PEACE RIVER REGIONAL DISTRICT

Rural Budgets Administration Committee Meeting
Agenda

November 25, 2021, Immediately Following EADC
1981 Alaska Avenue, Dawson Creek, BC

PEACE RIVER REGIONAL DISTRICT

RURAL BUDGETS ADMINISTRATION COMMITTEE MEETING MINUTES

THURSDAY, OCTOBER 28, 2021

LOCATION Peace River Regional District Office, Dawson Creek, BC

ATTENDANCE

Directors

Director Goodings, Electoral Area 'B' *(Via Zoom)*
Director Sperling, Electoral Area 'C'
Director Hiebert, Electoral Area 'D'
Director Rose, Electoral Area 'E' – Committee Chair

Staff

Shawn Dahlen, Chief Administrative Officer
Tyra Henderson, Corporate Officer
Teri Vetter, Chief Financial Officer
Tab Young, Deputy Corporate Officer
Crystal Brown, Electoral Area Manager
Kari Bondaroff, GM of Environmental Services
Jeff McDonald, Communications Manager *(Via Zoom)*
Daris Gillis, Environmental Services Manager
Gerritt Lacey, Solid Waste Services Manager
Hunter Rainwater, Recorder

1. CALL TO ORDER The Chair called the meeting to order at 11:37 am.

2. DIRECTORS' NOTICE OF NEW BUSINESS

Director Hiebert — CivX 2021 Virtual Event

Director Hiebert — Next Steps for Building a Business Case to Remove Weeds from Lakes within the PRRD Boundaries, ENV-EADC-018 Report

3. ADOPTION OF AGENDA

3.1 Adoption of Agenda

MOVED Director Sperling, SECONDED Director Hiebert,

That the Rural Budgets Administration Committee adopt the October 28, 2021 Meeting Agenda, as amended to include Director's new business:

1. Call to Order
2. Directors' Notice of New Business
3. Adoption of Agenda
4. Gallery Comments or Questions
5. Adoption of Minutes
5.1. Rural Budgets Administration Committee Draft Meeting Minutes of September 27, 2021
6. Business Arising from the Minutes
7. Delegations
8. Correspondence

(Continued on next page)

Adoption of Agenda (Continued)

9. Reports

9.1. Funding for the Development of a Lake Harvester Environmental Management Plan, ENV-RBAC-030
9.2. Grant Request – Tower Lake Community Club, FN-RBAC-110
9.3. Pacific Northern Gas Area B PRA Commitment, FN-RBAC-109
9.4. Rural Fringe Fund Reserve, FN-RBAC-108
9.5. September 2021 Financial Report, FN-RBAC-107

10. Discussion Item(s)

11. New Business

11.1. CivX 2021 Virtual Event
11.2. Next Steps for Building a Business Case to Remove Weeds from Lakes within the PRRD Boundaries, ENV-EADC-018 Report

12. Diary

12.1. Diary Items

13. Item(s) for Information

13.1. RBAC Establishing Bylaw

14. Adjournment

CARRIED

4. GALLERY COMMENTS OR QUESTIONS

5. ADOPTION OF MINUTES

5.1
Sept. 27/21 RBAC Minutes

MOVED Director Sperling, SECONDED Director Hiebert,
That the Rural Budgets Administration Committee adopt the September 27, 2021 Meeting Minutes.

CARRIED

6. BUSINESS ARISING FROM THE MINUTES

7. DELEGATIONS

8. CORRESPONDENCE

9. REPORTS

9.1
Funding for the Development of a Lake Harvester Environmental Management Plan, ENV-RBAC-030

MOVED Director Sperling, SECONDED Director Hiebert,
That the Rural Budgets Administration Committee authorize a funding commitment of $100,000, payable in the amount of $25,000 each from Electoral Area B, C, D and E Fair Share, for the development of a Lake Harvester Environmental Management Plan by a qualified professional biologist.

MOVED Director Sperling, SECONDED Director Hiebert,
That the Rural Budgets Administration Committee amend the motion by changing "payable in the amount of $25,000 each from Electoral Area B, C, D and E Fair Share" to "payable in the amount of $50,000 each from Electoral Area C and D Fair Share."

CARRIED

9.1 Funding for the Development of a Lake Harvester Environmental Management Plan, ENV-RBAC-030 (Continued)	MOVED Director Sperling, SECONDED Director Hiebert, That the Rural Budgets Administration Committee authorize a funding commitment of $100,000, payable in the amount of $50,000 each from Electoral Area C and D Fair Share, for the development of a Lake Harvester Environmental Management Plan by a qualified professional biologist. **CARRIED**
9.2 Grant Request – Tower Lake Community Club, FN-RBAC-110	MOVED Director Hiebert, SECONDED Director Sperling, That the Rural Budgets Administration Committee authorize a grant in the amount of $3,330, payable from the COVID-19 Reserve Fund, to be issued to Tower Lake Community Club to assist with revenue shortfalls incurred due to the inability to rent out the community hall as a result of the COVID-19 restrictions on public events. **CARRIED**
9.3 Pacific Northern Gas Area B PRA Commitment, FN-RBAC-109	MOVED Director Goodings, SECONDED Director Hiebert, That the Rural Budgets Administration Committee approve a funding commitment in the amount of $40,000, payable from Electoral Area B Peace River Agreement, Spending Item #9 – Natural Gas, to be issued to Pacific Northern Gas (PNG), for the extension of natural gas to two residents in the Wonowon subdivision pending formal letter of request from PNG. **CARRIED**
9.4 Rural Fringe Fund Reserve, FN-RBAC-108	MOVED Director Sperling, SECONDED Director Hiebert, That the Rural Budgets Administration Committee authorize the remaining balance of $1,208,783.03 from the Rural Fringe Fund Reserve be transferred to the Rural Loan Fund Reserve; and further, that $1,000,000 be put towards available loans and the remaining $208,783.03 be put towards interest for non-repayable grants. **CARRIED**
9.5 September 2021 Financial Report, FN-RBAC-107	MOVED Director Sperling, SECONDED Director Hiebert, That the Rural Budgets Administration Committee receive the report titled "September 2021 Financial Report – FN-RBAC-107", which details balances and commitments in various reserves, for information. **CARRIED**

10. DISCUSSION ITEM(s)

11. NEW BUSINESS

11.1 CivX 2021 Virtual Event	MOVED Director Hiebert, SECONDED Director Sperling, That the Rural Budgets Administration Committee authorize the Electoral Area Directors to attend the CivX 2021 Virtual Event, which is being held November 15 – 17, 2021. **CARRIED**

11.2 Next Steps for Building a Business Case to Remove Weeds from Lakes within the PRRD Boundaries, ENV-EADC-018	The Rural Budgets Administration Committee discussed the report titled "Next Steps for Building a Business Case to Remove Weeds from Lakes within the PRRD Boundaries, ENV-EADC-018", which was referred from the October 28, 2021 Electoral Area Directors Committee meeting. MOVED Director Sperling, SECONDED Director Hiebert, That the Rural Budgets Administration Committee recommend that the Regional Board authorize the compilation and issuance of a Request for Proposal for a qualified professional biologist to develop a Lake Harvester Environmental Management Plan for Charlie Lake, Swan Lake, and One Island Lake, for the purpose of obtaining a license to harvest aquatic vegetation in Charlie Lake, Swan Lake and One Island Lake. **CARRIED**

12. DIARY

12.1 Diary Items	No changes were made to the Diary

13. ITEMS FOR INFORMATION

13.1 RBAC Establishing Bylaw	The RBAC Establishing Bylaw was included for the Committee's information.

14. ADJOURNMENT The Chair adjourned the Meeting at 12:18 pm.

Director Rose, Meeting Chair

Hunter Rainwater, Recorder

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ADM-RBAC-014

From: Crystal Brown, Electoral Area Manager — Date: November 25, 2021

Subject: Local Government Leadership Academy – 2022 Leadership Forum

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RECOMMENDATION:

That the Rural Budgets Administration Committee authorize that conference registration, flights and hotels be booked for all four Electoral Area Directors for the 2022 LGLA Leadership Forum in Richmond BC, from February 9-11, 2022.

BACKGROUND/RATIONALE:

The Local Government Leadership Academy will be held in Richmond, at the Radisson Vancouver Airport Hotel from Wednesday February 9, beginning at 12:30pm, and ending Friday February 11, at 11:30am. At this time, there is no option to attend virtually, and there is no agenda available.

Registration will cost $395 plus GST. A full refund will be given if cancelled by January 28, 2022.

Registration deadline is Friday, February 4, 2022.

The conference will be adhering to up to date Provincial Health Regulations, including requiring proof of full vaccination status.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Not Applicable to Strategic Plan

FINANCIAL CONSIDERATION(S):

As per the Remuneration and Expense Bylaw No. 2354, 2019, Electoral Area Directors are authorized to attend the Local Government Leadership each calendar year with all costs to be paid from Legislative.

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

None at this time.

Staff Initials: CB   Dept. Head: CAO: Shawn Dahlen   Page 1 of 1

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ADM-RBAC-015

From: Crystal Brown, Electoral Area Manager — Date: November 25, 2021

Subject: UBCM – Electoral Area Director's Forum 2022

RECOMMENDATION:

That the Rural Budgets Administration Committee authorize that conference registration, flights and hotels be booked for all four Electoral Area Directors for the 2022 Electoral Area Directors Forum in Richmond BC, from February 8-9, 2022.

BACKGROUND/RATIONALE:

The UBCM Electoral Area Directors' Forum will be held in Richmond, at the Radisson Vancouver Airport Hotel from Tuesday Feb 8, beginning at noon and ending Wednesday, Feb 9 at noon. At this time, there is no option to attend virtually, and there is no agenda available.

The event provides an opportunity to discuss common issues and share potential solutions, and is open to regional district chairs, electoral area directors and alternates, and regional district staff.

Registration will cost $150.00 plus GST. A full refund will be given if cancelled by January 28, 2022.

The registration deadline is January 28, 2022.

The conference will be adhering to up to date Provincial Health Regulations, including requiring proof of full vaccination status.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Not Applicable to Strategic Plan

FINANCIAL CONSIDERATION(S):

As per the Remuneration and Expense Bylaw No. 2354, 2019, Electoral Area Directors are authorized to attend the Electoral Area Directors' Forum each calendar year with all costs to be paid from Legislative.

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

None at this time.

Staff Initials: *CB* Dept. Head: CAO: *Shawn Dahlen* Page 1 of 1

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: CS-RBAC-026

From: Trish Morgan, General Manager of Community Services — Date: November 25, 2021

Subject: Charlie Lake Fire Hall Condition Assessment Repairs

RECOMMENDATION #1:

That the Rural Budgets Administration Committee approve a funding commitment in the amount of $11,500, in 2021, payable from Electoral Area C Peace River Agreement Funds, Spending Item #6 – Fire Protection, to be issued to the Charlie Lake Fire Department Function – 315, for the replacement of their hot water heater.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee recommend that the Regional Board amend the 2021 budget for Function 315 – Charlie Lake Fire to:

- Increase Transfer from Peace River Agreement Reserve - $11,500
- Increase Machinery & Equipment - $11,500

RECOMMENDATION #3:

That the Rural Budgets Administration Committee approve a funding commitment in the amount of $26,000, in 2022, payable from Electoral Area C Peace River Agreement Funds, Spending Item #6 – Fire Protection, to be issued to Function 315 - Charlie Lake Fire Department, to move domestic water piping away from electrical outlets and to conduct engineering studies to:

a) review condition of structure between original building and addition;
b) examine the grading around the building perimeter; and
c) examine the heated water distribution and glycol loop.

BACKGROUND/RATIONALE:

Charlie Lake Fire Hall is located at Fire Hall Road in Charlie Lake, BC. This facility is a two-storey structure without a basement, constructed in 1977 on land leased from the Province of BC. An addition was constructed in 1987. The total gross floor area is estimated to be about 624 SM in size. The building was assessed on June 17, 2021.

Aligning with the current Regional Board Strategic Plan, a condition assessment of the Charlie Lake Fire Hall was conducted in 2021 by FCAPX in June 2021. The scope of the assessment was to determine the current condition and remaining service life of the fire hall, and to identify required repairs along with associated costs.

The Fire Hall's condition was rated as "Good" however, the following items need addressing in 2021 and 2022. Charlie Lake's hot water heater is currently not working and staff have been looking at options for replacement. WorkSafe Regulation 5.82 and 5.83 requires that firefighters shower at the fire hall after they have been exposed to any hazardous materials (e.g., after any fire). As such staff have been investigating hot water tanks with larger capacity and hot water on demand so that all crew members can decontaminate before leaving the hall.

Further, a number of recommendations relate to conducting engineering studies in 2022. Once those studies are complete, then requests for funding may be brought forward to the conduct the work based on the costs identified in the studies.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATION(S):

As of October 31, 2021 Electoral Area C had the following uncommitted balances:

- Peace River Agreement = $3,007,080.74
- Fair Share = $981,719.04
- Gas Tax = $2,300,136.34

2021 Recommendations

Item	Cost (+/- 30%)	Year
1. Replace rusted and worn domestic water heater (currently not functioning)	$8,822	2021
TOTAL	**$8,822**	
Including ~30% Contingency	**$11,500**	

2022 Recommendations

Item	Cost (+/- 30%)	Year
1. Engineering study to review condition of structure between original building and addition and conduct recommended repairs (p.22)	$5,000	2022
2. Engineering study of grading around the building perimeter and identify associated repairs.	$5,000	2022
3. Engineering study of heating water distribution and glycol loop and identify associated repairs (p. 77)	$5,000	2022
4. Move domestic water piping away from electrical outlets	$5,000	2022
TOTAL	**$20,000**	
Including ~30% Contingency	**$26,000**	

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

Community Works Gas Tax funding can now be used for specific items related fire departments as follows:

Fire Halls and Fire Stations

Fire hall and fire station infrastructure* Examples include:

- New fire hall (building) for housing fire-fighting apparatus and staff (may include attached dorms, basic training facilities and administration areas)
- Retro-fit and modernization of existing firehalls and attached building space
- Acquisition of a fire-truck as a capital asset as part of an overall capital upgrade to an existing fire hall or construction of a new firehall

*Note, the following investments are **not eligible** in the Fire Halls and Fire Stations category:*

- Acquisition or replacement of fire trucks or other vehicles as a standalone project
- Personal protective equipment (PPE) and gear and other fire station related equipment
- Fire hydrants and reservoirs
- Communications devices (Ex.: Cell phones, radios, pagers)
- Structural Protection Units and contents

*Exclusive to the Fire Halls and Fire Stations category, costs must have been incurred after April 1, 2021 to be eligible for investment.

Attachments:

1. Charlie Lake Fire Hall Facility Condition Assessment 2021
2. Charlie Lake Fire Hall Reserve Fund Study 2021
3. Charlie Lake Fire Hall Energy Efficiency Report 2021

PEACE RIVER REGIONAL DISTRICT

Submission to

Peace River Regional District

Facility Condition Assessment Report
Charlie Lake Fire Hall

Version: Final

November 18, 2021

Prepared by:
FCAPX a Division of Roth IAMS
Project No. 21075
www.fcapx.com

FCAPX

A Division of Roth IAMS

Executive Summary

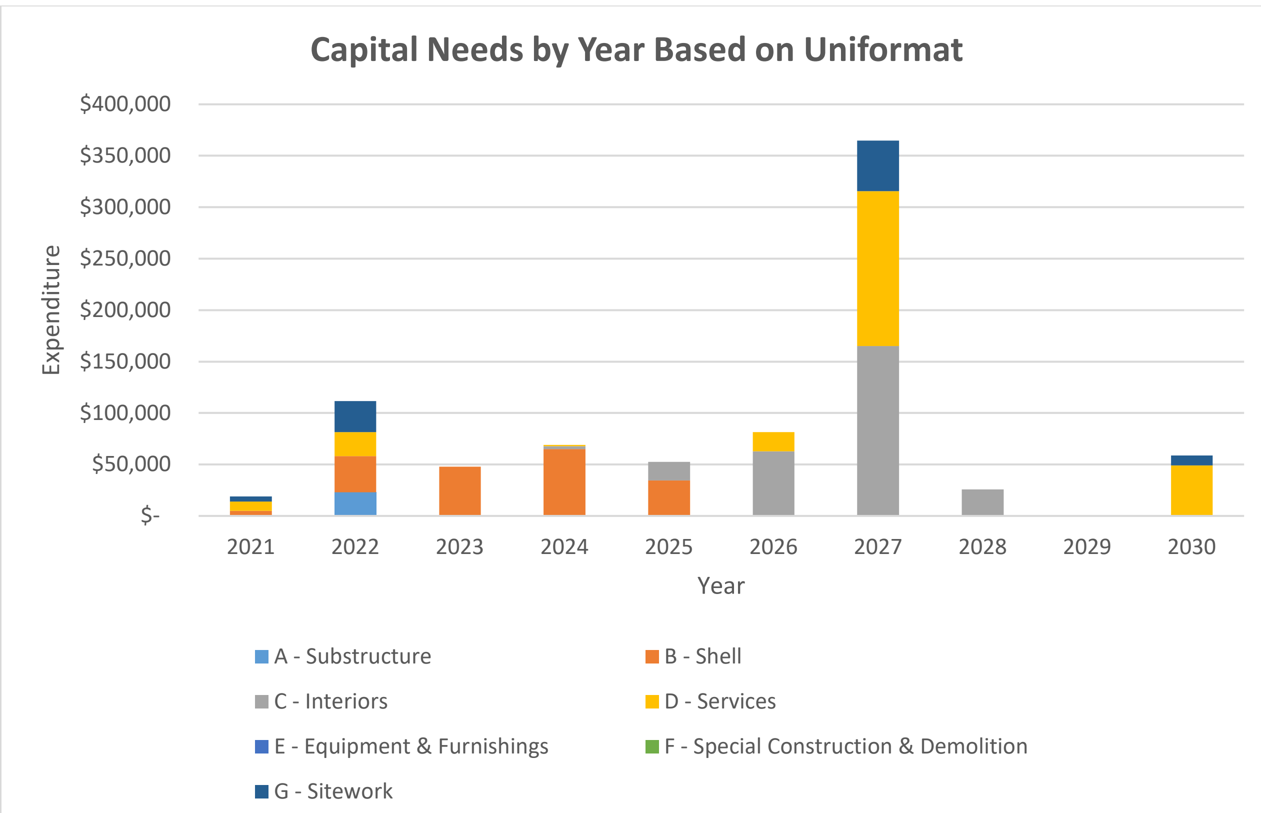
FCAPX a division of Roth IAMS Ltd. (FCAPX) was retained by the Peace River Regional District (PRRD) to conduct a Facility Condition Assessment (FCA) of the Charlie Lake Fire Hall, BC. The objective of the FCA was to identify, based on current observed conditions, deficiencies, and potential lifecycle replacements in the next 30 years.

Facility Summary

Charlie Lake Fire Hall is located at Firehall Road in Charlie Lake, BC. This facility is a two-storey structure without a basement, constructed in 1977. An addition was constructed in 1987. The total gross floor area is estimated to be about 624 SM in size. The building was assessed on June 17, 2021.

Findings

An analysis of the capital needs by building systems over the next 10 years was created for the building to visually view the replacement/repair forecast.



Collaborating to Provide Asset Data You Can Trust

The FCA identified repairs and replacements that are anticipated over the next 30 years. The table below summarizes the total capital expenditures (in current year dollars) for the repairs and replacements that are anticipated over the course of the 30-year evaluation period.

Uniformat Division	Immediate 2021	Short Term 2022-2026	Mid Term 2027-2031	Long Term 2032-2050	Totals
A-Substructure	$ -	$ 23,000	$ -	$ -	$ 23,000
B- Shell	$ 5,000	$ 182,605	$ -	$ 335,145	$ 522,750
C – Interiors	$ -	$ 83,305	$ 190,855	$ 277,221	$ 551,381
D – Services	$ 8,822	$ 43,335	$ 199,508	$ 561,850	$ 813,515
E – Equipment & Furnishings	$ -	$ -	$ -	$ 70,013	$ 70,013
F – Special Construction	$ -	$ -	$ -	$ -	$ -
G – Building Sitework	$ 5,000	$ 30,000	$ 58,661	$ 404,206	$ 497,867
Totals	$ 18,822	$ 362,245	$ 449,024	$ 1,648,435	$ 2,478,525

[1]Costs shown above do not include soft costs (engineering design, review, etc.). See section 3.6 for further information.

Table of Contents

APPENDIX

1 INTRODUCTION

FCAPX a division of Roth IAMS Ltd. (FCAPX) was retained by the Peace River Regional District (PRRD) to conduct a Facility Condition Assessment (FCA) of the Charlie Lake Fire Hall in Charlie Lake, BC (herein referred to as the "Facility, "Site" or "Property"). We understand the purpose of this report is to assist with the long-term capital planning for the facility. This report summarizes the findings of the FCA for the property.

1.1 FACILITY

Information on the evaluated facility is provided below:

Building Name	Charlie Lake Fire Hall
Address	Firehall Road, Charlie Lake, BC
Estimated Building Floor Area (sq.m.)	624
Number of Storeys	2
Date of Construction	1977 and 1987

1.2 SITE REVIEW

A site visit was performed on June 17, 2021 by the following FCAPX personnel:

- Inder Grewal, Facility Assessor

1.3 OWNER SUPPLIED MATERIAL

In this report, reference is made to the "reported" condition of particular systems and/or components. The reported condition pertains to information provided by the building's operations and maintenance personnel and/or tenants. In some cases, this information was gathered through either an onsite interview process or a formal off-site interview process.

- No Documents were available for review.

1.4 FACILITY SUMMARY

1.4.1 Structural and Architectural Summary

The building was constructed circa 1977 and has a reported gross floor area of approximately 292 SM (3,145 SF) with a two-storey addition in 1987 and a reported gross floor area of approximately 332 SM (3,570 SF). The building occupancy includes offices, kitchen, washrooms, and an apparatus bay.

The building's foundations appear to be cast-in-place concrete foundation walls and strip footings with a concrete slab-on-grade floor structure. The building appears to be a wood-frame with a wood roof structure. The building is clad with vinyl siding. The flat roof appears to be covered with modified bitumen roofing assembly. Exterior doors are painted, insulated hollow metal. Exterior windows appear to be operable, aluminum-framed units. Motorized sectional metal overhead doors are installed in the apparatus bays. Interior wall partitions appear to be gypsum wallboard. Interior doors are painted hollow-core wood. The second floor is provided with kitchen cabinets. The washroom is provided with typical fixtures. Flooring throughout the apparatus bay is painted concrete, while the washroom has ceramic floor tile. Ceilings are provided with a paint covering and second floor is suspended acoustic ceiling. The overall architectural systems are in good condition.

1.4.2 Plumbing and Mechanical Systems Summary

The facility is provided with a domestic water distribution system. The washroom plumbing fixtures include floor mounted water closets, countertop mounted lavatories and shower assemblies. Domestic hot water is provided by a gas fired domestic water heater installed in the boiler room. Ventilation for the apparatus bay is provided by vehicle exhaust system with ducting, controls, hose reels and flexible hoses. Heating is provided by fin tube radiation units on the second floor and radiant floor heating in the apparatus bay. The building uses electric controls as a method of control for HVAC systems. The overall mechanical systems are in good condition.

1.4.3 Electrical Systems Summary

The building is supplied with 120/208V power that is stepped down via utility owned pole mounted transformer. The facility is provided with a main electrical disconnect rated at 200 amps (A), 120/208 volts (V). Interior lighting fixtures, which are a combination of Linear LED light fixtures in the apparatus bay and linear T-8 fixtures on the second floor. There are LED wall pack fixtures installed along the building perimeter. The other electrical components include a fire alarm system, data systems, and an intrusion alarm. Exit signs are strategically located throughout the building to mark the path of emergency egress. The emergency power generator system includes a gas fired generator located on the north/east elevation. The overall electrical systems are in good condition.

1.4.4 Site Feature Systems Executive Summary

The site elements include an asphalt and concrete paved driveway, and a chain-link fence. The underground water supply line is provided from the municipality water supply to the storage room. The underground sanitary sewer line is provided from the storage room to the municipality sewer system. The underground electrical service is provided underground from the utility to the building electrical service equipment. The overall site systems are in good condition.

2 SCOPE OF WORK

The FCA carried out by FCAPX is generally based on the ASTM Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process (E2018-15) and consisted of the following:

- Background Information Request and Review;
- Interview(s) with Knowledgeable Site Staff;
- Walk-through Site Assessment Visit;
- Summary of Opinions of Probable Costs to remedy observed physical deficiencies;
- Summary of Opinions of Probable Costs to replace components which will exceed their expected useful life (EUL) over the evaluation period; and
- Preparation of an FCA Report, including salient findings and supporting photographs.

The ASTM defines a physical deficiency as a conspicuous defect or significant deferred maintenance of a site's material systems, components, or equipment as observed during the site assessor's walk-through site visit. Included within this definition are material systems, components, or equipment that are approaching, have reached, or have exceeded their typical expected useful life (EUL) or whose remaining useful life (RUL) should not be relied upon in view of actual or effective age, abuse, excessive wear and tear, exposure to the elements, lack of proper or routine maintenance, etc. This definition specifically excludes deficiencies that may be remedied with routine maintenance, miscellaneous minor repairs, normal operating maintenance, etc., and excludes conditions that generally do not constitute a material physical deficiency of the site.

The review of the Site was based on a visual walk-through review of the visible and accessible components of the property, building and related structures. The roof surface, interior and exterior wall finishes, and floor and ceiling finishes of the on-site building and related structures were visually assessed to determine their condition and to identify physical deficiencies, where observed. The assessment did not include an intrusive investigation of wall assemblies, ceiling cavities, or any other enclosures/assemblies. No physical tests were conducted, and no samples of building materials were collected to substantiate observations made, or for any other reason.

The review of the mechanical systems, electrical systems, and fire & life safety systems at the property included discussions with the site representative and review of pertinent maintenance records that were made available. A visual walk-through assessment of the mechanical systems, electrical systems, and fire & life safety systems was conducted to determine the type of systems present, age, and aesthetic condition, with considerations of the reported performance. No physical tests were conducted on these systems.

A detailed evaluation of the property development's compliance with applicable national and/or provincial Building Codes and/or Fire Codes is not part of the scope of this assessment. It is assumed that the existing buildings and related structures were reviewed and approved by local authorities at the time of construction. However, applicable codes may be referenced by FCAPX, at their discretion, to identify deficiencies and appropriate recommendations.

Replacement and repair costs are based on unit rates published by Means Publishing and/or Marshall & Swift Valuation Service, combined with local experience gained by FCAPX. The quantities associated with each item have been estimated during a walk-through site assessment and do not represent exact measurements or quantities. At the time of replacement, specific "scope of work" statements and quotations should be determined, and the budgetary items revised to reflect actual expenditures. Not included are items that would be addressed as routine maintenance. However, the capital costs may include items, which are currently managed under the Operations and Maintenance budget for the site.

Opinions of probable costs for deficiencies that are individually less than the established threshold amount are generally not included in the FCA cost tables. The exception are deficiency costs relating to life, safety or accessibility, these may be included regardless of this cost threshold.

2.1 Deviations from the Guide

The major deviations from ASTM E2018-15 for this project that was not included are as follows:

- A review of municipal/public records for zoning;
- A comprehensive building and/or fire & life safety code/regulatory review for compliance. It is assumed that at the time of building construction/commission and/or subsequent renovation(s), a duty of care was undertaken to ensure the building and related structures were constructed in accordance with the current building and fire code, as well as reviewed and approved by the local authorities having jurisdiction;
- An assessment of the property's compliance with barrier-free accessibility requirements; and
- A review of municipal/regional records to determine if the property resides in a designated flood plain.

Furthermore, the FCA did not include a:

- Verification of the number of parking spaces;
- Verification of gross and net usable areas of the site building(s); and
- Review of as-built construction drawings for the building and site.

2.2 Limiting Conditions

This report has been prepared for the exclusive and sole use of the Peace River Regional District (PRRD). The report may not be relied upon by any other person or entity without the express written consent of FCAPX and PRRD.

Any reliance on this report by a third party, any decisions that a third party makes based on this report, or any use at all of this report by a third party is the responsibility of such third parties. FCAPX accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions taken, based on this report.

The assessment of the building/site components was performed using methods and procedures that are consistent with standard commercial and customary practice as outlined in ASTM Standard E 2018-15 for facility condition assessments. As per this ASTM Standard, the assessment of the building/site components was based on a visual walk-through site visit, which captured the overall condition of the site at that specific point in time only.

No legal surveys, soil tests, environmental assessments, geotechnical assessments, detailed barrier-free compliance assessments, seismic assessments, detailed engineering calculations, or quantity surveying compilations have been made. No responsibility, therefore, is assumed concerning these matters. FCAPX did not design or construct the building(s) or related structures and therefore will not be held responsible for the impact of any design or construction defects, whether or not described in this report. No guarantee or warranty, expressed or implied, with respect to the property, building components, building systems, property systems, or any other physical aspect of the property is made.

The recommendations and our opinion of probable costs associated with these recommendations, as presented in this report, are based on walk-through non-invasive observations of the parts of the building which were readily accessible during our visual review. Conditions may exist that are not as per the general condition of the system being observed and reported in this report. Opinions of probable costs presented in this report are also based on information received during interviews with operations and maintenance staff. In certain instances, FCAPX has been required to assume that the information provided is accurate and cannot be held responsible for incorrect information received during the interview process. Should additional information become available with respect to the condition of the building and/or site elements, FCAPX requests that this information be brought to our attention so that we may reassess the conclusions presented herein.

The opinions of probable costs are intended for order of magnitude budgeting purposes only. The scope of work and the actual costs of the work recommended can only be determined after a detailed examination of the element/system in question, understanding of the site restrictions, understanding of the effects on the ongoing operations of the site/building, definition of the construction schedule, and preparation of tender documents. We expressly waive any responsibilities for the effects of any action taken as a result of these endeavors unless we are specifically advised of prior to, and participate in the action, at which time, our responsibility will be negotiated.

Our opinions and recommendations presented in our reports will be rendered in accordance with generally accepted professional standards and are not to be construed as a warranty or guarantee regarding existing or future physical conditions at the Site or regarding compliance of Site systems/components and procedures/operations with the various regulating codes, standards, regulations, ordinances, etc.

3 Definitions

The following are definitions to aid in the understanding of the assessment.

3.1 Evaluation Period

For the purpose of this report, the opinions of probable cost to repair major defects in materials or systems that may significantly affect the value of the property or continued operation of the facilities, and to replace base building equipment/systems that have reached, or may reach their expected useful life, will be a thirty (30) year evaluation period.

3.2 Opinions of Probable Costs

Opinions of probable costs for repair and/or replacement of components and/or additional investigation of the conditions identified in this report are based on the noted method of evaluation. These opinions are not construction costs and are for general budgeting purposes only since they are based on historical costing information and our experience with similar systems in other buildings. A detailed or exhaustive examination of quantities/costs of equipment, materials, or labour required for the remedial work has not been performed. Unless otherwise stated, engineering costs for remedial work have not been included in this report.

Cost estimates within the report are Class D (+/- 40%).

Only planned actions with a total cost over $5,000 have been included in this report. Actions below this cost threshold are assumed to be handled under Operation and Maintenance budgets. Actions relating to life safety may be included in the report, regardless of cost.

As components are replaced they will need to meet current code requirements, therefore, additional costs may be required.

3.3 Asset Life Expectancy

The facility systems observed during the assessment were broken down by their major assets and assigned an expected useful life (EUL). This value was used to determine the remaining useful life (RUL) of the asset. The values for EUL are based on information provided in manufacturer's literature, industry standards, our observations of the assets, and our experience with similar materials and systems in similar locales. Based on the asset's overall reported and/or observed physical condition an "Equivalent Age" was determined that represents the point within the asset's lifecycle based on the EUL. This was then used to determine the RUL.

The EUL of assets is a theoretical number, which is an estimate, that is a function of quality of materials used, manufacturing and installation, as well as frequency and intensity of service, the degree of maintenance afforded to the asset, and local weather conditions.

The realization of an asset's EUL does not necessarily constitutes its replacement. A detailed condition assessment or investigation is recommended as a prudent approach to confirm the component RUL and the need for either a repair (maintenance) or a refurbishment. Risk, including safety or the cost of damage to the facility and its use, was considered in estimating the RUL and the schedule for major repairs or replacements.

3.4 Recommendation Type

Recommendation types in this report indicate the action that is to take place based on the review of the component. The recommendation type categories are shown below.

- **Study:** Includes recommendations for further investigation into the condition or options for determining the appropriate repair/replacement action.
- **Major Repair:** Any component or system in which future major repair is anticipated but not replacement of the entire component.
- **Lifecycle Replacement:** Any component or system in which future full replacement is anticipated.

3.5 Condition Ratings and Site Observations

ASTM defines "physical deficiencies" as "the presence of conspicuous defects or material deferred maintenance of a subject property's material systems, components, or equipment as observed during the field observer's walk-through survey. Included within this definition are material systems, assets, or equipment that is approaching, has reached, or has exceeded its typical expected useful life (EUL) or whose remaining useful life (RUL) should not be relied upon in view of actual or effective age, abuse, excessive wear and tear, lack of proper maintenance, etc. This specifically excludes deficiencies that may be remediated with routine maintenance or miscellaneous minor repairs and excludes conditions that generally do not constitute a material physical deficiency of the site.

The physical condition of major facility / site systems and assets is dependent on whether a physical deficiency is associated with that asset / system. The physical condition of assets / systems noted in this report have been rated as either “Critical”, “Poor”, “Fair”, “Good”, or “Excellent”. Definitions for these ratings are provided below.

1- EXCELLENT: The component is new and no immediate concerns are evident.

2- GOOD: No immediate concerns are evident. The components appear to meet all present requirements and to be adequately maintained. Replacement anticipated in 6 years or beyond.

3- FAIR: The medium level condition rating. Generally, components meet present requirements and have been adequately maintained. Some minor deficiencies may be noted. A repair or lifecycle replacement is anticipated within the evaluation period between 3-5 years.

4- POOR: The component is not able to meet current requirements and has significant deficiencies. Generally, components may have failed, may be at or near the end of their service life, or may exhibit evidence of deterioration or insufficient maintenance. Recommendations may include urgent repair, replacement or upgrades within 1-2 years.

5- CRITICAL: Generally, components may have failed resulting in a high risk of injury, health and safety concerns, or critical system failure. Recommendations for urgent repair, replacement or upgrades are anticipated within the year (<12 months).

3.6 Factors

Difficulty – used to adjust the unit costs of the component based on its size, construction, etc. compared to the standard criteria for that component.

Regional – used to adjust the component costs based on the building’s geographical location within the Province and Country. Regional factors were provided by PRRD.

Soft Costs – Engineering or Architectural design fees, engineering review fees, etc. This factor is set to 1 when soft costs are not included in the component’s replacement costs. Typically, soft costs are required for large projects involving the replacement of several components at the same time (i.e. Heating System). As the FCA separates components into individual replacements, soft costs have not been included.

4 FACILITY CONDITION ASSESSMENT

Herein we present the findings of our assessment, based on the Scope of Work outlined in this report. The Facility Condition Assessment & Opinion of Probable Cost is included in Appendix A. Appendix B contains the Capital Planning Table.

4.1 FACILITY CONDITION INDEX

The Facility Condition Index (FCI) gives an indication of a building or portfolio's overall condition. The value is based on a 0-100%+ scale and is derived by dividing the repair costs for a facility by a Current Replacement Value (CRV). The FCI is calculated using only the current condition values, not taking into account the future needs identified in the life cycle evaluation. Site and miscellaneous items are removed from this calculation as the focus is on the building itself.

The overall condition is based on Table 1 below. It should be noted that there is no industry standard for the overall building condition based on a 5-Year FCI. The condition categories are recommendations to be considered.

Table 1: FCI Condition Categories

5-year Calculated FCI	Condition Category
0% to 10%	Good
11% to 20%	Fair
21% to 50%	Poor
>50%	Prohibitive to Repair

The 5-Year FCI is calculated as follows:

$$\textbf{5-Year FCI} = \frac{\textbf{Sum of 5-Year Renewal Need for the Building}}{\textbf{Current Replacement Value of the Building}} \times 100$$

$$\textbf{5-Year FCI} = \frac{\$264,703}{\$2,565,000} \times 100$$

5-Year FCI = 10.3%

The 5-Year Renewal Need is the sum of renewal costs recommended in the next 5 years to keep the building functional, and does not consider soft cost factor, criticality, available budget or capital planning decisions made. The total 5-Year Renewal Need cost, (2021-2025) excluding the renewal costs for the site features (roadways, parking lot, walkways, etc.) for the subject building is $165,098. The building Current Replacement Value (CRV) was estimated based on the Marshall and Swift insurable value. For the subject building the CRV (or Cost of Reproduction New (CRN)) was determined to be $2,565,000. The subject building 5-year Facility Condition Index (FCI), calculated based on the 5-Year Renewal Need is 10.3%. Based on the table above, the FCI suggests that the building is in Fair to Good condition overall.

5 Reserve Fund Analysis

The scope of work of the review of the Charlie Lake Fire Hall includes the review of the Asset Management Reserve Fund (AMRF) to ensure funding levels meet the required amounts.

Charlie Lake Fire Hall does not currently contribute annually to the fund. Cashflow Scenario 0 presented in this report shows the fund balance with no contributions. Cashflow Scenario 1 presented in this report shows the recommended annual contribution and one-time contributions to an AMRF to ensure funding is available for capital replacement projects in future years.

The cashflow projection considers the following:

- The cashflow scenario is based on the inflated FCA expenditures anticipated during the 30-year evaluation period.
- An annual inflation rate of **2.00%** has been applied to adjust projected replacement costs over the course of the evaluation period.
    - o It must be appreciated that both inflation and interest rates can be volatile due to a number of factors such as global business cycles, the state of the economy, and government policies.
- A positive closing balance was maintained in the AMRF.
- A 2021 AMRF Opening Balance of $394,522 (Provided by PRRD).
- The 2021 Expenditures from the AMRF are $16,615.
- It should be appreciated that the accuracy of this projected cash flow decreases toward the end of the 30-year period as a result of uncertainties related to the economy, interest and inflation rates, annual contributions and future replacement costs.
- Annual expenditures as per the findings of the FCA (of note only expenditures over $5,000 were included).
- Annual inflation rate of 2.0% applied to the estimated FCA expenditures.
- The AMRF is assumed to earn 2.0% interest.

The projections included in this table are estimates only, based on the information available at the time of preparation. The condition assessment must be updated regularly as the actual figures will vary from the amounts detailed in this table due to changes in interest rates, inflation rates and scheduling of the repair/replacement work.

The reserve fund scenario is included in Appendix C.

6 SITE PLAN

A site plan has been provided in Appendix D indicating the site boundary for the facility.

7 PREVENTATIVE MAINTENANCE PLAN

The compiled Preventative Maintenance Plan (PMP) for this facility are presented in Appendix E.

In general, the PMP provides a list of industry standard maintenance tasks for pertinent equipment and systems observed at the time of the facility condition assessment. In addition, the task list also includes recommendations on the amount of time that should be budgeted for each task, and the required skill sets and/or recommendations for the staff who should conduct the tasks.

It is the responsibility of the building owner to ensure that any federal, provincial, and municipal legislative requirements regarding preventative maintenance tasks are being complied with, including but not limited to; requirements enacted by those authorities having jurisdiction, changes over time to code requirements, and the licensing/training of technicians.

8 CLOSURE

This report has been prepared for the use of the Peace River Regional District as part of the due diligence process regarding the noted property, and no representations are made by FCAPX to any party other than Peace River Regional District.

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APPENDIX A

Facility Condition Assessment

A Substructure
A10 Foundations

Element Description	
Name	A101001 - Standard Foundations - Original
Installation Year	1977
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	31 Years
Renewal Year	2052
Quantity / Unit of Measure	69 / LM Footprint
Unit Cost	$984.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$126,761.83

Description

While concealed from view, standard foundations for the facility are presumed to comprise wood timbers that bear on concrete blocks and pavers. While concealed from view, the floor structure likely consists of a plywood sub-floor that bears on dimensional wood joists and beams.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - A101001

Charlie Lake Fire Hall - A101001

Element Description	
Name	A101001 - Standard Foundations - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	41 Years
Renewal Year	2062
Quantity / Unit of Measure	53 / LM Footprint
Unit Cost	$984.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$97,367.78

Description

While concealed from view, standard foundations for the facility are presumed to comprise wood timbers that bear on concrete blocks and pavers. While concealed from view, the floor structure likely consists of a plywood sub-floor that bears on dimensional wood joists and beams.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - A101001

Element Description	
Name	A103001 - Slab on Grade - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	41 Years
Renewal Year	2062
Quantity / Unit of Measure	166 / SM Footprint
Unit Cost	$71.33
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$22,106.74

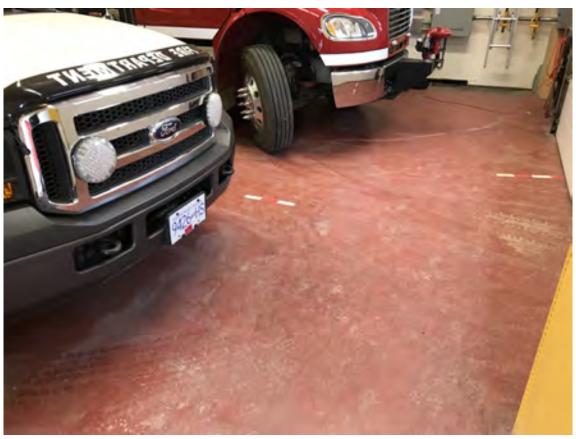
Description

A cast-in-place concrete slab-on-grade floor is constructed throughout the first level of the addition. The slab is presumably reinforced with conventional steel.

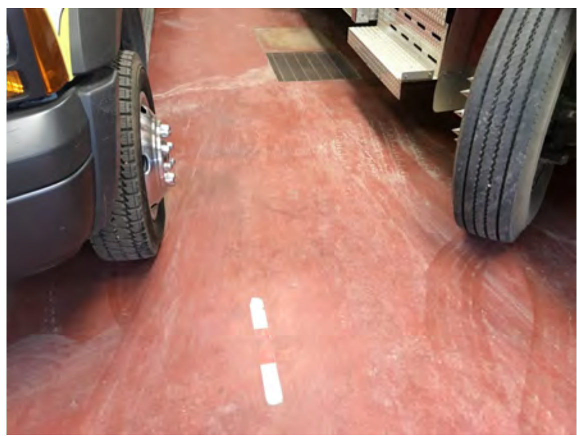
Condition Narrative

There are some localized cracks and uneven surfaces in the building. A repair allowance has been included herein to repair these areas. The remaining useful life has been left unchanged with the assumption that repairs are completed.

Photos



Charlie Lake Fire Hall - A103001



Charlie Lake Fire Hall - A103001

Recommendations

Recommendations #1 - Repairs - Concrete Slab On Grade	
Type	Major Repair
Year	2022
Cost	$8,000.00

Undertake repairs to areas of localized cracking/scaling, and correct uneven surfaces.

Element Description	
Name	A103001 - Slab on Grade - Original
Installation Year	1977
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	31 Years
Renewal Year	2052
Quantity / Unit of Measure	292 / SM Footprint
Unit Cost	$71.33
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$38,886.55

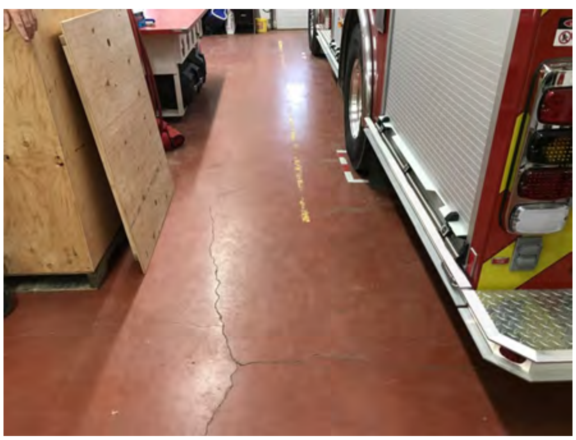
Description

A cast-in-place concrete slab-on-grade floor is constructed throughout the original structure. The slab is presumably reinforced with conventional steel.

Condition Narrative

There are some localized cracks and uneven surfaces in the building. A repair allowance has been included herein to repair these areas. The remaining useful life has been left unchanged with the assumption that repairs are completed

Photos



Charlie Lake Fire Hall - A103001

Recommendations

Recommendations #1 - Repairs - Concrete Slab On Grade	
Type	Major Repair
Year	2022
Cost	$15,000.00

Undertake repairs to areas of localized cracking/scaling, and correct uneven surfaces.

B Shell
B10 Superstructure

Element Description	
Name	B101001 - Floor Construction
Installation Year	1977
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	31 Years
Renewal Year	2052
Quantity / Unit of Measure	40 / SM Building
Unit Cost	$249.38
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$18,623.70

Description
A mezzanine structure is constructed in the original building. The mezzanine includes a wood floor deck that is presumably supported by wood floor joists and wood stud framework.

Condition Narrative
No major deficiencies were observed or reported during the assessment.

Photos


Charlie Lake Fire Hall - B101001

Element Description	
Name	B103001 - Structure - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	41 Years
Renewal Year	2062
Quantity / Unit of Measure	332 / SM Building
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$173,556.32

Description

While concealed from view during the assessment, the addition roof and floor structures are understood to be composed of wood decking that is supported by wood trusses, beams, and stud framework.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Second floor and main wall between original building has damage due to a prior water leak. Given the nature of the component, full-scale replacement during a specific year is not expected to be required. However, a cost allowance for partial replacement and/or repairs has been carried forward in this report as a precautionary measure.

Photos

Charlie Lake Fire Hall - B103001

Recommendations

Recommendations #1 - Study - Second Floor Structure	
Type	Engineering Study
Year	2021
Cost	$5,000.00

Based on the limited understanding of the component condition, further investigation is recommended to confirm performance and remaining useful life of the second floor and main wall between original building . The scope of the investigation should include potential remedial options, a renewal schedule and a cost to address the deficiencies and mitigate further deterioration.

Recommendations #2 - Repair - Second Floor Structure	
Type	Major Repair
Year	2022
Cost	$35,000.00

Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.

Element Description	
Name	B103001 - Structure - Original
Installation Year	1977
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	31 Years
Renewal Year	2052
Quantity / Unit of Measure	292 / SM Building
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$152,645.92

Description

While concealed from view during the assessment, the original building roof structure is understood to be composed of wood decking that is supported by wood trusses and stud framework.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - B103001

B20 Exterior Enclosure

Element Description	
Name	B201008 - Exterior Soffits
Installation Year	1987
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	16 Years
Renewal Year	2037
Quantity / Unit of Measure	46 / SM
Unit Cost	$110.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$9,447.02

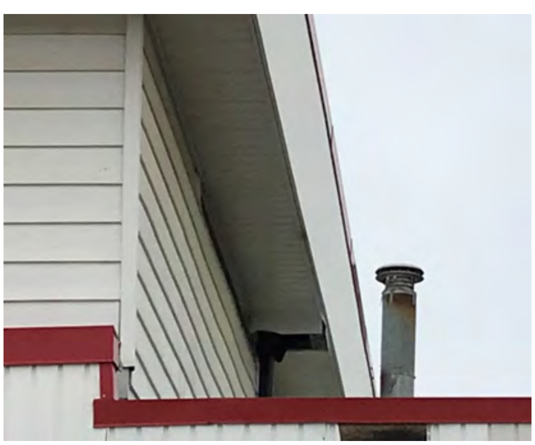
Description
Prefinished, perforated metal soffit panels are installed on the roof overhang on the building perimeter.

Condition Narrative
No major deficiencies were observed or reported during the assessment. Gaps were observed in some areas around lights. Also missing soffit on second floor around downspout. It is recommended these gaps be sealed to minimize the risk of pest infestation. Repair as part of maintenance.

Photos

Charlie Lake Fire Hall - B201008

Charlie Lake Fire Hall - B201008



Charlie Lake Fire Hall - B201008

Recommendations

Recommendations #1 - Exterior Soffits	
Type	Life Cycle Replacement
Year	2037
Cost	$9,447.02

Replace Exterior Soffits

Element Description	
Name	B201025 - Vinyl Siding
Installation Year	1977
Condition	3 - Fair
Expected Useful Life	25 Years
Remaining Useful Life	3 Years
Renewal Year	2024
Quantity / Unit of Measure	410 / SM
Unit Cost	$85.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$65,064.95

Description

The building is clad on its perimeter with lapped segments of horizontal vinyl siding. Vinyl fascia panels with a vertically-grooved profile are provided above apparatus bay doors.

Condition Narrative

The siding was observed to be generally performing as intended, although sections of damaged and missing siding were noted, along with isolated buckling and stained surfaces. Based on age and observed conditions, short-term replacement is recommended to maintain the performance of the building enclosure, and the building's external aesthetic appeal. In the interim, missing sections of siding are recommended for replacement to mitigate the risk of moisture infiltration.

Photos

Charlie Lake Fire Hall - B201025

Charlie Lake Fire Hall - B201025

Charlie Lake Fire Hall - B201025

Charlie Lake Fire Hall - B201025

Recommendations

Recommendations #1 - Vinyl Siding	
Type	Life Cycle Replacement
Year	2024
Cost	$65,064.95

Replace Vinyl Siding

Element Description	
Name	B202001 - Windows
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	35 Years
Remaining Useful Life	4 Years
Renewal Year	2025
Quantity / Unit of Measure	6 / SM
Unit Cost	$950.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$10,641.90

Description

Exterior windows composed of insulating double-paned glass set in operable wood frames are installed on the north/west elevations of the second floor addition.

Condition Narrative

The window frames appeared to remain serviceable although they exhibited wear and discoloration that is generally consistent with their age. Condensation was observed between the glass panes on a few windows on the north elevation (conference room) and on the mezzanine loft, suggesting glazing unit seal failure.

Photos

Charlie Lake Fire Hall - B201025

Recommendations

Recommendations #1 - Windows	
Type	Life Cycle Replacement
Year	2025
Cost	$10,641.90

Replace Windows

Element Description	
Name	B203022 - Overhead Doors - Industrial
Installation Year	2010
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	4 / Each
Unit Cost	$12,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$89,616.00

Description

Motorized sectional metal overhead doors are installed for the apparatus bay.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Door seals were deteriorating, replace/repair as part of maintenance.

Photos

Charlie Lake Fire Hall - B203022


Charlie Lake Fire Hall - B203022

Charlie Lake Fire Hall - B203022

Recommendations

Recommendations #1 - Overhead Doors - Industrial	
Type	Life Cycle Replacement
Year	2035
Cost	$89,616.00

Replace Overhead Doors - Industrial

Element Description	
Name	B203023 - Single Door - Hollow Metal
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	30 Years
Remaining Useful Life	4 Years
Renewal Year	2025
Quantity / Unit of Measure	4 / Each
Unit Cost	$3,200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$23,897.60

Description

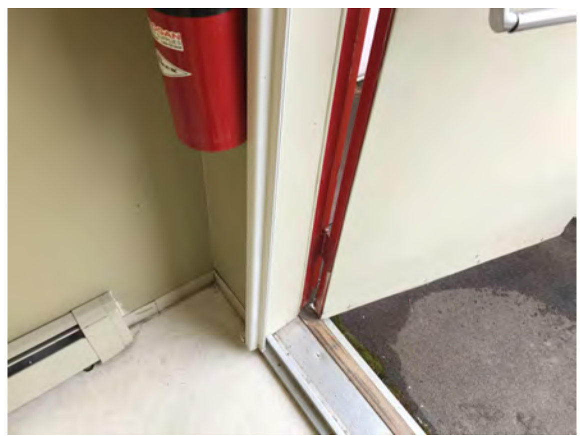
Exterior doors are composed of painted hollow metal swing-type units that are hinge-mounted in painted, pressed steel frames.

Condition Narrative

Exterior steel doors have reached the end of their expected useful life and are exhibiting wear and tear that is consistent with the age of the materials including loose hardware, difficultly latching (second floor emergency exit), and worn painted panels. Lifecycle replacement is recommended within the short-term of the evaluation period.

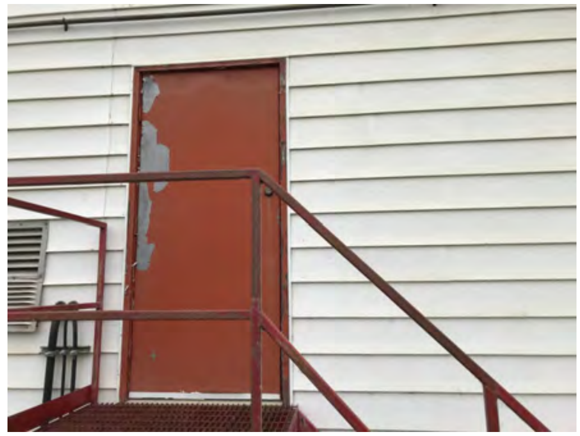
Photos

Charlie Lake Fire Hall - B203023



Charlie Lake Fire Hall - B203023


Charlie Lake Fire Hall - B203023


Charlie Lake Fire Hall - B203023

Recommendations

Recommendations #1 - Single Door - Hollow Metal	
Type	Life Cycle Replacement
Year	2025
Cost	$23,897.60

Replace Single Door - Hollow Metal

B30 Roofing

Element Description	
Name	B301022 - Conventional - Modified Bitumen
Installation Year	2010
Condition	3 - Fair
Expected Useful Life	22 Years
Remaining Useful Life	11 Years
Renewal Year	2032
Quantity / Unit of Measure	458 / SM
Unit Cost	$200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$171,017.20

Description

Flat roof sections are covered with a two-ply modified bitumen membrane roofing assembly that is presumably installed over layers of fiberboard, rigid insulation, vapour barrier, and gypsum board sheathing.

Condition Narrative

Roof access was not available during the assessment. Where visible, the gutters were observed to have inadequate drainage. It is recommended repairs be conducted in the short-term to address the drainage issues. An allowance for repairs has been provided.

Photos

Charlie Lake Fire Hall - B301023

Charlie Lake Fire Hall - B301023

Recommendations

Recommendations #1 - Repair - Drainage Issues	
Type	Repair
Year	2023
Cost	$48,000.00

Repair the roofing assembly drainage slopes.

Recommendations #2 - Conventional - Modified Bitumen	
Type	Life Cycle Replacement
Year	2032
Cost	$171,017.20

Replace Conventional - Modified Bitumen

C Interiors
C10 Interior Construction

Element Description	
Name	C101001 - Fixed Partitions - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	41 Years
Renewal Year	2062
Quantity / Unit of Measure	332 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$58,885.18

Description
Interior fixed partitions throughout the addition are composed of gypsum wall board affixed to wood studs. Gypsum board ceilings are installed above the apparatus bay and second floor.

Condition Narrative
No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - C101001

Charlie Lake Fire Hall - C101001

Charlie Lake Fire Hall - C101001

Element Description	
Name	C101001 - Fixed Partitions - Original
Installation Year	1977
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	31 Years
Renewal Year	2052
Quantity / Unit of Measure	292 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$51,790.58

Description

Interior fixed partitions throughout the original building are composed of gypsum wall board affixed to wood studs. Gypsum board ceilings are installed above the apparatus bay.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - C101001

Element Description	
Name	C101005 - Interior Windows
Installation Year	2010
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	64 Years
Renewal Year	2085
Quantity / Unit of Measure	2 / SM
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$2,240.40

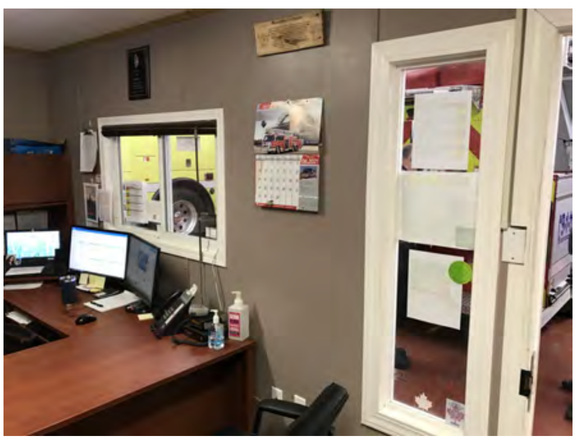
Description

Fixed and operable vinyl framed windows with single-pane or insulating glass units are installed between the office and apparatus bay.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos



Charlie Lake Fire Hall - C101005

Element Description	
Name	C102022 - Single Door - Wood - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	1 / Each
Unit Cost	$2,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

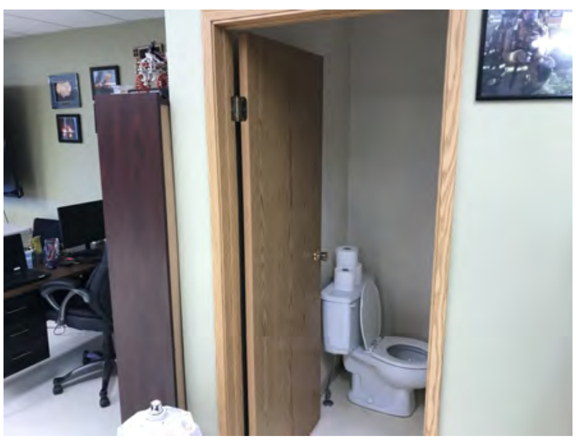
Description

A wood-framed passage door that is hinge-mounted in a wood-frame is installed at the entrance to the second floor washroom.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos



Charlie Lake Fire Hall - C102022

Recommendations

Recommendations #1 - Single Door - Wood	
Type	Life Cycle Replacement
Year	2027
Cost	$3,734.00

Replace Single Door - Wood

Element Description	
Name	C102022 - Single Door - Wood - Original
Installation Year	2010
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	29 Years
Renewal Year	2050
Quantity / Unit of Measure	5 / Each
Unit Cost	$2,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$18,670.00

Description

Wood-framed passage doors that are hinge-mounted in wood-frames are installed at entrances to washrooms and offices ion the original building. A wood-framed bi-folding closet door is installed at the communication/electrical closet.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos


Charlie Lake Fire Hall - C102022


Charlie Lake Fire Hall - C102022

Recommendations

Recommendations #1 - Single Door - Wood	
Type	Life Cycle Replacement
Year	2050
Cost	$18,670.00

Replace Single Door - Wood

Element Description	
Name	C103009 - Cabinets - Kitchens
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	35 Years
Remaining Useful Life	5 Years
Renewal Year	2026
Quantity / Unit of Measure	4 / LM
Unit Cost	$1,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$11,202.00

Description

Wall and floor-mounted fixed casework of laminated wood construction is installed in the addition on the second floor. The base cabinetry includes laminated wood countertops.

Condition Narrative

While generally performing as intended, the casework exhibited evidence of wear that is consistent with its age. Lifecycle replacement is recommended in the short-term of the evaluation period.

Photos

Charlie Lake Fire Hall - C103009

Recommendations

Recommendations #1 - Cabinets - Kitchens	
Type	Life Cycle Replacement
Year	2026
Cost	$11,202.00

Replace Cabinets - Kitchens

Element Description	
Name	C103010 - Vanities - Addition
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	25 Years
Remaining Useful Life	4 Years
Renewal Year	2025
Quantity / Unit of Measure	2 / LM
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	2.00 / 1.867 / 1
Replacement Cost	$4,480.80

Description

A floor-mounted vanity of wood construction is installed in the second floor washroom of the addition.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The component has exceeded its expected useful life, although its remaining useful life has been extended to a later year due to the absence of significant observed or reported deficiencies. The difficulty factor has been increased based on the vanity design.

Photos

Charlie Lake Fire Hall - C103010

Recommendations

Recommendations #1 - Vanities	
Type	Life Cycle Replacement
Year	2025
Cost	$4,480.80

Replace Vanities

Element Description	
Name	C103010 - Vanities - Original
Installation Year	2014
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	2 / LM
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	2.00 / 1.867 / 1
Replacement Cost	$4,480.80

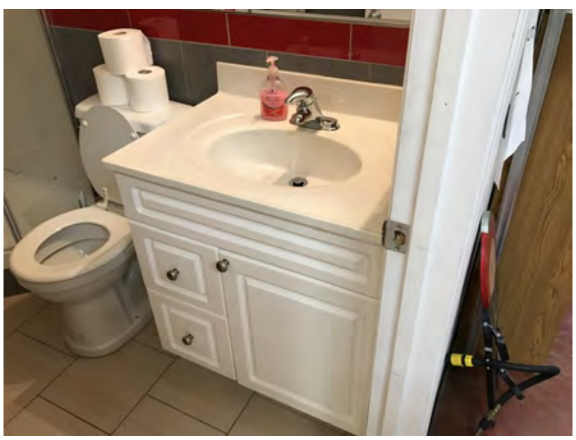
Description

Floor-mounted vanities of laminated wood construction are installed in washrooms in the original building.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The difficulty factor has been increased based on the vanity design.

Photos



Charlie Lake Fire Hall - C103010

Charlie Lake Fire Hall - C103010

Recommendations

Recommendations #1 - Vanities	
Type	Life Cycle Replacement
Year	2039
Cost	$4,480.80

Replace Vanities

Element Description	
Name	C103011 - Cabinets - General
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	35 Years
Remaining Useful Life	4 Years
Renewal Year	2025
Quantity / Unit of Measure	6 / LM
Unit Cost	$1,200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$13,442.40

Description

Wall and floor-mounted fixed casework of painted wood construction is installed around the addition apparatus bay. The floor-mounted casework is provided with wood countertops.

Condition Narrative

No major deficiencies were observed or reported. The cabinetry observed to be dated. The component will reach its expected useful life, although its remaining useful life has been extended to a later year due to the absence of significant observed or reported deficiencies.

Photos

Charlie Lake Fire Hall - C103011

Charlie Lake Fire Hall - C103011

Recommendations

Recommendations #1 - Cabinets - General	
Type	Life Cycle Replacement
Year	2025
Cost	$13,442.40

Replace Cabinets - General

Element Description	
Name	C103099 - Other Fittings - Metal Pipe Storage Racks
Installation Year	2010
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	19 Years
Renewal Year	2040
Quantity / Unit of Measure	6 / Lump Sum
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$56,010.00

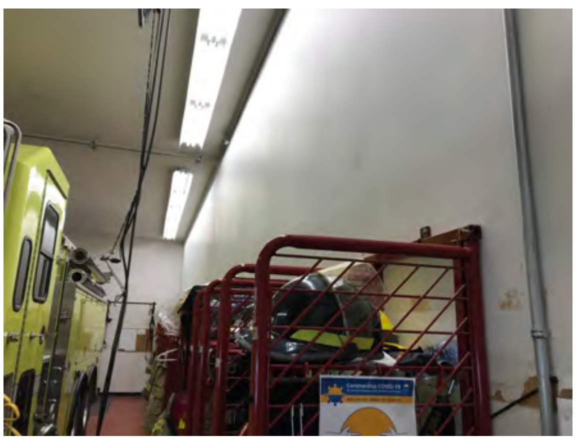
Description

Wall and floor-mounted painted metal pipe storage racks are installed in the apparatus bay.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos



Charlie Lake Fire Hall - C103099

Recommendations

Recommendations #1 - Other Fittings	
Type	Life Cycle Replacement
Year	2040
Cost	$56,010.00

Replace Other Fittings

C20 Stairs

Element Description	
Name	C201001 - Interior Stair Construction
Installation Year	1987
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	41 Years
Renewal Year	2062
Quantity / Unit of Measure	27 / Per Riser
Unit Cost	$800.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$40,327.20

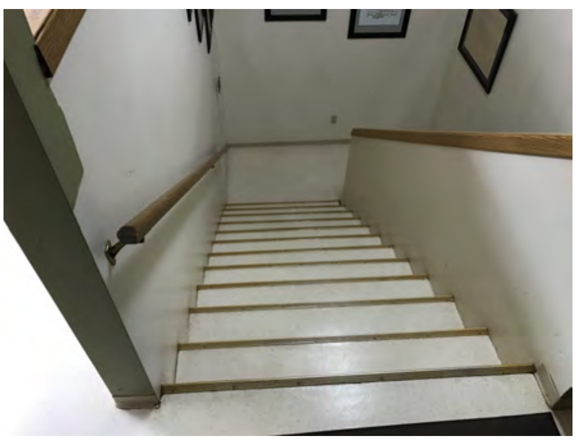
Description

A wood-framed staircase is constructed to connect the main floor with the second level of the addition. The staircase is bordered on one side by wall-mounted painted wood handrails.

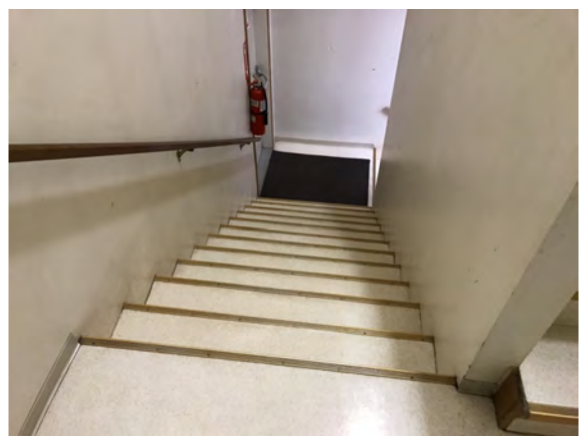
Condition Narrative

No major deficiencies were observed or reported during the assessment.

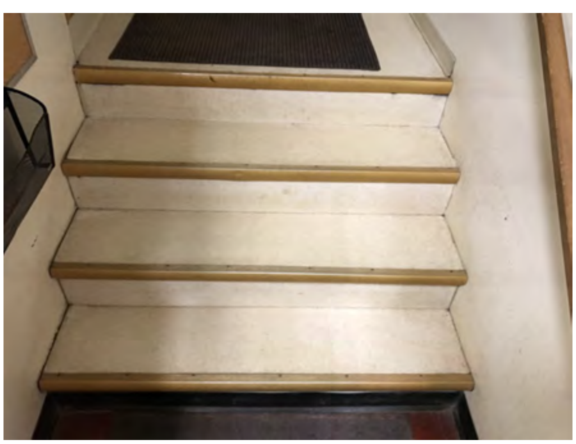
Photos



Charlie Lake Fire Hall - C201001



Charlie Lake Fire Hall - C201001



Charlie Lake Fire Hall - C201001

Element Description	
Name	C201002 - Exterior Stair Construction
Installation Year	1987
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	31 / Per Riser
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$57,877.00

Description

Exterior metal-framed stairs are constructed on the north and south/east elevations. The stairs include steel grille treads and upper landing areas that are supported by painted metal stringers, channels, and posts. The stairs are bordered along their outer edges by base-mounted, painted metal guardrails.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Periodic refinishing of steel surfaces is expected to be handled as a maintenance activity.

Photos

Charlie Lake Fire Hall - C201002

Charlie Lake Fire Hall - C201002

Recommendations

Recommendations #1 - Exterior Stair Construction	
Type	Life Cycle Replacement
Year	2027
Cost	$57,877.00

Replace Exterior Stair Construction

Element Description	
Name	C201027 - Access Ladders - Addition
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	5 / LM
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	0.50 / 1.867 / 1
Replacement Cost	$4,667.50

Description

A fixed, wall-mounted wood ladder is installed to access the tower balcony.

Condition Narrative

The ladder is not worksafe approved and should be addressed to meet current building code standards. The difficulty factor has been adjusted based on the ladder material and design.

Photos

Charlie Lake Fire Hall - C201027

Charlie Lake Fire Hall - C201027

Recommendations

Recommendations #1 - Access Ladders	
Type	Life Cycle Replacement
Year	2027
Cost	$4,667.50

Replace Access Ladders

Element Description	
Name	C201027 - Access Ladders - Original
Installation Year	1977
Condition	3 - Fair
Expected Useful Life	40 Years
Remaining Useful Life	5 Years
Renewal Year	2026
Quantity / Unit of Measure	3 / LM
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	0.50 / 1.867 / 1
Replacement Cost	$2,800.50

Description

A wall-mounted wood ladder is installed to provide access to the mezzanine.

Condition Narrative

The ladder was observed to have worn paint finishes. No major deficiencies were observed or reported during the assessment. Renewal of paint finishes is recommended as part of routine maintenance activities. The component has exceeded its expected useful life, although its remaining useful life has been extended to a later year due to the absence of significant observed or reported deficiencies. The difficulty factor has been adjusted based on the ladder material and design.

Photos

Charlie Lake Fire Hall - C201027

Charlie Lake Fire Hall - C201027

Recommendations

Recommendations #1 - Access Ladders	
Type	Life Cycle Replacement
Year	2026
Cost	$2,800.50

Replace Access Ladders

Element Description	
Name	C202027 - Vinyl Sheet
Installation Year	2000
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	27 / Per Riser
Unit Cost	$75.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,780.68

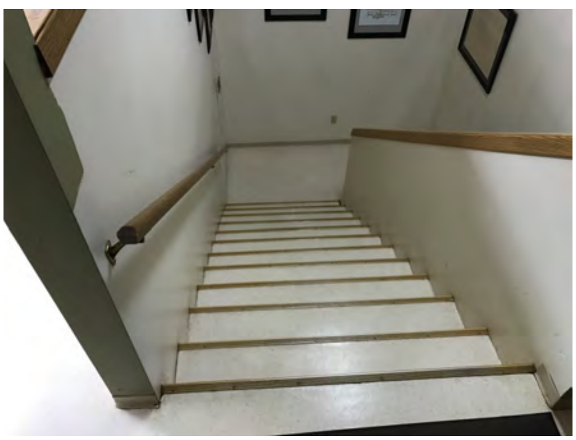
Description

A vinyl sheet finish is applied to treads and risers on stairs located in the addition.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The component has exceeded its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos



Charlie Lake Fire Hall - C202027

Charlie Lake Fire Hall - C202027

Recommendations

Recommendations #1 - Vinyl Sheet	
Type	Life Cycle Replacement
Year	2027
Cost	$3,780.68

Replace Vinyl Sheet

C30 Interior Finishes

Element Description	
Name	C301005 - Paint Wall Covering
Installation Year	2010
Condition	3 - Fair
Expected Useful Life	10 Years
Remaining Useful Life	5 Years
Renewal Year	2026
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$46,600.32

Description

Most interior fixed partitions throughout the building are provided with a paint finish.

Condition Narrative

While the paint finish was observed to be in fair condition at the time of assessment, it is likely that it will require renewal within the short-term of the evaluation period.

Photos

Charlie Lake Fire Hall - C301005

Charlie Lake Fire Hall - C301005

Recommendations

Recommendations #1 - Paint Wall Covering	
Type	Life Cycle Replacement
Year	2026
Cost	$46,600.32

Replace Paint Wall Covering

Element Description	
Name	C301022 - Wood Wall Finish
Installation Year	1977
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	16 / SM
Unit Cost	$270.00
Difficulty / Regional / Soft Cost Factors	0.50 / 1.867 / 1
Replacement Cost	$4,032.72

Description

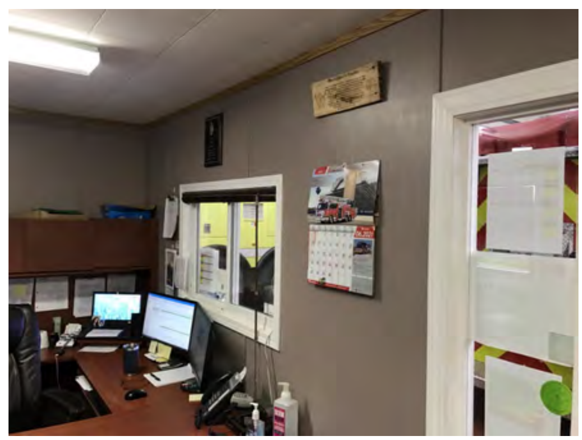
Board and batten wood wall finishes are used to cover interior wall surfaces in the main office.

Condition Narrative

The component has exceeded its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies. The difficulty factor has been adjusted based on the design of the wall finish.

Photos

Charlie Lake Fire Hall - C301022



Charlie Lake Fire Hall - C301022

Recommendations

Recommendations #1 - Wood Wall Finish	
Type	Life Cycle Replacement
Year	2027
Cost	$4,032.72

Replace Wood Wall Finish

Element Description	
Name	C301023 - Ceramic Wall Tile
Installation Year	2014
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	33 Years
Renewal Year	2054
Quantity / Unit of Measure	8 / SM
Unit Cost	$160.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$2,389.76

Description

A ceramic tile finish is installed on interior wall surfaces in the original building washrooms.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - C301023

Charlie Lake Fire Hall - C301023

Element Description	
Name	C302001 - Ceramic Tile Floor
Installation Year	2014
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	33 Years
Renewal Year	2054
Quantity / Unit of Measure	10 / SM
Unit Cost	$180.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,360.60

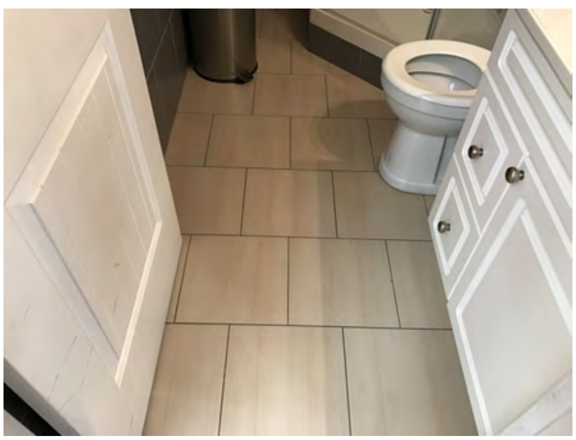
Description

A ceramic tile floor finish is installed in the original building washrooms.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos



Charlie Lake Fire Hall - C302001

Charlie Lake Fire Hall - C302001

Element Description	
Name	C302005 - Carpet Floor
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	10 Years
Remaining Useful Life	3 Years
Renewal Year	2024
Quantity / Unit of Measure	16 / SM
Unit Cost	$90.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$2,688.48

Description

Carpet sheet flooring is installed the main office of the original building.

Condition Narrative

Carpet surfaces were noted to be worn and stained. The observed condition is consistent with the component's age. Replacement is recommended.

Photos

Charlie Lake Fire Hall - C302005

Recommendations

Recommendations #1 - Carpet Floor	
Type	Life Cycle Replacement
Year	2024
Cost	$2,688.48

Replace Carpet Floor

Element Description	
Name	C302007 - Painted / Sealed Concrete Floor
Installation Year	2000
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	458 / SM
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$34,203.44

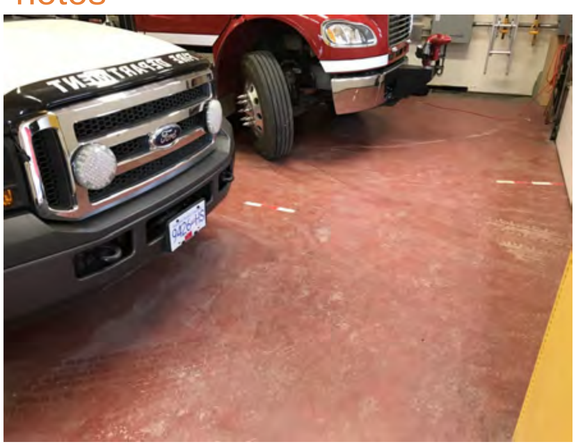
Description

The concrete slab-on-grade floor in the apparatus bay is an exposed concrete floor protected with a paint sealer.

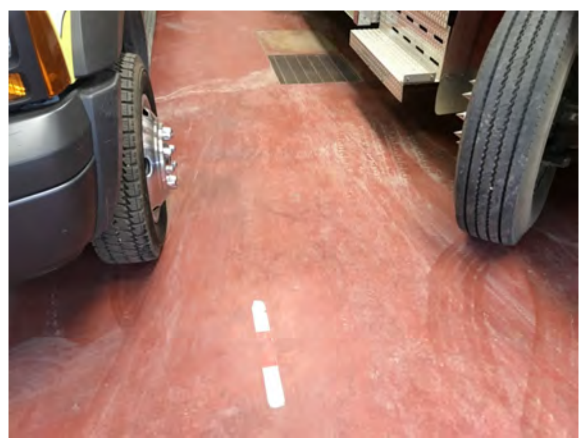
Condition Narrative

No major deficiencies were observed or reported during the assessment. Minor sections of damaged finish are expected to undergo repair/touch-up as a maintenance activity. The component has exceeded its expected useful life, based on the absence of significant observed or reported deficiencies, lifecycle replacement has been extended to a later year.

Photos



Charlie Lake Fire Hall - C302007



Charlie Lake Fire Hall - C302007

Recommendations

Recommendations #1 - Painted / Sealed Concrete Floor	
Type	Life Cycle Replacement
Year	2027
Cost	$34,203.44

Replace Painted / Sealed Concrete Floor

Element Description	
Name	C302023 - Vinyl Sheet Floor
Installation Year	2000
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	140 / SM
Unit Cost	$120.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$31,365.60

Description
Resilient sheet vinyl flooring is installed on the second floor of the addition.

Condition Narrative
The component has exceeded its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos

Charlie Lake Fire Hall - C302023


Charlie Lake Fire Hall - C302023

Recommendations

Recommendations #1 - Vinyl Sheet Floor	
Type	Life Cycle Replacement
Year	2027
Cost	$31,365.60

Replace Vinyl Sheet Floor

Element Description	
Name	C303004 - Acoustic Tile Ceiling
Installation Year	1977
Condition	3 - Fair
Expected Useful Life	30 Years
Remaining Useful Life	5 Years
Renewal Year	2026
Quantity / Unit of Measure	16 / SM
Unit Cost	$70.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$2,091.04

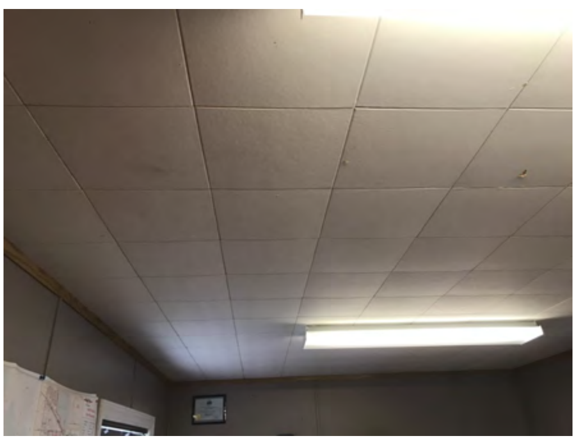
Description

Acoustic tile ceilings are installed in the main office of the original building.

Condition Narrative

However, as the component has long surpassed its expected useful life and plays a critical function in building operations, short-term replacement is recommended to minimize the risk and impact of sudden failure.

Photos



Charlie Lake Fire Hall - C303004

Recommendations

Recommendations #1 - Acoustic Tile Ceiling	
Type	Life Cycle Replacement
Year	2026
Cost	$2,091.04

Replace Acoustic Tile Ceiling

Element Description	
Name	C303006 - Painted Ceiling Structures
Installation Year	2000
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	7 Years
Renewal Year	2028
Quantity / Unit of Measure	458 / SM
Unit Cost	$30.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$25,652.58

Description

A painted finish is applied to the ceiling of the apparatus bay for the original building and addition.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The component has exceeded its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos

Charlie Lake Fire Hall - C303006

Recommendations

Recommendations #1 - Painted Ceiling Structures	
Type	Life Cycle Replacement
Year	2028
Cost	$25,652.58

Replace Painted Ceiling Structures

Element Description	
Name	C303007 - Suspended Acoustic Ceiling Panels
Installation Year	1987
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	152 / SM
Unit Cost	$90.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$25,540.56

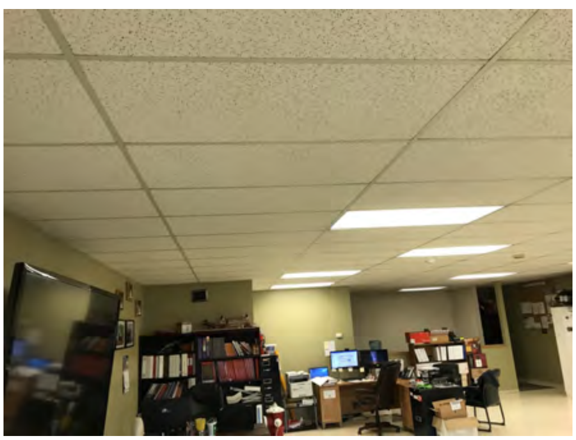
Description

Suspended metal T-bar grid ceilings with in-laid acoustic panels are installed on the second floor of the addition.

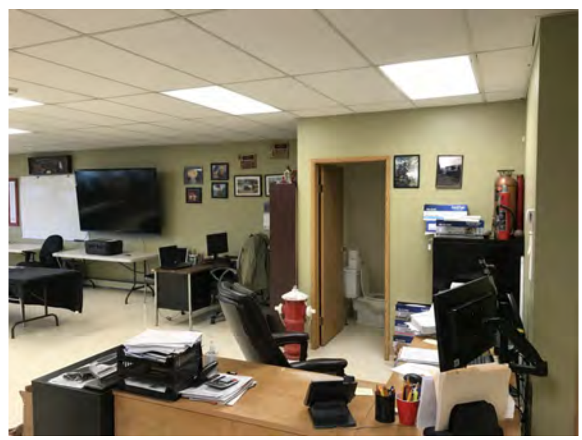
Condition Narrative

The component has exceeded its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos



Charlie Lake Fire Hall - C303007



Charlie Lake Fire Hall - C303007

Recommendations

Recommendations #1 - Suspended Acoustic Ceiling Panels	
Type	Life Cycle Replacement
Year	2027
Cost	$25,540.56

Replace Suspended Acoustic Ceiling Panels

D Services
D20 Plumbing

Element Description	
Name	D201001 - Water Closets - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	1 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$1,867.00

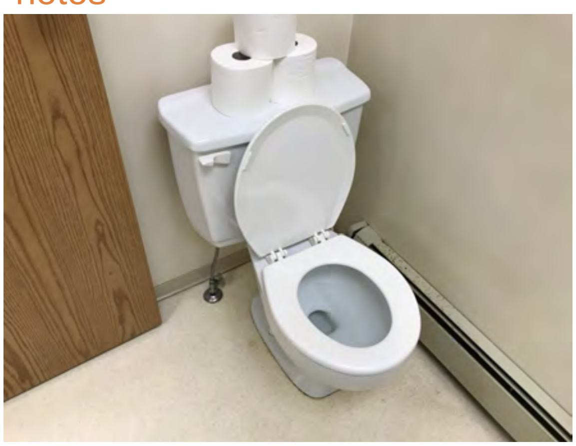
Description

A floor-mounted, flush-tank water closet of vitreous china construction is installed in the second floor washroom of the addition. The water closet has a manually-operated flush valve.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The component will reach its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos



Charlie Lake Fire Hall - D201001

Recommendations

Recommendations #1 - Water Closets	
Type	Life Cycle Replacement
Year	2027
Cost	$1,867.00

Replace Water Closets

Element Description	
Name	D201001 - Water Closets - Original
Installation Year	2014
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

Description

Floor-mounted, flush-tank water closets of vitreous china construction are installed in the main floor washrooms of the original building. The water closets have manually-operated flush valves.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D201001

Charlie Lake Fire Hall - D201001

Recommendations

Recommendations #1 - Water Closets	
Type	Life Cycle Replacement
Year	2049
Cost	$3,734.00

Replace Water Closets

Element Description	
Name	D201003 - Lavatories - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	1 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$1,867.00

Description

A counter-set lavatory of enameled steel construction is installed in the second floor washroom of the addition. The lavatory includes a centre-set faucet with a manually-operated hot/cold water tap set.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The component will reach its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos

Charlie Lake Fire Hall - D201003

Recommendations

Recommendations #1 - Lavatories	
Type	Life Cycle Replacement
Year	2027
Cost	$1,867.00

Replace Lavatories

Element Description	
Name	D201003 - Lavatories - Original
Installation Year	2014
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

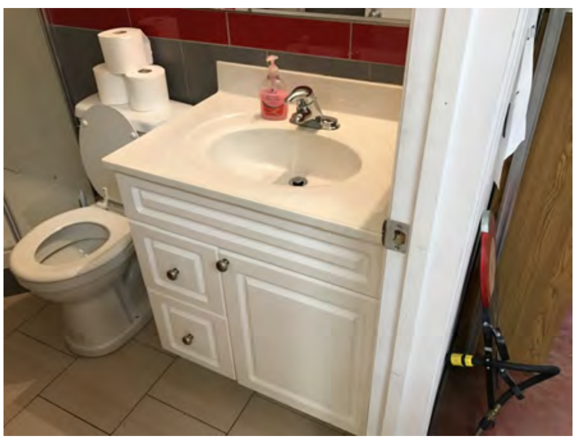
Description

Lavatory basins of molded marble construction are built integrally with vanity countertops in the main floor washrooms of the original building. The lavatories include centre-set faucets with manually-operated single-lever tap sets.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos



Charlie Lake Fire Hall - D201003

Recommendations

Recommendations #1 - Lavatories	
Type	Life Cycle Replacement
Year	2049
Cost	$3,734.00

Replace Lavatories

Element Description	
Name	D201004 - Sinks - Addition
Installation Year	2000
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	1 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$1,867.00

Description

A counter-set, double-basin sink of stainless steel construction is installed in the second floor kitchen of the addition. The sink includes a centre-set faucet with a manually-operate single-lever water valve.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D201004

Recommendations

Recommendations #1 - Sinks	
Type	Life Cycle Replacement
Year	2035
Cost	$1,867.00

Replace Sinks

Element Description	
Name	D201004 - Sinks - Utility Sink
Installation Year	2014
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	0.50 / 1.867 / 1
Replacement Cost	$1,867.00

Description

Free-standing, single-basin utility sinks of molded plastic construction are installed adjacent to the apparatus bay in the addition. One (1) sink is positioned below a set of domestic hot/cold water valves.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The difficulty factor has been adjusted based on the component design.

