lift station includes carbon steel piping for conveyance. The pipe flanges are constructed of carbon steel and stainless steel bolts and nuts have been used. In general, the piping is in "Fair" condition. Table 7.6 provides a summary of the condition of the piping at the Windsor Park Lift Station.

TABLE 7.6: WINDSOR PARK LIFT STATION PIPING CONDITION ASSESSMENT				
PIPING	MATERIAL	CONDITION	IMPORTANCE	ACTION
P-101 Suction Line	Carbon Steel	FAIR	Important	Mid Term
P-102 Suction Line	Carbon Steel	FAIR	Important	Mid Term
P-101 Discharge Line	Carbon Steel	FAIR	Important	Mid Term
P-102 Discharge Line	Carbon Steel	FAIR	Important	Mid Term
Discharge Header	Carbon Steel	FAIR	Important	Mid Term
SEWPCC Discharge Line	Carbon Steel	FAIR	Important	Mid Term
NEWPCC Discharge Line	Carbon Steel	FAIR	Important	Mid Term
Storm Discharge Line	Carbon Steel	FAIR	Important	Mid Term

7.5.1 Non-Destructive Testing

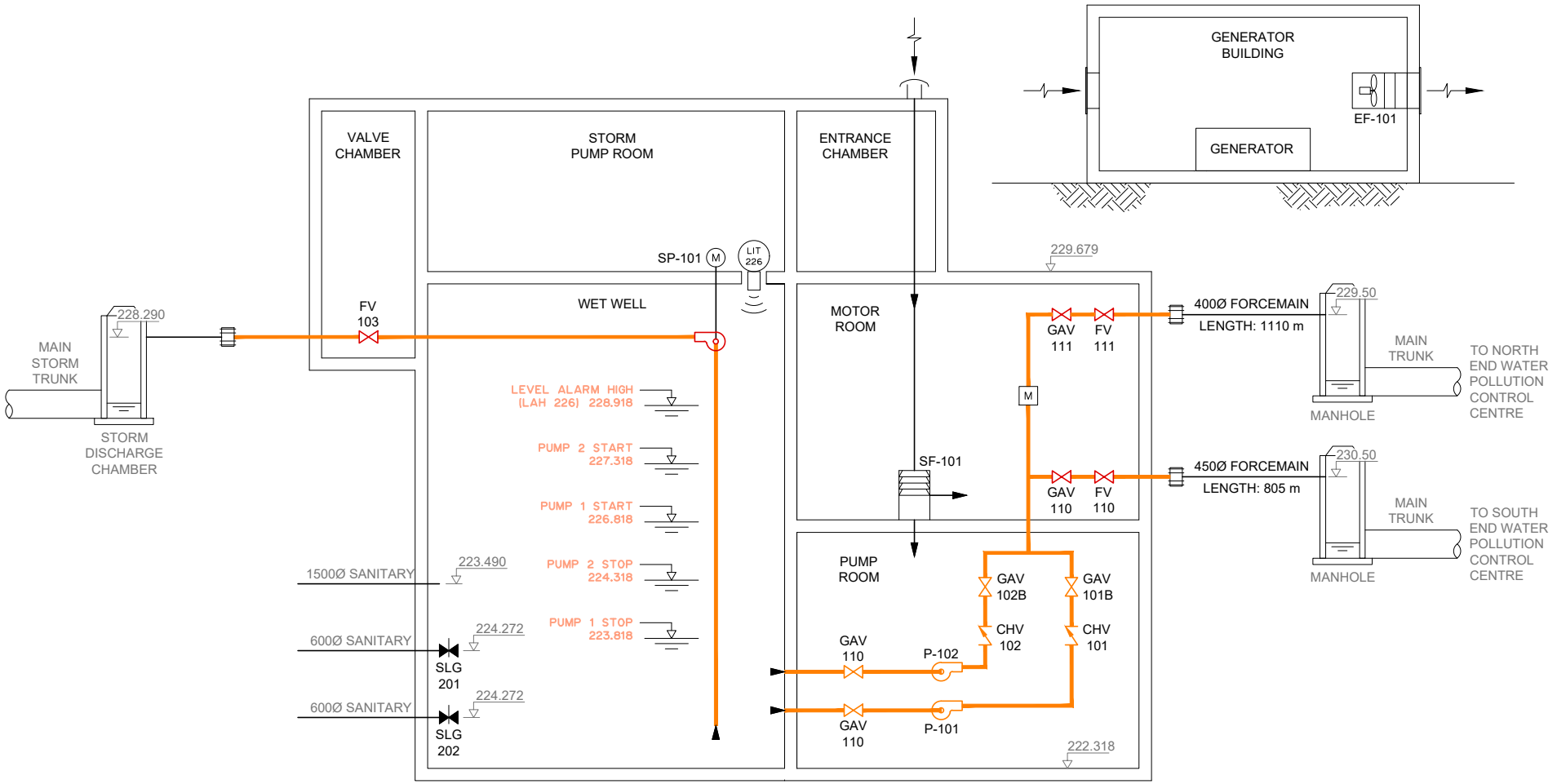
Non-destructive testing was not performed on the piping in the lift station.

7.5.2 Cathodic Protection

The lift station does not include cathodic protection and cathodic protection is not recommended for this station.

7.6 Summary of Condition Assessment

Figure 7.1 provides a graphical summary of the condition assessment of the mechanical components of the Windsor Park Lift Station.



LEGEND

- POOR
- FAIR
- GOOD
- EXCELENT

P-101
- DUTY POINT: 210 L/s @ 15.2 m
- 60 HP. 1185 RPM
- 575 VAC/3 PH/60 Hz

P-102
- DUTY POINT: 210 L/s @ 15.2 m
- 60 HP. 1185 RPM
- 575 VAC/3 PH/60 Hz

SP-101
- 150 HP. 1760RPM
- 575 VAC/3 PH/60 Hz

Winnipeg

MPE Engineering Ltd.

LIFT STATION ASSESSMENTS 2018-2019

WINDSOR PARK
CONDITION ASSESSMENT SUMMARY

SCALE: NTS	DATE: SEPT 2019	JOB: 8400-001-00	FIGURE: 7.1

7.7 Conclusions

The major findings for the Process Mechanical Assessment are summarized as follows:

- The mechanical equipment is generally in “Fair” to “Poor” condition.
- The force main isolation valves are not seating completely
- The storm pump was not operational at the time of inspection.
- The pumping system should be upgraded with new equipment.

7.8 Recommendations

7.8.1 Pump and Piping Replacement (5-10 years)

Due to the age and capacity of the pumping system, it is recommended that the replacement of the pumps, piping, and valves be completed in 5-10 years.

7.9 Improvement Cost Estimates

The capital costs for the recommended improvements are summarized in Table 7.7. These upgrades will provide long-term benefits to the sewage works system operations. The cost estimates include contingency and engineering but do not include taxes.

TABLE 7.7: MECHANICAL EQUIPMENT IMPROVEMENT COST ESTIMATES

ITEM	ACTION	DESCRIPTION	CAPITAL COST
1	Mid Term	Pumping and Piping Replacement	$506,000
TOTAL			**$506,000**

The capital costs for the recommended improvements have been ***estimated in 2019 dollars***. The cost estimate provided is an opinion of probable cost and is a function of many factors that can change with time and hence must not be relied upon as the actual cost. Construction equipment and methods that are commonly used in the industry are assumed for estimating purposes.

8.0 Electrical Equipment Condition Assessment

8.1 Background

This section provides an assessment of the electrical equipment in terms of the condition of individual system components and code and regulation compliance. The assessment identifies existing infrastructure that will require replacement or maintenance. A condition rating and priority has been given to the equipment to identify priority of future upgrades. Recommendations and project time frames have been developed in order to assist the City in prioritizing future projects. The Condition Assessment Forms have been appended to this report.

The Windsor Park Lift Station houses electrical equipment such as pump motors, and full voltage starters.

TABLE 8.1: WINDSOR PARK LIFT STATION ELECTRICAL OVERVIEW

YEAR CONSTRUCTED	1970
LOCATION	945 Cottonwood Road
SERVICE	400 AMP
VOLTAGE	600 VAC
STANDBY GENERATOR SIZE	N/A
NUMBER OF PUMPS	Three (3)
PUMP HORSEPOWER	P-101: 60HP, P-102: 60HP, P-103: 150HP

8.2 Code Review

As part of the condition assessment of the equipment and installation methods at the Windsor Park Lift Station, MPE reviews equipment and installations to assess whether standards set forth in applicable codes and regulations are met. The Canadian Electrical Codes CSA C22.1-15 and NFPA 820 are of particular relevance for wastewater lift station electrical systems. According to the NFPA 820 Table 4.2 Row 17, a below grade or partially below grade wastewater pumping station dry well that is ventilated with fewer than 6 air changes per hour is to be classified as a Zone 2 (or Class 1 Division 2) space. The dry well air space is not ventilated continuously to the minimum standards to achieve an unclassified rating. Currently, the electrical equipment within the station is not rated for use in a Zone 2 space; therefore, it is recommended that the ventilation system be upgraded to provide the necessary air changes to achieve an unclassified rating. Row 1 of Table 9.1.1.4 in the NFPA 820 requires a minimum of 12 air changes per hour to classify a wet well as a Zone 2 (or Class 1 Division 2) space. This lift station is unable to meet the required number of air changes per hour and is classified as a Zone 1 space.

CSA C282 provides the standard for emergency electrical power supplies for buildings where emergency electrical supplies are required by the National Building Code of Canada, and for essential electrical systems such as health care facilities. Emergency power generation is not required at this facility under this definition. Therefore it is not required that this installation adhere to the requirements of the CSA 282 standard. Table 8.2 provides a summary of the code review.

TABLE 8.2: ELECTRICAL CODE REVIEW			
YEAR CONSTRUCTED	1970		
LOCATION	945 Cottonwood Road		
WET WELL			
HAZARDOUS LOCATION CLASSIFICATION	Zone 1		
CORROSIVE ENVIRONMENT CATEGORY	Category 1		
DRY WELL			
HAZARDOUS LOCATION CLASSIFICATION	Zone 2		
CORROSIVE ENVIRONMENT CATEGORY	Category 2		
ITEM	**REQUIREMENT**	**CODE COMPLIANCE**	**CODE REFERENCE / NOTES**
EXPLOSION PROOF INSTALLATION	Required	NO	*CSA 22.1-15 CEC Section 18, NFPA 820*
AIR CHANGES FOR UNCLASSIFED RATING	6 air changes in dry well	NO	*NFPA 820*
AIR CHANGES FOR ZONE 2 RATING	12 air changes in wet well	NO	*NFPA 820*
CORROSIVE ENVIRONMENT WIRING	Required	NO	*CSA 22.1-15 CEC Section 22*
MINIMUM CLEARANCE	1 m Required	YES	*CSA 22.1-15 CEC Section 2-308*
MOTOR OVERCURRENT PROTECTION	Motor Breakers Adequate	YES	*CSA 22.1-15 CEC Section 28-200*
FEEDER OVERCURRENT PROTECTION	Service Breaker Adequate	YES	*CSA 22.1-15 CEC Section 28-204*
EMERGENCY POWER SUPPLY	Sufficient Capacity	YES	*CSA 22.1-15 CEC Section 46-202*
EMERGENCY POWER SUPPLY	Onsite Fuel Storage	YES	*CSA C282 (Not Required)*

8.3 Electrical Service Entrance Equipment

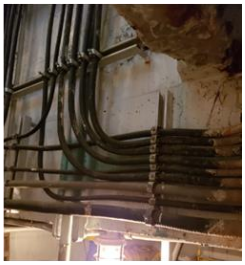
The electrical service is 600 VAC, 3 Phase, 400 Amp, 60 Hz service. The service is fed underground via a pad mount transformer. The main service and associated equipment is mounted within the generator building separate from the drywell structure. Windsor Park lift station's main service is constructed with the use of a Motor Control Centre (MCC) which then routes unground feeding the electrical equipment in the drywell structure. The 600VAC step down transformer is currently mounted in a location that restricts access to the panelboard, MCC bussing, and termination points do not appear to have been torqued, as no torque indicating marks are present. Table 8.3 provides a summary of the condition of the service entrance equipment at the Windsor Park Lift Station.

TABLE 8.3: WINDSOR PARK LIFT STATION SERVICE ENTRANCE EQUIPMENT CONDITION ASSESSMENT

DESCRIPTION	RATED VOLTAGE	CONDITION	IMPORTANCE	ACTION
Main Breaker	600 VAC	Good	Important	Short Term
Meter	600 VAC	Fair	Important	Short Term

8.4 Cable and Conduit

The wiring style in Windsor Park Electrical Building is run primarily using EMT while underground cabling has been done primarily using Teck cable. The drywell has a combination of Teck cabling, rigid conduit, and liquid tight flex.



8.5 Motors

The lift station is equipped with three (3) pumps. Each pump utilizes a 575 VAC 3 phase electric motor. Both sanitary pumps are equipped with a 60HP U.S Motors electric motor. While the storm pump is equipped with a 150HP Brook Electric motor. The vent motor in the generator building is a 575V 3HP Baldor electric motor. The vent motor nameplate in the drywell was not visible for verification. Drywell air compressor is equipped with a 575V 5HP A.O. Smith electric motor. The pump motors for P-101, P-102, and P-103 appear to have been previously painted, assuming in an attempt to reduce corrosion affecting the motors. Even with attempts to reduce corrosion by painting the motors, surface corrosion is evident. This is likely a result of inadequate ventilation to clear the corrosive gases present in this station. For that reason, the life expectancy of these motors has been reduced substantially. These motors are in "Poor" condition. Both vent motors and the air compressor motor appear to be in "Good" condition. It is recommended that motors for P-101, P-102, and P-103 be replaced as part of a general electrical upgrade. Table 8.4 provides a summary of the condition of the motors at the Windsor Park Lift Station.

TABLE 8.4: WINDSOR PARK LIFT STATION MOTOR CONDITION ASSESSMENT

DESCRIPTION	HORSEPOWER	CONDITION	IMPORTANCE	ACTION
P-101 Motor	60HP	Poor	Important	Short Term
P-102 Motor	60HP	Poor	Important	Short Term
P-103 Motor	150HP	Poor	Important	Short Term
Air Comp Motor	5HP	Good	Important	Mid Term
Vent Motor 1	3HP	Good	Important	Long Term
Vent Motor 2	N/A	Good	Important	Mid Term

8.5.1 Motor Circuit Analysis/ HIPOT Testing

A motor circuit analysis was not conducted.

8.6 Full Voltage Starters

Each pump is equipped with a Full Voltage Non Reversing (FVNR) starter. The FVNRs appear in "Good" condition. They are original to the building, which means the remaining service life is under 25%.

TABLE 8.5: WINDSOR PARK LIFT STATION MOTOR STARTER CONDITION ASSESSMENT

DESCRIPTION	RATED VOLTAGE	CONDITION	IMPORTANCE	ACTION
P-101 FVNR	600 VAC	Good	Important	Short Term
P-102 FVNR	600 VAC	Good	Important	Short Term
P-103 FVNR	600 VAC	Good	Important	Short Term
P-104 FVNR	600 VAC	Good	Important	Short Term
P-105 FVNR	600 VAC	Good	Important	Short Term
Vent 1 FVNR	600 VAC	Good	Important	Short Term

8.7 Transformers, Panelboards, and Distribution Equipment

Distribution Equipment is fed via a pad mount MCC. Distribution equipment appears to be in "Good" condition. The main lighting panel is fed from a floor mounted 600VAC:120/240VAC step down transformer. The transformer is in "Fair" condition and the lighting panel is in "Good" condition. Table 8.6 provides a summary of the condition of the transformers, panelboard, and distribution equipment at Windsor Park Lift Station.

TABLE 8.6: WINDSOR PARK LIFT STATION TRANSFORMERS, PANELBOARDS, AND DISTRIBUTION EQUIPMENT CONDITION ASSESSMENT

DESCRIPTION	RATED VOLTAGE	CONDITION	IMPORTANCE	ACTION
Main Lighting Panel	120/240VAC	Good	Intermediate	Short Term
Dry Type Transformer	600:120/240 VAC	Fair	Intermediate	Short Term
Building Envelope Lighting	120VAC	Fair	Intermediate	Short Term
Emergency Lighting	N/A	N/A	Intermediate	Short Term

8.7.1 Lighting

Lighting at the Windsor Park lift station has been update to fluorescent fixtures within the generator building. The drywell lighting is outdated and original to the station. This does not comply with the recommended fixtures of LED or F32T8 set forth in the City of Winnipeg Design Guide. Two exterior fixtures are located by the man door of the generator building. These fixtures are original to the building and require maintenance attention as one fixture is missing the cover and bulb, while the other appears to be burnt out.

8.7.2 Emergency Lighting

While an emergency lighting pack is installed within the generator building, it has been unplugged and is not operational.