Photos

Charlie Lake Fire Hall - D201004

Recommendations

Recommendations #1 - Sinks	
Type	Life Cycle Replacement
Year	2049
Cost	$1,867.00

Replace Sinks

Element Description	
Name	D201012 - Shower Assembly
Installation Year	2014
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	2 / Each
Unit Cost	$3,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$11,202.00

Description

Shower assemblies presumably of acrylic construction are installed in the main floor washrooms of the original building. The showers include glass panel enclosures, through-wall shower heads, and wall-mounted single-lever mixing valves.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos


Charlie Lake Fire Hall - D201012


Charlie Lake Fire Hall - D201012

Recommendations

Recommendations #1 - Shower Assembly	
Type	Life Cycle Replacement
Year	2039
Cost	$11,202.00

Replace Shower Assembly

Element Description	
Name	D202001 - Domestic Water Pipes and Fittings
Installation Year	1987
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$46,600.32

Description

Domestic water is distributed in the building via copper piping. Domestic water piping and fittings are primarily concealed behind wall, floor, or ceiling finishes.

Condition Narrative

Original pipe runs were presumably repaired or replaced as part of renovation activities performed subsequent to the building's construction. For reporting purposes, an average installation year of 1987 has been assumed. Repair allowance for moving domestic piping away from electrical outlets. No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D202001

Charlie Lake Fire Hall - D202001

Charlie Lake Fire Hall - D202001

Charlie Lake Fire Hall - D202001

Recommendations

Recommendations #1 - Repair - Move Piping	
Type	Major Repair
Year	2022
Cost	$5,000.00

Move domestic piping away from electrical outlets.

Recommendations #2 - Domestic Water Pipes and Fittings	
Type	Life Cycle Replacement
Year	2027
Cost	$46,600.32

Replace Domestic Water Pipes and Fittings

Element Description	
Name	D202034 - Gas Fired Domestic Water Heaters (Residential Tank Type)
Installation Year	2005
Condition	5 - Missing/Failed
Expected Useful Life	12 Years
Remaining Useful Life	0 Years
Renewal Year	2021
Quantity / Unit of Measure	189 / Liter
Unit Cost	$25.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$8,821.58

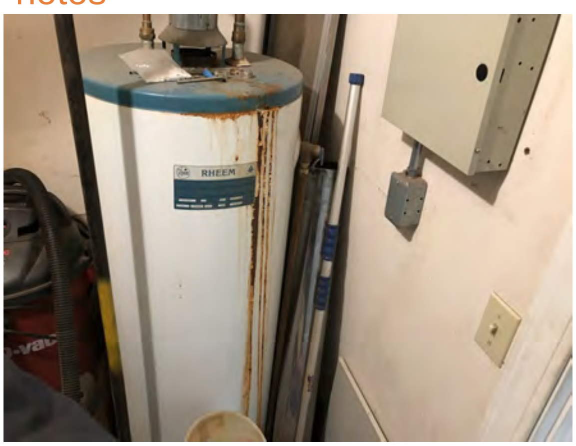
Description

A tank-type, natural gas-fired domestic water heater manufactured by Rheem is installed in the boiler room. The water heater has a volume and input heating capacity of 189 L (50 US Gal.), and 50 MBH, respectively. The water heater is vented via metal flue that connects with a metal chimney installed at roof level.

Condition Narrative

The water heater exhibited corrosion on its housing, and a generally worn/dated appearance. The water heater is also reportedly not performing as intended. Replacement is recommended immediately.

Photos



Charlie Lake Fire Hall - D202034

Charlie Lake Fire Hall - D202034

Recommendations

Recommendations #1 - Gas Fired Domestic Water Heaters (Residential Tank Type)	
Type	Life Cycle Replacement
Year	2021
Cost	$8,821.58

Replace Gas Fired Domestic Water Heaters (Residential Tank Type)

Element Description	
Name	D203001 - Sanitary Waste and Vent Piping - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	16 Years
Renewal Year	2037
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$45.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$52,425.36

Description

Sanitary waste and vent piping is a combination of cast iron and ABS piping which connects fixtures and floor drains to common sanitary lines serving the building's sanitary system. Sanitary waste and vent piping is primarily concealed behind wall, floor, and ceiling finishes.

Condition Narrative

Original sanitary waste and vent lines were presumably repaired or replaced as part of renovation activities performed subsequent to the building's construction. For reporting purposes, an average installation year of 1987 has been assumed. No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D203001

Recommendations

Recommendations #1 - Sanitary Waste and Vent Piping	
Type	Life Cycle Replacement
Year	2037
Cost	$52,425.36

Replace Sanitary Waste and Vent Piping

Element Description	
Name	D203007 - Interceptor Systems
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	25 Years
Remaining Useful Life	5 Years
Renewal Year	2026
Quantity / Unit of Measure	1 / Each
Unit Cost	$10,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$18,670.00

Description

The apparatus bay is provided with an interceptor pit that is understood to drain to site.

Condition Narrative

No major deficiencies were observed or reported. The component has exceeded its expected useful life, although its remaining useful life has been extended to a later year due to the absence of significant observed or reported deficiencies.

Photos

Charlie Lake Fire Hall - D203007

Recommendations

Recommendations #1 - Interceptor Systems	
Type	Life Cycle Replacement
Year	2026
Cost	$18,670.00

Replace Interceptor Systems

Element Description	
Name	D204001 - Rain Water Drainage Piping and Fittings
Installation Year	1987
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	16 Years
Renewal Year	2037
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$30.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$34,950.24

Description

Rainwater drainage from flat roof sections is through roof drains with dome strainers, which connect with internal rain water leader piping that is understood to consist of cast iron or rigid plastic. The piping exits through the exterior walls where it discharges onto grade.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D204001

Charlie Lake Fire Hall - D204001

Recommendations

Recommendations #1 - Rain Water Drainage Piping and Fittings	
Type	Life Cycle Replacement
Year	2037
Cost	$34,950.24

Replace Rain Water Drainage Piping and Fittings

Element Description	
Name	D204005 - Sump Pump
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	15 Years
Remaining Useful Life	13 Years
Renewal Year	2034
Quantity / Unit of Measure	1 / Each
Unit Cost	$3,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$5,601.00

Description

A sump is installed in the addition. The single-stage sump serves the washing machine and discharges to sanitary waste lines.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D204005

Recommendations

Recommendations #1 - Sump Pump	
Type	Life Cycle Replacement
Year	2034
Cost	$5,601.00

Replace Sump Pump

D30 HVAC

Element Description	
Name	D301002 - Gas Supply Systems
Installation Year	1987
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	624 / SM
Unit Cost	$20.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$23,300.16

Description

The building is provided with a natural gas feed that emerges from below-grade on the south/east elevation prior to connecting with a wall-mounted natural gas meter and pressure regulator. The gas feed is subsequently delivered to the mechanical room where it connects with natural gas-fired equipment. The distribution of natural gas appeared to be made via black steel pipe.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Periodic refinishing of external pipe runs is expected to be performed as a maintenance activity to address surface corrosion and wear.

Photos

Charlie Lake Fire Hall - D301002

Charlie Lake Fire Hall - D301002

Recommendations

Recommendations #1 - Gas Supply Systems	
Type	Life Cycle Replacement
Year	2027
Cost	$23,300.16

Replace Gas Supply Systems

Element Description	
Name	D302002 - Hot Water Boilers less than 1000 MBH
Installation Year	2010
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	19 Years
Renewal Year	2040
Quantity / Unit of Measure	270 / MBH
Unit Cost	$75.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$37,806.75

Description

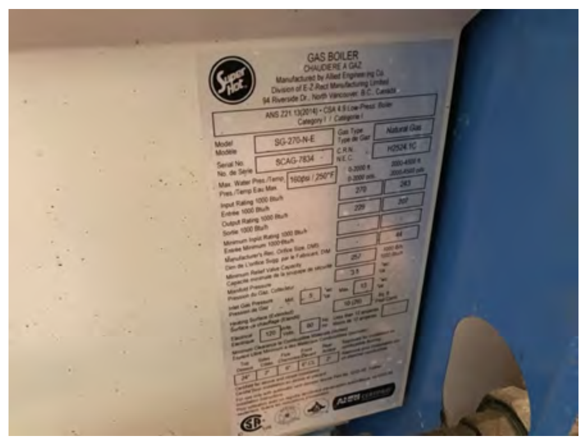
There is a natural gas-fired hot water boiler installed in the boiler room. The boiler is manufactured by Super Hot (model SG-270-N_E), with a heating capacity of 270 MBH.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Supports for the boiler's chimney are missing/damaged, replace as part of maintenance.

Photos

Charlie Lake Fire Hall - D302002



Charlie Lake Fire Hall - D302002

Recommendations

Recommendations #1 - Hot Water Boilers less than 1000 MBH	
Type	Life Cycle Replacement
Year	2040
Cost	$37,806.75

Replace Hot Water Boilers less than 1000 MBH

Element Description	
Name	D304003 - Heating Water Distribution Systems
Installation Year	1987
Condition	3 - Fair
Expected Useful Life	45 Years
Remaining Useful Life	11 Years
Renewal Year	2032
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$90.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$104,850.72

Description

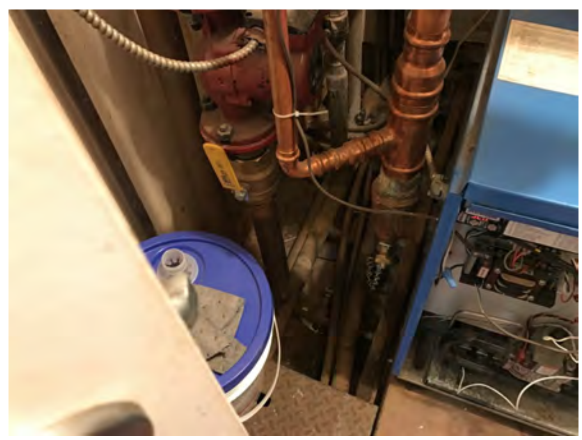
There is a closed loop heating water distribution system composed of copper piping and a glycol system. The system is distributed throughout the building to mechanical equipment. Piping is primarily hidden within ceiling, wall, and floor cavities.

Condition Narrative

The piping has reported leaks and glycol is added monthly. Given the nature of the component, full-scale replacement is not expected to be required. However, a cost allowance for partial replacement and study has been carried forward in this report as a precautionary measure.

Photos

Charlie Lake Fire Hall - D304003



Charlie Lake Fire Hall - D304003

Recommendations

Recommendations #1 - Study - Heating Water Distribution Systems	
Type	Engineering Study
Year	2022
Cost	$5,000.00

Based on the limited understanding of the component condition, further investigation is recommended to confirm performance and remaining useful life of the heating water piping. The scope of the investigation should include potential remedial options, a renewal schedule, and a cost to address the deficiencies and mitigate further deterioration.

Recommendations #2 - Repair - Heating Water Distribution Systems	
Type	Repair
Year	2022
Cost	$13,500.00

Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.

Recommendations #3 - Heating Water Distribution Systems	
Type	Life Cycle Replacement
Year	2032
Cost	$104,850.72

Replace Heating Water Distribution Systems

Element Description	
Name	D304021 - HVAC Pumps (Up to 10 HP)
Installation Year	2010
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	9 Years
Renewal Year	2030
Quantity / Unit of Measure	5 / Each
Unit Cost	$4,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$37,340.00

Description

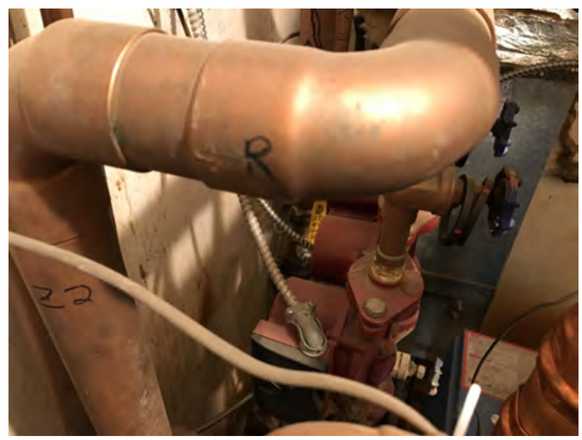
There are five (5) in-line HVAC circulating pumps installed in the mechanical room serving the heating water distribution system.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D202007



Charlie Lake Fire Hall - D202007

Recommendations

Recommendations #1 - HVAC Pumps (Up to 10 HP)	
Type	Life Cycle Replacement
Year	2030
Cost	$37,340.00

Replace HVAC Pumps (Up to 10 HP)

Element Description	
Name	D304033 - Exhaust Fan - Ceiling (Residential)
Installation Year	2014
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

Description

Ceiling-mounted exhaust fans are installed in the main floor washrooms of the original building to serve as ventilation for these spaces. Technical specifications for the fans are not available.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D304033

Recommendations

Recommendations #1 - Exhaust Fan - Ceiling (Residential)	
Type	Life Cycle Replacement
Year	2039
Cost	$3,734.00

Replace Exhaust Fan - Ceiling (Residential)

Element Description	
Name	D305004 - Fin Tube Radiation Units
Installation Year	1987
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	48 / LM
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$25,092.48

Description

Perimeter heating for the second floor of the addition consists of hydronic finned tube radiation units, installed at baseboard level.

Condition Narrative

The component has exceeded its expected useful life, although its remaining useful life has been extended beyond the short-term of the evaluation period due to the absence of significant observed or reported deficiencies.

Photos

Charlie Lake Fire Hall - D305004

Recommendations

Recommendations #1 - Fin Tube Radiation Units	
Type	Life Cycle Replacement
Year	2027
Cost	$25,092.48

Replace Fin Tube Radiation Units

Element Description	
Name	D305033 - Access Control Systems
Installation Year	2020
Condition	1 - Excellent
Expected Useful Life	20 Years
Remaining Useful Life	19 Years
Renewal Year	2040
Quantity / Unit of Measure	500 / SM
Unit Cost	$15.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$14,002.50

Description

The building is provided with an access control system that includes a control panel, door access panel, card swipes (keypads), maglocks, and shielded wiring.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D305033

Recommendations

Recommendations #1 - Access Control Systems	
Type	Life Cycle Replacement
Year	2040
Cost	$14,002.50

Replace Access Control Systems

D40 Fire Protection

Element Description	
Name	D403002 - Fire Extinguishers
Installation Year	2000
Condition	3 - Fair
Expected Useful Life	10 Years
Remaining Useful Life	3 Years
Renewal Year	2024
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$1.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$1,165.01

Description

Portable ABC-type fire extinguishers that are mounted to wall brackets are installed throughout the building.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Annual inspection appeared to be current. However, as the component has long surpassed its expected useful life and plays a critical function in building safety, short-term replacement is recommended to minimize the risk and impacts of sudden failure.

Photos


Charlie Lake Fire Hall - D403002

Charlie Lake Fire Hall - D403002

Recommendations

Recommendations #1 - Fire Extinguishers	
Type	Life Cycle Replacement
Year	2024
Cost	$1,165.01

Replace Fire Extinguishers

D50 Electrical

Element Description	
Name	D501005 - Panelboards up to 400A
Installation Year	2010
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	29 Years
Renewal Year	2050
Quantity / Unit of Measure	2 / Each
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	0.75 / 1.867 / 1
Replacement Cost	$14,002.50

Description
The building is provided with electrical distribution panels manufactured by Square D and Eaton. Each panel is provided with an electrical rating of 100 Amps 120/208 Volts.

Condition Narrative
No major deficiencies were observed or reported during the assessment. The difficulty factor has been adjusted based on the panel sizes/amperages.

Photos

Charlie Lake Fire Hall - D501005


Charlie Lake Fire Hall - D501005


Charlie Lake Fire Hall - D501005


Charlie Lake Fire Hall - D501005

Recommendations

Recommendations #1 - Panelboards up to 400A	
Type	Life Cycle Replacement
Year	2050
Cost	$14,002.50

Replace Panelboards up to 400A

Element Description	
Name	D501025 - LV Main Service Disconnects
Installation Year	2010
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	29 Years
Renewal Year	2050
Quantity / Unit of Measure	1 / Each
Unit Cost	$10,000.00
Difficulty / Regional / Soft Cost Factors	0.30 / 1.867 / 1
Replacement Cost	$5,601.00

Description

The building's incoming electrical service is delivered to the addition apparatus bay. The electrical feed connects with a fused electrical disconnect switch manufactured by Square D. The disconnect switch is rated for a 200 Amp, 120/208 Volt electrical feed.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The difficulty factor has been adjusted based on the switch amperage.

Photos

Charlie Lake Fire Hall - D501025

Charlie Lake Fire Hall - D501025

Recommendations

Recommendations #1 - LV Main Service Disconnects	
Type	Life Cycle Replacement
Year	2050
Cost	$5,601.00

Replace LV Main Service Disconnects

Element Description	
Name	D502001 - Branch Wiring and Devices - Addition
Installation Year	1987
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	16 Years
Renewal Year	2037
Quantity / Unit of Measure	332 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$58,885.18

Description

The low voltage electrical distribution system of the addition includes branch wiring to end devices such as switches and receptacles. The wiring includes commercial grade insulated copper wire, flex or armoured cable, outlets, switches and receptacles.

Condition Narrative

No major deficiencies were observed or reported during the assessment. however, some plugs over sinks did not appear to have ground fault protection. It is recommended to provide GFCI protected plugs over sinks. The cost complete with work is presumed to fall below the cost for repair threshold ($5,000) and should therefore be completed as a maintenance activity.

Photos

Charlie Lake Fire Hall - D502001


Charlie Lake Fire Hall - D502001

Recommendations

Recommendations #1 - Branch Wiring and Devices	
Type	Life Cycle Replacement
Year	2037
Cost	$58,885.18

Replace Branch Wiring and Devices

Element Description	
Name	D502001 - Branch Wiring and Devices - Original
Installation Year	1977
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	292 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$51,790.58

Description

The low voltage electrical distribution system of the original building includes branch wiring to end devices such as switches and receptacles. The wiring includes commercial grade insulated copper wire, flex or armoured cable, outlets, switches and receptacles.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D502001

Recommendations

Recommendations #1 - Branch Wiring and Devices	
Type	Life Cycle Replacement
Year	2027
Cost	$51,790.58

Replace Branch Wiring and Devices

Element Description	
Name	D502002 - Interior Lighting - Second Floor, Offices, and Washrooms
Installation Year	2000
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	206 / SM Building
Unit Cost	$85.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$32,691.17

Description

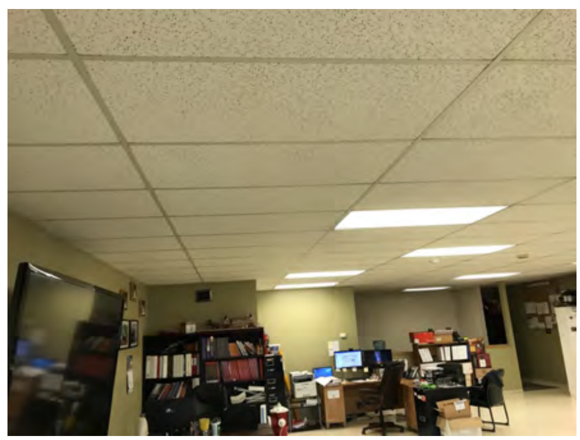
The interior lighting system includes a combination of linear fluorescent tube light fixtures on the second floor and decorative light fixtures in main floor washrooms and offices. Linear fixtures have T8 lamps. Decorative light fixtures have CFLs.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Replace fluorescent fixtures with LED in future upgrade.

Photos

Charlie Lake Fire Hall - D502002



Charlie Lake Fire Hall - D502002

Charlie Lake Fire Hall - D502002

Charlie Lake Fire Hall - D502002

Recommendations

Recommendations #1 - Interior Lighting	
Type	Life Cycle Replacement
Year	2035
Cost	$32,691.17

Replace Interior Lighting

Element Description	
Name	D502002 - Interior Lighting - Apparatus Bay
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	35 Years
Remaining Useful Life	33 Years
Renewal Year	2054
Quantity / Unit of Measure	418 / SM Building
Unit Cost	$85.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$66,334.51

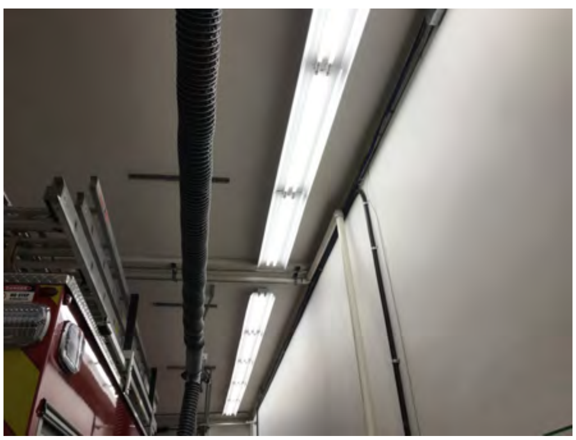
Description

The interior lighting system includes linear light fixtures in the apparatus bays. Linear fixtures are LED's.

Condition Narrative

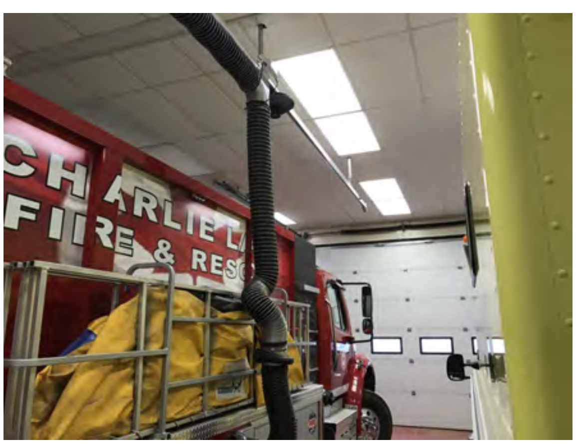
No major deficiencies were observed or reported during the assessment.

Photos



Charlie Lake Fire Hall - D502002

Charlie Lake Fire Hall - D502002



Charlie Lake Fire Hall - D502002

Charlie Lake Fire Hall - D502002

Element Description	
Name	D502041 - Exterior Lighting
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	20 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	8 / Each
Unit Cost	$500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$7,468.00

Description

The exterior lighting system includes wall pack fixtures along the perimeter of the building. The wall fixtures are LED.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D502041

Charlie Lake Fire Hall - D502041

Charlie Lake Fire Hall - D502041

Charlie Lake Fire Hall - D502041

Recommendations

Recommendations #1 - Exterior Lighting	
Type	Life Cycle Replacement
Year	2039
Cost	$7,468.00

Replace Exterior Lighting

Element Description	
Name	D502053 - Illuminated Combo Exit Signs
Installation Year	2000
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	4 / Each
Unit Cost	$450.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,360.60

Description

The exit lighting system includes illuminated single-sided combination exit signs along egresses and at exits. The system includes exit signs and wiring.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D502053

Charlie Lake Fire Hall - D502053


Charlie Lake Fire Hall - D502053

Recommendations

Recommendations #1 - Illuminated Combo Exit Signs	
Type	Life Cycle Replacement
Year	2035
Cost	$3,360.60

Replace Illuminated Combo Exit Signs

Element Description	
Name	D503002 - Telecommunication Systems - Telephone System
Installation Year	2010
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$5.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$5,825.04

Description

The building is equipped with a VOIP telephone system.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D503002


Charlie Lake Fire Hall - D503002

Recommendations

Recommendations #1 - Telecommunication Systems	
Type	Life Cycle Replacement
Year	2035
Cost	$5,825.04

Replace Telecommunication Systems

Element Description	
Name	D503002 - Telecommunication Systems - LAN System
Installation Year	2010
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$5.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$5,825.04

Description

The building is equipped with a local area network system.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D503002

Recommendations

Recommendations #1 - Telecommunication Systems	
Type	Life Cycle Replacement
Year	2035
Cost	$5,825.04

Replace Telecommunication Systems

Element Description	
Name	D503008 - Security Systems - Intrusion Alarm Systems
Installation Year	2010
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	9 Years
Renewal Year	2030
Quantity / Unit of Measure	624 / SM Building
Unit Cost	$10.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$11,650.08

Description

The building is provided with a DSC intrusion detection system that includes door contacts, and motion sensors. Keypads for arming/disarming the system are located at both entrances. Control panels for the system are installed in communication closet.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D503008

Charlie Lake Fire Hall - D503008

Recommendations

Recommendations #1 - Security Systems - Intrusion Alarm Systems	
Type	Life Cycle Replacement
Year	2030
Cost	$11,650.08

Replace Security Systems - Intrusion Alarm Systems

Element Description	
Name	D509012 - Emergency Power Generator Systems Natural Gas
Installation Year	2010
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	19 Years
Renewal Year	2040
Quantity / Unit of Measure	57 / kVA
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$63,851.40

Description

The emergency power generator system includes a natural gas generator located north/east of the building. The generator is manufactured by Kohler and rated for 57 kVA at 208V. The system includes the generator, radiator, air intake, exhaust muffler, battery charger, and control panel.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D509002

Charlie Lake Fire Hall - D509002

Charlie Lake Fire Hall - D509002

Charlie Lake Fire Hall - D509002

Recommendations

Recommendations #1 - Emergency Power Generator Systems Natural Gas	
Type	Life Cycle Replacement
Year	2040
Cost	$63,851.40

Replace Emergency Power Generator Systems Natural Gas

Element Description	
Name	D509031 - Automatic Transfer Switches (ATSs) up to 400A
Installation Year	2010
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	29 Years
Renewal Year	2050
Quantity / Unit of Measure	1 / Each
Unit Cost	$7,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$14,002.50

Description

The low voltage electrical distribution system includes a Thompson Technology automatic transfer switch located in the addition apparatus bay. The transfer switch has a rating of 200A at 208/120V.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - D509031

Charlie Lake Fire Hall - D509031

Recommendations

Recommendations #1 - Automatic Transfer Switches (ATSs) up to 400A	
Type	Life Cycle Replacement
Year	2050
Cost	$14,002.50

Replace Automatic Transfer Switches (ATSs) up to 400A

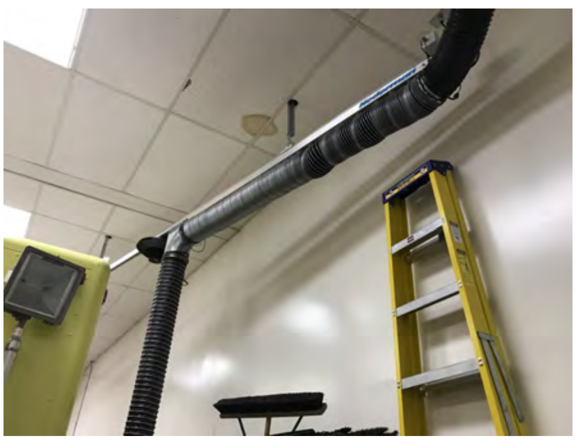
E Equipment & Furnishings
E10 Equipment

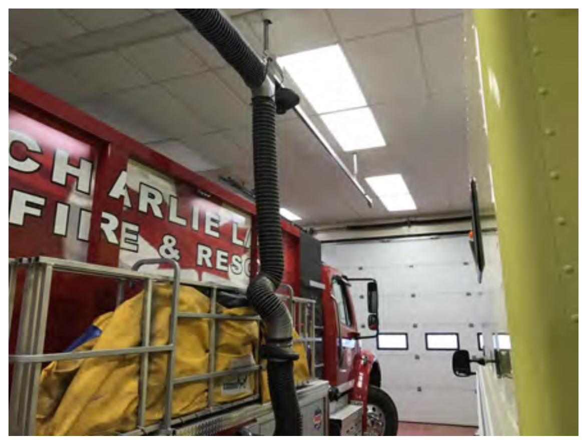
Element Description	
Name	E102010 - Vehicle Exhaust Systems
Installation Year	2010
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	5 / Per Hose Connection
Unit Cost	$7,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$70,012.50

Description
The building includes a vehicle exhaust system with ducting, controls, hose reels and flexible hoses provided in the apparatus bay. The exhaust fan is located on the mezzanine.

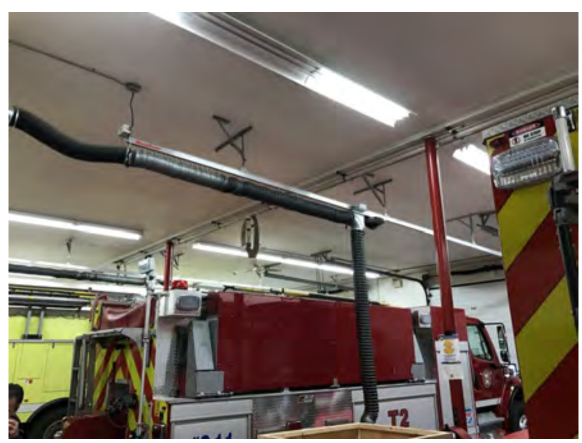
Condition Narrative
No major deficiencies were observed or reported during the assessment.

Photos


Charlie Lake Fire Hall - E102010


Charlie Lake Fire Hall - E102010


Charlie Lake Fire Hall - E102010


Charlie Lake Fire Hall - E102010

Recommendations

Recommendations #1 - Vehicle Exhaust Systems	
Type	Life Cycle Replacement
Year	2035
Cost	$70,012.50

Replace Vehicle Exhaust Systems

G Building Sitework
G20 Site Improvements

Element Description	
Name	G201023 - Concrete Paved Surface - Roadway
Installation Year	2010
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	19 Years
Renewal Year	2040
Quantity / Unit of Measure	410 / SM
Unit Cost	$215.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$164,576.05

Description
A concrete-surfaced roadway that presumably incorporates a light-duty paving structure is constructed north/west of the building.

Condition Narrative
No major deficiencies were observed or reported during the assessment. Site personnel expressed concerns regarding settlement in the compound that may affect the asphalt and gravel yard. In addition, there is reportedly settlement and frost heave at the Main Entry door which is setting off the alarm. An allowance for an engineering study has been provided along with an allowance for repairs. The repair allowance is a placeholder value only. Repair costs will be based on the results or recommendations in the study.

Photos

Charlie Lake Fire Hall - G201023

Charlie Lake Fire Hall - G201023

Recommendations

Recommendations #1 - Study - Yard Settlement	
Type	Engineering Study
Year	2021
Cost	$5,000.00

Based on the limited understanding of the component condition, further investigation is recommended to confirm settlement of ground around the building. The scope of the investigation should include potential remedial options, a renewal schedule and a cost to address the deficiencies and mitigate further deterioration.

Recommendations #2 - Repair - Yard Grading	
Type	Major Repair
Year	2022
Cost	$30,000.00

Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.

Recommendations #3 - Concrete Paved Surface - Roadway	
Type	Life Cycle Replacement
Year	2040
Cost	$164,576.05

Replace Concrete Paved Surface - Roadway

Element Description	
Name	G202021 - Asphalt Paved Surfaces - Parking Area
Installation Year	2010
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	830 / SM
Unit Cost	$75.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$116,220.75

Description

An asphalt-surfaced roadway that presumably incorporates a light-duty paving structure is constructed north/west of the building.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - G202021

Charlie Lake Fire Hall - G202021

Recommendations

Recommendations #1 - Asphalt Paved Surfaces - Parking Area	
Type	Life Cycle Replacement
Year	2035
Cost	$116,220.75

Replace Asphalt Paved Surfaces - Parking Area

Element Description	
Name	G204021 - Fencing and Gates - Chain Link Fence
Installation Year	2010
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	19 Years
Renewal Year	2040
Quantity / Unit of Measure	60 / LM
Unit Cost	$360.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$40,327.20

Description

On the north/east property perimeter a chain link fence is provided.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - G204021

Charlie Lake Fire Hall - G204021

Recommendations

Recommendations #1 - Fencing and Gates - Chain Link Fence	
Type	Life Cycle Replacement
Year	2040
Cost	$40,327.20

Replace Fencing and Gates - Chain Link Fence

Element Description	
Name	G204081 - Message Sign - Wall-Mounted
Installation Year	2010
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	9 Years
Renewal Year	2030
Quantity / Unit of Measure	1 / Each
Unit Cost	$1,300.00
Difficulty / Regional / Soft Cost Factors	4.00 / 1.867 / 1
Replacement Cost	$9,708.40

Description

Dimensional lettering that appeared to consist of aluminum is installed on the building's north and east elevations. The lettering spells out the facility name.

Condition Narrative

No major deficiencies were observed or reported during the assessment. Difficulty factor adjusted to reflect size of sign.

Photos

Charlie Lake Fire Hall - G204081

Recommendations

Recommendations #1 - Message Sign - Wall-Mounted	
Type	Life Cycle Replacement
Year	2030
Cost	$9,708.40

Replace Message Sign - Wall-Mounted

G30 Site Mechanical Utilities

Element Description	
Name	G301021 - Water Supply
Installation Year	1977
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	60 / LM
Unit Cost	$153.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$17,139.06

Description

While concealed from view below-grade, the underground water supply line is estimated to be steel piping in a trench from the municipality water supply to the north/east of the addition apparatus bay.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Recommendations

Recommendations #1 - Water Supply	
Type	Life Cycle Replacement
Year	2027
Cost	$17,139.06

Replace Water Supply

Element Description	
Name	G302001 - Sanitary Sewer
Installation Year	1977
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	60 / LM
Unit Cost	$200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$22,404.00

Description

While concealed from view below-grade, the underground sanitary sewer line is estimated to be cast iron piping in a trench from the building to the municipality sewer system.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Recommendations

Recommendations #1 - Sanitary Sewer	
Type	Life Cycle Replacement
Year	2027
Cost	$22,404.00

Replace Sanitary Sewer

Element Description	
Name	G306006 - Gas Distribution (Natural or Propane)
Installation Year	1977
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	60 / LM
Unit Cost	$84.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$9,409.68

Description

While concealed from view below-grade, the underground natural gas line is estimated to be welded steel piping in a trench from the utility to the meter on the exterior of the building.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - G306006

Recommendations

Recommendations #1 - Gas Distribution (Natural or Propane)	
Type	Life Cycle Replacement
Year	2027
Cost	$9,409.68

Replace Gas Distribution (Natural or Propane)

G40 Site Electrical Utilities

Element Description	
Name	G401011 - Electrical Service
Installation Year	1987
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	16 Years
Renewal Year	2037
Quantity / Unit of Measure	60 / LM
Unit Cost	$655.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$73,373.10

Description

The overhead single-phase electrical service is provided from the utility to the building electrical service equipment.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Charlie Lake Fire Hall - G401011

Charlie Lake Fire Hall - G401011

Recommendations

Recommendations #1 - Electrical Service	
Type	Life Cycle Replacement
Year	2037
Cost	$73,373.10

Replace Electrical Service

APPENDIX B

30-Year Capital Plan Renewal and Repair Summary

Client	Peace River Regional District
Site No.	
Building Name	Charlie Lake Fire Hall
Address	
Project No.	21075
Date	November 18, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Year	Recommendation Cost	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Totals (2021 - 2050)
A - Substructure																																					
A103001 Slab on Grade - Addition	Undertake repairs to areas of localized cracking/scaling, and correct uneven surfaces.	2 - Good	Major Repair	75	2022	$8,000		$8,000																													$8,000
A103001 Slab on Grade - Original	Undertake repairs to areas of localized cracking/scaling, and correct uneven surfaces.	2 - Good	Major Repair	75	2022	$15,000		$15,000																													$15,000
B - Shell																																					
B10 - Superstructure																																					
B103001 Structure - Addition	Based on the limited understanding of the component condition, further investigation is recommended to confirm performance and remaining useful life of the second floor and main wall between original building . The scope of the investigation should include potential remedial options, a renewal schedule and a cost to address the deficiencies and mitigate further deterioration.	2 - Good	Engineering Study	75	2021	$5,000	$5,000																														$5,000
B103001 Structure - Addition	Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.	2 - Good	Major Repair	75	2022	$35,000		$35,000																													$35,000
B20 - Exterior Enclosure																																					
B201008 Exterior Soffits	Replace Exterior Soffits	2 - Good	Life Cycle Replacement	50	2037	$9,447																	$9,447														$9,447
B201025 Vinyl Siding	Replace Vinyl Siding	3 - Fair	Life Cycle Replacement	25	2024	$65,065				$65,065																									$65,065		$130,130
B202001 Windows	Replace Windows	3 - Fair	Life Cycle Replacement	35	2025	$10,642					$10,642																										$10,642
B203022 Overhead Doors - Industrial	Replace Overhead Doors - Industrial	2 - Good	Life Cycle Replacement	25	2035	$89,616															$89,616																$89,616
B203023 Single Door - Hollow Metal	Replace Single Door - Hollow Metal	3 - Fair	Life Cycle Replacement	30	2025	$23,898					$23,898																										$23,898
B30 - Roofing																																					
B301022 Conventional - Modified Bitumen	Repair the roofing assembly drainage slopes.	3 - Fair	Repair	22	2023	$48,000			$48,000																												$48,000
B301022 Conventional - Modified Bitumen	Replace Conventional - Modified Bitumen	3 - Fair	Life Cycle Replacement	22	2032	$171,017												$171,017																			$171,017
C - Interiors																																					
C102022 Single Door - Wood - Addition	Replace Single Door - Wood	2 - Good	Life Cycle Replacement	40	2027	$3,734							$3,734																								$3,734
C102022 Single Door - Wood - Original	Replace Single Door - Wood	2 - Good	Life Cycle Replacement	40	2050	$18,670																														$18,670	$18,670
C103009 Cabinets - Kitchens	Replace Cabinets - Kitchens	3 - Fair	Life Cycle Replacement	35	2026	$11,202						$11,202																									$11,202
C103010 Vanities - Addition	Replace Vanities	3 - Fair	Life Cycle Replacement	25	2025	$4,481					$4,481																									$4,481	$8,962
C103010 Vanities - Original	Replace Vanities	2 - Good	Life Cycle Replacement	25	2039	$4,481																			$4,481												$4,481
C103011 Cabinets - General	Replace Cabinets - General	3 - Fair	Life Cycle Replacement	35	2025	$13,442					$13,442																										$13,442
C103099 Other Fittings - Metal Pipe Storage Racks	Replace Other Fittings	2 - Good	Life Cycle Replacement	30	2040	$56,010																				$56,010											$56,010
C201002 Exterior Stair Construction	Replace Exterior Stair Construction	2 - Good	Life Cycle Replacement	40	2027	$57,877							$57,877																								$57,877
C201027 Access Ladders - Addition	Replace Access Ladders	3 - Fair	Life Cycle Replacement	40	2027	$4,668							$4,668																								$4,668
C201027 Access Ladders - Original	Replace Access Ladders	3 - Fair	Life Cycle Replacement	40	2026	$2,801						$2,801																									$2,801
C202027 Vinyl Sheet	Replace Vinyl Sheet	2 - Good	Life Cycle Replacement	20	2027	$3,781							$3,781																				$3,781				$7,561
C301005 Paint Wall Covering	Replace Paint Wall Covering	3 - Fair	Life Cycle Replacement	10	2026	$46,600						$46,600										$46,600										$46,600					$139,801
C301022 Wood Wall Finish	Replace Wood Wall Finish	2 - Good	Life Cycle Replacement	25	2027	$4,033							$4,033																								$4,033
C302005 Carpet Floor	Replace Carpet Floor	3 - Fair	Life Cycle Replacement	10	2024	$2,688				$2,688										$2,688										$2,688							$8,065
C302007 Painted / Sealed Concrete Floor	Replace Painted / Sealed Concrete Floor	2 - Good	Life Cycle Replacement	15	2027	$34,203							$34,203															$34,203									$68,407
C302023 Vinyl Sheet Floor	Replace Vinyl Sheet Floor	2 - Good	Life Cycle Replacement	15	2027	$31,366							$31,366															$31,366									$62,731
C303004 Acoustic Tile Ceiling	Replace Acoustic Tile Ceiling	3 - Fair	Life Cycle Replacement	30	2026	$2,091						$2,091																									$2,091
C303006 Painted Ceiling Structures	Replace Painted Ceiling Structures	2 - Good	Life Cycle Replacement	15	2028	$25,653								$25,653															$25,653								$51,305
C303007 Suspended Acoustic Ceiling Panels	Replace Suspended Acoustic Ceiling Panels	2 - Good	Life Cycle Replacement	25	2027	$25,541							$25,541																								$25,541
D - Services																																					
D10 - Conveying																																					
D20 - Plumbing																																					
D201001 Water Closets - Addition	Replace Water Closets	2 - Good	Life Cycle Replacement	35	2027	$1,867							$1,867																								$1,867
D201001 Water Closets - Original	Replace Water Closets	2 - Good	Life Cycle Replacement	35	2049	$3,734																													$3,734		$3,734
D201003 Lavatories - Addition	Replace Lavatories	2 - Good	Life Cycle Replacement	35	2027	$1,867							$1,867																								$1,867
D201003 Lavatories - Original	Replace Lavatories	2 - Good	Life Cycle Replacement	35	2049	$3,734																													$3,734		$3,734
D201004 Sinks - Addition	Replace Sinks	2 - Good	Life Cycle Replacement	35	2035	$1,867															$1,867																$1,867
D201004 Sinks - Utility Sink	Replace Sinks	2 - Good	Life Cycle Replacement	35	2049	$1,867																													$1,867		$1,867
D201012 Shower Assembly	Replace Shower Assembly	2 - Good	Life Cycle Replacement	25	2039	$11,202																			$11,202												$11,202
D202001 Domestic Water Pipes and Fittings	Move domestic piping away from electrical outlets.	2 - Good	Major Repair	40	2022	$5,000		$5,000																													$5,000
D202001 Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	2 - Good	Life Cycle Replacement	40	2027	$46,600							$46,600																								$46,600
D202034 Gas Fired Domestic Water Heaters (Residential Tank Type)	Replace Gas Fired Domestic Water Heaters (Residential Tank Type)	5 - Missing/Failed	Life Cycle Replacement	12	2021	$8,822	$8,822												$8,822												$8,822						$26,465
D203001 Sanitary Waste and Vent Piping - Addition	Replace Sanitary Waste and Vent Piping	2 - Good	Life Cycle Replacement	50	2037	$52,425																	$52,425														$52,425
D203007 Interceptor Systems	Replace Interceptor Systems	3 - Fair	Life Cycle Replacement	25	2026	$18,670						$18,670																									$18,670
D204001 Rain Water Drainage Piping and Fittings	Replace Rain Water Drainage Piping and Fittings	2 - Good	Life Cycle Replacement	50	2037	$34,950																	$34,950														$34,950
D204005 Sump Pump	Replace Sump Pump	1 - Excellent	Life Cycle Replacement	15	2034	$5,601														$5,601															$5,601		$11,202
D30 - HVAC																																					
D301002 Gas Supply Systems	Replace Gas Supply Systems	2 - Good	Life Cycle Replacement	40	2027	$23,300							$23,300																								$23,300
D302002 Hot Water Boilers less than 1000 MBH	Replace Hot Water Boilers less than 1000 MBH	2 - Good	Life Cycle Replacement	30	2040	$37,807																				$37,807											$37,807
D304003 Heating Water Distribution Systems	Based on the limited understanding of the component condition, further investigation is recommended to confirm performance and remaining useful life of the heating water piping. The scope of the investigation should include potential remedial options, a renewal schedule, and a cost to address the deficiencies and mitigate further deterioration.	3 - Fair	Engineering Study	45	2022	$5,000		$5,000																													$5,000
D304003 Heating Water Distribution Systems	Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.	3 - Fair	Repair	45	2022	$13,500		$13,500																													$13,500
D304003 Heating Water Distribution Systems	Replace Heating Water Distribution Systems	3 - Fair	Life Cycle Replacement	45	2032	$104,851												$104,851																			$104,851
D304021 HVAC Pumps (Up to 10 HP)	Replace HVAC Pumps (Up to 10 HP)	2 - Good	Life Cycle Replacement	20	2030	$37,340										$37,340																				$37,340	$74,680
D304033 Exhaust Fan - Ceiling (Residential)	Replace Exhaust Fan - Ceiling (Residential)	2 - Good	Life Cycle Replacement	25	2039	$3,734																			$3,734												$3,734
D305004 Fin Tube Radiation Units	Replace Fin Tube Radiation Units	2 - Good	Life Cycle Replacement	30	2027	$25,092							$25,092																								$25,092
D305033 Access Control Systems	Replace Access Control Systems	1 - Excellent	Life Cycle Replacement	20	2040	$14,003																				$14,003											$14,003
D40 - Fire Protection																																					
D403002 Fire Extinguishers	Replace Fire Extinguishers	3 - Fair	Life Cycle Replacement	10	2024	$1,165				$1,165										$1,165										$1,165							$3,495
D50 - Electrical																																					
D501005 Panelboards up to 400A	Replace Panelboards up to 400A	2 - Good	Life Cycle Replacement	40	2050	$14,003																														$14,003	$14,003
D501025 LV Main Service Disconnects	Replace LV Main Service Disconnects	2 - Good	Life Cycle Replacement	40	2050	$5,601																														$5,601	$5,601
D502001 Branch Wiring and Devices - Addition	Replace Branch Wiring and Devices	2 - Good	Life Cycle Replacement	50	2037	$58,885																	$58,885														$58,885
D502001 Branch Wiring and Devices - Original	Replace Branch Wiring and Devices	2 - Good	Life Cycle Replacement	50	2027	$51,791							$51,791																								$51,791
D502002 Interior Lighting - Second Floor, Offices, and Washrooms	Replace Interior Lighting	2 - Good	Life Cycle Replacement	35	2035	$32,691															$32,691																$32,691
D502041 Exterior Lighting	Replace Exterior Lighting	1 - Excellent	Life Cycle Replacement	20	2039	$7,468																			$7,468												$7,468
D502053 Illuminated Combo Exit Signs	Replace Illuminated Combo Exit Signs	2 - Good	Life Cycle Replacement	35	2035	$3,361															$3,361																$3,361
D503002 Telecommunication Systems - LAN System	Replace Telecommunication Systems	2 - Good	Life Cycle Replacement	25	2035	$5,825															$5,825																$5,825
D503002 Telecommunication Systems - Telephone System	Replace Telecommunication Systems	2 - Good	Life Cycle Replacement	25	2035	$5,825															$5,825																$5,825
D503008 Security Systems - Intrusion Alarm Systems	Replace Security Systems - Intrusion Alarm Systems	2 - Good	Life Cycle Replacement	20	2030	$11,650										$11,650																				$11,650	$23,300
D509012 Emergency Power Generator Systems Natural Gas	Replace Emergency Power Generator Systems Natural Gas	2 - Good	Life Cycle Replacement	30	2040	$63,851																				$63,851											$63,851
D509031 Automatic Transfer Switches (ATSs) up to 400A	Replace Automatic Transfer Switches (ATSs) up to 400A	2 - Good	Life Cycle Replacement	40	2050	$14,003																														$14,003	$14,003
E - Equipment & Furnishings																																					
E102010 Vehicle Exhaust Systems	Replace Vehicle Exhaust Systems	2 - Good	Life Cycle Replacement	25	2035	$70,013															$70,013																$70,013
F - Special Construction & Demolition																																					
G - Site Surfacing and Landscaping																																					
G201023 Concrete Paved Surface - Roadway	Based on the limited understanding of the component condition, further investigation is recommended to confirm settlement of ground around the building. The scope of the investigation should include potential remedial options, a renewal schedule and a cost to address the deficiencies and mitigate further deterioration.	2 - Good	Engineering Study	30	2021	$5,000	$5,000																														$5,000
G201023 Concrete Paved Surface - Roadway	Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.	2 - Good	Major Repair	30	2022	$30,000		$30,000																													$30,000

OPINION OF PROBABLE COST TABLE

Client	Peace River Regional District
Site No.	
Building Name	Charlie Lake Fire Hall
Address	
Project No.	21075
Date	November 18, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Year	Recommendation Cost	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
G201023 Concrete Paved Surface - Roadway	Replace Concrete Paved Surface - Roadway	2 - Good	Life Cycle Replacement	30	2040	$164,576															
G202021 Asphalt Paved Surfaces - Parking Area	Replace Asphalt Paved Surfaces - Parking Area	2 - Good	Life Cycle Replacement	25	2035	$116,221															$116,221
G204021 Fencing and Gates - Chain Link Fence	Replace Fencing and Gates - Chain Link Fence	2 - Good	Life Cycle Replacement	30	2040	$40,327															
G204081 Message Sign - Wall-Mounted	Replace Message Sign - Wall-Mounted	2 - Good	Life Cycle Replacement	20	2030	$9,708										$9,708					
G301021 Water Supply	Replace Water Supply	2 - Good	Life Cycle Replacement	50	2027	$17,139							$17,139								
G302001 Sanitary Sewer	Replace Sanitary Sewer	2 - Good	Life Cycle Replacement	50	2027	$22,404							$22,404								
G306006 Gas Distribution (Natural or Propane)	Replace Gas Distribution (Natural or Propane)	2 - Good	Life Cycle Replacement	50	2027	$9,410							$9,410								
G401011 Electrical Service	Replace Electrical Service	2 - Good	Life Cycle Replacement	50	2037	$73,373															
					Total Capital Renewals	$2,131,127	$18,822	$111,500	$48,000	$68,918	$52,463	$81,364	$364,672	$25,653	$0	$58,698	$0	$275,868	$8,822	$9,454	$325,418

Element Name	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Totals (2021 - 2050)
G201023 Concrete Paved Surface - Roadway					$164,576											$164,576
G202021 Asphalt Paved Surfaces - Parking Area																$116,221
G204021 Fencing and Gates - Chain Link Fence					$40,327											$40,327
G204081 Message Sign - Wall-Mounted															$9,708	$19,417
G301021 Water Supply																$17,139
G302001 Sanitary Sewer																$22,404
G306006 Gas Distribution (Natural or Propane)																$9,410
G401011 Electrical Service		$73,373														$73,373
Total Capital Renewals	$46,600	$229,081	$0	$26,885	$376,574	$0	$65,569	$25,653	$3,853	$8,822	$46,600	$3,781	$0	$80,001	$115,455	$2,478,525

APPENDIX C

Reserve Fund Analysis

Cash Flow Table
Scenario 0: No Contribution

Reserve Fund Opening Balance	$ 394,522	Assumed Annual Inflation Rate for Reserve Fund Expenditures	2.00%
Projected Minimum Reserve Fund Balance	$ (3,080,636)	Assumed Annual Interest Rate for Interest Earned on Reserve Fund	2.00%

Year	Opening Balance	Recommended Annual Contribution	Other Contribution	Estimated Inflation Adjusted Expenditures	Estimated Interest Earned	% Increase In Recommended Annual Contribution	Closing Balance	Average Contribution Per Unit, Per Month
2021	$ 394,522	$ -	$ -	$ 19,950	$ 7,890	n/a	$ 382,463	$ -
2022	$ 382,463	$ -	$ -	$ 119,952	$ 7,770	2.00%	$ 270,280	$ -
2023	$ 270,280	$ -	$ -	$ 52,436	$ 6,527	2.00%	$ 224,372	$ -
2024	$ 224,372	$ -	$ -	$ 76,885	$ 4,947	2.00%	$ 152,434	$ -
2025	$ 152,434	$ -	$ -	$ 59,101	$ 3,768	2.00%	$ 97,101	$ -
2026	$ 97,101	$ -	$ -	$ 95,061	$ 2,495	2.00%	$ 4,535	$ -
2027	$ 4,535	$ -	$ -	$ 431,602	$ 1,016	2.00%	$ (426,050)	$ -
2028	$ (426,050)	$ -	$ -	$ 31,359	$ -	2.00%	$ (457,410)	$ -
2029	$ (457,410)	$ -	$ -	$ -	$ -	2.00%	$ (457,410)	$ -
2030	$ (457,410)	$ -	$ -	$ 74,036	$ -	2.00%	$ (531,446)	$ -
2031	$ (531,446)	$ -	$ -	$ -	$ -	2.00%	$ (531,446)	$ -
2032	$ (531,446)	$ -	$ -	$ 360,330	$ -	2.00%	$ (891,775)	$ -
2033	$ (891,775)	$ -	$ -	$ 11,985	$ -	2.00%	$ (903,760)	$ -
2034	$ (903,760)	$ -	$ -	$ 13,583	$ -	2.00%	$ (917,343)	$ -
2035	$ (917,343)	$ -	$ -	$ 451,658	$ -	2.00%	$ (1,369,001)	$ -
2036	$ (1,369,001)	$ -	$ -	$ 66,419	$ -	2.00%	$ (1,435,419)	$ -
2037	$ (1,435,419)	$ -	$ -	$ 328,645	$ -	2.00%	$ (1,764,064)	$ -
2038	$ (1,764,064)	$ -	$ -	$ -	$ -	2.00%	$ (1,764,064)	$ -
2039	$ (1,764,064)	$ -	$ -	$ 38,991	$ -	2.00%	$ (1,803,055)	$ -
2040	$ (1,803,055)	$ -	$ -	$ 576,679	$ -	2.00%	$ (2,379,734)	$ -
2041	$ (2,379,734)	$ -	$ -	$ -	$ -	2.00%	$ (2,379,734)	$ -
2042	$ (2,379,734)	$ -	$ -	$ 103,444	$ -	2.00%	$ (2,483,178)	$ -
2043	$ (2,483,178)	$ -	$ -	$ 42,205	$ -	2.00%	$ (2,525,384)	$ -
2044	$ (2,525,384)	$ -	$ -	$ 6,623	$ -	2.00%	$ (2,532,006)	$ -
2045	$ (2,532,006)	$ -	$ -	$ 96,265	$ -	2.00%	$ (2,628,271)	$ -
2046	$ (2,628,271)	$ -	$ -	$ 80,964	$ -	2.00%	$ (2,709,235)	$ -
2047	$ (2,709,235)	$ -	$ -	$ 7,028	$ -	2.00%	$ (2,716,264)	$ -
2048	$ (2,716,264)	$ -	$ -	$ -	$ -	2.00%	$ (2,716,264)	$ -
2049	$ (2,716,264)	$ -	$ -	$ 148,074	$ -	2.00%	$ (2,864,338)	$ -
2050	$ (2,864,338)	$ -	$ -	$ 216,298	$ -	2.00%	$ (3,080,636)	$ -

Note 1: The contributions for the 2021 fiscal year are amounts budgeted by Charlie Lake Fire Hall

Note 2: The 2021 Estimated Inflation Adjusted Expenditures includes approved CRF expenditures for the fiscal year, if any.

Note 3: The projections included in this table are estimates only, based on the information available at the time of preparation. The condition assessment must be updated regularly as the actual figures will vary from the amounts detailed in this table due to changes in interest rates, inflation rates and scheduling of the repair/replacement work.

Cash Flow Table

Scenario 1: Contributions Increase with Inflation

Reserve Fund Opening Balance	$ 394,522	Assumed Annual Inflation Rate for Reserve Fund Expenditures	2.00%
Projected Minimum Reserve Fund Balance	$ 21,795	Assumed Annual Interest Rate for Interest Earned on Reserve Fund	2.00%

Year	Opening Balance	Recommended Annual Contribution	Other Contribution	Estimated Inflation Adjusted Expenditures	Estimated Interest Earned	% Increase In Recommended Annual Contribution	Closing Balance	Average Contribution Per Unit, Per Month
2021	$ 394,522	$ -	$ -	$ 19,950	$ 7,890	n/a	$ 382,463	$ -
2022	$ 382,463	$ 85,000	$ -	$ 119,952	$ 7,770	2.00%	$ 355,280	$ 7,083
2023	$ 355,280	$ 86,700	$ -	$ 52,436	$ 7,377	2.00%	$ 396,922	$ 7,225
2024	$ 396,922	$ 88,434	$ -	$ 76,885	$ 7,522	2.00%	$ 415,993	$ 7,370
2025	$ 415,993	$ 90,203	$ -	$ 59,101	$ 8,129	2.00%	$ 455,224	$ 7,517
2026	$ 455,224	$ 92,007	$ -	$ 95,061	$ 8,712	2.00%	$ 460,882	$ 7,667
2027	$ 460,882	$ 93,847	$ -	$ 431,602	$ 9,161	2.00%	$ 132,288	$ 7,821
2028	$ 132,288	$ 95,724	$ -	$ 31,359	$ 5,932	2.00%	$ 202,584	$ 7,977
2029	$ 202,584	$ 97,638	$ -	$ -	$ 3,349	2.00%	$ 303,571	$ 8,137
2030	$ 303,571	$ 99,591	$ -	$ 74,036	$ 5,062	2.00%	$ 334,188	$ 8,299
2031	$ 334,188	$ 101,583	$ -	$ -	$ 6,378	2.00%	$ 442,148	$ 8,465
2032	$ 442,148	$ 103,615	$ -	$ 360,330	$ 7,763	2.00%	$ 193,196	$ 8,635
2033	$ 193,196	$ 105,687	$ -	$ 11,985	$ 6,353	2.00%	$ 293,252	$ 8,807
2034	$ 293,252	$ 107,801	$ -	$ 13,583	$ 4,864	2.00%	$ 392,334	$ 8,983
2035	$ 392,334	$ 109,957	$ -	$ 451,658	$ 6,856	2.00%	$ 57,489	$ 9,163
2036	$ 57,489	$ 112,156	$ -	$ 66,419	$ 4,498	2.00%	$ 107,724	$ 9,346
2037	$ 107,724	$ 114,399	$ 200,000	$ 328,645	$ 1,652	2.00%	$ 95,130	$ 9,533
2038	$ 95,130	$ 116,687	$ -	$ -	$ 2,029	2.00%	$ 213,846	$ 9,724
2039	$ 213,846	$ 119,021	$ -	$ 38,991	$ 3,090	2.00%	$ 296,965	$ 9,918
2040	$ 296,965	$ 121,401	$ 175,000	$ 576,679	$ 5,108	2.00%	$ 21,795	$ 10,117
2041	$ 21,795	$ 123,829	$ -	$ -	$ 3,188	2.00%	$ 148,812	$ 10,319
2042	$ 148,812	$ 126,306	$ -	$ 103,444	$ 1,706	2.00%	$ 173,379	$ 10,525
2043	$ 173,379	$ 128,832	$ -	$ 42,205	$ 3,222	2.00%	$ 263,227	$ 10,736
2044	$ 263,227	$ 131,408	$ -	$ 6,623	$ 4,366	2.00%	$ 392,379	$ 10,951
2045	$ 392,379	$ 134,036	$ -	$ 96,265	$ 6,556	2.00%	$ 436,706	$ 11,170
2046	$ 436,706	$ 136,717	$ -	$ 80,964	$ 8,291	2.00%	$ 500,750	$ 11,393
2047	$ 500,750	$ 139,452	$ -	$ 7,028	$ 9,375	2.00%	$ 642,548	$ 11,621
2048	$ 642,548	$ 142,241	$ -	$ -	$ 11,433	2.00%	$ 796,222	$ 11,853
2049	$ 796,222	$ 145,085	$ -	$ 148,074	$ 14,388	2.00%	$ 807,620	$ 12,090
2050	$ 807,620	$ 147,987	$ -	$ 216,298	$ 16,038	2.00%	$ 755,348	$ 12,332

Note 1: The contributions for the 2021 fiscal year are amounts budgeted by Charlie Lake Fire Hall

Note 2: The 2021 Estimated Inflation Adjusted Expenditures includes approved CRF expenditures for the fiscal year, if any.

Note 3: The projections included in this table are estimates only, based on the information available at the time of preparation. The condition assessment must be updated regularly as the actual figures will vary from the amounts detailed in this table due to changes in interest rates, inflation rates and scheduling of the repair/replacement work.

APPENDIX D

Site Plan


N
Lakeshore Drive
Alaska Highway
Highway

APPENDIX E

Preventative Maintenance Plan

Charlie Lake Fire Hall

Equipment List

Uniformat Code	Uniformat Name	Quantity	Description (If Applicable)	PM ID Number
B203022	Overhead Doors - Industrial	4		0003
D202034	Gas Fired Domestic Water Heaters (Residential Tank Type)	1		0022
D204005	Sump Pump	1		0025
D302002	Hot Water Boilers less than 1000 MBH	1	Condensing	0096
D304005	Glycol Distribution Systems	N/A		0040
D304021	HVAC Pumps (Up to 10 HP)	5		0016
D403002	Fire Extinguishers	Not Available		0071
D501005	Panelboards up to 400A	2		0077
D501025	LV Main Service Disconnects	1		0079
D502053	Illuminated Combo Exit Signs	Not Available		0086
D509012	Emergency Power Generator Systems Natural Gas	1		0085
D509031	Automatic Transfer Switches (ATSs) up to 400A	1		0088
E102010	Vehicle Exhaust Systems	1		0101

Charlie Lake Fire Hall
Preventative Maintenance Plan

PM ID Number	Component Name	PM Task List	Frequency	Estimated Time (Minutes)	Quantity	Resource/ Craft	Materials / Consumables	LOTO (Y/N)
0003	Overhead Doors - Industrial	Clean all hinges/hardware and lubricate as required per the manufacture's specifications. Inspect and clean all rollers, bearings, cables, chains, shaft, tracks, and hardware. Clean and test automatic sensors/door operators. Test operation of all buttons, controls, and switches. Inspect the motor, including electrical connections. Check electric motors for excessive vibration, unusual noise, and odours. Lubricate the motor as per manufacturer's specifications. Tighten the sprockets, brake solenoids, and armatures, as required. Lubricate all bearings, chains, gear reducers, disconnects and pivot points as per the manufacturer's specifications, Inspect the operator bearings, disconnect linkage, and chain hoist assemblies (If Applicable). Test the emergency shut-off switch, if present. Verify the sequence of operation, including any controls and safety mechanisms.	quarterly	120	Each	Door Technician	Toolset, Lubricant, Testing Equipment	Y
0016	Pumps	Visually assess the pump, fittings, and mounts for signs of corrosion, excessive sweating, and leaks. Lubricate pump bearings as per manufacturer's specifications Lubricate motor bearing as per manufacturer's specifications Check motor mounts and vibration pads to ensure there is not excessive vibration (If applicable). Ensure vents are clear of dust and obstruction. Visually assess electrical connections for loose or frayed wiring. Visually assess all mechanical seals. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	weekly	10	Each	Building Technician	Toolset	N
0022	Gas Fired Domestic Water Heaters	Inspect the tank and associated pipes and fittings for signs of leaks or corrosion. Visually assess electrical connections for loose or frayed wiring. Inspect the gas supply lines for signs of leaking, deterioration, and odours. Check to ensure the water heater is adequately vented and check the chimney for rust/leaks. Flush the tank. To prevent a vacuum from forming during flushing, run the hot water in a nearby sink and leave it running for the duration of the flushing process. Connect a hose or transfer pump to the drain outlet of the hot water heater and open the drain/blow down valve. Leave the valve open until water runs clear and free of sediment. Close the drain valve and turn off the hot water in the nearby tap set.	semi-annually	20	Each	Building Technician	Toolset, Drain Hose/Transfer Pump	N
0025	Sump Pump	Clean pump as required to ensure unimpeded impeller operation and discharge vents. Inspect the float arm and mechanism to ensure proper operation. Adjust as required. Inspect check valves for proper valve function (if applicable) Visually assess electrical connections for loose or frayed wiring. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	weekly	15	Each	Building Technician	Toolset, Cleaning Supplies	Y
0025	Sump Pump	Remove the pump and clean/de-scale the wet well. Lubricate pump/motor bearings as per manufacturer specifications.	quarterly	60	Each	Building Technician	Toolset, Wet Vacuum,	Y
0040	Glycol Distribution Systems	Visually assess accessible piping for signs of corrosion or leaks. Check pressure gauges and compare pressures with past data. Check accessible insulation for moisture and repair any loose/damaged sections. Check the glycol holding tank/check system glycol levels to ensure they meet design specifications. Add glycol solution as needed, if qualified to do so. If a glycol holding tank is present, inspect it for leaks or damage.	weekly	20	Total	Building Technician	NA	N
0040	Glycol Distribution Systems	Exercise main shut-off/isolation valves.	semi-annually	5	Each	Building Technician	Toolset	N
0040	Glycol Distribution Systems	Draw a sample of glycol water in the system from each sampling point and test it for quality, glycol percentage, and contaminants. Provide a detailed report of the testing results.	semi-annually	60	Total	Qualified Vendor	Specialized testing equipment	N
0040	Glycol Distribution Systems	If system is closed loop, glycol will need to be replaced based on a variable schedule to be determined by semi-annual testing results of glycol. Dispose of used glycol in accordance with legislation enacted by those authorities having jurisdiction.	1-3 years	480	Total	HVAC Technician	Glycol, Toolset, Vacuums, Pumps	Y
0071	Fire Extinguishers	Inspect the fire extinguisher and ensure the needle reads within acceptable ranges on the pressure gauge. Ensure the fire extinguisher is properly mounted/seated. Check to ensure pins are in place and secured with unbroken break-away ties. Initial the monthly inspection tags.	monthly	5	Each	Building Technician	NA	N
0071	Fire Extinguishers	Complete an annual inspection in accordance with fire code regulations and update inspection tags. Annual inspections must be performed by a technician who is licensed to do so.	annually	10	Each	Licensed Technician	Inspection Tags	N
0071	Fire Extinguishers	Complete hydrostatic testing. Recharge or replace the fire extinguisher as needed.	10 years	30	Each	Licensed Technician	Specialized re-charging equipment.	N

Charlie Lake Fire Hall
Preventative Maintenance Plan

PM ID Number	Component Name	PM Task List	Frequency	Estimated Time (Minutes)	Quantity	Resource/ Craft	Materials / Consumables	LOTO (Y/N)
0077	Panelboards	Perform thermal imaging (infrared scanning) to detect hot spots (excess heat) in electrical components. While thermal imaging is being undertaken, inspect electrical panelboards for missing breakers, panel schedules, knockouts, or unusual sounds or odours. Provide a detailed thermal imaging report based on the results of the infrared scanning.	3 years	10	Each	Electrician	Thermal Imaging Camera, Toolset	N
0079	Main Switches / Disconnects	Perform thermal imaging (infrared scanning) to detect hot spots (excess heat) in electrical components. While thermal imaging is being undertaken, inspect the switch for missing schedules, knockouts, or unusual sounds or odours. Provide a detailed thermal imaging report based on the results of the infrared scanning.	3 years	10	Each	Electrician	Thermal Imaging Camera, Toolset	N
0085	Emergency Power Generator Systems	Inspect fuel level and pressure to ensure it is full. Inspect lubricating oil and engine coolant levels and report if they not compliant with manufacturer specifications. Test annunciator lamps to confirm that they are operational, if applicable. If the unit has a display, check it to ensure there are no alarms or notifications. Visually assess the entire system for signs of damage, leaks, corrosion, or other issues. Operate the generator for 30 minutes, not under electrical load. (No Load Test) Inspect the unit while it is running and monitor for unusual noises, odours, or excessive vibration. Record any available statistics while the generator is operable and compare to past collected data. Inspect for correct operation of all auxiliary equipment, e.g., radiator shutter control, coolant pumps, fuel transfer pumps, oil coolers, and engine room ventilation system(s).	weekly	45	Each	Building Technician	Hearing Protection	N
0085	Emergency Power Generator Systems	Note: This monthly preventative maintenance event should replace the weekly preventative maintenance event that would normally fall on this week. Inspect day tank fuel level and pressure to ensure it is full. Inspect lubricating oil and engine coolant levels and report if they not compliant with manufacturer specifications. Test annunciator lamps to confirm that they are operational, if applicable. If the unit has a display, check it to ensure there are no alarms or notifications. Visually assess the entire system for signs of damage, leaks, corrosion, or other issues. Operate the generator for 60 minutes under electrical load. (Full Load Test) Inspect the unit while it is running and monitor for unusual noises, odours, or excessive vibration. Record any available statistics while the generator is operable and compare to past collected data. While the full load test is being completed, ensure any lighting operated by the generator for use as emergency lighting is illuminated properly. Inspect for correct operation of all auxiliary equipment, e.g., radiator shutter control, coolant pumps, fuel transfer pumps, oil coolers, and engine room ventilation system(s).	monthly	75	Each	Building Technician	Hearing Protection	N
0085	Emergency Power Generator Systems	Inspect, test, and calibrate all generator systems including but not limited to; the engine and all associated components, fuel tanks, fuel pumps, filters, oil, coolant, controls, transfer switches, dampers/linkages, safety systems. Clean all generator systems with a manufacturer approved degreasing agent or non-abrasive cleaner. Lubricate any bearings/nipples as per manufacturer specifications. Replace any oil/coolant filters Test the voltage of the batteries and replace if they are outputting less than 80% of the rated voltage. Inspect, test, and calibrate the battery charging station. Check belt alignment and correct as needed. Replace the belts, if needed. Test operation of any manual or automatic transfer switching equipment. Operate the generator for 60 minutes, under full electrical load. (Full Load Test) Record any available statistics while the generator is operable and compare to past collected data.	semi-annually	180	Each	Licensed Generator Technician	Hearing Protection, Toolset, Lubricant, Belts, Coolant, Cleaning Supplies	Y

Charlie Lake Fire Hall

Preventative Maintenance Plan

PM ID Number	Component Name	PM Task List	Frequency	Estimated Time (Minutes)	Quantity	Resource/ Craft	Materials / Consumables	LOTO (Y/N)
0085	Emergency Power Generator Systems	Inspect, test, and calibrate all generator systems including but not limited to; the engine and all associated components, fuel tanks, fuel pumps, filters, oil, coolant, controls, transfer switches, dampers/linkages, safety systems. Clean all generator systems with a manufacturer approved degreasing agent or non-abrasive cleaner. Lubricate any bearings/nipples as per manufacturer specifications. Clean an d lubricate all linkages/dampers. Test the voltage of the batteries and replace if they are outputting less than 80% of the rated voltage. Inspect, test, and calibrate the battery charging station. Check belt alignment and correct as needed. Replace the belts, if needed. Test operation of any manual or automatic transfer switching equipment. Test strength of coolant and chemical protection level of coolant inhibitors. Inspect the exhaust system. Check and record the back pressure of the exhaust system to ensure that it complies with the engine manufacturer's requirements, and compare with previous readings. Test surge suppressor and rotating rectifier on brushless machines. Clean rotor and stator windings using clean compressed air. Inspect coupling bolts and alignment. For spark ignition engines, inspect all components of ignition system(s) and service or replace as appropriate. Inspect all external surfaces of heat exchanger(s) and clean as necessary. Operate the generator for 120 minutes, under full electrical load. (Full Load Test) Record any available statistics while the generator is operable and compare to past collected data.	annually	240	Each	Licensed Generator Technician	Hearing Protection, Toolset, Lubricant, Belts, Coolant, Cleaning Supplies	Y
0086	Emergency Lighting - Battery Pack Units (EBUs), Emergency Lighting Systems, Illuminated Combo Exit Signs	Check to confirm operation of light(s) and that unit is secure and free from obstruction. Confirm operation of light by engaging test switch (Battery Operated Devices) or otherwise depowering the unit. Lights must remain illuminated for 30 minutes. Initial the monthly inspection tags.	monthly	60	Total	Building Technician	NA	N
0086	Emergency Lighting - Battery Pack Units (EBUs), Emergency Lighting Systems, Illuminated Combo Exit Signs	Annual certification of the emergency lighting system including a full timed test for each light (90 minutes). Annual certification must be completed by a technician who is licensed to do so. Provide annual inspection tags on each unit.	annually	180	Total	Licensed Technician	Toolset, Testing Equipment	N
0088	Automatic Transfer Switches (ATSs) up to 400A	Note that transfer switch operation is included under the emergency generator task list and this task list is specific to the electrical components of the transfer switch. Perform thermal imaging (infrared scanning) to detect hot spots (excess heat) in electrical components. While thermal imaging is being undertaken, inspect the transfer switch for missing knockouts, or unusual sounds or odours. Provide a detailed thermal imaging report based on the results of the infrared scanning.	3 years	10	Each	Electrician	Thermal Imaging Camera, Toolset	Y
0096	Condensing Hot Water Boilers	Remove the front cover(s) and inspect and test all system components including but not limited to; gas/fuel-fired burners, ignition systems, pilot light systems, burner assemblies, pumps, chimneys/flues, and heat exchangers. Check the fireside of the heat exchanger for fouling and clean as required. If using an oil coating on the heat exchanger surface ensure that is complies with manufacturer specifications. Remove and clean the burner mesh and burner assemblies. Replace consumable components as required, such as, but not limited to; igniters, flame rods, gaskets, filters. Test and examine all water treatment equipment. Verify quantities, concentrations, and replace filters as needed, as per system design specifications. Calibrate combustion and check draft readings. Visually assess electrical connections for loose or frayed wiring. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	semi-annually	180	Each	Licensed Gas Technician	Toolset, Testing/Calibration Equipment, Consumable Parts	Y
0101	Vehicle Exhaust Systems	Depower the fan unit(s) and open the fan cabinet/remove the fan hood and clean the interior, including fan blades. While the fan(s) is off, inspect the interior components for signs of damage, burns, or unusual odours. Ensure fan bearings are lubricated as per manufacturer specification. Check belt alignment (if present). Make adjustments as needed. Replace belt if required. Visually assess electrical connections for loose or frayed wiring. Replace fan hood/close the fan cabinet and restore power to the unit. Inspect vehicle hoses for any signs of deterioration or leaks and ensure they move freely along the track. Inspect the system under normal operation and monitor for unusual noises, odours, or excessive vibration. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	monthly	25	Per Fan	Building Technician	Toolset, Lubricant, Cleaning Supplies, Belts	Y

OPINION OF PROBABLE COST TABLE

Client	Peace River Regional District
Site No.	
Building Name	Charlie Lake Fire Hall
Address	
Project No.	21075
Date	Thursday, September 02, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Year	Recommendation Cost	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Totals (2021 - 2050)
A - Substructure																																					
A103001 Slab on Grade - Addition	Undertake repairs to areas of localized cracking/scaling, and correct uneven surfaces.	2 - Good	Major Repair	75	2022	$8,000		$8,000																													$8,000
A103001 Slab on Grade - Original	Undertake repairs to areas of localized cracking/scaling, and correct uneven surfaces.	2 - Good	Major Repair	75	2022	$15,000		$15,000																													$15,000
B - Shell																																					
B10 - Superstructure																																					
B103001 Structure - Addition	Based on the limited understanding of the component condition, further investigation is recommended to confirm performance and remaining useful life of the second floor and main wall between original building . The scope of the investigation should include potential remedial options, a renewal schedule and a cost to address the deficiencies and mitigate further deterioration.	2 - Good	Engineering Study	75	2021	$5,000	$5,000																														$5,000
B103001 Structure - Addition	Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.	2 - Good	Major Repair	75	2022	$35,000		$35,000																													$35,000
B20 - Exterior Enclosure																																					
B201008 Exterior Soffits	Replace Exterior Soffits	2 - Good	Life Cycle Replacement	50	2037	$9,447																	$9,447														$9,447
B201025 Vinyl Siding	Replace Vinyl Siding	3 - Fair	Life Cycle Replacement	25	2026	$65,065						$65,065																									$65,065
B202001 Windows	Replace Windows	3 - Fair	Life Cycle Replacement	35	2028	$10,642								$10,642																							$10,642
B203022 Overhead Doors - Industrial	Replace Overhead Doors - Industrial	2 - Good	Life Cycle Replacement	25	2035	$89,616															$89,616																$89,616
B203023 Single Door - Hollow Metal	Replace Single Door - Hollow Metal	3 - Fair	Life Cycle Replacement	30	2027	$23,898							$23,898																								$23,898
B30 - Roofing																																					
B301022 Conventional - Modified Bitumen	Repair the roofing assembly drainage slopes	3 - Fair	Repair	22	2023	$48,000			$48,000																												$48,000
B301022 Conventional - Modified Bitumen	Replace Conventional - Modified Bitumen	3 - Fair	Life Cycle Replacement	22	2032	$171,017												$171,017																			$171,017
C - Interiors																																					
C102022 Single Door - Wood - Addition	Replace Single Door - Wood	2 - Good	Life Cycle Replacement	40	2027	$3,734							$3,734																								$3,734
C102022 Single Door - Wood - Original	Replace Single Door - Wood	2 - Good	Life Cycle Replacement	40	2050	$18,670																														$18,670	$18,670
C103009 Cabinets - Kitchens	Replace Cabinets - Kitchens	3 - Fair	Life Cycle Replacement	35	2026	$11,202						$11,202																									$11,202
C103010 Vanities - Addition	Replace Vanities	3 - Fair	Life Cycle Replacement	25	2025	$4,481					$4,481																									$4,481	$8,962
C103010 Vanities - Original	Replace Vanities	2 - Good	Life Cycle Replacement	25	2039	$4,481																			$4,481												$4,481
C103011 Cabinets - General	Replace Cabinets - General	3 - Fair	Life Cycle Replacement	35	2025	$13,442					$13,442																										$13,442
C103099 Other Fittings - Metal Pipe Storage Racks	Replace Other Fittings	2 - Good	Life Cycle Replacement	30	2040	$56,010																				$56,010											$56,010
C201002 Exterior Stair Construction	Replace Exterior Stair Construction	2 - Good	Life Cycle Replacement	40	2027	$57,877							$57,877																								$57,877
C201027 Access Ladders - Addition	Replace Access Ladders	2 - Good	Life Cycle Replacement	40	2027	$4,668							$4,668																								$4,668
C201027 Access Ladders - Original	Replace Access Ladders	3 - Fair	Life Cycle Replacement	40	2026	$2,801						$2,801																									$2,801
C202027 Vinyl Sheet	Replace Vinyl Sheet	2 - Good	Life Cycle Replacement	20	2027	$3,781							$3,781																				$3,781				$7,561
C301005 Paint Wall Covering	Replace Paint Wall Covering	3 - Fair	Life Cycle Replacement	10	2027	$46,600							$46,600										$46,600										$46,600				$139,801
C301022 Wood Wall Finish	Replace Wood Wall Finish	2 - Good	Life Cycle Replacement	25	2027	$4,033							$4,033																								$4,033
C302005 Carpet Floor	Replace Carpet Floor	3 - Fair	Life Cycle Replacement	10	2024	$2,688				$2,688										$2,688										$2,688							$8,065
C302007 Painted / Sealed Concrete Floor	Replace Painted / Sealed Concrete Floor	2 - Good	Life Cycle Replacement	15	2027	$34,203							$34,203															$34,203									$68,407
C302023 Vinyl Sheet Floor	Replace Vinyl Sheet Floor	2 - Good	Life Cycle Replacement	15	2027	$31,366							$31,366															$31,366									$62,731
C303004 Acoustic Tile Ceiling	Replace Acoustic Tile Ceiling	3 - Fair	Life Cycle Replacement	30	2027	$2,091							$2,091																								$2,091
C303006 Painted Ceiling Structures	Replace Painted Ceiling Structures	2 - Good	Life Cycle Replacement	15	2028	$25,653								$25,653															$25,653								$51,305
C303007 Suspended Acoustic Ceiling Panels	Replace Suspended Acoustic Ceiling Panels	2 - Good	Life Cycle Replacement	25	2027	$25,541							$25,541																								$25,541
D - Services																																					
D10 - Conveying																																					
D20 - Plumbing																																					
D201001 Water Closets - Addition	Replace Water Closets	2 - Good	Life Cycle Replacement	35	2027	$1,867							$1,867																								$1,867
D201001 Water Closets - Original	Replace Water Closets	2 - Good	Life Cycle Replacement	35	2049	$3,734																													$3,734		$3,734
D201003 Lavatories - Addition	Replace Lavatories	2 - Good	Life Cycle Replacement	35	2027	$1,867							$1,867																								$1,867
D201003 Lavatories - Original	Replace Lavatories	2 - Good	Life Cycle Replacement	35	2049	$3,734																													$3,734		$3,734
D201004 Sinks - Addition	Replace Sinks	2 - Good	Life Cycle Replacement	35	2035	$1,867															$1,867																$1,867
D201004 Sinks - Utility Sink	Replace Sinks	2 - Good	Life Cycle Replacement	35	2049	$1,867																													$1,867		$1,867
D201012 Shower Assembly	Replace Shower Assembly	2 - Good	Life Cycle Replacement	25	2039	$11,202																			$11,202												$11,202
D202001 Domestic Water Pipes and Fittings	Move domestic piping away from electrical outlets	2 - Good	Major Repair	40	2022	$5,000		$5,000																													$5,000
D202001 Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	2 - Good	Life Cycle Replacement	40	2027	$46,600							$46,600																								$46,600
D202034 Gas Fired Domestic Water Heaters (Residential Tank Type)	Replace Gas Fired Domestic Water Heaters (Residential Tank Type)	5 - Missing/Failed	Life Cycle Replacement	12	2021	$8,822	$8,822												$8,822												$8,822						$26,465
D203001 Sanitary Waste and Vent Piping - Addition	Replace Sanitary Waste and Vent Piping	2 - Good	Life Cycle Replacement	50	2037	$52,425																	$52,425														$52,425
D203007 Interceptor Systems	Replace Interceptor Systems	3 - Fair	Life Cycle Replacement	25	2026	$18,670						$18,670																									$18,670
D204001 Rain Water Drainage Piping and Fittings	Replace Rain Water Drainage Piping and Fittings	2 - Good	Life Cycle Replacement	50	2037	$34,950																	$34,950														$34,950
D204005 Sump Pump	Replace Sump Pump	1 - Excellent	Life Cycle Replacement	15	2034	$5,601														$5,601															$5,601		$11,202
D30 - HVAC																																					
D301002 Gas Supply Systems	Replace Gas Supply Systems	2 - Good	Life Cycle Replacement	40	2027	$23,300							$23,300																								$23,300
D302002 Hot Water Boilers less than 1000 MBH	Replace Hot Water Boilers less than 1000 MBH	2 - Good	Life Cycle Replacement	30	2040	$37,807																				$37,807											$37,807
D304003 Heating Water Distribution Systems	Based on the limited understanding of the component condition, further investigation is recommended to confirm performance and remaining useful life of the heating water piping. The scope of the investigation should include potential remedial options, a renewal schedule, and a cost to address the deficiencies and mitigate further deterioration.	3 - Fair	Engineering Study	45	2022	$5,000		$5,000																													$5,000
D304003 Heating Water Distribution Systems	Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.	3 - Fair	Repair	45	2022	$13,500		$13,500																													$13,500
D304003 Heating Water Distribution Systems	Replace Heating Water Distribution Systems	3 - Fair	Life Cycle Replacement	45	2032	$104,851												$104,851																			$104,851
D304021 HVAC Pumps (Up to 10 HP)	Replace HVAC Pumps (Up to 10 HP)	2 - Good	Life Cycle Replacement	20	2030	$37,340										$37,340																				$37,340	$74,680
D304033 Exhaust Fan - Ceiling (Residential)	Replace Exhaust Fan - Ceiling (Residential)	2 - Good	Life Cycle Replacement	25	2039	$3,734																			$3,734												$3,734
D305004 Fin Tube Radiation Units	Replace Fin Tube Radiation Units	2 - Good	Life Cycle Replacement	30	2027	$25,092							$25,092																								$25,092
D309033 Access Control Systems	Replace Access Control Systems	1 - Excellent	Life Cycle Replacement	20	2040	$14,003																				$14,003											$14,003
D40 - Fire Protection																																					
D403002 Fire Extinguishers	Replace Fire Extinguishers	3 - Fair	Life Cycle Replacement	10	2024	$1,165				$1,165										$1,165										$1,165							$3,495
D50 - Electrical																																					
D501005 Panelboards up to 400A	Replace Panelboards up to 400A	2 - Good	Life Cycle Replacement	40	2050	$14,003																														$14,003	$14,003
D501025 LV Main Service Disconnects	Replace LV Main Service Disconnects	2 - Good	Life Cycle Replacement	40	2050	$5,601																														$5,601	$5,601
D502001 Branch Wiring and Devices - Addition	Replace Branch Wiring and Devices	2 - Good	Life Cycle Replacement	50	2037	$58,885																	$58,885														$58,885
D502001 Branch Wiring and Devices - Original	Replace Branch Wiring and Devices	2 - Good	Life Cycle Replacement	50	2027	$51,791							$51,791																								$51,791
D502002 Interior Lighting - Second Floor, Offices, and Washrooms	Replace Interior Lighting	2 - Good	Life Cycle Replacement	35	2035	$32,691															$32,691																$32,691
D502041 Exterior Lighting	Replace Exterior Lighting	1 - Excellent	Life Cycle Replacement	20	2039	$7,468																			$7,468												$7,468
D502053 Illuminated Combo Exit Signs	Replace Illuminated Combo Exit Signs	2 - Good	Life Cycle Replacement	35	2035	$3,361															$3,361																$3,361
D503002 Telecommunication Systems - LAN System	Replace Telecommunication Systems	2 - Good	Life Cycle Replacement	25	2035	$5,825															$5,825																$5,825
D503002 Telecommunication Systems - Telephone System	Replace Telecommunication Systems	2 - Good	Life Cycle Replacement	25	2035	$5,825															$5,825																$5,825
D503008 Security Systems - Intrusion Alarm Systems	Replace Security Systems - Intrusion Alarm Systems	2 - Good	Life Cycle Replacement	20	2030	$11,650										$11,650																				$11,650	$23,300
D509012 Emergency Power Generator Systems (Natural Gas)	Replace Emergency Power Generator Systems (Natural Gas)	2 - Good	Life Cycle Replacement	30	2040	$63,851																				$63,851											$63,851
D509031 Automatic Transfer Switches (ATSs) up to 400A	Replace Automatic Transfer Switches (ATSs) up to 400A	2 - Good	Life Cycle Replacement	40	2050	$14,003																														$14,003	$14,003
E - Equipment & Furnishings																																					
E102010 Vehicle Exhaust Systems	Replace Vehicle Exhaust Systems	2 - Good	Life Cycle Replacement	25	2035	$70,013															$70,013																$70,013
F - Special Construction & Demolition																																					
G - Site Surfaces and Landscaping																																					
G201023 Concrete Paved Surface - Roadway	Based on the limited understanding of the component condition, further investigation is recommended to confirm settlement of ground around the building. The scope of the investigation should include potential remedial options, a renewal schedule and a cost to address the deficiencies and mitigate further deterioration.	2 - Good	Engineering Study	30	2021	$5,000	$5,000																														$5,000
G201023 Concrete Paved Surface - Roadway	Budgetary repair allowance to undertake a remedial action to address the observed deficiencies and mitigate further deterioration.	2 - Good	Major Repair	30	2022	$30,000		$30,000																													$30,000
G201023 Concrete Paved Surface - Roadway	Replace Concrete Paved Surface - Roadway	2 - Good	Life Cycle Replacement	30	2040	$164,576																				$164,576											$164,576
G201021 Asphalt Paved Surfaces - Parking Area	Replace Asphalt Paved Surfaces - Parking Area	2 - Good	Life Cycle Replacement	25	2035	$116,221															$116,221																$116,221
G204021 Fencing and Gates - Chain Link Fence	Replace Fencing and Gates - Chain Link Fence	2 - Good	Life Cycle Replacement	30	2040	$40,327																				$40,327											$40,327
G204081 Message Sign - Wall-Mounted	Replace Message Sign - Wall-Mounted	2 - Good	Life Cycle Replacement	20	2030	$9,708										$9,708																				$9,708	$19,417
G301021 Water Supply	Replace Water Supply	2 - Good	Life Cycle Replacement	50	2027	$17,139							$17,139																								$17,139
G302001 Sanitary Sewer	Replace Sanitary Sewer	2 - Good	Life Cycle Replacement	50	2027	$22,404							$22,404																								$22,404
G306008 Gas Distribution (Natural or Propane)	Replace Gas Distribution (Natural or Propane)	2 - Good	Life Cycle Replacement	50	2027	$9,410							$9,410																								$9,410
G401011 Electrical Service	Replace Electrical Service	2 - Good	Life Cycle Replacement	50	2037	$73,373																	$73,373														$73,373
					Total Capital Renewals	$2,131,127	$18,822	$111,500	$48,000	$3,853	$17,923	$97,737	$437,261	$36,294	$0	$58,698	$0	$275,868	$8,822	$9,454	$325,418	$0	$275,681	$0	$26,885	$376,574	$0	$65,569	$25,653	$3,853	$8,822	$0	$50,381	$0	$14,936	$115,455	$2,413,460

Submission to

Peace River Regional District

Energy Audit Report for the Charlie Lake Fire Hall

Version: Draft

August 25, 2021

Prepared by:
FCAPX a Division of Roth IAMS Ltd.
Project No. 21075
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A Division of Roth IAMS

Executive Summary

Peace River Regional District retained FCAPX a Division of Roth IAMS Ltd (FCAPX) to complete an energy assessment (EA) of the Charlie Lake Firehall, which is located at 13065 Firehall Road, Charlie Lake, BC. The goal of the EA is to analyze the current energy performance of the facility and provide a list of potential energy conservation measures (ECMs) complete with relevant implementation costs with the aim of reducing energy consumption. The site visit for the energy assessment was conducted on June 17, 2021.