8.8 Standby Power Generators and Engines

The Windsor Park Lift Station relies upon a Cummins 325kW generator for standby power. This generator was installed in 2009. The generator and associated controls are in "Good" condition. It appears annual load testing has not been taking place. The maintenance record sticker affixed to the automatic transfer switch suggests load testing has not occurred since its date of install.

8.9 Conclusions

The major findings for the electrical equipment at the Windsor Park Lift Station are summarized as follows:

- In general, the electrical equipment within the generator building is in "Good" condition.
- While equipment in the generator building is in "Good" condition, it is nearing the end of its expected service life.
- In general, the electrical equipment within the drywell is in "Poor" condition.
- The dry well requires a ventilation upgrade in order for the existing electrical equipment to meet the Canadian Electrical Code.

8.10 Recommendations

8.10.1 Project 1: Electrical Upgrade (0-10 years)

It is recommended to design and execute a full electrical upgrade in two phases. Phases one being of higher priority and should be completed within a 0-5 year time frame. Phase one would include the improvement and replacement of electrical equipment within the drywell structure. The majority of this equipment has endured substantial corrosion and is in "Poor" condition. Phase two would include new service equipment within the generator building. The electrical equipment in the generator building is in "Good" condition with routine maintenance, the City will have five to ten years of remaining service life on this equipment. Prior to any drywell electrical upgrades, it is recommended to solve all heating and ventilation concerns so any new electrical equipment will not have a shortened life expectancy due to moisture and corrosive atmospheres. It is recommended to include existing generator and transfer switch into the new electrical upgrade.

8.11 Improvement Cost Estimates

The capital costs for the recommended improvements have been estimated and are summarized in Table 8.7. These upgrades will provide long-term benefits to waterworks system operations. The cost estimates include contingency and engineering but do not include taxes.

TABLE 8.7: ELECTRICAL EQUIPMENT IMPROVEMENT COST ESTIMATES

Item	Action	Description	Capital Cost
1	Short-Term	Electrical Upgrade	$173,000
		Total:	**$173,000**

The capital costs for the recommended improvements have been ***estimated in 2019 dollars***. The cost estimate provided is an opinion of probable cost and is a function of many factors that can change with time and hence must not be relied upon as the actual cost. Construction equipment and methods that are commonly used in the industry are assumed for estimating purposes. Refer to **Appendix E** for the complete details of the capital cost estimate.

9.0 Controls & Instrumentation Conditions Assessment

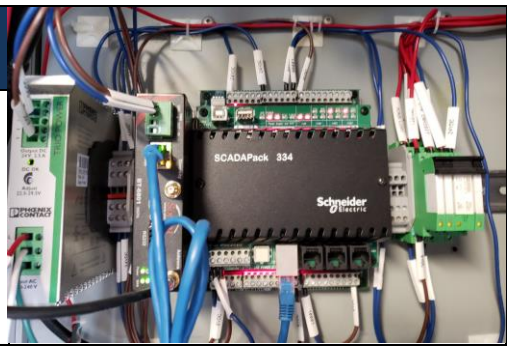
9.1 Background

This section provides an assessment of the controls and instrumentation equipment in terms of the condition of individual system components and code and regulation compliance. The assessment identifies existing infrastructure that will require replacement or maintenance. A condition rating and priority has been given to the equipment, identifying future upgrades. Recommendations and project time frames are presented to assist the City in prioritizing future projects. The Condition Assessment Forms have been appended to this report.

The Windsor Park Lift Station control system consists of a Schneider SCADAPack 334 and a Pressure Based Level Transmitter with a Float Level Switch.

TABLE 9.1: WINDSOR PARK LIFT STATION CONTROLS & INSTRUMENTATION OVERVIEW

YEAR CONSTRUCTED	2015 (1970)
LOCATION	945 Cottonwood Road
LAST AUTOMATION UPDATE	2015
CONTROLLER	SCADAPack 334
PROGRAMMING SOFTWARE	
COMMUNICATION TYPE	4G Cellular Communication with PSTN Backup
SCADA SOFTWARE	



9.2 Control Systems

A SCADAPack 334, Remote Telemetry Unit (RTU), monitors the lift station. The RTU is used for monitoring and reporting only. Pump control is done via a Pressure Based Level Transmitter. Currently, the station does not have control redundancy. This has been added to prior lift station upgrades and would be a recommended upgrade at the Windsor Park Lift Station. Field devices include one Pressure Based Level Transmitter, one Precision Digital Level Unit, and a float level switch.

9.2.1 Manual Control

Manual controls are located on the sub grade level in the drywell structure. Hand-Off-Auto switches are stand-alone wall mounted devices within close proximity to their associate motor. Manual control is achieved by turning the local switch to the Hand position, the motor becomes locally controlled by operations. Manual controls are functional and appear to have been recently replaced using a PVC enclosure.

9.2.2 Programmable Logic Controllers (PLC) and Remote Telemetry Units (RTU)

The RTU controller in use at this lift station is a SCADAPack 334. While this RTU is capable of controlling the equipment at this lift station, it is used to monitor the lift station only. This means that the station control is isolated from internet-connected devices. A PLC or RTU controller allows for custom lift station operation that can be programmed by any local integrator as well as the ability to adjust set points and operate pumps remotely if used for pump control. Prior to future upgrades, the City should evaluate if these functions are desired. Options for securing communications should be explored at that time. The condition of the RTU controller is in “Good” condition. No physical degradation of the controller was noted.

9.2.3 Human Machine Interface (HMI)

Windsor Park Lift Station is not equipped with an HMI.

9.2.4 Control Panel

The control panel is located in the generator building as an extension of the MCC sections and contains the SCADA PACK 334 as well as all of the equipment required for reporting to the SCADA system at Mcphillips Control Centre. The general condition of this panel and the equipment it contains is "Good". Wiring methods are disorganized and not contained within the Panduit. Terminations are secure and cabling appears to be in "Good" condition. Wire labelling is applied to both ends of the wire and device tagging has been used.

9.2.5 SCADA

The RTU controller is integrated into the central SCADA application at the McPhillips Control Centre. Data collected by the RTU is transmitted via cellular communication to the SCADA application

9.2.6 Communication Hardware

Communications to the Windsor Park Lift Station are accomplished using MTS 4G cellular communication. The station reports to the McPhillips Control Centre SCADA application at regular intervals via the communication link. A Sixnet cellular modem acts as the primary communications device enabling this link. The router is in "Good" condition. Table 9.2 provides a summary of the condition of the control equipment at Windsor Park Lift Station.

TABLE 9.2: WINDSOR PARK LIFT STATION CONTROL PANEL CONDITION ASSESSMENT

CONTROL PANEL	DESCRIPTION	CONDITION	IMPORTANCE	ACTION
Control Panel	Pump Controls and Monitoring	Fair	Important	Short Term
Generator Controls	Back up power with ATS	Good	Important	N/A
Communications Equipment	Sixnet Cellular Modem	Good	Low	N/A
Level Display	Drywell Subgrade	Fair	Low	Short Term

9.3 Instrumentation

Instrumentation at the Windsor Park Lift Station includes one Pressure Based Level Transmitter, a float level switch, a Rosemount Flow Transmitter, a Precision Digital Level Unit, two united electric pressure switch's, a continuous gas detection monitor, and ambient building temperature. Instrumentation within the generator building is in "Good" condition. Instrumentation within the drywell ranges from "Good" to "Poor" condition due to recent install and replacements of equipment. Table 9.3 provides a summary of the condition of the instrumentation at the station.

TABLE 9.3: WINDSOR PARK LIFT STATION INSTRUMENTATION CONDITION ASSESSMENT				
INSTRUMENTATION	**DESCRIPTION**	**CONDITION**	**IMPORTANCE**	**ACTION**
LIT-101	Level Transmitter	Fair	Important	Short Term
LSHH-101	Building Flood Detector	Good	Low	Long Term
AIT-101	Toxic & Combustible Gas Detector	Good	Improtant	Mid Term
TT-101	Building Ambient Temperature	Good	Low	Long Term
FIT-101	Flow Transmitter	Good	Important	Mid Term
PSL-101	Gen Building Pressure Switch	Good	Important	Mid Term
PSL-102	Drywell Pressure Switch	Critical	Important	Short Term

9.3.1 Process Control

9.3.1.1 Pumping

The primary process control device used at the Windsor Park Lift Station is a Pressure Based Level Transmitter. The condition of the level transmitter appears to be in "Fair" condition. There is currently no redundancy in case of instrument failure. Pumps start and stop based on the wet well level determined by these devices. It is recommended that a redundant ultrasonic level transmitter be installed to mitigate the risk of environmental damage and damage to property resulting from a flood situation.

9.3.2 Gas Monitoring

Fixed continuous gas monitoring is on site but only monitors the generator building. There are currently no gas detection devices within the drywell structure. When entering and occupying the dry well structure, City staff utilize personal gas detection monitor.

9.3.3 Process Monitoring

The wet well level is monitored continuously using the Pressure Based Level Transmitter. The wet well level is transmitted back to the central SCADA application where they are monitored by operations staff. Issues arising from out of normal values are highlighted with alarms and operations staff are notified to take action. Flow is continuously monitored using a Rosemount Flow Transmitter, allowing operations the ability to see pump performance along with providing the City with more data on flow outputs from the lift station for future planning.

9.3.4 Building Monitoring

Building alarms, including flood detection, are transmitted back to the central SCADA application. Operators are notified if an alarm condition exists and are able to take action to correct the alarm. No heat detector is installed at this station; it is recommended that one be installed in the generator building and in the drywell.

9.4 Pump Control Strategy & Reliability Review

9.4.1 Sanitary

The pump control strategy employed at this station is a basic level based pump control system. Each pump has a start level and a shut down level that are offset such that more pumps are enabled as the level becomes higher. Multiple pumps increase system reliability; however, this system does not have complete redundancy.

9.5 Conclusions

The major findings for the controls and instrumentation at Windsor Park Lift Station are summarized as follows:

- The automation platform in use at this lift station is adequate for the needs of the station; however, it does not provide remote set point or remote pump control capability.
- No redundant level detector presents an environmental risk if the primary level detector fails.
- Control panel is currently incorporated into the MCC.

9.6 Recommendations

9.6.1 Project 1: Controls Upgrade (0-5 years)

The Windsor Park Lift Station control upgrades should include isolating the control panel to a stand-alone panel separate from the MCC. Components such as the UPS system should be upgraded to match current City lift stations and redundant level sensors should be incorporated to mitigate environmental risk.

9.7 Improvement Cost Estimates

The capital costs for the recommended improvements have been estimated and are summarized in Table 9.4. These upgrades will provide long-term benefits to waterworks system operations. The cost estimates include contingency and engineering but do not include taxes.

TABLE 9.4: CONTROLS & INSTRUMENTATION IMPROVEMENT COST ESTIMATES

ITEM	ACTION	DESCRIPTION	CAPITAL COST
1	Short-Term	Controls Upgrade	$82,500
		Total:	**$82,500**

The capital costs for the recommended improvements have been ***estimated in 2019 dollars***. The cost estimate provided is an opinion of probable cost and is a function of many factors that can change with time and hence must not be relied upon as the actual cost. Construction equipment and methods that are commonly used in the industry are assumed for estimating purposes. Refer to **Appendix C** for the complete details of the capital cost estimate.

10.0 Dry & Wet Well Ventilation Review

10.1 Background

The Windsor Park Lift Station ventilation system includes a centrifugal supply fan located in the dry well and a sidewall exhaust fan located in the generator building. The dry well supply fan forces air into dry well lower level to create a positive pressure in the building. Fresh air is exhausted out of entrance hatch to the dry well. The generator building exhaust fan is used intermittently for cooling when the generator is in operation. There is no permanent wet well ventilation system in place. Operational staff noted that there has been no history of odour complains at the lift station and there is some condensation in the dry well in the summer months. In general, the equipment is in "Fair" operational condition. The Condition Assessment Forms have been appended to this report.

TABLE 10.1: WINDSOR PARK LIFT STATION VENTILATION OVERVIEW	
YEAR CONSTRUCTED	1989
ODOUR CONTROL	No
DRY WELL	
VENTILATION TYPE	Intermittent
VENTILATION RATE	995 m^3/hr
WET WELL	
VENTILATION TYPE	N/A
VENTILATION RATE	N/A

10.2 Ventilation Requirement Review

Table 10.2 provides a summary of the ventilation system at the Windsor Park Lift Station.

TABLE 10.2: WINDSOR PARK LIFT STATION VENTILATION REQUIREMENTS

VENTILATED AREA	VOLUME (m^3)	VENTILATION FREQUENCY	REQUIRED AIR CHANGES PER HOUR	REQUIRED VENTILATION RATE (m^3/hr)	CURRENT VENTILATION RATE (m^3/hr)	VENTILATION TYPE
Dry Well	214	Intermittent	30	6,421	995	Exhaust Fan
Wet Well	121	Intermittent	30	3,622	N/A	N/A

The dry well and wet well ventilation systems are undersized to meet NFPA 820 and Ten States ventilation requirements of 30 air changes per hour when used intermittently. There is no wet well ventilation system in place.

10.3 Ventilation Equipment

10.3.1 Fans, Blowers, & Blower Heaters

The dry well supply fan was installed in 1989 and the generator building exhaust fan was installed in 1976. MPE tested the airflow using a portable anemometer to confirm building airflows. In general, the fans are in "Fair" condition. Table 10.3 provides a summary of the condition of the fans at the Windsor Park Lift Station.

TABLE 10.3: WINDSOR PARK LIFT STATION FAN CONDITION ASSESSMENT

EQUIPMENT	DESCRIPTION	CONDITION	IMPORTANCE	ACTION
EF-101	1/3 HP Centrifugal Supply Fan	FAIR	Important	Short Term
EF-102	3 HP Sidewall Exhaust Fan	FAIR	Intermediate	None

10.3.2 Intake and Exhaust Louvres and Dampers

The generator building includes supply and exhaust louvres and dampers. When the exhaust fan starts, the supply and exhaust dampers open. Operational staff noted that the generator room dampers stick open at times in the winter months. The dry well includes a louvred penthouse intake to the supply fan. There are no exhaust louvres or dampers in place in dry well. The louvres and damper are in "Fair" condition.

10.3.3 Ventilation System Balancing

The dry well ventilation system includes ducting for fresh air supply. There is no exhaust ducting in place in the dry well. Fresh air is forced out of the dry well access hatch, which requires the access hatch to be open in order for the ventilation system to function correctly.

10.4 Odour Control System

The lift station is not fitted with an odour control system.

10.5 Conclusion

The major findings for the Ventilation System Assessment are summarized as follows:

- The dry well continuous ventilation system is undersized for the dry well fresh air requirements.
- There is no exhaust ducting in place in the dry well.
- There is no wet well ventilation system in place.

10.6 Recommendations

10.6.1 Wet Well Ventilation System (0-5 years)

It is recommended that an intermittent ventilation system be installed to provide the required 30 air changes per hour in the wet well. The upgrades would include installation of a new fan and ducting to provide fresh air directly into the wet well.

10.6.2 Dry Well Ventilation System Upgrades (0-5 years)

In order to provide a ventilation system that meets the required air changes per hour and reduces building corrosion and condensation, it is recommended that the existing ventilation system be upgraded to increase the capacity. The upgrades would include installation of blower heater that would connect to the existing ducting entering the dry vault to provide heated fresh air to the space to code requirements.

10.7 Improvement Cost Estimates

The capital costs for the recommended improvements are summarized in Table 10.4. These upgrades will provide long-term benefits to the sewage works system operations. The cost estimates include contingency and engineering but do not include taxes.

TABLE 10.4: WINDSOR PARK LIFT STATION VENTILATION SYSTEM RECOMMENDED PROJECTS

ITEM	ACTION	DESCRIPTION	CAPITAL COST
1	Short Term	Wet Well Ventilation System	$40,000
2	Short Term	Dry Well Ventilation System Upgrades	$36,000
		TOTAL:	**$76,000**

The capital costs for the recommended improvements have been ***estimated in 2019 dollars***. The cost estimate provided is an opinion of probable cost and is a function of many factors that can change with time and hence must not be relied upon as the actual cost. Construction equipment and methods that are commonly used in the industry are assumed for estimating purposes.

11.0 Recommendations

11.1 Recommended Projects

A list of recommended improvements has been prepared. For each recommended item, an "Action" was assigned based on an established methodology indicating the time period when the improvement should be completed.

Through the development of recommendations relative to system improvements or upgrades, projects were identified as either "Maintenance", "Capital", or "Study" projects. The differentiation between "Maintenance" and "Capital" projects was established based on our understanding of the scope of the project, project cost, and the assumed ability of the City to perform the work required utilizing in-house resources. Recommended improvements for the sewage lift station are presented in Table 11.1.

TABLE 11.1: SUMMARY OF RECOMMENDED IMPROVEMENTS - WINDSOR PARK

Item	Project Type	Action	Cost
Facility Condition Assessment			
Site Conditions	Maintenance	Short Term	$500
Foundations			$0
Primary Structural Systems	Study	Mid Term	$20,000
Secondary Structural Systems	Capital	Mid Term	$113,700
Building Envelope	Maintenance	Mid Term	$5,000
Roofing	Maintenance	Short Term	$1,500
Building Mechanical	Capital	Short Term	$3,500
Subtotal:			**$144,200**
Mechanical Equipment Condition Assessment			
Pump Replacements	Capital	Short Term	$330,000
Valve Replacements	Capital	Short Term	$108,000
Pipe Replacements	Capital	Short Term	$68,000
Subtotal:			**$506,000**
Electrical Equipment Condition Assessment			
Main Service	Capital	Short Term	$20,000
Breakers	Capital	Short Term	$7,000
Starters	Capital	Short Term	$35,000
Distribution Panel	Capital	Short Term	$5,000
Motors	Capital	Short Term	$50,000
Transformers	Capital	Short Term	$55,000
ATS	Study	Short Term	$1,000
Subtotal:			**$173,000**
Controls & Instrumentation Condition Assessment			
Control Panels	Capital	Mid Term	$50,000
UPS	Capital	Mid Term	$2,500
Level Unit	Capital	Mid Term	$25,000
Level Transmitter	Capital	Mid Term	$5,000
Subtotal:			**$82,500**
Dry & Wet Well Ventilation Review			
Wet Well Ventilation System	Capital	Short Term	$40,000
Dry Well Ventilation System Replacement	Capital	Short Term	$36,000
Subtotal:			**$76,000**
Total			
Total Estimated Cost - All Recommended Improvements:			**$981,700**

All recommendations were given an associated cost to implement. Cost estimates provided were based on engineering judgment for the component replacement value, and do not include ancillary costs associated with replacing a component. The cost estimates are intended to be used as a measure of comparing the lift stations, and are not intended to be used for budgetary numbers. Actual replacement costs will require further investigation.

11.2 Code Compliance & Safety Concerns

A list of the code compliance and safety concerns for the sewage lift station are presented in Table 11.2.

TABLE 11.2: CODE COMPLIANCE & SAFETY CONCERNS - WINDSOR PARK LIFT STATION

Item Description	Type
Site Conditions	
Traffic is a hazard when accessing the lift station via a busy intersection	Safety
Foundations	
Primary Structural Systems	
Secondary Structural Systems	
The ladder to the lower level does not have proper clearance	Code Compliance
There is no device to hold main entrance hatch open	Code Compliance
The main entrance door is at the landing of the stairs	Code Compliance
There is insufficient clearance around the the main entrance handrail	Code Compliance
Swing gates missing at openings in floor slab	Code Compliance
A wet well access opening is only covered with plywood.	Safety
Building Envelope	
Roofing	
Building Mechanical	
There is no current fire suppression system in the vault.	Code Compliance
Building Ventilation	

Appendix A

Facility Condition Assessment Forms

Project No.: 8400-001-00
Tag: **STR_Site_Conditions**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FACILITY CONDITION ASSESSMENT
SITE CONDITIONS

Assessor: Mark Baker
Date Assesed: 29-Jun-19

SECTION	ITEM	DATA		ASSESSMENT SCORES				AGE		
		Site Conditions: - Access to site, site grading, landscaping, perimeter fencing		Current Physical Condition	Fitness For Purpose		Safety	Year Installed	Expected Service Life	Remaining Service Life
Tag: STR_Site_Conditions	GENERAL	CODE COMPLIANCE ISSUES:		3.0	3.4		5.0			0
		SAFETY ISSUES: Traffic hazard to access the lift station via busy intersection		Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Site Access Road & Parking Lot:** *Issues for Discussion:* - Condition of surface -potholes, mud, etc - Proper bollards in place to protect infrastructure	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.4	*NOTES & COMMENTS:* - Access to Lift Station requires entry at a busy intersection. Traffic poses a hazard. - Bollards and guard rails protect access hatches. Guard rails are not sufficient to stop vehicles. - Generator building easily accessed, large areas for parking - Suitable site grading at generator building - Low hanging wires near generating station are in contact with a nearby tree			
		Site Grading & Landscaping: *Issues for Discussion:* - Ponding water on site - Ground sloped away from the building - Condition of vegetation on site - Trees overhanging powerlines or building - Trees blocking sight lines for access / exit	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.3					
		Fencing & Signage: *Issues for Discussion:* - Signage in place / visible - Fence and gate condition - *Warning signage appropriate*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.3					
	Fitness for Purpose	**Site Access Road & Parking Lot:** *Issues for Discussion:* - Sight lines entering and exiting the site - Sufficient parking space - Emergency vehicle accessibility	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.4	*RECOMMENDATIONS:* Prune back tree from contacting electrical service	*COST ESTIMATE* $ 500.00			
		Site Grading & Landscaping: *Issues for Discussion:* - Suitibility of landscaping for the community - Grading sufficient to drain site	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.2					
		Fencing & Signage: *Issues for Discussion:* - Signage reflect important information, emergency # - Fencing and gate appropriate or needed for security	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.4					
	Safety	**Public and Operator Safety:** *Issues for Discussion:* - Historical safety incidents, or potential conditions - Evacuation of personnel (davit, gear, hatch locations)	Rating 1: No Public Safety issues Rating 3: No record of incidents,possible concerns Rating 5: Historic incidents or probable safety risks	5	1					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **STR_Foundations**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FACILITY CONDITION ASSESSMENT FORM
FOUNDATION

Assessor: Mark Baker
Date Assesed: 29-Jun-19

SECTION	ITEM	DATA		ASSESSMENT SCORES				AGE		
		Foundations: - Foundation Slab, Below Grade Walls, Below Grade Columns and Beams		Current Physical Condition	Fitness For Purpose		Safety	Year Installed	Expected Service Life	Remaining Service Life
Tag: STR_Foundations	GENERAL	CODE COMPLIANCE ISSUES: SAFETY ISSUES:		3.4	3.7		3.0			0
				Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Base Slab:** *Issues for Discussion:* - Cracking, spalling, moisture infiltration - Evidence of settlements - Sump and Pump - Groundwater seepage deterioration - Effluorescence, salts from groundwater	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.3	*NOTES & COMMENTS:* - No evidence of foundation issues for generating station - Minor surface cracking in lift station base slabs - Minor concrete deterioration - Pooling in some areas - Deterioration around sump - Wet well concrete appears sound. Excessive corrosion has resulted in the access ladder falling into the well. - Arrangement of lift station is not suitable for safe access and functionality.			
		Below Grade Exterior Walls, Columns and Beams: *Issues for Discussion:* - Cracking, spalling, moisture infiltration - Evidence of movement - Degredation at base of columns - Damage from equipment operation / removal	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.3					
		Wet Well: *Issues for Discussion:* - Cracking, spalling, corrosion - Seepage through wet well wall	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.4					
	Fitness for Purpose	**Base Slab:** *Issues for Discussion:* - Sufficient space for equipement - Floor sloped sufficient to drain	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.3	*RECOMMENDATIONS:* Review alternatives to relocate the Lift Station out of the intersection	*COST ESTIMATE*			
		Below Grade Exterior Walls: *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.4					
		Columns and Beams: *Issues for Discussion:* - Interference with function or equipment removal	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.3					
	Safety	**Public and Operator Safety:** *Issues for Discussion:* - *Potential safety hazards* - Evacuation of personnel (davit, gear, hatch locations)	Rating 1: No Public Safety issues Rating 3: No record of incidents,possible concerns Rating 5: Historic incidents or probable safety risks	3	1					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **STR_Primary_Str_Systems**
Facility: Windsor Park Lift Station

FACILITY CONDITION ASSESSMENT FORM
PRIMARY STRUCTURAL SYSTEMS

Assessor: Mark Baker
Date Assesed: 16-May-19

SECTION	ITEM	DATA		ASSESSMENT SCORES: Current Physical Condition	Fitness For Purpose		Safety	AGE: Year Installed	Expected Service Life	Remaining Service Life
Tag: STR_Primary_Str_Systems		**Primary Structural Components:** - Loadbearing walls, Columns, Beams, Trusses, Joists, Suspended floors								
	GENERAL	CODE COMPLIANCE ISSUES: SAFETY ISSUES:		3.7	3.7		3.0			0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Loadbearing walls, columns, beams:** *Issues for Discussion:* - Deterioration of concrete - Corrosion of steel (beams, column base, anchors…)	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.4	*NOTES & COMMENTS:* - No evident structural concerns in generating station, though the steel beam ends behind the deteriorated plywood covers should be checked - Numerous modifications to the structure have compromised the structural integrity of the concrete. Further investigation is recommended to confirm sufficient capacity if lift station is to be kept in service in this location. - Damage to concrete column near entrance of lift station - Mechanical penetrations were saw-cut and jackhammered - Rebar is exposed in many places especially near mechanical penetrations - Exposed rebar has corroded and damaged concrete in several locations - Infiltration noted in many areas - Surface damage to concrete due to moisture is commonplace - Damaged concrete on NE wall of slide gate operation chamber		
		Trusses and Joists: *Issues for Discussion:* - Corrosion	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.3					
		Suspended Floors: *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.3					
	Fitness for Purpose	**Loadbearing walls, columns, beams:** *Issues for Discussion:* - Suitable access to equipment, levels - Compliance with Codes and Standards	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.4	*RECOMMENDATIONS:* Compete a structural assessment of the concrete capacity if operation is to continue. Assessment should include surcharge loading from vehicles	*COST ESTIMATE* $ 20,000.00			
		Trusses and Joists: *Issues for Discussion:* - Clearance	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.3					
		Suspended Floors: *Issues for Discussion:* - Sufficient Space for layout	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.3					
	Safety	**Public and Operator Safety:** *Issues for Discussion:* - *Potential safety hazards* - Evacuation of personnel (davit, gear, hatch locations)	Rating 1: No Public Safety issues Rating 3: No record of incidents,possible concerns Rating 5: Historic incidents or probable safety risks	3	1					
	PHOTOGRAPHS	   								

Project No.: 8400-001-00
Tag: **STR_Secondary_Str_Systems**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FACILITY CONDITION ASSESSMENT FORM
SECONDARY STRUCTURAL SYSTEMS

Assessor: Mark Baker
Date Assesed: 16-May-19

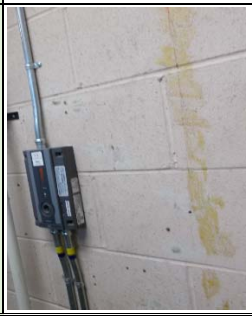
SECTION: Tag: STR_Secondary_Str_Systems

ITEM	DATA		ASSESSMENT SCORES: Current Physical Condition	Fitness For Purpose		Safety	AGE: Year Installed	Expected Service Life	Remaining Service Life
	Secondary Structural Components: - Stairs, ladders, handrails, guardrails, catwalks, mezzanines, hatches, davits, support brackets, equipment bases.								
GENERAL	CODE COMPLIANCE ISSUES: - Ladder to lower level does not have proper clearance - The Main Entrance: see notes and comments. - Swing gates missing at openings in floor slab SAFETY ISSUES: - Equipment for emergency of injured personnel is not in place, or practical. - Wet well hatch opening covered only with plywood.		3.8	3.7		4.0			0
			Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
Current Physical Condition	**Stairs, Ladders, Catwalks, Rails, Hatches:** *Issues for Discussion:* - Corrosion of material, anchors - Hatch seals, operability, locks	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.5	*NOTES & COMMENTS:* - Stairs and ladder systems have extensive corrosion on the members and anchors. - Ladder to lower level is not code compliant: rungs too close to wall. - Main entrance is not code compliant: - No device to hold lid open - Door at landing of entrance stairs - Incufficient clearance around handrail - External hatches are in good condition - Pipe supports have corroded in the valve chamber - Guardrail around opening should have swing gate - Hoist system appears in good condition - An opening in the slide gate operating chamber looks to be only covered with plywood - Unsafe work area at valve room. - All floor and wall finishes are beyond end of service life		
	Interior walls, Ceiling, Supports, Equipment Base: *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.2					
	Finishes: *Issues for Discussion:* - Floor, wall, ceiling paint. Finishes on doors, etc	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.1					
	Monorails and Hoists: *Issues for Discussion:* - Corrosion, anchor bolts, labels - Corrosive atmosphere	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.2					
Fitness for Purpose	**Stairs, Ladders, Catwalks, Rails, Hatches:** *Issues for Discussion:* - Corrosion resistance of material - Suitable access to equipment, levels - Compliance with Codes and Standards	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.5	*RECOMMENDATIONS:*	*COST ESTIMATE*			
	Interior walls, Ceiling, Supports, Equipment Base: *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.2	Replace corroded stairs and landings Install swing gates on guard rails at floor openings Install device to hold open exterior hatch - to prevent wind or accidental closure	$ 5,000.00 $ 1,500.00 $ 200.00			
	Finishes: *Issues for Discussion:* - Floor and wall protection.	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.1	Re finish all floor and wall surfaces Replace ladders to meet code Seal Infiltration	$ 100,000.00 $ 3,500.00 $ 3,500.00			
	Monorails and Hoists: *Issues for Discussion:* - Transport of equipment to accessible area - Certificated by others	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.2					
Safety	**Public and Operator Safety:** *Issues for Discussion:* - *Potential safety hazards* - Evacuation of personnel (davit, gear, hatch locations)	Rating 1: No Public Safety issues Rating 3: No record of incidents,possible concerns Rating 5: Historic incidents or probable safety risks	4	1					
PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **STR_Building_Envelope**
Facility: Windsor Park Lift Station

FACILITY CONDITION ASSESSMENT FORM
BUILDING ENVELOPE

Assessor: Mark Baker
Date Assesed: 16-May-19

SECTION	ITEM	DATA		ASSESSMENT SCORES: Current Physical Condition	Fitness For Purpose		Safety	AGE: Year Installed	Expected Service Life	Remaining Service Life
		Building Envelope Components: - Siding, Doors, Windows, Insulation, Vapour Barrier, Liners, Flashings, Soffits, Sealants, Weatherstripping								
Tag: STR_Building_Envelope	GENERAL	CODE COMPLIANCE ISSUES:		3.6	3.4		3.0			0
		SAFETY ISSUES:								
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Exterior Siding, Windows, Doors:** *Issues for Discussion:* - Weathering, deterioration - Door swing, seals, locks - Graffitti, vandalism - UV breakdown	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.4	*NOTES & COMMENTS:* - Minor cracks in masonry walls of generating station - Deterioration of plywood facia and soffit of generating station - Deterioration of trim on generating station - Penetrations in lift station pump room causing infiltration - Minor moisture damage on walls and floors of lift station - rigid insulation added to walls, however the lift station envelop is inadequate to prevent frost, condensation, and moisture infiltration.			
		Insulation, Vapour Barrier, Interior Liner: *Issues for Discussion:* - Interior frost, condensation	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.4					
		Flashings, Soffits, Sealants, Weatherstripping: *Issues for Discussion:* - UV breakdown	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.2					
	Fitness for Purpose	**Exterior Siding, Windows, Doors:** *Issues for Discussion:* - Door size, durability of siding	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.4	*RECOMMENDATIONS:* Replace or re-paint facia, trim, and soffit on generator building	*COST ESTIMATE* $ 5,000.00			
		Insulation, Vapour Barrier, Interior Liner: *Issues for Discussion:* - Adequate insulation, durability of liner	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.4					
		Flashings, Soffits, Sealants, Weatherstripping: *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.2					
	Safety	**Public and Operator Safety:** *Issues for Discussion:* - *Potential safety hazards*	Rating 1: No Public Safety issues Rating 3: No record of incidents,possible concerns Rating 5: Historic incidents or probable safety risks	3	1					
	PHOTOGRAPHS	    								

Project No.: 8400-001-00
Tag: **STR_Roofing**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FACILITY CONDITION ASSESSMENT FORM
ROOFING

Assessor: Mark Baker
Date Assesed: 29-Jun-19

SECTION	ITEM	DATA		ASSESSMENT SCORES: Current Physical Condition	Fitness For Purpose		Safety	AGE: Year Installed	Expected Service Life	Remaining Service Life
		Roofing Components: - Decking, insulation, membrane, skylights, hatches, penetrations, gutters, flashings, trim								
Tag: STR_Roofing	GENERAL	CODE COMPLIANCE ISSUES:		3.0	2.0		3.0			0
		SAFETY ISSUES:		**Rating**	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Roof Membrane, Insulation, Decking:** *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.5	*NOTES & COMMENTS:* - No evidence of leakage or damage to generating station roof - Rock ballast is eroding in the generator roof corners and edges. Additional ballast should be added to prevent breakdown of membrane.				
	Current Physical Condition	**Skylights, Hatches, Penetrations:** *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.3					
	Current Physical Condition	**Flashings, Trim, Gutters, Downspouts:** *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.2					
	Fitness for Purpose	**Roof Membrane, Insulation, Decking:** *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	2	0.5	*RECOMMENDATIONS:* Add additional rock ballast to protect exposed areas of roof membrane on generator building	*COST ESTIMATE* $ 1,500.00			
	Fitness for Purpose	**Skylights, Hatches, Penetrations:** *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	2	0.3					
	Fitness for Purpose	**Flashings, Trim, Gutters, Downspouts:** *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	2	0.2					
	Safety	**Public and Operator Safety:** *Issues for Discussion:* - Roof Tie-off	Rating 1: No Public Safety issues Rating 3: No record of incidents,possible concerns Rating 5: Historic incidents or probable safety risks	3	1					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **STR_Building_Mechanical**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FACILITY CONDITION ASSESSMENT FORM
BUILDING MECHANICAL