The EA involved a review of the buildings, which form the subject facility. The facility was constructed in parts with the original apparatus hall constructed in 1977 and measuring approximately 292m^2, followed by a second-floor addition in 1987 measuring 332m^2. The total floor area of the facility is approximately 694 m^2 (6,815 ft^2). The current annual utility consumption for this facility is approximately 34,073 kWh of electricity and 545 GJ of natural gas. This equates to an annual greenhouse gas (GHG) emissions of 29.2 Tonnes CO2e per year. The EA revealed the potential for the implementation of energy management measures, which will improve the overall efficiency of the facility.

An analysis of the existing energy consumption profile of the facility was undertaken, and the calculated Energy Utilization Index (EUI) was compared against similar buildings to determine the performance of the facility. The calculated EUI for the firehall is 1.07 GJ/m^2 which is very close to 1.04 GJ/m2, the overall EUI for similar buildings under the British Columbia Other Services Secondary Energy Use and GHG Emissions by End-Use 2012-2018.

The table on the following page summarizes potential ECMs that were identified for the Firehall. It is recommended that, prior to implementation, PRRD carefully review the potential ECMs.

By implementing the ECMs listed in Table 1 a potential annual savings of 48 GJ of natural gas, and 5,114 kWh of electricity may be achieved.

The anticipated GHG savings, based upon emission factors appropriate for British Columbia, with the implementation of all the proposed ECMs, is estimated to be 2.47 Tonnes CO_2e/year, which is equivalent to an 8% reduction overall.

Implementation of the measures identified in this assessment will assist PRRD to reduce risks associated with utility market volatility and unplanned capital maintenance expenditures.

Table 1
Summary of Potential Energy Conservation Measures - Charlie Lake Firehall

Natural Gas	$	8.610	per GJ
Fuel Oil	$	-	per L
Electricity	$	0.123	per kWh
Carbon Tax	$	45.00	per CO2 eq tonne

Province	British Columbia
Escalation Rate (Energy)	0%
Discount Rate	7%

		Utility Savings			Emissions Savings				Financial Analysis					
Measure Number	**Description**	**Natural Gas (GJ)**	**Electricity (kWh)**	**Total ($)**	**Electricity (CO2 eq tonnes/yr)**	**Natural Gas (CO2 eq tonnes/yr)**	**Total (CO2 eq tonnes/yr)**	**Total Savings ($)**	**Total Project Cost ($)**	**SPB[1] (Years)**	**Effective Measure Life (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback DPB (Years)**
ECM-1	Lighting Retrofit	-3	5,114	$ 601	0.06	-0.15	-0.09	$ 597	$ 8,000	13.4	25	-$ 1,042	5.51%	41.1
ECM-2	High Efficiency DHW Heater	21		$ 181	-	1.06	1.06	$ 228	$ 3,500	15.3	15	-$ 1,421	-0.27%	N/A
ECM-3	Night set back of heating	30		$ 258	-	1.51	1.51	$ 326	$ 3,000	9.2	20	$ 455	8.89%	15.3
	Recommended Measure Bundle	**48.00**	**5,114**	**$ 1,040.26**	**0.06**	**2.41**	**2.47**	**$ 1,151**	**$ 14,500.00**	**12.59**	**17.4**	-$ 3,257.71	**3.56%**	**31.52**

Table of Contents

APPENDIX

Appendix A – Definitions and Abbreviations
Appendix B – ECM Summary and Savings

1 Introduction

1.1 Purpose and Objective

Peace River Regional District retained Roth IAMS Ltd to conduct an energy assessment of the Charlie Lake Firehall, located at 13065 Firehall Road, Charlie Lake, BC. The purpose for the energy audit was to assist Peace River Regional District in identifying ways to reduce their energy consumption as part of their municipal energy management and GHG reduction plan.

The scope of this study was to analyze the current energy performance of the subject building, provide a list of potential energy conservation measures (ECMs) complete with relevant implementation costs, and simple payback.

The site visit for the EA was conducted on June 17, 2021.

The report has taken into consideration past retrofit work and future capital maintenance requirements in the development of energy conservation measures to ensure an effective and viable energy audit report. Our assessment involved a review of the approximately 624m² (6,815ft²) facility and revealed the potential for the implementation of energy management measures, which would improve the overall efficiency.

1.2 Scope of Work

The detailed energy consumption assessment consisted of an on-site facility assessment, a utility analysis, and a review and analysis for potential Energy Conservation Measures (ECMs).

The energy assessment report is organized as follows:

- Facility description;
- Utility analysis and benchmarking;
- Energy conservation measures; and,
- Conclusions and recommendations.

The following documents were provided by Peace River Regional District to Roth IAMS for consideration.

- Utility records;
  Facility drawings and floor layouts.

1.3 Background

Through the energy audit, Peace River Regional District plans to review options to reduce electricity and gas consumption, especially with the ongoing renewal/replacement of systems, some of which are either at or near the end of expected useful life. The findings will be used as part of the overall energy management plan to achieve a reduction in greenhouse gas (GHG) emissions.

The Peace River Regional District, Charlie Lake Firehall was constructed in two phases. The original building was constructed in 1977, and the addition was added in 1987.

The EA subject facility generally includes all areas of the building including offices, workshops, and garage. The gross floor area of the facility is approximately 624m² (6,815ft²).

1.4 Key Client Information Summary

Table 2: Key Client Information Summary	
Customer Name	PRRD – Charlie Lake Firehall
Site Address	13065 Firehall Road, Charlie Lake, BC
Contact Person	Ron Schildroph, Deputy Chief, Charlie Lake Fire Department
Contact Information	250-785-1424
	Ron.schildroph@prrd.bc.ca

1.5 Acknowledgements

Roth IAMS would like to acknowledge the contribution of the following individuals whose help was invaluable in completing this assignment.

- Ron Schildroph – Peace River Regional District – Charlie Lake Firehall

1.6 Definitions and Abbreviations

Definitions of key terms and abbreviations can be found in **Appendix A**.

1.7 Energy Assessment Team

The following individuals represented the energy assessment team.

- Curtis Loblick, P.Eng., CEM
- Tim Hobson, M.Sc. Tech., CEM
- Inder Gerwal, Facility Assessor

1.8 Assessment Methodology

1.8.1 Utility Analysis

An analysis of the utility consumption provides a good starting point from which to:

- Identify potential energy conservation measures (ECMs); and,
- Develop a baseline against which ECM performance can be quantified.

The consumption (and demand) registered on historical data for each utility meter can also be examined to identify issues that are affecting the energy performance of the site.

1.8.2 Documentation Review

One of the first steps is to review any available existing documentation. This includes drawings, operation and maintenance manuals, control sequences and previous reports. This helps to understand the current state of the facility.

1.8.3 Site Visits

The site visit includes a detailed interview with technical staff regarding the building's function as well as discussing any issues that were persistent and opportunities for operational optimization. A comprehensive tour of the site is conducted to gather current information and evaluate the Building Envelope, Mechanical and Electrical systems. The following three sections speak specifically to these areas.

1.8.4 Building Envelope System Assessment

The envelope and architectural assessment involve a non-intrusive visual inspection of the facility and a review of any available drawings to determine the condition and type of construction. Special attention will be paid to doors and windows during this review.

1.8.5 Mechanical System Assessment

The mechanical portion of the assessment involves taking a comprehensive inventory of mechanical components and an accurate appraisal of operational times and efficiencies for each mechanism. This is inclusive of all HVAC, Domestic Hot Water, and process related equipment. The Building Automation System (BAS) and/or manual equipment controls will be inventoried and assessed for integration. The sequence of operations will be examined for improvement opportunities.

1.8.6 Electrical System Assessment

A comprehensive assessment of the site's lighting includes a detailed review of the existing fixtures, lighting levels and controls throughout the site. Consideration is also given to operational hours and the diligence of occupants at switching OFF manually operated lighting. A comprehensive assessment of the site's other electrical equipment including motors, transformers and process equipment.

1.8.7 Energy Conservation Measure Identification and Analysis

Each measure proposed for implementation on this project has been selected based on its viability, as measured against the following criteria:

- Costs and savings within overall criteria for evaluation guidelines;
- Appropriateness for tasks performed in the space;
- The condition of existing systems;
- The consistency of application (all areas of similar function are consistent);
- Equipment approval by facilities personnel; and,
- Impact on occupant behaviour and general acceptance of changes.

The energy savings calculations are based on the best estimate of the anticipated reductions taking into consideration direct savings from electrical and gas consumption and electrical demand where appropriate. The savings for most of the recommendations were calculated through simple standard energy savings calculations and spreadsheets.

Costs associated with implementing the respective measures are estimated based on the approximate 'capital cost' for the materials and labour (including demolition and installation). Costs are determined from previous project experience and/or through published cost estimate data (RS Means, Hanscomb, …). All costs represent ROTH IAMS's opinion on construction costs and are provided as approximate estimates to give economies of scale. Further investigation and detailed costing should be carried out prior to implementation.

1.8.8 Recommendations

From the options considered, recommendations are put forward based on financial and practical feasibility using indicators such as simple payback, capital cost and net present value (NPV).

2 FACILITY DESCRIPTION

The following sections summarize observations made during the site investigation.

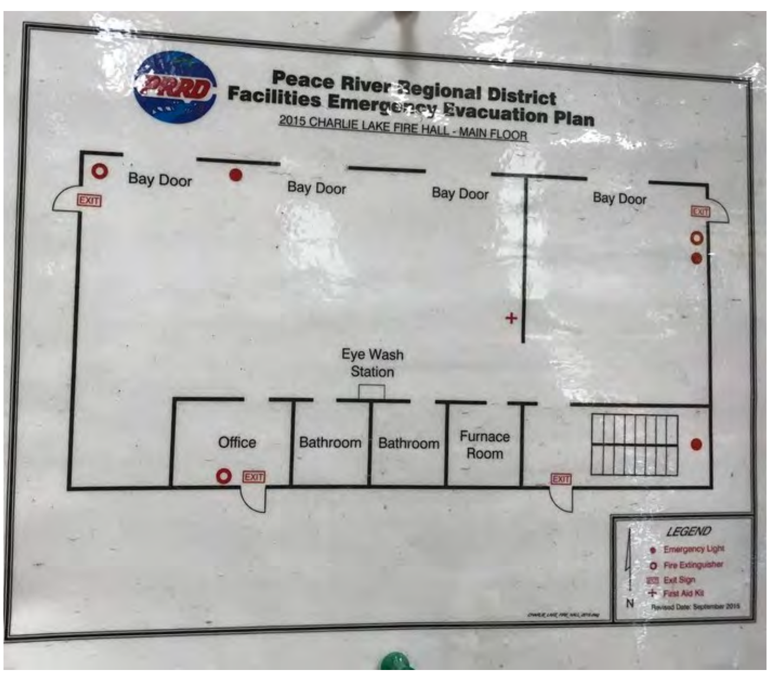
2.1 OVERVIEW

The Charlie Lake Firehall is located at 13065 Firehall Road, Charlie Lake, BC. Construction years and the total area of the facility have been estimated based on the data provided by the client. The facility was constructed in parts with the original apparatus hall constructed in 1977 and measuring approximately 292m^2, followed by a second-floor addition in 1987 measuring 332m^2. The facility includes administration office, apparatus hall, garage, kitchen, and washrooms.

Table 3: Charlie Lake Firehall Salient Features

Asset Name	Year Built	Floor Area (square meters)	Floor Area (square footage)	Building Usage
Firehall	1977	292	3,145	Apparatus Bay.
Addition	1987	332	3,570	Offices, kitchen, washrooms
Total		**624**	**6,815**	

Figure 1 is a schematic map showing the location and relative size of the different uses in the building.



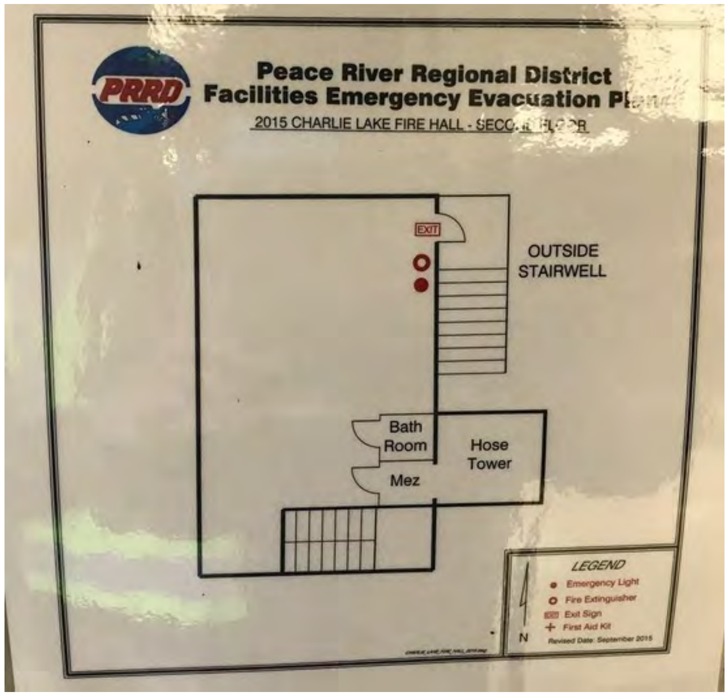


Figure 1: Peace River Regional District - Charlie Lake Firehall Layout showing main floor and upper level

2.2 Owner-Supplied Reference Material

In this report, reference is made to information that has been either collected on site, reported by operations staff and occupants, or through available documents. The reported condition pertains to information provided by the building's operations and maintenance personnel or tenants.

Documents available for review included:

- Utility records including Electricity (Jan 2018 – Dec 2020) and Gas (Jan 2018 – Dec 2020).

2.3 Building Envelope

The building's foundations appear to be cast-in-place concrete foundation walls and strip footings with a concrete slab-on-grade floor structure. The building appears to be a wood-frame with a wood roof structure. The building is clad with vinyl siding. The flat roof appears to be covered with modified bitumen roofing assembly.

View of the building

2.4 Mechanical Systems

Following is a description of the mechanical systems and components that were identified during the assessment. Mechanical equipment is mostly located on building rooftops, electrical and mechanical rooms. An equipment list has been provided as part of the Building Condition Assessment which was conducted at the same time as the energy audit by Roth IAMS Ltd.

2.4.1 Domestic Hot Water Systems

A tank-type, natural gas-fired domestic water heater manufactured by Rheem is installed in the boiler room. The water heater has a volume and input heating capacity of 189 L (50 US Gal.), and 50 MBH, respectively.

Natural gas fired DHW heater

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2.4.2 Heating Systems

There is a natural gas-fired hot water boiler installed in the boiler room. The boiler is manufactured by Super Hot (model SG-270-N_E), with a heating capacity of 270 MBH. The boiler provides heating water to the perimeter radiation on the second floor. The heating system appears to be controlled by simple adjustable room thermostats, one located on the second floor and one on the main. A third non-programmable thermostat is also installed on the main floor which presumably provides control of the heating for that zone.

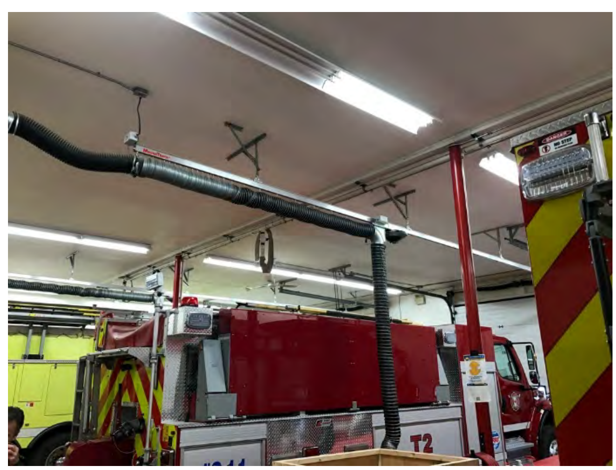
Main heating boiler

Non-Programmable thermostat for control of the heating

2.4.3 Ventilation Systems

Ceiling-mounted exhaust fans are installed in the main floor washrooms of the original building to serve as ventilation for these spaces. The fans are all residential style of fractional HP. The building includes a vehicle exhaust system with ducting, controls, hose reels and flexible hoses provided in the apparatus bay. The exhaust fan is located on the mezzanine.

View of ceiling mounted bathroom exhaust fan



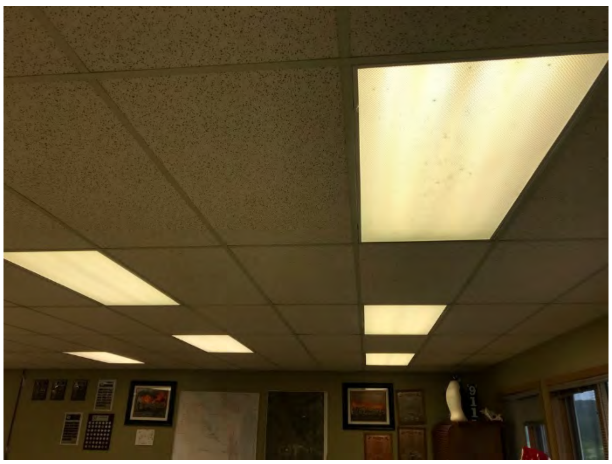
View of the apparatus hall exhaust air system

2.5 Electrical Systems

2.5.1 Lighting Systems

The interior lighting system includes a combination of linear fluorescent tube light fixtures on the second floor and wall sconce light fixtures in main floor washrooms and offices. Linear fixtures have T8 lamps. The wall sconces are fitted with compact fluorescent lamps (CFLs). The interior lighting system includes in the apparatus bays are comprised of linear fixtures fitted with light emitting diodes (LEDs).

Exterior lighting is provided by LED wall pack fixtures around the perimeter of the building. Exterior lighting control is generally by photocell.



Fluorescent T8 Lighting in the facility

Newer LED lighting in the Apparatus Room

2.5.2 Other Systems

A breathing air generator, manufactured by Jordair is installed in the Apparatus Hall. The compressor is rated to provide 7.5cfm and is equipped with a 7.5HP motor and provides breathing air for the portable tanks. There are also 2 pumps which are used to fill the appliances with water. The ratings were unknown.

Breathing air generator

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3 Utility Analysis and Benchmarking

The following sections detail the energy analysis completed for the building and include a utility analysis, a benchmark comparison, and an estimated breakdown of energy consumed by fuel.

The utility analysis of the facility provides a good starting point from which to identify potential energy conservation opportunities. Billing data was gathered in order to generate the facility utility baseline. The baseline represents a correlation between the weather-corrected utility consumption and the actual recorded data. This baseline provides an illustration of how effective the existing equipment and systems are operating in comparison to changes in the weather. The potential for improved operation relative to the facility baseline presents an indication of the opportunity for utility savings. In creating a baseline, the utility consumption is compared to Heating Degree Days (HDD) and Cooling Degree Days (CDD). By examining this graphically we can see how closely the energy consumption relates to changes in the weather. The result is the development of energy and cost indices, which are then compared with the Office of Energy Efficiency (OEE) and Energy Star benchmarks, to assess the facility's performance against similar buildings.

3.1 Current Utility Consumption

Charlie Lake Firehall electricity and gas consumption data used in the analysis was provided by PRRD. According to information provided, there is one main electricity and gas meter for the entire facility.

The following table summarizes the utility (electricity and natural gas) consumption data from the most recent year of utility data provided.

Summary of Utility Data January 2020 to December 2020

	Table 4: Summary of Utility Data					
Year	Electricity		Natural Gas		Total	
	Consumption (kWh)	Cost ($)	Consumption (GJ)	Cost ($)	EUI (GJ/m2)	Cost Index ($/m2)
2020	34,073	$4,178	545	$4,689	1.07	$14.21

3.2 Utility Price Structure

In terms of savings related to the identified measures, a blended rate, which effectively assumes that a reduction in consumption will reduce the cost by the rate that applies to the last unit of energy, was used. The blended rates include all components of the bill including energy, transmission, delivery, capacity, and line losses. However, taxes are excluded. These rates are listed in the table below.

Table 5: Summary of Blended Rates		
Electricity	**Demand**	**Natural Gas**
Rate ($/kWh)	**Rate ($/kW)**	**Rate ($/GJ)**
$0.1226	-	$8.61

3.3 Electricity

Electricity data was reviewed for the most recent 36 months was reviewed. The electricity utility data were analyzed and plotted to illustrate trends and identify any irregularities. It should be noted that electricity is billed bi-monthly, so it was not possible to split usage on a monthly basis

The figure below illustrates the electrical consumption data for the facility.

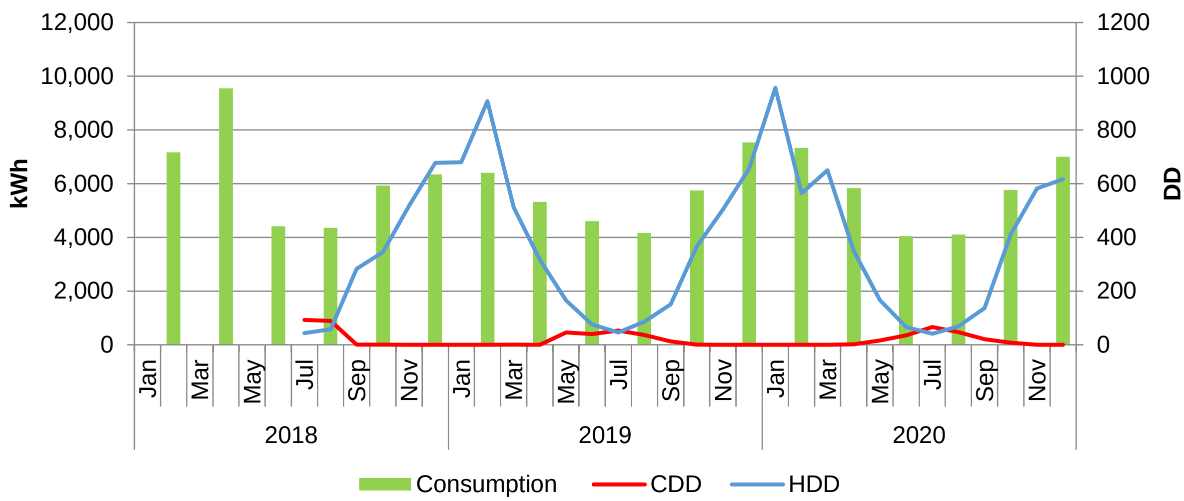

Figure 2: Electrical Consumption Trend for Charlie Lake Firehall

Based on the analysis, there is an increase in electricity consumption during the winter months (from October through March) each year. The electricity consumption increase may be attributed to a number of factors including increased operational hours of the lighting, and the operation of the heating water pumps.

When looking at 2018 and 2019 electricity consumption essentially follows the same pattern.

Year-round systems, which are building baseload electrical consumers, include building exhaust fans systems, the breathing air compressor, fire appliance fill pumps, as well as building plug loads, such as computers and small appliances.

3.4 Fossil Fuels

The most recent 36 months of natural gas utility data were collected, analyzed and then plotted to illustrate trends and identify any irregularities. The figure below illustrates the natural gas consumption data for the facility. It should be noted that natural gas is billed bi-monthly, so it was not possible to split usage on a monthly basis.

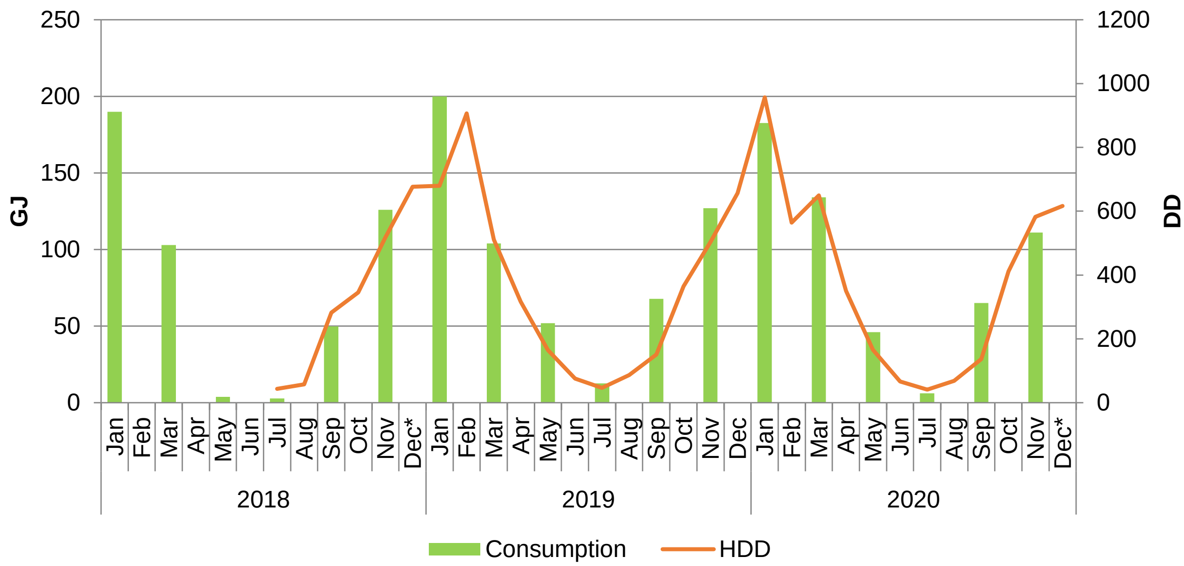

Figure 3: Fossil Fuel Consumption

At first glance, there appears to be some correlation between the heating degree days and consumption. The noticeable increase in natural gas usage, which starts in September and peaks in January or February, can be attributed to the heating cycle during the fall and winter months.

Building heating is provided by a single natural gas fired heating boiler serving the entire building. Occupancy also has an influence on usage as it also impacts the domestic hot water load provided by the gas-fired water heater. It was observed that the baseline amount of energy consumed during the summer months, which typically reflects non-heating loads, such as natural gas used for the generation of hot water, seems normal for this type of building.

A linear regression analysis was conducted on the building consumption data. The figure below shows the line of regression developed through the correlation of consumption and heating degree days that were used to develop the anticipated natural gas consumption during a baseline year.

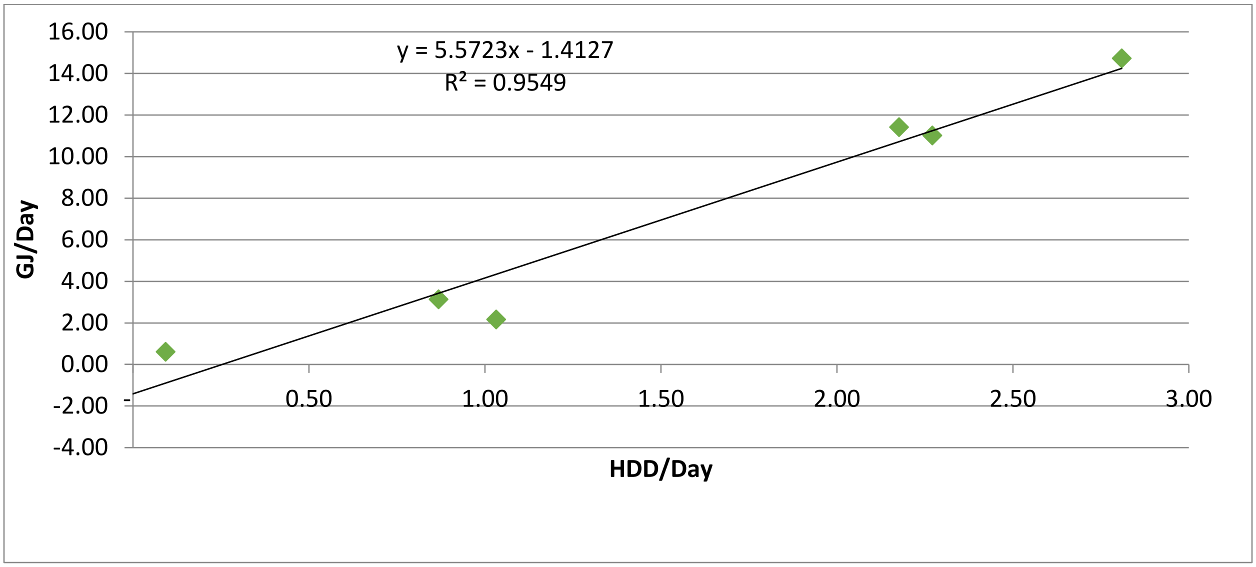

Figure 4: Results of Natural Gas Regression Analysis

Since the R-square (R2) value is a measure of the degree of correlated agreement between the natural gas consumed and the dependent variable chosen, in this case, HDD. The R2 value of 0.9549 shows a good correlation between natural gas consumption and HDD. The closer the value is to 1 the better the natural gas usage responds to changes in the weather. In In this case, it would appear that the buildings heating is well controlled in a manner that the consumption is dependent on changes in the weather. Despite this good correlation there is an opportunity to reduce the overall consumption of natural gas use.

3.5 Annual Energy Consumption Breakdown by Type

The combined electricity and natural gas energy consumption figures have been converted to common units of energy to be able to compare the total amount of energy from each source at this facility. Natural gas consumption has been estimated based on the results of the energy analysis.

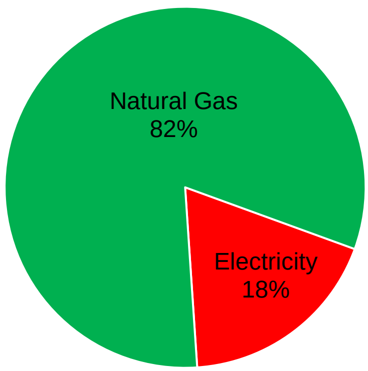

Figure 5: Annual Energy Consumption by Fuel Type

Based on the previous figure, natural gas accounts for 82% of all energy consumed while electricity accounts for the other 18% of energy consumed. If we look at the cost of energy and compare the two, we can see a different story in the figure below.

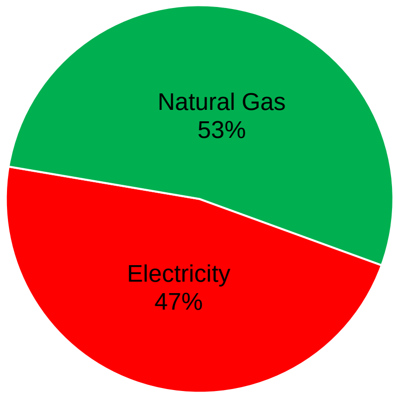

Figure 6: Annual Energy Cost by Fuel Type

Based on the figure above, natural gas accounts for 53% of all energy costs while electricity accounts for the other 47% of energy costs. Although Natural Gas makes up 82% of the energy consumption it only accounts for only 53% of the energy cost.

Another way to look at the utility consumption is by greenhouse gas emissions breakdown.

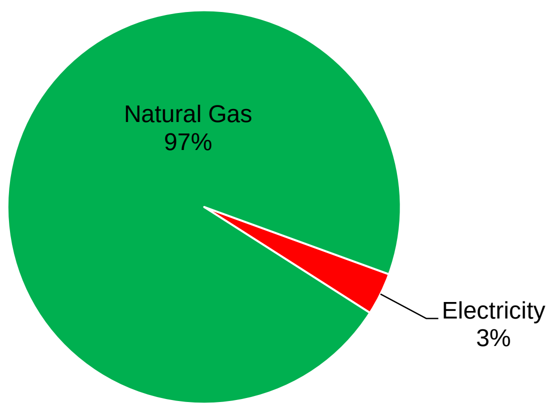

Figure 7: Annual Greenhouse Gas Emission by Fuel Type

Based on the figure above, greenhouse gas emissions from natural gas accounts for 97% of all greenhouse gas emissions while greenhouse gas emissions from electricity account for the other 3% of greenhouse gas emissions. This is the opposite of the energy costs. It indicates a reduction in natural gas consumption will have a large impact on greenhouse gas consumption and however only result in small cost savings.

3.6 Annual Energy Consumption Breakdown by Major End-Use

The total annual energy consumption of the facility was analyzed and broken down into major end-use categories. These categories (also refer to the table, below) in this analysis include:

- Domestic Hot Water
- Space Heating
- Pumps
- Exhaust Fans
- Lighting – All interior and exterior lighting.
- Other and Plug Loads

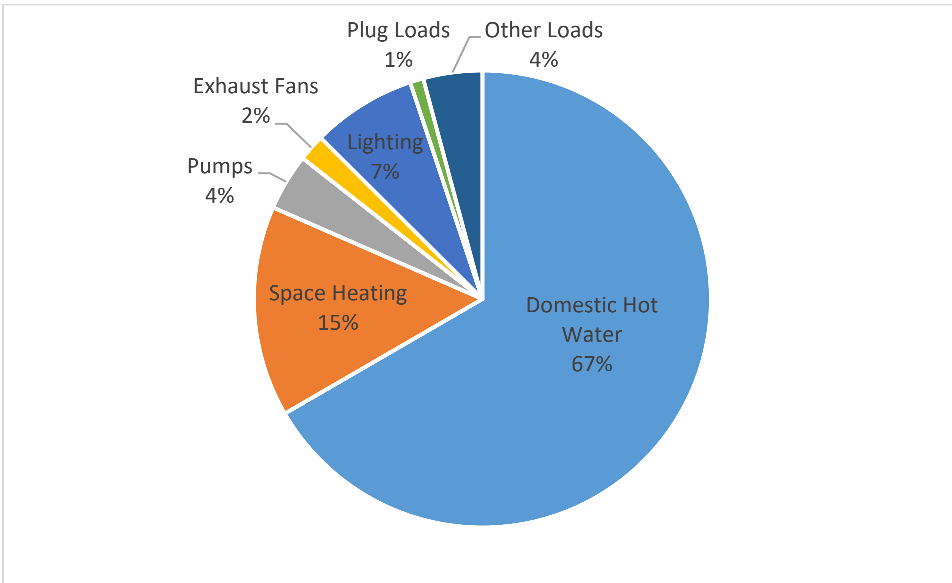

Figure 8: Annual Energy Consumption by End-Use

The following table summarizes that annual energy breakdown by major end-use in absolute energy consumption, as a percentage of the total energy consumed, and as an absolute cost.

Table 6: Annual Energy Consumption by Major End-Use				
Energy Type	**Natural Gas (GJ)**	**Electricity (kWh)**	**Equivalent Energy (ekWh)**	**% Energy**
Domestic Hot Water	443	0	123,079	67%
Space Heating	99	0	27,560	15%
Pumps	0	7,412	7,412	4%
Exhaust Fans	0	3,516	3,516	2%
Lighting	0	13,664	13,664	7%
Plug Loads	*0*	*1,750*	1,750	*1%*
Other Loads	0	7,712	7,712	4%
Total	**542**	**34,053**	**184,693**	**100%**

Another way of looking at the same information is to consider the cost breakdown in the figure below. This shows the lighting; air handling and exhaust fans are the largest contributors to the facilities energy costs.

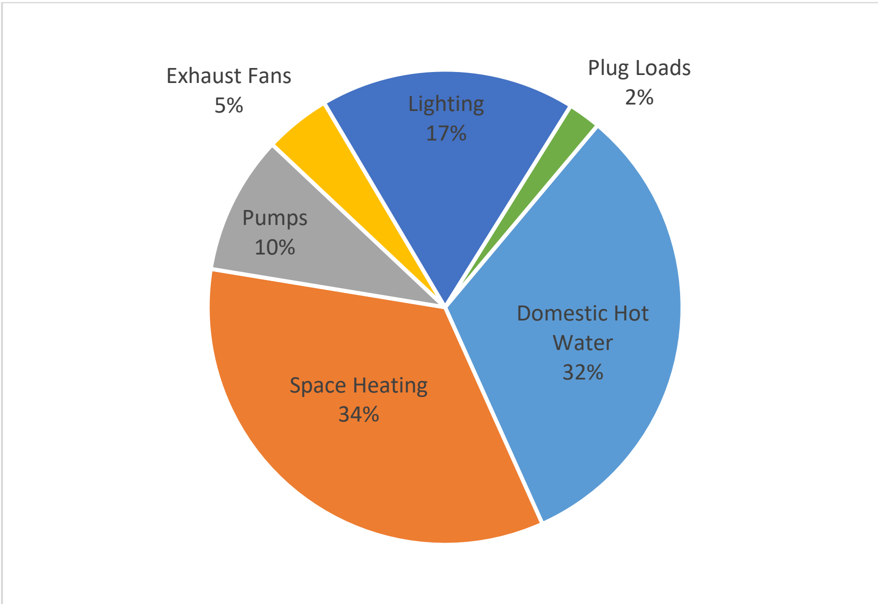

Figure 9: Annual Energy Cost by End-Use

3.7 Energy Performance Benchmarking

The facility Energy Utilization Index (EUI) was calculated by dividing the total annual energy used (all energy utilities in common units) by the gross floor area. The table below compares the EUI at this facility to the Office of Energy Efficiency (OEE) benchmarks to assess the facility's energy performance against similar buildings. Based on the limited categories the closest category was determined to be Commercial/Institutional Sector – British Columbia – Other Buildings.

Table 7: EUI Comparisons

Calculated in Utility Analysis ***GJ/m²***	**OEE** ***GJ/m²***
1.07	1.04

(Source: *Natural Resources Canada, Commercial and Institutional Consumption of Energy Survey 2018.*

Commercial/Institutional Sector British Columbia and Territories¹ Table 22: Other Services Secondary Energy Use and GHG Emissions by Energy Source | Natural Resources Canada (nrcan.gc.ca)

The data available from the OEE (NRCan) is for Energy intensity benchmarks for the commercial and institutional sector (Other Buildings in British Columbia). This data is an average and includes similar facilities as the Charlie Lake Firehall. The category chosen was the closest to the classification of the facility. The benchmark indicates that Charlie Lake Firehall Energy Use Intensity (EUI) is very close to the benchmark for the similar facilities.

4 Assessment Findings

This section provides an overview of the energy conservation measures (ECMs) analyzed in this report. A series of ECMs were reviewed. For each measure, estimates of the annual savings in each of the following were determined:

- Electricity consumption;
- Natural Gas consumption;
- Total energy cost; and
- GHG emissions.

The following ECMs were reviewed for the Firehall:

Table 8: Charlie Lake Firehall ECMs	
ECM	**Description**
ECM-1	Exterior Lighting Retrofit
ECM-2	Replace the DHW heating with high efficiency condensing unit
ECM-3	Night set back of heating

4.1 ECM-1: Lighting Retrofit

4.1.1 Existing Condition

The lighting in all areas of the firehall except the Apparatus Bay is comprised mainly of fluorescent T8 lamps and electronic ballasts, plus a few incandescent fixtures in bathrooms and utility spaces. The lighting is controlled by switches. The Apparatus Bays are illuminated by light emitting diode (LED) fixtures which were installed in the past 2 years.

Exterior lighting is predominantly by LED wall pack type fixtures mounted on the perimeter wall of the building, plus two incandescent pot lights mounted under the soffit.

4.1.2 Proposed Conditions

It is recommended the remainder of the interior fluorescent T8 light fixtures are replaced with new energy efficient LED lighting. The two incandescent pot lights on the exterior of the building should be fitted with LED lamps.

4.1.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 9: ECM-1 –Energy Savings			
Natural Gas Savings (GJ)	Electricity Savings (kWh)	GHG Reduction (Tonnes CO_2e)	Total Cost Savings ($)
-3	5,114	0.09	$597

The following table summarizes the financial analysis associated with this measure.

Table 10: ECM-1 –Financial Analysis					
Cost Savings ($)	Project Implementation Cost ($)	Simple Payback (Years)	Net Present Value ($)	Internal Rate of Return (%)	Discounted Payback (Years)
$597	$8,000	13.4	-$1,042	5.51%	41.1

4.2 ECM-2: New High Efficiency DHW Heater

4.2.1 Existing Condition

The existing domestic hot water heater is in need of replacement. The heater is relatively inefficient owing to its age and the fact that there is no damper on the flue to prevent draw through (natural draft losses) and standing losses. The current efficiency is estimated to be approximately 65%. The condition assessment recently completed is recommending replacement of the domestic hot water heater.

4.2.2 Proposed Condition

It is recommended that the domestic hot water heater is replaced with a high efficiency condensing natural gas fired heater, with an expected efficiency of 88%.

4.2.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 11: ECM-2 Energy Savings			
Natural Gas (GJ)	Electricity Savings (kWh)	GHG Reduction (Tonnes CO_2e)	Total Cost Savings ($)
21	0	1.06	$228

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The following table summarizes the financial analysis associated with this measure.

Table 12: ECM-2 – Financial Analysis					
Cost Savings ($)	Project Implementation Cost ($)	Simple Payback (Years)	Net Present Value ($)	Internal Rate of Return (%)	Discounted Payback (Years)
$228	$3,500	15.3	-$1,421	-0.27%	N/A

4.3 ECM-3: Night Set Back of Heating

4.3.1 Existing Condition

The existing perimeter radiation is controlled by three adjustable wall mounted thermostats that is currently set to maintain a space temperature of approximately 20ºC throughout the year.

4.3.2 Proposed Condition

It is recommended that the thermostats are replaced with programmable thermostats and that the temperature is set back to 16ºC outside of normal operating hours. To achieve this measure some additional modifications will be required for the new thermostats to provide the setback of the heating water.

4.3.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 13: ECM-3 Energy Savings			
Natural Gas (GJ)	Electricity Savings (kWh)	GHG Reduction (Tonnes CO_2e)	Total Cost Savings ($)
30	0	1.51	$326

The following table summarizes the financial analysis associated with this measure.

Table 14: ECM-3 – Financial Analysis					
Cost Savings ($)	**Project Implementation Cost ($)**	**Simple Payback (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback (Years)**
$326	$3,000	9.2	$455	8.89%	15.3

4.3.4 Other Opportunities Considered

The following section discusses energy saving opportunities that were considered and recommended for further analysis and possible implementation.

4.4 Solar Photovoltaic Generation System

The proposed alternative energy initiative involves the possibility of installing a solar array power generation system at the Firehall to complement the current solar collectors for DHW heating.

The cost of installing solar PV systems has declined steadily over the last decade as a result of technology improvements and more efficient systems yielding a higher power output. In B.C., a 1 kW solar PV system, south facing and tilted with no shading, will generate about 1,000 kWh per year or about 25,000 kWh over its 25-year lifetime. This is taking into account an industry average solar panel efficiency degradation rate of 0.5% per year. At a turnkey installation cost of about $3,500, per panel, it would take over 25 years to recoup your investment at today's average electricity rates.

In addition to the long payback there are other considerations to take into account. Which include the current load bearing capacity of the selected roof, the orientation of the roof, and the age of the roof (once the PV panels are installed it becomes more costly to replace the roof). Taking into consideration the long payback for solar panels, and the complications introduced by the physical characteristics of the roof, it was considered not economic or practical to pursue this option.

4.5 Improve Building Envelope Conditions

Other than simple weatherstripping measures for doors, building envelope modifications such as improved insulation, become very expensive and would typically only be considered if there were any significant deficiencies in the envelop. This would be evident from a high heating load in the building and based on the findings of the building energy index, no such deficiencies appear to be prevalent. As such any building envelope upgrades were not considered for this study.

5 Conclusions and Recommendations

Several ECMs were identified during the detailed energy assessment. Table 13 summarizes the combined recommended ECMs along with estimated costs, savings and simple payback. A more detailed summary is included in **Appendix B**.

Measure	Implementation Cost ($)	Table 15: Estimated Savings			Total Savings ($)	Simple Payback (Years)
		Electricity(kWh)	Natural Gas (GJ)	GHG Emissions (CO2 eq)		
ECM-1	$8,000	5,114	-3	0.09	$597	13.4
ECM-2	$3,500	-	21	1.06	$228	15.3
ECM-3	$3,000	-	30	1.51	$326	9.2
Bundle	**$14,500**	**5,114**	**48**	**2.47**	**$1,151**	**12.6**

A more detailed summary is included in **Appendix B**.

Based on the fact that some of the equipment has reached the end of its useful life the energy efficiency and conservation measures were selected to replace the existing technology with high efficiency alternatives. Although the paybacks are fairly long, Roth IAMS recommends that the Firehall proceeds with all of the measures identified.

6 Implementation Plan and M&V

6.1 Implementation Plan

Implementation of the measures identified in this assessment will assist the Peace River Regional District – Charlie Lake Firehall to reduce risks associated with utility market volatility and unplanned capital maintenance expenditures. As mentioned above, is only recommended that both measures are implemented if the long term use of the building is secure.

Table 20: Chetwynd Recreation Centre				
ECM/Scenario	Design Period	Construction Period	Seasonal Requirements	Disruption
ECM 1	2 weeks	2 Weeks	None	Minimal
ECM 2	0	1 Day	None	Minimal
ECM 3	0	2 days	Complete prior to start of heating season.	Minimal

6.2 Measure and Verification

Once the recommendations have been implemented it is recommended the facilities utility consumption be monitored to identify the actual savings that are a result of these changes.

A common general strategy is to compare historical energy use with post energy retrofit energy use. In short, this is establishing a baseline case and subtracting the post-installation energy use however you must include adjustments. Adjustments may account for changes in weather, occupancy, hours of operation or other factors that impact the baseline and performance periods.

Continue to monitor utility bills after the retrofits are implemented to determine the energy savings. Correct natural gas consumption for degree day data.

7 Emissions Saving Summary

7.1 Emission Reduction

The Canadian government is creating emission reduction targets that will determine the path of all business in Canada for the foreseeable future. An emissions reduction plan for Greenhouse Gas (GHG) emissions is the first step in achieving a reduced impact on the environment.

The Energy Savings measures proposed for the facility will have an immediate and positive effect on our local and global environment. The immediate impact on our local environment will follow as a reduction in demand offsets power generation from the local power stations and a reduction in natural gas consumption.

Greenhouse gases are primarily comprised of Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N2O), Sulphur Hexafluoride (SF6), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). CO2 is the primary component and typically makes up about making up over 99% of the greenhouse gases produced. As a result, greenhouse gases are typically measured in terms of kilograms or tonnes of equivalent carbon dioxide (CO2e). Emission factors used for calculating the combustion of natural gas and power generation in British Columbia are 51 kg of CO2e/GJ and 12 kg of CO2e/kWh respectively.

The sites total current annual equivalent carbon dioxide emissions (CO2e) are 29.2 Tonnes CO2e/year. This results in a current greenhouse gas intensity of 0.046 Tonnes CO2e/m^2. Based on the proposed bundle of ECMs the greenhouse gas savings are estimated to be 2.47 Tonnes of CO2e/year which represents approximately 8 percent greenhouse gas emission reduction.

8 STUDY LIMITATIONS

This report was prepared by Roth IAMS for Peace River Regional District. The material in it reflects our professional judgment considering the following:

- Our interpretation of the objective and scope of works during the study period;
- Information available to us at the time of preparation;
- Third party use of this report, without written permission from Roth IAMS, is the responsibility of such third party;
- Measures identified in this report are subject to the professional engineering design process before being implemented.

The savings calculations are our estimate of potential savings and are not guaranteed. The impact of building changes in space functionality, usage, equipment retrofit, and the weather should be considered when evaluating the savings.

Any third-party use of this report, or any reliance on decisions to be made, is subject to interpretation. Roth IAMS accepts no responsibility or damages, if any, suffered by any third party because of decisions made or actions based on this report.

9 CLOSURE

Based upon the information referenced herein, this report has been prepared exclusively for the Client – Peace River Regional District. It has been prepared in a manner consistent with good engineering judgement. Should new information come to light, RothIams Ltd. requests the opportunity to review this information, and our conclusions contained in this report. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, will be the responsibility of such third parties.

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APPENDIX A

DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations should be considered during the review of this energy and water assessment report:

- **Average Person** – An average person can be defined as a typical person within our society. The average person was used in the reports to describe the behaviour or a typical person in society in the context of their consumption patterns for water.
- **Average Resident** – An average resident can be defined as a resident of the assessed facility as observed by the facility assessors and via an interview with the facility managers.
- **Building Automation System (BAS) –** a distributed control system that is a computerized, intelligent network of electronic devices designed to monitor and control the mechanical, electronics, and lighting systems in a building. BAS core functionality keeps the building climate within a specified range, provides lighting based on an occupancy schedule, and monitors system performance and device failures and provides email and/or text notifications to building engineering/maintenance staff. The BAS functionality reduces building energy and maintenance costs when compared to a non-controlled building. A building controlled by a BAS is often referred to as an intelligent building. *Alternate term: **Building Management System (BMS).***
- **Capital Cost** – Capital Costs identified in this report include costs including the following phases of work: design, equipment and materials, construction/installation, project management, construction administration and commissioning.
- **Cooling Degree Days (CDD)** – Cooling Degree Days is a measure of how hot a location was over a period, relative to a base temperature. The base temperature is 18.0°C and the period is one year. If the daily average temperature exceeds the base temperature, the number of cooling degree-days for that day is the difference between the two temperatures. However, if the daily average is equal to or less than the base temperature, the number of cooling degree-days for that day is zero.
- **Discounted Payback** – Discounted Payback is the time required to recover the present value of cash flows equal to the cost of investment. Simple payback period does not take into account the principles of time value of money.
- **Energy Conservation Measure (ECM)** – any type of project conducted, or technology implemented to reduce the consumption of energy in a building. These can come in a variety of forms: water, electricity and gas being the main three for industrial and commercial enterprises. The aim of an ECM should be to achieve a saving, reducing the amount of energy used by a particular process, technology or facility. Alternative terms: **Energy Efficiency Measure (EEM)**, **Energy Management Opportunity (EMO)**, or **Facility Improvement Measure (FIM)**.
- **Energy Utilization Index (EUI)** – Energy Utilization Index is a normalized comparison of the energy performance of facility where the normalizing factor is floor area. The units for the EUI are $ekWh/m^2$ or GJ/m^2.

- **Equivalent Kilowatt Hour (ekWh)** – An equivalent kilowatt-hour is the equivalent energy content of natural gas in terms of kilowatt hours for use in facility benchmarking (requiring common energy units).
- **Greenhouse Gas Carbon Dioxide Equivalence (CO_2e)** – Greenhouse gases (GHGs) are primarily comprised of Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Sulfur Hexafluoride (SF_6), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). GHGs are typically measured in terms of kilograms or tonnes of carbon dioxide equivalent (CO_2e).
- **Heating Degree Days (HDD)** – Heating Degree Days is a measure of how cold a location was over a period, relative to a base temperature. The base temperature is 18.0°C and the period is one year. If the daily average temperature is below the base temperature, the number of heating degree-days for that day is the difference between the two temperatures. However, if the daily average temperature is equal to or higher than the base temperature, the number of heating degree-days for that day is zero.
- **Internal Rate of Return (IRR)** – The internal rate of return (IRR) is a capital budgeting metric used by firms to decide whether they should make investments. It is an indicator of the efficiency of an investment, as opposed to net present value (NPV), which indicates value or magnitude. The IRR is the annualized effective compounded return rate which can be earned on the invested capital, i.e., the yield on the investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments (investing in other projects, buying bonds, even putting the money in a bank account). Thus, the IRR should be compared to any alternate costs of capital including an appropriate risk premium.
- **Low Cost/No Cost Measures** – Low cost/no cost measures are defined as measures that can be implemented within the Operations and Maintenance (O&M) budget. Low cost/no cost measures typically include such initiatives as schedule adjustment, set-point adjustment, and fluid flow-rate adjustment.
- **Net Present Value (NPV)** – Net present value (NPV) is a standard method for the financial appraisal of long-term projects. Used for capital budgeting, and widely throughout economics, it measures the excess or shortfall of cash flows, in present value (PV) terms, once financing charges are met. It is also called net present worth (NPW).
- **Simple Payback (SP)** – Simple payback is the ratio of capital investment cost to the energy cost savings. It indicates how long a capital investment pays back. SP = (Capital Cost) / (Energy Cost Savings).
- **Greenhouse Gas Carbon Dioxide Equivalence (CO_2e)** – Greenhouse gases (GHGs) are primarily comprised of Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Sulfur Hexafluoride (SF_6), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). GHGs are typically measured in terms of kilograms or tonnes of carbon dioxide equivalent (CO_2e).

- **Water Conservation Measure (WCM)** – any type of project conducted, or technology implemented to reduce the consumption of water in a building. (See Energy Conservation Measure (ECM)). Alternative Term: **Water Efficiency Measure (WEM)**
- **Water Utilization Index (WUI)** – Water Utilization Index is a normalized comparison of the water performance of a facility where the normalizing factor is floor area. The units for the WUI are m^3/m^2.
- **Variable Frequency Drive (VFD)** – a type of adjustable-speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage.

APPENDIX B

ECM SUMMARY AND SAVINGS

Table 1
Summary of Potential Energy Conservation Measures - Charlie Lake Firehall

Natural Gas	$ 8.610	per GJ
Fuel Oil	$ -	per L
Electricity	$ 0.123	per kWh
Carbon Tax	$ 45.00	per CO2 eq tonne

Province	British Columbia
Escalation Rate (Energy)	0%
Discount Rate	7%

		Utility Savings			Emissions Savings				Financial Analysis					
Measure Number	**Description**	**Natural Gas (GJ)**	**Electricity (kWh)**	**Total ($)**	**Electricity (CO_2 eq tonnes/yr)**	**Natural Gas (CO_2 eq tonnes/yr)**	**Total (CO_2 eq tonnes/yr)**	**Total Savings ($)**	**Total Project Cost ($)**	**SPB[1] (Years)**	**Effective Measure Life (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback DPB (Years)**
ECM-1	Lighting Retrofit	- 3	5,114	$ 601	0.06	- 0.15	- 0.09	$ 597	$ 8,000	13.4	25	-$ 1,042	5.51%	41.1
ECM-2	High Efficiency DHW Heater	21		$ 181	-	1.06	1.06	$ 228	$ 3,500	15.3	15	-$ 1,421	-0.27%	N/A
ECM-3	Night set back of heating	30		$ 258	-	1.51	1.51	$ 326	$ 3,000	9.2	20	$ 455	8.89%	15.3
	Recommended Measure Bundle	**48.00**	**5,114**	**$ 1,040.26**	**0.06**	**2.41**	**2.47**	**$ 1,151**	**$ 14,500.00**	**12.59**	**17.4**	-$ 3,257.71	**3.56%**	**31.52**

REPORT

To: Rural Budgets Administration Committee | Report Number: CS-RBAC-027

From: Trish Morgan, General Manager of Community Services | Date: November 25, 2021

Subject: Moberly Lake Fire Hall Condition Assessment

RECOMMENDATION:

That the Rural Budgets Administration Committee approve a funding commitment in the amount of $28,500 in 2022, payable from Electoral Area E Peace River Agreement Funds, Spending Item #6 – Fire Protection, to be issued to the Moberly Lake Fire Department Function – 335, for the following:

1. Installation of an automated winch system for access to the hose tower;
2. Replacement of a forced air furnace; and
3. Completion of an engineering study to assess water ponding and running into the building, and heaving of gravel.

BACKGROUND/RATIONALE:

Moberly Lake Fire Hall is located at 6494 Lakeshore Drive in Moberly Lake, BC. This facility is a two-storey structure without a basement, constructed in 1983. An addition was constructed on the west side in 1991. The total gross floor area is estimated to be about 410 m^2 in size. The building was assessed on June 22, 2021.

In alignment with the current Regional Board Strategic Plan, a condition assessment of the Moberly Lake Fire Hall was conducted by FCAPX in June 2021. The scope and purpose of the assessment was to determine the current condition and remaining service life of the fire hall, and to identify required repairs along with associated costs.

The Firehall's condition was rated as "Good" however, a number of items need addressed in 2022. The wood ladder and wood platforms constructed within the hose tower are unsafe. As a result, the hose tower is not in use. It is recommended to provide an automated winch system for the hose drying tower to eliminate the need to climb the tower, which would allow removal of the unsafe wood infrastructure.

The lunchroom at the Fire Hall is heated and ventilated using a forced air furnace that is powered by natural gas. The furnace has exceeded its expected useful life and is exhibiting signs of wear and tear consistent with its age including loud operation and presumed loss of efficiency. Lifecycle replacement is recommended. The furnace is currently rated in "poor" condition.

It is recommended that a study be completed to determine the source and provide a solution for site stormwater ponding (which at times leads to water running into the building) and associated ground heaving around the west entrance. Once the cause has been determined, and options to remedy the issue are developed, a future funding request may be brought forward to complete any site remediation and repair works identified in the study.

Staff recommend deferral of repainting the metal cladding on the building, estimated at a cost of approximately $56,000. Other safety and capital needs are under review by the Fire Chief, which may need to be prioritized over painting the exterior in 2022.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATION(S):

As at October 31, 2021, the Electoral Area E PRA reserve balance was $2,283,900.20.

2022 Recommendations

Item	Cost (+/- 30%)	Year
4. Install an automated winch system for access to the hose tower as the current system is unsafe.	$10,000	2022
5. Replace forced air furnace. (p. 62)	$4,481	2022
6. Engineering study to assess ponding and heaving of gravel and water running into the building. (p.87)	$7,500	2022
7. Repaint exterior metal cladding	n/a	Defer 1 more year
TOTAL	**$21,981**	
Including ~30% Contingency	**$28,500**	

COMMUNICATIONS CONSIDERATION(S):

None.

OTHER CONSIDERATION(S):

None

Attachments:

1. Moberly Lake Fire Hall Facility Condition Assessment 2021
2. Moberly Lake Fire Hall Reserve Fund Study 2021
3. Moberly Lake Fire Hall Energy Efficiency Report 2021

PEACE RIVER REGIONAL DISTRICT

Submission to

Peace River Regional District

Facility Condition Assessment Report Moberly Lake Fire Hall

Version: Final

November 17, 2021

Prepared by:
FCAPX a Division of Roth IAMS
Project No. 21075
www.fcapx.com

FCAPX

A Division of Roth IAMS

Collaborating to Provide Asset Data You Can Trust

Executive Summary

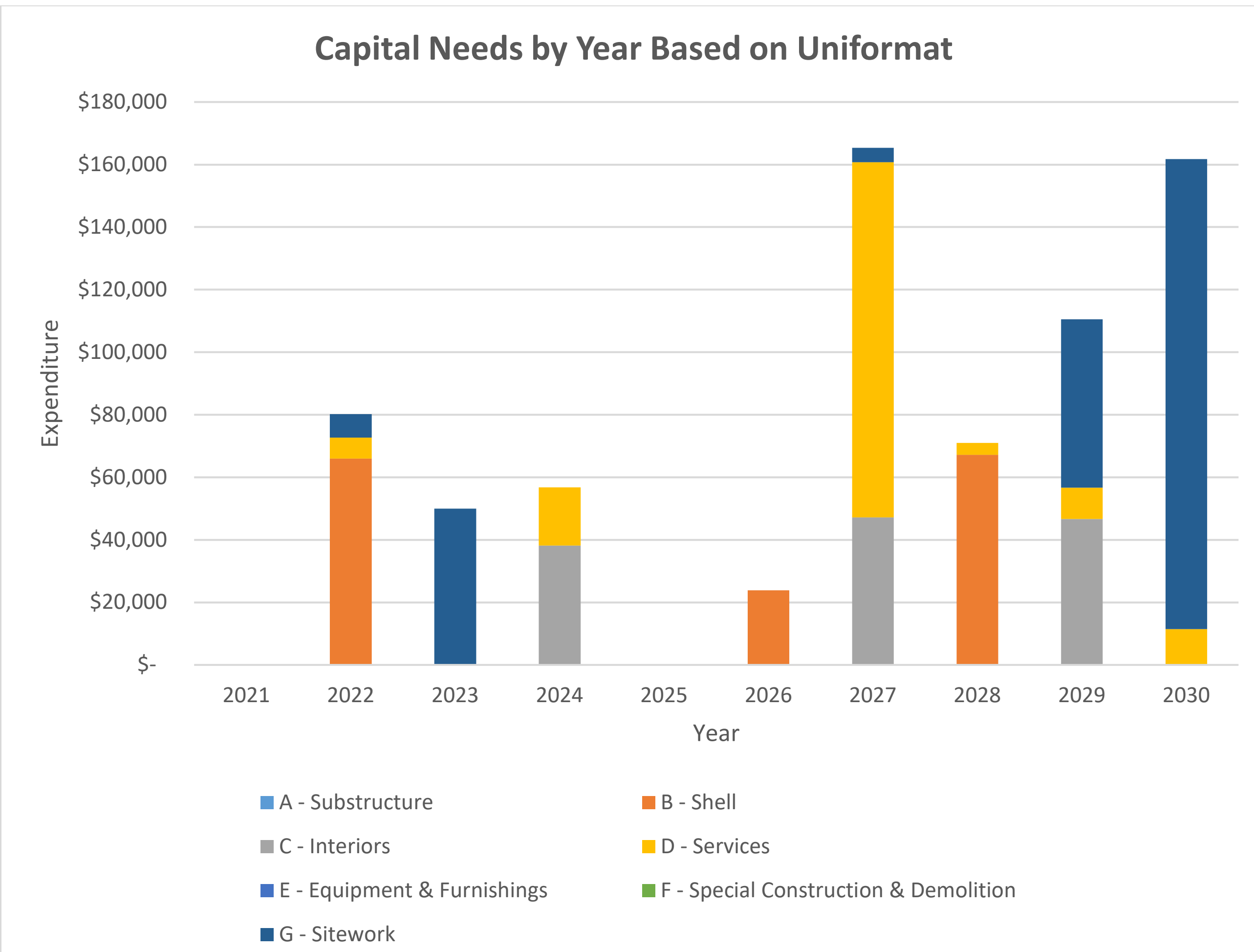
FCAPX a division of Roth IAMS Ltd. (FCAPX) was retained by the Peace River Regional District (PRRD) to conduct a Facility Condition Assessment (FCA) of the Moberly Lake Fire Hall, BC. The objective of the FCA was to identify, based on current observed conditions, deficiencies and potential lifecycle replacements in the next 30 years.

Facility Summary

Moberly Lake Fire Hall is located at 6494 Lakeshore Drive in Moberly Lake, BC. This facility is a two-storey structure without a basement, constructed in 1983. An addition was constructed on the west side in 1991. The total gross floor area is estimated to be about 410 SM in size. The building was assessed on June 22, 2021.

Findings

An analysis of the capital needs by building systems over the next 10 years was created for the building to visually view the replacement/repair forecast.



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The FCA identified repairs and replacements that are anticipated over the next 30 years. The table below summarizes the total capital expenditures (in current year dollars) for the repairs and replacements that are anticipated over the course of the 30-year evaluation period.

Uniformat Division	Immediate 2021	Short Term 2022-2026	Mid Term 2027-2031	Long Term 2032-2050	Totals
A-Substructure	$ -	$ -	$ -	$ -	$ -
B- Shell	$ -	$ 89,908	$ 67,212	$ 348,475	$ 505,595
C – Interiors	$ -	$ 38,158	$ 93,873	$ 191,629	$ 323,660
D – Services	$ -	$ 25,391	$ 138,787	$ 296,657	$ 460,835
E – Equipment & Furnishings	$ -	$ -	$ -	$ -	$ -
F – Special Construction	$ -	$ -	$ -	$ 9,335	$ 9,335
G – Building Sitework	$ -	$ 57,500	$ 208,732	$ 461,829	$ 728,061
Totals	$ 0	$ 210,957	$ 508,604	$ 1,307,925	$ 2,027,486

[1]Costs shown above do not include soft costs (engineering design, review, etc.). See section 3.6 for further information.

Table of Contents

1 INTRODUCTION

FCAPX a division of Roth IAMS Ltd. (FCAPX) was retained by the Peace River Regional District (PRRD) to conduct a Facility Condition Assessment (FCA) of Moberly Lake Fire Hall in Moberly Lake, BC (herein referred to as the "Facility, "Site" or "Property"). We understand the purpose of this report is to assist with the long-term capital planning for the facility. This report summarizes the findings of the FCA for the property.

1.1 FACILITY

Information on the evaluated facility is provided below:

Building Name	Moberly Lake Fire Hall
Address	6494 Lakeshore Drive, Moberly Lake, BC
Estimated Building Floor Area (sq.m.)	410
Number of Storeys	2
Date of Construction	1983

1.2 SITE REVIEW

A site visit was performed on June 22, 2021 by the following FCAPX personnel:

- Brenton Wier, Facility Assessor

1.3 OWNER SUPPLIED MATERIAL

In this report, reference is made to the "reported" condition of particular systems and/or components. The reported condition pertains to information provided by the building's operations and maintenance personnel and/or tenants. In some cases, this information was gathered through either an onsite interview process or a formal off-site interview process.

- No Documents were available for review.

1.4 FACILITY SUMMARY

1.4.1 Structural and Architectural Summary

Construction years and the total area of the facility have been estimated based on the data provided by the client. The facility was constructed in parts with the oldest section being constructed circa 1983. The original structure includes a vehicle bay and hose tower. The original building section measures approximately 110 SM. In circa 1991 a section with an additional vehicle bay, an administration area, two washrooms, and an upstairs lunchroom was added on the west side. The approximate area of the 1991 addition is 300 SM. The total building area is approximately 410 SM. The facility sits facing west, with Lakeshore Drive running along the property to the north. The Moberley Lake

Fire Hall sits to the east of the Community Hall. The main entrance is installed on the west elevation of the 1991 building section.

The building is conventional wood framing with a pitched, wood roof clad in metal roofing resting atop a concrete slab-on-grade. Painted metal siding is provided on all exterior elevations. Metal exterior doors are provided at entrances and exits. Interior finishes comprise painted walls, metal wall and ceiling panels, rolled vinyl flooring, wood kitchen cabinets with laminate countertops, and painted ceilings.

1.4.2 Plumbing and Mechanical Systems Summary

A buried domestic water feed enters the mechanical room to a pressure tank. Domestic water is provided by an electric domestic hot water heater. Plumbing fixtures include water closets, lavatories, sinks, and showers. The administration areas and washrooms are heated via electric baseboard heaters. The lunchroom is provided with a propane gas-fire forced air furnace. Vehicle bays are heated via electric unit heaters and propane gas-fired radiant tube heaters

1.4.3 Electrical Systems Summary

An overhead Single-Phase, 120/240V electrical service terminates to the main disconnect switch installed in the original building section. Power is fed to subdistribution panelboards. Interior lighting is a mix of LED and incandescent fixtures. Exterior lighting is incandescent/LED fixtures. Emergency lighting battery packs and exit lighting are provided. There is an automatic transfer switch that connects to the generator system installed on the exterior south elevation. The generator system also serves the Moberly Lake Community Hall.

1.4.4 Site Feature Systems Executive Summary

The gravel roadway that connects Don Phillips Way to Lakeshore Drive to the south is owned and operated by the Fire Hall. There is a gravel parking lot on the west elevation. Concrete barriers are provided at the edge of the parking lot and around the exterior truck fill area. Poured concrete pads are provided at the east and south elevations. A diesel fuel tank with a fill pump is installed south of the facility. There is a buried septic tank south of the facility and a buried domestic water tank installed south of the Moberly Lake Community Hall. Both tanks are owned and operated by the Fire Hall but are shared with Community Hall. There is a buried water tank connecting to a municipally owned cistern on the north side of the facility for truck filling. An overhead electrical service is provided by the local utility.

2 SCOPE OF WORK

The FCA carried out by FCAPX is generally based on the ASTM Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process (E2018-15) and consisted of the following:

- Background Information Request and Review;
- Interview(s) with Knowledgeable Site Staff;
- Walk-through Site Assessment Visit;
- Summary of Opinions of Probable Costs to remedy observed physical deficiencies;
- Summary of Opinions of Probable Costs to replace components which will exceed their expected useful life (EUL) over the evaluation period; and
- Preparation of an FCA Report, including salient findings and supporting photographs.

The ASTM defines a physical deficiency as a conspicuous defect or significant deferred maintenance of a site's material systems, components, or equipment as observed during the site assessor's walk-through site visit. Included within this definition are material systems, components, or equipment that are approaching, have reached, or have exceeded their typical expected useful life (EUL) or whose remaining useful life (RUL) should not be relied upon in view of actual or effective age, abuse, excessive wear and tear, exposure to the elements, lack of proper or routine maintenance, etc. This definition specifically excludes deficiencies that may be remedied with routine maintenance, miscellaneous minor repairs, normal operating maintenance, etc., and excludes conditions that generally do not constitute a material physical deficiency of the site.

The review of the Site was based on a visual walk-through review of the visible and accessible components of the property, building and related structures. The roof surface, interior and exterior wall finishes, and floor and ceiling finishes of the on-site building and related structures were visually assessed to determine their condition and to identify physical deficiencies, where observed. The assessment did not include an intrusive investigation of wall assemblies, ceiling cavities, or any other enclosures/assemblies. No physical tests were conducted, and no samples of building materials were collected to substantiate observations made, or for any other reason.

The review of the mechanical systems, electrical systems, and fire & life safety systems at the property included discussions with the site representative and review of pertinent maintenance records that were made available. A visual walk-through assessment of the mechanical systems, electrical systems, and fire & life safety systems was conducted to

FCAPX
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determine the type of systems present, age, and aesthetic condition, with considerations of the reported performance. No physical tests were conducted on these systems.

A detailed evaluation of the property development's compliance with applicable national and/or provincial Building Codes and/or Fire Codes is not part of the scope of this assessment. It is assumed that the existing buildings and related structures were reviewed and approved by local authorities at the time of construction. However, applicable codes may be referenced by FCAPX, at their discretion, to identify deficiencies and appropriate recommendations.

Replacement and repair costs are based on unit rates published by Means Publishing and/or Marshall & Swift Valuation Service, combined with local experience gained by FCAPX. The quantities associated with each item have been estimated during a walk-through site assessment and do not represent exact measurements or quantities. At the time of replacement, specific "scope of work" statements and quotations should be determined, and the budgetary items revised to reflect actual expenditures. Not included are items that would be addressed as routine maintenance. However, the capital costs may include items, which are currently managed under the Operations and Maintenance budget for the site.

Opinions of probable costs for deficiencies that are individually less than the established threshold amount are generally not included in the FCA cost tables. The exception are deficiency costs relating to life, safety or accessibility, these may be included regardless of this cost threshold.

2.1 Deviations from the Guide

The major deviations from ASTM E2018-15 for this project that was not included are as follows:

- A review of municipal/public records for zoning;
- A comprehensive building and/or fire & life safety code/regulatory review for compliance. It is assumed that at the time of building construction/commission and/or subsequent renovation(s), a duty of care was undertaken to ensure the building and related structures were constructed in accordance with the current building and fire code, as well as reviewed and approved by the local authorities having jurisdiction;
- An assessment of the property's compliance with barrier-free accessibility requirements; and
- A review of municipal/regional records to determine if the property resides in a designated flood plain.

Furthermore, the FCA did not include a:

- Verification of the number of parking spaces;
- Verification of gross and net usable areas of the site building(s); and
- Review of as-built construction drawings for the building and site.

2.2 LIMITING CONDITIONS

This report has been prepared for the exclusive and sole use of the Peace River Regional District (PRRD). The report may not be relied upon by any other person or entity without the express written consent of FCAPX and PRRD.

Any reliance on this report by a third party, any decisions that a third party makes based on this report, or any use at all of this report by a third party is the responsibility of such third parties. FCAPX accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions taken, based on this report.

The assessment of the building/site components was performed using methods and procedures that are consistent with standard commercial and customary practice as outlined in ASTM Standard E 2018-15 for facility condition assessments. As per this ASTM Standard, the assessment of the building/site components was based on a visual walk-through site visit, which captured the overall condition of the site at that specific point in time only.

No legal surveys, soil tests, environmental assessments, geotechnical assessments, detailed barrier-free compliance assessments, seismic assessments, detailed engineering calculations, or quantity surveying compilations have been made. No responsibility, therefore, is assumed concerning these matters. FCAPX did not design or construct the building(s) or related structures and therefore will not be held responsible for the impact of any design or construction defects, whether or not described in this report. No guarantee or warranty, expressed or implied, with respect to the property, building components, building systems, property systems, or any other physical aspect of the property is made.

The recommendations and our opinion of probable costs associated with these recommendations, as presented in this report, are based on walk-through non-invasive observations of the parts of the building which were readily accessible during our visual review. Conditions may exist that are not as per the general condition of the system being observed and reported in this report. Opinions of probable costs presented in this report are also based on information received during interviews with operations and maintenance staff. In certain instances, FCAPX has been required to assume that the information provided is accurate and cannot be held responsible for incorrect information received during the interview process. Should additional information become available with respect to the condition of the building and/or site elements, FCAPX requests that this information be brought to our attention so that we may reassess the conclusions presented herein.

The opinions of probable costs are intended for order of magnitude budgeting purposes only. The scope of work and the actual costs of the work recommended can only be determined after a detailed examination of the element/system in question, understanding of the site restrictions, understanding of the effects on the ongoing operations of the site/building, definition of the construction schedule, and preparation of tender documents. We expressly waive any responsibilities for the effects of any action taken as a result of these endeavors unless we are specifically advised of prior to, and participate in the action, at which time, our responsibility will be negotiated.

Our opinions and recommendations presented in our reports will be rendered in accordance with generally accepted professional standards and are not to be construed as a warranty or guarantee regarding existing or future physical conditions at the Site or regarding compliance of Site systems/components and procedures/operations with the various regulating codes, standards, regulations, ordinances, etc.

3 DEFINITIONS

The following are definitions to aid in the understanding of the assessment.

3.1 EVALUATION PERIOD

For the purpose of this report, the opinions of probable cost to repair major defects in materials or systems that may significantly affect the value of the property or continued operation of the facilities, and to replace base building equipment/systems that have reached, or may reach their expected useful life, will be a thirty (30) year evaluation period.

3.2 OPINIONS OF PROBABLE COSTS

Opinions of probable costs for repair and/or replacement of components and/or additional investigation of the conditions identified in this report are based on the noted method of evaluation. These opinions are not construction costs and are for general budgeting purposes only since they are based on historical costing information and our experience with similar systems in other buildings. A detailed or exhaustive examination of quantities/costs of equipment, materials, or labour required for the remedial work has not been performed. Unless otherwise stated, engineering costs for remedial work have not been included in this report.

Cost estimates within the report are Class D (+/- 40%).

Only planned actions with a total cost over $5,000 have been included in this report. Actions below this cost threshold are assumed to be handled under Operation and Maintenance budgets. Actions relating to life safety may be included in the report, regardless of cost.

As components are replaced they will need to meet current code requirements, therefore, additional costs may be required.

3.3 Asset Life Expectancy

The facility systems observed during the assessment were broken down by their major assets and assigned an expected useful life (EUL). This value was used to determine the remaining useful life (RUL) of the asset. The values for EUL are based on information provided in manufacturer's literature, industry standards, our observations of the assets, and our experience with similar materials and systems in similar locales. Based on the asset's overall reported and/or observed physical condition an "Equivalent Age" was determined that represents the point within the asset's lifecycle based on the EUL. This was then used to determine the RUL.

The EUL of assets is a theoretical number, which is an estimate, that is a function of quality of materials used, manufacturing and installation, as well as frequency and intensity of service, the degree of maintenance afforded to the asset, and local weather conditions.

The realization of an asset's EUL does not necessarily constitutes its replacement. A detailed condition assessment or investigation is recommended as a prudent approach to confirm the component RUL and the need for either a repair (maintenance) or a refurbishment. Risk, including safety or the cost of damage to the facility and its use, was considered in estimating the RUL and the schedule for major repairs or replacements.

3.4 Recommendation Type

Recommendation types in this report indicate the action that is to take place based on the review of the component. The recommendation type categories are shown below.

- **Study:** Includes recommendations for further investigation into the condition or options for determining the appropriate repair/replacement action.
- **Major Repair:** Any component or system in which future major repair is anticipated but not replacement of the entire component.
- **Lifecycle Replacement:** Any component or system in which future full replacement is anticipated.

3.5 Condition Ratings and Site Observations

ASTM defines "physical deficiencies" as "the presence of conspicuous defects or material deferred maintenance of a subject property's material systems, components, or equipment as observed during the field observer's walk-through survey. Included within this definition are material systems, assets, or equipment that is approaching, has reached, or has exceeded its typical expected useful life (EUL) or whose remaining useful life (RUL) should not be relied upon in view of actual or effective age, abuse, excessive wear and tear, lack of proper maintenance, etc. This specifically excludes deficiencies that may be remediated with routine maintenance or miscellaneous minor repairs and excludes conditions that generally do not constitute a material physical deficiency of the site.

The physical condition of major facility / site systems and assets is dependent on whether a physical deficiency is associated with that asset / system. The physical condition of assets / systems noted in this report have been rated as either "Critical", "Poor", "Fair", "Good", or "Excellent". Definitions for these ratings are provided below.

1- EXCELLENT: The component is new and no immediate concerns are evident.

2- GOOD: No immediate concerns are evident. The components appear to meet all present requirements and to be adequately maintained. Replacement anticipated in 6 years or beyond.

3- FAIR: The medium level condition rating. Generally, components meet present requirements and have been adequately maintained. Some minor deficiencies may be noted. A repair or lifecycle replacement is anticipated within the evaluation period between 3-5 years.

4- POOR: The component is not able to meet current requirements and has significant deficiencies. Generally, components may have failed, may be at or near the end of their service life, or may exhibit evidence of deterioration or insufficient maintenance. Recommendations may include urgent repair, replacement or upgrades within 1-2 years.

5- CRITICAL: Generally, components may have failed resulting in a high risk of injury, health and safety concerns, or critical system failure. Recommendations for urgent repair, replacement or upgrades are anticipated within the year (<12 months).

3.6 Factors

Difficulty – used to adjust the unit costs of the component based on its size, construction, etc. compared to the standard criteria for that component.

Regional – used to adjust the component costs based on the building's geographical location within the Province and Country. Regional factors were provided by PRRD.

Soft Costs – Engineering or Architectural design fees, engineering review fees, etc. This factor is set to 1 when soft costs are not included in the component's replacement costs. Typically, soft costs are required for large projects involving the replacement of several components at the same time (i.e. Heating System). As the FCA separates components into individual replacements, soft costs have not been included.

4 Facility Condition Assessment

Herein we present the findings of our assessment, based on the Scope of Work outlined in this report. The Facility Condition Assessment & Opinion of Probable Cost is included in Appendix A. Appendix B contains the Capital Planning Table.

4.1 Facility Condition Index

The Facility Condition Index (FCI) gives an indication of a building or portfolio's overall condition. The value is based on a 0-100%+ scale and is derived by dividing the repair costs for a facility by a Current Replacement Value (CRV). The FCI is calculated using only the current condition values, not taking into account the future needs identified in the life cycle evaluation. Site and miscellaneous items are removed from this calculation as the focus is on the building itself.

The overall condition is based on Table 1 below. It should be noted that there is no industry standard for the overall building condition based on a 5-Year FCI. The condition categories are recommendations to be considered.

Table 1: FCI Condition Categories

5-year Calculated FCI	Condition Category
0% to 10%	Good
11% to 20%	Fair
21% to 50%	Poor
>50%	Prohibitive to Repair

The 5-Year FCI is calculated as follows:

$$\text{5-Year FCI} = \frac{\text{Sum of 5-Year Renewal Need for the Building}}{\text{Current Replacement Value of the Building}} \times 100$$

$$\text{5-Year FCI} = \frac{\$129,559}{\$1,612,500} \times 100$$

5-Year FCI = 8%

The 5-Year Renewal Need is the sum of renewal costs recommended in the next 5 years to keep the building functional, and does not consider soft cost factor, criticality, available budget or capital planning decisions made. The total 5-Year Renewal Need cost, (2021-2025) excluding the renewal costs for the site features (roadways, parking lot, walkways, etc.) for the subject building is $129,559. The building Current Replacement Value (CRV) was estimated based on Marshall and Swift insurable value. For the subject building the CRV (or Cost of Reproduction New (CRN)) was determined to be $1,612,500. The subject building 5-year Facility Condition Index (FCI), calculated based on the 5-Year Renewal Need is 8%. Based on the table above, the FCI suggests that the building is in Good condition overall.

5 RESERVE FUND ANALYSIS

The scope of work of the review of the Moberly Lake Fire Hall includes the review of the Asset Management Reserve Fund (AMRF) to ensure funding levels meet the required amounts.

Moberly Lake Fire Hall does not currently contribute annually to the fund. Cashflow Scenario 0 presented in this report shows the fund balance with no contributions. Cashflow Scenario 1 presented in this report shows the recommended annual contribution and one-time contributions to an AMRF to ensure funding is available for capital replacement projects in future years.

The cashflow projection considers the following:

- The cashflow scenario is based on the inflated FCA expenditures anticipated during the 30-year evaluation period.
- An annual inflation rate of **2.00%** has been applied to adjust projected replacement costs over the course of the evaluation period.
    - o It must be appreciated that both inflation and interest rates can be volatile due to a number of factors such as global business cycles, the state of the economy, and government policies.
- A positive closing balance was maintained in the AMRF.
- A 2021 AMRF Opening Balance of $274,135 (Provided by PRRD).
- The 2021 Expenditures from the AMRF are nil.
- It should be appreciated that the accuracy of this projected cash flow decreases toward the end of the 30-year period as a result of uncertainties related to the economy, interest and inflation rates, annual contributions and future replacement costs.
- Annual expenditures as per the findings of the FCA (of note only expenditures over $5,000 were included).
- Annual inflation rate of 2.0% applied to the estimated FCA expenditures.

- The AMRF is assumed to earn 2.0% interest.

The projections included in this table are estimates only, based on the information available at the time of preparation. The condition assessment must be updated regularly as the actual figures will vary from the amounts detailed in this table due to changes in interest rates, inflation rates and scheduling of the repair/replacement work.

The reserve fund scenario is included in Appendix C.

6 Floor Plan/Site Plan

A floor plan displaying the basic layout of the facility has been provided in Appendix D.

A site plan has been provided in Appendix D indicating the site boundary for the facility.

7 Preventative Maintenance Plan

The compiled Preventative Maintenance Plan (PMP) for this facility are presented in Appendix E.

In general, the PMP provides a list of industry standard maintenance tasks for pertinent equipment and systems observed at the time of the facility condition assessment. In addition, the task list also includes recommendations on the amount of time that should be budgeted for each task, and the required skill sets and/or recommendations for the staff who should conduct the tasks.

It is the responsibility of the building owner to ensure that any federal, provincial, and municipal legislative requirements regarding preventative maintenance tasks are being complied with, including but not limited to; requirements enacted by those authorities having jurisdiction, changes over time to code requirements, and the licensing/training of technicians.

8 CLOSURE

This report has been prepared for the use of the Peace River Regional District as part of the due diligence process regarding the noted property, and no representations are made by FCAPX to any party other than Peace River Regional District.

Prepared by,

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APPENDIX A

Facility Condition Assessment

A Substructure
A10 Foundations

Element Description	
Name	A101001 - Standard Foundations
Installation Year	1983
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	37 Years
Renewal Year	2058
Quantity / Unit of Measure	150 / LM Footprint
Unit Cost	$984.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$275,569.20

Description

Construction drawings were not available for review during the assessment. While concealed from view below-grade, standard foundations for the building are presumably composed of cast-in-place concrete foundation walls and strip footings on the building perimeter.

Condition Narrative

No major deficiencies were observed or reported. It is understood that the original building was constructed in 1983, and the west addition was constructed in 1999. As the remaining useful life falls outside the evaluation window for the oldest installed section, this system has been combined using the oldest known install date (1983).

Element Description	
Name	A103001 - Slab on Grade
Installation Year	1983
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	37 Years
Renewal Year	2058
Quantity / Unit of Measure	330 / SM Footprint
Unit Cost	$71.33
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$43,947.13

Description

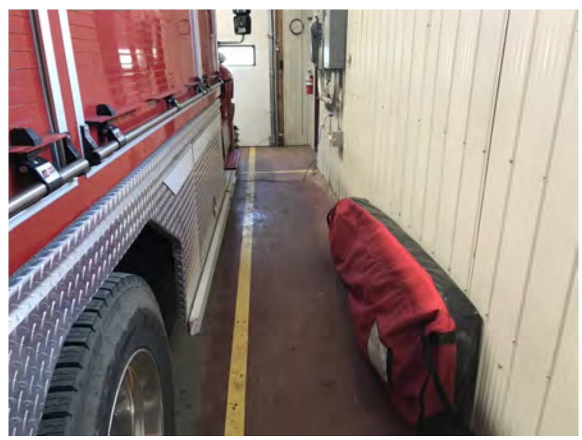
A cast-in-place concrete slab-on-grade floor is constructed throughout the building. The slab is presumably reinforced with conventional steel.