Assessor: Ryan Ursu
Date Assessed: 16-May-19

SECTION	ITEM	DATA		ASSESSMENT SCORES				AGE		
		Building Mechanical: - HVAC, Fire Suppression, Plumbing		Current Physical Condition	Fitness For Purpose		Safety	Year Installed	Expected Service Life	Remaining Service Life
Tag: STR_Building_Mechanical	GENERAL	CODE COMPLIANCE ISSUES: There is no apparent fire suppression system in vault. SAFETY ISSUES:		3.6	3.3		3.0	1955	25	0
				Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Heating and Ventilation Systems:** *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.3	*NOTES & COMMENTS:* *Handheld fire extinguisher in generator building, but no apparent fire suppression system in vault.* *Radiant and unit heaters in vault have exceeded their expected service life.*				
		Interior Plumbing: *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	0.4					
		Fire Suppression Systems: *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	4	0.3					
	Fitness for Purpose	**Heating and Ventilation Systems:** *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.3	*RECOMMENDATIONS:*		*COST ESTIMATE*		
		Interior Plumbing: *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	3	0.4	Install handheld fire extinguisher		$	500.00	
		Fire Suppression Systems: *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	0.3	Replace heaters in vault		$	3,000.00	
	Safety	**Public and Operator Safety:** *Issues for Discussion:* - Monitors, Alarms	Rating 1: No Public Safety issues Rating 3: No record of incidents, possible concerns Rating 5: Historic incidents or probable safety risks	3	1					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **VENTILATON SYSTEM**
Facility: Windsor Park Lift Station

VENTILATION CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 02-Jul-19

SECTION	ITEM	DATA		ASSESSMENT SCORES				AGE		
		Ventilation Systems: - Wet Well, Dry Well		Current Physical Condition	Fitness For Purpose		Safety	YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Tag: VENTILATON SYSTEM	GENERAL	CODE COMPLIANCE ISSUES: - Dry well ventilation system is undersized. SAFETY ISSUES:		3.0	4.0		3.0	1989	25	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Wet Well Ventilation** *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	0	0	*NOTES & COMMENTS:* *- Generator Room ventilation system in good condition.* *- No wet well ventilation system.* *- Dry well ventilation system is undersized to meet NFPA 820 ventilation requirements of 30 air changes per hour when used intermittently.*				
		Dry Well Ventilation *Issues for Discussion:*	Rating 1 (Excellent Condition) Rating 2 (Good Condition) Rating 3 (Functional Condition) Rating 4 (Poor Condition) Rating 5 (Not Functional)	3	1					
	Fitness for Purpose	**Wet Well Ventilation** *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	0	0	*RECOMMENDATIONS:* - Install Wet Well Ventilation System - Replace Dry Well Ventilation System		*COST ESTIMATE* $ 40,000.00 $ 36,000.00		
		Dry Well Ventilation *Issues for Discussion:*	Rating 1 (Excellent - performs for intended purpose) Rating 2 (Good - well suited for intended purpose) Rating 3 (Functional - performs adequately) Rating 4 (Poor - not suitable for intended purpose) Rating 5 (Fail - does not meet any requirements)	4	1					
	Safety	**Operator Safety** *Issues for Discussion:* *- Monitors, Alarms*	Rating 1: No safety hazard conditions Rating 3: No record of incidents, possible concerns Rating 5: Historic incidents or probable safety risks	3	1					
	PHOTOGRAPHS									

Appendix B

Pumps Condition Assessment Forms

Project No.: 8400-001-00
Tag: **P_101**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PUMP CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 12-Jun-19
Asset ID:

Equipment Tag: P_101
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: P_101 Description:	GENERAL	Location: Dry Well Type: 60 HP Dry Pit Solids Handling Description: Flooded Suction, Vertical Pump Manufacturer: Aurora Model: 612A RPM: 1185 Rated Voltage: 575 V Rated Current: 56 A		3.0	3.0	2.2		1998	25	4
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.2					
		Equipment Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.2					
		Condition of Pump Accessories: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1					
		Rebuild Potential of Pump: *Issues for Discussion:*	Rating 1 (N/A - Pump is New) Rating 2 (Pump Re-Build Feasible) Rating 3 (Pump Rebuild / Replace Equally Feasible) Rating 4 (Approaching End of Useful Life) Rating 5 (At or Surpassed Useful Life)	3	0.2					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3					
	Fitness for Purpose	**Design Flow Rate:** *Issues for Discussion:*	Rating 1 (Pump consistently provides design flow rate) Rating 2 (Pump consistently provides +/- 10% of design flow rate) Rating 3 (Pump consistently provides +/- 25% of design flow rate) Rating 4 (Pump performance a potential issue during high flow events) Rating 5 (Pump performance a critical issue)	4	0.2					
		Pump Redundancy: *Issues for Discussion:*	Rating 1 (100% Redundancy) Rating 3 (50% Redundancy) Rating 5 (No Redundancy. Risk of Critical Failure)	3	0.2					
		Appropriate Pump Type for Application: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper pump selection for application. Risk of Critical Failure)	1	0.2					
		Available Water Supply for Pumps (If Required): *Issues for Discussion:*	Rating 1 (Yes) Rating 2 (No - Not required for installed pumping equipment) Rating 3 (Yes - Flow / pressure inadequate for installed pumping equipment) Rating 4 (No - Available source on site but not connected) Rating 5 (No - No available source)	2	0.1					
		Pump Capacity: *Issues for Discussion:*	Rating 1 (Pump has sufficient capacity for current and projected demand conditions) Rating 2 (Pump has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Pump has sufficient capacity) Rating 4 (Pump does not meet current demand condition) Rating 5 (Pump is critically undersized and likelihood of station backup is high)	4	0.3					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.25					
		Piping/Equipment Interference with Pump Removal: *Issues for Discussion:*	Rating 1 (No interference) Rating 2 (Yes - Some minor piping/equipment interference with pump removal) Rating 3 (Yes - Piping/equipment interference causes minor alteration of work method) Rating 4 (Yes - Piping/equipment interference causes major alteration of work method) Rating 5 (Yes - Piping/equipment interference prevents safe removal of pumps)	2	0.2					
		Provision of Direct Lift Spot for Pump Removal: *Issues for Discussion:*	Rating 1 (Yes - Accessible unobstructed direct lift spot for pump removal) Rating 2 (Yes - Accessible direct lift spot for pump removal, with minor obstructions) Rating 3 (Yes - Direct lift spot with limited access and minor obstructions) Rating 4 (Yes - Direct lift spot with difficult access and major obstructions) Rating 5 (No provision for direct pump removal)	3	0.1					
		Pumping Equipment Uniformity: *Issues for Discussion:*	Rating 1 (Yes - All installed pumps are identical model and duty point) Rating 2 (Yes - All installed pumps are identical model with varying duty points) Rating 3 (No - All installed pumps are different models, but same manufacturer) Rating 4 (No - All installed pumps are different models and different manufacturers) Rating 5 (No - Pump record information (design duty point) is not known)	1	0.2					
		Availability of Spare Parts: *Issues for Discussion:*	Rating 1 (Yes - Spare parts readily available with < 6 week lead time) Rating 2 (Yes - Spare parts readily available with 6-8 week lead time) Rating 3 (Yes - Spare parts readily available with > 8 week lead time) Rating 4 (Yes - Select spare parts available with varying lead times) Rating 5 (No - Spare parts no longer available for this equipment)	3	0.25					

VIBRATION (in/s)	X	Y	Z
Motor	0.12	0.08	0.18
Volute	0.08	0.30	0.05

NOTES & COMMENTS:

Pump is nearing the end of its service life.

Surface corrosion noted on pump volute.

The pumping system is capable of meeting the peak dry weather influent flow requirements, however the pumping system is not currently capable of meeting the peak wet weather influent flow requirements.

Access restrictions cause difficulty for pump removal.

Spare parts are not readily available.

RECOMMENDATIONS	*COST ESTIMATE*
Replace Pump	$ 90,000.00

PHOTOGRAPHS




Project No.: 8400-001-00
Tag: **P_102**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PUMP CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 12-Jun-19

Asset ID:

Equipment Tag: P_102
Description:

GENERAL

Location:	Dry Well
Type:	60 HP Dry Pit Solids Handling
Description:	Flooded Suction, Vertical Pump
Manufacturer:	Aurora
Model:	612A
RPM:	1185
Rated Voltage:	575 V
Rated Current:	56 A

CONDITION RATING				AGE		
Current Physical Condition	Fitness For Purpose	Maintenance & Operation		YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
3.0	3.0	2.2		1998	25	4

Recommended Frequency of Review: (In years, specify between 1-15) **3**

ITEM	DATA		Rating	Weight
Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.2
	Equipment Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.2
	Condition of Pump Accessories: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1
	Rebuild Potential of Pump: *Issues for Discussion:*	Rating 1 (N/A - Pump is New) Rating 2 (Pump Re-Build Feasible) Rating 3 (Pump Rebuild / Replace Equally Feasible) Rating 4 (Approaching End of Useful Life) Rating 5 (At or Surpassed Useful Life)	3	0.2
	Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3
Fitness for Purpose	**Design Flow Rate:** *Issues for Discussion:*	Rating 1 (Pump consistently provides design flow rate) Rating 2 (Pump consistently provides +/- 10% of design flow rate) Rating 3 (Pump consistently provides +/- 25% of design flow rate) Rating 4 (Pump performance a potential issue during high flow events) Rating 5 (Pump performance a critical issue)	4	0.2
	Pump Redundancy: *Issues for Discussion:*	Rating 1 (100% Redundancy) Rating 3 (50% Redundancy) Rating 5 (No Redundancy. Risk of Critical Failure)	3	0.2
	Appropriate Pump Type for Application: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper pump selection for application. Risk of Critical Failure)	1	0.2
	Available Water Supply for Pumps (If Required): *Issues for Discussion:*	Rating 1 (Yes) Rating 2 (No - Not required for installed pumping equipment) Rating 3 (Yes - Flow / pressure inadequate for installed pumping equipment) Rating 4 (No - Available source on site but not connected) Rating 5 (No - No available source)	2	0.1
	Pump Capacity: *Issues for Discussion:*	Rating 1 (Pump has sufficient capacity for current and projected demand conditions) Rating 2 (Pump has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Pump has sufficient capacity) Rating 4 (Pump does not meet current demand condition) Rating 5 (Pump is critically undersized and likelihood of station backup is high)	4	0.3
Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.25
	Piping/Equipment Interference with Pump Removal: *Issues for Discussion:*	Rating 1 (No interference) Rating 2 (Yes - Some minor piping/equipment interference with pump removal) Rating 3 (Yes - Piping/equipment interference causes minor alteration of work method) Rating 4 (Yes - Piping/equipment interference causes major alteration of work method) Rating 5 (Yes - Piping/equipment interference prevents safe removal of pumps)	2	0.2
	Provision of Direct Lift Spot for Pump Removal: *Issues for Discussion:*	Rating 1 (Yes - Accessible unobstructed direct lift spot for pump removal) Rating 2 (Yes - Accessible direct lift spot for pump removal, with minor obstructions) Rating 3 (Yes - Direct lift spot with limited access and minor obstructions) Rating 4 (Yes - Direct lift spot with difficult access and major obstructions) Rating 5 (No provision for direct pump removal)	3	0.1
	Pumping Equipment Uniformity: *Issues for Discussion:*	Rating 1 (Yes - All installed pumps are identical model and duty point) Rating 2 (Yes - All installed pumps are identical model with varying duty points) Rating 3 (No - All installed pumps are different models, but same manufacturer) Rating 4 (No - All installed pumps are different models and different manufacturers) Rating 5 (No - Pump record information (design duty point) is not known)	1	0.2
	Availability of Spare Parts: *Issues for Discussion:*	Rating 1 (Yes - Spare parts readily available with < 6 week lead time) Rating 2 (Yes - Spare parts readily available with 6-8 week lead time) Rating 3 (Yes - Spare parts readily available with > 8 week lead time) Rating 4 (Yes - Select spare parts available with varying lead times) Rating 5 (No - Spare parts no longer available for this equipment)	3	0.25

VIBRATION (in/s)	*X*	*Y*	*Z*
Motor	*0.17*	*0.20*	*0.24*
Volute	*0.03*	*0.02*	*0.04*

NOTES & COMMENTS:

Pump is nearing the end of its service life.

Surface corrosion noted on pump volute.

The pumping system is capable of meeting the peak dry weather influent flow requirements, however the pumping system is not currently capable of meeting the peak wet weather influent flow requirements.

Access restrictions cause difficulty for pump removal.

Spare parts are not readily available.

RECOMMENDATIONS	*COST ESTIMATE*
Replace Pump	$ 90,000.00

PHOTOGRAPHS




Project No.: 8400-001-00
Tag: **SP_101**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PUMP CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 12-Jun-19
Asset ID:

Equipment Tag: SP_101
Description:

GENERAL

Location:	Dry Well
Type:	150 HP Vertical Turbine
Description:	Vertical Turbine, Horizontal Motor Mount
Manufacturer:	Johnston
Model:	JX-17378
RPM:	1760
Rated Voltage:	575 V
Rated Current:	134 A

CONDITION RATING				AGE		
Current Physical Condition	Fitness For Purpose	Maintenance & Operation		YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
4.4	3.8	3.8		1976	25	0

Recommended Frequency of Review: (In years, specify between 1-15) **3**

SECTION	ITEM	DATA		Rating	Weight
Equipment Tag: SP_101 Description:	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	5	0.2
		Equipment Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.2
		Condition of Pump Accessories: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1
		Rebuild Potential of Pump: *Issues for Discussion:*	Rating 1 (N/A - Pump is New) Rating 2 (Pump Re-Build Feasible) Rating 3 (Pump Rebuild / Replace Equally Feasible) Rating 4 (Approaching End of Useful Life) Rating 5 (At or Surpassed Useful Life)	5	0.2
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	5	0.3
	Fitness for Purpose	**Design Flow Rate:** *Issues for Discussion:*	Rating 1 (Pump consistently provides design flow rate) Rating 2 (Pump consistently provides +/- 10% of design flow rate) Rating 3 (Pump consistently provides +/- 25% of design flow rate) Rating 4 (Pump performance a potential issue during high flow events) Rating 5 (Pump performance a critical issue)	4	0.2
		Pump Redundancy: *Issues for Discussion:*	Rating 1 (100% Redundancy) Rating 3 (50% Redundancy) Rating 5 (No Redundancy. Risk of Critical Failure)	5	0.2
		Appropriate Pump Type for Application: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper pump selection for application. Risk of Critical Failure)	3	0.2
		Available Water Supply for Pumps (If Required): *Issues for Discussion:*	Rating 1 (Yes) Rating 2 (No - Not required for installed pumping equipment) Rating 3 (Yes - Flow / pressure inadequate for installed pumping equipment) Rating 4 (No - Available source on site but not connected) Rating 5 (No - No available source)	2	0.1
		Pump Capacity: *Issues for Discussion:*	Rating 1 (Pump has sufficient capacity for current and projected demand conditions) Rating 2 (Pump has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Pump has sufficient capacity) Rating 4 (Pump does not meet current demand condition) Rating 5 (Pump is critically undersized and likelihood of station backup is high)	4	0.3
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.25
		Piping/Equipment Interference with Pump Removal: *Issues for Discussion:*	Rating 1 (No interference) Rating 2 (Yes - Some minor piping/equipment interference with pump removal) Rating 3 (Yes - Piping/equipment interference causes minor alteration of work method) Rating 4 (Yes - Piping/equipment interference causes major alteration of work method) Rating 5 (Yes - Piping/equipment interference prevents safe removal of pumps)	3	0.2
		Provision of Direct Lift Spot for Pump Removal: *Issues for Discussion:*	Rating 1 (Yes - Accessible unobstructed direct lift spot for pump removal) Rating 2 (Yes - Accessible direct lift spot for pump removal, with minor obstructions) Rating 3 (Yes - Direct lift spot with limited access and minor obstructions) Rating 4 (Yes - Direct lift spot with difficult access and major obstructions) Rating 5 (No provision for direct pump removal)	4	0.1
		Pumping Equipment Uniformity: *Issues for Discussion:*	Rating 1 (Yes - All installed pumps are identical model and duty point) Rating 2 (Yes - All installed pumps are identical model with varying duty points) Rating 3 (No - All installed pumps are different models, but same manufacturer) Rating 4 (No - All installed pumps are different models and different manufacturers) Rating 5 (No - Pump record information (design duty point) is not known)	5	0.2
		Availability of Spare Parts: *Issues for Discussion:*	Rating 1 (Yes - Spare parts readily available with < 6 week lead time) Rating 2 (Yes - Spare parts readily available with 6-8 week lead time) Rating 3 (Yes - Spare parts readily available with > 8 week lead time) Rating 4 (Yes - Select spare parts available with varying lead times) Rating 5 (No - Spare parts no longer available for this equipment)	5	0.25

VIBRATION (in/s)	X	Y	Z
Motor	N/A		
Volute			

NOTES & COMMENTS:

Pump has reached the end of its service life.