Condition Narrative

No major deficiencies were observed or reported. It is understood that the original building was constructed in 1983, and the west addition was constructed in 1999. As the remaining useful life falls outside the evaluation window for the oldest installed section, this system has been combined using the oldest known install date (1983).

Photos

Moberly Lake Fire Hall - A103001



Moberly Lake Fire Hall - A103001

B Shell
B10 Superstructure

Element Description	
Name	B103001 - Structure
Installation Year	1983
Condition	3 - Fair
Expected Useful Life	75 Years
Remaining Useful Life	37 Years
Renewal Year	2058
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$214,331.60

Description

While concealed from view, the building structure is presumably composed of wood decking that is supported by wood trusses, beams, and perimeter wood stud framework. A hose tower is installed east of the laundry room. The building was constructed in parts with the oldest built circa 1983, housing a vehicle bay and hose tower. The 1999 addition features an additional vehicle bay, administration offices, washrooms, and an upstairs lunchroom and lounge.

Condition Narrative

No major deficiencies were observed or reported, however, the wood ladder and wood platforms constructed within the hose tower are reportedly unsafe. As a result, the hose tower is not in use. It is recommended to provide an automated winch system for the hose drying tower to eliminate the need to climb the tower. Unsafe wood infrastructure should be removed. A cost to provide an automated hoist system has been provided. Additionally, in the 1999 vehicle bay, there is a through-wall penetration lined with galvanized ductwork that should be investigated. If used for combustion air, it is recommended to install a grill or fan as a maintenance activity. The Fire Chief indicated onsite that the tower could be removed altogether as it has not been in use for several years with no impact on operations. As the remaining useful life falls outside the evaluation window for the oldest installed section, this system has been combined using the oldest known install date (1983).

Photos

Moberly Lake Fire Hall - B103001

Moberly Lake Fire Hall - B103001

Moberly Lake Fire Hall - B103001

Recommendations

Recommendations #1 - Hose Tower - Install Automated Winch / Remove Wood Ladders and Platforms	
Type	Major Repair
Year	2022
Cost	$10,000.00

Remove the wood ladder and platforms and install an automated winch system for the hose drying tower.

B20 Exterior Enclosure

Element Description	
Name	B201010 - Exterior Coatings/Paint
Installation Year	1999
Condition	4 - Poor
Expected Useful Life	10 Years
Remaining Useful Life	1 Year
Renewal Year	2022
Quantity / Unit of Measure	750 / SM
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$56,010.00

Description

Exterior sheet metal siding and the trim around overhead doors are provided with a paint finish.

Condition Narrative

The paint is worn and sun-damaged. The paint is thin in spots. Lifecycle replacement is recommended to preserve the metal siding.

Photos

Moberly Lake Fire Hall - B201010


Moberly Lake Fire Hall - B201010

Moberly Lake Fire Hall - B201010

Recommendations

Recommendations #1 - Exterior Coatings/Paint	
Type	Life Cycle Replacement
Year	2022
Cost	$56,010.00

Replace Exterior Coatings/Paint

Element Description	
Name	B201024 - Metal Siding
Installation Year	1999
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	750 / SM
Unit Cost	$160.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$224,040.00

Description

All exterior elevations are provided with vertically-corrugated, sheet metal siding.

Condition Narrative

No major deficiencies were observed or reported.

Photos


Moberly Lake Fire Hall - B201024

Moberly Lake Fire Hall - B201024


Moberly Lake Fire Hall - B201024

Recommendations

Recommendations #1 - Metal Siding	
Type	Life Cycle Replacement
Year	2039
Cost	$224,040.00

Replace Metal Siding

Element Description	
Name	B202001 - Windows
Installation Year	1999
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	13 Years
Renewal Year	2034
Quantity / Unit of Measure	7 / SM
Unit Cost	$950.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$12,415.55

Description

There are two (2) fixed windows installed on the main floor. There are fixed and operable sash windows installed on the upper south elevation in the lunchroom. Windows are vinyl and contain insulating glazing units. The main floor windows feature security bars.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - B202001

Moberly Lake Fire Hall - B202001

Moberly Lake Fire Hall - B202001

Recommendations

Recommendations #1 - Windows	
Type	Life Cycle Replacement
Year	2034
Cost	$12,415.55

Replace Windows

Element Description	
Name	B203022 - Overhead Doors - Industrial
Installation Year	2003
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	7 Years
Renewal Year	2028
Quantity / Unit of Measure	3 / Each
Unit Cost	$12,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$67,212.00

Description

There are three (3) sectional metal overhead doors installed on the building's east and west elevations to serve the vehicle bays. The doors feature automatic door openers and glazing inserts.

Condition Narrative

No major deficiencies were observed or reported.

Photos


Moberly Lake Fire Hall - B203022

Moberly Lake Fire Hall - B203022


Moberly Lake Fire Hall - B203022

Recommendations

Recommendations #1 - Overhead Doors - Industrial	
Type	Life Cycle Replacement
Year	2028
Cost	$67,212.00

Replace Overhead Doors - Industrial

Element Description	
Name	B203023 - Single Door - Hollow Metal
Installation Year	1983
Condition	3 - Fair
Expected Useful Life	30 Years
Remaining Useful Life	5 Years
Renewal Year	2026
Quantity / Unit of Measure	4 / Each
Unit Cost	$3,200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$23,897.60

Description

Hollow metal swing-type doors set in pressed metal frames are installed on the building's north, south, and west elevations.

Condition Narrative

No major deficiencies were observed or reported, however, some doors are marked as exit doors, yet do not have panic hardware. It is recommended to install panic hardware on these doors to meet requirements for emergency exit doors. The cost to complete these repairs is presumed to fall below the cost threshold for repair recommendations ($5,000) and should be completed as a routine maintenance activity. Doors were installed between 1983 and 1999. The components have surpassed their expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos

Moberly Lake Fire Hall - B203023


Moberly Lake Fire Hall - B203023

Moberly Lake Fire Hall - B203023

Recommendations

Recommendations #1 - Single Door - Hollow Metal	
Type	Life Cycle Replacement
Year	2026
Cost	$23,897.60

Replace Single Door - Hollow Metal

B30 Roofing

Element Description	
Name	B301028 - Metal Roofing
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	40 Years
Remaining Useful Life	38 Years
Renewal Year	2059
Quantity / Unit of Measure	370 / SM
Unit Cost	$280.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$193,421.20

Description

The pitched roof is clad in sheet metal roofing. The roof assembly includes perforated metal soffits, and metal fascia at roof edges. Metal gutters and downspouts are installed at roof edges.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - B301028

Moberly Lake Fire Hall - B301028

C Interiors
C10 Interior Construction

Element Description	
Name	C101001 - Fixed Partitions
Installation Year	1983
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	37 Years
Renewal Year	2058
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$72,719.65

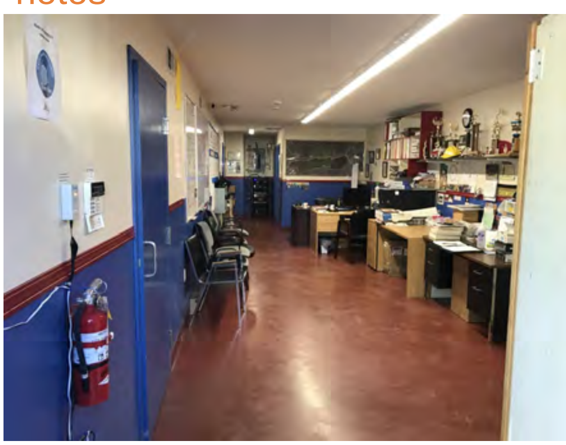
Description

Interior fixed partitions are assumed to consist of gypsum-clad wood stud assemblies. Ceilings are provided with a gypsum board finish in the administration area, utility rooms, and the lunchroom.

Condition Narrative

No major deficiencies were observed or reported. As the remaining useful life falls outside the evaluation window for the oldest installed section, this system has been combined using the oldest known install date (1983). It is recommended to conduct a Hazardous Materials Assessment based on the age of the building. A cost to complete the assessment has been provided herein.

Photos


Moberly Lake Fire Hall - C101001


Moberly Lake Fire Hall - C101001

Recommendations

Recommendations #1 - Hazardous Materials Assessment	
Type	Engineering Study
Year	2024
Cost	$5,000.00

Undertake a hazardous materials assessment.

Element Description	
Name	C101005 - Interior Windows
Installation Year	1999
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	53 Years
Renewal Year	2074
Quantity / Unit of Measure	6 / SM
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$6,721.20

Description

Interior vinyl windows are installed in the second-floor lunchroom to overlook the vehicle bay in the 1999 building section.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - C101005

Element Description	
Name	C102022 - Single Door - Wood
Installation Year	1999
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	9 / Each
Unit Cost	$2,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$33,606.00

Description

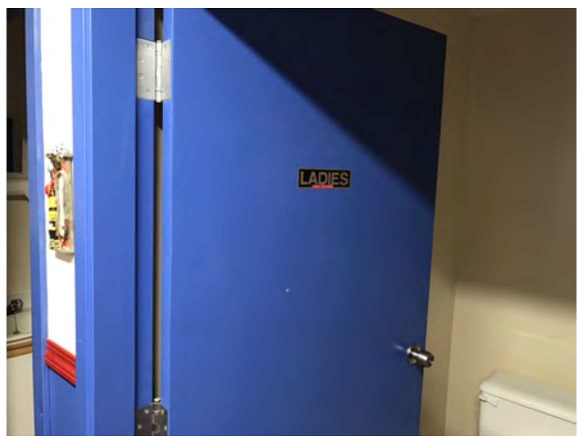
Swing-type wood doors set in wood or metal frames are installed throughout the building. The lunchroom door is a wood french door with glass inserts.

Condition Narrative

No major deficiencies were observed or reported during the assessment. It is assumed that the majority of interior doors were installed in 1999.

Photos

Moberly Lake Fire Hall - C102022



Moberly Lake Fire Hall - C102022

Moberly Lake Fire Hall - C102022

Recommendations

Recommendations #1 - Single Door - Wood	
Type	Life Cycle Replacement
Year	2039
Cost	$33,606.00

Replace Single Door - Wood

Element Description	
Name	C103009 - Cabinets - Kitchens
Installation Year	1983
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	4 / LM
Unit Cost	$1,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$11,202.00

Description

There are base and wall-mounted wood-framed cabinets with wood panels and laminate countertops installed in the lunchroom.

Condition Narrative

No major deficiencies were observed or reported. The components have surpassed their expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos

Moberly Lake Fire Hall - C103009

Recommendations

Recommendations #1 - Cabinets - Kitchens	
Type	Life Cycle Replacement
Year	2027
Cost	$11,202.00

Replace Cabinets - Kitchens

Element Description	
Name	C103010 - Vanities
Installation Year	1999
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	2 / LM
Unit Cost	$600.00
Difficulty / Regional / Soft Cost Factors	2.00 / 1.867 / 1
Replacement Cost	$4,480.80

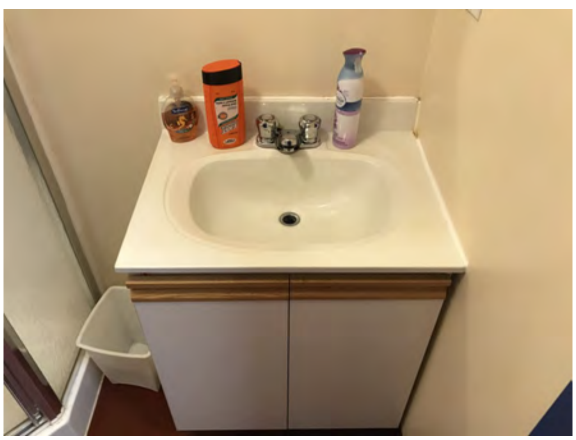
Description

There are base-mounted wood-framed vanities with pressed wood panels installed in the washrooms.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The components have surpassed their expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies. The cost factor has been increased due to the type of vanity construction.

Photos



Moberly Lake Fire Hall - C103010

Recommendations

Recommendations #1 - Vanities	
Type	Life Cycle Replacement
Year	2027
Cost	$4,480.80

Replace Vanities

Element Description	
Name	C103011 - Cabinets - General
Installation Year	1999
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	13 Years
Renewal Year	2034
Quantity / Unit of Measure	20 / LM
Unit Cost	$1,200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$44,808.00

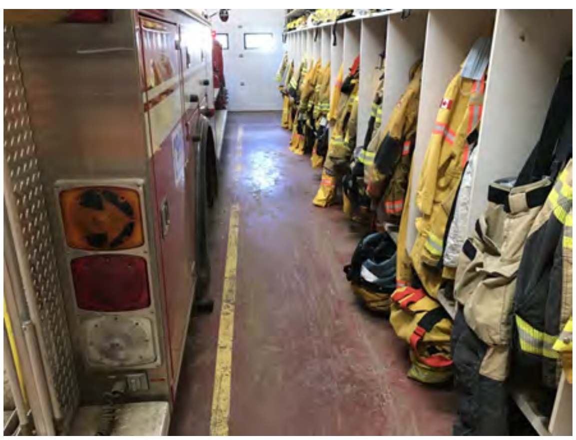
Description

There are base and wall-mounted storage partitions installed to line the apparatus floor. Racking is a mix of painted metal or wood.

Condition Narrative

No major deficiencies were observed or reported. The cost factor has been increased due to the type of vanity construction.

Photos



Moberly Lake Fire Hall - C103011

Moberly Lake Fire Hall - C103011

Recommendations

Recommendations #1 - Cabinets - General	
Type	Life Cycle Replacement
Year	2034
Cost	$44,808.00

Replace Cabinets - General

C20 Stairs

Element Description	
Name	C201001 - Interior Stair Construction
Installation Year	1999
Condition	2 - Good
Expected Useful Life	75 Years
Remaining Useful Life	53 Years
Renewal Year	2074
Quantity / Unit of Measure	16 / Per Riser
Unit Cost	$800.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$23,897.60

Description

Wood-framed close-backed stairs are installed to provide access to the lunchroom. The staircase features wall-mounted wood handrails. The stairs are provided with a paint finish.

Condition Narrative

No major deficiencies were observed or reported during the assessment.

Photos

Moberly Lake Fire Hall - C201001

Element Description	
Name	C201002 - Exterior Stair Construction
Installation Year	1999
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	20 / Per Riser
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	0.50 / 1.867 / 1
Replacement Cost	$18,670.00

Description

Wood-framed open-backed stairs to grade from the lunchroom on the building exterior. The staircase features base-mounted wood guardrails. An upper landing is supported by wood posts.

Condition Narrative

No major deficiencies were observed or reported during the assessment, however, it is recommended to paint the stairs to preserve the wood finish. The cost adjustment factor has been decreased to account for the wood construction.

Photos

Moberly Lake Fire Hall - C201026

Moberly Lake Fire Hall - C201026

Recommendations

Recommendations #1 - Exterior Stair Construction	
Type	Life Cycle Replacement
Year	2039
Cost	$18,670.00

Replace Exterior Stair Construction

C30 Interior Finishes

Element Description	
Name	C301005 - Paint Wall Covering
Installation Year	2017
Condition	2 - Good
Expected Useful Life	10 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	160 / SM Building
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$11,948.80

Description

Interior walls in the administration area, washrooms, utility rooms, and lunchroom are provided with a paint finish.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - C301005

Moberly Lake Fire Hall - C301005

Recommendations

Recommendations #1 - Paint Wall Covering	
Type	Life Cycle Replacement
Year	2027
Cost	$11,948.80

Replace Paint Wall Covering

Element Description	
Name	C301099 - Other Wall Finishes - Metal Wall Finish
Installation Year	1999
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	8 Years
Renewal Year	2029
Quantity / Unit of Measure	1 / Lump Sum
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	5.00 / 1.867 / 1
Replacement Cost	$46,675.00

Description

The 1999 vehicle bay interior walls and ceilings are provided with a sheet metal finish.

Condition Narrative

No major deficiencies were observed or reported. Unit cost has been determined based on $100/SM of the vehicle bays (250 SM). The average install date is estimated circa 1999.

Photos

Moberly Lake Fire Hall - C301099

Moberly Lake Fire Hall - C301099

Recommendations

Recommendations #1 - Other Wall Finishes	
Type	Life Cycle Replacement
Year	2029
Cost	$46,675.00

Replace Other Wall Finishes

Element Description	
Name	C302007 - Painted / Sealed Concrete Floor
Installation Year	2012
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	262 / SM
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$19,566.16

Description

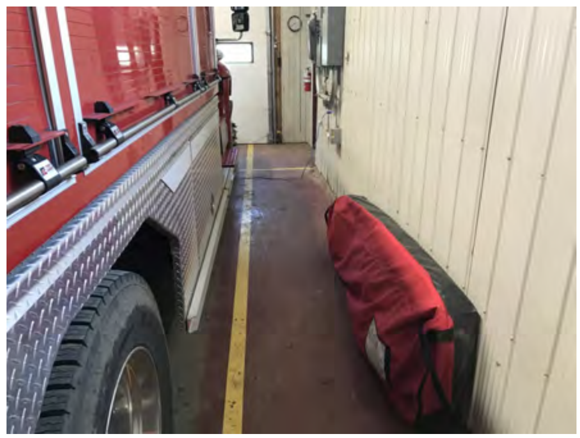
Vehicle bays and mechanical room floors are provided with a paint finish on concrete floor surfaces.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - C302007



Moberly Lake Fire Hall - C302007

Recommendations

Recommendations #1 - Painted / Sealed Concrete Floor	
Type	Life Cycle Replacement
Year	2027
Cost	$19,566.16

Replace Painted / Sealed Concrete Floor

Element Description	
Name	C302023 - Vinyl Sheet Floor
Installation Year	1999
Condition	3 - Fair
Expected Useful Life	15 Years
Remaining Useful Life	3 Years
Renewal Year	2024
Quantity / Unit of Measure	148 / SM
Unit Cost	$120.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$33,157.92

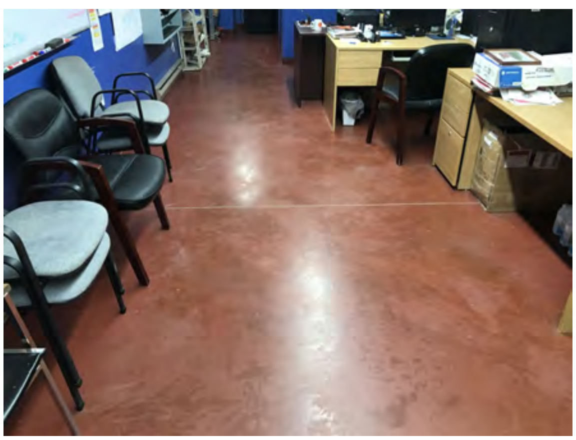
Description

The administration area, washrooms, and lunchroom are provided with a rolled vinyl floor with welded seams.

Condition Narrative

The flooring has exceeded its expected useful life and is exhibiting wear and tear that is consistent with age including separating at seams, lifting, and worn finishes in high traffic areas. Lifecycle replacement is recommended.

Photos



Moberly Lake Fire Hall - C302023

Moberly Lake Fire Hall - C302023

Recommendations

Recommendations #1 - Vinyl Sheet Floor	
Type	Life Cycle Replacement
Year	2024
Cost	$33,157.92

Replace Vinyl Sheet Floor

Element Description	
Name	C303006 - Painted Ceiling Structures
Installation Year	2017
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	11 Years
Renewal Year	2032
Quantity / Unit of Measure	160 / SM
Unit Cost	$30.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$8,961.60

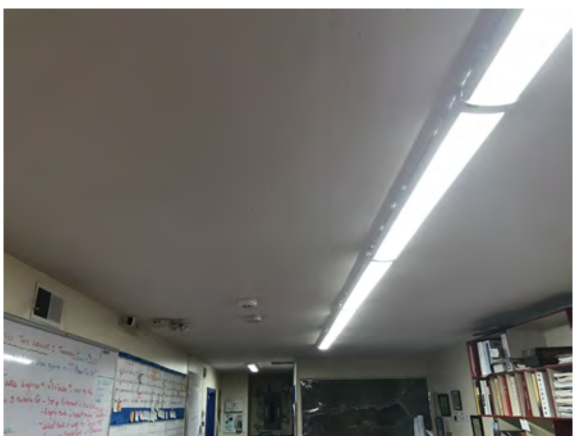
Description

The ceilings in administration areas, washrooms, utility rooms, and the lunchroom are provided with a paint finish.

Condition Narrative

No major deficiencies were observed or reported.

Photos



Moberly Lake Fire Hall - C303006

Recommendations

Recommendations #1 - Painted Ceiling Structures	
Type	Life Cycle Replacement
Year	2032
Cost	$8,961.60

Replace Painted Ceiling Structures

D Services
D20 Plumbing

Element Description	
Name	D201001 - Water Closets
Installation Year	1999
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	13 Years
Renewal Year	2034
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

Description
There are two (2) floor-mounted vitreous china water closets with flush tanks installed in the washrooms.

Condition Narrative
No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D201001

Moberly Lake Fire Hall - D201001

Recommendations

Recommendations #1 - Water Closets	
Type	Life Cycle Replacement
Year	2034
Cost	$3,734.00

Replace Water Closets

Element Description	
Name	D201003 - Lavatories
Installation Year	1999
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	13 Years
Renewal Year	2034
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

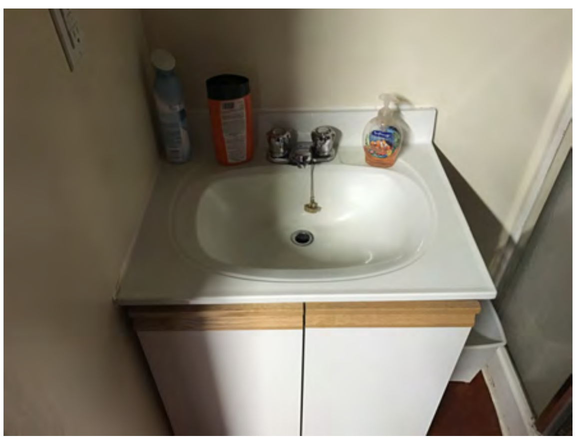
Description

There are two (2) single-piece vanity countertops with an integrated lavatory installed in the washrooms. The lavatories each include a manually operated tap-set.

Condition Narrative

No major deficiencies were observed or reported.

Photos



Moberly Lake Fire Hall - D201003

Recommendations

Recommendations #1 - Lavatories	
Type	Life Cycle Replacement
Year	2034
Cost	$3,734.00

Replace Lavatories

Element Description	
Name	D201004 - Sinks
Installation Year	1999
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	13 Years
Renewal Year	2034
Quantity / Unit of Measure	1 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$1,867.00

Description

There is a dual-basin stainless steel sink with a manually operated tap-set installed in the lunchroom.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D201004

Recommendations

Recommendations #1 - Sinks	
Type	Life Cycle Replacement
Year	2034
Cost	$1,867.00

Replace Sinks

Element Description	
Name	D201012 - Shower Assembly
Installation Year	1999
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	2 / Each
Unit Cost	$3,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$11,202.00

Description

There are two (2) individual fibreglass shower assemblies installed in the washrooms. Showers feature through-wall valve sets, showerheads, and swinging glass doors.

Condition Narrative

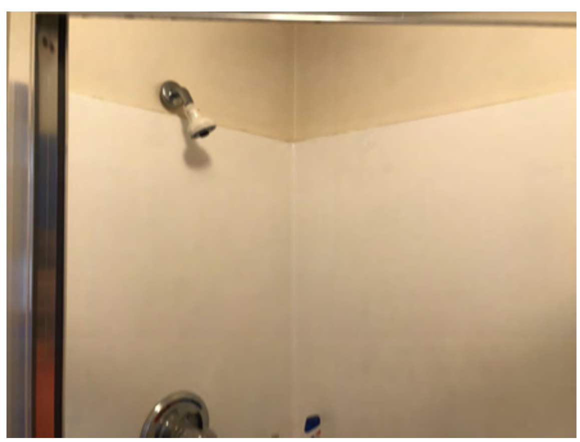
The components have surpassed their expected useful life, however, due to limited or less than average use, they remain in good condition. Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos


Moberly Lake Fire Hall - D201012


Moberly Lake Fire Hall - D201012


Moberly Lake Fire Hall - D201012


Moberly Lake Fire Hall - D201012

Recommendations

Recommendations #1 - Shower Assembly	
Type	Life Cycle Replacement
Year	2027
Cost	$11,202.00

Replace Shower Assembly

Element Description	
Name	D201016 - Custodial Sinks
Installation Year	1999
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	8 Years
Renewal Year	2029
Quantity / Unit of Measure	2 / Each
Unit Cost	$2,000.00
Difficulty / Regional / Soft Cost Factors	0.25 / 1.867 / 1
Replacement Cost	$1,867.00

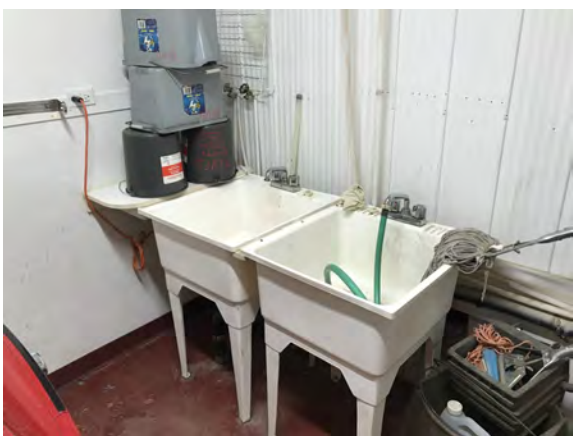
Description

There are two (2) free-standing fibreglass utility sinks installed in the laundry room. Each sink is provided with a manually operated tap-set.

Condition Narrative

No major deficiencies were observed or reported. The cost factor has been decreased to account for the type of sinks.

Photos



Moberly Lake Fire Hall - D201016

Recommendations

Recommendations #1 - Custodial Sinks	
Type	Life Cycle Replacement
Year	2029
Cost	$1,867.00

Replace Custodial Sinks

Element Description	
Name	D202001 - Domestic Water Pipes and Fittings
Installation Year	1983
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$30,618.80

Description

A buried water service connects the shared exterior buried domestic water tank to domestic water equipment in the mechanical room. Domestic water is distributed via a mix of copper and cross-linked polyethylene (PEX) piping. Firefighting water is fed from a municipally-owned cistern located off-property. Piping enters the west end of the 1999 vehicle bay and includes a fill valve with a flexible hose.

Condition Narrative

No major deficiencies were observed or reported. A large portion of the domestic water piping was replaced in 2017. The components have surpassed their expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos

Moberly Lake Fire Hall - D202001

Moberly Lake Fire Hall - D202001

Recommendations

Recommendations #1 - Domestic Water Pipes and Fittings	
Type	Life Cycle Replacement
Year	2027
Cost	$30,618.80

Replace Domestic Water Pipes and Fittings

Element Description	
Name	D202006 - Domestic Water Booster Systems/Pumps
Installation Year	2017
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	16 Years
Renewal Year	2037
Quantity / Unit of Measure	1 / Each
Unit Cost	$10,000.00
Difficulty / Regional / Soft Cost Factors	0.20 / 1.867 / 1
Replacement Cost	$3,734.00

Description

There is a domestic water pump installed in the mechanical room to pull water from the exterior buried domestic water tank. The pump is rated at 1/2 HP and is manufactured by Diamond.

Condition Narrative

No major deficiencies were observed or reported. The difficulty factor has been decreased to account for the size of the pump.

Photos

Moberly Lake Fire Hall - D202006

Moberly Lake Fire Hall - D202006

Recommendations

Recommendations #1 - Domestic Water Booster Systems/Pumps	
Type	Life Cycle Replacement
Year	2037
Cost	$3,734.00

Replace Domestic Water Booster Systems/Pumps

Element Description	
Name	D202008 - Domestic Water Expansion Tanks/Pressure Tank
Installation Year	2017
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	26 Years
Renewal Year	2047
Quantity / Unit of Measure	1 / Each
Unit Cost	$4,000.00
Difficulty / Regional / Soft Cost Factors	0.40 / 1.867 / 1
Replacement Cost	$2,987.20

Description

There is a residential-grade pressure tank installed in the mechanical room.

Condition Narrative

No major deficiencies were observed or reported. The difficulty factor has been decreased to account for the residential grade equipment.

Photos

Moberly Lake Fire Hall - D202008

Moberly Lake Fire Hall - D202008

Moberly Lake Fire Hall - D202008

Recommendations

Recommendations #1 - Domestic Water Expansion Tanks/Pressure Tank	
Type	Life Cycle Replacement
Year	2047
Cost	$2,987.20

Replace Domestic Water Expansion Tanks/Pressure Tank

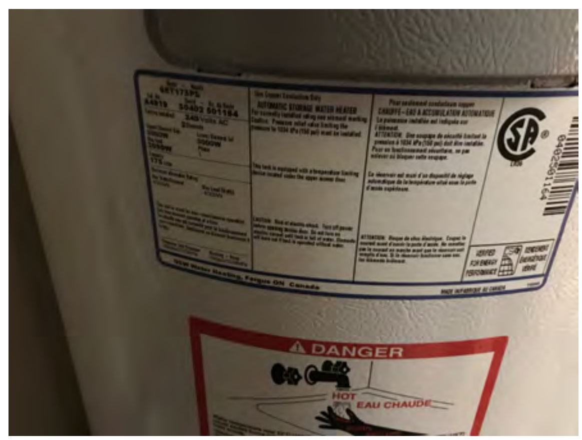
Element Description	
Name	D202035 - Electric Domestic Water Heaters (Residential Tank Type)
Installation Year	2017
Condition	2 - Good
Expected Useful Life	12 Years
Remaining Useful Life	8 Years
Renewal Year	2029
Quantity / Unit of Measure	175 / Liter
Unit Cost	$25.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$8,168.13

Description
There is an electric domestic water heater installed in the mechanical room. It is manufactured by GSW (Model: 6ET175PS) and has a tank capacity of 175 litres. The heating input rating is 3000 Watts.

Condition Narrative
No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D202035



Moberly Lake Fire Hall - D202035

Recommendations

Recommendations #1 - Electric Domestic Water Heaters (Residential Tank Type)	
Type	Life Cycle Replacement
Year	2029
Cost	$8,168.13

Replace Electric Domestic Water Heaters (Residential Tank Type)

Element Description	
Name	D203001 - Sanitary Waste and Vent Piping
Installation Year	1983
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	12 Years
Renewal Year	2033
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$45.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$34,446.15

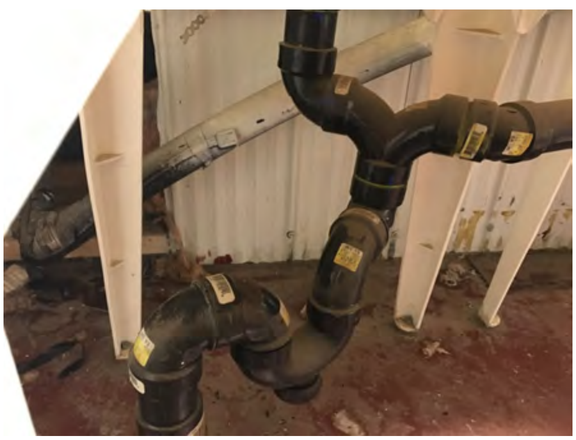
Description

Sanitary waste and vent piping is ABS and connects fixtures and floor drains to a common drain line that is directed to the site septic tank.

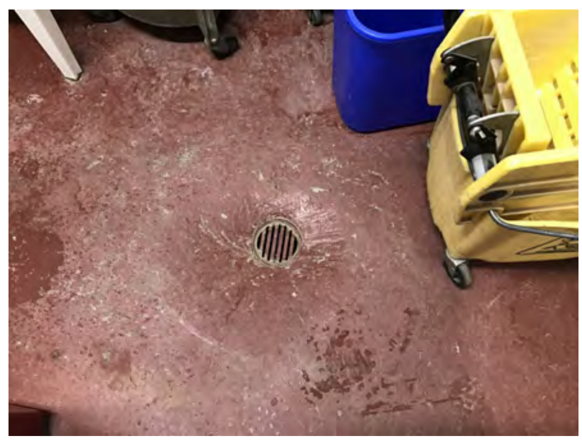
Condition Narrative

No major deficiencies were observed or reported.

Photos



Moberly Lake Fire Hall - D203001



Moberly Lake Fire Hall - D203001

Recommendations

Recommendations #1 - Sanitary Waste and Vent Piping	
Type	Life Cycle Replacement
Year	2033
Cost	$34,446.15

Replace Sanitary Waste and Vent Piping

Element Description	
Name	D203007 - Interceptor Systems
Installation Year	1999
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	2 / Each
Unit Cost	$10,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$37,340.00

Description

There is an inceptor system installed in the 1983 vehicle bay. It is assumed that a second interceptor is installed in the 1991 bay, though it was covered by a parked truck.

Condition Narrative

No major deficiencies were observed or reported. The majority of the system is concealed from view. The components are nearing their expected useful life and should therefore be inspected by a qualified tradesperson to determine piping and basin integrity. The cost to complete this inspection is presumed to fall below the cost threshold for repair recommendations ($5,000) and therefore should be completed as a maintenance activity. In the absence of observed or reported deficiencies, the Remaining Useful Life has been extended.

Photos

Moberly Lake Fire Hall - D203007

Recommendations

Recommendations #1 - Interceptor Systems	
Type	Life Cycle Replacement
Year	2027
Cost	$37,340.00

Replace Interceptor Systems

D30 HVAC

Element Description	
Name	D301002 - Gas Supply Systems
Installation Year	1983
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	410 / SM
Unit Cost	$20.00
Difficulty / Regional / Soft Cost Factors	0.61 / 1.867 / 1
Replacement Cost	$9,338.73

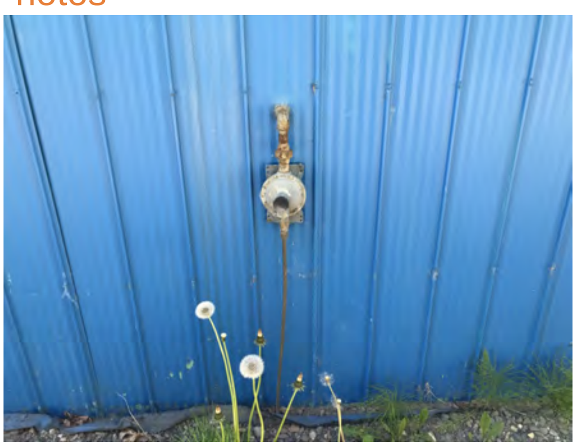
Description

There is a steel piped propane gas distribution system to provide propane gas to gas-fired mechanical equipment. Propane is delivered via a tank located on the site grounds. The regulator valve is installed on the exterior north elevation.

Condition Narrative

No major deficiencies were observed or reported, however, exterior sections of gas piping should be inspected/tested by a qualified technician due to the presence of oxidation on the piping. Once inspected/tested, piping should be repainted as a maintenance activity. The cost to assess/test and repaint exterior sections of piping is presumed to fall below the cost threshold for repair recommendations ($5,000) and should therefore be completed as a maintenance activity. In the absence of significant deficiencies being observed or reported, lifecycle replacement has been deferred. The exterior propane tank is utility-owned and operated and is not included within this report. The cost adjustment factor has been reduced to account for the limited amount of gas-fired equipment.

Photos



Moberly Lake Fire Hall - D203001

Recommendations

Recommendations #1 - Gas Supply Systems	
Type	Life Cycle Replacement
Year	2027
Cost	$9,338.73

Replace Gas Supply Systems

Element Description	
Name	D302003 - Fuel Fired Forced Air Furnace
Installation Year	1999
Condition	4 - Poor
Expected Useful Life	18 Years
Remaining Useful Life	1 Year
Renewal Year	2022
Quantity / Unit of Measure	60 / MBH
Unit Cost	$40.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$4,480.80

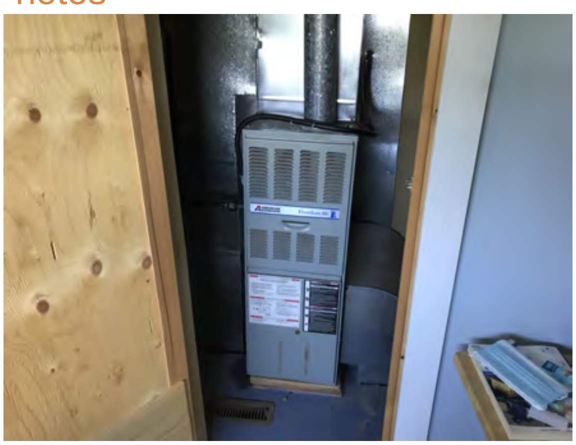
Description

There is a propane gas-fired forced-air furnace installed to provide heating and ventilation to the lunchroom. It is manufactured by American Standard (Model: AUD060C924H3) and has a heating input rating of 60 MBH.

Condition Narrative

The furnace has exceeded its expected useful life and is exhibiting wear and tear that is consistent with age including loud operation and presumed loss of efficiency. Lifecycle replacement is recommended.

Photos



Moberly Lake Fire Hall - D302003

Moberly Lake Fire Hall - D302003

Moberly Lake Fire Hall - D302003

Recommendations

Recommendations #1 - Fuel Fired Forced Air Furnace	
Type	Life Cycle Replacement
Year	2022
Cost	$4,480.80

Replace Fuel Fired Forced Air Furnace

Element Description	
Name	D302032 - Fuel-Fired Radiant Tube Heaters
Installation Year	1999
Condition	3 - Fair
Expected Useful Life	18 Years
Remaining Useful Life	3 Years
Renewal Year	2024
Quantity / Unit of Measure	2 / Each
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$18,670.00

Description

There are two (2) propane gas-fired radiant tube heaters installed in the vehicle bays. Technical specifications are not available.

Condition Narrative

No major deficiencies were observed or reported, however, the equipment has exceeded its expected useful life and therefore has a higher likelihood of failure. Lifecycle replacement is recommended.

Photos

Moberly Lake Fire Hall - D302032

Moberly Lake Fire Hall - D302032

Recommendations

Recommendations #1 - Fuel-Fired Radiant Tube Heaters	
Type	Life Cycle Replacement
Year	2024
Cost	$18,670.00

Replace Fuel-Fired Radiant Tube Heaters

Element Description	
Name	D304001 - Air Distribution Systems
Installation Year	1999
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	80 / SM Building
Unit Cost	$120.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$17,923.20

Description

There is low velocity galvanized steel ductwork installed to provide ventilation in the lunchroom. Ductwork terminates in floor-mounted deflecting diffusers.

Condition Narrative

No major deficiencies were observed or reported. There was a noted lack of make-up air and exhaust systems present in vehicle bays. It is recommended to consult with local authorities having jurisdiction to ensure that existing infrastructure provides adequate airflow/air exchange in vehicle bays.

Photos

Moberly Lake Fire Hall - D304001

Recommendations

Recommendations #1 - Air Distribution Systems	
Type	Life Cycle Replacement
Year	2049
Cost	$17,923.20

Replace Air Distribution Systems

Element Description	
Name	D304033 - Exhaust Fan - Ceiling (Residential)
Installation Year	2003
Condition	2 - Good
Expected Useful Life	25 Years
Remaining Useful Life	7 Years
Renewal Year	2028
Quantity / Unit of Measure	2 / Each
Unit Cost	$1,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

Description

There are ceiling-mounted residential grade exhaust fans installed in the washrooms. Technical specifications are not available.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D304033

Recommendations

Recommendations #1 - Exhaust Fan - Ceiling (Residential)	
Type	Life Cycle Replacement
Year	2028
Cost	$3,734.00

Replace Exhaust Fan - Ceiling (Residential)

Element Description	
Name	D305009 - Unit Heaters (Electric)
Installation Year	1999
Condition	2 - Good
Expected Useful Life	18 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	2 / Each
Unit Cost	$2,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$9,335.00

Description

There are two (2) suspended electric unit heaters installed in the 1983 vehicle bay. Technical specifications are not available.

Condition Narrative

No major deficiencies were observed or reported. The components have surpassed their expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies, likely due to the limited use of the heater.

Photos

Moberly Lake Fire Hall - D305009

Recommendations

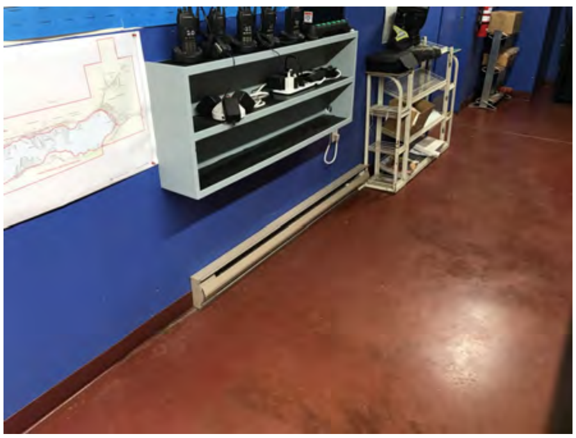
Recommendations #1 - Unit Heaters (Electric)	
Type	Life Cycle Replacement
Year	2027
Cost	$9,335.00

Replace Unit Heaters (Electric)

Element Description	
Name	D305010 - Electric Baseboard Heaters
Installation Year	1999
Condition	4 - Poor
Expected Useful Life	18 Years
Remaining Useful Life	1 Year
Renewal Year	2022
Quantity / Unit of Measure	4 / Each
Unit Cost	$300.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$2,240.40

Description
The administration area and the washrooms are provided with electric baseboard heaters.

Condition Narrative
No major deficiencies were observed or reported, however, the baseboards have exceeded their expected useful life and should therefore be replaced.

Photos

Moberly Lake Fire Hall - D305010


Moberly Lake Fire Hall - D305010

Recommendations

Recommendations #1 - Electric Baseboard Heaters	
Type	Life Cycle Replacement
Year	2022
Cost	$2,240.40

Replace Electric Baseboard Heaters

D40 Fire Protection

Element Description	
Name	D403002 - Fire Extinguishers
Installation Year	2017
Condition	2 - Good
Expected Useful Life	10 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$1.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$765.47

Description

There are wall-mounted ABC-type fire extinguishers installed throughout the building.

Condition Narrative

No major deficiencies were observed or reported. Annual inspection tags appeared to be up to date.

Photos


Moberly Lake Fire Hall - D403002


Moberly Lake Fire Hall - D403002

Recommendations

Recommendations #1 - Fire Extinguishers	
Type	Life Cycle Replacement
Year	2027
Cost	$765.47

Replace Fire Extinguishers

D50 Electrical

Element Description	
Name	D501005 - Panelboards up to 400A - 1983
Installation Year	1983
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	1 / Each
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$9,335.00

Description

There is a 120/240V panelboard installed on the south elevation of the 1983 vehicle bay. The amperage reading is not available.

Condition Narrative

No major deficiencies were observed or reported, however, it is recommended to include breaker schedules in the panels as a maintenance activity. The component has surpassed its expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos

Moberly Lake Fire Hall - D501005

Moberly Lake Fire Hall - D501005

Recommendations

Recommendations #1 - Panelboards up to 400A	
Type	Life Cycle Replacement
Year	2027
Cost	$9,335.00

Replace Panelboards up to 400A

Element Description	
Name	D501005 - Panelboards up to 400A - 2015
Installation Year	2015
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	34 Years
Renewal Year	2055
Quantity / Unit of Measure	1 / Each
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$9,335.00

Description

There is a 120/240V panelboard installed in the administration area. It is manufactured by Siemens and contains a 100A main breaker.

Condition Narrative

No major deficiencies were observed or reported, however, the panel is blocked by server equipment. Server equipment should be relocated as a maintenance activity.

Photos

Moberly Lake Fire Hall - D501005

Moberly Lake Fire Hall - D501005

Moberly Lake Fire Hall - D501005

Element Description	
Name	D501025 - LV Main Service Disconnects
Installation Year	1983
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	1 / Each
Unit Cost	$10,000.00
Difficulty / Regional / Soft Cost Factors	0.30 / 1.867 / 1
Replacement Cost	$5,601.00

Description

The main disconnect switch is installed on the south wall in the 1983 vehicle bay. It is manufactured by Square D and is rated for 200A at 240V.

Condition Narrative

No major deficiencies were observed or reported during the assessment. The difficulty factor has been lowered to account for the size of the switch. The component has surpassed its expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos

Moberly Lake Fire Hall - D501025

Moberly Lake Fire Hall - D501025

Recommendations

Recommendations #1 - LV Main Service Disconnects	
Type	Life Cycle Replacement
Year	2027
Cost	$5,601.00

Replace LV Main Service Disconnects

Element Description	
Name	D502001 - Branch Wiring and Devices
Installation Year	1983
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	12 Years
Renewal Year	2033
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$95.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$72,719.65

Description

Branch wiring consists of a mix of residential-grade and commercial-grade wiring which terminates to electrical distribution panelboards and terminal components, including stratification fans in the apparatus bay. Branch wiring is primarily hidden within wall and ceiling finishes.

Condition Narrative

No major deficiencies were observed or reported, however, the plug installed over the sink in the kitchen should be replaced with a GFCI rated plug as a maintenance activity.

Photos

Moberly Lake Fire Hall - D502001

Moberly Lake Fire Hall - D502001

Recommendations

Recommendations #1 - Branch Wiring and Devices	
Type	Life Cycle Replacement
Year	2033
Cost	$72,719.65

Replace Branch Wiring and Devices

Element Description	
Name	D502002 - Interior Lighting
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	35 Years
Remaining Useful Life	33 Years
Renewal Year	2054
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$85.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$65,064.95

Description

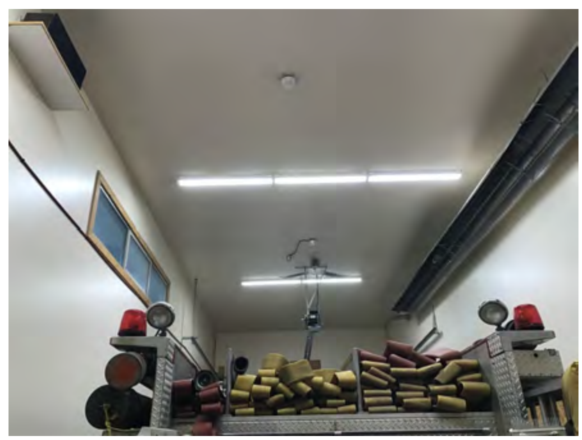
Interior lighting is primarily provided via ceiling-mounted LED fixtures. Lighting in the washrooms and stairwell is provided via incandescent fixtures. There is a 4-lamp halogen fixture installed in the kitchenette in the lunchroom.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D502002



Moberly Lake Fire Hall - D502002

Element Description	
Name	D502041 - Exterior Lighting
Installation Year	2019
Condition	1 - Excellent
Expected Useful Life	20 Years
Remaining Useful Life	18 Years
Renewal Year	2039
Quantity / Unit of Measure	4 / Each
Unit Cost	$500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$3,734.00

Description

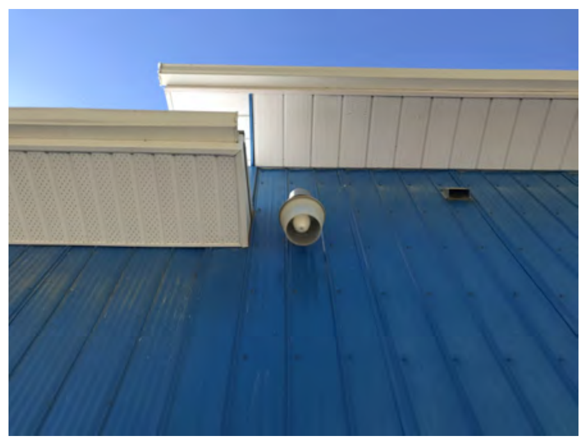
Exterior lighting is primarily provided via wall-mounted LED fixtures. There are incandescent fixtures installed on the north and south elevations.

Condition Narrative

No major deficiencies were observed or reported, however, the remaining incandescent fixtures should be replaced with LED as a routine maintenance activity.

Photos

Moberly Lake Fire Hall - D502041


Moberly Lake Fire Hall - D502041

Recommendations

Recommendations #1 - Exterior Lighting	
Type	Life Cycle Replacement
Year	2039
Cost	$3,734.00

Replace Exterior Lighting

Element Description	
Name	D502053 - Illuminated Combo Exit Signs
Installation Year	2010
Condition	2 - Good
Expected Useful Life	35 Years
Remaining Useful Life	24 Years
Renewal Year	2045
Quantity / Unit of Measure	5 / Each
Unit Cost	$450.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$4,200.75

Description

There are wall-mounted combination exit and emergency lighting battery packs installed over exits to direct and illuminate the path of emergency egress. Some units contain emergency lighting only.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D502041

Recommendations

Recommendations #1 - Illuminated Combo Exit Signs	
Type	Life Cycle Replacement
Year	2045
Cost	$4,200.75

Replace Illuminated Combo Exit Signs

Element Description	
Name	D503008 - Security Systems - Intrusion Alarm Systems
Installation Year	2010
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	9 Years
Renewal Year	2030
Quantity / Unit of Measure	410 / SM Building
Unit Cost	$10.00
Difficulty / Regional / Soft Cost Factors	1.50 / 1.867 / 1
Replacement Cost	$11,482.05

Description

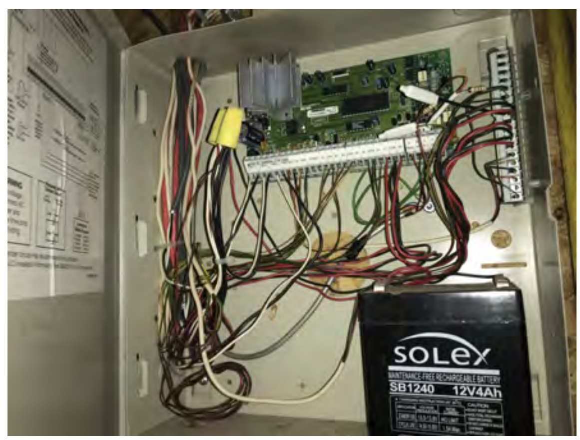
There is an intrusion detection system installed that includes keypads, motion sensors, and door contacts. The main controller is located in the mechanical room. The system is manufactured by DSC and is externally monitored. The system also connects to and monitors the hard-wired smoke detectors installed in the Fire Hall.

Condition Narrative

No major deficiencies were observed or reported. The difficulty factor has been increased to account for the smoke detectors included in the system.

Photos

Moberly Lake Fire Hall - D503008



Moberly Lake Fire Hall - D503008

Moberly Lake Fire Hall - D503008

Recommendations

Recommendations #1 - Security Systems - Intrusion Alarm Systems	
Type	Life Cycle Replacement
Year	2030
Cost	$11,482.05

Replace Security Systems - Intrusion Alarm Systems

Element Description	
Name	D503031 - Video Surveillance Systems
Installation Year	2015
Condition	2 - Good
Expected Useful Life	20 Years
Remaining Useful Life	14 Years
Renewal Year	2035
Quantity / Unit of Measure	410 / SM
Unit Cost	$10.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$7,654.70

Description

There is a video surveillance system with a camera in the administration area to monitor the exterior generator and fuel tank.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D503031

Recommendations

Recommendations #1 - Video Surveillance Systems	
Type	Life Cycle Replacement
Year	2035
Cost	$7,654.70

Replace Video Surveillance Systems

Element Description	
Name	D509002 - Emergency Power Generator Systems
Installation Year	2015
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	24 Years
Renewal Year	2045
Quantity / Unit of Measure	100 / kVA
Unit Cost	$450.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$84,015.00

Description

There is a packaged diesel-fired emergency power generator installed on the south exterior elevation. The generator is manufactured by Kohler Power Systems (Model: 80RE0ZJD). The assembly is rated for 100 kVA and will generate 278 amps at 120/208V.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D509002

Moberly Lake Fire Hall - D509002

Moberly Lake Fire Hall - D509002

Recommendations

Recommendations #1 - Emergency Power Generator Systems	
Type	Life Cycle Replacement
Year	2045
Cost	$84,015.00

Replace Emergency Power Generator Systems

Element Description	
Name	D509031 - Automatic Transfer Switches (ATSs) up to 400A
Installation Year	2015
Condition	2 - Good
Expected Useful Life	40 Years
Remaining Useful Life	34 Years
Renewal Year	2055
Quantity / Unit of Measure	1 / Each
Unit Cost	$7,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$14,002.50

Description

There is an automatic transfer switch installed on the south wall of the 1983 vehicle bay. It is manufactured by Kohler Power Systems.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - D509031

F Special Construction & Demolition
F10 Special Construction

Element Description	
Name	F101099 - Other Special Construction - Seacan
Installation Year	2012
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	21 Years
Renewal Year	2042
Quantity / Unit of Measure	1 / Lump Sum
Unit Cost	$5,000.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$9,335.00

Description
There is a packaged shipping container located south of the Fire Hall that is used for general storage.

Condition Narrative
No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - F101099


Moberly Lake Fire Hall - F101099

Recommendations

Recommendations #1 - Other Special Construction	
Type	Life Cycle Replacement
Year	2042
Cost	$9,335.00

Replace Other Special Construction

G Building Sitework
G20 Site Improvements

Element Description	
Name	G201005 - Guardrails and Barriers
Installation Year	1999
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	8 Years
Renewal Year	2029
Quantity / Unit of Measure	24 / LM
Unit Cost	$1,200.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$53,769.60

Description

There are concrete-filled steel bollards installed on the east and west elevations to guard against vehicle impacts. There are pre-cast concrete jersey barriers installed at the south end of the gravel parking lot and at the north exterior truck fill line.

Condition Narrative

No major deficiencies were observed or reported. It is recommended to paint the barriers with exterior grade high visibility paint to help with visibility. The cost to paint the barriers is presumed to fall below the cost threshold for repair recommendations ($5,000) and should be completed as a routine maintenance activity.

Photos

Moberly Lake Fire Hall - G201005

Moberly Lake Fire Hall - G201005


Moberly Lake Fire Hall - G201005


Moberly Lake Fire Hall - G201005

Recommendations

Recommendations #1 - Guardrails and Barriers	
Type	Life Cycle Replacement
Year	2029
Cost	$53,769.60

Replace Guardrails and Barriers

Element Description	
Name	G201025 - Gravel Paved Surface - Roadway
Installation Year	2015
Condition	3 - Fair
Expected Useful Life	15 Years
Remaining Useful Life	9 Years
Renewal Year	2030
Quantity / Unit of Measure	2300 / SM
Unit Cost	$35.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$150,293.50

Description

It is understood that the entire length of gravel surfaced roadway that connects Don Phillips Way to the north, to the asphalt-paved section of Lakeshore Drive to the south, is owned and maintained by the Moberly Lake Fire Hall.

Condition Narrative

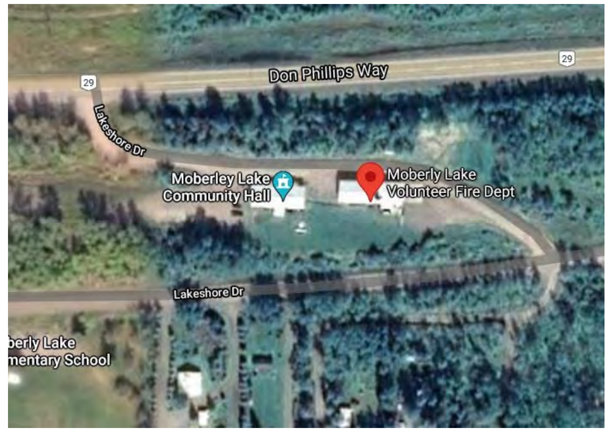
No major deficiencies were observed or reported, however, there are reportedly some grading issues with the roadway. At times of heavy rainfall or snowmelt, water ponds at the west entrance to the fire hall, and reportedly is not contained within the drainage ditch that runs parallel to the roadway. There is some evidence of ground heaving around the west entrance. It is recommended to undertake an engineering study to determine a solution for site ponding/heaving. A recommendation for a study and a placeholder repair have been provided herein.

Photos

Moberly Lake Fire Hall - G201025

Moberly Lake Fire Hall - G201025

Moberly Lake Fire Hall - G201025



Moberly Lake Fire Hall - G201025

Recommendations

Recommendations #1 - Engineering Study - Site Ponding / Heaving	
Type	Engineering Study
Year	2022
Cost	$7,500.00

Undertake an engineering study to determine the source and provide a solution for site stormwater ponding and ground heaving around the west entrance.

Recommendations #2 - Placeholder Repair - Site Ponding / Heaving	
Type	Major Repair
Year	2023
Cost	$50,000.00

Complete regrading/repairs as directed by the engineering report.

Recommendations #3 - Gravel Paved Surface - Roadway	
Type	Life Cycle Replacement
Year	2030
Cost	$150,293.50

Replace Gravel Paved Surface - Roadway

Element Description	
Name	G202024 - Gravel Paved Surface - Parking Area
Installation Year	2000
Condition	2 - Good
Expected Useful Life	15 Years
Remaining Useful Life	6 Years
Renewal Year	2027
Quantity / Unit of Measure	100 / SM
Unit Cost	$25.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$4,667.50

Description
There is a gravel-surfaced parking area provided at the east elevation.

Condition Narrative
No major deficiencies were observed or reported during. The components have surpassed their expected useful life, however, the Remaining Useful Life has been extended to a later year based on the absence of significant deficiencies.

Photos

Moberly Lake Fire Hall - G202024


Moberly Lake Fire Hall - G202024

Recommendations

Recommendations #1 - Gravel Paved Surface - Parking Area	
Type	Life Cycle Replacement
Year	2027
Cost	$4,667.50

Replace Gravel Paved Surface - Parking Area

Element Description	
Name	G203022 - Concrete Paved Surfaces
Installation Year	2012
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	21 Years
Renewal Year	2042
Quantity / Unit of Measure	135 / SM
Unit Cost	$165.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$41,587.43

Description

There is a cast-in-place concrete pad poured at the west vehicle bay entrance. An additional cast-in-place concrete slab is poured at the south exit below the generator and fuel tank.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - G203022

Moberly Lake Fire Hall - G203022

Moberly Lake Fire Hall - G203022

Moberly Lake Fire Hall - G203022

Recommendations

Recommendations #1 - Concrete Paved Surfaces	
Type	Life Cycle Replacement
Year	2042
Cost	$41,587.43

Replace Concrete Paved Surfaces

Element Description	
Name	G204021 - Fencing and Gates - Chain Link Fence
Installation Year	2012
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	21 Years
Renewal Year	2042
Quantity / Unit of Measure	15 / LM
Unit Cost	$360.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$10,081.80

Description

There is a galvanized metal chain-link fence installed to surround the generator and fuel tank on the south elevation.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - G204021

Moberly Lake Fire Hall - G204021

Recommendations

Recommendations #1 - Fencing and Gates - Chain Link Fence	
Type	Life Cycle Replacement
Year	2042
Cost	$10,081.80

Replace Fencing and Gates - Chain Link Fence

G30 Site Mechanical Utilities

Element Description	
Name	G301024 - Water Supply Infrastructure
Installation Year	1999
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	30 / LM
Unit Cost	$588.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$32,933.88

Description

A buried water line connects domestic water equipment in the mechanical room to the buried domestic water tank installed south of the Moberly Lake Community Hall.

Condition Narrative

No major deficiencies were observed or reported.

Recommendations

Recommendations #1 - Water Supply Infrastructure	
Type	Life Cycle Replacement
Year	2049
Cost	$32,933.88

Replace Water Supply Infrastructure

Element Description	
Name	G301099 - OtherWater Supply - Buried Water Tanks
Installation Year	1999
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	2 / Lump Sum
Unit Cost	$10,000.00
Difficulty / Regional / Soft Cost Factors	2.00 / 1.867 / 1
Replacement Cost	$74,680.00

Description

It is understood that there are two (2) buried water tanks installed at the site. The first tank is buried north of the Fire Hall and connects to a municipally-owned cistern installed off-property to provide fill-water for fire trucks. The tank includes a fill line at grade level. The second tank is buried south of the Moberly Lake Community Hall and is used for domestic water. Each tank has an estimated size of 10,000 litres. The domestic water tank is used to provide domestic water to the Moberly Lake Community Hall as well as the Fire Hall.

Condition Narrative

No major deficiencies were observed or reported. The difficulty factor has been adjusted to account for the estimated size of the tanks.

Photos

Moberly Lake Fire Hall - G301099

Recommendations

Recommendations #1 - OtherWater Supply	
Type	Life Cycle Replacement
Year	2049
Cost	$74,680.00

Replace OtherWater Supply

Element Description	
Name	G302016 - Septic Tank (4000 Gallons)
Installation Year	1983
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	12 Years
Renewal Year	2033
Quantity / Unit of Measure	1 / Each
Unit Cost	$26,500.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$49,475.50

Description

There is a buried septic tank that is reportedly located south of the Fire Hall. Technical specifications are not available. Buried sanitary piping connects the tank to the Fire Hall.

Condition Narrative

The septic tank did not have any reported issues, however, the date it was last emptied is unknown. It is recommended to have the tank emptied as a precaution.

Recommendations

Recommendations #1 - Septic Tank (4000 Gallons)	
Type	Life Cycle Replacement
Year	2033
Cost	$49,475.50

Replace Septic Tank (4000 Gallons)

Element Description	
Name	G306004 - Fuel Storage Tanks - Aboveground Less than 10,000 L
Installation Year	2012
Condition	2 - Good
Expected Useful Life	30 Years
Remaining Useful Life	21 Years
Renewal Year	2042
Quantity / Unit of Measure	1315 / L
Unit Cost	$30.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$73,653.15

Description

There is a double-walled diesel fuel tank of steel construction installed on the south elevation. It is manufactured by Westell and has a capacity of 1,315 litres. The tank includes a 1/6 HP fuel pump with a hose and nozzle for truck filling.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - G306004

Moberly Lake Fire Hall - G306004

Recommendations

Recommendations #1 - Fuel Storage Tanks - Aboveground Less than 10,000 L	
Type	Life Cycle Replacement
Year	2042
Cost	$73,653.15

Replace Fuel Storage Tanks - Aboveground Less than 10,000 L

G40 Site Electrical Utilities

Element Description	
Name	G401011 - Electrical Service
Installation Year	1999
Condition	2 - Good
Expected Useful Life	50 Years
Remaining Useful Life	28 Years
Renewal Year	2049
Quantity / Unit of Measure	20 / LM
Unit Cost	$655.00
Difficulty / Regional / Soft Cost Factors	1.00 / 1.867 / 1
Replacement Cost	$24,457.70

Description

An overhead, single-phase, 120/240V electrical service connects with a meter installed on the building's south elevation from a utility-owned, pole-mounted transformer.

Condition Narrative

No major deficiencies were observed or reported.

Photos

Moberly Lake Fire Hall - G401011

Recommendations

Recommendations #1 - Electrical Service	
Type	Life Cycle Replacement
Year	2049
Cost	$24,457.70

Replace Electrical Service

APPENDIX B

30-Year Capital Plan Renewal and Repair Summary

Client	Peace River Regional District
Site No.	
Building Name	Moberly Lake Fire Hall
Address	
Project No.	21075
Date	November 17, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Year	Recommendation Cost	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Totals (2021 - 2050)
A - Substructure																																					
B - Shell																																					
B10 - Superstructure																																					
B103001 Structure	Remove the wood ladder and platforms and install an automated winch system for the hose drying tower.	3 - Fair	Major Repair	75	2022	$10,000		$10,000																													$10,000
B20 - Exterior Enclosure																																					
B201010 Exterior Coatings/Paint	Replace Exterior Coatings/Paint	4 - Poor	Life Cycle Replacement	10	2022	$56,010		$56,010										$56,010										$56,010									$168,030
B201024 Metal Siding	Replace Metal Siding	2 - Good	Life Cycle Replacement	40	2039	$224,040																			$224,040												$224,040
B202001 Windows	Replace Windows	2 - Good	Life Cycle Replacement	35	2034	$12,416														$12,416																	$12,416
B203022 Overhead Doors - Industrial	Replace Overhead Doors - Industrial	2 - Good	Life Cycle Replacement	25	2028	$67,212								$67,212																							$67,212
B203023 Single Door - Hollow Metal	Replace Single Door - Hollow Metal	3 - Fair	Life Cycle Replacement	30	2026	$23,898						$23,898																									$23,898
B30 - Roofing																																					
C - Interiors																																					
C101001 Fixed Partitions	Undertake a hazardous materials assessment.	2 - Good	Engineering Study	75	2024	$5,000				$5,000																											$5,000
C102022 Single Door - Wood	Replace Single Door - Wood	2 - Good	Life Cycle Replacement	40	2039	$33,606																			$33,606												$33,606
C103009 Cabinets - Kitchens	Replace Cabinets - Kitchens	2 - Good	Life Cycle Replacement	35	2027	$11,202							$11,202																								$11,202
C103010 Vanities	Replace Vanities	2 - Good	Life Cycle Replacement	25	2027	$4,481							$4,481																								$4,481
C103011 Cabinets - General	Replace Cabinets - General	2 - Good	Life Cycle Replacement	35	2034	$44,808														$44,808																	$44,808
C201002 Exterior Stair Construction	Replace Exterior Stair Construction	2 - Good	Life Cycle Replacement	40	2039	$18,670																			$18,670												$18,670
C301005 Paint Wall Covering	Replace Paint Wall Covering	2 - Good	Life Cycle Replacement	10	2027	$11,949							$11,949										$11,949										$11,949				$35,846
C301099 Other Wall Finishes - Metal Wall Finish	Replace Other Wall Finishes	2 - Good	Life Cycle Replacement	30	2029	$46,675									$46,675																						$46,675
C302007 Painted / Sealed Concrete Floor	Replace Painted / Sealed Concrete Floor	2 - Good	Life Cycle Replacement	15	2027	$19,566							$19,566															$19,566									$39,132
C302023 Vinyl Sheet Floor	Replace Vinyl Sheet Floor	3 - Fair	Life Cycle Replacement	15	2024	$33,158				$33,158															$33,158												$66,316
C303006 Painted Ceiling Structures	Replace Painted Ceiling Structures	2 - Good	Life Cycle Replacement	15	2032	$8,962												$8,962															$8,962				$17,923
D - Services																																					
D10 - Conveying																																					
D20 - Plumbing																																					
D201001 Water Closets	Replace Water Closets	2 - Good	Life Cycle Replacement	35	2034	$3,734														$3,734																	$3,734
D201003 Lavatories	Replace Lavatories	2 - Good	Life Cycle Replacement	35	2034	$3,734														$3,734																	$3,734
D201004 Sinks	Replace Sinks	2 - Good	Life Cycle Replacement	35	2034	$1,867														$1,867																	$1,867
D201012 Shower Assembly	Replace Shower Assembly	2 - Good	Life Cycle Replacement	25	2027	$11,202							$11,202																								$11,202
D201016 Custodial Sinks	Replace Custodial Sinks	2 - Good	Life Cycle Replacement	30	2029	$1,867									$1,867																						$1,867
D202001 Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	2 - Good	Life Cycle Replacement	40	2027	$30,619							$30,619																								$30,619
D202006 Domestic Water Booster Systems/Pumps	Replace Domestic Water Booster Systems/Pumps	2 - Good	Life Cycle Replacement	20	2037	$3,734																	$3,734														$3,734
D202008 Domestic Water Expansion Tanks/Pressure Tank	Replace Domestic Water Expansion Tanks/Pressure Tank	2 - Good	Life Cycle Replacement	30	2047	$2,987																											$2,987				$2,987
D202035 Electric Domestic Water Heaters (Residential Tank Type)	Replace Electric Domestic Water Heaters (Residential Tank Type)	2 - Good	Life Cycle Replacement	12	2029	$8,168									$8,168												$8,168										$16,336
D203001 Sanitary Waste and Vent Piping	Replace Sanitary Waste and Vent Piping	2 - Good	Life Cycle Replacement	50	2033	$34,446													$34,446																		$34,446
D203007 Interceptor Systems	Replace Interceptor Systems	2 - Good	Life Cycle Replacement	25	2027	$37,340							$37,340																								$37,340
D30 - HVAC																																					
D301002 Gas Supply Systems	Replace Gas Supply Systems	2 - Good	Life Cycle Replacement	40	2027	$9,339							$9,339																								$9,339
D302003 Fuel Fired Forced Air Furnace	Replace Fuel Fired Forced Air Furnace	4 - Poor	Life Cycle Replacement	18	2022	$4,481		$4,481																		$4,481											$8,962
D302032 Fuel-Fired Radiant Tube Heaters	Replace Fuel-Fired Radiant Tube Heaters	3 - Fair	Life Cycle Replacement	18	2024	$18,670				$18,670																		$18,670									$37,340
D304001 Air Distribution Systems	Replace Air Distribution Systems	2 - Good	Life Cycle Replacement	50	2049	$17,923																													$17,923		$17,923
D304033 Exhaust Fan - Ceiling (Residential)	Replace Exhaust Fan - Ceiling (Residential)	2 - Good	Life Cycle Replacement	25	2028	$3,734								$3,734																							$3,734
D305009 Unit Heaters (Electric)	Replace Unit Heaters (Electric)	2 - Good	Life Cycle Replacement	18	2027	$9,335							$9,335																		$9,335						$18,670
D305010 Electric Baseboard Heaters	Replace Electric Baseboard Heaters	4 - Poor	Life Cycle Replacement	18	2022	$2,240		$2,240																		$2,240											$4,481
D40 - Fire Protection																																					
D403002 Fire Extinguishers	Replace Fire Extinguishers	2 - Good	Life Cycle Replacement	10	2027	$765							$765										$765										$765				$2,296
D50 - Electrical																																					
D501005 Panelboards up to 400A - 1983	Replace Panelboards up to 400A	2 - Good	Life Cycle Replacement	40	2027	$9,335							$9,335																								$9,335
D501025 LV Main Service Disconnects	Replace LV Main Service Disconnects	2 - Good	Life Cycle Replacement	40	2027	$5,601							$5,601																								$5,601
D502001 Branch Wiring and Devices	Replace Branch Wiring and Devices	2 - Good	Life Cycle Replacement	50	2033	$72,720													$72,720																		$72,720
D502041 Exterior Lighting	Replace Exterior Lighting	1 - Excellent	Life Cycle Replacement	20	2039	$3,734																			$3,734												$3,734
D502053 Illuminated Combo Exit Signs	Replace Illuminated Combo Exit Signs	2 - Good	Life Cycle Replacement	35	2045	$4,201																									$4,201						$4,201
D503008 Security Systems - Intrusion Alarm Systems	Replace Security Systems - Intrusion Alarm Systems	2 - Good	Life Cycle Replacement	20	2030	$11,482										$11,482																				$11,482	$22,964
D503031 Video Surveillance Systems	Replace Video Surveillance Systems	2 - Good	Life Cycle Replacement	20	2035	$7,655															$7,655																$7,655
D509002 Emergency Power Generator Systems	Replace Emergency Power Generator Systems	2 - Good	Life Cycle Replacement	30	2045	$84,015																									$84,015						$84,015
E - Equipment & Furnishings																																					
F - Special Construction & Demolition																																					
F101099 Other Special Construction - Seacan	Replace Other Special Construction	2 - Good	Life Cycle Replacement	30	2042	$9,335																						$9,335									$9,335
G - Site Surfacing and Landscaping																																					
G201005 Guardrails and Barriers	Replace Guardrails and Barriers	2 - Good	Life Cycle Replacement	30	2029	$53,770									$53,770																						$53,770
G201025 Gravel Paved Surface - Roadway	Undertake an engineering study to determine the source and provide a solution for site stormwater ponding and ground heaving around the west entrance.	3 - Fair	Engineering Study	15	2022	$7,500		$7,500																													$7,500
G201025 Gravel Paved Surface - Roadway	Complete regrading/repairs as directed by the engineering report.	3 - Fair	Major Repair	15	2023	$50,000			$50,000																												$50,000
G201025 Gravel Paved Surface - Roadway	Replace Gravel Paved Surface - Roadway	3 - Fair	Life Cycle Replacement	15	2030	$150,294										$150,294															$150,294						$300,587
G202024 Gravel Paved Surface - Parking Area	Replace Gravel Paved Surface - Parking Area	2 - Good	Life Cycle Replacement	15	2027	$4,668							$4,668															$4,668									$9,335
G203022 Concrete Paved Surfaces	Replace Concrete Paved Surfaces	2 - Good	Life Cycle Replacement	30	2042	$41,587																						$41,587									$41,587
G204021 Fencing and Gates - Chain Link Fence	Replace Fencing and Gates - Chain Link Fence	2 - Good	Life Cycle Replacement	30	2042	$10,082																						$10,082									$10,082
G301024 Water Supply Infrastructure	Replace Water Supply Infrastructure	2 - Good	Life Cycle Replacement	50	2049	$32,934																													$32,934		$32,934
G301099 OtherWater Supply - Buried Water Tanks	Replace OtherWater Supply	2 - Good	Life Cycle Replacement	50	2049	$74,680																													$74,680		$74,680
G302016 Septic Tank (4000 Gallons)	Replace Septic Tank (4000 Gallons)	2 - Good	Life Cycle Replacement	50	2033	$49,476													$49,476																		$49,476
G306004 Fuel Storage Tanks - Aboveground Less than 10,000 L	Replace Fuel Storage Tanks - Aboveground Less than 10,000 L	2 - Good	Life Cycle Replacement	30	2042	$73,653																						$73,653									$73,653
G401011 Electrical Service	Replace Electrical Service	2 - Good	Life Cycle Replacement	50	2049	$24,458																													$24,458		$24,458
					Total Capital Renewals	$1,619,015	$0	$80,231	$50,000	$56,828	$0	$23,898	$165,401	$70,946	$110,480	$161,776	$0	$64,972	$156,641	$66,559	$7,655	$0	$16,448	$0	$313,208	$6,721	$8,168	$233,571	$0	$0	$247,844	$0	$24,663	$0	$149,995	$11,482	$2,027,486

APPENDIX C

Reserve Fund Analysis

Cash Flow Table

Scenario 0: No Contribution

Reserve Fund Opening Balance	$ 274,135	Assumed Annual Inflation Rate for Reserve Fund Expenditures	2.00%
Projected Minimum Reserve Fund Balance	$ (2,678,316)	Assumed Annual Interest Rate for Interest Earned on Reserve Fund	2.00%

Year	Opening Balance	Recommended Annual Contribution	Other Contribution	Estimated Inflation Adjusted Expenditures	Estimated Interest Earned	% Increase In Recommended Annual Contribution	Closing Balance	Average Contribution Per Unit, Per Month
2021	$ 274,135	$ -	$ -	$ -	$ 5,483	n/a	$ 279,618	$ -
2022	$ 279,618	$ -	$ -	$ 85,680	$ 5,538	2.00%	$ 199,476	$ -
2023	$ 199,476	$ -	$ -	$ 54,621	$ 4,791	2.00%	$ 149,646	$ -
2024	$ 149,646	$ -	$ -	$ 63,513	$ 3,491	2.00%	$ 89,623	$ -
2025	$ 89,623	$ -	$ -	$ -	$ 2,393	2.00%	$ 92,016	$ -
2026	$ 92,016	$ -	$ -	$ 27,823	$ 1,816	2.00%	$ 66,010	$ -
2027	$ 66,010	$ -	$ -	$ 195,108	$ 1,580	2.00%	$ (127,518)	$ -
2028	$ (127,518)	$ -	$ -	$ 85,635	$ -	2.00%	$ (213,152)	$ -
2029	$ (213,152)	$ -	$ -	$ 136,557	$ -	2.00%	$ (349,709)	$ -
2030	$ (349,709)	$ -	$ -	$ 202,030	$ -	2.00%	$ (551,739)	$ -
2031	$ (551,739)	$ -	$ -	$ -	$ -	2.00%	$ (551,739)	$ -
2032	$ (551,739)	$ -	$ -	$ 84,860	$ -	2.00%	$ (636,600)	$ -
2033	$ (636,600)	$ -	$ -	$ 207,738	$ -	2.00%	$ (844,338)	$ -
2034	$ (844,338)	$ -	$ -	$ 91,005	$ -	2.00%	$ (935,343)	$ -
2035	$ (935,343)	$ -	$ -	$ 11,084	$ -	2.00%	$ (946,427)	$ -
2036	$ (946,427)	$ -	$ -	$ -	$ -	2.00%	$ (946,427)	$ -
2037	$ (946,427)	$ -	$ -	$ 36,036	$ -	2.00%	$ (982,462)	$ -
2038	$ (982,462)	$ -	$ -	$ 73,513	$ -	2.00%	$ (1,055,975)	$ -
2039	$ (1,055,975)	$ -	$ -	$ 470,893	$ -	2.00%	$ (1,526,868)	$ -
2040	$ (1,526,868)	$ -	$ -	$ 9,178	$ -	2.00%	$ (1,536,046)	$ -
2041	$ (1,536,046)	$ -	$ -	$ 12,482	$ -	2.00%	$ (1,548,528)	$ -
2042	$ (1,548,528)	$ -	$ -	$ 373,991	$ -	2.00%	$ (1,922,518)	$ -
2043	$ (1,922,518)	$ -	$ -	$ -	$ -	2.00%	$ (1,922,518)	$ -
2044	$ (1,922,518)	$ -	$ -	$ -	$ -	2.00%	$ (1,922,518)	$ -
2045	$ (1,922,518)	$ -	$ -	$ 417,148	$ -	2.00%	$ (2,339,666)	$ -
2046	$ (2,339,666)	$ -	$ -	$ -	$ -	2.00%	$ (2,339,666)	$ -
2047	$ (2,339,666)	$ -	$ -	$ 43,927	$ -	2.00%	$ (2,383,594)	$ -
2048	$ (2,383,594)	$ -	$ -	$ -	$ -	2.00%	$ (2,383,594)	$ -
2049	$ (2,383,594)	$ -	$ -	$ 274,211	$ -	2.00%	$ (2,657,805)	$ -
2050	$ (2,657,805)	$ -	$ -	$ 20,511	$ -	2.00%	$ (2,678,316)	$ -

Note 1: The contributions for the 2021 fiscal year are amounts budgeted by Moberly Lake Fire Hall

Note 2: The 2021 Estimated Inflation Adjusted Expenditures includes approved CRF expenditures for the fiscal year, if any.

Note 3: The projections included in this table are estimates only, based on the information available at the time of preparation. The condition assessment must be updated regularly as the actual figures will vary from the amounts detailed in this table due to changes in interest rates, inflation rates and scheduling of the repair/replacement work.

Cash Flow Table

Scenario 1: Contributions Increase with Inflation

Reserve Fund Opening Balance	$ 274,135	Assumed Annual Inflation Rate for Reserve Fund Expenditures	2.00%
Projected Minimum Reserve Fund Balance	$ 21,944	Assumed Annual Interest Rate for Interest Earned on Reserve Fund	2.00%

Year	Opening Balance	Recommended Annual Contribution	Other Contribution	Estimated Inflation Adjusted Expenditures	Estimated Interest Earned	% Increase In Recommended Annual Contribution	Closing Balance	Average Contribution Per Unit, Per Month
2021	$ 274,135	$ -	$ -	$ -	$ 5,483	n/a	$ 279,618	$ -
2022	$ 279,618	$ 73,500	$ -	$ 85,680	$ 5,538	2.00%	$ 272,976	$ 6,125
2023	$ 272,976	$ 74,970	$ -	$ 54,621	$ 5,526	2.00%	$ 298,851	$ 6,248
2024	$ 298,851	$ 76,469	$ -	$ 63,513	$ 5,718	2.00%	$ 317,525	$ 6,372
2025	$ 317,525	$ 77,999	$ -	$ -	$ 6,164	2.00%	$ 401,687	$ 6,500
2026	$ 401,687	$ 79,559	$ -	$ 27,823	$ 7,192	2.00%	$ 460,616	$ 6,630
2027	$ 460,616	$ 81,150		$ 195,108	$ 8,623	2.00%	$ 355,281	$ 6,762
2028	$ 355,281	$ 82,773	$ -	$ 85,635	$ 8,159	2.00%	$ 360,578	$ 6,898
2029	$ 360,578	$ 84,428	$ -	$ 136,557	$ 7,159	2.00%	$ 315,608	$ 7,036
2030	$ 315,608	$ 86,117	$ -	$ 202,030	$ 6,762	2.00%	$ 206,457	$ 7,176
2031	$ 206,457	$ 87,839	$ -	$ -	$ 5,221	2.00%	$ 299,517	$ 7,320
2032	$ 299,517	$ 89,596	$ -	$ 84,860	$ 5,060	2.00%	$ 309,312	$ 7,466
2033	$ 309,312	$ 91,388		$ 207,738	$ 6,088	2.00%	$ 199,051	$ 7,616
2034	$ 199,051	$ 93,216	$ -	$ 91,005	$ 5,084	2.00%	$ 206,345	$ 7,768
2035	$ 206,345	$ 95,080	$ -	$ 11,084	$ 4,054	2.00%	$ 294,395	$ 7,923
2036	$ 294,395	$ 96,982	$ -	$ -	$ 5,007	2.00%	$ 396,384	$ 8,082
2037	$ 396,384	$ 98,921	$ -	$ 36,036	$ 6,908	2.00%	$ 466,178	$ 8,243
2038	$ 466,178	$ 100,900	$ -	$ 73,513	$ 8,626	2.00%	$ 502,190	$ 8,408
2039	$ 502,190	$ 102,918	$ -	$ 470,893	$ 9,684	2.00%	$ 143,899	$ 8,576
2040	$ 143,899	$ 104,976	$ -	$ 9,178	$ 6,461	2.00%	$ 246,158	$ 8,748
2041	$ 246,158	$ 107,076	$ -	$ 12,482	$ 3,901	2.00%	$ 344,652	$ 8,923
2042	$ 344,652	$ 109,217	$ -	$ 373,991	$ 5,908	2.00%	$ 85,787	$ 9,101
2043	$ 85,787	$ 111,401	$ -	$ -	$ 4,304	2.00%	$ 201,493	$ 9,283
2044	$ 201,493	$ 113,630	$ -	$ -	$ 2,873	2.00%	$ 317,995	$ 9,469
2045	$ 317,995	$ 115,902	$ -	$ 417,148	$ 5,195	2.00%	$ 21,944	$ 9,659
2046	$ 21,944	$ 118,220	$ -	$ -	$ 3,399	2.00%	$ 143,563	$ 9,852
2047	$ 143,563	$ 120,585	$ -	$ 43,927	$ 1,655	2.00%	$ 221,876	$ 10,049
2048	$ 221,876	$ 122,996	$ -	$ -	$ 3,654	2.00%	$ 348,526	$ 10,250
2049	$ 348,526	$ 125,456	$ -	$ 274,211	$ 5,704	2.00%	$ 205,475	$ 10,455
2050	$ 205,475	$ 127,965	$ -	$ 20,511	$ 5,540	2.00%	$ 318,470	$ 10,664

Note 1: The contributions for the 2021 fiscal year are amounts budgeted by Moberly Lake Fire Hall

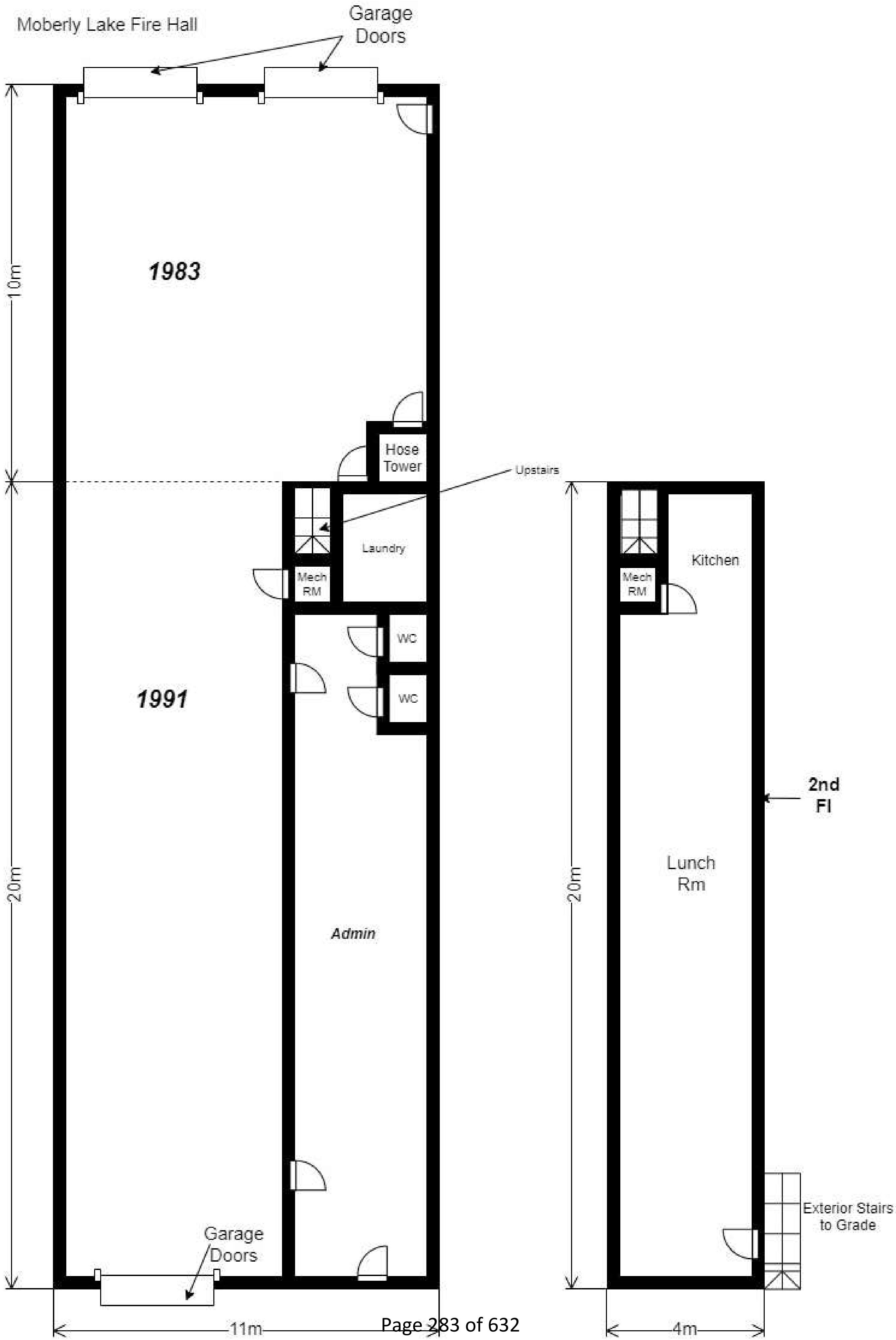
Note 2: The 2021 Estimated Inflation Adjusted Expenditures includes approved CRF expenditures for the fiscal year, if any.

Note 3: The projections included in this table are estimates only, based on the information available at the time of preparation. The condition assessment must be updated regularly as the actual figures will vary from the amounts detailed in this table due to changes in interest rates, inflation rates and scheduling of the repair/replacement work.

APPENDIX D

Floor Plan/Site Plan


Highway 29
Highway 29
Highway 29
N
Moberly Lake Community Hall
Moberly Lake Fire Hall
Generator
Lakeshore Drive
Lakeshore Drive
Lakeshore Drive


Moberly Lake Fire Hall
Garage Doors
1983
10m
Hose Tower
Upstairs
Laundry
Mech RM
WC
WC
1991
20m
Admin
Garage Doors
11m
Kitchen
Mech RM
2nd Fl
Lunch Rm
20m
Exterior Stairs to Grade
4m

APPENDIX E

Preventative Maintenance Plan

Moberly Lake Fire Hall

Equipment List

Uniformat Code	Uniformat Name	Quantity	Description (If Applicable)	PM ID Number
B203022	Overhead Doors - Industrial	3		0003
D202006	Domestic Water Booster Systems/Pumps	1		0016
D202008	Domestic Water Expansion Tanks/Pressure Tank	1	Well Water Pressure Tank	0017
D202035	Electric Domestic Water Heaters (Residential Tank Type)	1		0023
D302003	Fuel Fired Forced Air Furnace	1		0030
D302032	Fuel-Fired Radiant Tube Heaters	2		0031
D305009	Unit Heaters (Electric)	2		0058
D403002	Fire Extinguishers	Not Available		0071
D501005	Panelboards up to 400A	2		0077
D501025	LV Main Service Disconnects	1		0079
D509002	Emergency Power Generator Systems	1		0085
D503008	Illuminated Combo Exit Signs	Not Available		0086
D509031	Automatic Transfer Switches (ATSs) up to 400A	1		0088
G306004	Fuel Storage Tanks - Aboveground Less than 10,000 L	1		0092

Moberly Lake Fire Hall
Preventative Maintenance Plan

PM ID Number	Component Name	PM Task List	Frequency	Estimated Time (Minutes)	Quantity	Resource/ Craft	Materials / Consumables	LOTO (Y/N)
0003	Overhead Doors - Industrial	Clean all hinges/hardware and lubricate as required per the manufacture's specifications. Inspect and clean all rollers, bearings, cables, chains, shaft, tracks, and hardware. Clean and test automatic sensors/door operators. Test operation of all buttons, controls, and switches. Inspect the motor, including electrical connections. Check electric motors for excessive vibration, unusual noise, and odours. Lubricate the motor as per manufacturer's specifications. Tighten the sprockets, brake solenoids, and armatures, as required. Lubricate all bearings, chains, gear reducers, disconnects and pivot points as per the manufacturer's specifications, Inspect the operator bearings, disconnect linkage, and chain hoist assemblies (If Applicable). Test the emergency shut-off switch, if present. Verify the sequence of operation, including any controls and safety mechanisms.	quarterly	120	Each	Door Technician	Toolset, Lubricant, Testing Equipment	Y
0016	Pumps	Visually assess the pump, fittings, and mounts for signs of corrosion, excessive sweating, and leaks. Lubricate pump bearings as per manufacturer's specifications Lubricate motor bearing as per manufacturer's specifications Check motor mounts and vibration pads to ensure there is not excessive vibration (If applicable). Ensure vents are clear of dust and obstruction. Visually assess electrical connections for loose or frayed wiring. Visually assess all mechanical seals. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	weekly	10	Each	Building Technician	Toolset	N
0017	Domestic Water Expansion Tanks/Pressure Tank,	Visually assess the tank and associated fittings for signs of corrosion or leaks. Check and record any associated pressure gauges and compare with past data. If there is a drop in pressure, or domestic water pressure is low, test the pressure of the tank and add/remove air as required. If possible, listen for unusual sounds that may indicate a perforation in the interior bladder (if applicable) such as bubbling or dripping.	weekly	5	Each	Building Technician	NA	N
0023	Electric Domestic Water Heaters	Inspect the tank and associated pipes and fittings for signs of leaks or corrosion. Visually assess electrical connections for loose or frayed wiring. Flush the tank. To prevent a vacuum from forming during flushing, run the hot water in a nearby sink and leave it running for the duration of the flushing process. Connect a hose or transfer pump to the drain outlet of the hot water heater and open the drain/blow down valve. Leave the valve open until water runs clear and free of sediment. Close the drain valve and turn off the hot water in the nearby tap set.	semi-annually	20	Each	Building Technician	Toolset, Drain Hose/Transfer Pump	N
0030	Fuel Fired Forced Air Furnace	Replace filters, if needed. Depower the furnace and remove the front cover(s). Remove any dirt and debris from the cabinet interior. Check the interior components for signs of excessive wear and tear, indications of burn marks or short circuits, and oxidization. Check the burner element for signs of material breakdown or blockages. Inspect the blower motor for sings of damage or excessive wear and tear. Visually assess electrical connections for loose or frayed wiring. Check to ensure the condensate drain line is free of clogs or blockages and is properly directed to a sanitary drain. (If applicable) Check to ensure the vent/chimney is free of blockages. Inspect the chimney to ensure it is free of rust, moisture, or leaks. Inspect gas/fuel piping to ensure it is free of rust or leaks. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	quarterly	20	Each	Building Technician	Toolset, Filters, Cleaning Supplies	Y
0030	Fuel Fired Forced Air Furnace	Replace filters. Replace the fan belt (If applicable). Remove the front cover(s) and inspect and test all system components including but not limited to; gas/fuel-fired burners, ignition systems, pilot light systems, burner assemblies, blower motor, dampers, and chimneys. Tighten all mechanical and electrical components. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	semi-annually	45	Each	HVAC Technician	Toolset, Filters, Belts, Testing Equipment	Y
0031	Fuel Fired Radiant Tube Heaters	Clean heating elements with a non-abrasive cleaner that is approved by the manufacturer. Compressed air may be used to clear out dust and debris. Inspect radiant heating elements for signs of cracks, damage, deterioration, or leaks. Remove the cover(s) and inspect and test all system components including but not limited to; gas/fuel-fired burners, ignition systems, pilot light systems, burner assemblies, dampers, and chimneys. Tighten all mechanical and electrical components. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	semi-annually	120	Each	Gas Technician	Toolset, Testing Equipment, Cleaning Supplies, Air Compressor	Y

Moberly Lake Fire Hall

Preventative Maintenance Plan

PM ID Number	Component Name	PM Task List	Frequency	Estimated Time (Minutes)	Quantity	Resource/ Craft	Materials / Consumables	LOTO (Y/N)
0058	Unit Heaters (Electric)	Depower the unit and open the cabinet and clean the interior, including fan blades if they are accessible. While the unit is off, inspect the interior components for signs of damage, burns, or unusual odours. Ensure fan bearings are lubricated as per manufacturer specification. Visually assess electrical connections and heating element for loose or frayed wiring. Clean any fins or manifolds. Close the cabinet and restore power to the unit. Inspect the unit under normal operation and monitor for unusual noises, odours, or excessive vibration. Verify the sequence of operation, including any controls, redundancy systems, and safety mechanisms.	quarterly	20	Each	Building Technician	Toolset, Cleaning Supplies	Y
0071	Fire Extinguishers	Inspect the fire extinguisher and ensure the needle reads within acceptable ranges on the pressure gauge. Ensure the fire extinguisher is properly mounted/seated. Check to ensure pins are in place and secured with unbroken break-away ties. Initial the monthly inspection tags.	monthly	5	Each	Building Technician	NA	N
0071	Fire Extinguishers	Complete an annual inspection in accordance with fire code regulations and update inspection tags. Annual inspections must be performed by a technician who is licensed to do so.	annually	10	Each	Licensed Technician	Inspection Tags	N
0071	Fire Extinguishers	Complete hydrostatic testing. Recharge or replace the fire extinguisher as needed.	10 years	30	Each	Licensed Technician	Specialized re-charging equipment.	N
0077	Panelboards	Perform thermal imaging (infrared scanning) to detect hot spots (excess heat) in electrical components. While thermal imaging is being undertaken, inspect electrical panelboards for missing breakers, panel schedules, knockouts, or unusual sounds or odours. Provide a detailed thermal imaging report based on the results of the infrared scanning.	3 years	10	Each	Electrician	Thermal Imaging Camera, Toolset	N
0079	Main Switches / Disconnects	Perform thermal imaging (infrared scanning) to detect hot spots (excess heat) in electrical components. While thermal imaging is being undertaken, inspect the switch for missing schedules, knockouts, or unusual sounds or odours. Provide a detailed thermal imaging report based on the results of the infrared scanning.	3 years	10	Each	Electrician	Thermal Imaging Camera, Toolset	N
0085	Emergency Power Generator Systems	Inspect fuel level and pressure to ensure it is full. Inspect lubricating oil and engine coolant levels and report if they not compliant with manufacturer specifications. Test annunciator lamps to confirm that they are operational, if applicable. If the unit has a display, check it to ensure there are no alarms or notifications. Visually assess the entire system for signs of damage, leaks, corrosion, or other issues. Operate the generator for 30 minutes, not under electrical load. (No Load Test) Inspect the unit while it is running and monitor for unusual noises, odours, or excessive vibration. Record any available statistics while the generator is operable and compare to past collected data. Inspect for correct operation of all auxiliary equipment, e.g., radiator shutter control, coolant pumps, fuel transfer pumps, oil coolers, and engine room ventilation system(s).	weekly	45	Each	Building Technician	Hearing Protection	N
0085	Emergency Power Generator Systems	Note: This monthly preventative maintenance event should replace the weekly preventative maintenance event that would normally fall on this week. Inspect day tank fuel level and pressure to ensure it is full. Inspect lubricating oil and engine coolant levels and report if they not compliant with manufacturer specifications. Test annunciator lamps to confirm that they are operational, if applicable. If the unit has a display, check it to ensure there are no alarms or notifications. Visually assess the entire system for signs of damage, leaks, corrosion, or other issues. Operate the generator for 60 minutes under electrical load. (Full Load Test) Inspect the unit while it is running and monitor for unusual noises, odours, or excessive vibration. Record any available statistics while the generator is operable and compare to past collected data. While the full load test is being completed, ensure any lighting operated by the generator for use as emergency lighting is illuminated properly. Inspect for correct operation of all auxiliary equipment, e.g., radiator shutter control, coolant pumps, fuel transfer pumps, oil coolers, and engine room ventilation system(s).	monthly	75	Each	Building Technician	Hearing Protection	N

Moberly Lake Fire Hall
Preventative Maintenance Plan

PM ID Number	Component Name	PM Task List	Frequency	Estimated Time (Minutes)	Quantity	Resource/ Craft	Materials / Consumables	LOTO (Y/N)
0085	Emergency Power Generator Systems	Inspect, test, and calibrate all generator systems including but not limited to; the engine and all associated components, fuel tanks, fuel pumps, filters, oil, coolant, controls, transfer switches, dampers/linkages, safety systems. Clean all generator systems with a manufacturer approved degreasing agent or non-abrasive cleaner. Lubricate any bearings/nipples as per manufacturer specifications. Replace any oil/coolant filters Test the voltage of the batteries and replace if they are outputting less than 80% of the rated voltage. Inspect, test, and calibrate the battery charging station. Check belt alignment and correct as needed. Replace the belts, if needed. Test operation of any manual or automatic transfer switching equipment. Operate the generator for 60 minutes, under full electrical load. (Full Load Test) Record any available statistics while the generator is operable and compare to past collected data.	semi-annually	180	Each	Licensed Generator Technician	Hearing Protection, Toolset, Lubricant, Belts, Coolant, Cleaning Supplies	Y
0085	Emergency Power Generator Systems	Inspect, test, and calibrate all generator systems including but not limited to; the engine and all associated components, fuel tanks, fuel pumps, filters, oil, coolant, controls, transfer switches, dampers/linkages, safety systems. Clean all generator systems with a manufacturer approved degreasing agent or non-abrasive cleaner. Lubricate any bearings/nipples as per manufacturer specifications. Clean an d lubricate all linkages/dampers. Test the voltage of the batteries and replace if they are outputting less than 80% of the rated voltage. Inspect, test, and calibrate the battery charging station. Check belt alignment and correct as needed. Replace the belts, if needed. Test operation of any manual or automatic transfer switching equipment. Test strength of coolant and chemical protection level of coolant inhibitors. Inspect the exhaust system. Check and record the back pressure of the exhaust system to ensure that it complies with the engine manufacturer's requirements, and compare with previous readings. Test surge suppressor and rotating rectifier on brushless machines. Clean rotor and stator windings using clean compressed air. Inspect coupling bolts and alignment. For spark ignition engines, inspect all components of ignition system(s) and service or replace as appropriate. Inspect all external surfaces of heat exchanger(s) and clean as necessary. Operate the generator for 120 minutes, under full electrical load. (Full Load Test) Record any available statistics while the generator is operable and compare to past collected data.	annually	240	Each	Licensed Generator Technician	Hearing Protection, Toolset, Lubricant, Belts, Coolant, Cleaning Supplies	Y
0086	Emergency Lighting - Battery Pack Units (EBUs), Emergency Lighting Systems, Illuminated Combo	Check to confirm operation of light(s) and that unit is secure and free from obstruction. Confirm operation of light by engaging test switch (Battery Operated Devices) or otherwise depowering the unit. Lights must remain illuminated for 30 minutes. Initial the monthly inspection tags.	monthly	60	Total	Building Technician	NA	N
0086	Emergency Lighting - Battery Pack Units (EBUs), Emergency Lighting Systems,	Annual certification of the emergency lighting system including a full timed test for each light (90 minutes). Annual certification must be completed by a technician who is licensed to do so. Provide annual inspection tags on each unit.	annually	180	Total	Licensed Technician	Toolset, Testing Equipment	N
0088	Automatic Transfer Switches (ATSs) up to 400A	Note that transfer switch operation is included under the emergency generator task list and this task list is specific to the electrical components of the transfer switch. Perform thermal imaging (infrared scanning) to detect hot spots (excess heat) in electrical components. While thermal imaging is being undertaken, inspect the transfer switch for missing knockouts, or unusual sounds or odours. Provide a detailed thermal imaging report based on the results of the infrared scanning.	3 years	10	Each	Electrician	Thermal Imaging Camera, Toolset	Y
0092	Fuel Storage Tanks - Aboveground Less than 10,000 L	Ensure the pathway to the tank is clear of obstruction. Remove vegetation growth around the tank and cement pad (if applicable). Check for leaks, spills, or unusual odours. Wipe the tank exterior with a damp rag to removed build-up of grime. Visually assess the tank fill or regulator components. Ensure the fill cap is secured and locked (if applicable).	weekly	10	Each	Building Technician	NA	N

OPINION OF PROBABLE COST TABLE

Client	Peace River Regional District
Site No.	
Building Name	Moberly Lake Fire Hall
Address	
Project No.	21075
Date	Thursday, September 02, 2021

Element Name	Recommendation Description	Element Condition	Recommendation Type	Expected Useful Life (Years)	Recommendation Year	Recommendation Cost	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Totals (2021 - 2050)
A - Substructure																																					
B - Shell																																					
B10 - Superstructure																																					
B103001 Structure	Remove the wood ladder and platforms and install an automated winch system for the hose drying tower	3 - Fair	Major Repair	75	2022	$10,000		$10,000																													$10,000
B20 - Exterior Enclosure																																					
B201010 Exterior Coatings/Paint	Replace Exterior Coatings/Paint	4 - Poor	Life Cycle Replacement	10	2022	$56,010		$56,010										$56,010										$56,010									$168,030
B201024 Metal Siding	Replace Metal Siding	2 - Good	Life Cycle Replacement	40	2031	$224,040											$224,040																				$224,040
B202001 Windows	Replace Windows	2 - Good	Life Cycle Replacement	35	2032	$12,416												$12,416																			$12,416
B203022 Overhead Doors - Industrial	Replace Overhead Doors - Industrial	2 - Good	Life Cycle Replacement	25	2028	$67,212								$67,212																							$67,212
B203023 Single Door - Hollow Metal	Replace Single Door - Hollow Metal	3 - Fair	Life Cycle Replacement	30	2027	$23,898							$23,898																								$23,898
B30 - Roofing																																					
C - Interiors																																					
C101001 Fixed Partitions	Undertake a hazardous materials assessment.	2 - Good	Engineering Study	75	2024	$5,000				$5,000																											$5,000
C102022 Single Door - Wood	Replace Single Door - Wood	2 - Good	Life Cycle Replacement	40	2031	$33,606											$33,606																				$33,606
C103009 Cabinets - Kitchens	Replace Cabinets - Kitchens	2 - Good	Life Cycle Replacement	35	2027	$11,202							$11,202																								$11,202
C103010 Vanities	Replace Vanities	2 - Good	Life Cycle Replacement	25	2027	$4,481							$4,481																								$4,481
C103011 Cabinets - General	Replace Cabinets - General	2 - Good	Life Cycle Replacement	35	2027	$44,808							$44,808																								$44,808
C201002 Exterior Stair Construction	Replace Exterior Stair Construction	2 - Good	Life Cycle Replacement	40	2031	$18,670											$18,670																				$18,670
C301005 Paint Wall Covering	Replace Paint Wall Covering	2 - Good	Life Cycle Replacement	10	2027	$11,949							$11,949										$11,949										$11,949				$35,846
C301099 Other Wall Finishes - Metal Wall Finish	Replace Other Wall Finishes	2 - Good	Life Cycle Replacement	30	2027	$46,675							$46,675																								$46,675
C302007 Painted / Sealed Concrete Floor	Replace Painted / Sealed Concrete Floor	2 - Good	Life Cycle Replacement	15	2027	$19,566							$19,566															$19,566									$39,132
C302023 Vinyl Sheet Floor	Replace Vinyl Sheet Floor	3 - Fair	Life Cycle Replacement	15	2024	$33,158				$33,158															$33,158												$66,316
C303006 Painted Ceiling Structures	Replace Painted Ceiling Structures	2 - Good	Life Cycle Replacement	15	2032	$8,962												$8,962															$8,962				$17,923
D - Services																																					
D10 - Conveying																																					
D20 - Plumbing																																					
D201001 Water Closets	Replace Water Closets	2 - Good	Life Cycle Replacement	35	2032	$3,734												$3,734																			$3,734
D201003 Lavatories	Replace Lavatories	2 - Good	Life Cycle Replacement	35	2027	$3,734							$3,734																								$3,734
D201004 Sinks	Replace Sinks	3 - Fair	Life Cycle Replacement	35	2032	$1,867												$1,867																			$1,867
D201012 Shower Assembly	Replace Shower Assembly	2 - Good	Life Cycle Replacement	25	2027	$11,202							$11,202																								$11,202
D201016 Custodial Sinks	Replace Custodial Sinks	2 - Good	Life Cycle Replacement	30	2027	$1,867							$1,867																								$1,867
D202001 Domestic Water Pipes and Fittings	Replace Domestic Water Pipes and Fittings	2 - Good	Life Cycle Replacement	40	2027	$30,619							$30,619																								$30,619
D202006 Domestic Water Booster Systems/Pumps	Replace Domestic Water Booster Systems/Pumps	2 - Good	Life Cycle Replacement	20	2037	$3,734																	$3,734														$3,734
D202008 Domestic Water Expansion Tanks/Pressure Tank	Replace Domestic Water Expansion Tanks/Pressure Tank	2 - Good	Life Cycle Replacement	30	2047	$2,987																											$2,987				$2,987
D202035 Electric Domestic Water Heaters (Residential Tank Type)	Replace Electric Domestic Water Heaters (Residential Tank Type)	2 - Good	Life Cycle Replacement	12	2029	$8,168									$8,168												$8,168										$16,336
D203001 Sanitary Waste and Vent Piping	Replace Sanitary Waste and Vent Piping	2 - Good	Life Cycle Replacement	50	2033	$34,446													$34,446																		$34,446
D203007 Interceptor Systems	Replace Interceptor Systems	2 - Good	Life Cycle Replacement	25	2027	$37,340							$37,340																								$37,340
D30 - HVAC																																					
D301002 Gas Supply Systems	Replace Gas Supply Systems	2 - Good	Life Cycle Replacement	40	2029	$9,339									$9,339																						$9,339
D302003 Fuel Fired Forced Air Furnace	Replace Fuel Fired Forced Air Furnace	4 - Poor	Life Cycle Replacement	18	2022	$4,481		$4,481																		$4,481											$8,962
D302032 Fuel-Fired Radiant Tube Heaters	Replace Fuel-Fired Radiant Tube Heaters	3 - Fair	Life Cycle Replacement	18	2024	$18,670				$18,670																		$18,670									$37,340
D304001 Air Distribution Systems	Replace Air Distribution Systems	2 - Good	Life Cycle Replacement	50	2041	$17,923																					$17,923										$17,923
D304033 Exhaust Fan - Ceiling (Residential)	Replace Exhaust Fan - Ceiling (Residential)	2 - Good	Life Cycle Replacement	25	2028	$3,734								$3,734																							$3,734
D305009 Unit Heaters (Electric)	Replace Unit Heaters (Electric)	2 - Good	Life Cycle Replacement	18	2027	$9,335							$9,335																		$9,335						$18,670
D305010 Electric Baseboard Heaters	Replace Electric Baseboard Heaters	4 - Poor	Life Cycle Replacement	18	2027	$2,240							$2,240																		$2,240						$4,481
D40 - Fire Protection																																					
D403002 Fire Extinguishers	Replace Fire Extinguishers	2 - Good	Life Cycle Replacement	10	2027	$765							$765										$765										$765				$2,296
D50 - Electrical																																					
D501005 Panelboards up to 400A - 1983	Replace Panelboards up to 400A	2 - Good	Life Cycle Replacement	40	2029	$9,335									$9,335																						$9,335
D501025 LV Main Service Disconnects	Replace LV Main Service Disconnects	2 - Good	Life Cycle Replacement	40	2029	$5,601									$5,601																						$5,601
D502001 Branch Wiring and Devices	Replace Branch Wiring and Devices	2 - Good	Life Cycle Replacement	50	2033	$72,720													$72,720																		$72,720
D502041 Exterior Lighting	Replace Exterior Lighting	1 - Excellent	Life Cycle Replacement	20	2039	$3,734																			$3,734												$3,734
D502053 Illuminated Combo Exit Signs	Replace Illuminated Combo Exit Signs	2 - Good	Life Cycle Replacement	35	2045	$4,201																									$4,201						$4,201
D503008 Security Systems - Intrusion Alarm Systems	Replace Security Systems - Intrusion Alarm Systems	2 - Good	Life Cycle Replacement	20	2030	$11,482										$11,482																				$11,482	$22,964
D503031 Video Surveillance Systems	Replace Video Surveillance Systems	2 - Good	Life Cycle Replacement	20	2035	$7,655															$7,655																$7,655
D509002 Emergency Power Generator Systems	Replace Emergency Power Generator Systems	2 - Good	Life Cycle Replacement	30	2045	$84,015																									$84,015						$84,015
E - Equipment & Furnishings																																					
F - Special Construction & Demolition																																					
F101099 Other Special Construction - Seacan	Replace Other Special Construction	2 - Good	Life Cycle Replacement	30	2042	$9,335																						$9,335									$9,335
G - Site Surfacing and Landscaping																																					
G201005 Guardrails and Barriers	Replace Guardrails and Barriers	2 - Good	Life Cycle Replacement	30	2027	$53,770							$53,770																								$53,770
G201025 Gravel Paved Surface - Roadway	Undertake an engineering study to determine the source and provide a solution for site stormwater ponding and ground heaving around the west entrance	3 - Fair	Engineering Study	15	2022	$7,500		$7,500																													$7,500
G201025 Gravel Paved Surface - Roadway	Complete regrading/repairs as directed by the engineering report	3 - Fair	Major Repair	15	2023	$50,000			$50,000																												$50,000
G201025 Gravel Paved Surface - Roadway	Replace Gravel Paved Surface - Roadway	3 - Fair	Life Cycle Replacement	15	2030	$150,294										$150,294															$150,294						$300,587
G202024 Gravel Paved Surface - Parking Area	Replace Gravel Paved Surface - Parking Area	2 - Good	Life Cycle Replacement	15	2027	$4,668							$4,668															$4,668									$9,335
G203022 Concrete Paved Surfaces	Replace Concrete Paved Surfaces	2 - Good	Life Cycle Replacement	30	2042	$41,587																						$41,587									$41,587
G204021 Fencing and Gates - Chain Link Fence	Replace Fencing and Gates - Chain Link Fence	2 - Good	Life Cycle Replacement	30	2042	$10,082																						$10,082									$10,082
G301024 Water Supply Infrastructure	Replace Water Supply Infrastructure	2 - Good	Life Cycle Replacement	50	2041	$32,934																					$32,934										$32,934
G301099 OtherWater Supply - Buried Water Tanks	Replace OtherWater Supply	2 - Good	Life Cycle Replacement	50	2041	$74,680																					$74,680										$74,680
G302016 Septic Tank (4000 Gallons)	Replace Septic Tank (4000 Gallons)	2 - Good	Life Cycle Replacement	50	2033	$49,476													$49,476																		$49,476
G306004 Fuel Storage Tanks - Aboveground Less than 10,000 L	Replace Fuel Storage Tanks - Aboveground Less than 10,000 L	2 - Good	Life Cycle Replacement	30	2042	$73,653																						$73,653									$73,653
G401011 Electrical Service	Replace Electrical Service	2 - Good	Life Cycle Replacement	50	2041	$24,458																					$24,458										$24,458
					Total Capital Renewals	$1,619,015	$0	$77,991	$50,000	$56,828	$0	$0	$318,118	$70,946	$32,443	$161,776	$276,316	$82,988	$156,641	$0	$7,655	$0	$16,448	$0	$36,892	$4,481	$158,163	$233,571	$0	$0	$250,085	$0	$24,663	$0	$0	$11,482	$2,027,486

FCAPX

Submission to

Peace River Regional District

Energy Audit Report for the Moberly Lake Fire Hall

Version: Draft

August 25, 2021

Prepared by:
FCAPX a Division of Roth IAMS Ltd.
Project No. 21075
www.fcapx.com

Executive Summary

Peace River Regional District retained FCAPX a Division of Roth IAMS Ltd (FCAPX) to complete an energy assessment (EA) of the Moberly Lake Firehall, which is located at 6492 Lakeshore Dr, Moberly Lake, BC V0C 1X0. The goal of the EA is to analyze the current energy performance of the facility and provide a list of potential energy conservation measures (ECMs) complete with relevant implementation costs with the aim of reducing energy consumption. The site visit for the energy assessment was conducted on June 17, 2021.

The EA involved a review of the buildings, which form the subject facility. The facility was constructed in parts with the original apparatus hall constructed in 1983 and measuring approximately 110m^2, followed by an addition in 1991 measuring approximately 300m^2. The total floor area of the facility is approximately 410 m^2 (4,411 ft^2). The current annual utility consumption for this facility is approximately 16,849 kWh of electricity and 133 GJ of propane. This equates to an annual greenhouse gas (GHG) emissions of 9.1 Tonnes CO2e per year. The EA revealed the potential for the implementation of energy management measures, which will improve the overall efficiency of the facility.

An analysis of the existing energy consumption profile of the facility was undertaken, and the calculated Energy Utilization Index (EUI) was compared against similar buildings to determine the performance of the facility. The calculated EUI for the firehall is 0.47 GJ/m2. which is significantly lower than 1.04 GJ/m2, the overall EUI for similar buildings under the British Columbia Other Services Secondary Energy Use and GHG Emissions by End-Use 2012-2018.

The table on the following page summarizes potential ECMs that were identified for the Firehall. It is recommended that, prior to implementation, PRRD carefully review the potential ECMs.

By implementing the ECMs listed in Table 1, a potential annual savings of 22 GJ of Propane, and 1,517kWh of electricity may be achieved.

The anticipated GHG savings, based upon emission factors appropriate for British Columbia, with the implementation of all the proposed ECMs, is estimated to be 1.14 Tonnes CO2e/year, which is equivalent to a 12.5% reduction overall.

Implementation of the measures identified in this assessment will assist PRRD to reduce risks associated with utility market volatility and unplanned capital maintenance expenditures.

Table 1
Summary of Potential Energy Conservation Measures - Moberly Lake Fire Hall

Propane	$ 19.850	per GJ
Fuel Oil	$ -	per L
Electricity	$ 0.142	per kWh
Carbon Tax	$ 45.00	per CO2 eq tonne

Province	British Columbia
Escalation Rate (Energy)	0%
Discount Rate	7%

		Utility Savings			Emissions Savings				Financial Analysis					
Measure Number	**Description**	**Natural Gas (GJ)**	**Electricity (kWh)**	**Total ($)**	**Electricity (CO2 eq tonnes/yr)**	**Natural Gas (CO2 eq tonnes/yr)**	**Total (CO2 eq tonnes/yr)**	**Total Savings ($)**	**Total Project Cost ($)**	**SPB[1] (Years)**	**Effective Measure Life (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback DPB (Years)**
ECM-1	High Efficiency LPG (Propane) DHW Heater	- 5	1,517	$ 122	0.02	- 0.24	- 0.22	$ 113	$ 4,500	40.0	15	-$ 3,475	-10.32%	N/A
ECM-2	Replace furnace with high efficiency condensing Furnace	13		$ 258	-	0.65	0.65	$ 287	$ 7,500	26.1	25	-$ 4,150	-0.33%	N/A
ECM-3	Night set back for Administration offices	11		$ 218	-	0.55	0.55	$ 243	$ 750	3.1	25	$ 2,084	32.40%	3.6
ECM-4	Replace radiant tube heaters with high efficiency heaters	3		$ 60	-	0.15	0.15	$ 66	$ 8,000	120.6	25	-$ 7,227	-9.65%	N/A
	Recommended Measure Bundle	**22**	**1,517**	**$ 658**	**0.02**	**1.12**	**1.14**	**$ 710**	**$ 20,750.00**	**29.24**	**22.8**	-$ 12,900.95	**-2.35%**	N/A

Table of Contents

APPENDIX

1 INTRODUCTION

1.1 PURPOSE AND OBJECTIVE

Peace River Regional District retained Roth IAMS Ltd to conduct an energy assessment of the Moberly Lake Firehall, located at 6492 Lakeshore Dr, Moberly Lake, BC V0C 1X0. The purpose for the energy audit was to assist Peace River Regional District in identifying ways to reduce their energy consumption as part of their municipal energy management and GHG reduction plan.

The scope of this study was to analyze the current energy performance of the subject building, provide a list of potential energy conservation measures (ECMs) complete with relevant implementation costs, and simple payback.

The site visit for the EA was conducted on June 17, 2021.

The report has taken into consideration past retrofit work and future capital maintenance requirements in the development of energy conservation measures to ensure an effective and viable energy audit report. Our assessment involved a review of the approximately 410m² (4,411ft²) facility and revealed the potential for the implementation of energy management measures, which would improve the overall efficiency.

1.2 SCOPE OF WORK

The detailed energy consumption assessment consisted of an on-site facility assessment, a utility analysis, and a review and analysis for potential Energy Conservation Measures (ECMs).

The energy assessment report is organized as follows:

- Facility description;
- Utility analysis and benchmarking;
- Energy conservation measures; and,
- Conclusions and recommendations.

The following documents were provided by Peace River Regional District to Roth IAMS for consideration.

- Utility records;
- Maintenance records;
- Previously completed assessment reports (energy, and condition assessments); and,
- Facility drawings and floor layouts.

1.3 Background

Through the energy audit, Peace River Regional District plans to review options to reduce electricity and gas consumption, especially with the ongoing renewal/replacement of systems, some of which are either at or near the end of expected useful life. The findings will be used as part of the overall energy management plan to achieve a reduction in greenhouse gas (GHG) emissions.

The Peace River Regional District, Charlie Lake Firehall was constructed in two phases. The original building was constructed in 1977, and the addition was added in 1987.

The EA subject facility generally includes all areas of the building including Administration offices, lunchroom, washrooms, and vehicle bay. The gross floor area of the facility is approximately 410m² (4,411ft²).

1.4 Key Client Information Summary

Table 2: Key Client Information Summary

Customer Name	PRRD – Moberly Lake Firehall
Site Address	6492 Lakeshore Dr, Moberly Lake, BC V0C 1X0
Contact Person	Trish Morgan
Contact Information	250-784-3600
	Trish.morgan@prrd.bc.ca

1.5 Acknowledgements

Roth IAMS would like to acknowledge the contribution of the following individuals whose help was invaluable in completing this assignment.

- Trish Morgan – Peace River Regional District

1.6 Definitions and Abbreviations

Definitions of key terms and abbreviations can be found in **Appendix A**.

1.7 Energy Assessment Team

The following individuals represented the energy assessment team.

- Curtis Loblick, P.Eng., CEM
- Tim Hobson, M.Sc. Tech., CEM
- Inder Gerwal, Facility Assessor

1.8 Assessment Methodology

1.8.1 Utility Analysis

An analysis of the utility consumption provides a good starting point from which to:

- Identify potential energy conservation measures (ECMs); and,
- Develop a baseline against which ECM performance can be quantified.

The consumption (and demand) registered on historical data for each utility meter can also be examined to identify issues that are affecting the energy performance of the site.

1.8.2 Documentation Review

One of the first steps is to review any available existing documentation. This includes drawings, operation and maintenance manuals, control sequences and previous reports. This helps to understand the current state of the facility.

1.8.3 Site Visits

The site visit includes a detailed interview with technical staff regarding the building's function as well as discussing any issues that were persistent and opportunities for operational optimization. A comprehensive tour of the site is conducted to gather current information and evaluate the Building Envelope, Mechanical and Electrical systems. The following three sections speak specifically to these areas.

1.8.4 Building Envelope System Assessment

The envelope and architectural assessment involve a non-intrusive visual inspection of the facility and a review of any available drawings to determine the condition and type of construction. Special attention will be paid to doors and windows during this review.

1.8.5 Mechanical System Assessment

The mechanical portion of the assessment involves taking a comprehensive inventory of mechanical components and an accurate appraisal of operational times and efficiencies for each mechanism. This is inclusive of all HVAC, Domestic Hot Water, and process related equipment. The Building Automation System (BAS) and/or manual equipment controls will be inventoried and assessed for integration. The sequence of operations will be examined for improvement opportunities.

1.8.6 Electrical System Assessment

A comprehensive assessment of the site's lighting includes a detailed review of the existing fixtures, lighting levels and controls throughout the site. Consideration is also given to operational hours and the diligence of occupants at switching OFF manually operated lighting. A comprehensive assessment of the site's other electrical equipment including motors, transformers and process equipment.

1.8.7 Energy Conservation Measure Identification and Analysis

Each measure proposed for implementation on this project has been selected based on its viability, as measured against the following criteria:

- Costs and savings within overall criteria for evaluation guidelines;
- Appropriateness for tasks performed in the space;
- The condition of existing systems;
- The consistency of application (all areas of similar function are consistent);

- Equipment approval by facilities personnel; and,
- Impact on occupant behaviour and general acceptance of changes.

The energy savings calculations are based on the best estimate of the anticipated reductions taking into consideration direct savings from electrical and gas consumption and electrical demand where appropriate. The savings for most of the recommendations were calculated through simple standard energy savings calculations and spreadsheets.

Costs associated with implementing the respective measures are estimated based on the approximate 'capital cost' for the materials and labour (including demolition and installation). Costs are determined from previous project experience and/or through published cost estimate data (RS Means, Hanscomb, …). All costs represent ROTH IAMS's opinion on construction costs and are provided as approximate estimates to give economies of scale. Further investigation and detailed costing should be carried out prior to implementation.

1.8.8 Recommendations

From the options considered, recommendations are put forward based on financial and practical feasibility using indicators such as simple payback, capital cost and net present value (NPV).

2 FACILITY DESCRIPTION

The following sections summarize observations made during the site investigation.

2.1 OVERVIEW

The Moberly Lake Firehall is located at 6492 Lakeshore Dr, Moberly Lake, BC V0C 1X0. Construction years and the total area of the facility have been estimated based on the data provided by the client. The facility was constructed in parts with the original apparatus hall constructed in 1983 and measuring approximately 110m^2, followed by an addition in 1991 measuring approximately 300m^2, for a total floor area of 410m^2 (4,411ft^2). The facility includes vehicle bay, an administration area, two washrooms, and an upstairs lunchroom.

Table 3: Charlie Lake Firehall Salient Features				
Asset Name	**Year Built**	**Floor Area (square meters)**	**Floor Area (square footage)**	**Building Usage**
Firehall	1983	110	1,183	Vehicle Bay.
Addition	1991	300	3,228	Administration area, two washrooms, and an upstairs lunchroom
Total		**410**	**4,411**	

Figure 1 is a schematic map showing the location and relative size of the different uses in the building.

2.2 OWNER-SUPPLIED REFERENCE MATERIAL

In this report, reference is made to information that has been either collected on site, reported by operations staff and occupants, or through available documents. The reported condition pertains to information provided by the building's operations and maintenance personnel or tenants.

Documents available for review included:

- Utility records including Electricity (Jan 2020 – Feb 2021) and Propane (Jan 2020 – Mar 2021).

2.3 BUILDING ENVELOPE

The building is conventional wood framing with a pitched, wood roof clad in metal roofing resting atop a concrete slab-on-grade. Painted metal siding is provided on all exterior elevations. Metal exterior doors are provided at entrances and exits.

View of the building

2.4 Mechanical Systems

Following is a description of the mechanical systems and components that were identified during the assessment. Mechanical equipment is located in mechanical rooms.

2.4.1 Domestic Hot Water Systems

There is an electric domestic water heater installed in the mechanical room. It is manufactured by GSW (Model: 6ET175PS) and has a tank capacity of 175 litres. The heating input rating is 3000 Watts.

There is a domestic water pump installed in the mechanical room to pull water from the exterior buried domestic water tank. The pump is rated at $^{1}/_{2}$ HP and is manufactured by Diamond.

Electric DHW heater

Domestic water booster pump

2.4.2 Heating Systems

There is a propane propane-fired forced-air furnace installed to provide heating and ventilation to the lunchroom. It is manufactured by American Standard (Model: AUD060C924H3) and has a heating input rating of 60 MBH. A simple adjustable wall mounted thermostat provides control of the furnace which is set at 20ºC.

There are two (2) propane propane-fired radiant tube heaters installed in the vehicle bays. Technical specifications were not available but estimated to be approximately 80 MBH each.

There are two (2) suspended electric unit heaters installed in the 1983 vehicle bay. The ratings were unknown but estimated to be approximately 10 kW each.

The administration area and the washrooms are provided with electric baseboard heaters. The ratings were unknown

Main heating boiler

Propane fired radiant tube heater

Suspended electric unit heater in the Vehicle Bay

Typical electric baseboard heater in the washrooms

2.4.3 Ventilation Systems

Ceiling-mounted exhaust fans are installed in the washrooms to serve as ventilation for these spaces. The fans are all residential style of fractional HP

View of ceiling mounted bathroom exhaust fan

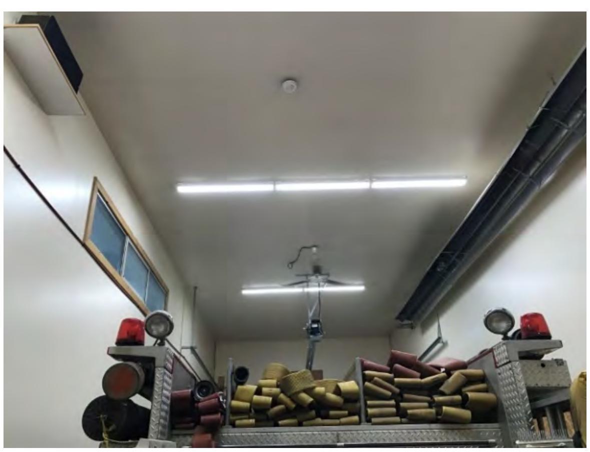
2.5 Electrical Systems

2.5.1 Lighting Systems

Interior lighting is primarily provided via ceiling-mounted LED fixtures. Lighting in the washrooms and stairwell is provided via incandescent fixtures. There is a 4-lamp halogen fixture installed in the kitchenette in the lunchroom. All lighting is controlled by wall mounted switches.

There are wall-mounted combination exit and emergency lighting battery packs installed over exits to direct and illuminate the path of emergency egress.

Exterior lighting is primarily provided via wall-mounted LED fixtures. There are incandescent fixtures installed on the north and south elevations.



Fluorescent T8 Lighting in the facility

Newer LED lighting in the Apparatus Room

2.5.2 Other Systems

A breathing air generator is installed in the vehicle bay. The compressor rating was unknown but based on the unit installed at the Charlie Lake firehall, is estimated to provide 7.5cfm and equipped with a 7.5HP motor and provides breathing air for the portable tanks.

Breathing air generator

3 Utility Analysis and Benchmarking

The following sections detail the energy analysis completed for the building and include a utility analysis, a benchmark comparison, and an estimated breakdown of energy consumed by fuel.

The utility analysis of the facility provides a good starting point from which to identify potential energy conservation opportunities. Billing data was gathered in order to generate the facility utility baseline. The baseline represents a correlation between the weather-corrected utility consumption and the actual recorded data. This baseline provides an illustration of how effective the existing equipment and systems are operating in comparison to changes in the weather. The potential for improved operation relative to the facility baseline presents an indication of the opportunity for utility savings. In creating a baseline, the utility consumption is compared to Heating Degree Days (HDD) and Cooling Degree Days (CDD). By examining this graphically we can see how closely the energy consumption relates to changes in the weather. The result is the development of energy and cost indices, which are then compared with the Office of Energy Efficiency (OEE) and Energy Star benchmarks, to assess the facility's performance against similar buildings.

3.1 Current Utility Consumption

Moberly Lake Firehall electricity and propane consumption data used in the analysis was provided by PRRD. According to information provided, there are two (2) electricity meters for the facility. Propane is delivered by tanker and only deliveries are recorded. As actual monthly use of propane gas is not provided it has not been possible to accurately analyse fuel consumption throughout the year.

The following table summarizes the utility (electricity and propane) consumption data from the most recent year of utility data provided.

Summary of Utility Data January 2020 to December 2020

	Table 4: Summary of Utility Data					
Year	Electricity		Natural Gas		Total	
	Consumption (kWh)	Cost ($)	Consumption (GJ)	Cost ($)	EUI (GJ/m2)	Cost Index ($/m2)
2020	16,849	$2,395	133	$2,632	0.47	$12.26

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3.2 Utility Price Structure

In terms of savings related to the identified measures, a blended rate, which effectively assumes that a reduction in consumption will reduce the cost by the rate that applies to the last unit of energy, was used. The blended rates include all components of the bill including energy, transmission, delivery, capacity, and line losses. However, taxes are excluded. These rates are listed in the table below.

Table 5: Summary of Blended Rates

Electricity	Demand	Natural Gas
Rate ($/kWh)	Rate ($/kW)	Rate ($/GJ)
$0.1422	-	$19.85

3.3 Electricity

Electricity data was reviewed for the most recent 12 months (we typically analyse 36 months but only 12 months was available). The electricity utility data were analyzed and plotted to illustrate trends and identify any irregularities. It should be noted that electricity is billed bi-monthly, so it was not possible to split usage on a monthly basis

The figure below illustrates the electrical consumption data for the facility.

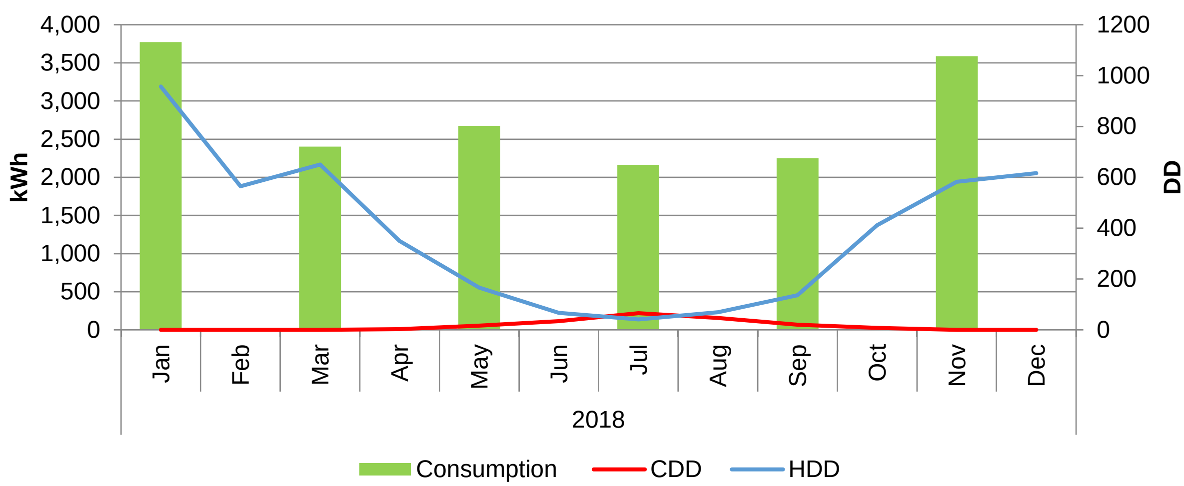


Figure 2: Electrical Consumption Trend for Moberly Lake Firehall

Based on the analysis, there is an increase in electricity consumption during the winter months (from October through March). The electricity consumption increase may be attributed to a number of factors including increased operational hours of the lighting, and the operation of the electric heating, furnace, and radiant tube fans.

Year-round systems, which are building baseload electrical consumers, include the electric domestic hot water heater, building exhaust fans systems, the breathing air compressor, as well as building plug loads, such as computers and small appliances.

3.4 Fossil Fuels

As there is no means of metering the amount of propane consumed each month in the facility it has not been possible to analyse the correlation of fossil fuel use for heating with degree days.

3.5 Annual Energy Consumption Breakdown by Type

The combined electricity and propane energy consumption figures have been converted to common units of energy to be able to compare the total amount of energy from each source at this facility. Propane consumption has been estimated based on the results ofthe energy model.

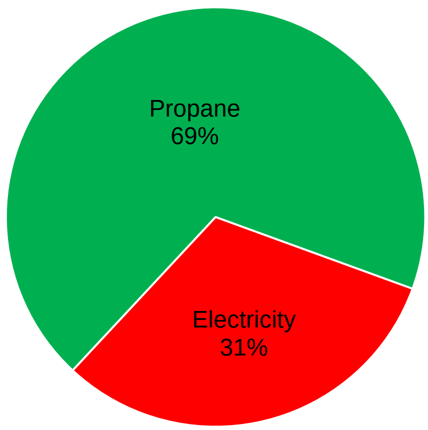


Figure 3: Annual Energy Consumption by Fuel Type

Based on the previous figure, propane accounts for 69% of all energy consumed while electricity accounts for the other 31% of energy consumed. If we look at the cost of energy and compare the two, we can see a different story in the figure below.

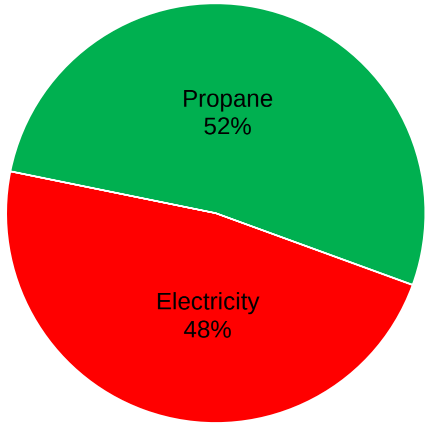


Figure 4: Annual Energy Cost by Fuel Type

Based on the figure above, propane accounts for 52% of all energy costs while electricity accounts for the other 48% of energy costs. Although Propane makes up 69% of the energy consumption it only accounts for only 53% of the energy cost.

Another way to look at the utility consumption is by greenhouse propane emissions breakdown.

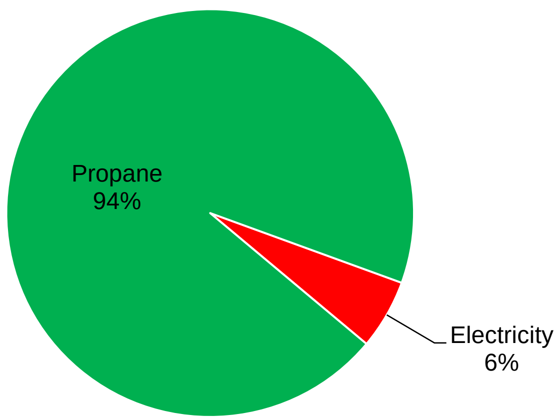


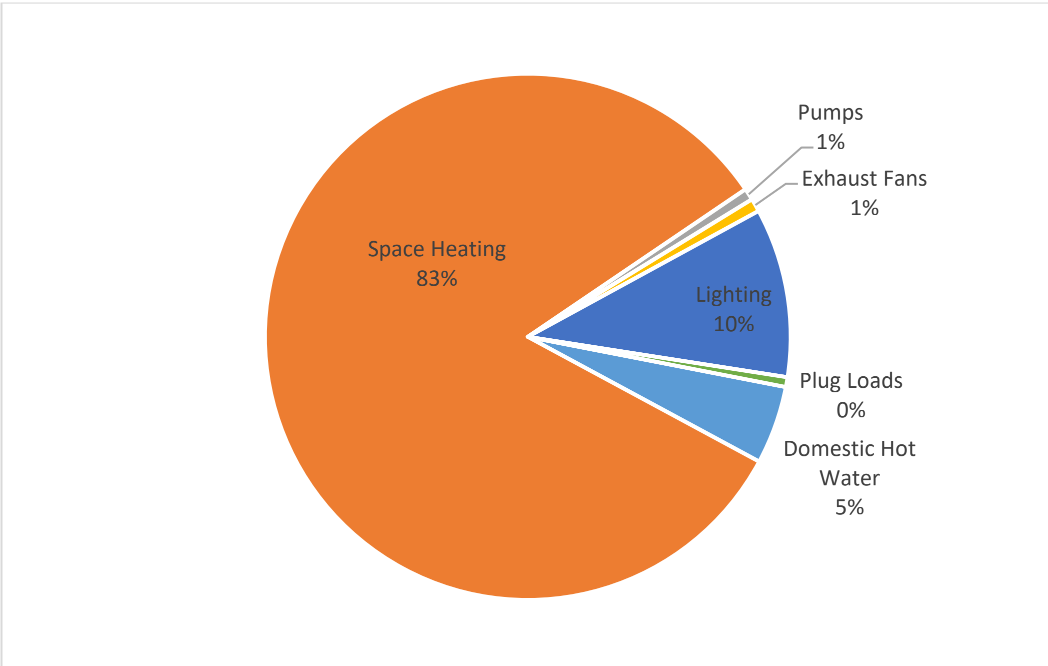
Figure 5: Annual Greenhouse Propane Emission by Fuel Type

Based on the figure above, greenhouse propane emissions from propane accounts for 94% of all greenhouse propane emissions while greenhouse propane emissions from electricity account for the other 6% of greenhouse propane emissions. This is the opposite of the energy costs. It indicates a reduction in propane consumption will have a large impact on greenhouse propane consumption and however only result in small cost savings.

3.6 Annual Energy Consumption Breakdown by Major End-Use

The total annual energy consumption of the facility was analyzed and broken down into major end-use categories. These categories (also refer to the table, below) in this analysis include:

- Domestic Hot Water
- Space Heating
- Pumps
- Exhaust Fans
- Lighting – All interior and exterior lighting.
- Other and Plug Loads



- Figure 6: Annual Energy Consumption by End-Use

The following table summarizes that annual energy breakdown by major end-use in absolute energy consumption, as a percentage of the total energy consumed, and as an absolute cost.

Table 6: Annual Energy Consumption by Major End-Use

Energy Type	LPG (GJ)	Electricity (kWh)	Equivalent Energy (ekWh)	% Energy
Domestic Hot Water	0	2,628	2,628	5%
Space Heating	136	7,360	45,153	83%
Pumps	0	395	395	1%
Exhaust Fans	0	443	443	1%
Lighting	0	5,680	5,680	10%
Plug Loads	*0*	*101*	*101*	*1%*
Other Loads	0	224	224	0%
Total	**136**	**16,831**	**54,614**	**100%**

Another way of looking at the same information is to consider the cost breakdown in the figure below. This shows the space heating (including electric) and lighting are the largest contributors to the facilities energy costs.

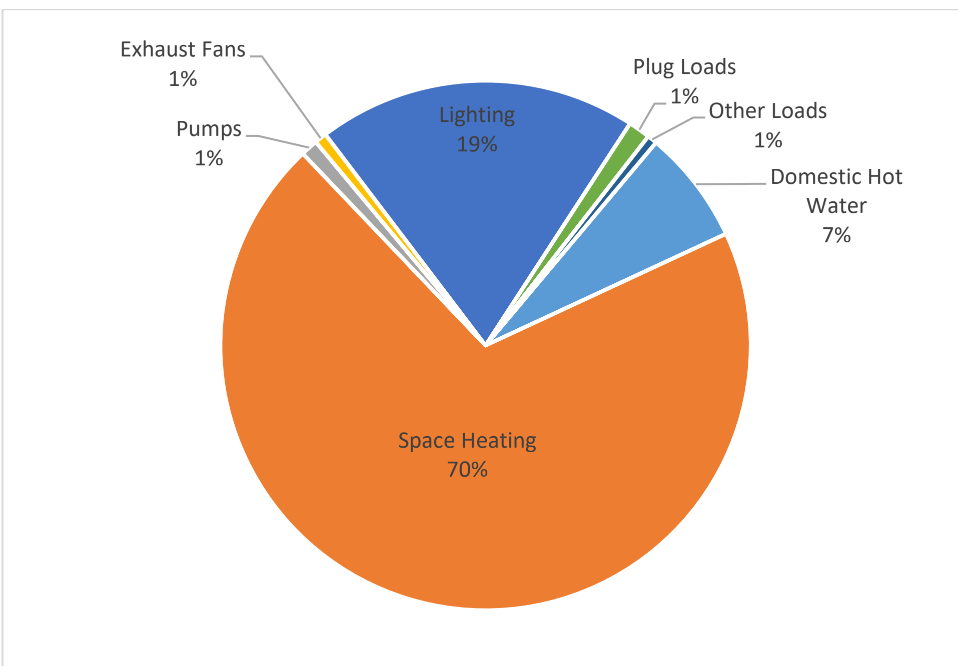


Figure 7: Annual Energy Cost by End-Use

3.7 ENERGY PERFORMANCE BENCHMARKING

The facility Energy Utilization Index (EUI) was calculated by dividing the total annual energy used (all energy utilities in common units) by the gross floor area. The table below compares the EUI at this facility to the Office of Energy Efficiency (OEE) benchmarks to assess the facility's energy performance against similar buildings. Based on the limited categories the closest category was determined to be Commercial/Institutional Sector – British Columbia – Other Services.

Table 7: EUI Comparisons

Calculated in Utility Analysis ***GJ/m²***	**OEE** ***GJ/m²***
0.47	1.04

(Source: *Natural Resources Canada, Commercial and Institutional Consumption of Energy Survey 2018.*

Commercial/Institutional Sector British Columbia and Territories[1] Table 22: Other Services Secondary Energy Use and GHG Emissions by Energy Source | Natural Resources Canada (nrcan.gc.ca)

The data available from the OEE (NRCan) is for Energy intensity benchmarks for the commercial and institutional sector (Other Services in British Columbia). This data is an average and includes similar facilities as the Moberly Lake Firehall. The category chosen was the closest to the classification of the facility. The benchmark indicates that Moberly Lake Firehall Energy Use Intensity (EUI) is much lower than the benchmark for the similar facilities.

4 ASSESSMENT FINDINGS

This section provides an overview of the energy conservation measures (ECMs) analyzed in this report. A series of ECMs were reviewed. For each measure, estimates of the annual savings in each of the following were determined:

- Electricity consumption;
- Natural Gas consumption;
- Total energy cost; and
- GHG emissions.

The following ECMs were reviewed for the Firehall:

Table 8: Charlie Lake Firehall ECMs	
ECM	**Description**
ECM-1	Replace electric DHW heater with tankless LPG (propane) heater
ECM-2	Replace LPG furnace with high efficiency furnace
ECM-3	Set back temperature of Administration offices
ECM-4	Replace radiant tube heaters with new high efficiency units

4.1 ECM-1: NEW LPG FIRED HIGH EFFICIENCY DHW HEATER

4.1.1 Existing Condition

The existing domestic hot water heater has surpassed its expected useful life and requires replacement. The heater uses electricity, which is significantly more expensive than LPG, and also there will be significant standing losses, despite the tank being insulated and it has very little use. The cost of LPG is $19.79/GJ and electricity when converted to GJ is $39.50/GJ.

4.1.2 Proposed Conditions

It is recommended that the domestic hot water heater is replaced with a high efficiency near condensing propane fired heater, with an expected efficiency of 88%. This will eliminate standing losses and will benefit from the less expensive fuel source.

4.1.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 9: ECM-1 –Energy Savings			
Natural Gas Savings (GJ)	Electricity Savings (kWh)	GHG Reduction (Tonnes CO_2e)	Total Cost Savings ($)
-4.7	1517	-0.22	$113

The following table summarizes the financial analysis associated with this measure.

Table 10: ECM-1 –Financial Analysis					
Cost Savings ($)	Project Implementation Cost ($)	Simple Payback (Years)	Net Present Value ($)	Internal Rate of Return (%)	Discounted Payback (Years)
$113	$4,500	40	-$3,475	-10.32%	N/A

4.2 ECM-2: Install New High Efficiency Condensing Furnace

4.2.1 Existing Condition

The existing LPG fired furnace has surpassed its expected useful life and should be replaced. The furnace has a current rated efficiency of 80%, although based on age it is likely less efficient.

4.2.2 Proposed Condition

It is recommended that the furnace is replaced with a high efficiency condensing furnace with an expected efficiency of 98%. This will increase the overall efficiency by up to 23%.

4.2.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 11: ECM-2 Energy Savings			
Natural Gas (GJ)	Electricity Savings (kWh)	GHG Reduction (Tonnes CO_2e)	Total Cost Savings ($)
13	0	0.65	$287

The following table summarizes the financial analysis associated with this measure.

Table 12: ECM-2 – Financial Analysis					
Cost Savings ($)	Project Implementation Cost ($)	Simple Payback (Years)	Net Present Value ($)	Internal Rate of Return (%)	Discounted Payback (Years)
$287	$7,500	26.1	-$4,159	-0.33%	N/A

4.3 ECM-3: Night Set Back of Heating

4.3.1 Existing Condition

The existing LPG fired furnace is controlled by an adjustable wall mounted thermostat that is currently set to maintain a space temperature of 20°C throughout the year.

4.3.2 Proposed Condition

It is recommended that the thermostat is replaced with a programmable thermostat and that the temperature is set back continuously to 16oC. As the fire hall is manned for only approximately 8 hours per month the thermostat should have an override switch that can be activated by the occupants to boost the heat to the desired level for a 2 hour period.

4.3.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 13: ECM-3 Energy Savings			
Natural Gas (GJ)	Electricity Savings (kWh)	GHG Reduction (Tonnes CO_2e)	Total Cost Savings ($)
11	0	0.55	$243

The following table summarizes the financial analysis associated with this measure.

Table 14: ECM-3 – Financial Analysis					
Cost Savings ($)	**Project Implementation Cost ($)**	**Simple Payback (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback (Years)**
$243	$750	3.1	$2,084	32.40%	3.6

4.4 ECM-4: Replace Radiant Tube Heaters with High Efficiency Heaters

4.4.1 Existing Condition

The existing LPG fired radiant tube heaters in the vehicle bay has passes their expected useful life and should be replaced.

4.4.2 Proposed Condition

It is recommended that the radiant tube heaters are replaced with new high efficiency radiant tube heaters complete with back reflectors.

4.4.3 Analysis

The following table summarizes the estimated energy savings associated with this measure.

Table 15: ECM-2 Energy Savings			
Propane (GJ)	**Electricity Savings (kWh)**	**GHG Reduction (Tonnes CO_2e)**	**Total Cost Savings ($)**
3	0	0.15	$66

The following table summarizes the financial analysis associated with this measure.

Table 16: ECM-2 – Financial Analysis					
Cost Savings ($)	**Project Implementation Cost ($)**	**Simple Payback (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback (Years)**
$66	$8,000	121	-$7,227	-9.65%	NA

5 Other Opportunities Considered

The following section discusses energy saving opportunities that were considered and recommended for further analysis and possible implementation.

5.1 Solar Photovoltaic Generation System

The proposed alternative energy initiative involves the possibility of installing a solar array power generation system at the Firehall to complement the current solar collectors for DHW heating.

The cost of installing solar PV systems has declined steadily over the last decade as a result of technology improvements and more efficient systems yielding a higher power output. In B.C., a 1 kW solar PV system, south facing and tilted with no shading, will generate about 1,000 kWh per year or about 25,000 kWh over its 25-year lifetime. This is taking into account an industry average solar panel efficiency degradation rate of 0.5% per year. At a turnkey installation cost of about $3,500, per panel, it would take over 25 years to recoup your investment at today's average electricity rates.

In addition to the long payback there are other considerations to take into account. Which include the current load bearing capacity of the selected roof, the orientation of the roof, and the age of the roof (once the PV panels are installed it becomes more costly to replace the roof). Taking into consideration the long payback for solar panels, and the complications introduced by the physical characteristics of the roof, it was considered not economic or practical to pursue this option.

5.2 Improve Building Envelope Conditions

Other than simple weatherstripping measures for doors, building envelope modifications such as improved insulation, become very expensive and would typically only be considered if there were any significant deficiencies in the envelop. This would be evident from a high heating load in the building and based on the findings of the building energy index, no such deficiencies appear to be prevalent. As such any building envelope upgrades were not considered for this study.

6 CONCLUSIONS AND RECOMMENDATIONS

Several ECMs were identified during the detailed energy assessment. Table 15 summarizes the combined recommended ECMs along with estimated costs, savings and simple payback. A more detailed summary is included in **Appendix B**.

Measure	Implementation Cost ($)	Table 15: Estimated Savings			Total Savings ($)	Simple Payback (Years)
		Electricity(kWh)	Natural Gas (GJ)	GHG Emissions (CO2 eq)		
ECM-1	$4,500	1,517	-4.7	-0.22	$113	40
ECM-2	$7,500	-	13	0.65	$287	26.1
ECM-3	$750	-	11	0.55	$243	3.1
ECM-4	$8,000	-	3	0.15	$66	120.6
Bundle	**$20,750**	**1,517**	**22**	**1.14**	**$710**	**29.2**

A more detailed summary is included in **Appendix B**.

Based on the fact that some of the equipment has reached the end of its useful life the energy efficiency and conservation measures were selected to replace the existing technology with high efficiency alternatives. Although the paybacks are fairly long, Roth IAMS recommends that the Firehall proceeds with all of the measures identified.

7 Implementation Plan and M&V

7.1 Implementation Plan

Implementation of the measures identified in this assessment will assist the Peace River Regional District – Moberly Lake Firehall to reduce risks associated with utility market volatility and unplanned capital maintenance expenditures. It is recommended that the measures which are the simplest and have the least interruption to the occupants be implemented first. The information below has been provided to assist with the planning for implementation.

Table 20: Chetwynd Recreation Centre

ECM/Scenario	Design Period	Construction Period	Seasonal Requirements	Disruption
ECM-1	0	2 Days	Install before winter sets in.	Minimal.
ECM-2	0	2 Days	Can install same time as DHW heater.	Minimal.
ECM-3	0	1 day	To be completed when new furnace installed.	None.
ECM-4	0	2 Days	Coordinate with replacement of furnace.	Will require fire trucks to be moved outside

7.2 Measure and Verification

Once the recommendations have been implemented it is recommended the facilities utility consumption be monitored to identify the actual savings that are a result of these changes.

This is relatively straight forward for electricity as it is billed on a monthly basis. However, for LPG (Propane) it would be very difficult to monitor as there are no consumption records, only deliveries.

8 EMISSIONS SAVING SUMMARY

8.1 EMISSION REDUCTION

The Canadian government is creating emission reduction targets that will determine the path of all business in Canada for the foreseeable future. An emissions reduction plan for Greenhouse Gas (GHG) emissions is the first step in achieving a reduced impact on the environment.

The Energy Savings measures proposed for the facility will have an immediate and positive effect on our local and global environment. The immediate impact on our local environment will follow as a reduction in demand offsets power generation from the local power stations and a reduction in natural gas consumption.

Greenhouse gases are primarily comprised of Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N2O), Sulphur Hexafluoride (SF6), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). CO2 is the primary component and typically makes up about making up over 99% of the greenhouse gases produced. As a result, greenhouse gases are typically measured in terms of kilograms or tonnes of equivalent carbon dioxide (CO2e). Emission factors used for calculating the combustion of natural gas and power generation in British Columbia are 51 kg of CO2e/GJ and 12 kg of CO2e/kWh respectively.

The sites total current annual equivalent carbon dioxide emissions (CO2e) are 9.1 Tonnes CO2e/year. This results in a current greenhouse gas intensity of 0.016 Tonnes CO2e/m^2. Based on the proposed bundle of ECMs the greenhouse gas savings are estimated to be 1.14 Tonnes of CO2e/year which represents approximately 12.5 percent greenhouse gas emission reduction.

9 STUDY LIMITATIONS

This report was prepared by Roth IAMS for Peace River Regional District. The material in it reflects our professional judgment considering the following:

- Our interpretation of the objective and scope of works during the study period;
- Information available to us at the time of preparation;
- Third party use of this report, without written permission from Roth IAMS, is the responsibility of such third party;
- Measures identified in this report are subject to the professional engineering design process before being implemented.

The savings calculations are our estimate of potential savings and are not guaranteed. The impact of building changes in space functionality, usage, equipment retrofit, and the weather should be considered when evaluating the savings.

Any third-party use of this report, or any reliance on decisions to be made, is subject to interpretation. Roth IAMS accepts no responsibility or damages, if any, suffered by any third party because of decisions made or actions based on this report.

10 CLOSURE

Based upon the information referenced herein, this report has been prepared exclusively for the Client – Peace River Regional District. It has been prepared in a manner consistent with good engineering judgement. Should new information come to light, RothIams Ltd. requests the opportunity to review this information, and our conclusions contained in this report. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, will be the responsibility of such third parties.

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APPENDIX A

DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations should be considered during the review of this energy and water assessment report:

- **Average Person** – An average person can be defined as a typical person within our society. The average person was used in the reports to describe the behaviour or a typical person in society in the context of their consumption patterns for water.
- **Average Resident** – An average resident can be defined as a resident of the assessed facility as observed by the facility assessors and via an interview with the facility managers.
- **Building Automation System (BAS) –** a distributed control system that is a computerized, intelligent network of electronic devices designed to monitor and control the mechanical, electronics, and lighting systems in a building. BAS core functionality keeps the building climate within a specified range, provides lighting based on an occupancy schedule, and monitors system performance and device failures and provides email and/or text notifications to building engineering/maintenance staff. The BAS functionality reduces building energy and maintenance costs when compared to a non-controlled building. A building controlled by a BAS is often referred to as an intelligent building. *Alternate term: **Building Management System (BMS).***
- **Capital Cost** – Capital Costs identified in this report include costs including the following phases of work: design, equipment and materials, construction/installation, project management, construction administration and commissioning.
- **Cooling Degree Days (CDD)** – Cooling Degree Days is a measure of how hot a location was over a period, relative to a base temperature. The base temperature is 18.0°C and the period is one year. If the daily average temperature exceeds the base temperature, the number of cooling degree-days for that day is the difference between the two temperatures. However, if the daily average is equal to or less than the base temperature, the number of cooling degree-days for that day is zero.
- **Discounted Payback** – Discounted Payback is the time required to recover the present value of cash flows equal to the cost of investment. Simple payback period does not take into account the principles of time value of money.
- **Energy Conservation Measure (ECM)** – any type of project conducted, or technology implemented to reduce the consumption of energy in a building. These can come in a variety of forms: water, electricity and gas being the main three for industrial and commercial enterprises. The aim of an ECM should be to achieve a saving, reducing the amount of energy used by a particular process, technology or facility. Alternative terms: **Energy Efficiency Measure (EEM)**, **Energy Management Opportunity (EMO)**, or **Facility Improvement Measure (FIM)**.
- **Energy Utilization Index (EUI)** – Energy Utilization Index is a normalized comparison of the energy performance of facility where the normalizing factor is floor area. The units for the EUI are ekWh/m^2 or GJ/m^2.

- **Equivalent Kilowatt Hour (ekWh)** – An equivalent kilowatt-hour is the equivalent energy content of natural gas in terms of kilowatt hours for use in facility benchmarking (requiring common energy units).
- **Greenhouse Gas Carbon Dioxide Equivalence (CO_2e)** – Greenhouse gases (GHGs) are primarily comprised of Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Sulfur Hexafluoride (SF_6), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). GHGs are typically measured in terms of kilograms or tonnes of carbon dioxide equivalent (CO_2e).
- **Heating Degree Days (HDD)** – Heating Degree Days is a measure of how cold a location was over a period, relative to a base temperature. The base temperature is 18.0°C and the period is one year. If the daily average temperature is below the base temperature, the number of heating degree-days for that day is the difference between the two temperatures. However, if the daily average temperature is equal to or higher than the base temperature, the number of heating degree-days for that day is zero.
- **Internal Rate of Return (IRR)** – The internal rate of return (IRR) is a capital budgeting metric used by firms to decide whether they should make investments. It is an indicator of the efficiency of an investment, as opposed to net present value (NPV), which indicates value or magnitude. The IRR is the annualized effective compounded return rate which can be earned on the invested capital, i.e., the yield on the investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments (investing in other projects, buying bonds, even putting the money in a bank account). Thus, the IRR should be compared to any alternate costs of capital including an appropriate risk premium.
- **Low Cost/No Cost Measures** – Low cost/no cost measures are defined as measures that can be implemented within the Operations and Maintenance (O&M) budget. Low cost/no cost measures typically include such initiatives as schedule adjustment, set-point adjustment, and fluid flow-rate adjustment.
- **Net Present Value (NPV)** – Net present value (NPV) is a standard method for the financial appraisal of long-term projects. Used for capital budgeting, and widely throughout economics, it measures the excess or shortfall of cash flows, in present value (PV) terms, once financing charges are met. It is also called net present worth (NPW).
- **Simple Payback (SP)** – Simple payback is the ratio of capital investment cost to the energy cost savings. It indicates how long a capital investment pays back. SP = (Capital Cost) / (Energy Cost Savings).
- **Greenhouse Gas Carbon Dioxide Equivalence (CO_2e)** – Greenhouse gases (GHGs) are primarily comprised of Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Sulfur Hexafluoride (SF_6), Perfluorocarbons (PFCs), and Hydrofluorocarbons (HFCs). GHGs are typically measured in terms of kilograms or tonnes of carbon dioxide equivalent (CO_2e).

- **Water Conservation Measure (WCM)** – any type of project conducted, or technology implemented to reduce the consumption of water in a building. (See Energy Conservation Measure (ECM)). Alternative Term: **Water Efficiency Measure (WEM)**
- **Water Utilization Index (WUI)** – Water Utilization Index is a normalized comparison of the water performance of a facility where the normalizing factor is floor area. The units for the WUI are m^3/m^2.
- **Variable Frequency Drive (VFD)** – a type of adjustable-speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage.

APPENDIX B

ECM SUMMARY AND SAVINGS

Table 1
Summary of Potential Energy Conservation Measures - Moberly Lake Fire Hall

Propane	$ 19.850	per GJ
Fuel Oil	$ -	per L
Electricity	$ 0.142	per kWh
Carbon Tax	$ 45.00	per CO2 eq tonne

Province	British Columbia
Escalation Rate (Energy)	0%
Discount Rate	7%

		Utility Savings			Emissions Savings				Financial Analysis					
Measure Number	**Description**	**Natural Gas (GJ)**	**Electricity (kWh)**	**Total ($)**	**Electricity (CO2 eq tonnes/yr)**	**Natural Gas (CO2 eq tonnes/yr)**	**Total (CO2 eq tonnes/yr)**	**Total Savings ($)**	**Total Project Cost ($)**	**SPB[1] (Years)**	**Effective Measure Life (Years)**	**Net Present Value ($)**	**Internal Rate of Return (%)**	**Discounted Payback DPB (Years)**
ECM-1	High Efficiency LPG (Propane) DHW Heater	-5	1,517	$ 122	0.02	-0.24	-0.22	$ 113	$ 4,500	40.0	15	-$ 3,475	-10.32%	N/A
ECM-2	Replace furnace with high efficiency condensing Furnace	13		$ 258	-	0.65	0.65	$ 287	$ 7,500	26.1	25	-$ 4,150	-0.33%	N/A
ECM-3	Night set back for Administration offices	11		$ 218	-	0.55	0.55	$ 243	$ 750	3.1	25	$ 2,084	32.40%	3.6
ECM-4	Replace radiant tube heaters with high efficiency heaters	3		$ 60	-	0.15	0.15	$ 66	$ 8,000	120.6	25	-$ 7,227	-9.65%	N/A
	Recommended Measure Bundle	**22**	**1,517**	**$ 658**	**0.02**	**1.12**	**1.14**	**$ 710**	**$ 20,750.00**	**29.24**	**22.8**	-$ 12,900.95	**-2.35%**	N/A

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PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ENV-RBAC-031

From: Daris Gillis, Environmental Services Manager — Date: November 25, 2021

Subject: Rolla Dyke 2022 Operational Request

RECOMMENDATION:

That the Rural Budgets Administration Committee approve the supplementary request of $150,000 payable from the Area D Community Works Gas Tax fund, to be issued to the Function 430 - Rolla Dyking for the decommissioning of Rolla Dyke and associated structures.

BACKGROUND/RATIONALE:

On September 27, 2021, the Rural Budgets Administration Committee passed the following resolution:

> *MOVED, SECONDED, CARRIED*
> That the Rural Budgets Administration Committee authorize a funding commitment allocation in the amount of $50,000, payable from Area D Gas Tax Fund, for the professional services required to prepare a Rolla Dyke Decommissioning Plan for submission required by the provincial Dyke Management Branch.

On October 7, 2021, the Regional Board passed the following resolution:

> *MOVED, SECONDED, CARRIED*
> That the Regional Board move forward with decommissioning Rolla Dyke and dissolving Function 430 - Rolla Creek Dyking.

Austin Engineering has been secured through three Requests for Quotations (RFQ) for a total contract amount not to exceed $50,000 (excluding taxes) to prepare the necessary documents to be submitted to the Province for decommissioning. Once approved by the Dyke Management Branch, the Decommissioning plan will outline the dyke excavation, regrading, and erosion placement requirements. For full details on the activities required for the plan, please refer to the external link to the previous report, “Rolla Dyke Decommissioning Plan Request for Funds, ENV-RBAC-027”. These requirements will be used to determine a scope of work for the construction works. Decommissioning is anticipated to take place in 2022/2023 pending the necessary approvals. Funding allocations are required in the 2022 budget to cover dyke decommissioning costs. As the estimation of costs cannot be anticipated at this time, the suggested funding allocation aligns with the maximum operational reserve for the Function 430 - Rolla Dyking. A supplementary operational request has been attached for the Committee’s consideration.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Not Applicable to Strategic Plan

FINANCIAL CONSIDERATION(S):

There are no reserve funds available to finance the decommissioning of Function 430 – Rolla Dyking. An alternative funding source is required.

As of October 31, 2021 the balance available after the remaining commitments in Electoral Area D are as follows:

- Peace River Agreement: $592,594.35,
- Gas Tax Reserve fund: $1,238,444.68, and
- Fair Share Reserve fund: $1,854,311.67.

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

None at this time.

Attachments:

1. 2022 Rolla Dyking Operational Request

External Links:

1. Rolla Dyke Decommissioning Plan Request for Funds, ENV-RBAC-027

2022 Budget - Operating Supplemental Item

Title:	Decommission	**Environmental Services**
Division:	Water	**Rolla Creek Dyking - 430**
Type:	Operating	**High**

Description

Decommissioning of the Rolla Dyke structures and associated engineering works.

Benefits

Funding for this function is requisitioned from six property owners. The operation, maintenance and liability for this function have been increasing. Decommissioning reduces the operation and maintenance and costs.

Risks

Pending the approval turn around of the Dyke Decommissioning Plan submission to the Province, the decommissioning works may move forward to 2023.

Financial Information

Operating

Funding Sources	2022	2023	2024	2025	2026	5 Year Total
Area D Gas Tax	150,000					150,000
						0
						0
	150,000	**0**	**0**	**0**	**0**	**150,000**

Expenses	2022	2023	2024	2025	2026	5 Year Total
Dyke deconstruction - excavation,	150,000					150,000
						0
						0
						0
						0
						0
						0
						0
	150,000	**0**	**0**	**0**	**0**	**150,000**

Administration

Author: Daris Gillis **Date Prepared: November 5, 2021**

Approval Date

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ENV-RBAC-033

From: Daris Gillis, Environmental Services Manager — Date: November 25, 2021

Subject: Rolla Sewer Collection System 2022 Capital Repairs

RECOMMENDATION #1:

That the Rural Budgets Administration Committee approve the supplementary request of $330,000 payable from the Area D Community Works Gas Tax fund, to be issued to Function 607 - Rolla Sewer, as outlined in the 2021 Rolla Sewer Condition Assessment.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee allocate $20,000 from Area D Fair Share to be transferred into the capital reserve for Function 607 – Rolla Sewer in the 2022 budget.

BACKGROUND/RATIONALE:

The Rolla Sewer Collection System consists of a gravity collection system, a lift station immediately upstream of the lagoons, an aerated lagoon and blower system, a storage lagoon and a discharge outfall to Rolla Creek.

The Rolla Sewer system was built originally in 1977. In 2002, a second lagoon was added to the treatment facility and an aeration system was added to the original lagoon. As a result of a multitude of operational challenges there has been very little preventative maintenance performed on the existing treatment facility.

Aligning with the current Regional Board Strategic Plan, a condition assessment of the Rolla sewer collection system was conducted in 2021. The assessment revealed deficiencies within multiple areas of the system and includes recommendations for repairs and/or replacements within the next 1-3 years. Table 1 highlights the areas within the system that will require capital upgrades and replacement in order to maintain the integrity and functionality of the collection system. A 30% contingency has been added into the costs to account for inflation and or any other unforeseen circumstances.

Table 1. Estimated Cost of Repairs for 2022.

Area of Concern	Estimate Cost for Repairs/Replacement
Sewer Piping (Five sections of pipe)	$ 235,000.00
Sewer Manholes (Six manholes)	$ 65,000.00
Construction Oversight	$ 30,000.00
Total:	**$ 330,000.00**

A supplemental capital request form is attached for the Committee's consideration.

Staff Initials: *DG* Dept. Head: *KB* CAO: *Shawn Dahlen* Page 1 of 2

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

  ☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATIONS

The Rolla Sewer System is made up of two parts: the collection system and the treatment system. Repairs and upgrades to the treatment system were previously budgeted for in 2021 and amounted to $561,200. Funding for the treatment upgrades was allocated from Area D Gas Tax and will be rolled over into 2022 for completion. The collection system upgrades amount to $330,000, bringing the entire system upgrades to a total of $891,200.

As of October 31, 2021 the balance available after the remaining commitments in Electoral Area D are as follows:

- Peace River Agreement: $592,594.35,
- Gas Tax Reserve fund: $1,238,444.68, and
- Fair Share Reserve fund: $1,854,311.67.

COMMUNICATIONS CONSIDERATION(S):

A public open house was held on November 16, 2021 to discuss the repairs planned for 2022.

OTHER CONSIDERATION(S):

None at this time.

Attachments:

1. 2021 Rolla Sewer Collection Condition Assessment
2. 2022 Rolla Sewer Capital Budget Request Form

PEACE RIVER
REGIONAL DISTRICT

HAMLET OF ROLLA SEWER COLLECTION SYSTEM

CONDITION ASSESSMENT

HAMLET OF ROLLA SEWER COLLECTION SYSTEM CONDITION ASSESSMENT

NOVEMBER 2021 FINAL REPORT

RECORD OF ISSUES AND REVISIONS					
R	DATE	DESCRIPTION	PREPARED	VERIFIED	APPROVED
0B	2021-11-10		R. Flannery	A.Hernandez	G.Boutron, P.Eng

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1 SCOPE OF WORK

Simo Management Inc. (Simo) was selected by Peace River Regional District (PRRD) to undertake a non-destructive and non- invasive field condition assessment and an overall operational structural evaluation of the Hamlet of Rolla Sewer Collection System to determine the remaining service life, and repair/replacement costs of any identified deficiencies.

This report summarizes the results found from the condition assessment of the Hamlet of Rolla Sewer Collection System. Assets reviewed include manholes and sewer lines as described in table 1.

Final recommendations are available in section 3.0.

1.2 DESCRIPTION OF FACILITIES

The Rolla Sewer Collection System consists of a gravity collection system within the Hamlet Rolla Community, a lift station immediately upstream of the lagoons, a 1.0 hectare aerated lagoon and blower system, a 1.0 hectare storage lagoon, and an outfall to Rolla Creek.

The Rolla sewer treatment facility system was initially constructed in 1977. It was composed of a lift station, aerobic stabilization pond, and an effluent outfall which discharges into Rolla Creek. In 2002, a second lagoon was added including a fine bubble diffuser aeration system in the original lagoon.

The Rolla sewer collection system within the scope of this report includes:

Table 1. Hamlet of Rolla Sewer Collection System

INFRASTRUCTURE	DESCRIPTION
MANHOLES	33 Manholes and three cleanouts
SEWER LINES	3.5km collection pipeline of 200 mm SDR 35; 0.1km collection pipeline of 150 mm SDR 35; 1.25km collection pipeline of 200 mm SDR 35

1.3 REPORT LIMITATIONS

The objective of this report is to supply a common sign of the current physical state of the sewer collection system. The following assumptions were considered:

- Estimated Useful Life is based on a sensible degree of continuous maintenance.
- Timeframes given for undertaking work represent our opinion on when to budget for the work. Variations of our estimate could happen in the case failure of the item, or the optimum repair/replacement process.
- Costs of replacement is based on our knowledge and experience but is subject to change depending on labor market, resources availability and projects peculiar constraints.
- We focused our recommendations on short to medium term action plans (1 to 5 years). We recommend re-assessments for longer term issues.
- Where measures where not used for assessing the condition of the assets, a knowledge-based evaluation was conducted using the available data from the district and interview with its operator.
- We used a condition-based similarity model to estimate remaining lifetime and not a statistical degradation model.

2.0 ASSESSMENT RESULTS

Between August 26th and August 28th, our team conducted a series of inspections at The Hamlet of Rolla Collection System with the assistance of Peace River Regional District operator.

Our crew employed a high-resolution Zoom Camera to check the pipes, valves, shut-offs, and cleanouts for wall structural integrity and sewage leaks.

A number of manholes were buried, necessitating the use of an excavator to dig them out.

Following the inspection of the pipes and manholes, PACP/MACP certified viewers reviewed and graded the inspection videos. This report and appendices include listings of defects encountered during inspections, according to PACP/MACP terminology.

Figure 1:Manhole inspection in Rolla Hamlet

The following information is provided:

- Observed manhole defects categorized according to physical condition and operation and maintenance (O&M) grades from MACP v 7.
- Pipe defects categorized according to internal structural condition and O&M grades from PACP v 7.
- Infiltration/inflow sources observed at each manhole and pipe by type of defect
- Manholes and pipes requiring hydraulic and/or special cleaning (grease, roots, incrustations, debris, etc.)
- Manholes and sections requiring repairs
- Printed photos of major defects observed during the inspection of pipes

This report also includes color-coded maps illustrating:

- Manholes and pipes inspected
- Manholes and pipes O&M Condition
- Manholes and pipes structural Condition
- Pipes required hydraulic and/or special cleaning

The condition assessment is designed to provide prioritized lists of defects intended to assist the district in the development of a proactive operations and maintenance program, and to define where capital improvement spending may be required. Compared to classical CCTV inspection, this allows to narrowing the scope of flushing activities by identifying the pipes and manholes in excellent condition (not requiring cleaning) and those that have a very poor physical condition and requires repairs instead of cleaning.

All our camera inspections of manholes and pipes were carried out at ground level. The information contained in this report such as diameters, type of pipe, section lengths, etc. was taken directly from the files furnished by the District and were complemented by measurements performed by our field crews.

Table 2. Hamlet of Rolla Summary inspections

Site	Hamlet Rolla
Type of the collection system:	Sanitary
Total number of sections inspected:	43
Number of manholes inspected :	36
Date of Survey:	August 26th to 28th

The zoom inspection was carried out in the Hamlet in order to assess the sanitary sewer condition. Therefore, 36 manholes and 43 pipes were inspected. The inspected manholes and pipes inventories are presented respectively in Appendix 1 and Appendix 2.

The attached report summarizes our findings of the O&M and structural condition, as well as infiltration/inflow (I/I) found in The Hamlet. We have also summarized our recommendations for cleaning, CCTV-inspection, and manhole intervention. The following paragraphs contain the details of all these items.

2.1 MANHOLES

To determine a maintenance priority list, the manholes were graded according to their O&M, Structural and Physical defects. To do so, a grade from 1 to 5 was assigned (according to MACP v 7) to each identified defect.

2.1.1 Operation and Maintenance (O&M)

From an operation and maintenance standpoint, the inspection results confirmed that the inspected manholes are in good condition. Only 2 manholes (6%) have grades 4 and 5 O&M deficiencies.

A breakdown of the percentage of the manholes falling under each of the five (5) O&M defects is provided in the following tables.