Pump is not currently operational.

Surface corrosion noted on pump.

Pump discharges to the storm water system and does not contribute to the sewage pumping capacity of the lift station.

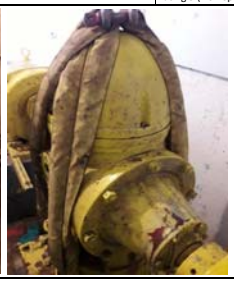
Access restrictions cause difficulty for pump removal.

Pump record information (design duty point) is not known.

Pump model is outdated and no longer manufactered. Spare parts are not readily available.

RECOMMENDATIONS	*COST ESTIMATE*
Replace Pump	$ 150,000.00

PHOTOGRAPHS

Appendix C

Electrical & Communication Condition Assessment Forms

Project No.: 8400-001-00
Tag: **IC_101_Panel**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

CONTROL PANEL CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	Component Age: YEAR INSTALLED	Component Age: EXPECTED SERVICE LIFE	Component Age: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Panel Description: IC_101_Panel	GENERAL	Location: Drywell, Main Level Description: IC_101_Panel Function: Station Monitoring PLC Processor: SCADAPack 334 UPS Protection: Yes		1.6	1.4	1980	30	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)		**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment has received recent upgrades of internal components. The control Panel is currently an extension of the MCC section. Wiring is loose and disorganized.*		
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	3	0.1			
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4			
	Fitness for Purpose	**Controls Functioning as Expected:** *Issues for Discussion:*	Rating 1 (Always) Rating 2 (More than half of time) Rating 3 (Half of the time) Rating 4 (Less often than half) Rating 5 (Never)	1	0.3	*RECOMMENDATIONS:* Isolate the control panel from the MCC section. Complete a control panel upgrade meeting City Design Standards.	*COST ESTIMATE* $ 45,000.00	
		Panel is Appropriately Designed: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	3	0.1			
		Control Logic is Appropriate for Installation: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3			
		Communications Equipment is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1			
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.2			
	PHOTOGRAPHS							

Project No.: 8400-001-00
Tag: **IC_102_Panel**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

CONTROL PANEL CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose			Component Age: YEAR INSTALLED	Component Age: EXPECTED SERVICE LIFE	Component Age: REMAINING SERVICE LIFE
Equipment Tag: IC_102_Panel Description: IC_102_Panel	GENERAL	Location: Drywell Description: IC_102_Panel Function: Level Control PLC Processor: N/A UPS Protection: No		3.6	1.6			1980	30	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1	*NOTES & COMMENTS:* *Equipment is not rated for Zone 2 locations and is showing internal corrosion. Components within the panel have endured a corrosive atmosphere and are at the end of their service life. Overall the equipment is in "Poor" condition.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4					
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	5	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4					
	Fitness for Purpose	**Controls Functioning as Expected:** *Issues for Discussion:*	Rating 1 (Always) Rating 2 (More than half of time) Rating 3 (Half of the time) Rating 4 (Less often than half) Rating 5 (Never)	1	0.3	*RECOMMENDATIONS:* Incorporate new panel as part of the overall control panel upgrade and design.	*COST ESTIMATE* $ 5,000.00			
		Panel is Appropriately Designed: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
		Control Logic is Appropriate for Installation: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3					
		Communications Equipment is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.2					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **IC_103_Panel**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

CONTROL PANEL CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

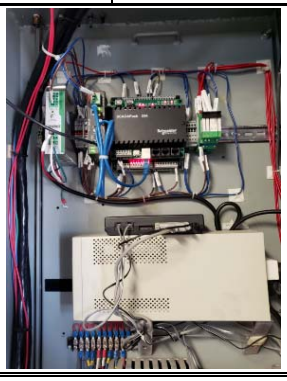
SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose			Component Age: YEAR INSTALLED	Component Age: EXPECTED SERVICE LIFE	Component Age: REMAINING SERVICE LIFE
Equipment Tag: IC_103_Panel Description: IC_103_Panel	GENERAL	Location: Gen Building Description: IC_103_Panel Function: Generator Control PLC Processor: N/A UPS Protection: No		1.4	1.2			2009	30	20
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment was installed in 2009 and appears to be in "Good" condition.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4					
	Fitness for Purpose	**Controls Functioning as Expected:** *Issues for Discussion:*	Rating 1 (Always) Rating 2 (More than half of time) Rating 3 (Half of the time) Rating 4 (Less often than half) Rating 5 (Never)	1	0.3	*RECOMMENDATIONS:*	*COST ESTIMATE*			
		Panel is Appropriately Designed: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
		Control Logic is Appropriate for Installation: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3					
		Communications Equipment is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.2					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **IC_101_UPS**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

UPS CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 16-May-19

Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	Component Age: YEAR INSTALLED	Component Age: EXPECTED SERVICE LIFE	Component Age: REMAINING SERVICE LIFE
Equipment Tag: IC_101_UPS Description: IC_101_UPS	GENERAL	Location: Electrical Building Description: IC_101_UPS Make: Powerware Model: 3115 Rated VA: 300VA		1.4	2.6	1970	25	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)		**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* Equipment appears to be in "Good" condition. Battery expires August 2020.		
	Current Physical Condition	**Canadian Electrical Code Issues Identified:** *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
	Current Physical Condition	**Control Wiring Terminations Visual Inspection:** *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1			
	Current Physical Condition	**Occurrences of Maintenance Issues:** *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* During electrical upgrade update UPS to 24V system City has been using in new Control Panel Design.	*COST ESTIMATE* $ 2,500.00	
	Fitness for Purpose	**UPS system is Present & Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.2			
	Fitness for Purpose	**UPS External Maintenance Bypass is Installed:** *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	5	0.1			
	Fitness for Purpose	**UPS Redundancy is Required / Installed:** *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1			
	Fitness for Purpose	**UPS is Sized Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (Load > 80% or Runtime below design guidelines) Rating 5 (Load and Runtime outside guidelines)	1	0.2			
	Fitness for Purpose	**UPS Remaining Service Life:** *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.4			
	PHOTOGRAPHS							
								
								

Project No.: 8400-001-00
Tag: **IC_101_Low_Temp**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Low_Temp Description: IC_101_Low_Temp	GENERAL	Location: Electrical Building Description: IC_101_Low_Temp Make: Honeywell Model: N/A Device Span: N/A Input/Output: Input Signal Type: N/A Rated Voltage: 24VDC		1.0	1.5	2009	30	20
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1			
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1			
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	1	0.4			
	Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3			
		Instrument Redundancy is Required/Installed: *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1			
		Instrument Range is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1			
		Instrument Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.5			

Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)	5

NOTES & COMMENTS:
Equipment appears to be in "Good" condition.

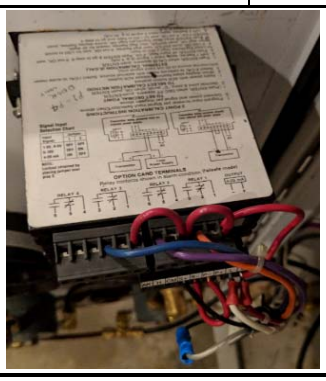
RECOMMENDATIONS:	*COST ESTIMATE*

PHOTOGRAPHS

Project No.: 8400-001-00
Tag: **IC_101_Level_Unit**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

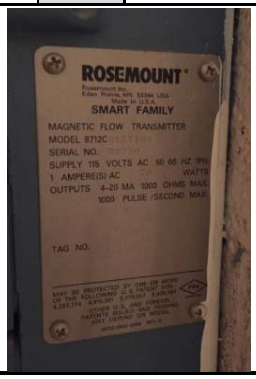
Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Level_Unit Description: IC_101_Level_Unit	GENERAL	Location: Dry Well, Sub Grade Description: IC_101_Level_Unit Make: Precision Digital Model: N/A Device Span: N/A Input/Output: Input Signal Type: 4-20mA Rated Voltage: 24VDC		2.8	2.5	2000	20	1
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)		**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	2	0.1	*NOTES & COMMENTS:* Equipment appears to be in "Fair" Condition. Device is not rated for classified locations. Wire tags are missing at point of termination. Device is nearing the end of its expected service life		
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4			
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	2	0.1			
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	1	0.4	*RECOMMENDATIONS:* Once HVAC improvement have happened install a new Level Control Panel incorporating a digital display for operations.	*COST ESTIMATE* $ 25,000.00	
	Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3			
		Instrument Redundancy is Required/Installed: *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1			
		Instrument Range is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1			
		Instrument Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5			
	PHOTOGRAPHS							

Project No.: 8400-001-00
Tag: **IC_101_Flow**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Flow Description: IC_101_Flow	GENERAL	Location: Dry Well, Sub Grade Description: IC_101_Flow Make: Rosemount Model: 8712 Device Span: 0.01-39ft/s (0-12m/s) Input/Output: Input Signal Type: 4-20mA Rated Voltage: 90-250VDC		1.4	1.5			2015	20	16
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* Equipment appears to be in "Good" condition.				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:*	*COST ESTIMATE*			
	Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3					
		Instrument Redundancy is Required/Installed: *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1					
		Instrument Range is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
		Instrument Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **IC_101_Level_Transmit**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Level_Transmitter Description: IC_101_Level_Transmitter	GENERAL	Location: Dry Well, Sub Grade Description: IC_101_Level_Transmitter Make: Foxboro Model: 823DP-I3S1NM2 Device Span: 0-120 in H2O Input/Output: Input Signal Type: 4-20mA Rated Voltage: 24VDC		1.6	2.9	2000	20	1
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1			
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1			
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4			
	Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3			
		Instrument Redundancy is Required/Installed: *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	5	0.1			
		Instrument Range is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1			
		Instrument Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5			

Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)	
			5

NOTES & COMMENTS:

Equipment appears to be in "Fair" condition. Fastening harware is showing corrosion and is nearing the end of its expected service life. Currently no level redundancy.

RECOMMENDATIONS:	*COST ESTIMATE*
Upgrade device to match City standard at the same time as new control panel is installed.	$ 5,000.00

PHOTOGRAPHS

Project No.: 8400-001-00
Tag: **IC_101_Low_Pressure**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Low_Pressure Description: IC_101_Low_Pressure	GENERAL	Location:	Electrical Building	1.4	2.0	2009	20	10
		Description:	IC_101_Low_Pressure					
		Make:	United Electric Controls					
		Model:	266					
		Device Span:	0-100 PSI					
		Input/Output:	Input					
		Signal Type:						
		Rated Voltage:	125/250VAC					

			Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)	5
Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* Equipment appears to be in "Good" condition.	
	Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4		
	Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1		
	Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Maintain routine maintenance checks to ensure device is operational. Replace device as required.	*COST ESTIMATE*
Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3		
	Instrument Redundancy is Required/Installed: *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1		
	Instrument Range is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1		
	Instrument Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	3	0.5		

PHOTOGRAPHS

Project No.: 8400-001-00
Tag: **IC_101_Gas_Detection**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

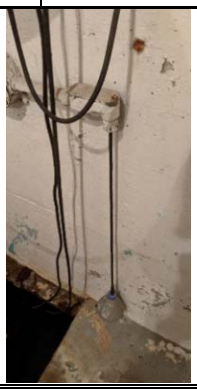
Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_Gas_Detection Description: IC_101_Gas_Detection	GENERAL	Location:	Electrical Building	1.8	2.0	2009	20	10
		Description:	IC_101_Gas_Detection					
		Make:	Honeywell					
		Model:	Vulcain 201M					
		Device Span:						
		Input/Output:	Input					
		Signal Type:	4-20mA					
		Rated Voltage:	24VDC					
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)		**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* Equipment appears to be in "Good" condition.		
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
		Control Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1			
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.4	*RECOMMENDATIONS:* Maintain regular maintenance as per manufacture recommendations.	*COST ESTIMATE*	
	Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3			
		Instrument Redundancy is Required/Installed: *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1			
		Instrument Range is Appropriate: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1			
		Instrument Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	3	0.5			
	PHOTOGRAPHS							

Project No.: 8400-001-00
Tag: **IC_101_FLYGT**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

INSTRUMENTATION CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		Assessment Scores: Current Physical Condition	Assessment Scores: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: IC_101_FLYGT Description: IC_101_FLYGT	GENERAL	Location: Dry Well, Sub Grade Description: IC_101_FLYGT Make: Xylem Model: ENM-10 Device Span: 0.95-1.10g/cm3 Input/Output: Input Signal Type: Discrete Rated Voltage: 250VAC		1.4	1.0			2015	20	16
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* Device appears to be in "Good" condition.				
	Current Physical Condition	**Canadian Electrical Code Issues Identified:** *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
	Current Physical Condition	**Control Wiring Terminations Visual Inspection:** *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
	Current Physical Condition	**Occurrences of Maintenance Issues:** *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Maintain routine maintenance checks to ensure device is operational. Replace Flygt Ball as required.	*COST ESTIMATE*			
	Fitness for Purpose	**Instrument/Measurement is Designed Appropriately:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.3					
	Fitness for Purpose	**Instrument Redundancy is Required/Installed:** *Issues for Discussion:*	Rating 1 (Yes or Not Required) Rating 3 (Required, non standard) Rating 5 (Required, not installed)	1	0.1					
	Fitness for Purpose	**Instrument Range is Appropriate:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.1					
	Fitness for Purpose	**Instrument Remaining Service Life:** *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	1	0.5					
	PHOTOGRAPHS									

Appendix D

Pipe Work & Valves Condition Assessment Forms

Project No.: 8400-001-00
Tag: **GAV_101A**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	CONDITION RATING: Fitness For Purpose	CONDITION RATING: Maintenance & Operation		AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: GAV_101A Description:	GENERAL	Location:	Dry Well	3.0	1.0	2.0		1998	25	4
		Description:	Gate Valve							
		Size:	300 mm							
		Valve Make:	Mueller							
		Valve Model:	12 AWWA 200W							
		Actuation:	Manual - Handwheel							
		Actuator Make:	N/A							
		Actuator Model:	N/A							
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	3	0.2	*NOTES & COMMENTS:* *Valve is nearing the end of its service life.* *Surface corrosion noted on valve body.* *Surface corrosion noted on valve handwheel stem.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 8,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **GAV_101B**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

Equipment Tag: GAV_101B
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location:	Dry Well	3.0	1.0	2.0		1998	25	4
		Description:	Gate Valve							
		Size:	250 mm							
		Valve Make:	McAvity							
		Valve Model:	Fig 125							
		Actuation:	Manual - Handwheel							
		Actuator Make:	N/A							
		Actuator Model:	N/A							
				Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	3	0.2	*NOTES & COMMENTS:* *Valve is nearing the end of its service life.* *Surface corrosion noted on valve body.* *Surface corrosion noted on valve handwheel and stem.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 6,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **GAV_102A**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19

Asset ID:

Equipment Tag: GAV_102A
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location:	Dry Well	3.0	1.0	2.0		1998	25	4
		Description:	Gate Valve							
		Size:	300 mm							
		Valve Make:	Mueller							
		Valve Model:	12 AWWA 200W							
		Actuation:	Manual - Handwheel							
		Actuator Make:	N/A							
		Actuator Model:	N/A							
				Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	3	0.2	*NOTES & COMMENTS:* *Valve is nearing the end of its service life.* *Surface corrosion noted on valve body.* *Surface corrosion noted on valve handwheel stem.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 8,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **GAV_102B**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 11-Jun-19
Asset ID:

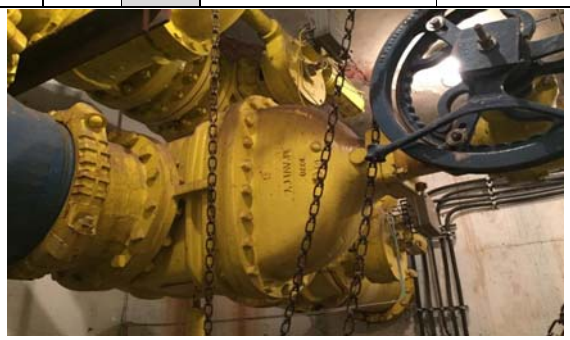
Equipment Tag: GAV_102B
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location:	Dry Well	3.0	1.0	2.0		1998	25	4
		Description:	Gate Valve							
		Size:	250 mm							
		Valve Make:	McAvity							
		Valve Model:	Fig 125							
		Actuation:	Manual - Handwheel							
		Actuator Make:	N/A							
		Actuator Model:	N/A							
				Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	3	0.2	*NOTES & COMMENTS:* *Valve is nearing the end of its service life.* *Surface corrosion noted on valve body.* *Surface corrosion noted on valve handwheel and stem.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 6,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **GAV_110**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