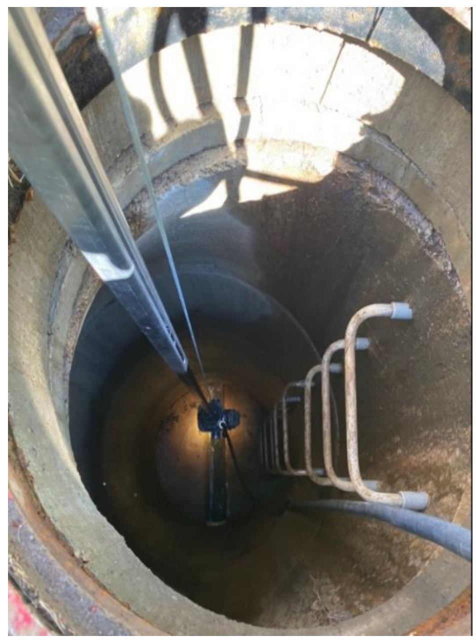


Figure 2 : Manhole

Table 2. Hamlet of Rolla Sewer Manholes O&M Grade

Manholes						
O&M grade	5	4	3	2	1	Total
Number of manholes	1	1	1	25	8	36
%	2.7%	2.7%	2.7%	69.7%	22%	100%

2.1.2 Structural and Physical Condition

In order to determine intervention priorities, the manholes inspected by Simo's camera were graded in accordance with MACP coding procedures. Grade from 1 to 5 are allocated to each defect.

From a structural standpoint, the inspection confirmed that 17% (6) of the manholes are not in good condition (physical condition grade of 4 or 5). Nevertheless, the vast majority of the manholes inspected are in excellent condition, 80% (29 Mh) of them was found with no significant deficiencies.

A breakdown of the percentage of the pipe and manholes falling under each of the five (5) structural and physical condition categories is provided in the following tables:

Table 3. Hamlet of Rolla Sewer Manholes Physical Grade

Manholes						
Physical condition grade	5	4	3	2	1	Total
Number of manholes	6	0	1	2	27	36
%	16.9%	0%	2.7%	5.4%	75%	100%

2.1.3 Manhole Repairs Recommendations

As blocked collection systems can have serious repercussions, manholes and sections with O&M grades of 4 and 5 justify immediate maintenance to eliminate further consequences. In addition, all manholes and sections graded 3 should be scheduled for maintenance in a near future to avoid the amplification of blockage risks.

Manholes with physical condition grade 5-4 require a special attention and we recommend repairing any defects found and to reassess their physical condition in a near future to monitor the manholes' deterioration. Most of them have defect located near the surface. These manholes must be repaired in the near future to eliminate the risk of surface settlement or mining of the soil and further structural deterioration

All manholes grade 3 require a second inspection in medium-term (5 to 10 years).

Table 4. Hamlet of Rolla Manhole Repair Recommendations

Recommendations						
Item	Repairs	Next Year	1-3 years	5- 10 years	Estimated Replacement Cost	Estimate Remaining Service Life
SMH-05					$15,000.00	28.00
SMH-06					$15,000.00	28.00
SMH-07					$15,000.00	28.00
SMH-08					$15,000.00	28.00
SMH-09					$15,000.00	28.00
SMH-10					$15,000.00	28.00
SMH-11					$15,000.00	28.00
SMH-12					$15,000.00	28.00
SMH-13					$15,000.00	28.00
SMH-14					$15,000.00	28.00
SMH-15	Special Cleaning	$750			$15,000.00	28.00
SMH-16					$15,000.00	28.00
SMH-17					$15,000.00	28.00
SMH-18	Hydraulic cleaning and Inspection	$500		$800	$15,000.00	28.00
SMH-19					$15,000.00	28.00
SMH-20					$15,000.00	28.00
SMH-21	Extending the height of the frame by manhole cover adjustment ring and broken frame replacement (if necessary). Injection grouting at wall interior joints.		$3,500		$15,000.00	15.00
SMH-21A					$15,000.00	28.00
SMH-22					$15,000.00	21.00
SMH-23	Hydraulic cleaning Frame seal installation.	$500	$1,500		$15,000.00	15.00
SMH-24					$15,000.00	21.00
SMH-25					$15,000.00	28.00
SMH-26	Extending the height of the frame by manhole cover adjustment ring and grouting in hole		$3,500		$15,000.00	15.00
SMH-27					$15,000.00	14.00
SMH-28					$15,000.00	28.00
SMH-29	Frame seal installation and cutting roots.		$1,500		$15,000.00	15.00

SMH-30	Frame seal installation, and coating or lining wall interior.		$3,500		$15,000.00	15.00
SMH-31					$15,000.00	28.00
SMH-32					$15,000.00	28.00
SMH-32A					$15,000.00	28.00
SMH-32B					$15,000.00	28.00
SMH-33					$15,000.00	28.00
SMH-34	Frame seal installation.		$1,500		$15,000.00	15.00
SMH-35					$15,000.00	28.00
SMH-36					$15,000.00	28.00
SMH-37					$15,000.00	28.00
TOTAL		$1,750	$15,000.00	$800	$540,000.00	

2.2 PIPELINES

To determine a maintenance and repair priority list, pipes were graded according to their defects. To do so, a grade from 1 to 5 was assigned (according to PACP v 7) to each identified defect.

Normally, two (2) views of the pipes are taken; one from the upstream manhole and the other from downstream manhole. In some cases, sections were accessible only from one end. In these cases, only one (1) view of the pipe was captured. 34 sections were inspected with 2 view and 9 with only one.

2.2.1 Operation and Maintenance (O&M)

Regarding operation and maintenance condition of pipes sections, the inspected part of the network is in good condition, only 5 pipes (13%) present deficiencies (Grade 4 and 5).

Table 5. Hamlet of Rolla Sewer Pipes O&M Grade

Pipes						
O&M grade	5	4	3	2	1	Total
Number of pipes	3	2	13	14	11	43
%	7%	5%	30%	32%	26%	100%

Table 6. Summary of main defects

Class of Defect	Section Number	Details
Significant O&M	PCO-03	Deposits->Settled->Fine > 30%
	SP-22	Deposits->Settled->Fine > 30%
	SP-32	Deposits->Settled->Fine > 30%
	SP-21A	Deposits->Settled->Fine > 20% & <= 30%
	SP-36	Deposits->Settled->Fine > 20% & <= 30%

2.2.2 Structural and Physical Condition

Table 7. Hamlet of Rolla Sewer Pipes O&M Grade

Pipes						
O&M grade	5	4	3	2	1	Total
Number of pipes	1	0	1	10	31	43
%	2%	0%	2%	23%	73%	100%

2.2.3 Infiltration

One of the main goals of this inspection program was to assess the water tightness of the sanitary sewer system. For this reason, special attention was required to help in locating manholes and pipes with high risk of any water ingress. Information related to cover condition, frame condition, pipe seal condition, potential for runoff and rim to grade heights were collected during the inspection by our field crews. All data collected is available in the PACP/MACP database provided with this report.

Table 8. Summary of main defects

Class of Defect	Section Number	Details
Infiltration	SP-36	O&M Defects->Infiltration->Dripper

2.2.4 Surcharges

Only one section was seen with a surcharge. Surcharges indicate a higher-than-expected level of water within the pipes. In these cases, all this surcharge correlates with obstructed manholes MH-15. CCTV inspection was conducted conclusion are available in the repair recommendations and in the appendix.

Table 9. Summary of main defects

Class of Defect	Section Number	Details
Surcharge	SP-15	Surcharged/Debris

2.2.5 Pipes Corrective actions Recommendations

Hydraulic and/or Special cleaning

As blocked collection systems can have serious repercussions, manholes and sections with O&M grades of 4 and 5 justify immediate maintenance to eliminate further consequences, except for SP-32., which was clean for CCTV inspection.

In general, hydraulic cleaning is recommended for pipes with silt and gravel debris and special cleaning should be performed in pipes with encrustation, roots, hard debris, grease, intruding connections, joint gasket visible and penetration of foreign objects. A CCTV camera should always work in conjunction with specialized pipe cleaning equipment to supervise and guide all these operations.

List of Pipes to Clean :

- SP-36
- SP-21A
- SP-22
- PCO-03

Pipes Repair Recommendations

Table 10. Hamlet of Rolla Pipes repairs Recommendations

Recommendations						
Item	Remediation Description	Next Year	1-3 years	5-10 years	Estimated Cost Of replacement	Estimate Remaining Service Life
SP-05	Inspection			$800	$130,676.00	60.00
SP-06					$130,532.00	80.00
SP-07					$140,564.00	80.00
SP-08					$139,904.00	80.00
SP-09					$139,280.00	80.00
SP-10	Inspection			$800	$139,964.00	80.00
SP-11					$141,056.00	80.00
SP-12					$138,824.00	80.00
SP-13					$140,204.00	60.00
SP-14					$139,880.00	80.00
SP-15	Replace pipe total length is recommended. It is suggested to do hydraulic studies prior to carrying out the recommended works.		$150,000		$142,700.00	80.00
SP-16					$106,340.00	80.00
SP-17					$105,968.00	80.00
SP-18					$119,624.00	80.00
SP-19	Inspection			$800	$123,908.00	80.00
SP-20					$75,164.00	60.00
SP-21					$134,936.00	60.00
SP-21A	Hydraulic Cleaning	$300			$56,780.00	80.00
SP-21B	Inspection			$200	$19,376.00	60.00

SP-22	Hydraulic Cleaning	$500			$132,032.00	80.00
SP-23					$117,764.00	60.00
SP-24					$97,844.00	80.00
SP-25	Inspection			$800	$96,188.00	80.00
SP-25-a					$14,708.00	80.00
SP-26					$113,324.00	60.00
SP-27					$94,904.00	80.00
SP-28	Inspection			$800	$100,412.00	80.00
SP-29					$130,652.00	80.00
SP-30				$800	$108,056.00	80.00
SP-31				$800	$121,712.00	40.00
SP-32	Hydraulic Cleaning	$500			$145,772.00	80.00
SP-32A					$85,892.00	80.00
SP-32B	Inspection			$500	$86,072.00	80.00
SP-33					$145,076.00	80.00
SP-33A					$2,012.00	80.00
SP-34					$118,052.00	60.00
SP-35					$89,612.00	80.00
SP-36	Special Cleaning	$750			$118,904.00	80.00
SP-37					$148,292.00	80.00
SP-x1					$43,808.00	60.00
PCO-01	Inspection			$300	$42,164.00	60.00
PCO-02					$19,088.00	60.00
PCO-03	Replacing pipe and installing new manhole at 13.0 m from downstream MH SMH-19 is recommended. Replace cleanout mainline by new manhole. It is suggested to do hydraulic studies prior to		$35,000		$13,712.00	5.00

	carrying out the recommended works.					
TOTAL		$2,050	$185,000	$6,600	$4,451,732	

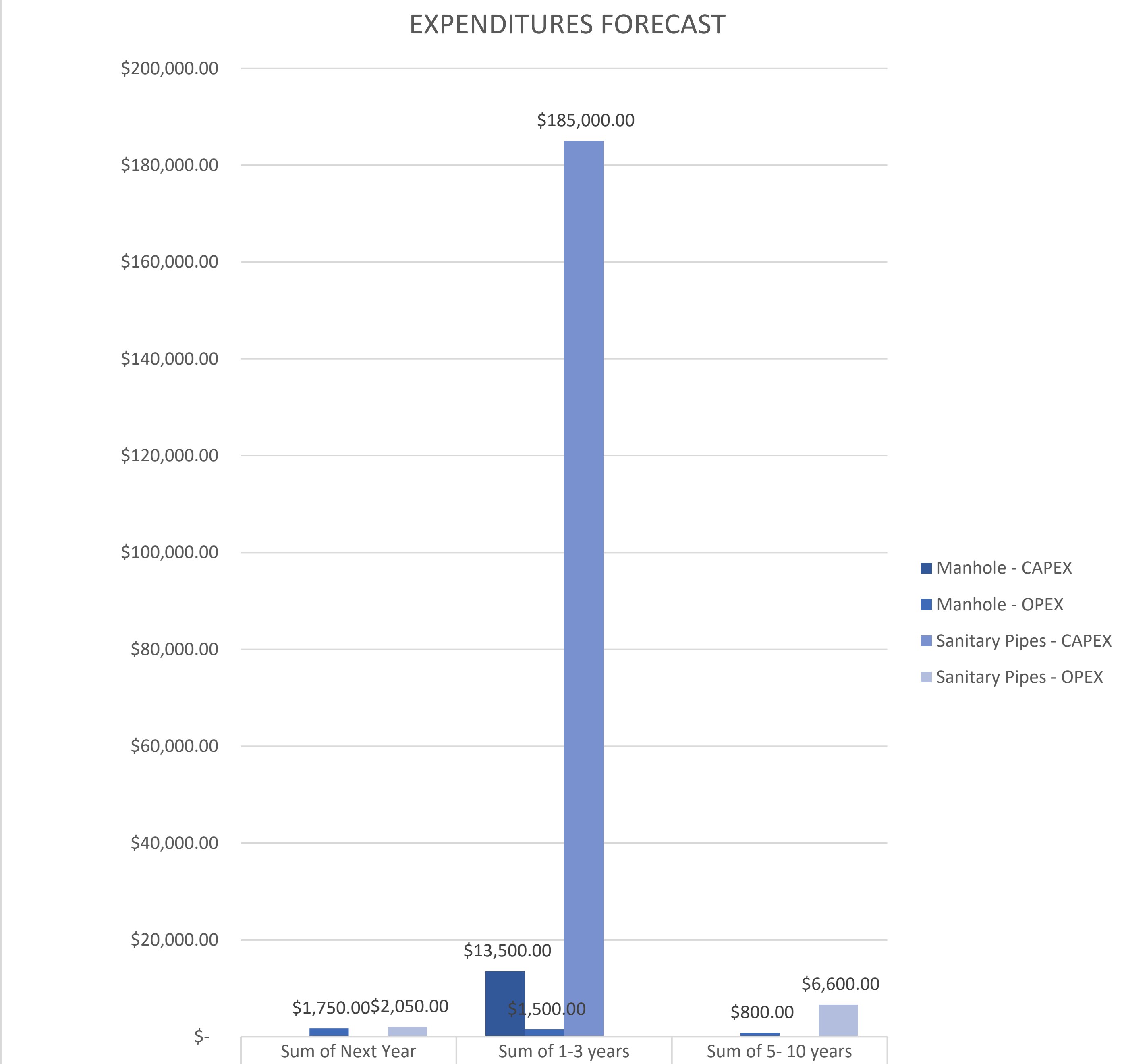
3.0 RECOMMANDATIONS SUMMARY

The costs estimated include study, permits, excavation, road work and material. This is based on the best of our knowledge and subject to changes based on geographic availability of resources. These costs should be used as guideline to provision and prioritize and accurate estimates, request for quote should be launched at the time of the repairs.

Table 11 : Summary table of recommendations

Recommendations						
Item	Repairs	Next Year	1-3 years	5- 10 years	Estimated Replacement Cost	Estimate Remaining Service Life
SMH-15	Special Cleaning	$750			$15,000.00	28.00
SMH-18	Hydraulic cleaning and Inspection	$500		$800	$15,000.00	28.00
SMH-21	Extending the height of the frame by manhole cover adjustment ring and broken frame replacement (if necessary). Injection grouting at wall interior joints.		$3,500		$15,000.00	15.00
SMH-23	Hydraulic cleaning Frame seal installation.	$500	$1,500		$15,000.00	15.00
SMH-26	Extending the height of the frame by manhole cover adjustment ring and grouting in hole		$3,500		$15,000.00	15.00
SMH-29	Frame seal installation and cutting roots.		$1,500		$15,000.00	15.00
SMH-30	Frame seal installation, and coating or lining wall interior.		$3,500		$15,000.00	15.00
SMH-34	Frame seal installation.		$1,500		$15,000.00	15.00
SP-05	Inspection			$800	$130,676.00	60.00
SP-10	Inspection			$800	$139,964.00	80.00
SP-15	Replace pipe total length is recommended. It is suggested to do hydraulic studies prior to carrying out the recommended works.		$150,000		$142,700.00	80.00

SP-19	Inspection			$800	$123,908.00	80.00
SP-21A	Hydraulic Cleaning	$300			$56,780.00	80.00
SP-21B	Inspection			$200	$19,376.00	60.00
SP-22	Hydraulic Cleaning	$500			$132,032.00	80.00
SP-25	Inspection			$800	$96,188.00	80.00
SP-28	Inspection			$800	$100,412.00	80.00
SP-30				$800	$108,056.00	80.00
SP-31				$800	$121,712.00	40.00
SP-32	Hydraulic Cleaning	$500			$145,772.00	80.00
SP-32B	Inspection			$500	$86,072.00	80.00
SP-36	Special Cleaning	$750			$118,904.00	80.00
PCO-01	Inspection			$300	$42,164.00	60.00
PCO-03	Replacing pipe and installing new manhole at 13.0 m from downstream MH SMH-19 is recommended. Replace cleanout mainline by new manhole. It is suggested to do hydraulic studies prior to carrying out the recommended works.		$35,000		$13,712.00	5.00
	TOTAL	**$3,800.00**	**$200,000.00**	**$7,400.00**	**$1,698,428.00**	



	Sum of Next Year	Sum of 1-3 years	Sum of 5- 10 years
Manhole - CAPEX		$13,500.00	
Manhole - OPEX	$1,750.00	$1,500.00	$800.00
Sanitary Pipes - CAPEX		$185,000.00	
Sanitary Pipes - OPEX	$2,050.00		$6,600.00

Figure 3 : Recommendations costs by Timeframe

PEACE RIVER
REGIONAL DISTRICT

APPENDIX 1

LIST OF PIPES

Number	Start Date of inspection	Completion Date of inspection	Node Upstream	Node Downstream	Start Node	Street Name	SG	OMG	Network Type	Dimension 1 mm	Shape	Material	Length m	Hydraulic Cleaning	Special Cleaning	CCTV Inspection Required
SP-32	2021-08-26 17:05	2021-08-26 17:33	SMH-32	SMH-31	SMH-31 / SMH-32	405	3	5	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	119,808	H	-	CCTV
PCO-03	2021-08-27 19:14	-	CO-03	SMH-19	SMH-19	400	5	5	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	9,757	H	-	CCTV
SP-32B	2021-08-26 18:12	2021-08-26 18:30	SMH-32B	SMH-32A	SMH-32A / SMH-32B	405	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	70,062	H	S	-
SP-32A	2021-08-26 17:34	2021-08-26 18:09	SMH-32A	SMH-32	SMH-32 / SMH-32A	405	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	69,906	-	-	-
SP-35	2021-08-26 15:28	2021-08-26 16:29	SMH-35	SMH-34	SMH-35 / SMH-34	404	2	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	73,012	-	-	-
SP-34	2021-08-26 16:16	2021-08-26 17:01	SMH-34	SMH-31	SMH-34 / SMH-31	404	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	96,709	-	-	-
SP-33	2021-08-26 17:07	2021-08-27 17:05	SMH-33	SMH-31	SMH-31 / SMH-33	405	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	119,226	-	-	-
SP-31	2021-08-26 16:57	2021-08-27 17:44	SMH-31	SMH-30	SMH-31 / SMH-30	405	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	99,756	H	-	-
SP-30	2021-08-26 14:15	2021-08-27 17:43	SMH-30	SMH-29	SMH-29 / SMH-30	Sweetwater Rd	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	88,379	H	-	-
SP-28	2021-08-26 13:30	2021-08-26 13:50	SMH-28	SMH-27	SMH-28 / SMH-27	Sweetwater Rd / 403	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	82,014	H	-	-
SP-27	2021-08-26 12:59	2021-08-26 13:46	SMH-27	SMH-26	SMH-26 / SMH-27	Sweetwater Rd / 403	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	77,422	H	-	-
SP-37	2021-08-26 14:38	2021-08-26 14:59	SMH-37	SMH-36	SMH-36 / SMH-37	Sweetwater Rd / 407	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	121,913	-	-	-
SP-36	2021-08-26 14:11	2021-08-26 14:33	SMH-36	SMH-29	SMH-29 / SMH-36	Sweetwater Rd	1	4	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	97,421	H	S	-
SP-29	2021-08-26 12:57	2021-08-26 14:09	SMH-29	SMH-26	SMH-26 / SMH-29	Sweetwater Rd	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	107,209	-	-	-
PCO-01	2021-08-26 15:03	-	CO-01	SMH-37	SMH-37	407	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	33,471	H	-	-
SP-26	2021-08-26 12:28	2021-08-26 12:53	SMH-26	SMH-22	SMH-22 / SMH-26	Sweetwater Rd	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	92,771	-	-	-
SP-25	2021-08-28 11:21	2021-08-28 11:42	SMH-25	SMH-24	SMH-25 / SMH-24	Rolla Rd	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	78,486	H	-	-
SP-24	2021-08-26 12:33	2021-08-28 11:39	SMH-24	SMH-22	SMH-22 / SMH-24	Sweetwater Rd	2	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	79,865	-	-	-
SP-23	2021-08-26 11:58	2021-08-26 12:29	SMH-23	SMH-22	SMH-23 / SMH-22	Sweetwater Rd	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	96,467	-	-	-
SP-22	2021-08-26 12:26	2021-08-28 11:58	SMH-22	SMH-17	SMH-22 / SMH-17	Sweetwater Rd	2	5	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	108,362	H	-	-
SP-21	2021-08-27 18:02	2021-08-27 18:53	SMH-21	SMH-20	SMH-21 / SMH-20	407	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	110,780	H	-	-
SP-20	2021-08-27 18:51	2021-08-27 19:15	SMH-20	SMH-19	SMH-20 / SMH-19	405	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	60,970	-	-	-
SP-19	2021-08-27 19:12	2021-08-27 19:42	SMH-19	SMH-18	SMH-19 / SMH-18	400	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	101,589	H	-	-
SP-18	2021-08-27 19:42	2021-08-28 11:57	SMH-18	SMH-17	SMH-18 / SMH-17	400 / Rolla Rd	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	98,017	-	-	-
SP-21A	2021-08-27 18:07	2021-08-27 18:24	SMH-21A	SMH-21	SMH-21 / SMH-21A	407	2	4	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	45,654	H	-	-
PCO-02	2021-08-27 18:08	-	CO-02	SMH-21	SMH-21	407	2	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	14,242	-	-	-
SP-17	2021-08-28 11:55	2021-08-28 12:15	SMH-17	SMH-16	SMH-17 / SMH-16	Rolla Rd	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	86,640	-	-	-
SP-16	2021-08-28 12:12	2021-08-28 12:31	SMH-16	SMH-15	SMH-16 / SMH-15	Rolla Rd	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	86,947	-	-	-
SP-15	2021-08-27 16:09	-	SMH-15	SMH-14	SMH-14	Canola Field	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	117,250	-	-	-
SP-14	2021-08-27 15:45	2021-08-27 16:07	SMH-14	SMH-13	SMH-13 / SMH-14	Canola Field	2	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	114,903	-	-	-
SP-13	2021-08-27 15:15	2021-08-27 15:43	SMH-13	SMH-12	SMH-12 / SMH-13	Canola Field	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	115,168	-	-	-
SP-12	2021-08-27 14:51	2021-08-27 15:11	SMH-12	SMH-11	SMH-11 / SMH-12	Canola Field	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	114,018	-	-	-
SP-11	2021-08-27 14:18	2021-08-27 14:48	SMH-11	SMH-10	SMH-10 / SMH-11	Canola Field	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	115,879	-	-	-
SP-10	2021-08-27 13:46	2021-08-27 14:16	SMH-10	SMH-09	SMH-09 / SMH-10	Canola Field	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	114,967	H	-	-
SP-09	2021-08-27 13:13	2021-08-27 13:43	SMH-09	SMH-08	SMH-08 / SMH-09	Canola Field	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	114,404	-	-	-
SP-08	2021-08-27 12:38	2021-08-27 13:10	SMH-08	SMH-07	SMH-07 / SMH-08	Canola Field	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	114,920	-	-	-
SP-07	2021-08-27 12:11	2021-08-27 12:36	SMH-07	SMH-06	SMH-06 / SMH-07	Canola Field	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	115,472	-	-	-
SP-06	2021-08-27 11:46	2021-08-27 12:08	SMH-06	SMH-05	SMH-05 / SMH-06	Canola Field	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	107,109	H	-	-
SP-05	2021-08-27 11:41	-	SMH-05	Lift_St-01	SMH-05	Canola Field	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	107,228	-	S	-
SP-x1	2021-08-26 14:35	-	SMH-36	SMH-036_NA	SMH-36	Sweetwater Rd	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	34,839	-	-	-
SP-33A	2021-08-27 17:09	-	SMH-33A	SMH-33	SMH-33A	403	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	0.007	-	-	-
SP-21B	2021-08-27 18:26	-	SMH-21A	SMH-21A_NA	SMH-21A	407	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	14,477	H	-	-
sp-25-a	2021-08-28 11:23	-	SMH-25	SMH-25_NA	SMH-25	Rolla Rd	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	10,585	-	-	-

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention - Date	Node Upstream	Node Downstream	Start Node	Deficiency (Deficiency found)	Operation and maintenance grade	Order #
SP-36	Sanitary Sewage Pi	Sweetwater Rd	2021-08-26	SMH-36	SMH-29	SMH-36	O&M Defects->Infil	4	Zoom2021_Hamlet

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention - Date	Node Upstream	Node Downstream	Start Node	Deficiency (Deficiency found)	Extent	Operation and maintenance grade	Order #
PCO-03	Sanitary Sewage Pipe	400	2021-08-27	CO-03	SMH-19	SMH-19	O&M Defects->Deposits->Settled->Fine	> 30%	5	Zoom2021_Hamlet Roll
SP-32	Sanitary Sewage Pipe	405	2021-08-26	SMH-32	SMH-31	SMH-31	O&M Defects->Deposits->Settled->Fine	> 30%	5	Zoom2021_Hamlet Roll
SP-21A	Sanitary Sewage Pipe	407	2021-08-27	SMH-21A	SMH-21	SMH-21	O&M Defects->Deposits->Settled->Fine	> 20% & <= 30%	4	Zoom2021_Hamlet Roll
SP-36	Sanitary Sewage Pipe	Sweetwater Rd	2021-08-26	SMH-36	SMH-29	SMH-29	O&M Defects->Deposits->Settled->Fine	> 20% & <= 30%	4	Zoom2021_Hamlet Roll
SP-22	Sanitary Sewage Pipe	Sweetwater Rd	2021-08-28	SMH-22	SMH-17	SMH-17	O&M Defects->Deposits->Settled->Fine	> 30%	5	Zoom2021_Hamlet Roll

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention Date	Node Upstream	Node Downstream	Start Node	Deficiency (Deficiency found)	Extent	Internal structural condition grade	Order #
PCO-03	Sanitary Sewage I	400	2021-08-27	CO-03	SMH-19	SMH-19	Structural Defects	N/A	5	Zoom2021_Haml

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention - Date	Node Upstream	Node Downstream	Start Node	21. Inspection Status	Order #
SP-15	Sanitary Sewage Pipe	Rolla Rd	2021-08-28	SMH-15	SMH-14	SMH-15	Surcharged/Debris	Zoom2021_Hamlet Rol

PEACE RIVER
REGIONAL DISTRICT

APPENDIX 2

LIST OF MANHOLES

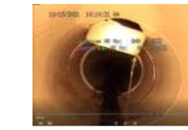
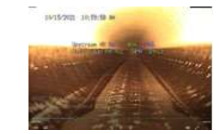
Number	Inspection Date	Street Name	PCG	OMG	Network Type	Hydraulic Cleaning	Special Cleaning
SMH-05	2021-08-27 11:28	Canola Field	1	2	Sanitary	-	-
SMH-06	2021-08-27 11:35	Canola Field	1	2	Sanitary	-	-
SMH-07	2021-08-27 11:35	Canola Field	1	1	Sanitary	-	-
SMH-08	2021-08-27 12:14	Canola Field	1	1	Sanitary	-	-
SMH-09	2021-08-27 12:16	Canola Field	1	1	Sanitary	-	-
SMH-10	2021-08-27 12:16	Canola Field	1	2	Sanitary	-	-
SMH-11	2021-08-27 12:54	Canola Field	1	1	Sanitary	-	-
SMH-12	2021-08-27 12:54	Canola Field	1	1	Sanitary	-	-
SMH-13	2021-08-27 12:55	Canola Field	1	1	Sanitary	-	-
SMH-14	2021-08-27 13:43	Canola Field	1	1	Sanitary	-	-
SMH-15	2021-08-28 11:45	Rolla Rd	1	5	Sanitary	-	S
SMH-16	2021-08-28 11:27	Rolla Rd	1	2	Sanitary	-	-
SMH-17	2021-08-28 11:26	Rolla Rd	1	2	Sanitary	-	-
SMH-18	2021-08-27 18:57	400	1	4	Sanitary	H	-
SMH-19	2021-08-27 17:57	405	1	2	Sanitary	-	-
SMH-20	2021-08-27 17:56	405	1	2	Sanitary	-	-
SMH-21	2021-08-27 17:48	407	5	2	Sanitary	-	-
SMH-21A	2021-08-27 17:46	407	1	2	Sanitary	-	-
SMH-22	2021-08-26 12:00	Sweetwater Rd	2	2	Sanitary	-	-
SMH-23	2021-08-26 11:34	Sweetwater Rd	5	3	Sanitary	H	-
SMH-24	2021-08-28 11:25	Rolla Rd	2	2	Sanitary	-	-
SMH-25	2021-08-28 11:08	Rolla Rd	1	2	Sanitary	-	-
SMH-26	2021-08-26 12:02	Sweetwater Rd	5	2	Sanitary	-	-
SMH-27	2021-08-26 13:05	403	3	2	Sanitary	-	-
SMH-28	2021-08-26 13:02	403	1	2	Sanitary	-	-
SMH-29	2021-08-26 13:33	Sweetwater Rd	5	2	Sanitary	-	-
SMH-30	2021-08-27 16:57	405	5	2	Sanitary	-	-
SMH-31	2021-08-26 16:44	405	1	2	Sanitary	-	-
SMH-32	2021-08-26 17:10	405	1	2	Sanitary	-	-
SMH-32A	2021-08-26 17:12	406	1	2	Sanitary	-	-
SMH-32B	2021-08-26 17:13	406	1	2	Sanitary	-	-
SMH-33	2021-08-27 16:53	403	1	2	Sanitary	-	-
SMH-34	2021-08-26 16:00	407	5	1	Sanitary	-	-
SMH-35	2021-08-26 15:13	404	1	2	Sanitary	-	-
SMH-36	2021-08-26 13:53	Sweetwater Rd	1	2	Sanitary	-	-
SMH-37	2021-08-26 13:54	407	1	2	Sanitary	-	-

PEACE RIVER
REGIONAL DISTRICT

APPENDIX 3
CCTV RECOMMANDATIONS

PRRD - Hamlet Rolla - Recommendations

Date: October 21th, 2021

Main ID	Date	Location	Start MH	End MH	Pipe	Height (mm)	Length	Surveyed Length	CCTV Video File	Recommendations	Pictures		
SP-32	10/15/2021	45th Street	SMH-32	SMH-31	PVC	200	119,8	100,5	PRRD_Rolla_Sanitary_Oct2021-AMH 'SMH32'-AMH 'SMH31'-45th Street (1).mpg	Survey abandoned by tap break-in/hammer intruding. The total inspected length is 100.5 m for 119.8 m of theoretical length. See the final recommendation below.			
SP-32	10/15/2021	45th Street	SMH-31	SMH-32	PVC	200	119,8	18,5	PRRD_Rolla_Sanitary_Oct2021-AMH 'SMH32'-AMH 'SMH.31'-405Street and 404Ave (1).mpg	Completed survey at matching point from other end. Total length surveyed is 119.0 m. Cutting the intruding tap at 18.5 m from upstream manhole SMH-31 is recommended. Pipe in good condition.			
PCO-03	10/15/2021	405 Street and 404 Ave	SMH-19	CO-03	PVC	150	9,8	13,1	PRRD_Rolla_Sanitary_Oct2021-AMH 'CO03'-AMH 'SMH19'-405Street and 400Ave (1).mpg	Water level sag and unable access from cleanout mainline CO-03. Replacing pipe and installing new manhole at 13.0 m from downstream MH SMH-19 is recommended. Replace cleanout mainline by new manhole. It is suggested to do hydraulic studies prior to carrying out the recommended works.			
SP-15	10/15/2021	Off of Rolla Rd.	SMH-15	SMH-14	PVC	200	117,3	113.6	PRRD_Rolla_Sanitary_Oct2021-AMH 'SMH15'-AMH 'SMH14.'-Off of Rolla Rd (1).mpg	Water level sag and high water mark from upstream manhole to 18.3 m, fracture spiral at 16,1 m and fracture longitudinal and crack multiple at 34.4 m from upstream manhole SMH-15. Replace pipe total length is recommended. It is suggested to do hydraulic studies prior to carrying out the recommended works.			

[redacted]

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2022 Budget - Capital Supplemental Item

Title:	Collection System Repairs	**Environmental Services**
Division:	Sewer	**Rolla Sewer - 607**
Type:	Capital - Replacement	**High**

Description

These capital repairs are prioritized defects in the sewer collection sytem identified in the 2021 Rolla Sewer Collection System Condition Assessment. The repairs/replacements include five sections of sewer pipe and six manholes.

Benefits

The capital works will support the the ongoing integrity and functionality of the asset by maintaining its useful life.

Risks

Further repairs or upgrades may be identified during the course of contruction.

Financial Information

Capital

Funding Sources	2022	2023	2024	2025	2026	5 Year Total
Area D Gas Tax	330,000					330,000
						0
						0
	330,000	**0**	**0**	**0**	**0**	**330,000**

Expenses	2022	2023	2024	2025	2026	5 Year Total
Manhole repairs - infrastructure	65,000					65,000
Sewer line repairs - infrastructure	235,000					235,000
Project management	30,000					30,000
						0
						0
						0
						0
						0
	330,000	**0**	**0**	**0**	**0**	**330,000**

Administration

Author: Daris Gillis **Date Prepared: November 5, 2021**
Approval Date

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ENV-RBAC-034

From: Daris Gillis, Environmental Services Manager — Date: November 25, 2021

Subject: Kelly Lake Sewer Condition Assessment & 2022 Capital Request

RECOMMENDATION #1:

That the Rural Budgets Administration Committee approve the supplementary request of $135,000 payable from the Area D Community Works Gas Tax fund, to be issued to Function 606 – Kelly Lake Sewer, as outlined in the 2021 Kelly Lake Sewer Condition Assessment.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee allocate $20,000 from Area D Fair Share to be transferred into the capital reserve for Function 606 – Kelly Lake Sewer in the 2022 budget.

BACKGROUND/RATIONALE:

The Kelly Lake Sewer Collection system was constructed in 1995-1996 and consists of a lift station, a five stage settling lagoon, constructed wetland, and an outflow pipe to Steeprock Creek. The collection portion of system consists of 2.4 km of sanitary sewer pipe and associated manholes.

Aligning with the current Regional Board Strategic Plan, a condition assessment of the Kelly Lake Sewer Collection system was conducted in 2021 by Simo Management Inc. The scope of the assessment was to determine the current condition and remaining service life of the system, and to identify required system repairs along with associated costs. The Kelly Lake system is estimated to have at least 20 years of remaining service life with proper maintenance and repairs. The cost for total replacement of the collection system in 2021 dollars is $2,997,528.

Table 1 highlights the areas within the system that will require immediate repairs in order to maintain proper functioning of the collection system. Cost estimates have been built with a 50% contingency.

Table 1. Cost of Repairs and Maintenance for 2022.

Repairs/Immediate Maintenance	Estimated Cost of Repairs/Replacement
Pipes	$ 25,000
Manholes	$ 35,000
Lagoons/Lift Station	$ 65,000
Construction Oversight	$ 10,000
Total:	**$135,000**

A supplemental capital request form is attached for the Committee's consideration.

Staff Initials: DG Dept. Head: kb CAO: Shawn Dahlen

ALTERNATIVE OPTIONS:
1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:
☒ Organizational Effectiveness
  ☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATION(S):
The current parcel tax requisition for the Kelly Lake Sewer function is $23,437. In order to cover the cost of replacement in 2041, staff are recommending an increase in parcel tax by 5% to allow for an annual incremental increase, which will eventually be able to allow the function to sustain itself.

As of October 31, 2021 the balance available after the remaining commitments in Electoral Area D are as follows:
- Peace River Agreement: $592,594.35,
- Gas Tax Reserve fund: $1,238,444.68, and
- Fair Share Reserve fund: $1,854,311.67.

COMMUNICATIONS CONSIDERATION(S):
None at this time.

OTHER CONSIDERATION(S):
In order to allow for growth in this metis community, there are multi-family dwellings proposed for construction. It is recommended that a user fee bylaw be developed to allow for each dwelling to be billed individually for use of the sewer system.

Attachments:
1. 2021 Kelly Lake Sewer Condition Assessment
2. 2022 Kelly Lake Sewer Capital Request Form

PEACE RIVER
REGIONAL DISTRICT

KELLY LAKE SEWER SYSTEM
CONDITION ASSESSMENT

KELLY LAKE SEWER SYSTEM CONDITION ASSESSMENT

NOVEMBER 2021 FINAL REPORT

RECORD OF ISSUES AND REVISIONS					
R	DATE	DESCRIPTION	PREPARED	VERIFIED	APPROVED
0B	2021-11-10		R. Flannery	A.Hernandez	G.Boutron, P.Eng.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

1.1 SCOPE OF WORK

Simo Management Inc. (Simo) was selected by Peace River Regional District (PRRD) to undertake a non-destructive and non-invasive field condition assessment and an overall operational structural evaluation of the Kelly Lake Sewer System to determine the remaining service life, and repair/replacement costs of any identified deficiencies.

This report summarizes the results found from the condition assessment of the Kelly Lake Sewer System. Assets reviewed include the collection system, lift stations, lagoons, engineered wetland and the outflow pipe as described in table 1.

1.2 DESCRIPTION OF FACILITIES

The Kelly Lake sewer system consists of a wastewater collection system within the Kelly Lake subdivision, a lift station, 5 stages settling lagoons, a wetland, and an outflow pipe to Steeprock Creek.

The Kelly Lake sewer system was initially constructed in 1995-1996. The wastewater collection system within the scope of this report includes:

Table 1. Kelly Lake Sewer System Facilities

INFRASTRUCTURE	DESCRIPTION
FORCEMAINS	2.4 km long 100mm or 150mm
SEWER LAGOON	5 settling lagoons
WETLAND	6th stage engineered
LIFT STATION	Lift station housing 2 alternating pumps

1.3 REPORT LIMITATIONS

The objective of this report is to supply a common sign of the current physical state of the sewer collection system. The following assumptions were considered:

- Estimated Useful Life is based on a sensible degree of continuous maintenance.
- Timeframes given for undertaking work represent our opinion on when to budget for the work. Variations of our estimate could happen in the case failure of the item, or the optimum repair/replacement process.
- Costs of replacement is based on our knowledge and experience but is

subject to change depending on labor market, resources availability and projects peculiar constraints.

- We focused our recommendations on short to medium term action plans (1 to 5 years). We recommend re-assessments for longer term issues.
- Where measures where not used for assessing the condition of the assets, a knowledge-based evaluation was conducted using the available data from the district and interview with its operator.
- We used a condition-based similarity model to estimate remaining lifetime and not a statistical degradation model.

2.0 ASSESSMENT RESULTS

Our team conducted the assessments of the designated Kelly Lake sanitary system between the August 24th and August 28th, and October 12th to 13th with the assistance of Peace River Regional District operator.

Our crew employed a high-resolution Zoom Camera to check the pipes, valves, shut offs, and cleanouts for wall structural integrity and sewage leaks. T

Following the inspection of the pipes and manholes, PACP/MACP certified viewers reviewed and graded the inspection videos. This report includes listings of defects encountered during inspections, according to PACP/MACP terminology. The following information is provided:

Figure 1: Zoom Inspection of Lift Station

- Observed manhole defects categorized according to physical condition and operation and maintenance (O&M) grades from MACP v 7.
- Pipe defects categorized according to internal structural condition and O&M grades from PACP v 7.
- Infiltration/inflow sources observed at each manhole and pipe by type of defect
- Manholes and pipes requiring hydraulic and/or special cleaning (grease, roots, incrustations, debris, etc.)
- Manholes and sections requiring repairs
- Printed photos of major defects observed during the inspection of pipes

This report also includes color-coded maps illustrating:

- Manholes and pipes inspected
- Manholes and pipes O&M Condition
- Manholes and pipes structural Condition
- Pipes required hydraulic and/or special cleaning

The condition assessment is designed to provide prioritized lists of defects intended to assist the district in the development of a proactive operations and maintenance program, and to define where capital improvement spending may be required. Compared to classical CCTV inspection, this allows to narrowing the scope of flushing activities by identifying the pipes and manholes in excellent condition (not requiring cleaning) and those that have a very poor physical condition and requires repairs instead of cleaning.

All our camera inspections of pipes and manholes were carried out at ground level. The information contained in this report such as diameters, type of pipe, section lengths, etc. was taken directly from the files furnished by the District and were complemented by measurements performed by our field crews.

Table 2: Kelly Lake Summary inspections

Site	Kelly Lake
Type of the collection system:	Sanitary
Total number of sections inspected:	22
Number of manholes inspected:	29
Number of Lagoons	5 + 1 Engineered wetland
Date of Survey:	August 26th and 28th, November 12th and 13th

The zoom inspection was carried out in the Disctrict in order to assess the sanitary sewer condition. Therefore, 29 manholes and 22 pipe sections were inspected. The inspected manholes and pipes inventories are presented respectively in Appendix 1 and Appendix 2.
The attached report summarizes our findings of the O&M and structural condition, as well as infiltration/inflow (I/I) found in the Kelly Lake Sanitary Sewer System. We have also summarized our recommendations for cleaning, repairs and manhole intervention. The following paragraphs contain the details of all these items.

The lagoons and surroundings were also assessed to identify any issues that may be affecting treatment performance or that could require repairs, maintenance, or changes in day-to-day operations.

Finally, an environmental expert assessed the Constructed Wetland (CW) with in order to:

- Determine whether the as-built condition of the CW is consistent with the original design drawings (L&M Engineering Ltd. 1996; no. 200A and no. 202A), and document any significant differences.
- Assess the condition and function of the main elements of the CW including the inlet, outlet, operating depth, substrate, and wetland plant cover and species distribution.

- Review the normal operating procedures of the CW;
- Identify any issues that may be affecting treatment performance or that could require repair, maintenance, or changes in day-to-day operations.
- Assess the biophysical condition of the immediate receiving environment (i.e. area <200 m from discharge point);
- Assess compliance with the conditions specified in Permit #14420 that apply to the CW; and
- Comment on potential environmental issues related to the discharge of treated municipal effluent from the Kelly Lake WWTF.

2.1 SITE CONDTIONS

2.1.1 ACCESS ROAD AND SITE SECURITY

Access to the lagoons is through Kelly Lake Transfer Station (PRRD). The shared gravel access road is in good condition. Two gates closed with padlocks need to be opened to access the cells area. All gates, fencing and access road are in acceptable condition except for a few potholes.

Numerous muskrats' burrows have been seen on the edges of the various lagoons and along the access roads. This is not causing any functional or structural problems at this time but should be monitored as the accumulation of these could cause the edges to become brittle and lead to the collapse of the roads especially between the cells 3 and 4 where the berm is already unstable and cannot allow heavy rolling equipment to access. Furthermore, this passage is not level and should be reconditioned.

Figure 2: Muskrats Burrows between cell 4 & 5

Figure 3: Unlevelled Access between Cell 3 & 4

Repeated overflowing of lagoon 3 has created crevasses as well as a slight subsidence of the road. It is advisable to proceed to a sludge measurement on cells 1, 2 and 3 to evaluate if the design capacity is still maintained and prevent further overflow. In addition, the level of pond 3 should be lowered regularly in anticipation of the high rainfall seasons.

Figure 4: Crevasses between Cell 3 & 5

There is very little human activities in the vicinity of the lagoons. There are potential accesses to the site through the section north of the Constructed wetland and east of the lagoons through the forest. Human intrusions are unlikely, but animals could venture into the lagoons.

A break in the fence, probably caused by an animal, was seen on the south side fence surrounding lagoons 1 and 2.

Table 3. Kelly Lake Access Road Repair Recommendations

Recommendations				
Item	Repairs	Priority	Estimated Cost	Remaining Useful Life
Access Between Cell 3 and 4	Leveling of the road Approx. 50mx5m	5-10 years	$50,000	35
Fence Cell 1 and 2	New Fencing Approx. 50m	1-3 years	$1,500	15

2.2 LAGOONS

The 5 stage lagoons were designed 1995 and commissioned in 1996. According to the study of the CAD drawings, the main technical characteristics built in 1995 still seem to be present. The lagoons are designed to discharge sequentially into each other through the sanitary manholes B, D, E, F and H. Bypass valves (A, B and C) exist to level the water tables and prevent the overflow of certain cells by isolating them. In particular, by using the overflow C between cell 1 and 3 and G between cell 3 and 5. Since the exercise of the valves (submerged at this time of the year) would not have given us any indication as to their tightness and degree of closure, we relied on the operational history of the valves to judge their condition. The valves are in working condition and exercised at least once a year.

The levels of the lagoons observed are within acceptable ranges. Nevertheless, it seems that cell 3 is regularly overflowing. A sludge measurement by sludge judge is recommended for cells 1, 2 and 3.

Figure 5 : Cell 1 and Cell 2

Figure 6 : Cell 3 and Cell 4

The berms of the different cells are in average to poor condition.
In addition to muskrat burrows and uncontrolled vegetation, there is a strong degradation of the berm slope, especially on the eastern side of lagoon 5. The clay layer is uneven and may result in infiltration and increase risk of collapsing from the surrounding roads.

Figure 7 : Cell 5 berm

Table 4. Kelly Lake Lagoon Repair Recommendations

Recommendations				
Item	Repairs	1-3 years	3-5 years	Estimated Replacement Cost
East Berm of Cell 5	Re-sloping or repacking. Could be part of a larger rehabilitation of the lagoon in the next 15-20 years.		$50,000 - $100,000	N/A
Sludge	Sludge Judge	$3,500		N/A

2.3 WETLAND

The detailed report of the environmental expert is available in Appendix 3. The main conclusions are as follows

- The current structure and condition of the CW is consistent with the original design drawing from 1995. In general, the wetland appears to be functioning as intended with adequate depth and vegetation cover and operational features to minimize short-circuiting of the flow.
- The discharge of treated effluent from Lagoon 5 to the CW is reportedly stopped on September 15 each year); and
- The treated effluent released from the CW is discharged to ground after travelling about 160 m through a ditch, rather than being discharged to Steeprock Creek. The District confirmed the ENV was aware and approve that water will discharge to Steeprock Creek after running off and infiltration through the woods soil.
- The treated effluent flowing through the ditch downstream from the CW was clear and there was no evidence during the site visit of excessive nutrient enrichment or other adverse environmental effects. At the end of the ditch, the water was infiltrating to ground.
- Given the high level of treatment measured in 2021 (n=3), the final effluent likely presents negligible risk to the environment or to human health, regardless of the point of discharge. Before contacting ENV to clarify the Permit requirements, PRRD may wish to analyze additional recent monitoring data (e.g. from 2019 and 2020) to demonstrate treatment performance. Moving forward, PRRD should sample the Lagoon 5 and CW discharges at least monthly and forward the data to ENV, as required.

2.4 MANHOLES

To determine a maintenance and repairs priority list, the manholes were graded according to their O&M, Structural and Physical defects. To do so, a grade from 1 to 5 was assigned (according to MACP v 7) to each identified defect.
Manhole A, B and F could not be inspected because they were full at the period of the year due to level equalizing operations. Though, no signs of heavy infiltration or leak were notice from above-ground visual inspection.

2.4.1 Operation and Maintenance (O&M)

From an operation and maintenance standpoint, the inspection results confirmed that the inspected manholes are in fair condition. Only 10 manholes (35%) have grades 4 and 5 O&M deficiencies.
A breakdown of the percentage of the manholes falling under each of the five (5) O&M defects is provided in the following tables.

Table 5. Kelly Lake Sewer Manholes O&M Grade

Manholes						
O&M grade	5	4	3	2	1	Total
Number of manholes	6	4	2	11	6	29
%	20.5%	14%	7%	38%	20.5%	100%

2.4.2 Structural and Physical Condition

In order to determine intervention priorities, the manholes inspected by Simo's camera were graded in accordance with MACP coding procedures. Grade from 1 to 5 are allocated to each defect.

From a structural standpoint, the inspection confirmed that 17% (5) of the manholes are not in good condition (physical condition grade of 4 or 5). Nevertheless, the vast majority of the manholes inspected are in excellent condition, 82% (24 Mh) of them was found with no significant deficiencies.
A breakdown of the percentage of manholes falling under each of the five (5) structural and physical condition categories is provided in the following tables:

Table 6. Kelly Lake Sewer Manholes Physical Grade

Manholes						
Physical condition grade	5	4	3	2	1	Total
Number of manholes	5	0	1	2	21	29
%	17%	0	3.5%	7%	72.5%	100%

2.4.3 Manhole Repairs Recommendations

As blocked collection systems can have serious repercussions, manholes and sections with O&M grades of 4 and 5 justify immediate maintenance to eliminate further consequences. In addition, all manholes and sections graded 3 should be scheduled for maintenance in a near future to avoid the amplification of blockage risks.

Manholes with physical condition grade 5-4 require a special attention and we recommend repairing any defects found and to reassess their physical condition in a near future to monitor the manholes' deterioration. Most of them have defect located near the surface. These manholes must be repaired in the near future to eliminate the risk of surface settlement or mining of the soil and further structural deterioration.

All manholes grade 3 require a second inspection in medium-term (5 to 10 years).

Additionally, all lids from the lagoons were originally sealed with concrete lips, which had failed over. This leads to rain fall infiltration, but do not cause serious functional problems, we do not recommend any actions.

Table 7. Kelly Lake Manhole Repair Recommendations

Recommendations						
Item	Repairs	Next Year	1-3 years	5- 10 years	Estimated Replacement Cost	Estimate Remaining Service Life
SMH-02	Inspection			$800	$15,000.00	14
SMH-03					$15,000.00	28
SMH-04					$15,000.00	28
SMH-05					$15,000.00	28
SMH-16					$15,000.00	28
SMH-19					$15,000.00	28

SMH-21					$15,000.00	28
SMH-22	Hydraulic Cleaning	$500			$15,000.00	28
SMH-23	Hydraulic Cleaning	$500			$15,000.00	28
SMH-24					$15,000.00	28
SMH-25					$15,000.00	28
SMH-26					$15,000.00	28
SMH-27					$15,000.00	28
SMH-A					$15,000.00	28
SMH-B					$15,000.00	28
SMH-D	Hydraulic Cleaning	$500			$15,000.00	28
SMH-E	Hydraulic Cleaning	$500			$15,000.00	28
SMH-F					$15,000.00	28
SMH-G					$15,000.00	28
SMH-H					$15,000.00	28
SMH-J					$15,000.00	28
SMH-K					$15,000.00	28
SMH-L	Frame seal installation.		$1,500		$15,000.00	15
SMH-M					$15,000.00	28
SMH-N (RipRap)	Frame adjustment and seal installation		$1,500			
SMH-17					$15,000.00	21
SMH-C	Hydraulic Cleaning	$500			$15,000.00	21
SMH-06	Hydraulic Cleaning Precast concrete chimney components adjustment.	$500	$3,500		$15,000.00	15
SMH-07	Frame adjustment and extending the height of the frame by manhole cover adjustment ring.		$3,500		$15,000.00	15
SMH-18	Precast concrete chimney components adjustment and extending the height of the frame by manhole cover adjustment ring.		$3,500		$15,000.00	15
TOTAL		$3,000.00	$13,500.00	$800.00	$450,000.00	

2.5 PIPELINES

To determine a maintenance and repair priority list, pipes were graded according to their defects. To do so, a grade from 1 to 5 was assigned (according to PACP v 7) to each identified defect.

Normally, two (2) views of the pipes are taken; one from the upstream manhole and the other from downstream manhole. In some cases, sections were accessible only from one end. In these cases, only one (1) view of the pipe was captured. 15 sections were inspected with 2 view and 6 with only one.

2.5.1 Operation and Maintenance (O&M)

Regarding operation and maintenance condition of pipes sections, the inspected part of the network is in fair condition, 6 pipes (29%) present deficiencies (Grade 4 and 5).

Table 8. Kelly Lake Sewer Pipes O&M Grade

Pipes						
O&M grade	5	4	3	2	1	Total
Number of pipes	1	5	6	6	3	21
%	5%	24%	28%	28%	15	100%

Table 9. Summary of main defects

Class of Defect	Section Number	Details
Significant O&M	SP-24	O&M Defects->Deposits->Attached->Encrustation
	SP-18	O&M Defects->Deposits->Settled->Fine
	SP-22	O&M Defects->Deposits->Settled->Fine
	SP-I	O&M Defects->Deposits->Settled->Gravel
	SP-J	O&M Defects->Obstacles/Obstructions->Construction Debris

2.5.2 Structural and Physical Condition

All pipes inspected were in great condition and do not require any intervention or repair except where leaks were located, see 2.2.3 Infiltration.

Table 10. Kelly Lake Sewer Pipes O&M Grade

Pipes						
O&M grade	5	4	3	2	1	Total
Number of pipes	0	0	0	9	12	21
%	0%	0%	0%	43%	57%	100%

2.5.3 Infiltration

One of the main goals of this inspection program was to assess the water tightness of the sanitary sewer system. For this reason, special attention was required to help in locating high risks of any water ingress. Information related to cover condition, frame condition, pipe seal condition, potential for runoff and rim to grade heights were collected during the inspection by our field crews. All data collected is available in the PACP/MACP database provided with this report. Given the size of the leaks we do not recommend any repairs at this stage. An inspection should be carried out in the 3 to 5 years to monitor the evolution of these leaks.

Table 11. Summary of main defects

Class of Defect	Section Number	Details
Infiltration	SP-24	O&M Defects->Infiltration->Dripper
	SP-04	O&M Defects->Infiltration->Dripper

2.5.4 Surcharges

Surcharges indicate a higher-than-expected level of water within the pipes. In these cases, all these surcharges correlate with obstructed manholes upstream and/or downstream. The corrective action is cleaning of the manholes as indicated per their OM grades in the manholes section of the present report.

Table 12. Summary of main defects

Class of Defect	Section Number	Details
Surcharges	SP-23	Surcharged/Debris
	SP-22	Surcharged/Debris
	SP-J	Surcharged/Debris

2.5.5 Pipes Corrective actions Recommendations

As blocked collection systems can have serious repercussions, sections with O&M grades of 4 and 5 justify immediate maintenance to eliminate further consequence.

In general, hydraulic cleaning is recommended for pipes with silt and gravel debris and special cleaning should be performed in pipes with encrustation, roots, hard debris, grease, intruding connections, joint gasket visible and penetration of foreign objects. A CCTV camera should always work in conjunction with specialized pipe cleaning equipment to supervise and guide all these operations.

Pipes with physical condition grade 5-4 require a special attention and we recommend repairing any defects found.

All pipes grade 3 require a second inspection in medium-term (5 to 10 years).

Pipes Repair Recommendations

Table 13. Kelly Lake Repair Recommendations

	Recommendations					
Item	Remediation Description	Next Year	3-5 years	5-10 years	Estimated Cost Of replacement	Estimate Remaining Service Life
SP-02					$122,624.00	60
SP-03	Inspection			$850	$124,736.00	60
SP-04	Hydraulic Cleaning and Inspection monitoring leaks	$750	$750		$122,048.00	60

SP-05					$147,584.00	80
SP-06					$144,632.00	80
SP-07					$144,128.00	60
SP-16	Inspection			$850	$144,056.00	60
SP-17					$131,504.00	60
SP-18	Special Cleaning	$750			$86,456.00	80
SP-19	Inspection			$850	$127,040.00	60
SP-20					$145,220.00	80
SP-21	Inspection			$850	$146,072.00	80
SP-22	Hydraulic Cleaning	$500			$102,872.00	80
SP-23					$112,280.00	60
SP-24	Inspection monitoring leaks	$750	$750		$103,892.00	80
SP-25					$138,608.00	60
SP-26	Inspection			$750	$93,932.00	80
SP-27					$71,984.00	80
SP-I	Special Cleaning	$750			$143,348.00	80
SP-J	Hydraulic Cleaning	$500			$145,772.00	80
SP-K	Special Cleaning	$500			$48,740.00	80
TOTAL		$4,500	$1,500	$4,150	$2,547,528	

2.6 LIFT STATION

2.6.1 Operation and Maintenance (O&M)

The lift station was in good condition with a MACP grade of 2. It does not require any cleaning in the short term

2.6.2 Structural and Physical Condition

The lift station was in very good physical condition with a MACP grade of 1. It does not require actions at the moment.

2.6.3 Pumps

Although no data was available with the exact installation date or preventive/corrective records, it has been understood from discussions with the operator that the pumps meet their intended purpose without specific sign of failure or premature aging. The yearly routine maintenance is followed. Their design capacity is not exceeded by the average daily flows.

2.6.4 Panels and controls

Panels were recent (about 10-15 years). Although no data was available about the exact installation date or preventive/corrective data it has been understood from discussions with the operator that the panel meet their intended purpose without specific sign of failure or premature aging.

2.6.5 Access Ladder, Lids and safety features

Although rust was present, the Access ladder did not show safety concerns.

A bolt-in protective fence is available to visually inspect the pit without the need for fall protection equipment. The anchorages are in good condition.

Ventilation of the well seem satisfying, although no measurements of the air was performed.

The guiding rails to extract the pumps are in good working condition. The absence of a built-in jib-crane support forces the use of mobile crane. Long term savings could be generated by upgrading this station with the addition of such equipment.

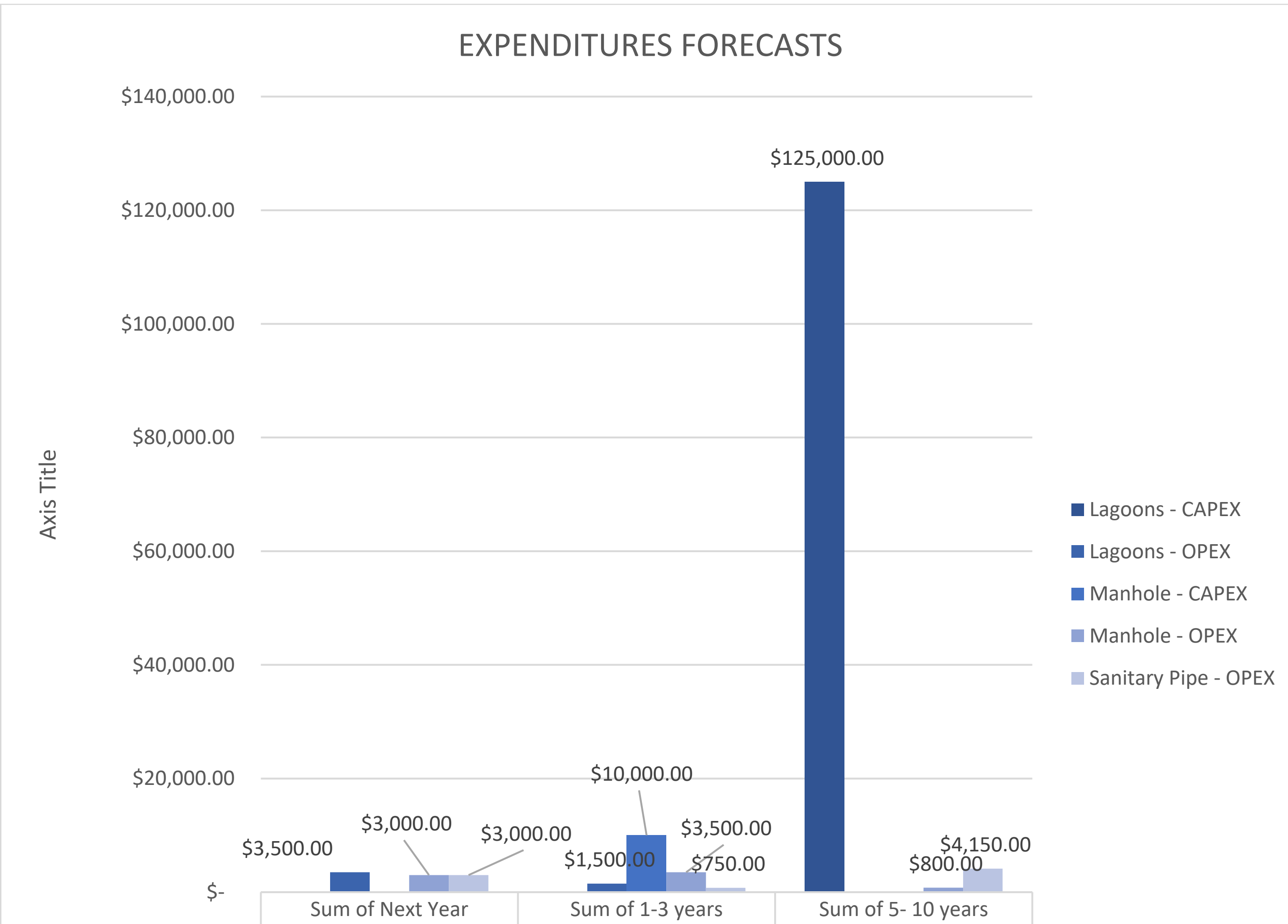
3.0 RECOMMANDATIONS SUMMARY

The costs estimated include study, permits, excavation, road work and material. This is based on the best of our knowledge and subject to changes based on geographic availability of resources. These costs should be used as guideline to provision and prioritize and accurate estimates, request for quote should be launched at the time of the repairs.

Table 14. Kelly Lake Summary of Recommendations

Recommendations						
Item	Repairs	Next Year	1-3 years	5- 10 years	Estimated Replacement Cost	Estimate Remaining Service Life
SMH-02	Inspection			$800	$15,000.00	28
SMH-22	Hydraulic Cleaning	$500			$15,000.00	28
SMH-23	Hydraulic Cleaning	$500			$15,000.00	28
SMH-D	Hydraulic Cleaning	$500			$15,000.00	28
SMH-E	Hydraulic Cleaning	$500			$15,000.00	28
SMH-L	Frame seal installation		$1,500		$15,000.00	15
SMH-N (RipRap)	Frame adjustment and seal installation		$1,500			
SMH-C	Hydraulic Cleaning	$500			$15,000.00	21
SMH-02					$15,000.00	14
SMH-06	Hydraulic Cleaning Precast concrete chimney components adjustment.	$500	$3,500		$15,000.00	15
SMH-07	Frame adjustment and extending the height of the frame by manhole cover adjustment ring.		$3,500		$15,000.00	15
SMH-18	Precast concrete chimney components adjustment and extending the height of the frame by manhole cover adjustment ring.		$3,500		$15,000.00	15
East Berm of Cell 5	Re-sloping or repacking. Could be part of a larger rehabilitation of the lagoon in the next 15-20 years.			$50,000-$100,000		
Sludge	Sludge Judge	$3,500				
Access Between Cell 3 and 4	Leveling of the road Approx. 50mx5m			$50,000		
Fence Cell 1 and 2	New Fencing Approx. 50m		1,500			
SP-03	Inspection			$850	$124,736.00	60
SP-04	Hydraulic Cleaning and Inspection monitoring leaks	750$	$750		$122,048.00	60
SP-16	Inspection			$850	$144,056.00	60
SP-18	Special Cleaning	$750			$86,456.00	80
SP-19	Inspection			$850	$127,040.00	60
SP-21	Inspection			$850	$146,072.00	80

SP-22	Hydraulic Cleaning	$500			$102,872.00	80
SP-24	Inspection monitoring leaks	750$	750$		$103,892.00	80
SP-26	Inspection			$750	$93,932.00	80
SP-I	Special Cleaning	$750			$143,348.00	80
SP-J	Hydraulic Cleaning	$500			$145,772.00	80
SP-K	Special Cleaning	$500			$48,740.00	80
TOTAL		$9,500	$15,750	$129,950		



	Sum of Next Year	Sum of 1-3 years	Sum of 5- 10 years
Lagoons - CAPEX			$125,000.00
Lagoons - OPEX	$3,500.00	$1,500.00	
Manhole - CAPEX		$10,000.00	
Manhole - OPEX	$3,000.00	$3,500.00	$800.00
Sanitary Pipe - OPEX	$3,000.00	$750.00	$4,150.00

Figure 8 : Expenditures forecast

PEACE RIVER
REGIONAL DISTRICT

APPENDIX 1

PIPES LIST

Number	Start Date of inspection	Completion Date of inspection	Node Upstream	Node Downstream	Start Node	Street Name	SG	OMG	Network Type	Dimension 1 mm	Shape	Material	Length m	Hydraulic Cleaning	Special Cleaning	CCTV Inspection
SP-04	2021-08-24 17:09	2021-08-24 17:35	SMH-04	SMH-03	SMH-04 / SMH-03	Kelly Lake Road 11	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	100,042	-	S	-
SP-03	2021-08-24 17:32	2021-08-24 17:58	SMH-03	SMH-02	SMH-03 / SMH-02	Kelly Lake Road 11	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	102,284	H	-	-
SP-07	2021-08-24 15:44	2021-08-24 16:20	SMH-07	SMH-06	SMH-07 / SMH-06	Kelly Lake Road 11	2	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	118,442	-	-	-
SP-06	2021-08-24 16:17	2021-08-24 16:48	SMH-06	SMH-05	SMH-06 / SMH-05	Kelly Lake Road 11	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	118,856	-	-	-
SP-05	2021-08-24 16:45	2021-08-24 17:12	SMH-05	SMH-04	SMH-05 / SMH-04	Kelly Lake Road 11	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	121,322	-	-	-
SP-21	2021-08-24 13:24	-	SMH-21	SMH-20	SMH-21	Gauthier Road	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	120,060	H	-	-
SP-20	2021-08-24 14:01	-	SMH-20	SMH-19	SMH-19	Gauthier Road	1	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	119,347	-	-	-
SP-19	2021-08-24 13:58	2021-08-24 14:31	SMH-19	SMH-18	SMH-19 / SMH-18	Gauthier Road	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	104,201	H	-	-
SP-18	2021-08-24 14:26	2021-08-24 14:54	SMH-18	SMH-17	SMH-18 / SMH-17	Gauthier Road	1	5	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	70,381	H	S	-
SP-17	2021-08-24 14:50	2021-08-24 15:22	SMH-17	SMH-16	SMH-17 / SMH-16	Gauthier Road	2	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	107,924	-	-	-
SP-16	2021-08-24 15:16	2021-08-24 15:51	SMH-16	SMH-07	SMH-16 / SMH-07	Kelly Lake Road 11	2	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	118,381	H	-	-
SP-24	2021-08-25 12:50	2021-08-25 13:19	SMH-24	SMH-23	SMH-24 / SMH-23	Gauthier Road	1	4	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	84,907	-	S	-
SP-23	2021-08-25 13:17	-	SMH-23	SMH-22	SMH-23	Easement	2	1	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	91,897	-	-	-
SP-22	2021-08-24 17:11	-	SMH-22	SMH-04	SMH-04	Kelly Lake Road 11	1	4	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	84,059	H	-	-
SP-27	2021-08-25 11:33	2021-08-25 11:56	SMH-27	SMH-26	SMH-27 / SMH-26	Gauthier Road	1	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	58,317	-	-	-
SP-26	2021-08-25 11:54	2021-08-25 12:29	SMH-26	SMH-25	SMH-26 / SMH-25	Gauthier Road	1	3	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	76,610	-	S	-
SP-25	2021-08-25 12:17	2021-08-25 12:52	SMH-25	SMH-24	SMH-25 / SMH-24	Gauthier Road	2	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	113,843	-	-	-
SP-I	2021-08-25 17:21	-	SMH-I	SMH-J	SMH-J	Lagoons	1	4	Sanitary Sewage Pipe	150	Circular	Polyvinyl Chloride	117,794	H	S	-
SP-J	2021-08-25 16:59	-	SMH-J	SMH-K	SMH-K	Lagoons	1	4	Sanitary Sewage Pipe	150	Circular	Polyvinyl Chloride	119,806	H	-	-
SP-K	2021-08-25 16:40	2021-08-25 16:57	SMH-K	SMH-L	SMH-L / SMH-K	Lagoons	1	4	Sanitary Sewage Pipe	150	Circular	Polyvinyl Chloride	38,952	-	S	-
SP-02	2021-08-24 17:48	2021-08-24 18:39	SMH-02	Lift_St-01	SMH-02 / Lift_St-01	Kelly Lake Road 11	2	2	Sanitary Sewage Pipe	200	Circular	Polyvinyl Chloride	100,521	-	-	-

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention - Date	Node Upstream	Node Downstream	Start Node	Deficiency (Deficiency found)	Operation and maintenance grade	Order #
SP-24	Sanitary Sewage Pipe	Gauthier Road	2021-08-25	SMH-24	SMH-23	SMH-23	O&M Defects-	4	Zoom2021_Kelly Lake
SP-04	Sanitary Sewage Pipe	Kelly Lake Road 11	2021-08-24	SMH-04	SMH-03	SMH-03	O&M Defects-	3	Zoom2021_Kelly Lake

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention - Date	Node Upstream	Node Downstream	Start Node	Deficiency (Deficiency found)	Extent	Operation and maintenance grade	Order #
SP-24	Sanitary Sewage	Gauthier Road	2021-08-25	SMH-24	SMH-23	SMH-23	O&M Defects-	> 20% & <= 30%	4	Zoom2021_Ke
SP-18	Sanitary Sewage	Gauthier Road	2021-08-24	SMH-18	SMH-17	SMH-17	O&M Defects-	> 30%	5	Zoom2021_Ke
SP-22	Sanitary Sewage	Kelly Lake Road	2021-08-24	SMH-22	SMH-04	SMH-04	O&M Defects-	> 20% & <= 30%	4	Zoom2021_Ke
SP-I	Sanitary Sewage	Lagoons	2021-08-25	SMH-I	SMH-J	SMH-J	O&M Defects-	> 20% & <= 30%	4	Zoom2021_Ke
SP-J	Sanitary Sewage	Lagoons	2021-08-25	SMH-J	SMH-K	SMH-K	O&M Defects-	> 20% & <= 30%	4	Zoom2021_Ke

Number	30. Pipe Use	26. Street (Name & Number)	11. Intervention - Date	Node Upstream	Node Downstream	Start Node	21. Inspection Status	Order #
SP-23	Sanitary Sewage Pipe	Easement	2021-08-25	SMH-23	SMH-22	SMH-22	Surcharged/Debris	Zoom2021_Kelly Lake
SP-22	Sanitary Sewage Pipe	Kelly Lake Road 11	2021-08-25	SMH-22	SMH-04	SMH-22	Surcharged/Debris	Zoom2021_Kelly Lake
SP-J	Sanitary Sewage Pipe	Lagoons	2021-08-25	SMH-J	SMH-K	SMH-J	Surcharged/Debris	Zoom2021_Kelly Lake

PEACE RIVER
REGIONAL DISTRICT

APPENDIX 2

MANHOLES LIST

Number	Inspection Date	Street Name	PCG	OMG	Network Type	Hydraulic Cleaning	Special Cleaning
Lift_St-01	2021-08-24 18:23	Kelly Lake Road 11	1	2	Sanitary	-	-
Rip-Rap	2021-08-25 16:01	Lagoons	5	2	Sanitary	-	-
SMH-02	2021-08-24 17:16	Kelly Lake Road 11	3	2	Sanitary	-	-
SMH-03	2021-08-24 17:15	Kelly Lake Road 11	1	2	Sanitary	-	-
SMH-04	2021-08-24 15:55	Kelly Lake Road 11	1	2	Sanitary	-	-
SMH-05	2021-08-24 15:54	Kelly Lake Road 11	1	3	Sanitary	H	-
SMH-06	2021-08-24 15:53	Kelly Lake Road 11	5	2	Sanitary	-	-
SMH-07	2021-08-24 15:24	Kelly Lake Road 11	5	1	Sanitary	-	-
SMH-16	2021-08-24 15:03	Kelly Lake Road 11	1	4	Sanitary	-	-
SMH-17	2021-08-24 14:33	Gauthier Road	2	2	Sanitary	-	-
SMH-18	2021-08-24 13:33	Gauthier Road	5	2	Sanitary	-	-
SMH-19	2021-08-24 13:32	Gauthier Road	1	4	Sanitary	H	-
SMH-21	2021-08-24 12:58	Gauthier Road	1	2	Sanitary	-	-
SMH-22	2021-08-25 13:21	Easement	1	4	Sanitary	H	-
SMH-23	2021-08-25 12:56	Easement	1	4	Sanitary	H	-
SMH-24	2021-08-25 11:59	Gauthier Road	1	2	Sanitary	-	-
SMH-25	2021-08-25 11:58	Gauthier Road	1	3	Sanitary	-	S
SMH-26	2021-08-25 11:35	Gauthier Road	1	1	Sanitary	-	-
SMH-27	2021-08-25 11:18	Gauthier Road	1	1	Sanitary	-	-
SMH-C	2021-08-25 14:05	Lagoons	1	5	Sanitary	-	S
SMH-D	2021-08-25 14:19	Lagoons	1	5	Sanitary	-	S
SMH-E	2021-08-25 14:37	Lagoons	2	5	Sanitary	-	S
SMH-G	2021-08-25 15:18	Lagoons	1	5	Sanitary	-	S
SMH-H	2021-08-25 14:55	Lagoons	1	5	Sanitary	-	S
SMH-I	2021-08-25 15:26	Lagoons	1	2	Sanitary	-	-
SMH-J	2021-08-25 17:02	Lagoons	1	5	Sanitary	H	-
SMH-K	2021-08-25 16:51	Lagoons	1	1	Sanitary	-	-
SMH-L	2021-08-25 16:22	Lagoons	5	1	Sanitary	-	-
SMH-M	2021-08-25 16:15	Lagoons	1	1	Sanitary	-	-

PEACE RIVER
REGIONAL DISTRICT

APPENDIX 3
ENVIRONMENTAL ASSESMENT

DRAFT

October 28, 2021
File: 2021-8015

Gregoire Boutron
Project Manager
Helios Group
4570 Henry-Julien Avenue
Montreal, Quebec H2T 2C8

Re: KELLY LAKE WASTEWATER TREATMENT FACILITY CONDITION ASSESSMENT - CONSTRUCTED WETLAND COMPONENT

Attn: Gregoire Boutron:

This draft letter provides the findings from the Condition Assessment of the constructed wetland component of the Kelly Lake Wastewater Treatment Facility (WWTF) in Kelly Lake, BC. The facility is owned and operated by Peace River Regional District (PRRD) and operates under a Permit (#14420) issued by the BC Ministry of Environment and Climate Change Strategy (ENV). The assessment was completed through a review of available background information (including the original design drawings) and a site visit on October 13, 2021 by Hugh Hamilton, P.Ag. of Associated Environmental Consultants Inc. and Gregoire Boutron, P.Eng. of Groupe Helios. We were accompanied on the site visit by Nathan Goudie from PRRD.

The goals of the constructed wetland (CW) condition assessment were to:

- Determine whether the as-built condition of the CW is consistent with the original design drawings (L&M Engineering Ltd. 1996; no. 200A and no. 202A), and document any significant differences;
- Assess the condition and function of the main elements of the CW including the inlet, outlet, operating depth, substrate, and wetland plant cover and species distribution;
- Review the normal operating procedures of the CW;
- Identify any issues that may be affecting treatment performance or that could require repair, maintenance, or changes in day-to-day operations;
- Assess the biophysical condition of the immediate receiving environment (i.e. area <200 m from discharge point);
- Assess compliance with the conditions specified in Permit #14420 that apply to the CW; and
- Comment on potential environmental issues related to the discharge of treated municipal effluent from the Kelly Lake WWTF.

1 DESCRIPTION OF THE CONSTRUCTED WETLAND

The CW is the sixth cell in a lagoon-based treatment system. Municipal wastewater from the Kelly Lake community flows to the WWTF, which is located 3.3 km west from the community centre. The wastewater moves through five lagoon cells before being discharged to the CW for final polishing before it is released to the environment. The CW is a surface flow (SF) type of wetland, with emergent aquatic plants growing in water that is contained by berms on all four sides. The key features of the CW design and current status are as follows:

- The wetland surface area is approximately 8,160 m^2 (rectangle 102 m long by 80 m wide). Including the berms, the total footprint area is 9,290 m^2.
- The design water depth is 0.33 m. The wetland was ice-covered near the banks at the time of the site visit, but it appeared that the depth was close to this value. Mr. Goudie indicated that the water depth during summer operations would be about 0.45 m. The water level was being drawn down for the winter during the site visit, which is intended to prevent the inlet and outlet structures from freezing.
- The base of the wetland is compacted native soil. This material appears to be adequate to hold water in the CW.
- The most common wetland plant species is Common cattail (*Typha latifolia*). Other species noted to be present include Hardstem bulrush (*Scoenoplectus acutus*), Arctic rush (*Juncus arcticus*), and *Carex* spp. Duckweed (*Lemna* spp.), a free-floating plant, is also present in patches, notably at the inflow. Duckweed can be an indicator of available nitrogen in the water. Willow (*Salix* spp.) shrubs are common along the CW margins.
- The vegetation cover in the wetland is approximately 30%-40%, and the remainder of the wetland is open water. According to Mr. Goudie, the vegetation coverage was much less three years ago, but the plants have recolonized the wetland since then.
- The inflow to the CW from the lagoons is through a pipe that connects in a T-junction to a 150-mm slotted drainpipe that runs across the width of the CW. The ends are capped.
- The outflow is through a similar pipe running across the full width, with the slots facing downwards. A 150-mm pipe collects the water and directs it through a manhole that connects to a second 150-mm pipe that leads to a Palmer-Bowlus flume for flow measurement. Just below the flume, the water discharges to a ditch through a final 0.3-m long section of 150-mm pipe.
- Permit #14420 authorizes PRRD to discharge treated effluent from the lagoons to the CW discharge from the CW between May 15 and September 15 each year (~124 days).
- After it enters the ditch, the treated effluent flows through a linear ditch for a distance of about 160 m before dissipating to ground in the forest. This is discussed further in Section 3 Regulatory Compliance.

2 FUNCTIONAL ASSESSMENT OF THE CONSTRUCTED WETLAND

Based on the field observations, the CW appears to be fulfilling its intended function. The factors that support this conclusion are as follows.

- The configuration of the inflow, which distributes the flow across the width of the CW, is a good design for optimizing the hydraulic retention time (HRT) of the CW by minimizing "short-circuiting." The estimated HRT, assuming the average authorized design flow, is between 7.5 days (with 0.33 m depth) and 10 days (with 0.45 m depth) [1].

- The operating water depth is adequate, as it provides for a sufficient HRT while providing favourable conditions for wetland plant growth.
- Plants appear healthy and vigorous. The amount of plant cover could be better, but the ongoing natural regeneration will likely increase the cover in several years (e.g. to >70%). Some open is desirable to enable UV radiation to act on the water column.
- The Inlet system was not being used at the time of the site visit, but Mr. Goudie reported that it works well if properly maintained. The outlet system appeared to be functioning as intended, with flow being steadily discharged through the pipe to the receiving ditch.
- The water in the wetland (where there was no ice cover) and flowing through the discharge pipe is clear with no visible turbidity or suspended algae.

3 REGULATORY COMPLIANCE

The requirements of the latest version of Permit #14420 (January 7, 2020) were reviewed, and the physical attributes and operational regime of the CW were compared against those requirements. The areas of potential non-compliance that were observed based on our review and site visit are as follows:

- **Authorized Discharge Period** (Permit Section 1.1.2). As noted above, water (treated effluent) was still being discharged at the time of the October 13 site visit to prepare for winter. According to the Permit, the discharge should cease on September 15.
- **Final Effluent Quality** (Permit Section 1.1.3). PRRD provided Associated with the monitoring data that are available from 2021. Sampling of the discharge from the CW took place on three dates: May 17, June 14, and July 12. On all three dates, the effluent quality met the Permit requirements of ≤10 mg/L biochemical oxygen demand (BOD), ≤10 mg/l total suspended solids (TSS), and ≤200 CFU/100 mL fecal coliforms. The average concentrations in the discharge in 2021 were 2.4 mg/L BOD, 4.4 mg/L TSS, and 8.3 CFU/100 mL fecal coliforms.
- **Point of Discharge** (Permit pg. 1 and Section 1.1.4). The Permit is unclear on the required point of discharge. Page 1 of the Permit states that PRRD is authorized to discharge effluent "into Steeprock Creek," while Site Plan A suggests it would discharge to the ditch (as indicated by a dashed line, with no specific termination in Steeprock Creek). Section 1.1.4 mentions an outfall, but the Site Plan A only labels the pipe connecting Lagoon 5 to the CW as an outfall. Also, Section 4.4 describes the sampling location as "Discharge from the wetland *to land* draining into Steeprock Creek." During the site visit, the water was confirmed to flow into and through a well maintained ditch for a distance of about 160 m (measured on Google Earth). The flow then dissipates into the soil in the forest and does not reach Steeprock Creek. The implication of this for regulatory compliance is discussed further below.

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[1] HRT = (width x depth x *f*) ÷ Flow Rate. Where *f* is a factor accounting for volume occupied by plants in the CW (*f* is assumed to be 0.9).

- **Posting of Outfall** (Permit Section 3.4). There are no signs identifying the CW or the location of the outfall.
- **Surface Water Entering CW** (Permit Section 3.6.2). Mr. Goudie reported that spring runoff occasionally enters the CW on the south corner. There was no evidence that this is affecting the berm.
- **Effluent Quality Sampling** (Permit Sections 4.4 & 4.5). The Permit requires monthly sampling of the discharge from Lagoon 5 and from the CW (i.e. 4 samples each year). In 2021, PRRD sampled the Lagoon 5 water four times and the CW discharge three times. The additional Lagoon 5 sample was from April 19, prior to discharge. All of the required parameters were analyzed. Permit compliance would require an additional sampling date in late August/early September.

The point of discharge to the environment is potentially an issue. From the 1985 aerial photograph on Google Earth (attached), after the first 160 m, the ditch appears to have entered a cutline that runs north-south, and proceeds for another 140 m. Steeprock Creek was about 290 m further north at its closest point. At the time of the site visit, that cutline has filled in with trees and shrubs, and the ditch is no longer present. The aerial imagery indicates that the terrain shifts from mixed forest to wetland around the end of the original ditch. In its present condition, the treated effluent that is released from the CW is discharged to ground and not to Steeprock Creek. Based on Permit Site Plan A and Section 4.4, it is likely that this is what the Permit intended. However, PRRD may wish to confirm this with ENV.

The local topography suggests that the water enters the ground, and any portion not taken up by vegetation likely flows as shallow groundwater flow towards Steeprock Creek. To evaluate the potential implications of the ground discharge, we searched the BC groundwater well database[2]. There are no registered wells downgradient of the CW between the point of discharge and Steeprock Creek. Furthermore, there are no points of diversion on Steeprock Creek downgradient of the CW licensed for domestic use, based on a search of the BC Water Resource Atlas[3]. Therefore, there is negligible risk to human health from the existing discharge.

All of the other technical requirements of Permit #14420 that pertain to the CW are being met, based on the available information and what could be observed from a single site visit. Note that we did not check the administrative requirements of the Permit, such providing the monitoring data to ENV annually (Section 5.1).

[2] On-line at https://apps.nrs.gov.bc.ca/gwells/groundwater-information.
[3] On-line at https://maps.gov.bc.ca/ess/hm/wrbc/. We also searched for Steeprock Creek in the BC Water Licence Search Tool. The BC Ministry of Transportation & Infrastructure holds two licences to take water from the creek for dust control and road maintenance.

4 ENVIRONMENTAL PERFORMANCE AND POTENTIAL ISSUES

Based on our review of the monitoring data from 2021, the Kelly Lake WWTF is capable of meeting the treatment requirements that are specified in the Permit. The maximum concentrations of BOD, TSS, and fecal coliform bacteria were well within the specified limits.

The Permit does not set limits for total phosphorus (TP) or total ammonia-N. As a benchmark, we compared the 2021 data to the standards set by the BC *Municipal Wastewater Regulation* (MWR)[4]. For TP, all three samples met the MWR standard of ≤1 mg/L, averaging 0.042 mg/L. The MWR ammonia-N standard is based on a back-calculation after initial dilution. However, the ammonia-N concentrations in the discharge met the most restrictive BC water quality guideline of ≤1.22 mg/L on all three dates[5], averaging <0.153 mg/L. This indicates that the discharge comfortably met the MWR requirement for ammonia-N in 2021.

As noted, the treated effluent discharged from the CW is presently being discharged to ground rather than to Steeprock Creek. Given the high level of treatment measured in 2021 (n=3), the treated effluent likely presents negligible risk to the environment or to human health, regardless of the point of discharge.

5 SUMMARY AND CLOSURE

To summarize:

- The current structure and condition of the CW is consistent with the original design drawing from 1995. In general, the wetland appears to be functioning as intended with adequate depth and vegetation cover and operational features to minimize short-circuiting of the flow.
- There are two potential issues related to compliance with Permit #14420 that PRRD may wish to clarify with ENV:
    - Water (treated effluent) was being discharged from the CW after the cut-off date of September 15 (the discharge of treated effluent from Lagoon 5 to the CW is reportedly stopped on September 15 each year); and
    - The treated effluent released from the CW is discharged to ground after travelling about 160 m through a ditch, rather than being discharged to Steeprock Creek. The Permit is unclear on the authorized point of discharge, but it is likely that the current operation is what the Permit intended.

---

[4] *Municipal Wastewater Regulation*, B.C. Reg. 87/2012.
[5] The ammonia-N guideline varies with pH and water temperature. No data are available, so the guideline shown assumes pH = 7 and temperature = 20°C. It is the chronic (average) guideline for aquatic life protection.

- The treated effluent flowing through the ditch downstream from the CW was clear and there was no evidence during the site visit of excessive nutrient enrichment or other adverse environmental effects. At the end of the ditch, the water was infiltrating to ground.
- Given the high level of treatment measured in 2021 (n=3), the final effluent likely presents negligible risk to the environment or to human health, regardless of the point of discharge. Before contacting ENV to clarify the Permit requirements, PRRD may wish to analyze additional recent monitoring data (e.g. from 2019 and 2020) to demonstrate treatment performance. Moving forward, PRRD should sample the Lagoon 5 and CW discharges at least monthly and forward the data to ENV, as required.

We look forward to your comments on this draft report. Please contact Hugh Hamilton or Jacques Groenewald if you have any questions or require additional information.

Sincerely yours,

Prepared by:

(Signatures on final report)

Hugh Hamilton, Ph.D., P.Ag.
Senior Environmental Scientist

Reviewed by:

Jacques Groenewald, M.Sc., P.Geo.
Senior Hydrogeologist

Attachment: 1985 aerial photograph


Figure 1
Kelly Lake WWTF and Constructed Wetland: Steeprock Creek is in north part of photo.
Legend
Steeprock Creek
Ditch
Constructed Wetland
Kelly Lake Transfer Station (PRRD)
Kelly Lake Rd
Treatment Lagoons
Kelly Lake Rd
Google Earth
Image © 2021 Maxar Technologies
2000 ft
N

DRAFT

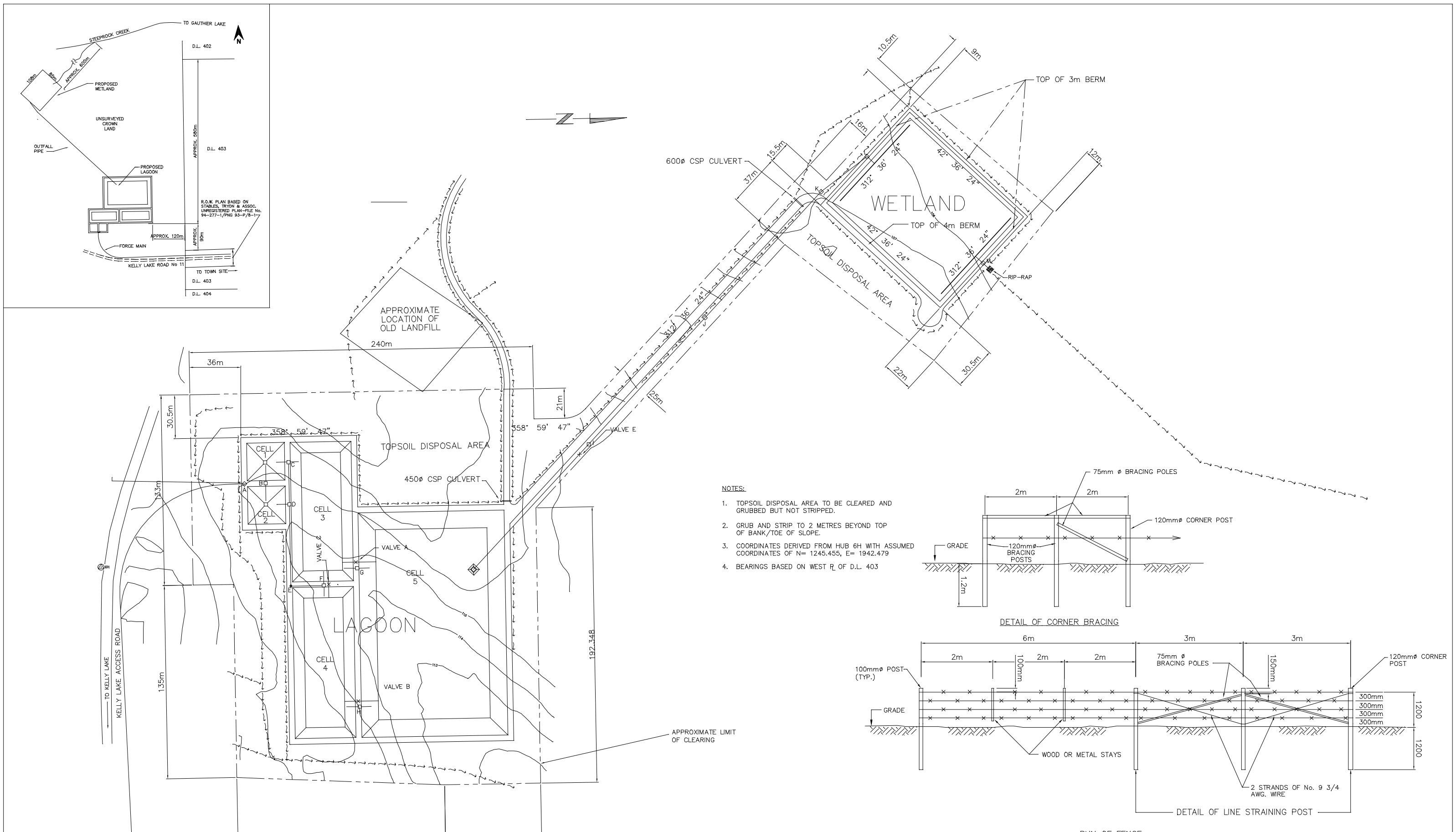
PEACE RIVER
REGIONAL DISTRICT

APPENDIX 4

DRAWINGS

SIMO

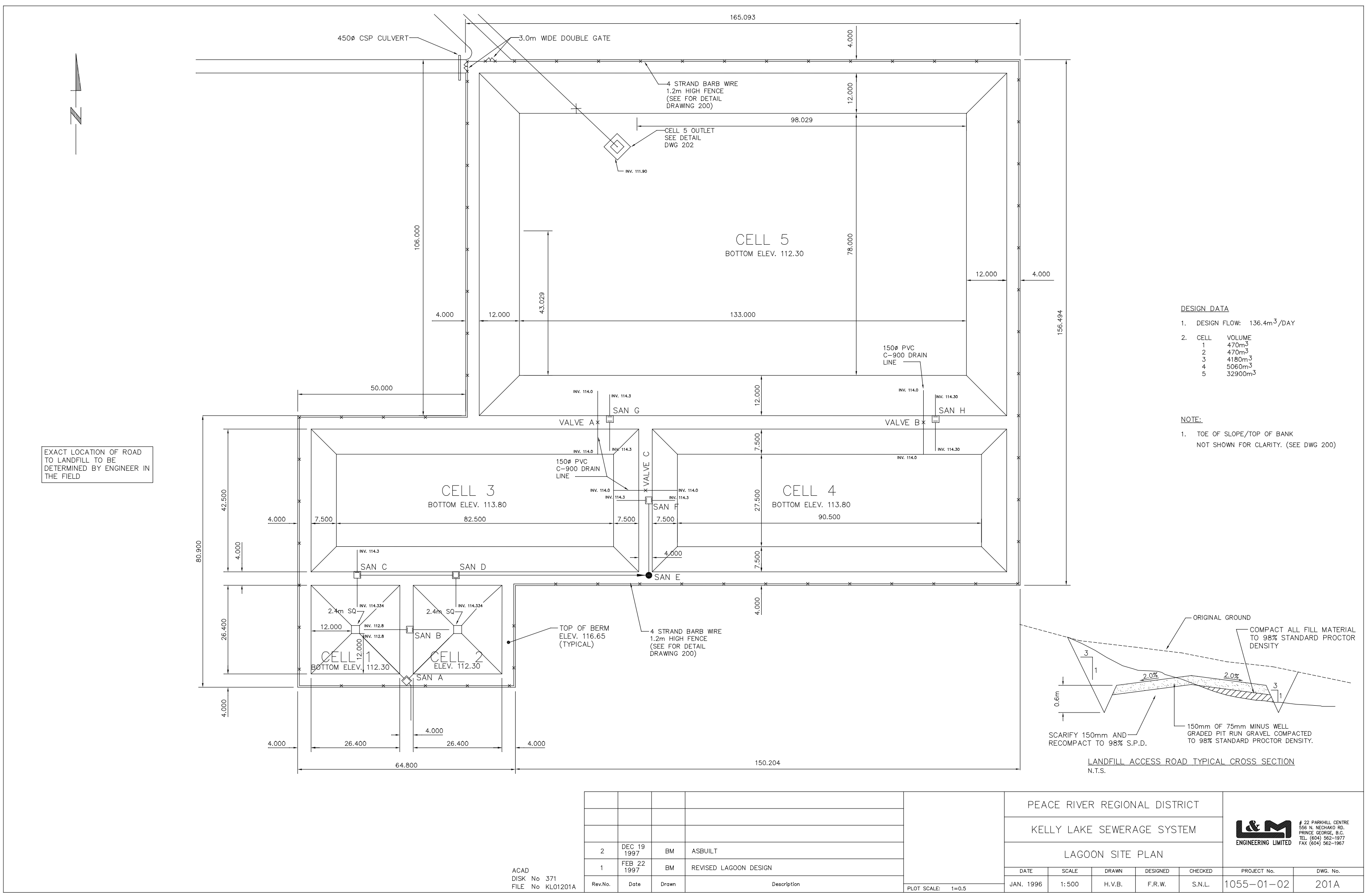
USE 22 x 34 PAPER PLOT 1 = 0.5

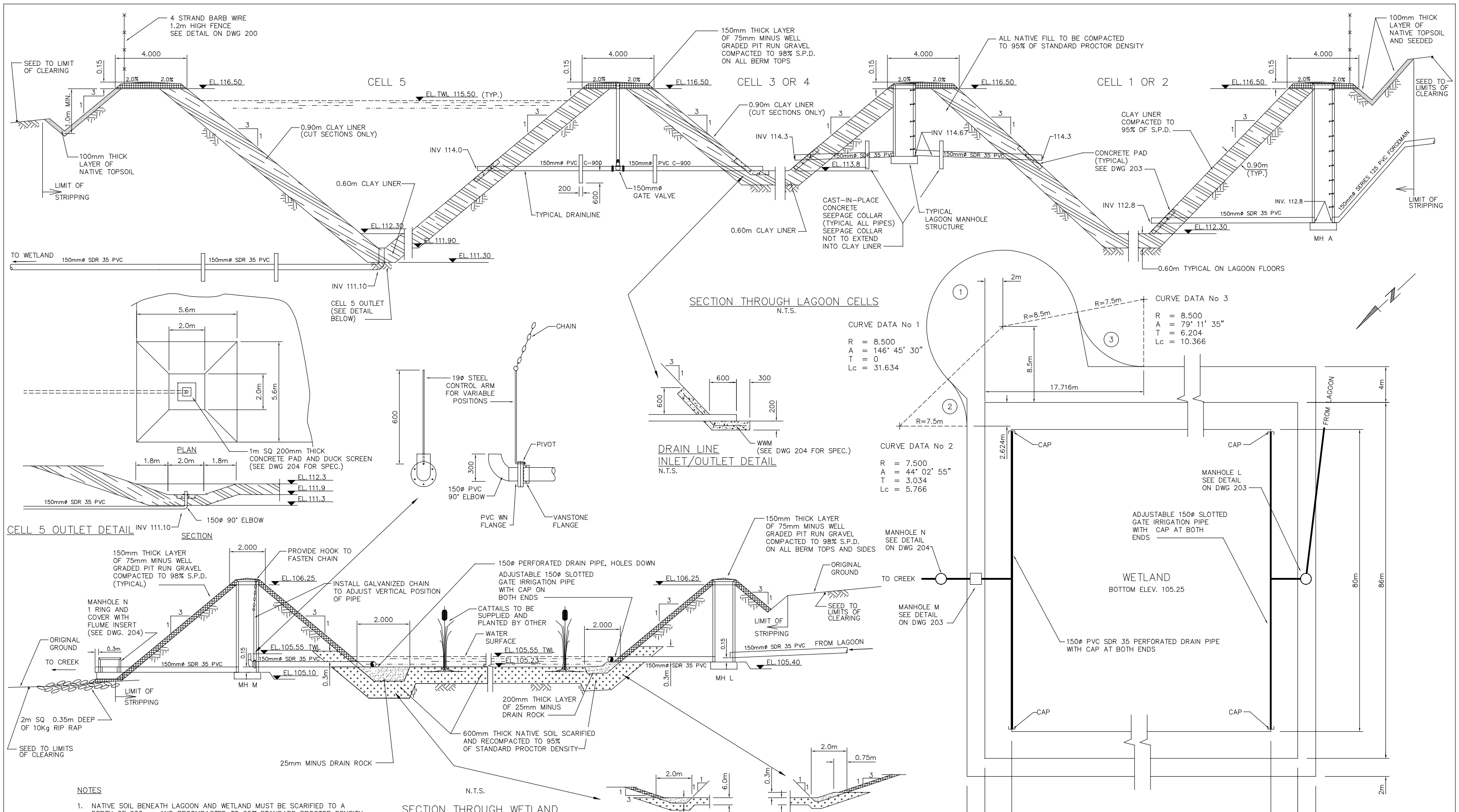


Rev.No.	Date	Drawn	Description
3	DEC 4 '97	BM	ASBUILTS
2	FEB 22 '97	BM	REVISED LAGOON DESIGN
1	NOV 4 '96	BM	PROPOSED RE-SHAPING OF CELL No. 5

DATE	SCALE	DRAWN	DESIGNED	CHECKED	PROJECT No.	DWG. No.
NOV. 1995	1:1250	FRW/HVB	FRW	SNL	1055-01-02	200A

USE 22 x 34 PAPER PLOT 1 = 0.5





NOTES

1. NATIVE SOIL BENEATH LAGOON AND WETLAND MUST BE SCARIFIED TO A DEPTH OF 600mm AND RECOMPACTED TO 95% STANDARD PROCTOR DENSITY.
2. AGGREGATE IN EXCESS OF 100mm DIAMETER MUST BE REMOVED PRIOR TO COMPACTION.
3. CLAY LINER CAN BE OBTAINED THROUGH THE FOLLOWING PREPARATION OF NATIVE SOILS.
   a) BASE AND CUT SLOPES MUST BE SCARIFIED, STRIPPED AND RECOMPACTED TO A DEPTH OF 200mm.
   b) LINER CLAY MUST BE THROUGHLY MIXED AND PLACED IN UNIFORM LIFTS NO GREATER THAN 150mm.
   c) COMPACT TO 95% OF STANDARD PROCTOR DENSITY
   d) LINER CLAY MUST BE 0.6m THICK ON LAGOON FLOORS AND 0.9m THICK ON SIDE SLOPES.
   e) LINER CLAY MUST BE PLACED AT A MOISTURE CONTENT WITHIN 4 PERCENT ABOVE OPTIMUM MOISTURE CONTENT.
4. SEE SOIL REPORTS PREPARED BY AGRA EARTH & ENVIRONMENTAL (AT THE BACK OF THE TENDER DOCUMENTS) FOR FURTHER INFORMATION ON LAGOON AND WETLANDS CONSTRUCTION.
5. SAND BEDDING TO BE OMITTED FROM PIPE BACKFILL WITHIN THE CLAY LINER.
6. ELEVATIONS TO BE CONFIRMED BY THE ENGINEER AFTER CLEARING, GRUBBING AND STRIPPING HAS BEEN COMPLETED.

ACAD
DISK No 371
FILE No KL01202A

Rev.No.	Date	Drawn	Description
2	DEC 19 '97	BM	ASBUILT
1	FEB 22 '97	BM	REVISED LAGOON DESIGN

PLOT SCALE: 1=0.1

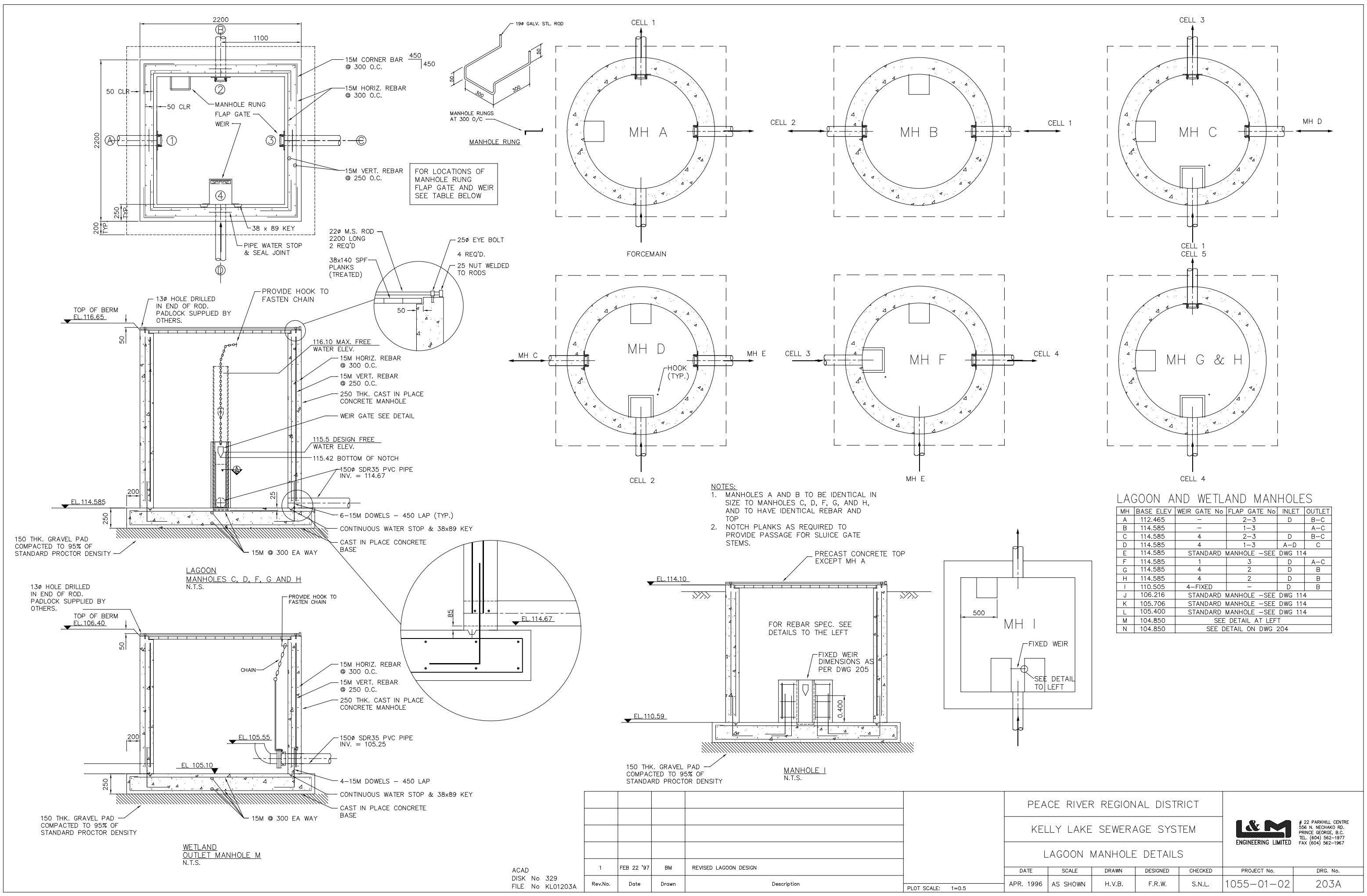
PEACE RIVER REGIONAL DISTRICT

KELLY LAKE SEWERAGE SYSTEM

LAGOON & WETLAND SECTIONS

L&M ENGINEERING LIMITED
22 PARKHILL CENTRE
556 N. NECHAKO RD.
PRINCE GEORGE, B.C.
TEL (604) 562-1977
FAX (604) 562-1967

DATE	SCALE	DRAWN	DESIGNED	CHECKED	PROJECT No.	DRG. No.
MAR 1996	N.T.S.	H.V.B.	F.R.W.	S.N.L.	1055-01-02	202A



LAGOON AND WETLAND MANHOLES

MH	BASE ELEV	WEIR GATE No	FLAP GATE No	INLET	OUTLET
A	112.465	–	2–3	D	B–C
B	114.585	–	1–3		A–C
C	114.585	4	2–3	D	B–C
D	114.585	4	1–3	A–D	C
E	114.585	STANDARD MANHOLE –SEE DWG 114			
F	114.585	1	3	D	A–C
G	114.585	4	2	D	B
H	114.585	4	2	D	B
I	110.505	4–FIXED	–	D	B
J	106.216	STANDARD MANHOLE –SEE DWG 114			
K	105.706	STANDARD MANHOLE –SEE DWG 114			
L	105.400	STANDARD MANHOLE –SEE DWG 114			
M	104.850	SEE DETAIL AT LEFT			
N	104.850	SEE DETAIL ON DWG 204			

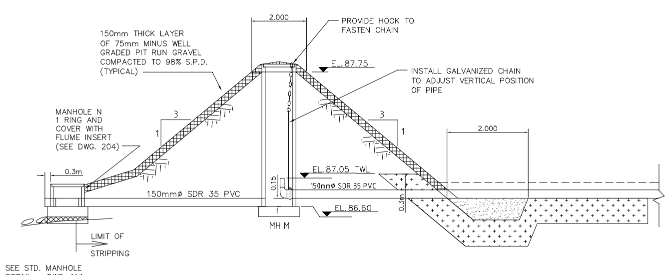
PEACE RIVER REGIONAL DISTRICT

KELLY LAKE SEWERAGE SYSTEM

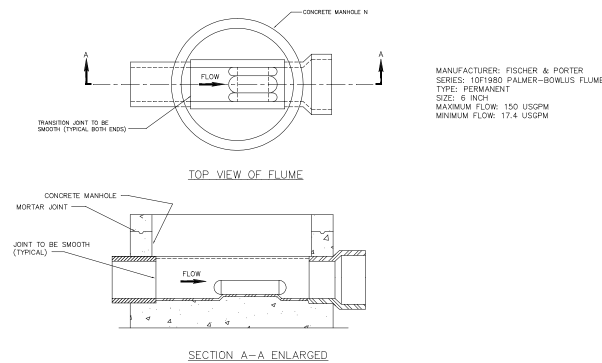
LAGOON MANHOLE DETAILS

L&M ENGINEERING LIMITED
22 PARKHILL CENTRE
556 N. NECHAKO RD.
PRINCE GEORGE, B.C.
TEL. (604) 562–1977
FAX (604) 562–1967

DATE	SCALE	DRAWN	DESIGNED	CHECKED	PROJECT No.	DRG. No.
APR. 1996	AS SHOWN	H.V.B.	F.R.W.	S.N.L.	1055–01–02	203A

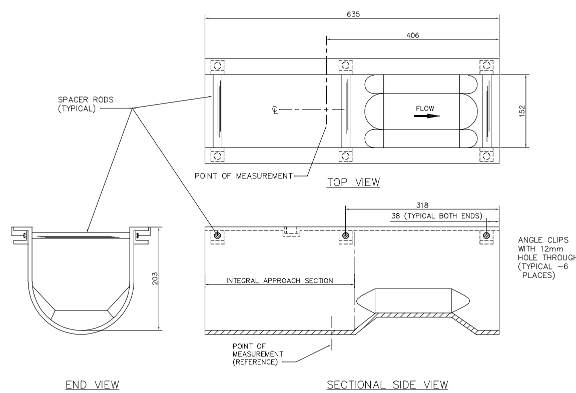


ENLARGED SECTION–SHOWN ON DWG. 202



MANUFACTURER: FISCHER & PORTER
SERIES: 10F1980 PALMER–BOWLUS FLUME
TYPE: PERMANENT
SIZE: 6 INCH
MAXIMUM FLOW: 150 USGPM
MINIMUM FLOW: 17.4 USGPM

TYPICAL INSTALLATION PERMANENT TYPE – PALMER BOWLUS FLUME
SCALE : N.T.S.



PERMANENT TYPE FLUME
SCALE : N.T.S.

ACAD
DISK No 409
FILE No KL01204A

Rev.No.	Date	Drawn	Description
1	DEC 19 '97	BM	ASBUILT

PLOT SCALE: 1=0.1

PEACE RIVER REGIONAL DISTRICT
KELLY LAKE SEWERAGE SYSTEM
Manhole N and Palmer–Bowlus Flume Details

DATE	SCALE	DRAWN	DESIGNED	CHECKED	PROJECT No.	DRG. No.
AUG 1996	N.T.S.	D.W.M.	F.R.W.	S.N.L.	1055–01–02	204A

L&M ENGINEERING LIMITED

2022 Budget - Capital Supplemental Item

Title:	Sewer System Repairs	**Environmental Services**
Division:	Sewer	**Kelly Lake Sewer - 606**
Type:	Capital - Replacement	**High**

Description

These capital repairs are based on identified defects found in the 2021 Condition Assessment by Simo Management Inc. The repairs/replacements include repairs to the lagoons, pipes, lift station and manholes.

Benefits

The capital works will support the the ongoing integrity and functionality of the asset by maintaining its service life.

Risks

Further repairs or upgrades may be identified during the course of contruction.

Financial Information

Capital

Funding Sources	2022	2023	2024	2025	2026	5 Year Total
Area D Gas Tax	135,000					135,000
						0
						0
	135,000	**0**	**0**	**0**	**0**	**135,000**

Expenses	2022	2023	2024	2025	2026	5 Year Total
Manhole repairs - infrastructure	35,000					35,000
Sewer line repairs - infrastructure	25,000					25,000
Lagooon and access repairs	65,000					65,000
Construction oversight	10,000					10,000
						0
						0
						0
						0
	135,000	**0**	**0**	**0**	**0**	**135,000**

Administration

Author: Daris Gillis **Date Prepared: November 10, 2021**

Approval Date

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ENV-RBAC-035

From: Daris Gillis, Environmental Services Manager — Date: November 25, 2021

Subject: Harper Sewer 2022 Condition Assessment & Capital Request

RECOMMENDATION #1:

That the Rural Budgets Administration Committee approve the supplementary request of $264,200 payable from the Area D Community Works Gas Tax fund, to be issued to the Function 605 - Harper Sewer, as outlined in the 2021 Harper Sewer Condition Assessment.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee authorize a funding commitment of $215,000, payable from Area D Fair Share, to be issued to Municipal Finance Authority, to pay off the long-term debt; further, that the current principal and interest payments totalling $38,000, be transferred annually to the capital reserve for Function 605 – Harper Imperial Sewer starting in the 2023 budget cycle.

RECOMMENDATION #3:

That the Rural Budgets Administration Committee allocate $20,000 from Area D Fair Share to be transferred into the capital reserve for Function 605 - Harper Sewer in the 2022 budget.

BACKGROUND/RATIONALE:

The Harper Sewer Collection system was constructed in 2011, and consists of a lift station, and approximately 2 km of sanitary sewer pipe and manholes.

Aligning with the current Regional Board Strategic Plan, a condition assessment of the Harper Sewer Collection system was conducted in 2021 by McElhanney. The scope of the assessment was to determine the current condition and remaining service life of the system, and to identify required system repairs along with associated costs. The Harper system is estimated to have over 40 years of remaining service life with proper maintenance and repairs. The cost for total replacement of the collection system in 2021 dollars is $2,168,500.

Table 1 highlights the areas within the system that will require immediate repairs in order to maintain proper functioning of the collection system. Cost estimates have been built with a 30% contingency.

Table 1. Cost of Repairs and Maintenance for 2022.

Repairs/Immediate Maintenance	Estimated Cost of Repairs/Replacement
Lift Station	$ 18,200
Pipes	$ 207,000
Manholes	$ 9,000
Construction Oversight	$ 30,000
Total:	**$ 264,200**

A supplemental capital request form is attached for the Committee's consideration.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATION(S):

The Harper Subdivision is under a current Municipal Financing Authority funding arrangement that costs annually approximately $22,000 in principal and $15,000 in interest to the taxpayers. Staff are recommending that Area D Fair Share be used to pay-off the loan and redistribute the annual funds to the capital reserve for Function 605 – Harper Sewer.

As of October 31, 2021 the balance available after the remaining commitments in Electoral Area D are as follows:

- Peace River Agreement: $592,594.35,
- Gas Tax Reserve fund: $1,238,444.68, and
- Fair Share Reserve fund: $1,854,311.67.

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

Attachments:

1. 2021 Harper Sewer Condition Assessment
2. 2022 Harper Sewer Capital Request Form

Peace River Regional District Harper Assessment

October 29, 2021 | Revision 0

Submitted to: Peace River Regional District
Prepared by: McElhanney Ltd.

Contact
Justin Todd, P.Eng.
Engineering Division Manager
jtodd@mcelhanney.com
778-844-0133

Address
8808 Northern Lights Drive
Fort St. John, BC, Canada
V1J 6M2

Prepared by
Jun Xiong, P.Eng.

Reviewed by
Larry Sawchyn, P.Eng.

Our file: 3111-26522-00

Your Challenge.
Our Passion.

Our File: 3111-26522-00

October 29, 2021

Peace River Regional District
1981 Alaska Avenue
Dawson Creek, BC V1G 4H8

Peace River Regional District Harper Assessments

McElhanney performed an inspection of the Harper lift station to determine the condition and maintenance required to improve operations. The lift station has adequate capacity to meet the current and future demand. PRRD staff report very few issues with operation and maintenance. During the inspection, McElhanney noticed a few electrical items not installed to the industrial standard and that the pumping rate was not meeting design specifications. The recommended immediate repairs and upgrades in 2021 total approximately $18,200. A major mechanical system replacement with an estimated total cost of $106,000 (in 2021 dollars) is not due for another 10 years. In addition, McElhanney recommends some procedures to improve the maintenance of the lift station.

McElhanney performed CCTV inspection on approximately 2 kilometres of sanitary gravity sewer. We found that the gravity sewer was generally in good condition, with an estimated 40+ years of service remaining. There are some areas of repair required to eliminate some sags and offset joints in the sewer that are difficult to inspect and may accelerate pipe deterioration; the required repairs have an estimated cost of $216,000. Long-term, the pipe should be flushed and reinspected every 5 to 10 years to continuously monitor structural stability and, once the pipe requires replacement, the replacement cost for the gravity sewer system, in 2021 dollars, is an estimated $2,168,500.

Sincerely,
McElhanney Ltd.

[redacted]

PERMIT TO PRACTICE
McElhanney Ltd.
PERMIT NUMBER: 1003299
Engineers and Geoscientists of BC

Justin Todd, P.Eng.
Engineering Division Manager
jtodd@mcelhanney.com
778-844-0133

Contents

Figures

Tables

Appendices

1. Introduction

As part of its 2021 operations and maintenance plan, the Peace River Regional District (PRRD) contracted McElhanney Ltd. (McElhanney) to conduct a condition assessment of the Harper subdivision sanitary sewer system, including the lift station and associated infrastructure. Located in the City of Dawson Creek (the City), the Harper subdivision sanitary sewer system conveys flows through the City's system leading to their wastewater treatment facility. The goal of the assessment was to determine the current condition, remaining service life, and identify required system repairs and upgrades.

1.1. BACKGROUND

The Harper subdivision was originally constructed in 2011, with approximately 1.6km of 200mm HDPE DR11 gravity sanitary sewer and 370m of 200mm PVC SRD35 gravity sanitary sewer. A map of the area is provided in *Figure 1*.

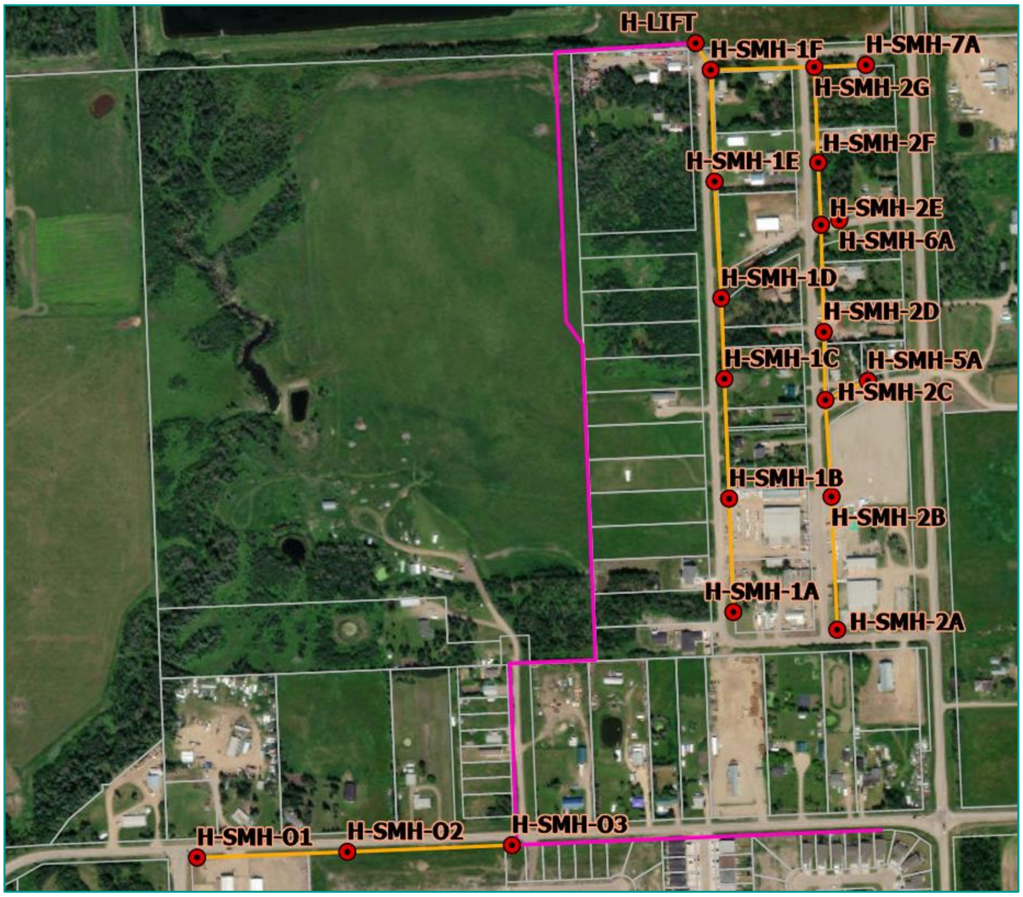


Figure 1: Map of the Harper Gravity Sanitary Sewer Network

The gravity main pipe is sloped at 1.5% to 4.0% with 2.5m of cover. The sanitary sewer was generally constructed in the boulevard outside of the roadway, with an as-constructed cross-section as shown in *Figure 2*. Based on as-built drawings, the pipe bedding was generally Class "B" bedding, consisting of fine granular material (sand and gravel) above and below the pipe and compacted to 95% SPD.

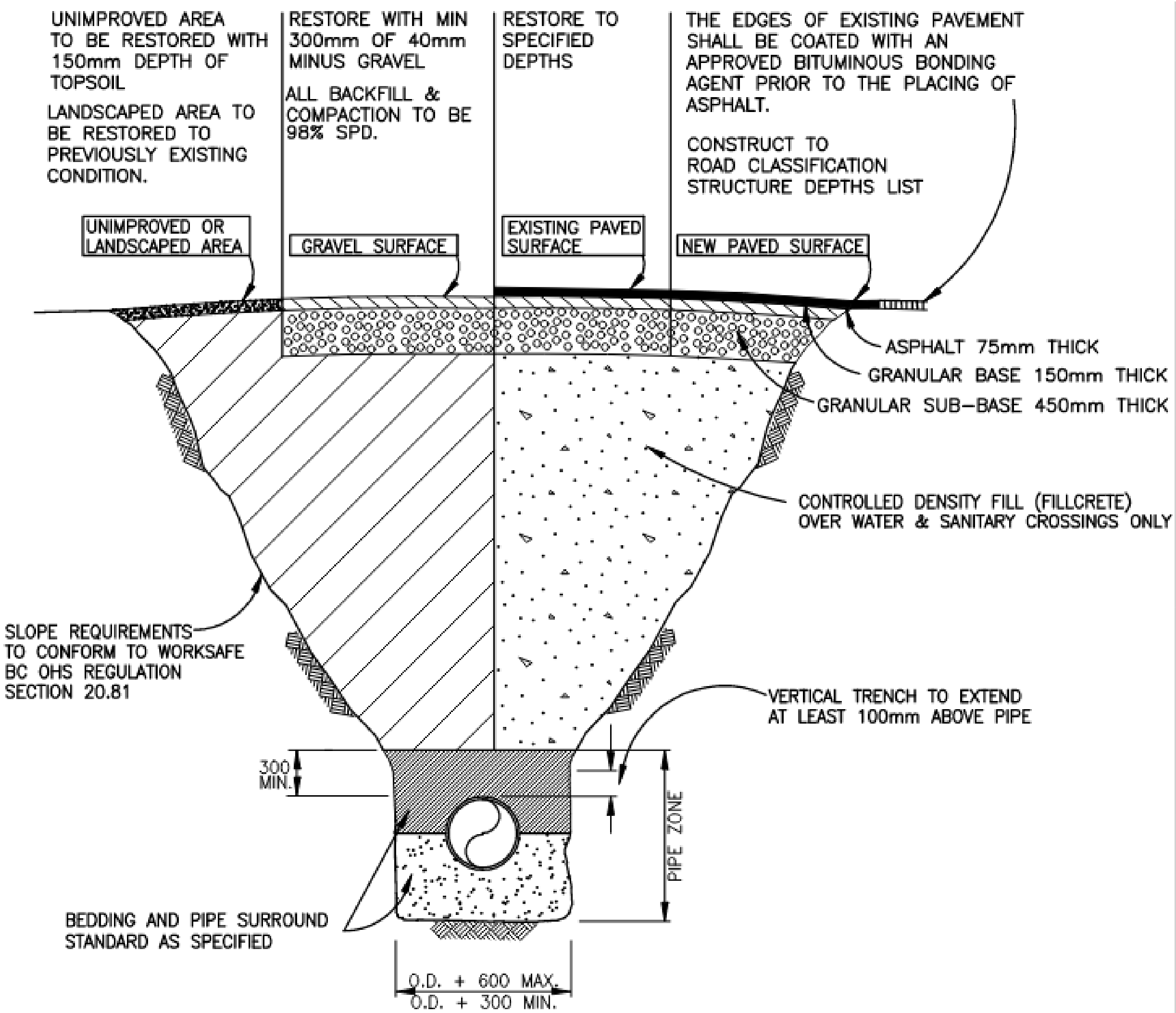


Figure 2: Typical Trench Detail for Harper Subdivision Sewer Installation

2. Lift Station Assessment

The Harper subdivision lift station (*Figure 3*), located along 210 Road, is fed by approximately 1,425m of 200mm diameter DR11 HDPE gravity sanitary pipe. The wastewater collected from the serviced community is pumped into a downstream HDPE DR11 forcemain that is approximately 875m long. There are no other services or connections between these two points. The lift station assessment summarizes the findings and provides recommendations for infrastructure needs.

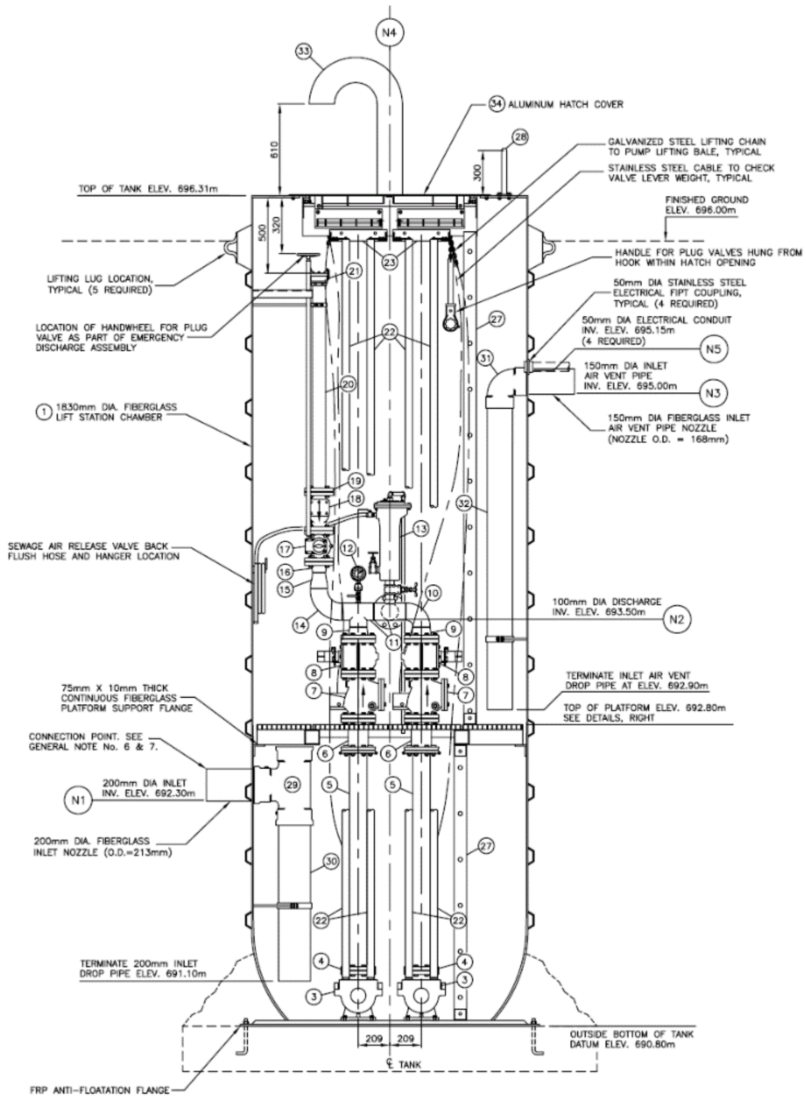


Figure 3: Harper Lift Station General Arrangement

2.1. INSPECTION

McElhanney, along with PRRD representatives, conducted a site inspection from May 31 to June 2, 2021, to assess existing conditions for the Harper subdivision lift station. The site allows drive-up access, with jersey barriers positioned to protect the wet well and kiosk.

The inspection included a general visual inspection of all components, verification of installed pump type, and a drawdown test. The physical integrity of the lift station was found to be generally acceptable. The following sections detail the findings for specific lift station components.

2.1.1. Wet Well

The wet well was found to be in good condition, with no damage to the fibreglass surface. Operations staff reported no wet well leakage, nor was any observed during the inspection. Spalling paint and rust were visible on the surfaces of pipes, fittings, flanges, and valves (*Figure 4*). The check valves, plug valves, and air release valve in the wet well had no apparent issues nor did staff report any concerning observations.

Since commissioning, the lift station has not received upgrades or replacement of parts. The operation staff reported that the lift station does not have any functional issues and the equipment is not approaching the end of its life expectancy.

During the inspection, a crew was vacuum cleaning the wet well to remove debris and sediment. McElhanney was informed by PRRD staff that cleaning is scheduled every six (6) months and that PRRD staff conduct a regular check on the station approximately three (3) times per month or if a system alarm is triggered.

Figure 4: Rusted Pipes, Flanges, and Valves in the Wet Well

It was observed that the station has no inflow shutoff valve or outflow shutoff valve. While influent shut off is useful if entry is needed into a wet well, it is not recommended unless frequent work within the barrel is expected. There are portable inflatable valves or other means to isolate the station if access is required.

If a shutoff valve for the outlet pipe were available, the shut-in head from the pump could be verified and compared to the pump curve to determine the condition of the impeller and the pump volume.

2.1.2. Pumps

The Harper subdivision lift station has two pumps installed with one running and the other as a standby. The pumps alternate to maintain equal hours on the pumps unless extremely high flows require both to work in unison. A third shelf spare pump is available to replace a working pump for preventative maintenance or in the event of failure. PRRD staff informed McElhanney that one pump is removed for servicing every four (4) months; each pump runs for eight (8) consecutive months between servicing.

No issues with solids entering the pumps were reported. However, the lift station supplier is aware of the Chilton system and recommended also upgrading the power supply to 3-phase power and replacing the pumps for improved torque. This will limit the risk of stalling due to rags or bulky unacceptable waste entering the system.

The pumps may not be performing according to the design and appear to have a lower flow rate than the pump curves would suggest. The pumps do, however, provide sufficient service for the current community demand. All other mechanical components and fittings had no reported issues.

The current pumping system is providing sufficient capacity for the area serviced. A theoretical analysis of the pump / forcemain performance based on the line record drawings and the pump curve shows a difference in actual performance compared to theoretical. This may be due to wear of the pump impeller, flow restriction in the forcemain or a combination of both.

To evaluate the pump**,** the pump curve for the Myers pump was used **(***Figure 5*):

i. Point 1 is the design performance of the pump: 6.3L/s (100 USGPM) with design head at 15.0m (49.2ft).

ii. Point 2 shows the theoretical total head of 12.2m (40ft) required for the system as calculated using the Hazen-Williams equation according to the record drawings based on the design flowrate: 6.3L/s (100 USGPM).

iii. Point 3 is the anticipated total head of 16.2m (53 ft) of the pump according to the pump curve when pumping at the field recorded flowrate from the drawdown test: 3.8L/s (60 USGPM).

iv. Point 4 is the theoretical total head required by the system as calculated using the Hazen-Williams equation according to the line record drawings based on the flowrate from the drawdown test: 3.8L/s (60 USGPM) with total head at 9.4m (31ft).

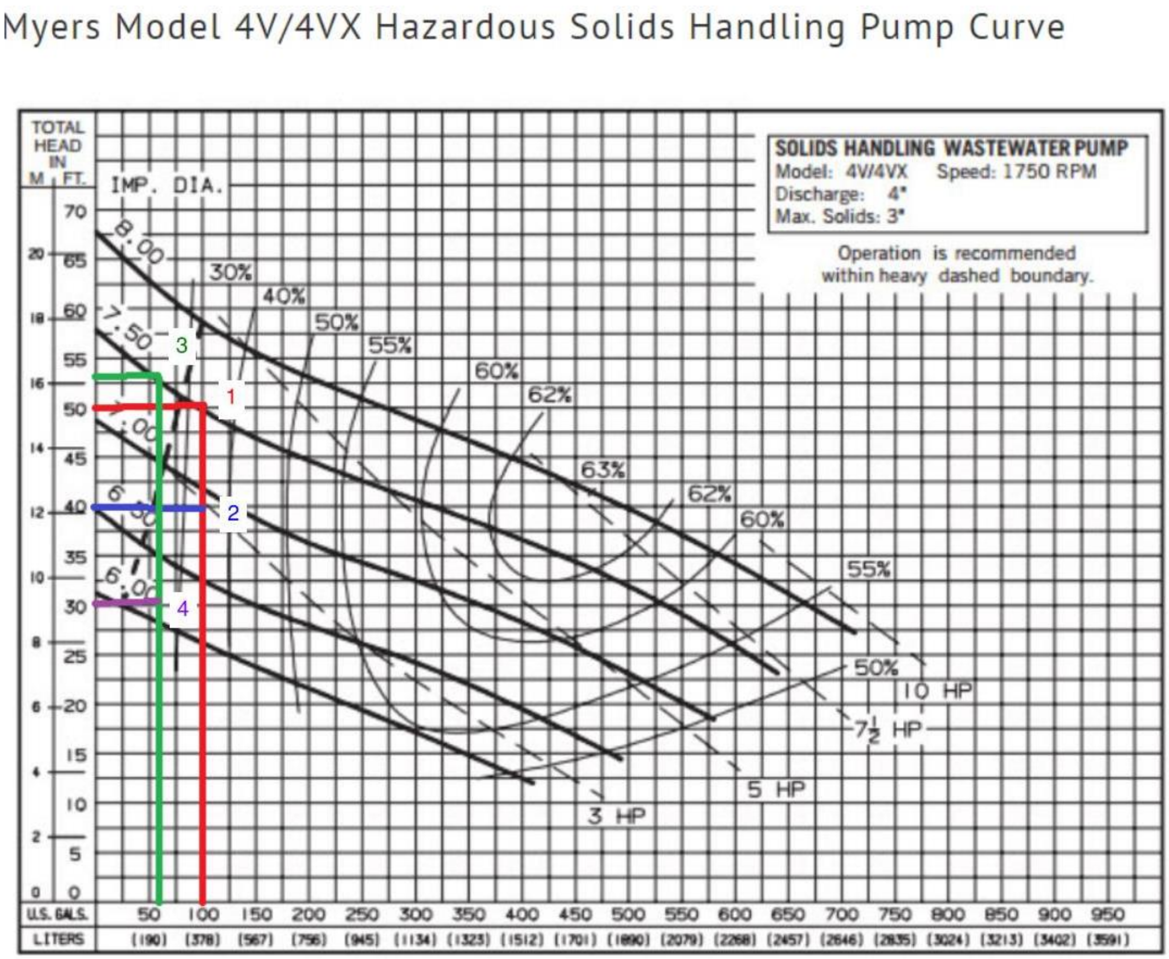


Figure 5: Pump Curve Comparison – Harper Lift Station

The total pressure head gap between points 3 and 4 and the performance gap between points 1 and 4 could be caused by:

i. Increased roughness inside pipe due to rust and spalling that causes higher flow restriction.

ii. Sediment accumulated in the pipe that increases flow resistance and reduces flow area in the pipe (see *Section 3.4.2* for on-going maintenance on sewer pipe).

iii. Wear on the impeller (although not reported by PRRD staff, this could still be a possibility).

iv. A high point bend approximately 790m from the lift station (*Figure 8*) may allow some air to accumulate at the bend and restrict water flow.

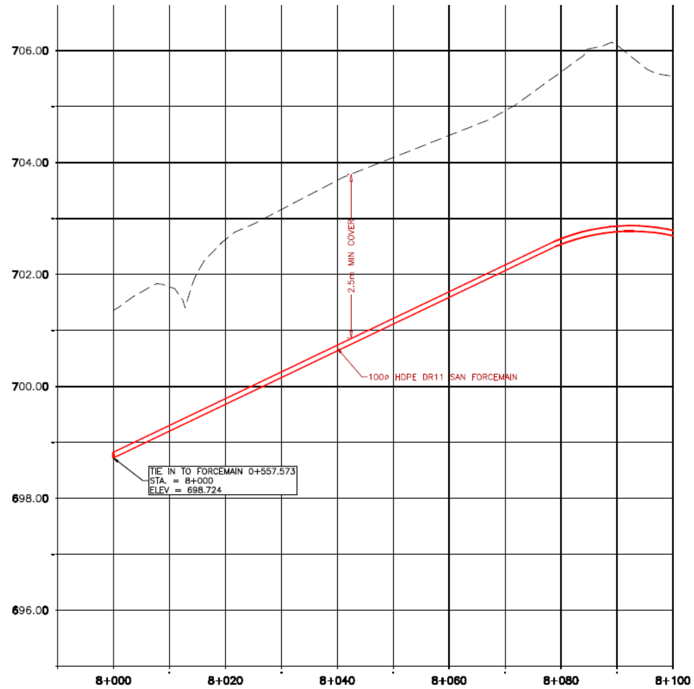


Figure 6: A High Point Bend Section Downstream from the Lift Station

The above observations and analysis are presented to address the observed system performance compared to the design information. The pumps are providing adequate service; upgrades to the electrical drive appear to be the more pressing issue.

At the current flow rate, the water velocity in the outlet pipe is 0.43m/s and the typical cleansing flow velocity is 1m/s. This low velocity is a result of using larger diameter conveyance lines. Larger lines are used for smaller sewage pumping systems as the larger diameter line limits plugging, resulting in better overall forcemain reliability.

2.1.3. Additional Observations

According to the subdivision maintenance staff, the Harper lift station alarm signals are sent to City staff who are not directly involved in regular maintenance. Therefore, there is the potential for a similar issue to the Chilton station, where an alarm was reported via SCADA to City staff but not relayed to responsible PRRD lift station staff in a timely fashion. Standard Operating Procedure changes are recommended to ensure alarms reach lift station staff promptly.

2.2. ELECTRICAL CONTROL SYSTEMS

The lift station and pumps are controlled and automated by an electrical control unit built near the wet well approximately 2m west inside a metal cabinet on a concrete base. The primary controls appear to be relay-based logic with a PLC panel and were installed in 2010. A ventilation fan is also connected and controlled by a switch attached on the south side of the control unit.

At the time of field assessment, the LED display screen and alarms on the PLC panel were showing a status of normal for the pumps and liquid level. The pump starters appear to be in good condition. Manual controls were used to conduct drawdown tests and appeared to be functioning well. The PLC cabinet is in good condition and has plenty of room.

Based on the site pictures, conduit penetrations appear to be routed to external junction boxes containing EYS seals to prevent sewer gas escape. The wiring and connections in the external junction boxes are in good condition.

Inside the electrical cabinet, a residential grade ethernet switch is utilized (*Figure 7*). This should be replaced with a unit suitable for municipal infrastructure service and capable of operating below 0°C.

McElhanney noticed that the running hours of the pump shown on the PLC panel were not updated when the service pump was switched. A pump log with updated running time after each switch would help determine the current condition and remaining life of the pumps. This will be reviewed in the recommended maintenance section (*Section 2.4*).

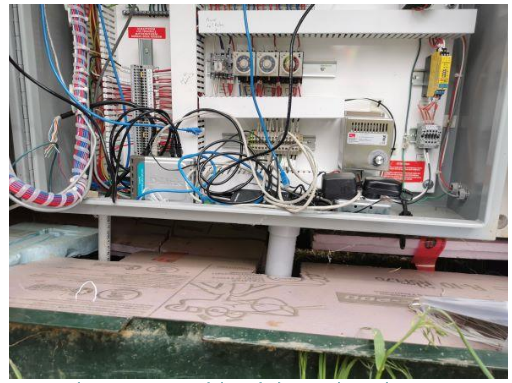


Figure 7: Residential Grade Ethernet

2.3. ELECTRICAL POWER DISTRIBUTION SYSTEMS

On the west side of the cabinet, cable connections and junction boxes of the electrical components were mounted on the wall behind the control panels. At the bottom of the cabinet, a residential grade computer UPS, as shown in *Figure 8*, is used for backup power. There is no monitoring of this UPS system and it could fail at any point. In addition, it may not provide proper equipment protection compared to a municipal grade UPS suitable for this type of installation.

On the cabinet exterior, a manual transfer switch is installed on the outside of the cabinet and has a pin and sleeve connector for connection to a portable generator.

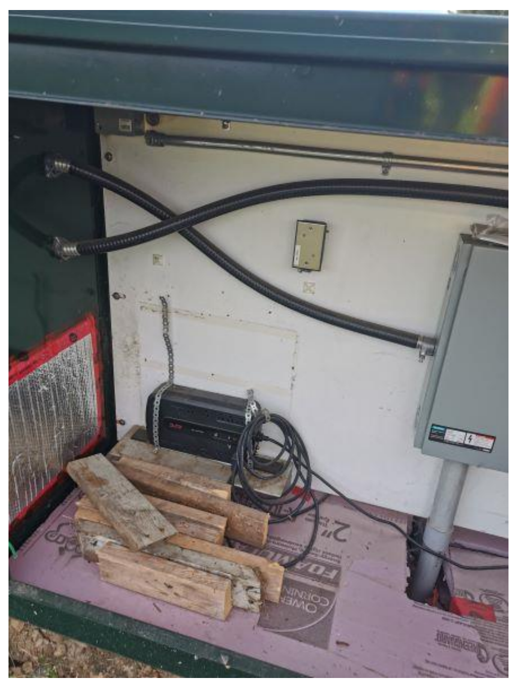


Figure 8: Residential Grade UPS

While reviewing the pictures of the electrical components inside the cabinet, McElhanney noticed at least one of the capacitors in each of the pump starter cabinets (total: 2 capacitors) appears to have experienced catastrophic failure and has been replaced (*Figure 9*), as indicated by the black burn mark circled in red in the photo. Based on the age of the facility and the capacitor failures already experienced, it is anticipated that another failure is likely. As the capacitors are installed directly into the starter cabinets, another catastrophic failure could cause other damage. A similar failure was noticed for the lift station in Chilton subdivision and may indicate a lighting strike occurred on one of the phases. A surge protector should be installed to avoid re-occurrence.

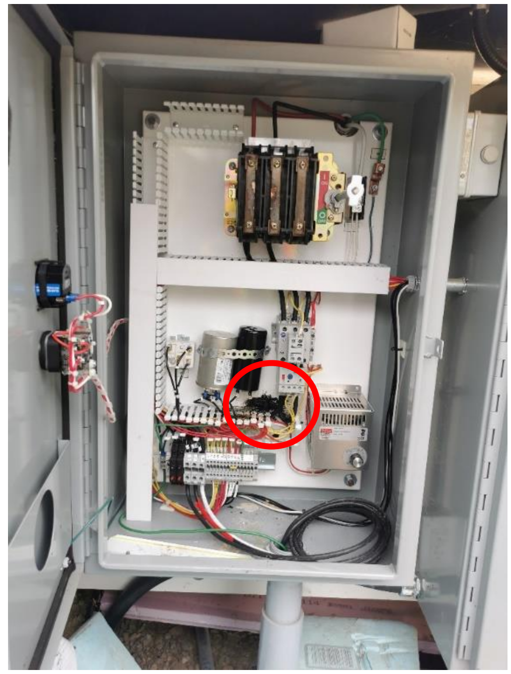


Figure 9: Capacitors Appear to Have Experienced Catastrophic Failure

2.4. SUMMARY & PROPOSED UPGRADES

Some lift station electrical components do not meet municipal standards and there is evidence of capacitor failure. The pumps appear to perform below the as-new design basis. However, the station has met capacity needs without issue and the lift station safely provides reasonable access for staff. There is no planned future expansion in the community; thus, there appears to be no need for a pump capacity upgrade. The following recommendations are intended to prolong the lift station service life.

2.4.1. Recommended Upgrades and Actions

To define a standard to prioritize the upgrade, we have utilized the following classification scheme for asset condition (*Table 1*).

Table 1: Asset Condition Classification Schema

Classification	Definition
A Adequate	High level of confidence feature will perform well under operating conditions. Limited probability degraded conditions will impact service.
B Probably Adequate	Low level of confidence feature will perform well under operating conditions. System may not meet industry standards. Feature may require additional investigation to confirm adequacy. Low probability degrade in condition will negatively impact service.
C Probably Inadequate	Low level of confidence feature will meet current industry standards. Moderate probability degrade in conditions will impact service.
D Inadequate	High level of confidence feature will not perform well under design operating conditions. Signs of distress and deterioration. Deficiency in features serious enough to impact service. High probability degrade in conditions will result in impact to service.
F Failed	Feature has failed.

Table 2: Recommended Immediate Remedial Work

Recommended Upgrade	Cost	Class	Priority	Rational
Update SCADA Programing	$5,000	D	High	Current SCADA system sends alarm signals to City staff who would forward to PRRD staff. The delayed response is a high risk to the safety of the lift station, and it served residents.
Install Surge Protector	$5,000	C	Medium	The PRRD has experienced power outrage many times in the past and the capacitor units appears to have experienced catastrophic failure in the past. Install a surge protector to significantly reduce the risk for connected electrical components. See *Section 2.3*.
Install Proper Ethernet Switch	$1,000	C	Medium	Municipal infrastructure quality equipment should be used. See section 2.2.
Install Proper UPS	$3,000	C	Medium	Municipal infrastructure quality equipment should be used. See *Section 2.3*.
Contingency (30%)	$4,200			
2021 Total	**$18,200**			

Table 3: Recommended Remedial Work Within Ten Years

Recommended Upgrade	Cost	Class	Priority	Rational
Replace steel piping, fittings, flanges, and valves in year 2030	$38,000	B	Medium	Moderate corrosion and spalling of paint on the surface. Reaching the end of its design life in 10 years according to ISC's guideline.
Replace pumps in year 2035	$40,500	B	Medium	The pumps were purchased in 2010 and will reach the end of their service life in 15 years according to ISC's guideline.
Install shut off valve for the pipe outlet	$3,000	B	Low	Not required for operation; improves station analytics.
Contingency (30%)	$24,500			
10+ Year Total	**$106,000**			

The item costs are based on vender pricing with an added allowance for installation. Improved reliability of the station can be gained by changing the motor drive to 3-phase power. The station did not report issues with the motor drive, but higher torque will limit plugging issues. If the pumps are to be upgraded, an investigation into the availability of 3-phase power for this station and the practicality of this upgrade should be undertaken.

The running times of individual pump is not tracked. McElhanney recommends tracking how often each pump is cycled to provide an indication of the amount of sewage being pumped through the system, which will provide a useful preventative maintenance tool. When the pumps are upgraded, run meters should be included in the upgraded control package.

3. Sewer CCTV Inspection Assessment

This section summarizes the findings and recommendations for the gravity sanitary sewer main of the Harper subdivision based on CCTV inspection in order to assist the PRRD with determining current condition, identifying required repairs, estimating remaining service life, and providing a cost estimate for repairs that are currently required and an estimated replacement cost for the whole system.

3.1. METHODOLOGY

McElhanney contracted Northern Lites Technologies to inspect each section of sanitary sewer in the Harper subdivision. The pipe segments were flushed when necessary and video was recorded using a CCTV camera mounted on a remote operated tractor. The operator stopped the camera and noted defects based on the National Association of Sewer Service Companies (NASSCO) defect codes during the inspection. When surveys needed to be abandoned due to water levels or other obstructions, an attempt would be made to send the camera to that location from the opposite direction. The collected videos were then watched, verified, and scored according to the NASSCO Pipeline Assessment Certification Program (PACP) rating guidelines.

The pipe segments were analyzed using the NASSCO PACP Condition Grading System. For each segment of pipe, a list of defects and a score associated with that defect was identified. The scores range from 1 to 5, with 5 being the most severe; separate scoring is completed for structural defects as well as operational and maintenance defects. The full table can be seen in *Appendix B*.

The PACP Quick Scoring method has four (4) digits and represents the two most severe defects and their number of occurrences. For example, a PACP Quick Score of 3224 identifies that the segment of pipe has two (2) grade 3 defects and four (4) grade 2 defects. Using such a system allows quick identification of pipe that may require closer scrutiny.

The Index Rating method takes a sum of all the defect scores and divides it by the number of defects, essentially calculating an average defect score for the segment of pipe. This method is to be applied with caution, as a severe defect can become diluted by many less severe defects; hence, the two rating systems are used in conjunction to allow the review to focus on pipe segments that may need more attention and closer scrutiny.

The pipe rating system used is in accordance with the NASSCO Pipeline Assessment and Certification Program, Version 6.0.1, dated November 2010. Refer to *Appendix C* for an excerpt from the PACP training manual that describes the rating methods described above. Also included are two pages taken from the PACP training manual that briefly describe the reasons for CCTV inspection, the information derived from CCTV inspection data, reasons for standardization in CCTV inspection reporting and the origin of condition codes.

Manholes were assessed using a remote camera suspended from a tripod that was capable of taking 3D scans of the manhole interior. The camera was lowered to different heights and a 360° view of the manhole was then compiled at each depth. Using these 3D views, the manholes were assessed using the NASSCO MACP system. The MACP system collects information on the manhole and is divided into Level 1 and Level 2 assessments. Level 1 MACP assessments gather information for a general condition assessment with observations and helps to determine whether a more comprehensive inspection (Level 2) is required. If a Level 2 inspection is warranted, the MACP uses coded defect ratings similar to the NASSCO PACP rating system.

3.2. NASSCO PIPE AND MANHOLE ANALYSIS

The following sections provide a summary of the defects for each of the branches assessed. Identified in the sections below are the segments of the sewer with a pipe defect severity of 4 or higher as well as other problematic segments. Defects of a lower severity are associated with minor infiltration or deposits in the main, which would be addressed by flushing.

3.2.1. Pipe Segments

The Harper segment of the CCTV assessment generally had HDPE (Welded DR11) and PVC sanitary sewer main in good structural condition. In general, laterals were installed using manufactured connections, with services typically being in good condition. A few pipes exhibited problems with large sags in the pipe grade, indicated by changes in the water level with stagnant water pooling. Several other pipes showed signs of less significant sags, with sections of water pooling to about 20% of the pipe area. Unless otherwise noted the pipe segments maintained minimum 80% pipe cross-section. Below is a summary of each segment; details can be found in *Appendix B*.

- SMH-01A to SMH-01B; 200mm HDPE: Pipe in fair condition, one instances of increased water level to approximately 50%, indicating sags in the pipe grade.
- SMH-01B to SMH-01C; 200mm HDPE: Pipe is in very good condition, no defects of note.
- SMH-01C to SMH-01D; 200mm HDPE: Pipe in fair condition, one instances of increased water level to approximately 30% near manhole SMH-01D, indicating sags in the pipe grade near the manhole. Services appear offset at their connections as seen in *Figure 10*, but appear to be functioning.

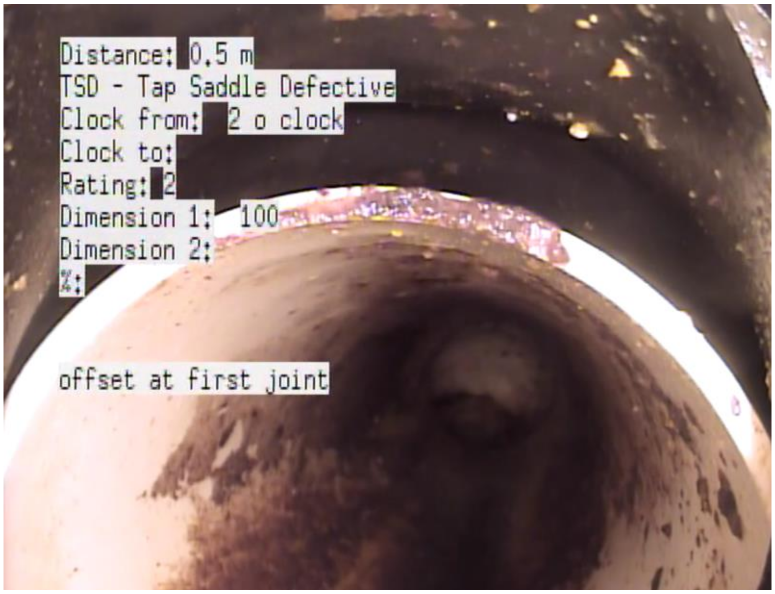


Figure 10: Offset Connection for Service Between SMH-01C and SMH-01D

- SMH-01D to SMH-01E; 200mm HDPE: Pipe in fair condition, one instance of increased water level to approximately 30% near manhole SMH-01D, indicating sags in the pipe grade near the manhole.
- SMH-01E to SMH-01F; 200mm HDPE: Pipe in poor condition. One instance of underwater camera with pipe 80% full of water (with dry sections before and after) indicating large sags in the pipe grade. Several additional instances of water level reaching 50% of pipe diameter.
- SMH-01F to Lift Station; 200mm HDPE: Pipe in poor condition. While the structural condition of the pipe along the mainline is good, the pipe outfall to the lift station has a large offset joint as seen in *Figure 11*. This offset joint constricts flow to the pump station and may result in reduced system capacity.

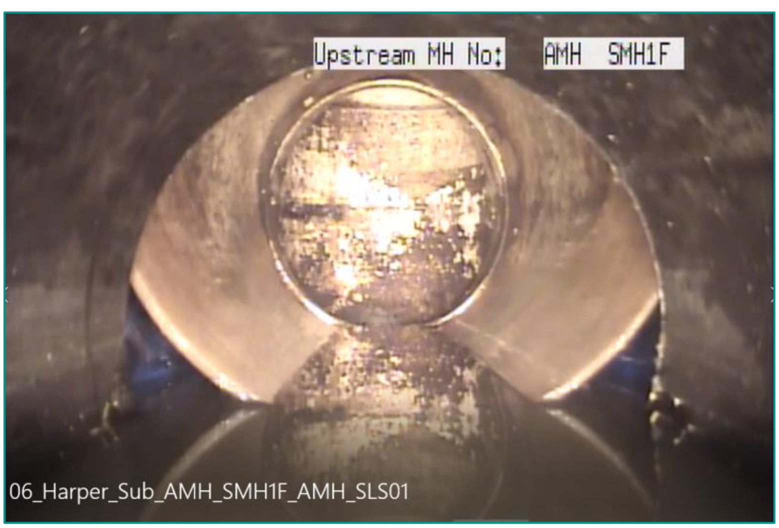


Figure 11: Offset Joint at Lift Station Outfall

- SMH-02A to SMH-02B; 200mm HDPE: Pipe is in good condition, one instance of increased water level to approximately 30%, indicating minor sags in the pipe grade.
- SMH-02B to SMH-02C; 200mm HDPE: Pipe is in fair condition, one instance of underwater camera with pipe 80% full of water (with dry sections before and after) indicating large sag in the pipe grade with debris blocking the pipe as seen in *Figure 12*.

Figure 12: Gravel and Water Level Obstruction Caused by Pipe Sag Between SMH-02B and SMH-02C

- SMH-02C to SMH-02D; 200mm HDPE: Pipe is in very good condition, no defects of note.
- SMH-02D to SMH-02E; 200mm HDPE: Pipe is in very good condition, no defects of note.
- SMH-02E to SMH-02F; 200mm HDPE: Pipe is in very good condition, no defects of note.
- SMH-02F to SMH-02G; 200mm HDPE: Pipe is in very good condition, no defects of note.
- SMH-02G to SMH-01F; 200mm HDPE: Pipe is in very good condition, no defects of note.
- SMH-03 to SMH-02; 200mm PVC: Pipe is in good condition, with a single service showing some signs of minor encrustation.
- SMH-05A to SMH-02C; 200mm PVC: Pipe is in very good condition, no defects of note.
- SMH-06A to SMH-02E; 200mm PVC: Pipe is in very good condition, no defects of note.
- SMH-07A to SMH-02G; 200mm HDPE: Pipe is in very good condition, no defects of note.

Table 4 provides an overview of the pipe conditions and the PACP ratings for the surveys conducted.

Table 4: NASSCO PACP Pipe Segment Rating and Index

Upstream MH	Downstream MH	PACP Quick (Structural)	PACP Quick (O&M)	Structural Index	O&M Index	Overall Index	Rating per m	Defects per m
SMH-1A	**SMH-1B**	0000	0000	0	0	0	0.000	0.000
SMH-1B	**SMH-1C**	0000	0000	0	0	0	0.000	0.000
SMH-1C	**SMH-1D**	0000	2400	0	2	2	0.079	0.039
SMH-1D	**SMH-1E**	0000	0000	0	0	0	0.000	0.000
SMH-1E	**SMH-1F**	0000	4200	0	4	4	0.068	0.017
SMH-1F	**LIFT STATION**	2100	0000	2	0	2	0.065	0.032
SMH-2A	**SMH-2B**	0000	0000	0	0	0	0.000	0.000
SMH-2	**SMH-1**	1100	0000	1	0	1	0.006	0.006
SMH-2B	**SMH-2C**	0000	5121	0	2.67	2.67	0.081	0.031
SMH-2C	**SMH-2D**	0000	0000	0	0	0	0.000	0.000
SMH-2D	**SMH-2E**	0000	0000	0	0	0	0.000	0.000
SMH-2E	**SMH-2F**	0000	0000	0	0	0	0.000	0.000
SMH-2F	**SMH-2G**	0000	0000	0	0	0	0.000	0.000
SMH-2G	**SMH-1F**	0000	0000	0	0	0	0.000	0.000
SMH-3	**SMH-2**	0000	2100	0	2	2	0.012	0.006
SMH-5A	**SMH-2C**	0000	0000	0	0	0	0.000	0.000
SMH-6A	**SMH-2E**	0000	0000	0	0	0	0.000	0.000
SMH-7A	**SMH-2G**	0000	0000	0	0	0	0.000	0.000

3.2.1.Manhole 3D Scan Inspection

The Harper manhole assessment found that the manholes were generally in good condition. The manholes are all precast manufactured concrete with aluminum stepladder rungs, manufactured benching, and cast-iron manhole covers. Manholes of this type installed to specifications are expected to have a lifespan of 50+ years but can last for significantly longer in low corrosivity environments.

Several manholes exhibited some minor infiltration, typical of all manholes, and a few exhibited some encrustation around the manhole benching and manhole base. All assessments were completed to NASSCO MACP Level 1 standards. Below is a summary of each manhole; details can be found in *Appendix B*.

- SMH-01A, 1050mm concrete manhole: Manhole in good condition.
- SMH-01B, 1050mm concrete manhole: Manhole in good condition.
- SMH-01C, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-01D, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining, and the pipe on either side of the manhole is sagging approximately 30% of pipe diameter.
- SMH-01E, 1050mm concrete manhole: Manhole in good condition. Some standing water at the time of survey in manhole channels.
- SMH-01F, 1050mm concrete manhole: Manhole in good condition. Some standing water at the time of survey in manhole channels as seen in *Figure 13*.

Figure 13: Standing Water in Channels of SMH-01F (Final Manhole before Harper Lift Station).

- SMH-02B, 1050mm concrete manhole: Manhole in good condition. Manhole has a service break-in set above the manhole benching without drop or ramp structure, as seen in Figure 14.

Figure 14: Break in Service Connection to SMH-02B.
This service does not have a drop structure or benching to direct flows.

- SMH-02C, 1050mm concrete manhole: Manhole in good condition.
- SMH-02D, 1050mm concrete manhole: Manhole in good condition.
- SMH-02E, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-02F, 1050mm concrete manhole: Manhole in good condition.
- SMH-02G, 1050mm concrete manhole: Manhole in good condition.
- SMH-05A, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation on manhole base joint.
- SMH-06A, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near the manhole base joint.
- SMH-07A, 1050mm concrete manhole: Manhole in good condition.
- SMH-01, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near the manhole base joint.
- SMH-02, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near the manhole base joint.
- SMH-03, 1050mm concrete manhole: Manhole in good condition. Drop structure from forcemain in good condition as seen in Figure 15, with restraints intact.

Figure 15: Drop Structure in Good Condition Based on Visual Inspection, with Restraints Intact. Rusting is present on the restraint hardware, but bolt threading and nut shape remain distinct and visible.

3.3. RECOMMENDATIONS

McElhanney recommends:

- Continuing the monitoring and maintenance program, with flushing every 5 years (or more often as required) and reinspection and assessment every 10 years.
- Cleaning of all manholes to remove encrustation, with concrete patching to infill any deficiencies in the manhole joints to prevent future encrustation.
- Full replacement of pipe segment SMH-01E to SMH-01F due to numerous sags. Service connections should be located and reinstalled at the time of construction.
- Full replacement of SMH-01F to Lift Station. Because this is a critical section and it appears to have a large offset joint right at the Harper Lift Station, replacement is necessary to repair the grade along the entirety of the pipe.
- Locating and replacing the segment of pipe exhibiting a large sag between SMH-02B and SMH-02C. This may require reconnecting service connections at the new grade.
- Repairing the sagging pipe on either side of SMH-01D.

3.4. COST ESTIMATE

The system has defects that require attention but the system, as a whole, is in fair condition, with an estimated lifespan of another 30+ years with proper maintenance. All costs are listed as 2021 dollars and include a 30% contingency. *Table 5* provides an overview of the repairs, on-going maintenance, replacement costs, and estimated lifespan for each asset.

Table 5: Cost Estimate for Harper Sanitary Sewer Repairs, Maintenance, and Replacement

	Asset	Cost of Current Repairs Required	Cost of Maintenance (Yearly)	Cost of Replacement	Estimated Lifespan (Years)
PIPES	SMH-01A TO SMH-01B	$0.00	$200.00	$147,000.00	64
	SMH-01B TO SMH-01C	$0.00	$200.00	$147,000.00	64
	SMH-01C TO SMH-01D	$7,500.00	$200.00	$106,000.00	64
	SMH-01D TO SMH-01E	$7,500.00	$200.00	$135,000.00	64
	SMH-01E TO SMH-01F	$139,000.00	$200.00	$139,000.00	64
	SMH-01F TO LIFT STATION	$38,000.00	$200.00	$38,000.00	64
	SMH-02A TO SMH-02B	$0.00	$200.00	$106,000.00	64
	SMH-02B TO SMH-02C	$15,000.00	$200.00	$115,000.00	64
	SMH-02C TO SMH-02D	$0.00	$200.00	$87,000.00	64
	SMH-02D TO SMH-02E	$0.00	$200.00	$133,000.00	64
	SMH-02E TO SMH-02F	$0.00	$200.00	$77,000.00	64
	SMH-02F TO SMH-02G	$0.00	$200.00	$117,000.00	64
	SMH-02G TO SMH-01F	$0.00	$200.00	$128,000.00	64
	SMH-05A TO SMH-02C	$0.00	$200.00	$51,000.00	64
	SMH-06A TO SMH-02E	$0.00	$200.00	$21,000.00	64
	SMH-07A TO SMH-02G	$0.00	$200.00	$57,000.00	64
	SMH-02 TO SMH-01	$0.00	$200.00	$165,000.00	64
	SMH-03 TO SMH-02	$0.00	$200.00	$177,000.00	64
MANHOLES	SMH-01A	$500.00	$100.00	$12,000.00	39
	SMH-01B	$500.00	$100.00	$12,000.00	39
	SMH-01C	$500.00	$100.00	$12,000.00	39
	SMH-01D	$500.00	$100.00	$12,000.00	39
	SMH-01E	$500.00	$100.00	$12,000.00	39
	SMH-01F	$500.00	$100.00	$12,000.00	39
	SMH-02B	$500.00	$100.00	$12,000.00	39
	SMH-02C	$500.00	$100.00	$12,000.00	39
	SMH-02D	$500.00	$100.00	$12,000.00	39
	SMH-02E	$500.00	$100.00	$12,000.00	39
	SMH-02F	$500.00	$100.00	$12,000.00	39
	SMH-02G	$500.00	$100.00	$12,000.00	39
	SMH-05A	$500.00	$100.00	$12,000.00	39
	SMH-06A	$500.00	$100.00	$12,000.00	39
	SMH-07A	$500.00	$100.00	$12,000.00	39
	SMH-01	$500.00	$100.00	$12,000.00	39
	SMH-02	$500.00	$100.00	$12,000.00	39
	SMH-03	$500.00	$100.00	$18,000.00	39

3.4.1. Repairs

Pipes

McElhanney recommends replacement of two sewer sections (SMH-01E to SMH-01F and SMH-01F to Lift Station) and point repairs on sagging areas to MMCD standards, including new sections of PVC SDR35 sanitary sewer installed with new bedding and repair couplings. During repairs, the subgrade should be inspected for suitability and removed if unsuitable or if deleterious materials are found, as soft ground may be the cause of the pipe sags. Once repaired, the pipes should be re-inspected.

Estimated Cost of Repairs: $207,000

Manholes

McElhanney recommends cleaning all manholes to clear debris and encrustation. Once complete, perform concrete patching as required to prevent future encrustation.

Estimated Cost: $9,000

3.4.2. On-going Maintenance

Pipes

Flushing and reinspecting every 5 to 10 years to watch for signs of pipe failure is recommended. Pipes showing signs of early failure (cracking, root intrusion, additional sagging) should be repaired as needed until full replacement is warranted. Pricing assumes that the entire system is cleaned and inspected together. Individual segments inspected more frequently would lead to a higher overall maintenance cost.

Estimated Cost: $200 per segment per year with an expected $36,000 total per inspection and flushing cycle.

Manholes

Cleaning and reinspecting every 5 to 10 years to watch for signs of structural failure is recommended. Manholes showing signs of early failure (cracking, root intrusion, major encrustation) should be repaired as necessary until full replacement is warranted.

Estimated Cost: $100 per manhole per year with a total expected spend of $18,000 total every inspection cycle.

3.4.3. Replacement

Once replacement is warranted, the entire gravity system should be removed and replaced. Services should be scoped as the replacement takes place, with deficient services being replaced and transferred at property line. Replacement is usually required when the cost of on-going repairs becomes too high or when the pipes begin to exhibit excessive structural failures in the NASSCO PACP ratings system. Full replacement is not warranted at this time. The system condition is consistent with the age of the assets. The system should be expected to last 30+ years with proper maintenance and repairs

Estimated Total Replacement Costs: $2,168,000

Appendix A

Statement of Limitations

Statement of Limitations

Use of this Report. This report was prepared by McElhanney Ltd. ("McElhanney") for the particular site, design objective, development and purpose (the "Project") described in this report and for the exclusive use of the client identified in this report (the "Client"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used or relied upon, in whole or in part, by a party other than the Client, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors and regulatory authorities for use in relation to and in connection with the Project provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies.

Standard of Care and Disclaimer of Warranties. This report was prepared with the degree of care, skill, and diligence as would reasonably be expected from a qualified member of the same profession, providing a similar report for similar projects, and under similar circumstances, and in accordance with generally accepted engineering and scientific judgments, principles and practices. McElhanney expressly disclaims any and all warranties in connection with this report.

Information from Client and Third Parties. McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

Effect of Changes. All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the site assessment and report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Construction activities can significantly alter soil, rock and other geologic conditions on the site. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, c) new information is discovered in the future during site excavations, construction, building demolition or other activities, or d) additional subsurface assessments or testing conducted by others.

Independent Judgments. McElhanney will not be responsible for the independent conclusions, interpretations, interpolations and/or decisions of the Client, or others, who may come into possession of this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance or sell land or with respect to public offerings for the sale of securities.

Construction Cost Estimates. This construction cost estimate has been prepared using the design and technical information currently available, and without the benefit of Geotechnical, Environmental, and Archaeological information. Furthermore, McElhanney cannot predict the competitive environment, weather or other unforeseen conditions that will prevail at the time that contractors will prepare their bids. The cost estimate is therefore subject to factors over which McElhanney has no control, and McElhanney does not guarantee or warranty the accuracy of such estimate.

Appendix B

Pipe Condition Tables

File: 3111-26522-00CIV-RPT-003 Harper CCTV Table

Date: October 29, 2021

Pipe Segment	U/S MH#	D/S MH#	Pipe Size (mm)	Material	Length (m)	Grade (%)	Report #	Report Date	Video #	Station	Defect Group	Descriptor	Modifier	Defect	Defect (Input)	Continuous (Match Codes)	Numeral Mod	Percent/Count	Structural Rating	O&M Rating	# of Structural Defects Count	# of O&M Defects Count	Total Number of Defects	Structural Rating Index	O&M Rating Index	Overall Index
1	AMH_SMH 1A	AMH_SMH 1B	200	HDPE	125.2	-	31112652200	Jun-21	01_Harper_Sub_AMH_SMH1A_AMH_SMH1B	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										48.1	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										76.2	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										78.7	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										82.8	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										125.2	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									0	0	0	0				
										Quick									0000	0000						
2	AMH_SMH 1B	AMH_SMH 1C	200	AC	101.4	-	31112652200	Jun-21	02_Harper_Sub_AMH_SMH1B_AMH_SMH1C	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										17.6	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										27.8	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										58.1	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										76.6	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										101.4	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									0	0	0	0				
										Quick									0000	0000						
3	AMH_SMH 1C	AMH_SMH 1D	200	AC	101.6	-	31112652200	Jun-21	03_Harper_Sub_AMH_SMH1C_AMH_SMH1D	0	Access_Points	Manhole		AMH			0		0	0	0	0	4	0.0	2.0	2.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										0.5	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										45.9	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										58.9	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										74.5	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										100.8	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										101.6	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									0	8	0	4				
										Quick									0000	2400						
4	AMH_SMH 1D	AMH_SMH 1E	200	AC	122.5	-	31112652200	Jun-21	04_Harper_Sub_AMH_SMH1D_AMH_SMH1E	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										1.9	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										2.7	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										54.9	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										122.5	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									0	0	0	0				
										Quick									0000	0000						
5	AMH_SMH 1E	AMH_SMH 1F	200	AC	117	-	31112652200	Jun-21	05_Harper_Sub_AMH_SMH1E_AMH_SMH1F	0	Access_Points	Manhole		AMH			0		0	0	0	0	2	0.0	4.0	4.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										1.9	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										30.4	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										79.4	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										86	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										89.9	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										91.4	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										93	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										95.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										100.5	Miscellaneous	Camera Underwater		MCU			0		0	4	0	1				
										101.9	Miscellaneous	General Observation		MGO			0		0	0	0	0				
										103.4	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										104.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										111.2	Miscellaneous	Camera Underwater		MCU			0		0	4	0	1				
										113.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										114.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										117	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										117	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									0	8	0	2				
										Quick									0000	4200						
6	AMH_SMH 1F	AMH_SLS 01	200	AC	30.8	-	31112652200	Jun-21	06_Harper_Sub_AMH_SMH1F_AMH_SLS01	0	Access_Points	Manhole		AMH			0		0	0	0	0	1	2.0	0.0	2.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										3.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										30.3	Miscellaneous	Material Change		MMC			0		0	0	0	0				
										30.3	Joint	Offset (displaced) Large		JOL			0		2	0	1	0				
										30.8	Access_Points	Other Special Chamber		AOC			0		0	0	0	0				
										Total									2	0	1	0				
										Quick									2100	0000						
7	AMH_SMH 2A	AMH_SMH 2B	200	AC	136.1	-	31112652200	Jun-21	07_Harper_Sub_AMH_SMH2A_AMH_SMH2B	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										12.2	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										21.2	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										105.8	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										122	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										127.8	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										130.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										131.7	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										134	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										136	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										136.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										136.1	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									0	0	0	0				
										Quick									0000	0000						
8	AMH_SMH 2	AMH_SMH 1	200	PVC	158.1	-	31112652200	Jun-21	08_Harper_Sub_AMH_SMH2_AMH_SMH1	0	Access_Points	Manhole		AMH			0		0	0	0	0	1	1.0	0.0	1.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										146.1	Tap	Saddle	-	TS			0		0	0	0	0				
										147.2	Tap	Saddle	-	TS			0		0	0	0	0				
										147.6	Tap	Saddle	-	TS			0		0	0	0	0				
										151.1	Joint	Separated (open) Medium		JSM			0		1	0	1	0				
										158.1	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									1	0	1	0				
										Quick									1100	0000						

9	AMH_SMH 2B	AMH_SMH 2C	200	AC	98.2	-	31112652200	Jun-21	09_Harper_Sub_AMH_SMH2B_AMH_SMH2C	0	Access_Points	Manhole		AMH		0		0	0	0	0	4	**0.0**	**3.0**	**3.0**
10							31112652200	Jun-21	10_Harper_Sub_AMH_SMH2B_AMH_SMH2C_Harpe_Dr	0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										0.2	Line	Down		LD		OM_Degree	<=20	0	2	0	1				
										1	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										1.5	Line	Up		LU		OM_Degree	<=10	0	1	0	1				
										3.2	Deposits	Deposits_Settled	Gravel	DSGV		OM_Percent	>30	0	5	0	1				
										3.2	Miscellaneous	Camera Underwater		MCU		0		0	4	0	1				
										3.2	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										4	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										5	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										96	Line	Left		LL		OM_Degree	>30	0	0	0	0				
										98.2	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**12**	**0**	**4**				
										Quick								**0000**	**5141**						
11	AMH_SMH 2C	AMH_SMH 2D	200	AC	70.6	-	31112652200	Jun-21	11_Harper_Sub_AMH_SMH2C_AMH_SMH2D	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										70.6	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
12	AMH_SMH 2D	AMH_SMH 2E	200	AC	114.6	-	31112652200	Jun-21	12_Harper_Sub_AMH_SMH2D_AMH_SMH2E	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										55.1	Tap	Saddle	Activity	TSA		0		0	0	0	0				
										114.6	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
13	AMH_SMH 2E	AMH_SMH 2F	200	AC	64.5	-	31112652200	Jun-21	13_Harper_Sub_AMH_SMH2E_AMH_SMH2F	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										0	Miscellaneous	General Observation		MGO		0		0	0	0	0				
										64.5	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
14	AMH_SMH 2F	AMH_SMH 2G	200	AC	99.8	-	31112652200	Jun-21	14_Harper_Sub_AMH_SMH2F_AMH_SMH2G	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										68.7	Tap	Saddle	Activity	TSA		0		0	0	0	0				
										99.8	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
15	AMH_SMH 2G	AMH_SMH 1F	200	AC	108.4	-	31112652200	Jun-21	15_Harper_Sub_AMH_SMH2G_AMH_SMH1F	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										82.6	Tap	Saddle	Activity	TSA		0		0	0	0	0				
										108.4	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
16	AMH_SMH 3	AMH_SMH 2	200	PVC	170.6	-	31112652200	Jun-21	16_Harper_Sub_AMH_SMH3_AMH_SMH2	0	Access_Points	Manhole		AMH		0		0	0	0	0	1	**0.0**	**2.0**	**2.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										79.9	Tap	Saddle	-	TS		0		0	0	0	0				
										79.9	Tap	Factory_Made	-	TF		0		0	0	0	0				
										79.9	Deposits	Deposits_Attached	Encrustation	DAE		OM_Percent	<=10	0	2	0	1				
										170.6	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**2**	**0**	**1**				
										Quick								**0000**	**2100**						
17	AMH_SMH 5A	AMH_SMH 2C	200	PVC	44	-	31112652200	Jun-21	17_Harper_Sub_AMH_SMH5A_AMH_SMHSMH2C	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										15.5	Tap	Saddle	Activity	TSA		0		0	0	0	0				
										41.9	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										44	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
18	AMH_SMH 6A	AMH_SMH 2E	200	PVC	20.1	-	31112652200	Jun-21	18_Harper_Sub_AMH_SMH6A_AMH_SMH2E	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										20.1	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						
19	AMH_SMH7A	AMH_SMH 2G	200	AC	61.1	-	31112652200	Jun-21	19_Harper_Sub_AMH_SMH7A_AMH_SMH2G	0	Access_Points	Manhole		AMH		0		0	0	0	0	0	**0.0**	**0.0**	**0.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										59.8	Tap	Saddle	Activity	TSA		0		0	0	0	0				
										61.1	Access_Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**0**	**0**	**0**				
										Quick								**0000**	**0000**						

Appendix C

NASSCO PACP Rating Guidelines

PACP© Condition Grading System

The Pipeline Assessment and Certification Program (PACP) developed by NASSCO provides a mechanism for creating reliable descriptions of pipe conditions. NASSCO has also developed a system based on the PACP codes to assign a condition rating to pipelines. Requirements of the grading system were as follows:

1. Like the PACP, the grading system should be direct and objective.
2. Provide the ability to qualitatively identify differences in pipe condition between one inspection and subsequent inspections, and to prioritize based on the significance of the defects different pipe segments.