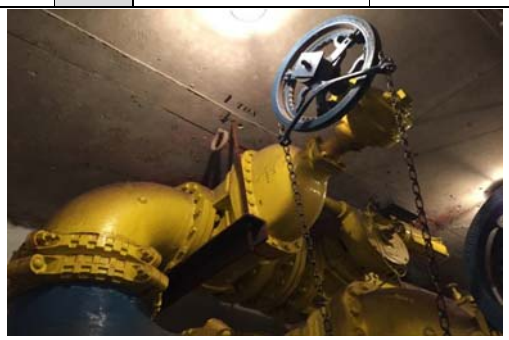
Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: GAV_110 Description:	GENERAL	Location:	Dry Well	3.4	1.0	2.6		1976	25	0
		Description:	Gate Valve							
		Size:	450 mm							
		Valve Make:	McAvity							
		Valve Model:	Fig 125							
		Actuation:	Chain Operated Manual Handwheel							
		Actuator Make:	N/A							
		Actuator Model:	N/A							
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	5	0.2	*NOTES & COMMENTS:* *Valve has exceeded its expected service life.* *Corrosion noted on valve body and flanges.* *Valve is not seating completely.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 10,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	3	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **GAV_111**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: GAV_111 Description:	GENERAL	Location:	Dry Well	3.4	1.0	3.2		1976	25	0
		Description:	Gate Valve							
		Size:	450 mm							
		Valve Make:	McAvity							
		Valve Model:	Fig 125							
		Actuation:	Chain Operated Manual Handwheel							
		Actuator Make:	N/A							
		Actuator Model:	N/A	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	5	0.2	*NOTES & COMMENTS:* *Valve has exceeded its expected service life.* *Corrosion noted on valve body and flanges.* *Valve is not seating completely.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 10,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	4	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **CHV_101**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: CHV_101 Description:	GENERAL	Location:	Dry Well	3.3	1.0	1.6		1998	25	4
		Description:	Check Valve							
		Size:	250 mm							
		Valve Make:	McAvity							
		Valve Model:	125 SWP							
		Actuation:	N/A							
		Actuator Make:	N/A							
		Actuator Model:	N/A	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	3	0.2	*NOTES & COMMENTS:* *Valve is nearing the end of its service life.* *Surface corrosion noted on valve body.* *Valve clogs occasionally due to ragging.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 6,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **CHV_102**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: CHV_102 Description:	GENERAL	Location: Dry Well Description: Check Valve Size: 250 mm Valve Make: McAvity Valve Model: 125 SWP Actuation: N/A Actuator Make: N/A Actuator Model: N/A		3.3	1.0	1.6		1998	25	4
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	3	0.2	*NOTES & COMMENTS:* *Valve is nearing the end of its service life.* *Surface corrosion noted on valve body.* *Valve clogs occasionally due to ragging.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 6,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **FV_103**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 11-Jun-19
Asset ID:

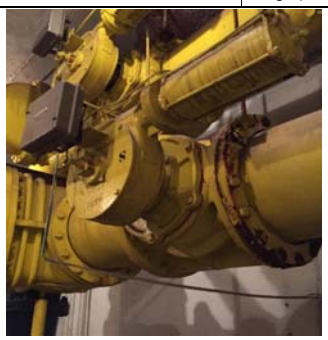
SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: FV_103 Description:	GENERAL	Location:	Dry Well	3.9	1.6	2.8		1976	25	0
		Description:	Flow Control Valve							
		Size:	450 mm							
		Valve Make:								
		Valve Model:								
		Actuation:	Pnuematic							
		Actuator Make:								
		Actuator Model:		Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	5	0.2	*NOTES & COMMENTS:* *Valve has exceeded it's expected service life.* *Severe corrosion noted on valve body, flanges and accessories.* *Valve is pnuematically operated and can easily be operated, however mantenance is difficult to perform safely.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	4	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	3	0.3	*RECOMMENDATIONS:* Replace Valve		*COST ESTIMATE* $ 16,000.00		
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	4	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **FV_110**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 11-Jun-19
Asset ID:

Equipment Tag: FV_110
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location:	Dry Well	3.7	1.0	2.6		1976	25	0
		Description:	Flow Control Valve							
		Size:	450 mm							
		Valve Make:	Dezurik							
		Valve Model:	212							
		Actuation:	Pneumatic							
		Actuator Make:	Dezurik							
		Actuator Model:	828	**Rating**	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	5	0.2	*NOTES & COMMENTS:* *Valve has exceed its expected service life.* *Corrosion noted on valve body and flanges.* *Valve is not seating completely.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 16,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	3	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **FV_111**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

VALVE CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: FV_111 Description:	GENERAL	Location:	Dry Well	3.7	1.0	2.6		1976	25	0
		Description:	Flow Control Valve							
		Size:	450 mm							
		Valve Make:	Dezurik							
		Valve Model:	212							
		Actuation:	Pneumatic							
		Actuator Make:	Dezurik							
		Actuator Model:	828	**Rating**	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Valve Visual Inspection:** *Issues for Discussion:*	Rating 1 (New) Rating 2 (Good condition, functions well) Rating 3 (Fair condition) Rating 4 (Minor leaks) Rating 5 (Risk of critical failure)	5	0.2	*NOTES & COMMENTS:* *Valve has exceed its expected service life.* *Corrosion noted on valve body and flanges.* *Valve is not seating completely.*				
		Valve Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like new) Rating 2 (Minor surface corrosion) Rating 3 (Surface & internal corrosion) Rating 4 (Extensive corrosion) Rating 5 (Corrosion affects opperability)	3	0.2					
		Valve Operation: *Issues for Discussion:*	Rating 1 (New) Rating 2 (Valve functions well) Rating 3 (Functions but with difficulty) Rating 4 (Valve operable but exceeds service life) Rating 5 (No - Valve inoperable)	4	0.3					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	3	0.3					
	Fitness For Purpose	**Appropriate Valve Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper valve configuration for application. Risk of Critical Failure)	1	0.3	*RECOMMENDATIONS:* Replace Valve	*COST ESTIMATE* $ 16,000.00			
		Valve Capacity: *Issues for Discussion:*	Rating 1 (Valve size sufficient for current and projected demand conditions) Rating 2 (Valve size sufficient for current demand conditions with minor surplus) Rating 3 (Valve size sufficient) Rating 4 (Valve size does not meet current demand condition) Rating 5 (Valve is critically undersized and likelihood of station backup is high)	1	0.7					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	3	0.6					
		Sufficient Access to Exercise Valve: *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of valve operation) Rating 4 (No - Access restrictions cause significant alteration of valve operation) Rating 5 (No - Access restrictions prevent safe operation of valve)	2	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **P_P101_Suction**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 16-May-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: P_P101_Suction Description:	GENERAL	Location: Dry Well Description: P-101 Suction Line Size: 300 mm Material: Carbon Steel Service: Sewage Coating: Epoxy		2.7	1.0	1.6		1998	50	29
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is within its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 6,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **P_P102_Suction**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 16-May-19
Asset ID:

Equipment Tag: P_P102_Suction
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location: Dry Well Description: P-102 Suction Line Size: 300 mm Material: Carbon Steel Service: Sewage Coating: Epoxy		2.7	1.0	1.6		1998	50	29
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is within its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 6,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **P_P101_Discharge**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 16-May-19
Asset ID:

Equipment Tag: P_P101_Discharge
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location:	Dry Well							
		Description:	P-101 Discharge Line							
		Size:	250 mm	2.7	1.0	1.6		1998	50	29
		Material:	Carbon Steel							
		Service:	Sewage							
		Coating:	Epoxy	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is within its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 7,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **P_P102_Discharge**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 16-May-19
Asset ID:

Equipment Tag: P_P102_Discharge
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location:	Dry Well	2.7	1.0	1.6		1998	50	29
		Description:	P-102 Discharge Line							
		Size:	250 mm							
		Material:	Carbon Steel							
		Service:	Sewage							
		Coating:	Epoxy	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				3
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is within its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 7,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS	  								

Project No.: 8400-001-00
Tag: **P_Discharge_HDR**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 16-May-19
Asset ID:

Equipment Tag: P_Discharge_HDR
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location: Dry Well Description: Discharge Header Size: 250 mm - 450 mm Material: Carbon Steel Service: Sewage Coating: Epoxy		2.7	1.0	1.6		1998	50	29
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is within its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 10,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS	   								

Project No.: 8400-001-00
Tag: **P_SEWPCC_Discharge**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 16-May-19
Asset ID:

Equipment Tag: P_SEWPCC_Discharge
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location: Dry Well Description: South End Water Pollution Control Centre Discharge Line Size: 450 mm Material: Carbon Steel Service: Sewage Coating: Epoxy		2.7	1.0	1.6		1976	50	7
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is nearing its expected service life.*				
	Current Physical Condition	**Piping Corrosion Noted:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
	Current Physical Condition	**Condition of Potable Water Piping and Backflow** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
	Current Physical Condition	**Occurrence of Maintenance Issues:** *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
	Fitness for Purpose	**Flow Meter Installed:** *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 10,000.00			
	Fitness for Purpose	**Appropriate Piping Configuration:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
	Fitness for Purpose	**Piping Capacity:** *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
	Maintainability and Operability	**Isolation Valves Installed:** *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **P_NEWPCC_Discharge**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
Equipment Tag: P_NEWPCC_Discharge Description:	GENERAL	Location: Dry Well Description: North End Water Pollution Control Centre Discharge Line Size: 450 mm Material: Carbon Steel Service: Sewage Coating: Epoxy		2.7	1.0	1.6		1976	50	7
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is nearing its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	1	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 10,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	2	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **P_Storm_Discharge**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19
Asset ID:

Equipment Tag: P_Storm_Discharge
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose	Maintenance & Operation		AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location: Dry Well Description: Storm Pump Discharge Line Size: 450 mm Material: Carbon Steel Service: Sewage Coating: Epoxy		2.7	1.8	2.8		1976	50	7
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**3**
	Current Physical Condition	**Piping Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Leaks) Rating 5 (Risk of Critical Failure)	3	0.3	*NOTES & COMMENTS:* *Surface corrosion noted on piping.* *Piping is nearing the end of its expected service life.*				
		Piping Corrosion Noted: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.4					
		Condition of Potable Water Piping and Backflow *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	0	0					
		Occurrence of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but Occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.3					
	Fitness for Purpose	**Force Main Shut Off Valve:** *Issues for Discussion:*	Rating 1 (Yes - Valve functions) Rating 3 (Yes - Valve does not operate) Rating 5 (No)	1	0.3					
		Flow Meter Installed: *Issues for Discussion:*	Rating 1 (Yes - Flow meter is accurate) Rating 3 (Yes - Flow meter not accurate) Rating 5 (No)	5	0.2	*RECOMMENDATIONS:* Replace Piping	*COST ESTIMATE* $ 12,000.00			
		Appropriate Piping Configuration: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper piping configuration for application. Risk of Critical Failure)	1	0.1					
		Piping Capacity: *Issues for Discussion:*	Rating 1 (Piping has sufficient capacity for current and projected demand conditions) Rating 2 (Piping has sufficient capacity for current demand conditions with minor surplus) Rating 3 (Piping has sufficient capacity) Rating 4 (Piping does not meet current demand condition) Rating 5 (Piping is critically undersized and likelihood of station backup is high)	1	0.4					
	Maintainability and Operability	**Sufficient Access to Perform O&M Activities Safely:** *Issues for Discussion:*	Rating 1 (Yes - No access restrictions) Rating 2 (Yes - Some minor access restrictions) Rating 3 (Yes - Access restrictions that cause minor alteration of work method) Rating 4 (No - Access restrictions cause significant alteration of work method) Rating 5 (No - Access restrictions prevent safe completion of O&M activities)	4	0.6					
		Isolation Valves Installed: *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.4					
	PHOTOGRAPHS	  								

Appendix E

Power Condition Assessment Forms

Project No.: 8400-001-00
Tag: **E_E101_Service**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

ELECTRICAL SERVICE CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19

Asset ID:

Equipment Tag: E_E101_Service
Description: E-E101_Service

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Service Description: E-E101_Service	GENERAL	Location: Electrical Building Description: E-E101_Service Phase: 3 Phase Rated Voltage: 600 VAC Rated Current: 400 A		1.0	2.0	1968	40	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)		**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Service is fed via a pad mount transformer continuing underground to the MCC Main Breaker. System grounding has experienced corrosion.*		
	Current Physical Condition	**Canadian Electrical Code Issues Identified:** *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
	Current Physical Condition	**Wiring Terminations Visual Inspection:** *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1			
	Current Physical Condition	**Occurrences of Maintenance Issues:** *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	1	0.4			
	Fitness for Purpose	**Meets City Electical Design Guide:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.2			
	Fitness for Purpose	**Standby Generator Needed & Present:** *Issues for Discussion:*	Rating 1 (Yes / Not needed) Rating 3 (Needed / Portable Generator) Rating 5 (Needed / Not Available)	1	0.2	*RECOMMENDATIONS:* Upgrade service equipment as part of the electrical upgrade.	*COST ESTIMATE* $ 20,000.00	
	Fitness for Purpose	**Is Main Breaker Present & Appropriate:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (Present, not appropriate) Rating 5 (Not Present)	1	0.05			
	Fitness for Purpose	**Is Grounding System Present & Appropriate:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (Present, not appropriate) Rating 5 (Not Present)	3	0.1			
	Fitness for Purpose	**Is Utility Service appropriate: (600V/3PH)** *Issues for Discussion:*	Rating 1 (Yes) Rating 5 (No)	1	0.1			
	Fitness for Purpose	**Has the Service Capactiy Been Reached?** *Issues for Discussion:*	Requires review of service calculation. Rating 1 (Service < 85% capacity) Rating 3 (Service 85% - 99% capacity) Rating 5 (Service > 99% capacity	1	0.1			
	Fitness for Purpose	**Equipment Remaining Service Life:** *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.25			

PHOTOGRAPHS

Project No.: 8400-001-00
Tag: **E_E101_Breaker**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

BREAKER CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19

Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Breaker Description: E_E101_Breaker	GENERAL	Location: Dry Well, Sub Grade Description: E_E101_Breaker Phase: 3 Rated Voltage: 600 VAC Rated Current: 400A		1.4	2.0			1972	40	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Breakers termination and connection points do not have torque mark indications. While the breaker appears to be in "Good" condition it is at the end of its expected service life.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Incorporate new main as part of the electrical upgrade.	*COST ESTIMATE* $ 5,000.00			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has breaker capacity been Reached? *Issues for Discussion:*	Rating 1 (Appropriately sized) Rating 5 (Undersized)	1	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	3	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E102_Breaker**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

BREAKER CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19

Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E102_Breaker Description: E_E101_Breaker	GENERAL	Location: Dry Well, Sub Grade Description: E_E101_Breaker Phase: 3 Rated Voltage: 600 VAC Rated Current: 15A		1.4	2.5			1972	40	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment appears to be in "Good" condition. While appearing in "Good" condition the equipment is at the end of its expected service life.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Incorporate new breaker as part of the electrical upgrade.	*COST ESTIMATE* $ 1,000.00			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has breaker capacity been Reached? *Issues for Discussion:*	Rating 1 (Appropriately sized) Rating 5 (Undersized)	1	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E103_Breaker**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

BREAKER CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

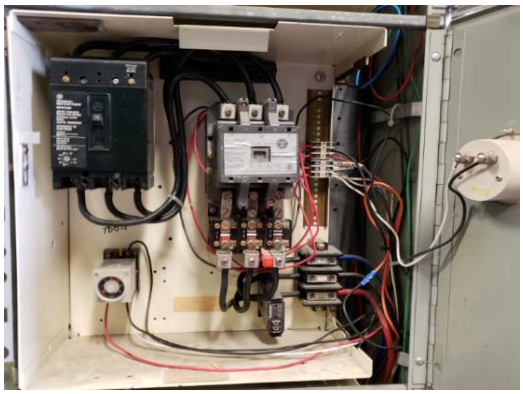
SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E103_Breaker Description: E_E103_Breaker	GENERAL	Location:	Generator Building	1.4	2.5			1972	40	0
		Description:	E_E103_Breaker							
		Phase:	3							
		Rated Voltage:	600 VAC							
		Rated Current:	30A	**Rating**	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment appears to be in "Good" condition. While appearing in "Good" condition the equipment is at the end of its expected service life.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Incorporate new breaker as part of the electrical upgrade.	*COST ESTIMATE* $ 1,000.00			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has breaker capacity been Reached? *Issues for Discussion:*	Rating 1 (Appropriately sized) Rating 5 (Undersized)	1	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E101_Starter**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FVNR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19

Asset ID:

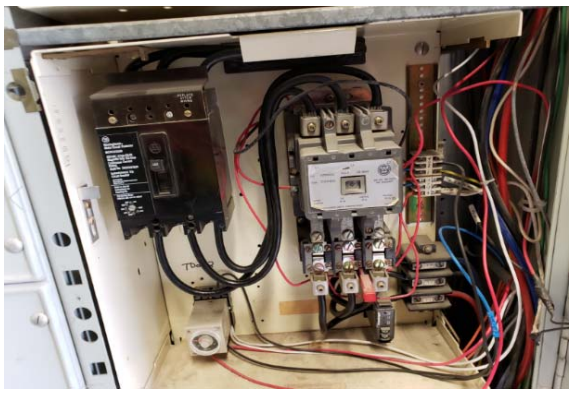
SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Starter Description: E-E101_Starter	GENERAL	Location: Dry Well, Sub Grade Description: E-E101_Starter Manufacturer: Westinghouse Model: Phase: 3 Phase Rated Voltage: 600 Rated Horsepower: 15		1.5	2.5			1972	40	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment appears to be in "Good" condition. While appearing in "Good" condition the equipment is at the end of its expected service life.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	2	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Install new starter as part of the electrical upgrade.	*COST ESTIMATE* $ 10,000.00			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Breaker Capactiy been Reached? *Issues for Discussion:*	Review starts per hour vs. recommendation Rating 1 (< 80% rec. starts / hour) Rating 3 (80% - 95% rec. starts / hour) Rating 5 (>95% rec. starts / hour)	1	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E102_Starter**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FVNR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19

Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E102_Starter Description: E-E102_Starter	GENERAL	Location:	Electrical Building	1.5	2.5			1972	40	0
		Description:	E-E102_Starter							
		Manufacturer:	Westinghouse							
		Model:								
		Phase:	3 Phase							
		Rated Voltage:	600							
		Rated Horsepower:		Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				5
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment appears to be in "Good" condition. While appearing in "Good" condition the equipment is at the end of its expected service life.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	2	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Install new starter as part of the electrical upgrade.		*COST ESTIMATE* $ 10,000.00		
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Breaker Capactiy been Reached? *Issues for Discussion:*	Review starts per hour vs. recommendation Rating 1 (< 80% rec. starts / hour) Rating 3 (80% - 95% rec. starts / hour) Rating 5 (>95% rec. starts / hour)	1	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E103_Starter**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FVNR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19

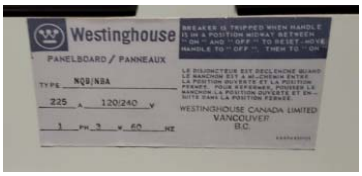
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E103_Starter Description: E-E103_Starter	GENERAL	Location:	Dry Well, Sub Grade	1.5	2.5			1972	40	0
		Description:	E-E103_Starter							
		Manufacturer:	Westinghouse							
		Model:								
		Phase:	3 Phase							
		Rated Voltage:	600							
		Rated Horsepower:		Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				5
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4	*Equipment appears to be in "Good" condition. While appearing in "Good" condition the equipment is at the end of its expected service life.*				
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	2	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:*		*COST ESTIMATE*		
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25	Install new starter as part of the electrical upgrade.		$ 15,000.00		
		Has the Breaker Capactiy been Reached? *Issues for Discussion:*	Review starts per hour vs. recommendation Rating 1 (< 80% rec. starts / hour) Rating 3 (80% - 95% rec. starts / hour) Rating 5 (>95% rec. starts / hour)	1	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E101_Dist_Panel**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

PANELBOARD CONDITION ASSESSMENT FORM

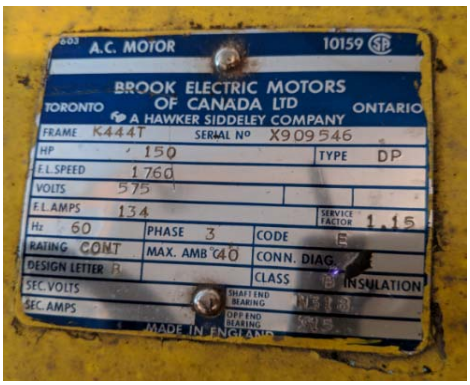
Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Dist_Panel Description: E_E101_Dist_Panel	GENERAL	Location: Dry Well, Sub Grade Level Description: E_E101_Dist_Panel Manufacturer: Westinghouse Model: NQB/NBA Phase: Single Phase Rated Voltage: 120/240 Rated Current: 225A		2.3	2.3			1972	40	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Panel is mounted above the transformer limiting access to the panel. Equipment appears to be in "Good" condition but is at the end of its service life.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	3	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	2	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* During Electrical upgrades arrange new equipment in a manner that restricted access is not a concern.	*COST ESTIMATE* $ 5,000.00			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Panel < 70% Full) Rating 2 (Panel < 90% Full) Rating 3 (Panel > 90 Full or Loaded) Rating 4 (Panel Full but not Loaded) Rating 5 (Panel 100% Full or Loaded)	2	0.25					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	3	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E101_Motor**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Motor Description: E_E101_Motor	GENERAL	Location: Dry Well, Sub Grade Level Description: E_E101_Motor Manufacturer: Brook Electric Motors Model: K444T Horsepower: 150 Rated Voltage: 575 Phase: 3 Rated Current: 134A RPM: 1760		3.2	2.3			1970	50	1
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1	*NOTES & COMMENTS:* *Equipment was not operational during the site visit. Equipment is not rated for a Class 2 location. The motor has been painted making a visual inspection inaccurate. Peckerhead was not opened during inspections.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Replace Motor during electrical upgrades.	*COST ESTIMATE* $ 20,000.00			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.25					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E102_Motor**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

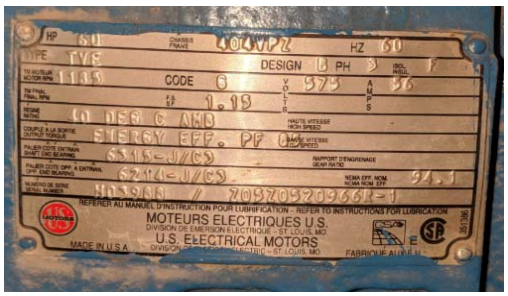
Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E102_Motor Description: E_E102_Motor	GENERAL	Location:	Dry Well, Sub Grade Level	3.0	1.8			2000	50	31
		Description:	E_E102_Motor							
		Manufacturer:	A. O. Smith							
		Model:	E225							
		Horsepower:	5							
		Rated Voltage:	575							
		Phase:	3							
		Rated Current:	5.1A							
		RPM:	1745	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				5
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipments appears to be in "Good" condition. Equipment is not suitable for a Zone 2 location.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Improve HVAC system to allow for regular electrical equipment.		*COST ESTIMATE*		
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.25					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E103_Motor**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E103_Motor Description: E_E103_Motor	GENERAL	Location:	Dry Well, Sub Grade Level	3.2	2.8			1970	50	1
		Description:	E_E103_Motor							
		Manufacturer:	US Motors							
		Model:	TVE 404YPZ							
		Horsepower:	60							
		Rated Voltage:	575							
		Phase:	3							
		Rated Current:	56A							
		RPM:	1185	Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)				5
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1	*NOTES & COMMENTS:* *Motor appears to have been painted but still shows corrosion. Motor is not rated for Zone 2 locations. Motor is at the end of its expected service life. Pecker Heads were not opened during site investigation. Cable is not adequately supported.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Replace motor as part of the electrical upgrade.		*COST ESTIMATE* $ 15,000.00		
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	3	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.25					
	PHOTOGRAPHS									
										
										

Project No.: 8400-001-00
Tag: **E_E104_Motor**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

Equipment Tag: E_E104_Motor
Description: E_E104_Motor

GENERAL

DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Location:	Dry Well, Sub Grade Level	3.2	2.8	1970	50	1
Description:	E_E104_Motor					
Manufacturer:	US Motors					
Model:	TVE 404YPZ					
Horsepower:	60					
Rated Voltage:	575					
Phase:	3					
Rated Current:	56A					
RPM:	1185					

Current Physical Condition

		Rating	Weight
Equipment Visual Inspection: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1
Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4
Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1
Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4

Fitness for Purpose

		Rating	Weight
Meets City Electical Design Standards: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	3	0.25
Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5
Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.25

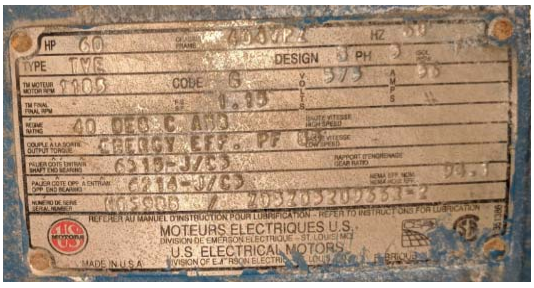
Recommended Frequency of Review: (In years, specify between 1-15)

NOTES & COMMENTS:

Motor appears to have been painted but still shows considerable corrosion. Motor is not rated for Zone 2 locations. Motor is at the end of its expected service life. Pecker Heads were not opened during site investigation. Cable is not adequately supported.

RECOMMENDATIONS:	*COST ESTIMATE*
Replace motor as part of the electrical upgrade.	$ 15,000.00

PHOTOGRAPHS



Project No.: 8400-001-00
Tag: **E_E105_Motor**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E105_Motor Description: E_E105_Motor	GENERAL	Location: Electrical Building Description: E_E105_Motor Manufacturer: Baldor Model: EM3211T-5 Horsepower: 3 Rated Voltage: 575V Phase: 3 Rated Current: 3.4A RPM: 1765		1.4	1.5			2019	15	15
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipment has recently been replaced and appears in "Good" condition.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:*		*COST ESTIMATE*		
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	1	0.25					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E106_Motor**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E106_Motor Description: E_E106_Motor	GENERAL	Location: Dry Well, Sub Grade Description: E_E106_Motor Manufacturer: N/A Model: N/A Horsepower: N/A Rated Voltage: N/A Phase: N/A Rated Current: N/A RPM: N/A		3.0	2.0			2010	15	6
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Nameplate was not visible at time of inspection. Motor appears to have been replaced and in "Good" condition.Equipment is not rated for hazardous locations.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	5	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Upgrade motor to meet new requirements.	*COST ESTIMATE*			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	3	0.25					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E101_Sump_Pump**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

MOTOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Sump_Pump Description: E_E101_Sump_Pump	GENERAL	Location:	Dry Well, Sub Grade Level	1.6	2.0			2010	15	6
		Description:	E_E101_Sump_Pump							
		Manufacturer:	Franklin Electric							
		Model:	ESP33AM							
		Horsepower:	03-Jan							
		Rated Voltage:	155V							
		Phase:	Single							
		Rated Current:	15A							
		RPM:	1160	**Rating**	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1	*NOTES & COMMENTS:* *Equipment appears to be in "Fair" Condition.*				
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Maintain regular maintenance checks to ensure pump is operational. Replace pump as needed.	*COST ESTIMATE*			
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (Below service factor) Rating 2 (Occasional within service factor) Rating 3 (Frequent within service factor) Rating 4 (Always Within Service Factor) Rating 5 (> Service Factor)	2	0.5					
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	3	0.25					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **E_E101_Transformer**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

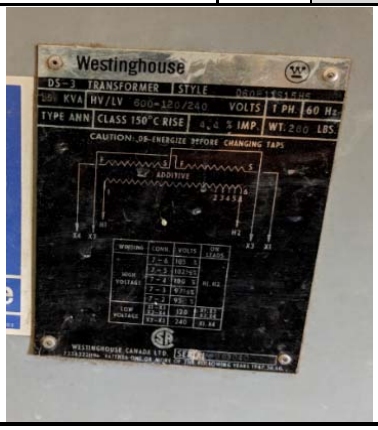
TRANSFORMER CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

Equipment Tag: E_E101_Transformer
Description: E_E101_Transformer

SECTION	ITEM	DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
	GENERAL	Location: Electrical Building Description: E_E101_Transformer Manufacturer: Westinghouse Model: D60P11S15H5 Phase: Single Rated Voltage: 600:120/240V Rated kVA: 15		1.1	2.2	1972	40	0
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)		**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	2	0.1	*NOTES & COMMENTS:* *Equipment appears to be in "Fair" condition. Equipment is at the end of its expected service life. Enclosure is not bonded to ground. Corrosion is taking place at the base of the transformer. Equipment was not opened during site investigation for termination inspection.*		
		Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4			
		Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1			
		Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	1	0.4	*RECOMMENDATIONS:* Install a new transformer as part of the electrical upgrade. Install transformer on a housekeeping pad. Locate new transformer in an alternate location to allow unobstructed access to the distribution panel.	*COST ESTIMATE* $ 10,000.00	
	Fitness for Purpose	**Meets City Electical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.2			
		Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (<75%) Rating 2 (<85%) Rating 3 (<95%) Rating 4 (At capacity) Rating 5 (Above capacity)	1	0.4			
		Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.4			

PHOTOGRAPHS



Project No.: 8400-001-00
Tag: **E_E102_Transformer**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

TRANSFORMER CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

Equipment Tag: E_E102_Transformer
Description: E_E102_Transformer

GENERAL

DATA		CONDITION RATING: Current Physcial Condition	CONDITION RATING: Fitness For Purpose	AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Location:	Pad Mount Exterior of Building	1.2	2.2	1972	40	0
Description:	E_E102_Transformer					
Manufacturer:	Pioneer Electric					
Model:	S/N S4386 01					
Phase:	3					
Rated Voltage:	4160:600/347V					
Rated kVA:	300					

Current Physical Condition

		Rating	Weight
Equipment Visual Inspection: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	3	0.1
Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4
Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1
Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	1	0.4

Fitness for Purpose

		Rating	Weight
Meets City Electical Design Standards: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.2
Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (<75%) Rating 2 (<85%) Rating 3 (<95%) Rating 4 (At capacity) Rating 5 (Above capacity)	1	0.4
Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	4	0.4

Recommended Frequency of Review: (In years, specify between 1-15) — **5**

NOTES & COMMENTS:

Equipment appears to be in "Fair" condition with general wear and tear. Appears vandalism has been an issue in the past. Equipment is at the end of its expected service life. Equipment was not opened during site investigation for termination inspections.

RECOMMENDATIONS:	*COST ESTIMATE*
Consult with Manitoba Hydro during electrical upgrade to have a new pad mount transformer incorporated into the design and project scope. Install a fence to prevent pedestrian and vandal activities on the transformer.	$ 45,000.00

PHOTOGRAPHS

Project No.: 8400-001-00
Tag: **E_E101_ATS**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

AUTOMATIC TRANSFER SWITCH CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

Equipment Tag: E_E101_ATS
Description: E_E101_ATS

GENERAL

Location:	Electrical Building
Description:	E_E101_ATS
Manufacturer:	Cummins
Model:	OTPCC-7234610
Phase:	3
Rated Voltage:	600V
Rated Current:	400A
Rated KW	

CONDITION RATING				AGE		
Current Physcial Condition	Fitness For Purpose			YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
1.7	1.5			2009	25	15

Rating	Weight	Recommended Frequency of Review: (In years, specify between 1-15)	5

Current Physical Condition

		Rating	Weight
Equipment Visual Inspection: *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1
Canadian Electrical Code Issues Identified: *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4
Wiring Terminations Visual Inspection: *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	4	0.1
Occurrences of Maintenance Issues: *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4

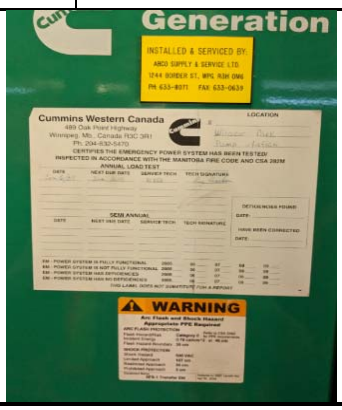
Fitness for Purpose

Meets City Electical Design Standards: *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25
Has the Capactiy been Reached? *Issues for Discussion:*	Rating 1 (<75%) Rating 2 (<85%) Rating 3 (<95%) Rating 4 (At capacity) Rating 5 (Above capacity)	1	0.25
Equipment Remaining Service Life: *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.5

NOTES & COMMENTS:
Equipment appears to be in "Good" condition. Phase identification is not sufficient to CEC. Termination points do not have torque marks suggesting torque verification has not been complete. Based on service sticker fastened to the ATS, annual load testing has not been taking place.

RECOMMENDATIONS:	*COST ESTIMATE*
Identify phases as per CEC. Verify torque values have been met and mark lug for visual identification. Maintain a proper service schedule as per manufacture recommendation.	$ 1,000.00

PHOTOGRAPHS



Project No.: 8400-001-00
Tag: **E_E101_Generator**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

GENERATOR CONDITION ASSESSMENT FORM

Assessor: Richard Ofstie/Doug Grant
Date: 28-Jun-19
Asset ID:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	CONDITION RATING: Fitness For Purpose			AGE: YEAR INSTALLED	AGE: EXPECTED SERVICE LIFE	AGE: REMAINING SERVICE LIFE
Equipment Tag: E_E101_Generator Description: E_E101_Generator	GENERAL	Location: Electrical Building Description: E_E101_Generator Manufacturer: Cummins Model: OTPCC-7234610 Rated kW: 325 Rated kVA: Phase: 3 Rated Voltage: 600V RPM:		1.4	1.5			2009	40	30
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**5**
	Current Physical Condition	**Equipment Visual Inspection:** *Issues for Discussion:*	Rating 1 (Like New) Rating 2 (Minor Surface Corrosion) Rating 3 (Surface & Internal Corrosion) Rating 4 (Severe Corrosion) Rating 5 (Safety Concern)	1	0.1	*NOTES & COMMENTS:* *Equipmet appears to be in "Good" condition. Annual load testing does not appear to be taking place.*				
	Current Physical Condition	**Canadian Electrical Code Issues Identified:** *Issues for Discussion:*	Rating 1 (No issues) Rating 3 (Non compliant - current code) Rating 5 (Non compliant - legacy code)	1	0.4					
	Current Physical Condition	**Wiring Terminations Visual Inspection:** *Issues for Discussion:*	Rating 1 (Connections tight, labelled) Rating 2 (Missing Labels) Rating 3 (Loose / Disorganized wiring) Rating 4 (Inappropriate wiring) Rating 5 (Combination of above)	1	0.1					
	Current Physical Condition	**Occurrences of Maintenance Issues:** *Issues for Discussion:*	Rating 1 (None) Rating 2 (Intermittent) Rating 3 (Consistent but occasional) Rating 4 (Frequent) Rating 5 (Constant)	2	0.4	*RECOMMENDATIONS:* Maintain proper service schedule as per manufacture recommendation.	*COST ESTIMATE*			
	Fitness for Purpose	**Meets City Electrical Design Standards:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - current standards) Rating 5 (No - legacy standards)	1	0.25					
	Fitness for Purpose	**Has the Capacity been Reached?** *Issues for Discussion:*	Rating 1 (<75%) Rating 2 (<85%) Rating 3 (<95%) Rating 4 (At capacity) Rating 5 (Above or < 30% capacity)	1	0.25					
	Fitness for Purpose	**Equipment Remaining Service Life:** *Issues for Discussion:*	Rating 1 (> 90% lifecycle remain) Rating 2 (> 75% lifecycle remain) Rating 3 (> 50% lifecycle remain) Rating 4 (> 25% lifecycle remain) Rating 5 (obsolete)	2	0.5					
	PHOTOGRAPHS									

Appendix F

Force Main Condition Assessment Forms

Project No.: 8400-001-00
Tag: **FM_SEWPCC**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FORCE MAIN PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 04-Jul-19

Equipment Tag: FM_SEWPCC
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose		3rd Party & Environmental Damage	AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location: Parkdale Description: South End Water Pollution Control Centre Sanitary Force Main Size: 450 mm Material: Asbestos Cement / Steel Service: Sewage Coating: N/A		3.4	1.0		1.6	1961	75	17
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**10**
	Current Physical Condition	**Force Main Breaks or Leaks in the Past:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Repairs) Rating 4 (Major Repairs) Rating 5 (Risk of Critical Failure)	3	0.6	*NOTES & COMMENTS:* *Sections of force main are over 50 years old, however the Force Main is within its expected service life.* *Force main is undersized for the majority of flows from the station.*				
	Current Physical Condition	**Force Main Age:** *Issues for Discussion:*	Rating 1 (Less than 10 years old) Rating 2 (Less than 25 years old) Rating 3 (Greater than 25 years old) Rating 4 (Greater than 50 years old) Rating 5 (Greater than 75 years old)	4	0.4					
	Fitness for Purpose	**Compatibility with Pumps and Motors:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper Force Main selection for application. Risk of Critical Failure)	1	1	*RECOMMENDATIONS:*	*COST*			
	3rd Party & Environmental Damage	**Force Main Attached to a Bridge:** *Issues for Discussion:*	Rating 1 (No) Rating 5 (Yes)	1	0.2					
	3rd Party & Environmental Damage	**Force Main Near Other Underground Utilities:** *Issues for Discussion:*	Rating 1 (No) Rating 3 (Yes - Minor nearby utilities) Rating 5 (Yes - Major nearby utilities)	3	0.3					
	3rd Party & Environmental Damage	**Force Main Under a River Crossing:** *Issues for Discussion:*	Rating 1 (No) Rating 3 (Yes - location of pipe not an issue) Rating 5 (Yes - location of pipe is an issue)	1	0.5					
	PHOTOGRAPHS									

Project No.: 8400-001-00
Tag: **FM_NEWPCC**
Facility: Windsor Park Lift Station
Assessment Page 1 of 1

FORCE MAIN PIPING CONDITION ASSESSMENT FORM

Assessor: Ryan Ursu
Date: 15-May-19

Equipment Tag: FM_NEWPCC
Description:

SECTION	ITEM	DATA		CONDITION RATING: Current Physical Condition	Fitness For Purpose		3rd Party & Environmental Damage	AGE: YEAR INSTALLED	EXPECTED SERVICE LIFE	REMAINING SERVICE LIFE
	GENERAL	Location: Parkdale Description: North End Water Pollution Control Centre Sanitary Force Main Size: 450 mm Material: Cast Iron / Asbestos Cement Service: Sewage Coating: N/A		3.4	1.0		1.6	1955	75	11
				Rating	**Weight**	Recommended Frequency of Review: (In years, specify between 1-15)				**10**
	Current Physical Condition	**Force Main Breaks or Leaks in the Past:** *Issues for Discussion:*	Rating 1 (Like New) Rating 3 (Minor Repairs) Rating 4 (Major Repairs) Rating 5 (Risk of Critical Failure)	3	0.6	*NOTES & COMMENTS:* *Sections of force main are over 50 years old, however within its expected service life.* *Force main is undersized for the majority of flows from the station.*				
	Current Physical Condition	**Force Main Age:** *Issues for Discussion:*	Rating 1 (Less than 10 years old) Rating 2 (Less than 25 years old) Rating 3 (Greater than 25 years old) Rating 4 (Greater than 50 years old) Rating 5 (Greater than 75 years old)	4	0.4					
	Fitness for Purpose	**Compatibility with Pumps and Motors:** *Issues for Discussion:*	Rating 1 (Yes) Rating 3 (No - Station still functional) Rating 5 (No - Improper Force Main selection for application. Risk of Critical Failure)	1	1	*RECOMMENDATIONS:*		*COST*		
	3rd Party & Environmental Damage	**Force Main Attached to a Bridge:** *Issues for Discussion:*	Rating 1 (No) Rating 5 (Yes)	1	0.2					
	3rd Party & Environmental Damage	**Force Main Near Other Underground Utilities:** *Issues for Discussion:*	Rating 1 (No) Rating 3 (Yes - Minor nearby utilities) Rating 5 (Yes - Major nearby utilities)	3	0.3					
	3rd Party & Environmental Damage	**Force Main Under a River Crossing:** *Issues for Discussion:*	Rating 1 (No) Rating 3 (Yes - location of pipe not an issue) Rating 5 (Yes - location of pipe is an issue)	1	0.5					
	PHOTOGRAPHS									

Appendix G

Design Standards & Guidelines

Appendix G – Design Standards and Guidelines

The Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers and Ontario Ministry of the Environment, as stipulated in *Recommended Standards for Wastewater Facilities – 2014 and Design Guidelines for Sewage Works – 2008,* have established standards and guidelines for public sewage works such as gravity sewers, force mains, and sewage pumping stations. The following information summarizes the guidelines and best industry practices as they relate to the components of the sewage pumping facility.

Structures – Regulatory Requirements

Lift station structures should be designed to facilitate removing pumps, monitors, and other mechanical and electrical equipment. In areas where high groundwater conditions are expected, adequate provisions should be made for protection against buoyancy of the lift station structures. Lift station structures should be water tight, protected from physical damage from a 100-year flood, and should remain fully operational and accessible during a 25-year flood. Lift stations are to be designed as "Post-Disaster" buildings under the Manitoba Building Code.

Pumps – Regulatory Requirements

Lift stations shall be designed with multiple pump units, with provision for the peak wastewater design flows to be handled by the remaining pumps in the event of the largest pump being out of service. Pumps handling raw wastewater should be capable of passing particles of a minimum 75 mm in diameter. Minimum pump suction and discharge openings should be 100 mm in diameter. Each pump should have an individual intake with wet well and intake designed to avoid turbulence near the intake and prevent vortexing. In order to minimize hydraulic surges, lift stations should be designed to deliver as uniform a flow as practicable.

Valves – Regulatory Requirements

Suitable shut-off valves should be placed on the discharge lines of pumps. Check valves should be placed between the shut-off valve and the pump on the discharge line of each pump. Check valves should be suitable for the material being handled and shall be placed on the horizontal portion of the discharge piping with the exception of ball check valves, which may be placed in the vertical. Valves should be capable of withstanding normal operating pressure and water hammer. All valves should be operable from floor level and accessible for maintenance.

Wet Wells – Regulatory Requirements

Wet well sizing should take into consideration the design fill time and minimum pump cycle time. The effective volume of the wet well should be based on design average flow and is not to exceed a fill time of 30 minutes unless the facility is designed to provide flow equalization/storage. When selecting the minimum cycle time, the motor manufacturer's duty cycle recommendations should be utilized. Provisions should be made so that the fill time indicated is not exceeded for initial flows when the anticipated initial flow to the pumping station is less than the design average flow. Pump configurations within the wet well should be designed to avoid settling of solids. The wet well floor should have a minimum slope of 1:1 to the hopper bottom.

Flow Measurement – Regulatory Requirements

All lift stations should be provided with suitable devices for measuring wastewater flow. Large lift stations with peak design flow greater than 50 L/s should be provided with indicating, totalizing, and recording flow measurement devices. Elapsed time meters may be used for lift stations with peak design flow less than 50 L/s.

Electrical Equipment – Regulatory Requirements

Electrical systems and associated components (motors, lights, cable, switchboxes, control circuits, etc.) in lift station wet wells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapours are likely to occur in normal operation, should comply with the Canadian Electrical Code requirements for Zone 1 hazardous locations. Equipment located in wet wells should be suitable for use in corrosive conditions and meet the requirements under the Canadian Electrical Code for Category 2 corrosive environments. Electrical systems installed in lift station dry wells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapours are not likely to occur in normal operation, should comply with the Canadian Electrical Code requirements for Zone 2 hazardous locations. Equipment located in dry wells should be suitable for use in corrosive conditions and meet the requirements under the Canadian Electrical Code for Category 1 corrosive environments. If a lift station dry well complies with the ventilation requirements set forth in the NFPA standard 820 to be an unclassified space, the electrical systems installed in dry wells may not be considered a Zone 2 hazardous location.

Alarm Systems – Regulatory Requirements

Alarm systems should be provided for lift stations. Alarms should be in place for cases of high and low liquid levels, power failure, sump pump failure, pump failure, unauthorized entry, or any cause of lift station fault. Lift station alarms should be telemetered to the personnel in charge of operating the lift station. In some cases, audio-visual alarm systems with a self-contained power supply may be installed in lieu of a telemetering system depending on location, station holding capacity, and inspection frequency.

Emergency Operation – Regulatory Requirements

Lift stations should be designed to operate in such a way that equipment failure may not result in the discharge of raw wastewater to any waters and to protect public health by preventing backup of wastewater and subsequent discharge to basements, streets, and other public and private property.

Ventilation – Regulatory Requirements

Ventilation systems shall be designed to function year round, including fresh air intake louvers and openings. To prevent subsequent blockages, screen openings should be sized to avoid build-up of frost during winter months. Ventilation of the wet well may be either continuous or intermittent. If continuous, a minimum of 12 complete air changes per hour is required. If intermittent, a minimum of 30 complete air changes per hour during the period of occupancy is required. Fresh air should be forced into wet wells by mechanical means at a point about 30 cm above the expected high liquid level, with provision for emergency automatic blow-by to elsewhere in the wet well, should the fresh air outlet become submerged. Provision should be made in the lift station system design to verify that the ventilation fan is operational and the air change capacity is achieved.

Ventilation of the dry well may be either continuous or intermittent. If continuous, a minimum of 6 complete air changes per hour are required. If intermittent, a minimum of 30 complete air changes per hour during the period of occupancy are required. Positive pressure ventilation is recommended and the system is to avoid dispensing contaminants throughout other areas of the lift station.

Provision for heating of intake air is recommended. Switches for the operation of ventilation equipment are to be plainly identified and located within arm's reach of the lift station entry way. All intermittently operated ventilation equipment should be interconnected with the lighting system.

Force main – Regulatory Requirements

The minimum pipe diameter for a force main should not be less than 100 mm. Velocities less than 0.6 m/sec (2 ft/sec) and greater than 1.6 m/sec (5.2 ft/sec) are not recommended. Above 3.0 m/sec pipe scouring can damage the walls of the pipe. Below 0.6 m/sec solid particles can separate from the wastewater and settle to the bottom of the pipe, which can obstruct the pipe flow over time. Total retention time in a force main should be kept under 4 hours to avoid anaerobic fermentation and the resultant production of odorous, hazardous, and corrosive gases.

Sewer – Regulatory Requirements

It is recommended that no gravity sewer conveying raw sewage should be less than 200 mm in diameter. Sanitary sewers should be designed and constructed with such slopes to give a mean velocity of not less than 0.6 m/s (2 fps) during average flow conditions with due consideration given to actual depth of sewage flowing in the pipe. Slopes slightly less than those required for 0.6 m/s (2 fps) may be considered if the depth of flow will be 0.3 of the diameter or greater for design average flow, and provisions can be made for frequent cleaning. Manholes should be installed at the end of each line and at all changes in grade, size, or alignment. Manhole spacing should not exceed 120 m for sewers 380 mm (15 inches) in diameter or less. The sewer shall be installed at no less than 600 mm below a water line if installed in the same trench and the horizontal separation distance is a minimum of 300 mm. Best industry practices are to maintain a minimum of 3 meters separation distance between water and sewer lines and a separation distance of 300 mm when crossing with the water line above.

Design Standards & Guidelines

- MPE prepared this assessment in accordance to the following standards and guidelines as a minimum:
- City of Winnipeg Design and Development Standards Manual, 2017
- City of Winnipeg Sewage Works Control Bylaw (Bylaw No. 5115)
- City of Winnipeg Standard Construction Specifications and Drawings, Roadways, Water, and Sewer
- The Waterworks and Sewage Works Regulations, 2015
- The Environmental Management and Protection Act, 2002
- Water Security Agency, Sewage Works Design Standard (EPB 503), Nov. 15, 2012
- AWWA M11 – Steel Pipe – A Guide for Design and Installation
- AWWA M23 – PVC Pipe: Design and Installation
- AWWA M55 – PE Pipe: Design and Installation
- ANSI/HI – 1.3, 1.4, 1.6, 9.1-9.5 Standards for Centrifugal Pumps
- ANSI/HI – 9.6.4 Rotodynamic Pumps for Vibration Measurements & Allowable Values
- ANSI/HI – 9.6.5 Rotodynamic Pumps – Guideline for Condition Monitoring
- ANSI/HI – 9.6.6 Rotodynamic Pumps for Pump Piping

- ANSI/HI – 9.8 Pump Intake Design
- ANSI/HI – 11.6-2012 Rotodynamic Submersible Pumps: for Hydraulic Performance
- ASME/ANSI B16.5 – 2013
- ANSI – Applicable Standards
- ASTM – Applicable Standards
- AMSE – Applicable Standards
- AWWA – Applicable Standards
- Saskatchewan Plumbing and Drainage Regulations
- Canadian Standards Association (CSA)
- National Sanitation Foundation (NSF)
- Canadian Electrical Code (CEC)
- Institute of Electrical and Electronic Engineers (IEEE)
- Electrical and Electronic Equipment Manufacturers Association of Canada (EEMAC)
- National Building Code of Canada
- National Plumbing Code of Canada
- Canadian Standards Association (CSA) Natural Gas and Propane Installation Code CSA B149.1
- American Society of Heating, Refrigeration & Air Conditioning Engineers (ASHRAE)
- ACI, Requirements for Assessment, Repair, and Rehab of Existing Concrete Structures (ACI 562M-16)
- ACI, Metric Building Code Requirements for Structural Concrete and Commentary (ACI 318M-14)
- ACI, Code Requirements for Environmental Engineering Concrete Structures (ACI 350-06)
- Process Industry Practices, Fixed Ladders and Cages (PIP STF05501)
- National Fire Code of Canada
- NFPA 820
- The Uniform Building & Accessibility Standards Regulations of Saskatchewan
- The Occupational Health and Safety Act