Many other approaches to sewer pipe grading have been used in the United States as well as in other parts of the World. These approaches generally use some type of defect grading that is then used to calculate an overall pipe rating.

It is problematic to develop a single pipe segment rating that fully describes all of the important aspects of a pipe. Therefore the PACP Condition Grading System uses more than one method of rating pipe segment condition including a rating that considers the number of total defects within the pipe segment and a rating that considers the most severe defects within the pipe segment.

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in the PACP Condition Grading System. The PACP Condition Grading System should be used only as a tool for screening pipe segment inspections, allowing the User to quickly determine which pipe segments have significant defects. It is expected that as the PACP further develops the PACP Condition Grading System will expand to include other factors.

The PACP Condition Grading System provides condition ratings for Structural Defects and Operation and Maintenance Defects.

Approach

Using the PACP Code Matrix, Each PACP defect code is assigned a condition grade of from 1 to 5. Grades are assigned based on the significance of the defect, extent of

damage, percentage of flow capacity restriction, or the amount of wall loss due to deterioration.

The PACP Condition Grading System alone is inadequate for determining if a pipe segment should be rehabilitated or replaced. Many other factors in addition to the internal condition of the segment should be considered. The fact that a segment has significant Grade 4 or Grade 5 defects does not necessarily mean the pipe segment should be immediately rehabilitated. Recent experience by PACP Users has shown that pipe segments with serious defects such as hinge failures may remain largely unchanged for many decades if no deterioration factors such as surcharging, roots, or groundwater are present.

What is needed is improved estimates of remaining life or mean time before failure that are based on close monitoring of pipe segments over time. Once we know how much change occurs in pipe segments we can better understand the relationship between defects, deterioration factors, and pipe segment life expectancy. PACP continues to be an excellent tool for benchmarking pipe condition between one inspection and subsequent inspections of the same pipe.

Grades are assigned for two categories, Structural, and O&M defects.
Grades are as follows;
5 - Most significant defect grade
4 – Significant
3 – Moderate defect grade
2 – Minor to Moderate
1 –Minor defect grade

The PACP Condition Grading System results are entirely dependent on the quality of the PACP defect coding. Errors in the coding will directly result in errors in the Grading. All utilities, engineers, and contractors should make sure the data they are using was coded by experienced technicians who have successfully demonstrated their competence through a formal or informal apprenticeship program. PACP data from inexperienced technicians should be checked and corrected as needed. Errors found in coding should be corrected and the errors brought to the attention of the technician.

Grading of Continuous Defects

The PACP continuous defect feature is used to denote where long portions of a sewer pipe are affected by the same defect, without the User having to repetitively enter point defects. However to develop a grade for the pipe segment, a mechanism is needed to translate a continuous defect into an equivalent number of point defects.

The equivalent number (quantity) of "uninterrupted" and "joint repeating" continuous defects is calculated by dividing the length of the continuous defect by 5. Example, a 6-meter long continuous defect, grade 3, should equate to four Grade 3 defects. Fractions are rounded to the nearest whole number.

Pipe Ratings

The pipe rating is based on the number of occurrences for each condition grade. Ratings are calculated separately for **Structural Defects** and **O&M Defects**. Several ways of expressing pipe segment condition are used by the PACP Condition Grading System as follows.

Segment Grade Scores - Each pipe segment will have a Segment Grade Score for each of the five grades. The number of occurrences of each pipe grade is multiplied by the pipe grade to calculate the segment grade score. Example, six Grade 5 defects would be 6 times 5 and equates to a Segment Grade 5 Score of 30. If a pipe segment had no defects of a particular grade, then the Segment Grade Score for that grade would be 0.

Overall Pipe Rating –The five Segment Grade Scores are added together to calculate the **Overall Pipe Rating. Structural Pipe Ratings** are calculated using only Structural Defect grades, while **O&M Pipe Ratings** are calculated using only O&M Defect grades.

PACP Quick Rating – The PACP Quick Rating is a shorthand way of expressing the number of occurrences for the two highest severity grades. The PACP Quick Rating is a four character score as follows:

1. The first character is the highest severity grade occurring along the pipe length.
2. The second character is the total number of occurrences of the highest severity grade. If the total number exceeds 9, then alphabetic characters are used as follows- 10 to 14 – A; 15 to 19 – B; 20 to 24 – C; etc.
3. The third character is the next highest severity grade occurring along the pipe length.
4. The fourth character is the total number of the second highest severity grade occurrences, derived as in item 2 above.

For Example

4B27

This immediately shows that no grade 5 defects or grade 3 defects, however 15 to 19 grade 4 defects and seven grade 2 defects were found.

Another Example

3224

Two grade 3 defects and four grade 2 defects, however no grade 5 or grade 4 defects were found.

If a pipe segment only has defects of one grade, the first two characters are the grade and the quantity of defects, and the last two characters are 00 (denoting no other defect grades). A pipe segment with no defects would have a Quick Score of 0000 (all zeros).

The PACP Quick Rating provides the ability to summarize the number and severity of defects found within a pipe segment. As with the Pipe Rating, Quick Structural Ratings

are calculated using only Structural Defect Grades, and Quick O&M Ratings are calculated using only O&M Defect Grades.

The Quick Rating is an excellent screening tool to determine which pipe segments require closer scrutiny. If a pipe has not defects greater than Grade 1 or 2, then the pipe segment probably does not need any further investigation.

Pipe Ratings Index – This is an indicator of the distribution of defect severity. The Pipe Ratings Index is calculated by dividing the Pipe Rating by the number of defects. For example, the Structural Pipe Ratings Index would be the Structural Pipe Rating divided by the number of structural defects. Pipe Ratings Indexes are calculated for Structural, O&M, and Overall. A pipe segment with a Pipe Rating of zero (0) would have a Pipe Rating Index of zero (0).

Summary

The following procedures are used to calculate pipe segment ratings using the PACP Condition Grading System:

1. Determine the number of occurrences for each condition grade within the pipe segment. Calculate separately for Structural Defect Grades and O&M Defect Grades.
2. Calculate the Segment Grade Score by multiplying the number of occurrences by the respective grade 1 through 5. Calculate the Structural Segment Grade Score and the O&M Segment Grade Score separately, and then add together for the Overall Segment Grade Score.
3. Calculate the Pipe Rating for the pipe segment by adding the Segment Grade Scores. Add all five Structural Segment Grade Scores for the Structural Pipe Rating, and add all five O&M Segment Grade Scores for the O&M Pipe Rating. Add all five Overall Segment Grade Scores for the Overall Pipe Rating.
4. Determine the PACP Quick Rating by calculating the number of occurrences of the two highest severity grades.

5. Calculate the Pipe Ratings Index by dividing the Pipe Rating by the number of defects. If the pipe has no defects, the Pipe Ratings Index is zero.
6. Verify the PACP defect data used in accurate. The grading is a direct calculation from the defect data, and coding errors will be reflected in grading errors.

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
Structural	Crack (C)	Circumferential (C)		CC	1	
		Longitudinal (L)		CL	2	
		Multiple (M)		CM	3	
		Hinge (CH2)		CH2	4	
		Hinge (CH3)		CH3	5	
		Hinge (CH4)		CH4	5	
		Spiral (S)		CS	2	
Structural	Fracture (F)	Circumferential (C)		FC	2	
		Longitudinal (L)		FL	3	
		Multiple (M)		FM	4	
		Hinge (H2)		FH2	4	
		Hinge (H3)		FH3	5	
		Hinge (H4)		FH4	5	
		Spiral (S)		FS	3	
Structural	Pipe Failures (Silent)	Broken (B)		B	1 clock pos - 3, 2 clock pos - 4, >=3 clock pos - 5	
		Broken (B)	Soil Visible (SV)	BSV	5	
		Broken (B)	Void Visible (V V)	BVV	5	
		Hole (H)		H	1 clock pos - 3, 2 clock pos - 4, >= 3 clock pos - 5	
		Hole (H)	Soil Visible (SV)	HSV	5	
		Hole (H)	Void Visible (V V)	HVV	5	
Structural	Collapse (X)	Pipe (P)		XP	5	
		Brick (B)		XB	5	
Structural	Deformed (D)	(Pipe)		D	<=10% - 4,>10% - 5	
		(Brick)	Horizontally (H)	DH	5	
		(Brick)	Vertically (V)	DV	5	
Structural	Joint (J)	Offset (displaced) (O)	Med (M)	JOM	1	
			Large (L)	JOL	2	
		Separated (open) (S)	Med (M)	JSM	1	
			Large (L)	JSL	2	
		Angular (A)	Med (M)	JAM	1	
			Large (L)	JAL	2	
Structural	Surface Damage Chemical (S)	Roughness Increased (RI)	C	SRIC	1	
		Surface Spalling (SS)	C	SSSC	2	
		Aggregate Visible (AV)	C	SAVC	3	
		Aggregate Projecting (AP)	C	SAPC	3	
		Aggregate Missing (AM)	C	SAMC	4	

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Reinforcement Visible (RV)	C	SRVC	5	
		Reinforcement Projecting (RP)	C	SRPC	3	
		Reinforcement Corroded (RC)	C	SRCC	5	
		Missing Wall (MW)	C	SMWC	5	
		Other (Z)	C	SZC		
Structural	Surface Damage Mechanical (M)	Roughness Increased (RI)	M	SRIM	1	
		Surface Spalling (SS)	M	SSSM	2	
		Aggregate Visible (AV)	M	SAVM	3	
		Aggregate Projecting (AP)	M	SAPM	3	
		Aggregate Missing (AM)	M	SAMM	4	
		Reinforcement Visible (RV)	M	SRVM	5	
		Reinforcement Projecting (RP)	M	SRPM	3	
		Reinforcement Corroded (RC)	M	SRCM	5	
		Missing Wall (MW)	M	SMWM	5	
		Other (Z)	M	SZM	N/A	
Structural	Surface Damage Not Evident (Z)	Roughness Increased (RI)	Z	SRIZ	1	
		Surface Spalling (SS)	Z	SSSZ	2	
		Aggregate Visible (AV)	Z	SAVZ	3	
		Aggregate Projecting (AP)	Z	SAPZ	3	
		Aggregate Missing (AM)	Z	SAMZ	4	
		Reinforcement Visible (RV)	Z	SRVZ	5	
		Reinforcement Projecting (RP)	Z	SRPZ	3	
		Reinforcement Corroded (RC)	Z	SRCZ	5	
		Missing Wall (MW)	Z	SMWZ	5	
		Other (Z)	Z	SZZ	N/A	
Structural	Surface Damage (Metal Pipes)	Corrosion (CP)		SCP	3	
Structural	Lining Features (LF)	Detached (D)		LFD	3	
		Defective End (DE)		LFDE	3	
		Blistered (B)		LFB	3	
		Service Cut Shifted (CS)		LFCS	3	
		Abandoned Connection (AC)		LFAC		
		Overcut Service (OC)		LFOC	3	
		Undercut Service (UC)		LFUC	3	
		Buckled (BK)		LFBK	3	
		Annular Space (AS)		LFAS	3	
		Bulges (BU)		LFBU	3	
		Discoloration (DC)		LFDC	3	
		Delamination (DL)		LFDL	3	
		Pinholes (PH)		LFPH	3	
		Resin Slug (RS)		LFRS	3	
		Wrinkled (W)		LFW	3	
		Other (Z)		LFZ	N/A	
Structural	Weld Failure (WF)	Circumfrential (C)		WFC	2	
		Longitudinal (L)		WFL	2	

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Multiple (M)		WFM	3	
		Spiral (S)		WFS	2	
Structural	Point Repair (RP)	Localized Pipeliner (L)		RPL		
		Localized Pipeliner (L)	Defective (D)	RPLD	4	
		Patch Repair (P)		RPP		
		Patch Repair (P)	Defective (D)	RPPD	4	
		Pipe Replaced (R)		RPR		
		Pipe Replaced (R)	Defective (D)	RPRD	4	
		Other (Z)		RPZ		
		Other (Z)	Defective (D)	RPZD		
Structural	Brickwork (Silent)	Displaced (DB)		DB	3	
		Missing (MB)		MB	4	
		Dropped Invert (DI)		DI	5	
		Missing Mortar	Small	MMS	2	
			Medium	MMM	3	
			Large	MML	3	
O&M	Deposits (D)	Deposits Attached (DA)	Encrustation (E)	DAE		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Grease (G)	DAGS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Ragging (R)	DAR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Other (Z)	DAZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Deposits Settled (DS)	Hard/Compacted (C)	DSC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Fine silt/sand (F)	DSF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Gravel (G)	DSGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Other (Z)	DSZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Deposits Ingress (DN)	Fine silt/sand (F)	DNF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Gravel (GV)	DNGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
			Other (Z)	DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connecfion (C)	RFC		1
	Roots (R) at a Joint		N/A	RFJ	in software with a J	1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connecfion (C)	RTC		2
	Roots (R) at a Joint		N/A	RTJ		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connecfion (C)	RMC		3
	Roots (R) at a Joint		N/A	RMJ		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connecfion (C)	RBC		4
	Roots (R) at a Joint		N/A	RBJ		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
		Stain (S)		IS		
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Intruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		External Pipe or Cable In Sewer (P)		OBP		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Built Into Structure (S)		OBS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Construction Debris (N)		OBN		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Rocks (R)		OBR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other Objects (Z)		OBZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Vermin (V)	Rat (R)		VR		2
		Cockroach (C)		VC		1
		Other (Z)		VZ		1
O&M	Grout Test and Seal (G)	Grout Test Pass (GTP)				
			Joint (J)	GTPJ		
			Lateral (L)	GTPL		
		Grout Test Fail (GTF)				
			Joint (J)	GTFJ		
			Lateral (L)	GTFL		
		Grout Test Unable to Test (GTU)				
			Joint (J)	GTUJ		
			Lateral (L)	GTUL		
		Grout at a Location (not a joint) (GRT)		GRT		
Construction Features	Tap (T)	Factory Made (F)		TF		
			Capped (C)	TFC		
			Abandoned (B)	TFB		
			Defective (D)	TFD		2
			Intruding (I)	TFI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TFA		
		Break-In/Hammer (B)		TB		
			Capped (C)	TBC		2
			Abandoned (B)	TBB		
			Defective (D)	TBD		3
			Intruding (I)	TBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TBA		
		Saddle (S)		TS		
			Capped (C)	TSC		
			Abandoned (B)	TSB		

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
			Defective (D)	TSD		2
			Intruding (I)	TSI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TSA		
		Rehabilitated (R)		TR		
			Defective (D)	TRD		2
			Intruding (I)	TRI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Intruding Seal Material (IS)			IS		
		Sealing Ring (SR)		ISSR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Hanging (H)	ISSRH		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Broken (B)	ISSRB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Loose, Poorly Fitting (SRL)		ISSRL		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Grout (GT)		ISGT		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other (Z)		ISZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Line (L)	Left (L)		LL		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Up (LU)		LLU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Down (LD)		LLD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right (R)		LR		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Right/Up (RU)		LRU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right/Down (RD)		LRD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Up (U)		LU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Down (D)		LD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
Construction	Access Points (A)					
		Cleanout (CO)		ACO		
			Mainline (M)	ACOM		
			Property (P)	ACOP		
			House (H)	ACOH		
		Discharge Point (DP)		ADP		
		Junction Box (JB)		AJB		
		Meter (M)		AM		
		Manhole (MH)		AMH		
		Other Special Chamber (OC)		AOC		
		Tee Connection (TC)		ATC		
		WW Access Device (WA)		AWA		
		Wet Well (WW)		AWW		
		Catch Basin (CB)		ACB		
		End of Pipe (EP)		AEP		
Other	Miscellaneous (M)	Camera Underwater (CU)		MCU		4
		Dimension/Diam/Shape Change (SC)		MSC		
		General Observation (GO)		MGO		
		General Photograph (GP)		MGP		
		Material Change (MC)		MMC		
		Lining Change (LC)		MLC		
		Pipe Joint Length Change (JL)		MJL		
		Survey Abandoned (SA)		MSA		
		Water Level (WL)		MWL		
			Sag (S)	MWLS	<=30% - 2, <=50% - 3, >50% - 4	
		Water Mark (WM)		MWM		>=50% 4, >=75% 5
		Dye Test (Y)		MY		
			Visible (V)	MYV		5
			Not Visible (N)	MYN		3

Reasons for TV Inspection

We televise sewers for many different purposes, some of those purposes are:

- **Routine Operational Requirements** – Pro-active inspection to identify potential failures and for planning routine Operation and Management (O&M) and renovation programs.
- **Troubleshooting** – Investigation of problem incidents to select remedial action.
- **Compliance with Mandated Programs** – Inspection and data collection to support programs such as Capacity, Management, Operations and Maintenance (C-MOM) and Administrative Orders (AOs), Governmental Accounting Standards Board statement 34 (GASB-34), and Consent Decrees.
- **Acceptance Testing** – Inspection of new or renewed sewers to insure that construction met specifications and to document as-built conditions.
- **Infiltration/Inflow (I/I) or Capital Improvement Program (CIP) Projects** – Examples of the type projects normally conducted by specialty firms or engineering consultants.

Regardless of what purpose we televise sewers, it is important that TV inspection data is collected thoroughly and consistently. This approach insures better and more comprehensive data is collected, and will provide opportunities for a single TV inspection to serve multiple purposes. While obtaining a limited amount of information may meet the immediate data needs, it also means the information obtained as part of a comprehensive PACP inspection will not be available for other possible requirements in the future.

What We Need from TV Inspection Data

The basic information we need from TV inspection is as follows:

- Record and archive all descriptive data using standard procedures and data format
- Develop a condition rating for each line
- Provide follow-up recommendations
- Display results on a map
- Establish benchmarks to compare with future inspections of same line

Standardizing on the PACP codes as well as integration with other components of the PACP will meet the above objectives.

Why Standardization is Important

Some the benefits of standardization are as follows:

- Allows for more effort to be placed on consistency of data and utilization of data rather than development of utility-specific or project-specific standards
- Provides the capability of benchmarking sewers within a single utility as well as from one geographical area of the US to another
- Ability to detect change due to deterioration over time
- Provides better opportunities for integrating data from different software programs
- Improved confidence in the description of pipe conditions will provide cost savings during renewal
- Advances the professionalism of the TV inspection industry

Origin of Condition Codes

WRc first drafted the Manual of Sewer Condition Classification (MSCC) in 1980 for use in the United Kingdom. At that time, consistent assessment of sewer condition was needed in order to fairly set sewer rates charged to consumers by the private utility companies that operated throughout the UK, and those codes are now the mandated standard. The MSCC was most recently updated by WRc in 2004 (MSCC Fourth Edition) and are used extensively throughout the world. Other WRc-based coding systems have been implemented throughout the world including Australia, New Zealand, Southeast Asia, and Europe.

The PACP codes were developed by NASSCO and the Water Research Centre (WRc) in 2002. Prior to the development of the PACP, no standard TV inspection codes or procedures existed in the United States. While many agencies and engineering firms in the US used adaptations of the WRc codes, no single standard existed, nor was a standard training and certification program available.

Those familiar with the WRc codes will find the PACP codes very similar. Terminology has been changed to reflect terms used in the United States. Codes have been added to describe conditions found in renewed pipes and point repairs. The ability to describe pipe corrosion has been greatly improved. Coding of Operational and Maintenance problems in general has been improved. Codes have been added to describe observations and defects that otherwise would be noted in the remarks or comment section.

Contact
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778-844-0133

2022 Budget - Capital Supplemental Item

Title:	Sewer System Repairs	**Environmental Services**
Division:	Sewer	**Harper Imperial Sewer - 605**
Type:	Capital - Replacement	**High**

Description

These capital repairs are based on identified defects found in the 2021 Condition Assessment by McElhanney. The repairs/replacements include five sections of sewer pipe and nine manholes and lift station electrical.

Benefits

The capital works will support the the ongoing integrity and functionality of the asset by maintaining its service life.

Risks

Further repairs or upgrades may be identified during the course of contruction.

Financial Information

Capital

Funding Sources	2022	2023	2024	2025	2026	5 Year Total
Area D Gas Tax	264,200					264,200
						0
						0
	264,200	**0**	**0**	**0**	**0**	**264,200**

Expenses	2022	2023	2024	2025	2026	5 Year Total
Manhole repairs - infrastructure	9,000					9,000
Sewer line repairs - infrastructure	207,000					207,000
Lift station repairs	18,200					18,200
Construction oversight	30,000					30,000
						0
						0
						0
						0
	264,200	**0**	**0**	**0**	**0**	**264,200**

Administration

Author: Daris Gillis **Date Prepared: November 5, 2021**

Approval Date

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ENV-RBAC-036

From: Daris Gillis, Environmental Services Manager — Date: November 25, 2021

Subject: Function 602 - Chilton Sewer Condition Assessment & Capital Request

RECOMMENDATION #1:

That the Rural Budgets Administration Committee approve the supplementary request of $186,190 payable from the Area D Community Works Gas Tax fund, to be issued to the Function 602 - Chilton Sewer, as outlined in the 2021 Chilton Sewer Condition Assessment.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee allocate $20,000 from Area D Fair Share to be transferred into the capital reserve for Function 602 - Chilton Sewer in the 2022 budget.

BACKGROUND/RATIONALE:

The Chilton Sewer Collection system was constructed in 2001, and consists of a lift station, and approximately 1 km of sanitary sewer pipe and associated manholes. The sanitary system conveys flow from the Chilton subdivision to the lift station and then conveys flow to the City of Dawson Creek's infrastructure.

Aligning with the current Regional Board Strategic Plan, a condition assessment of the Chilton Sewer Collection system was conducted in 2021. The scope of the assessment was to determine the current condition and remaining service life of the system, and to identify system repairs along with associated costs. The Chilton system is estimated to have over 30 years of remaining service life with proper maintenance and repairs. The cost for total replacement of the collection system based on 2021 dollars is $928,800.

Table 1 highlights the areas within the system that will require immediate repairs in order to maintain proper functioning of the collection system. Cost estimates have been built with a 30% contingency.

Table 1. Estimated Cost of Repairs and Maintenance for 2022.

Repairs/Immediate Maintenance	Estimated Cost of Repairs/Replacement
Lift Station	$ 32,690
Pipes	$ 91,000
Manholes	$ 32,500
Construction Oversight	$ 30,000
Total:	**$ 186,190**

A supplemental capital request form is attached for the Committee's consideration.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

  ☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATION(S):

As of October 31, 2021 the balance available after the remaining commitments in Electoral Area D are as follows:

- Peace River Agreement: $592,594.35,
- Gas Tax Reserve fund: $1,238,444.68, and
- Fair Share Reserve fund: $1,854,311.67.

COMMUNICATIONS CONSIDERATION(S):

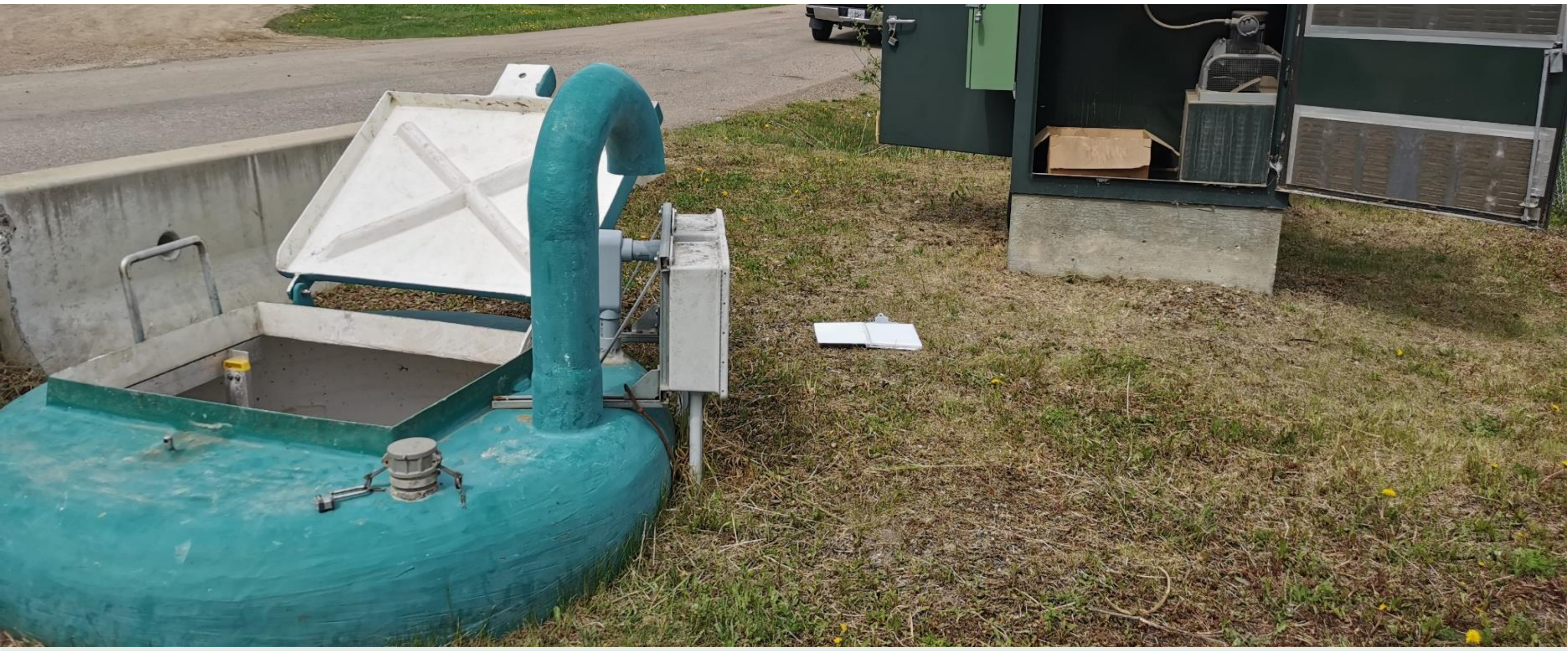
None at this time.

OTHER CONSIDERATION(S):

Staff recommend the establishment of a user fee bylaw to supplement the operational costs for preventative maintenance and repairs of pumps, manholes and sewer lines. Preventative maintenance will support the asset service life.

Attachments:

1. 2021 Chilton Sewer Condition Assessment
2. 2022 Chilton Sewer Capital Request Form



Peace River Regional District Chilton Assessment

October 29, 2021 | Revision 0

Submitted to: Peace River Regional District
Prepared by: McElhanney Ltd.

Contact
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Prepared by
Jun Xiong, P.Eng.

Reviewed by
Larry Sawchyn, P.Eng.

Our file: 3111-26522-00-CIV-RPT-001

Your Challenge.
Our Passion.

Our File: 3111-26522-00-CIV-RPT-001

October 29, 2021

Peace River Regional District
1981 Alaska Avenue
Dawson Creek, BC V1G 4H8

Peace River Regional District Chilton Assessments

McElhanney performed an inspection of the Chilton lift station to determine the condition and maintenance required to improve operations. The lift station pumps require frequent servicing, and the potential capacity of the lift station is negatively affected by some maintenance issues. Despite this, the lift station has adequate capacity for the community it serves; therefore, we recommend maintaining the current design operation and performing maintenance to prolong the service life of the lift station and to reduce the required future maintenance effort and cost. McElhanney recommends completing some preliminary repairs as soon as possible, with an estimated cost of $27,690, in order to improve the lift station's systems. There is also a need identified to study the upgrade to 3-phase power. Within the next 3 years, additional maintenance for the piping, pumps, and power supply will be required at consecutive phases, with an estimated cost of $111,500.

McElhanney performed CCTV inspection on approximately 1.2 kilometres of sanitary gravity sewer. We found that the gravity sewer was generally in fair condition, with an estimated 30+ years of service remaining. There are some repairs required to eliminate some sags in the sewer that may accelerate pipe deterioration and to replace existing cleanouts with manholes; the repairs required have an estimated cost of $123,500. Long-term, the pipes should be flushed and reinspected every 5 to 10 years to continuously monitor structural stability. Since replacing the pipe will occur at some point in the future, a precise cost cannot be provided; however, the 2021 replacement cost for the gravity sewer system is an estimated $928,800.

Sincerely,
McElhanney Ltd.

[redacted]

PERMIT TO PRACTICE
McElhanney Ltd.
PERMIT NUMBER: 1003299
Engineers and Geoscientists of BC

Justin Todd, P.Eng.
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Contents

Figures

Tables

Appendices

1. Introduction

As part of its 2021 operations and maintenance plan, the Peace River Regional District (PRRD) contracted McElhanney Ltd. (McElhanney) to conduct a condition assessment of the Chilton subdivision sanitary sewer system, including the lift station and associated infrastructure. Located in the City of Dawson Creek (the City), the Chilton subdivision sanitary sewer system conveys flows through the City's system leading to their wastewater treatment facility. The goal of the assessment was to determine the current condition and remaining service life and to identify required system repairs and upgrades.

1.1. BACKGROUND

The Chilton subdivision was originally constructed in 2001, with approximately 1km of sanitary sewer main of 150mm to 200mm SDR35 PVC gravity main and a 100mm DR26 HDPE forcemain from the lift station to its outfall on 20th Street. A map of the area is provided in *Figure 1*.

Figure 1: Map of the Chilton Gravity Sanitary Sewer Network

The gravity main pipe is sloped at 1.5% to 2.5%. The sanitary sewer was generally constructed in the boulevard outside of the roadway, with an as-constructed cross-section as shown in *Figure 2.* Based on the as-built drawings, the pipe bedding was generally Class "B" bedding consisting of fine granular material (sand and gravel) above and below the pipe and compacted to 95% SPD.

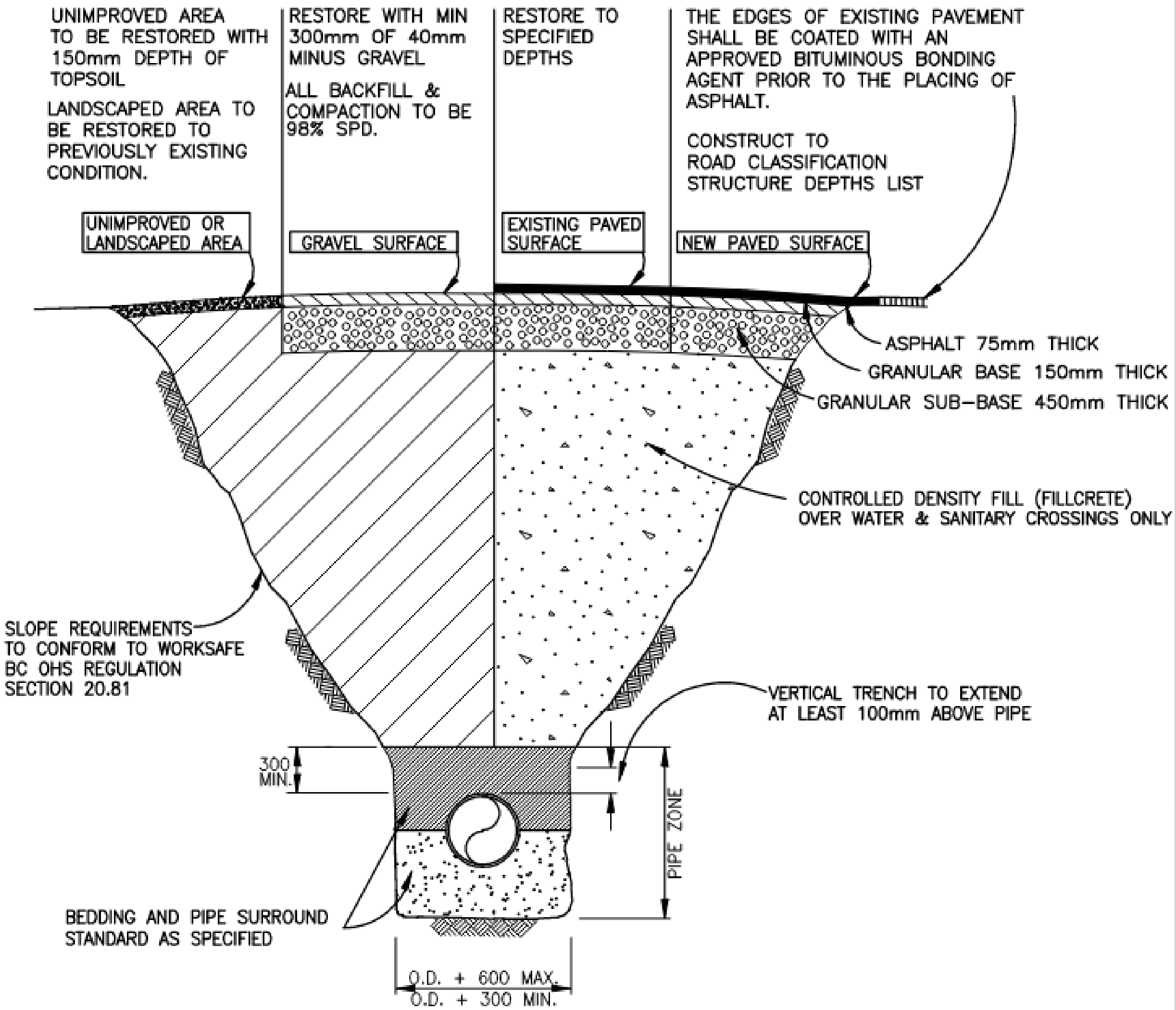

Figure 2: Typical Trench Detail for Chilton Subdivision Sewer Installation

2. Lift Station Assessment

The Chilton subdivision lift station (*Figure 3*), located along Patrick Drive, is fed by approximately 1180m of 200mm diameter PVC gravity sanitary pipe. It was commissioned in 2001 and lifts sanitary waste to a gravity manhole approximately 375m downstream on 20th Street via a 100mm DR 26 HDPE forcemain. There are no other services or connections between these two points. The lift station assessment summarizes the findings and recommendations for the infrastructure.

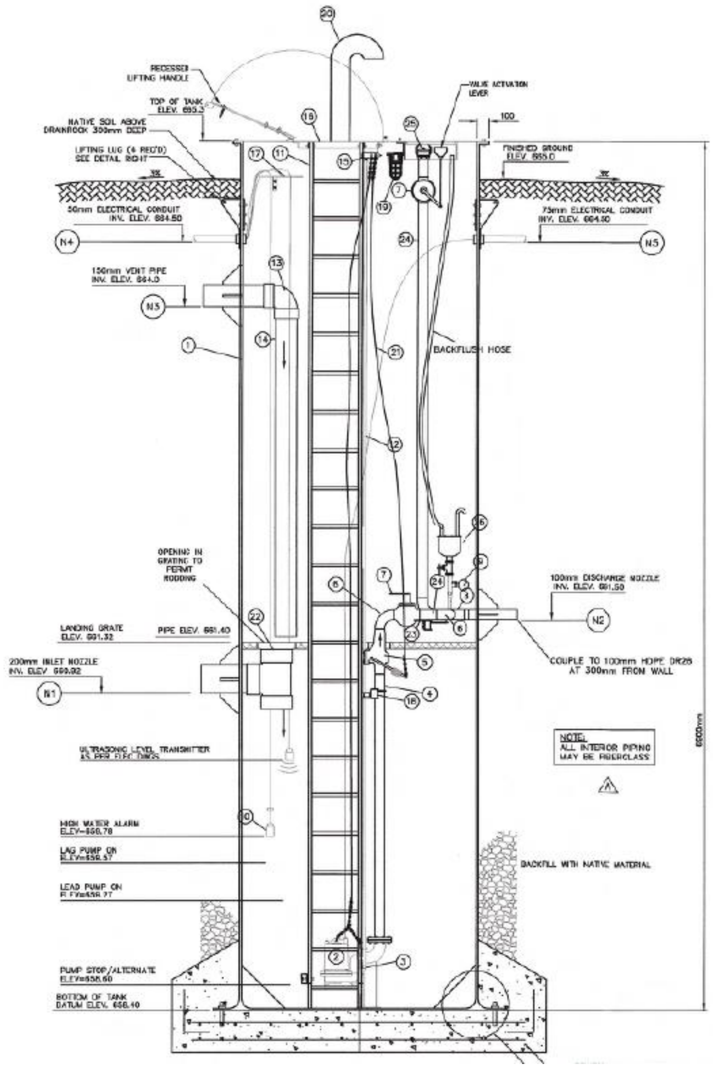

Figure 3: Chilton Lift Station General Arrangement

2.1. INSPECTION

McElhanney, along with PRRD representatives, conducted a site inspection from May 31 to June 2, 2021, to assess the existing conditions for the Chilton subdivision lift station. The site allows drive-up access, with jersey barriers positioned to protect the wet well and kiosk.

The inspection included a general visual inspection of all components, verification of installed pump type, and a drawdown test. The physical integrity of the lift station was found to be generally acceptable. The following sections will detail the findings for specific lift station components.

2.1.1. Wet Well

The wet well was found to be in good condition, without damage to the fibreglass surface. Operations staff reported no wet well leakage, nor was any observed during the inspection. Considerable rust was visible on the galvanized steel pipes and their flanges (*Figure 4*). The check valves, plug valves, and air release valve (*Figure 5*) within the wet well had no reported issues nor were any extraordinary observations reported by the staff.

Figure 4: Rusted Pipe and Flange in the Wet Well

EQUIPMENT SPECIFICATION

ITEM	DESCRIPTION
1.	1800mm DIA X 6900mm DEEP FIBERGLASS PUMP STATION C/W FIBERGLASS ENCAPSULATED STEEL ANTIFLOTATION COLLAR AND FIBERGLASS SUMP. (SEE DETAIL FOR DIMENSIONS)
2.	SUBMERSIBLE PUMP CAPABLE OF PUMPING 5.0 l/s @ 10.3m TDH. 2 FLYGT PUMPS, OR APPROVED EQUAL – 230/1/60 c/w CABLES.
3.	LIFT–OUT RAIL ASSEMBLY C/W 100mm THREADED DISCHARGE ELBOW. (EPOXY COATED)
4.	100mm VIC x FL SCH 40 STEEL SPOOL
5.	100mm VICTAULIC SWING CHECK VALVE C/W OUTSIDE LEVER AND WEIGHT
6.	100mm VICTAULIC SHORT RADIUS 90° ELBOW
7.	100mm VICTAULIC PLUG VALVE
8.	VICTAULIC CROSS – 75X100X100X100 mm
9.	12mm WELDOLET FITTING, SCH 40 STEEL PIPE, BALL VALVE AND NIPPLE FOR PRESSURE GAUGE – ALL THREADED. RANGE 0–30 PSI
10.	LEVEL CONTROL FLOAT (TYP.)
11.	ALUMINUM LADDER
12.	19mm DIA. SCH. 40 GALVANIZED GUIDE RAILS
13.	150mm SCH 40 PVC 90° ELBOW
14.	150mm SCH 40 PVC PIPE FOR VENTALATION FASTENED TO 23
15.	UPPER GUIDE RAIL SUPPORT
16.	STEEL STATION COVER FABRICATED FROM 9mm ASTM A-36 PLATE EPOXY COATED GREEN C/W ACCESS TO BOTH PUMPS.
17.	GALVANIZED FLOAT SUPPORT BRACKET
18.	INTERMEDIATE GUIDE RAIL SUPPORT (GALVANIZED)
19.	EXPLOSION PROOF 150 WATT CEILING MOUNTED LIGHT FIXTURE
20.	150mmø SCH. 40 STEEL GOOSENECK c/w 6mm OPENING GALVANIZED MESH SCREEN
21.	SS CABLE TO ACTIVATE CHECK VALVE LEVER FOR BACKFLUSHING
22.	200mm DR35 PVC TEE
23.	75 mm ALUMINUM ANGLE FOR DISCHARGE SUPPORT ACROSS ENTIRE TANK
24.	75mm VICTAULIC SPOOL TO FIT
25.	CAM–LOCK COUPLER 100mm HOSE CONNECTION WITH DUST CAP
26.	50mm AIR RELEASE VALVE C/W ISOLATION VALVE, THREADED

Figure 5: Lift Station Equipment List

It was observed that there is no inflow shutoff valve or outflow shutoff valve. Influent shutoff is useful for entry or inspection within the wet well; however, it is not recommended unless frequent work within the barrel is expected. In the event entry is required in the future, it is possible to utilize a temporary inflatable plug installed in the upstream manhole to gain access for a detailed inspection. This report notes the lack of isolation as a potential deficiency; however, long-term upgrade is not recommended based on limited reported issues with entry. The PRRD may consider the value of adding isolation valves at a later date if the station requires more cleaning or inspection than is currently the case.

The fixtures inside the barrel, such as the ladder, rails, grate, and chains, appeared to be in good condition and no damage was observed. The light bulb was broken; this is discussed in Electrical Control

Systems (*Section 2.2*). The hinge connection of the hatch door is loose and paint is spalling (*Figure 6*). Repair is necessary before the hatch door fails.

Figure 6: Anchor of Hatch Door Requires Tightening

2.1.2. Pumps

The Chilton subdivision lift station has two pumps installed with one operating and the other as a standby. During extremely high flows, both will work in unison. A shelf spare third pump is available to replace either installed pump for preventative maintenance or in the event of failure. PRRD staff informed McElhanney that one pump is removed for servicing every four (4) months; each pump runs for eight (8) consecutive months between servicing. Since commissioning in 2001, one additional pump was purchased for the lift station in 2019.

The review of the lift station documentation revealed that the installed pump is a Myers/Barnes; however, the record drawings from the contractor shows a Flygt pump (*Figure 7*). The O&M manuals are correct; thus, this is not likely to cause confusion. The documentation will be updated once the pumps are updated in 3 to 5 years; immediate changes are not recommended.

ITEM	DESCRIPTION
1.	1800mm DIA X 6900mm DEEP FIBERGLASS PUMP STATION C/W FIBERGLASS ENCAPSULATED STEEL ANTIFLOTATION COLLAR AND FIBREGLASS SUMP. (SEE DETAIL FOR DIMENSIONS)
2.	SUBMERSIBLE PUMP CAPABLE OF PUMPING 5.0 l/s @ 10.3m TDH. 2 FLYGT PUMPS, OR APPROVED EQUAL – 230/1/60 c/w CABLES.
3.	LIFT-OUT RAIL ASSEMBLY C/W 100mm THREADED DISCHARGE ELBOW. (EPOXY COATED)
4.	100mm VIC x FL SCH 40 STEEL SPOOL
5.	100mm VICTAULIC SWING CHECK VALVE C/W OUTSIDE LEVER

Figure 7: Myers/Barnes Pump Installed

PRRD Operations staff informed McElhanney that the pumps require frequent service or repair due to solids entering the system. Two of the pumps were removed for repair in early July due to excessive solids (rags) entering the pumps. This resulted in issues starting the pumps and Operations reported that this is a common issue for this station. No issues were reported for any other mechanical components and fittings.

A recommendation from the lift station supplier (Engineered Pump Systems Ltd.) was to upgrade the drive power supply to 3-phase power and upgrade the pumps. Pumps running on 3-phase power have greater torque than the current single-phase pumping system. The lower torque pumps typically cannot overcome additional resistance caused by entrained solids. The pumps are within 5 years of their theoretical end of life. Upgrades to electrical to 3-phase power would limit the issue (if possible, which can be verified in an electrical supply study). If the pumps are replaced, the system controller would also be replaced and should include an hour meter.

The base of the lift station barrel is vacuum cleaned every six (6) months to remove debris and sediment and the station is inspected by PRRD staff approximately three (3) times per month or when a system alarm is triggered.

A drawdown test was conducted during the site inspection. The test revealed that the pumps are not performing to specification; the average flow rate was 5.5L/s, which is lower than expected based on the relevant pump curve (expected flow rate would be 9.5L/s). The pressure gauge (*Figure 5*, item 9) was removed prior to the inspection; therefore, a dead-head test was not conducted to confirm shut in pressure. It was noted that the gauge connection was severely corroded; thus, a gauge could not be connected.

The current pumping system is providing sufficient capacity for the area serviced. A theoretical analysis of the pump / forcemain performance based on PRRD record drawings and the pump curve shows a difference in actual performance compared to theoretical. This may be due to wear of the pump impeller, flow restriction in the forcemain or a combination of both.

To evaluate the pump, the Myers pump curve was used (*Figure 8*):

i. Point 1 is the design performance of the pump: 9.46L/s (150 USGPM) with design head at 12.2m (40ft).

ii. Point 2 shows the theoretical total head of 8.5m (28ft) required for the system as calculated using the Hazen-Williams equation according to the line record drawings based on the design flowrate: 9.46l/s (150 USGPM).

iii. Point 3 is the anticipated total head of 13.1m (43ft) of the pump according to the pump curve when pumping at the field recorded flowrate from the drawdown test: 5.5L/s (87 USGPM).

iv. Point 4 is the theoretical total head required by the system as calculated using the Hazen-Williams equation according to the line record drawings based on the flowrate obtained from the drawdown test: 5.5L/s (87 USGPM) with total head at 5.8m (19ft).

Myers Model 4V/4VX Hazardous Solids Handling Pump Curve

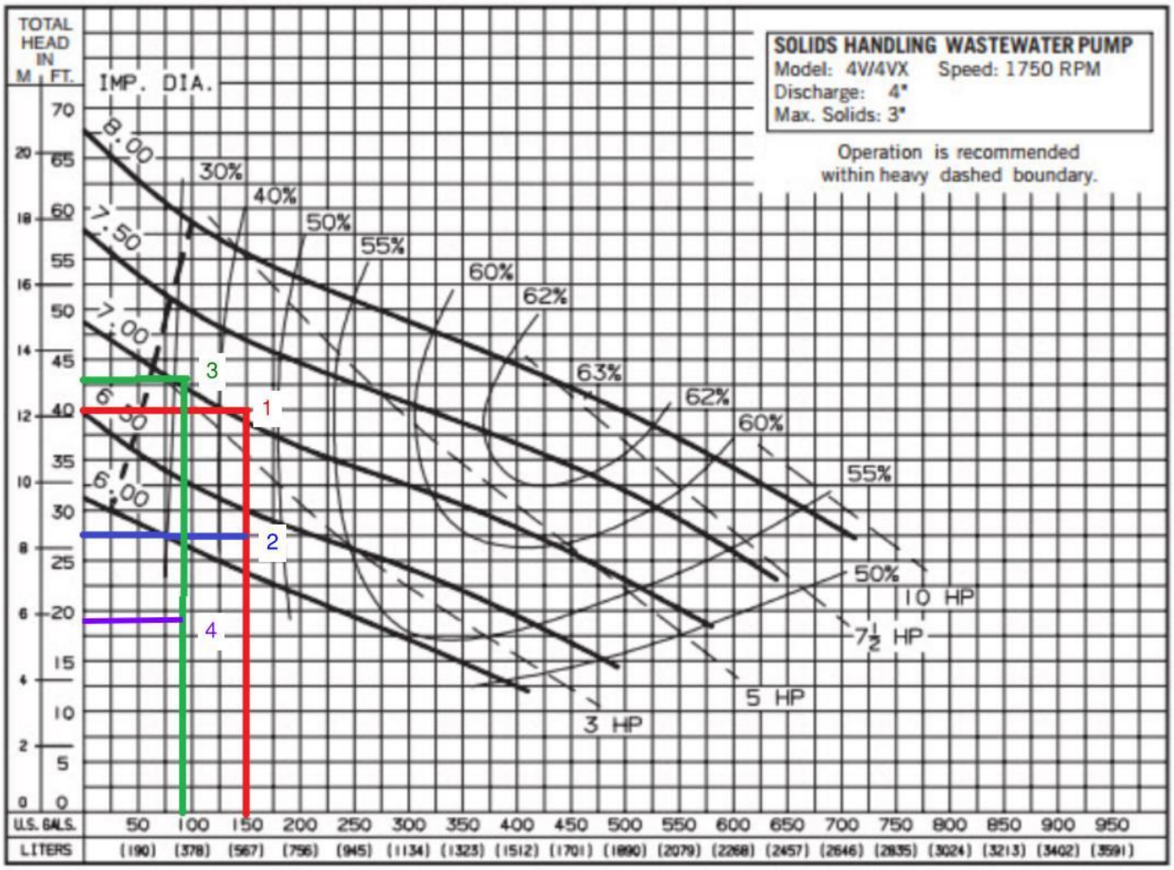

Figure 8: Pump Curve Comparison – Chilton Lift Station

The total pressure head gap between points 3 and 4 and the performance gap between points 1 and 4 could be caused by:

i. Increased roughness inside the pipe due to rust and spalling which increases flow restriction.

ii. Wear on the impeller (according to the PRRD staff who performed regular maintenance on the pump, the two original pump impellers had signs of significant wear and had been trimmed in the past).

iii. Sediment accumulation in the pipe, which would increase flow resistance and result in reduced flow area within the pipe (see *Section 3.3* for recommendations for on-going maintenance for the sewer pipe).

The above observations and analysis are presented primarily to address the observed system performance compared to the design information. The pumps are providing adequate service and upgrades to the electrical drive to limit stoppage during plugging appears to be the more pressing issue.

At the current flow rate, the water velocity in the outlet pipe is 0.63m/s; the recommended self-cleaning flow velocity is 1m/s. However, with smaller systems, having a larger diameter line is an acceptable approach as it is less vulnerable to plugging.

2.1.3. Additional Observations

On the morning of June 1, 2021, PRRD staff arrived on site and noticed the system alarm with the pump locked out due to over-heating. Further investigation revealed that one of the relay contacts had malfunctioned, burnt out the capacitor and prevented the pump from stopping at low liquid levels. The SCADA system alarm is monitored by City staff, who were sent the alarm at approximately 11 pm the previous day, but the information was not forwarded to the PRRD Operations staff for response.

Operations staff were able to replace the burnt capacitor and relay and no other issues were reported to McElhanney; therefore, this report assumes no further direct action for this item is required. However, communication protocols between the City and the PRRD should be addressed to ensure those directly involved with maintaining the lift station are alerted immediately to prevent any lag in addressing alarms.

2.2. ELECTRICAL CONTROL SYSTEMS

The lift station and pumps are controlled and automated by an electrical control unit, built approximately 3m north of the wet well. The unit is contained within a metal cabinet and is placed on a concrete base. The primary controls appear to be relay-based logic and were installed in 2001. A Programable Logic Control (PLC) was added for communications in 2009 but does not appear to replace the existing relay-based logic. A ventilation fan is also connected and controlled by a switch on the north side of the PLC unit.

At the time of field assessment, the LED display screen and alarms on the PLC panel were showing normal status for the pumps and liquid level. The pump starters appear to be in good condition. Manual control was used during drawdown tests and appeared to be functioning well.

The site pictures appear to show the conduit penetrations routed to external junction boxes containing EYS seals to prevent sewer gas escape. The wiring and connections in the external junction boxes are in good condition, with the power wiring clearly labelled. It was noted that the explosion-proof fixture (the light bulb) is damaged and is an immediate hazard (*Figure 9*). McElhanney recommends repair as soon as possible.

Figure 9: Damaged Explosion Proof Fixture (Light Bulb)

An unused residential grade ethernet switch was found lying at the base of the electrical cabinet (*Figure 10*). Decommissioned equipment should be removed to ensure staff do not think the system is operational.

Figure 10: Un-used Ethernet Switch

There appears to be a directional antenna installed on the wood pole with the incoming service and meter (*Figure 11*). This cable has been improperly installed and does not meet current electrical code. The antenna cabling should be replaced with a code-compliant installation.

Figure 11: Antenna and Improperly Installed Cable

McElhanney noticed that the running hours of the pump shown on the PLC panel were not updated when the service pump was switched. A pump log with updated running time after each switch would help determine the current condition and remaining life of the pumps. This will be reviewed in Recommendations (*Section 2.5)*.

2.3. ELECTRICAL POWER DISTRIBUTION SYSTEMS

The power breaker panel is located inside the cabinet next to the PCL panel (*Figure 12*). Federal Pioneer breakers are a known fire hazard and do not operate correctly under some conditions. This panel and all associated circuit breakers should be replaced with a currently available panelboard.

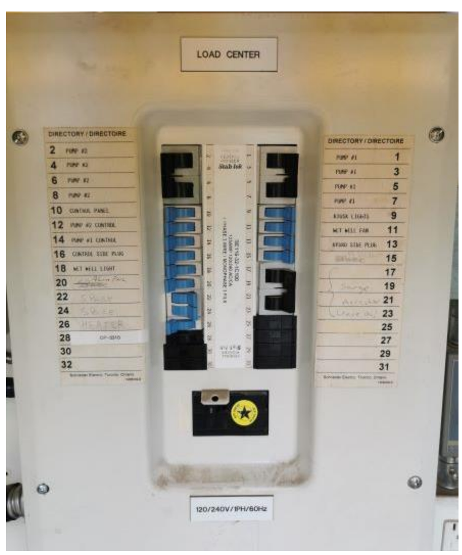

Figure 12: Electrical Panel with Federal Pioneer Breakers

On the west side of the cabinet, cable connections and junction boxes of the electrical components were mounted on the wall at the back of the control panels. At the bottom of the cabinet, a residential grade computer Uninterrupted Power Supply (UPS) is used for backup power (*Figure 13*). There is no monitoring of this UPS system, which could fail at any point. In addition, it may not provide proper equipment protection compared to a UPS suitable for this type of installation (i.e. Liebert GXT5 series or Eaton Powerware 9SX series). Replacement with a municipal quality UPS is recommended.

Figure 13: Residential Grade UPS

On the cabinet exterior, a manual transfer switch is installed with a pin and sleeve connector to allow connection to a portable generator. There is an overhead service coming to a wood pole with the service meter installed on it, which then transitions to underground to feed the manual transfer switch.

As described in *Section 2.1.3*, the capacitors in the power factor correction cabinet appear to have experienced catastrophic failure in the past and have been replaced (*Figure 14*). Based on the age of the facility and the previous capacitor failure, it is anticipated that another failure is likely. A surge protector should be installed to avoid re-occurrence.

Figure 14: Capacitor Cabinet with Burn Mark

2.4. AUXILIARY SYSTEMS

At the bottom of the cabinet on the back side of the control panels (west side), there is a plug-in ceramic heater used to maintain temperature in the cabinet (*Figure 15*). This is a fire hazard as the heater could be placed in front of flammable material or fall over. It should be replaced with a properly sized and installed heating unit.

Figure 15: Plug-in Ceramic Heater

2.5. SUMMARY & PROPOSED UPGRADES

Problems with the lift station electrical control components and pumps required frequent service and repairs and were not performing to the design. The capacity and safety of the lift station were negatively affected by the issues described above. Nevertheless, the flow demand from the community it serves has been met and there is no planned future expansion. Our recommendation is to maintain the current design operation and prolong the service life of the lift station and to reduce the required maintenance effort and cost.

2.5.1. Recommended Upgrades and Actions

To define a standard to prioritize the upgrade, we have utilized the following asset condition classification schema.

Table 1: Asset Condition Classification Schema

Classification	Definition
A Adequate	High level of confidence feature will perform well under operating conditions. Limited probability degraded conditions will impact service.
B Probably Adequate	Low level of confidence feature will perform well under operating conditions. System may not meet industry standards. Feature may require additional investigation to confirm adequacy. Low probability degraded condition will impact service.
C Probably Inadequate	Low level of confidence feature will meet current industry standards. Moderate probability degraded conditions will impact service.
D Inadequate	High level of confidence feature will not perform well under operating conditions. Signs of distress and deterioration. Deficiency in features serious enough to impact service. High probability degraded conditions will result in impact to service.
F Failed	Feature has failed.

Based on asset condition definitions listed above, *Table 2* assesses the upgrades recommended for 2021 and 2022.

Table 2: Recommended Scope of Work to be Completed in 2021-2022

Recommended Upgrade	Cost	Class	Priority	Rationale
Update SCADA programing/call out protocol	$5,000	D	High	Current SCADA system sends alarm signals to City staff who are to forward to PRRD staff. The delayed response is a high risk to lift station safety and jeopardizes robust service for the drainage area.
Replace damaged explosion-proof fixture	$1,500	F	High	Current light bulb is damaged. See *Section 2.2* and *Figure 9*.
Replace breaker panels	$5,000	C	Medium	Panels are not ideal for intended service and should be replaced. See *Section 2.3*.
Replace UPS	$3,000	C	Medium	Municipal infrastructure quality equipment should be used. See *Section 2.3*.
Install surge protector	$5,000	C	Medium	The PRRD has experienced power outrage many times in the past and the capacitor units appear to have experienced catastrophic failure in the past. Install a surge protector to significantly reduce the risk for connected electrical components. See *Section 2.3*.
Reinstall cabling for antenna	$500	D	High	Cable does not meet electrical standard. See *Section 2.2*.
Install a proper heating unit	$500	D	High	The current heater is a fire hazard. See *Section 2.4*.
Remove un-used ethernet switch	Nil	B	Medium	See *Section 2.4*.
Tighten hinge support of hatch door	$200	A	Low	See *Section 2.1.1*.
Reinstall Pressure Gauge	$600	A	Low	See *Section 2.1.2*.
Contingency (30%)	$6,390			
2021 Total	**$27,690**			

Table 3: Recommended Scope of Work to be Completed within Three (3) Years

Recommended Upgrade	Cost	Class	Priority	Rational
Replace steel piping, fittings, flanges, and valves	$32,250	B	Medium	Significant corrosion and spalling of paint on the surface and most parts; has reached the end of its design life according to ISC's guideline.
Replace two pumps that were purchased in 2001	$40,500	B	Medium	Two pumps purchased in 2001 will reach the end of their service life in 4 years according to ISC's guideline. In addition, plugging issues due to low torque can be improved if electrical study confirms power upgrade is possible
Upgrade power supply to a 3-phase power	$10,000	B	Medium	Upgraded power will limit pump plugging. See *Section 2.1.2*. Cost estimate does not include utility costs, which can vary significantly and will be determined with study as recommended in *Table 2*.
Install shut off valve for the pipe outlet	$3,000	B	Low	Not required for operation; improves station analytics.
Contingency (30%)	$25,725			
3+ Year Total	**$111,500**			

The cost items are quoted based on vendor pricing with an added allowance for installation.

Pump replacement will require investigation of the availability and practicality of providing 3-phase power. If power upgrade is not viable, the pump upgrade may require additional electrical upgrades to improve reliability by increasing pump torque. Conducting this study is outside the scope of this project but is recommended before upgrading the pumps.

3. CCTV Inspection Assessment

This section summarizes the findings and recommendations for the gravity sanitary sewer main of the Chilton subdivision based on CCTV inspection. The analysis will assist the PRRD with determining current condition, identifying required repairs, estimating remaining service life, providing a cost estimate for repairs that are required immediately, and estimating replacement costs for the whole system in 2021 funds.

3.1. METHODOLOGY

McElhanney contracted Northern Lites Technologies to inspect each section of sanitary sewer in the Chilton subdivision. The pipe segments were flushed when necessary and video was recorded using a CCTV camera mounted on a remote operated tractor. The operator stopped the camera and noted defects based on the National Association of Sewer Service Companies (NASSCO) defect codes during the inspection. When surveys needed to be abandoned due to water levels or other obstructions, an attempt was made to send the camera to that spot from the opposite direction. The collected videos were then watched, verified, and scored according to the NASSCO Pipeline Assessment Certification Program (PACP) rating guidelines.

The pipe segments were analyzed using the NASSCO PACP Condition Grading System and a score associated with each defect was identified. The scores range from 1 to 5, with 5 being the most severe; separate scoring is completed for structural defects as well as operational and maintenance defects. The full table can be seen in *Appendix B*.

The PACP Quick Scoring method has four (4) digits and represents the two most severe defects and their number of occurrences. For example, a PACP Quick Score of 3224 identifies that the segment of pipe has two (2) grade 3 defects and four (4) grade 2 defects. Using such a system allows quick identification of pipe segments that may require closer scrutiny.

The Index Rating method takes a sum of all the defect scores and divides it by the number of defects, essentially calculating an average defect score for a given segment of pipe. This method is to be applied with caution, as a severe defect can be diluted by many less severe defects; hence, the two rating systems are used in conjunction to allow the review to focus on pipe segments that may need closer scrutiny.

The pipe rating system used is in accordance with the NASSCO Pipeline Assessment and Certification Program, Version 6.0.1, dated November 2010. Refer to *Appendix C* for an excerpt from the PACP training manual that describes the rating methods described above. Also included are two pages taken from the PACP training manual that briefly describe the reasons for CCTV inspection, the information provided by CCTV inspection data, reasons for standardization in CCTV inspection reporting and the origin of condition codes.

Manholes were assessed using a remote camera suspended from a tripod that was capable of taking 3D scans of manhole interiors. The camera was lowered to different heights and a 360° view of the manhole was then compiled at each depth. From these 3D views, the manholes were assessed using the NASSCO MACP system. The MACP system collects information on the manhole and is divided into Level 1 and Level 2 assessments. Level 1 MACP assessments gather information for a general condition assessment with observations and helps to determine whether a more comprehensive inspection (Level 2) is required. If a Level 2 inspection is warranted, the MACP uses coded defect ratings similar to the NASSCO PACP rating system.

3.2. NASSCO PIPE AND MANHOLE ANALYSIS

The following sections provide a summary of the defects for each of the branches assessed. Identified in the sections below are the segments of the sewer with a pipe defect severity of 4 or higher as well as other problematic segments. Defects of a lower severity are associated with minor infiltration or deposits in the main, which would be addressed by flushing.

3.2.1. Pipe Segments CCTV Inspection

The Chilton segment of the CCTV assessment generally had PVC sanitary sewer main in good structural condition. In general, laterals were installed using manufactured connections, with services typically being in good condition. A few pipes exhibited problems with large sags in the pipe grade, indicated by changes in the water level with stagnant water pooling. Several other pipes showed signs of less significant sags, with sections of water pooling to about 20% of the pipe area.

Some segments in this area had encrustation, intruding saddles, and settled gravels but, unless otherwise noted, maintained minimum 80% pipe cross-section. Below is a summary of each segment; details can be found in *Appendix B*.

- SMH-01 to SMH-02, 200mm PVC: Pipe in good condition, no defects of note.
- SMH-02 to SMH-03; 200mm PVC: Survey abandoned due to underwater camera with pipe 80% to 100% full of water (with dry sections before and after) indicating large sags in the pipe grade as seen in *Figure 16*.

Figure 16: Sags in Pipe Grade Causing Standing Water between SMH-02 and SMH-03

- SMH-03 to SMH-04; 200mm PVC: Several intruding service leads, including an intruding saddle causing the CCTV investigation to be abandoned, as seen in *Figure 17.* The saddle appears to be installed correctly, but the service is intruding enough to require abandoning the survey and approach from the downstream manhole There is also a moderate severity infiltration leak and attached deposits at the interface of manhole SMH-04 and the sewer main.

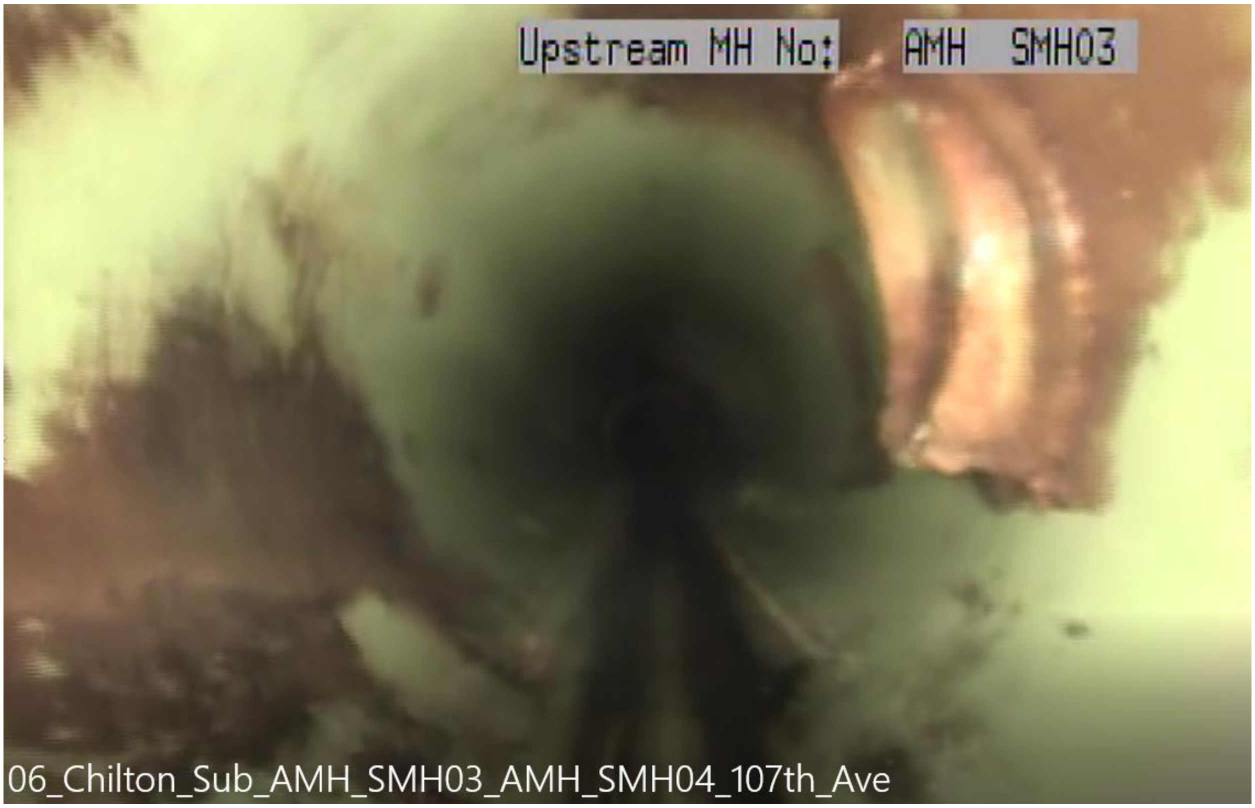

Figure 17: Intruding Service Caused CCTV Inspection to be Abandoned; Service Installed Correctly and Not Defective

- SMH-04 to SMH-05; 200mm PVC: Moderate severity infiltration leak at interface of SMH-05 and the sewer main. Some sections of increased water level to approximately 20%, indicating minor sags in the pipe grade.
- SMH-05 to SMH-06, 200mm PVC: Pipe in fair condition, with one section of increased water level to approximately 20% at a service location, indicating a minor sag in the pipe grade.
- SMH-06 to SMH-07, 200mm PVC: Pipe in good condition, no defects of note.
- SMH-07 to SMH-09; 150mm PVC: Several instances of underwater camera with pipe 80% full of water (with dry sections before and after) indicating large sags in the pipe grade.
- SMH-09 to SMH-08, 150mm PVC: Pipe is in fair condition. Some sections of increased water level to approximately 20%, indicating minor sags in the pipe grade. Pipe was unable to be surveyed beyond the first cleanout as the pipe was not accessible due to bends in the pipe mainline as seen in *Figure 18*.

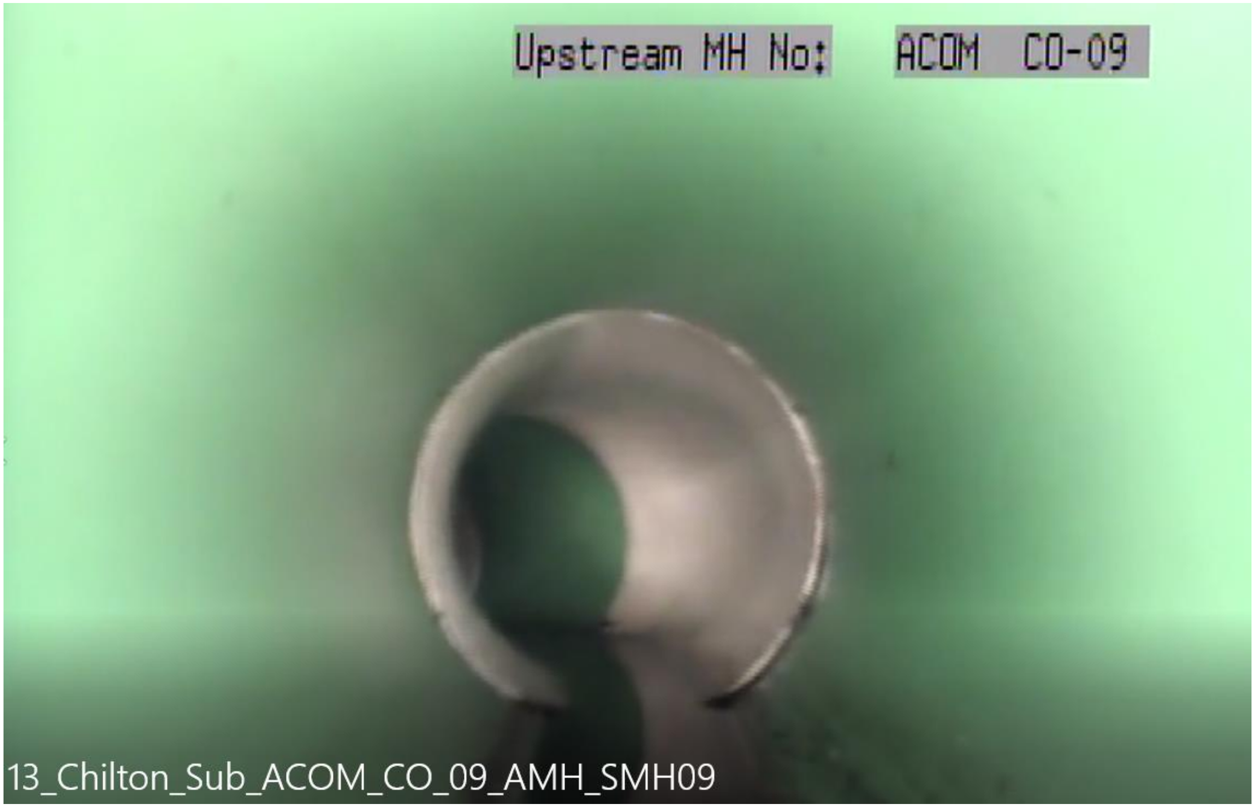

Figure 18: Bends in Pipe in Mainline Prevented CCTV Camera Survey

- SMH-07 to Lift Station: Large amount of debris obstructing inspection of the pipe, as seen in *Figure 19*. Survey abandoned shortly beyond SMH-07.

Figure 19: Debris Blocking Sewer Main Leading to Chilton Lift Station

Table 4 provides an overview of pipe conditions and the PACP ratings for the surveys conducted.

Table 4: NASSCO PACP Pipe Segment Rating and Index

Upstream MH	Downstream MH	PACP Quick (Structural)	PACP Quick (O&M)	Structural Index	O&M Index	Overall Index	Rating per m	Defects per m
SMH-01	**SMH-02**	1100	2311	1	1.75	1.6	0.113	0.071
SMH-02	**SMH-03**	1100	2700	1	2	1.875	0.126	0.067
SMH-03	**SMH-04**	1100	4131	1	2.5	2.29	0.139	0.061
SMH-04	**SMH-05**	1100	2600	1	2	1.86	0.131	0.071
SMH-05	**SMH-06**	0000	2400	0	2	2	0.072	0.036
SMH-06	**SMH-07**	0000	2400	0	2	2	0.074	0.037
SMH-09	**SMH-07**	0000	4400	0	4	4	0.178	0.045
SMH-09	**SMH-08**	0000	2100	0	2	2	0.027	0.013
SMH-07	**LIFT STATION**	0000	5100	0	5	5	5.000	1.000

3.2.1. Manhole 3D Scan Inspection

The Chilton manhole assessment indicated that the manholes were generally in good condition. The manholes are all precast manufactured concrete with aluminum stepladder rungs, manufactured benching, and cast-iron manhole covers. Manholes of this type installed to specifications are expected to have a lifespan of 50+ years but can last for significantly longer in low corrosivity environments.

Several manholes exhibited some minor infiltration, typical of all manholes, and a few exhibited some encrustation around the manhole benching and manhole base. All assessments were completed to NASSCO MACP Level 1 standards. Below is a summary of each manhole; details can be found in *Appendix B*.

- SMH-01, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near the manhole base joint, as seen in *Figure 20*.

Figure 20: Some Minor Infiltration Staining and Encrustation in SMH-01

- SMH-02, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-03, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-04, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining, and the pipe interfaces are exhibiting some minor infiltration

- SMH-05, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near the manhole base joint, and the pipe interfaces are exhibiting some minor infiltration
- SMH-06, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-07, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-09, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-08, 1050mm concrete manhole: Manhole in good condition.

3.3. RECOMMENDATIONS

The following recommended repairs are based on the NASSCO PACP rating and industry best practices. Areas of sag greater that 50% in the mainline of the pipe should be repaired, when possible, as it is difficult to remotely inspect the issue and causes of the sag. In addition, the stagnant water can lead to flow and odour problems and may be a sign of other problems like collapsed pipe and in-washing trench material.

McElhanney recommends the following:

- Continuing the monitoring and maintenance program, with flushing every 5 years (or more often as required) and reinspection and assessment every 10 years.
- Replacement of the SMH-07 to SMH-09 segment and reconnection of services. This segment is exhibiting three sagged sections with water levels over 50%, with point repairs expected to be similar to the cost of full replacement.
- Locating and replacing the segments of pipe exhibiting sagging between SMH-02 and SMH-03. This work could be performed as point repairs to the system with disturbance only required in the vicinity of the repair. This may require work to reconnect service connections at the new grade if services are located at the underwater sections.
- The pipe segment between SMH-04 to SMH-05, SMH-05 to SMH-06 and SMH-09 to SMH-08 should be monitored for signs of increasing sags along the line of the pipe. The existing sags are minor and will not impact the flow capacity of the pipe, but additional issues may occur if the sags increase.
- Cleaning and repairing the interface of SMH-04 and SMH-05 and the sewer mains to repair infiltration.
- Installing new overbuild manholes between SMH-09 and SMH-08 to replace the existing cleanouts. Typically, cleanouts are not acceptable for use along a mainline as they can prevent maintenance and inspection. While the sewer main services only a few lots along this run, manholes are preferred for operational purposes.
- Flushing of the pipe segment SMH-07 to the lift station.

3.4. COST ESTIMATE

The system has defects that require attention but the system, as a whole, is in fair condition, with an estimated lifespan of another 30+ years with proper maintenance. All costs are listed as 2021 dollars with a 30% contingency. *Table 5* provides an overview of the repairs, on-going maintenance, replacement costs, and the estimated lifespan for each asset.

Table 5: Cost Estimate for Chilton Sanitary Sewer Repairs, Maintenance, and Replacement

Asset		Cost of Current Repairs Required	Cost of Maintenance (Yearly)	Cost of Replacement	Estimated Lifespan (Years)
PIPES	**SMH-01 to SMH-02**	$0	$200	$56,800	55
	SMH-02 to SMH-03	$15,000	$200	$95,200	55
	SMH03 to SMH-04	$0	$200	$92,000	55
	SMH04 to SMH-05	$0	$200	$79,200	55
	SMH05 to SMH-06	$0	$200	$88,800	55
	SMH-06 to SMH-07	$0	$200	$86,400	55
	SMH-09 to SMH-07	$72,000	$200	$72,000	55
	SMH-08 to SMH-09	$0	$200	$151,200	55
	SMH-07 to LIFT	$4,000	$200	$75,200	55
MANHOLES	**SMH-01**	$500	$100	$12,000	30
	SMH-02	$500	$100	$12,000	30
	SMH-03	$500	$100	$12,000	30
	SMH-04	$2,500	$100	$12,000	30
	SMH-05	$2,500	$100	$12,000	30
	SMH-06	$500	$100	$12,000	30
	SMH-07	$500	$100	$12,000	30
	SMH-09	$500	$100	$12,000	30
	SMH-08	$500	$100	$12,000	30
	SMH-09-CO1	$12,000	$100	$12,000	30
	SMH-09-CO2	$12,000	$100	$12,000	30

3.4.1. Repairs

Pipes

McElhanney recommends replacement of one section of sewer (SMH09 to SMH-07) and point repairs on sagging areas of the sewers to MMCD standards, including new sections of PVC SDR35 sanitary sewer installed with new bedding and repair couplings. While repairs are carried out, the subgrade should be inspected for suitability and removed if unsuitable or if deleterious materials are found, as soft ground may be the cause of the pipe sags. Once repaired, the pipes should be re-inspected. McElhanney also recommends flushing of sewer segment SMH-07 to the lift station.

Estimated Cost of Repairs: $91,000

Manholes

McElhanney recommends replacing the cleanouts along the line with manholes. McElhanney also recommends cleaning all manholes to clear encrustation. Once complete, perform concrete patching as required, with special attention paid to SMH-04 and SMH-05 and pipe interfaces.

McElhanney also recommends replacing the existing cleanouts along the mainline between SMH-09 and SMH-08 with new manholes to facilitate operations and maintenance.

Estimated Cost: $32,500

3.4.2. On-going Maintenance

Pipes

Flushing and reinspecting every 5 to 10 years to watch for signs of pipe failure is recommended. Pipes showing signs of early failure (cracking, root intrusion, additional sagging) should be repaired as necessary until full replacement is warranted. Pricing assumes that the entire system is cleaned and inspected together. Individual segments inspected more frequently would lead to a higher overall maintenance cost.

Estimated Cost: $200 per segment per year with an expected $20,000 total per inspection and flushing cycle.

Manholes

Cleaning and reinspecting every 5 to 10 years to watch for signs of structural failure is recommended. Manholes showing signs of early failure (cracking, root intrusion, major encrustation) should be repaired as necessary until full replacement is warranted.

Estimated Cost: $100 per manhole per year with a total expected spend of $11,000 total every inspection cycle.

3.4.3. Replacement

Once replacement is warranted, the entire gravity system should be removed and replaced. Services should be scoped as the replacement takes place, with deficient services being replaced and transferred at property line. Replacement is usually required when the cost of on-going repairs becomes too high or when the pipes begin to exhibit excessive structural failures in the NASSCO PACP ratings system. Full replacement is not warranted at this time. The system condition is consistent with the age of the assets. The system should be expected to last 30+ years with proper maintenance and repairs

Estimated Total Replacement Costs: $928,800

Appendix A

Statement of Limitations

Statement of Limitations

Use of this Report. This report was prepared by McElhanney Ltd. ("McElhanney") for the particular site, design objective, development and purpose (the "Project") described in this report and for the exclusive use of the client identified in this report (the "Client"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used or relied upon, in whole or in part, by a party other than the Client, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors and regulatory authorities for use in relation to and in connection with the Project provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies.

Standard of Care and Disclaimer of Warranties. This report was prepared with the degree of care, skill, and diligence as would reasonably be expected from a qualified member of the same profession, providing a similar report for similar projects, and under similar circumstances, and in accordance with generally accepted engineering and scientific judgments, principles and practices. McElhanney expressly disclaims any and all warranties in connection with this report.

Information from Client and Third Parties. McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

Effect of Changes. All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the site assessment and report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Construction activities can significantly alter soil, rock and other geologic conditions on the site. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, c) new information is discovered in the future during site excavations, construction, building demolition or other activities, or d) additional subsurface assessments or testing conducted by others.

Independent Judgments. McElhanney will not be responsible for the independent conclusions, interpretations, interpolations and/or decisions of the Client, or others, who may come into possession of this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance or sell land or with respect to public offerings for the sale of securities.

Construction Cost Estimates. This construction cost estimate has been prepared using the design and technical information currently available, and without the benefit of Geotechnical, Environmental, and Archaeological information. Furthermore, McElhanney cannot predict the competitive environment, weather or other unforeseen conditions that will prevail at the time that contractors will prepare their bids. The cost estimate is therefore subject to factors over which McElhanney has no control, and McElhanney does not guarantee or warranty the accuracy of such estimate.

Appendix B

Pipe Condition Tables

File: 3111-26522-00CIV-RPT-001 Chilton CCTV Table

Date: October 29, 2021

Pipe Segment	U/S MH#	D/S MH#	Pipe Size (mm)	Material	Length (m)	Grade (%)	Report #	Report Date	Video #	Station	Defect Group	Descriptor	Modifier	Defect	Defect (Input)	Continuous (Match Codes)	Numeral Mod	Percent/Count	Structural Rating	O&M Rating	# of Structural Defects Count	# of O&M Defects Count	Total Number of Defects	Structural Rating Index	O&M Rating Index	Overall Index
1	SMH 01	SMH 02	200	PVC	70.5	-	3.1113E+10	Jun-21	01 Chilton Sub AMH SMH01 AMH SMHO2	0	Access Points	Manhole		AMH			0		0	0	0	0	5	1.0	1.8	1.6
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										14.5	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										27.5	Tap	Saddle	-	TS			0		0	0	0	0				
										27.5	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										30.5	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										39	Joint	Separated (open) Medium		JSM			0		1	1	1	1				
										39	Infiltration	Stain		IS			0		0	0	0	0				
										49.1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										69.7	Tap	Saddle	Intruding	TSI			OM Percent		0	0	0	0				
										70.5	Access Points	Manhole		AMH			0		0	0	0	0				
										Total									1	7	1	4				
										Quick									1100	2311						
2	SMH 02	SMH 03	200	PVC	118.6	-	3.1113E+10	Jun-21	02 Chilton Sub AMH SMH02 SSM AMH SMH03 mp4	0	Access Points	Manhole		AMH			0		0	0	0	0	8	1.0	2.0	1.9
3					23.5	-	3.1113E+10	Jun-21	03 Chilton Sub AMH SMH02 AMH SMH03 1	0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
4					37.4	-	3.1113E+10	Jun-21	04 Chilton Sub AMH SMH02 AMH SMH03	0	Infiltration	Stain		IS			0		0	0	0	0				
					Combined video data					15.3	Joint	Separated (open) Medium		JSM			0		1	0	1	0				
										15.3	Infiltration	Stain		IS			0		0	0	0	0				
										18.3	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										20	Deposits	Deposits Settled	Other	DSZ			OM Percent	<=10	0	2	0	1				
										24.4	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										45.1	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										56.6	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										57.4	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										57.8	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										57.8	Miscellaneous	Survey Abandoned		MSA			0		0	0	0	0				
										58.2	Miscellaneous	Survey Abandoned		MSA			0		0	0	0	0				
										59	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										59	Infiltration	Stain		IS			0		0	0	0	0				
										59	Tap	Saddle	Defective	TSD			0		0	2	0	1				
										107.8	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										118.6	Access Points	Manhole		AMH			0		0	0	0	0				
										Total									1	14	1	7				
										Quick									1100	2700						
5	SMH 03	SMH 04	200	PVC	115.4	-	3.1113E+10	Jun-21	05 Chilton Sub AMH SMH03 AMH SMH04	0	Access Points	Manhole		AMH			0		0	0	0	0	7	1.0	2.5	2.3
6										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										49.9	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										53.8	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										80	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										89.5	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										98.7	Joint	Separated (open) Medium		JSM			0		1	0	1	0				
										98.7	Infiltration	Stain		IS			0		0	0	0	0				
										106	Tap	Saddle	Intruding	TSI			OM Percent	<=20	0	3	0	1				
										106	Miscellaneous	Survey Abandoned		MSA			0		0	0	0	0				
										115.4	Infiltration	Runner		IR			0		0	4	0	1				
										115.4	Access Points	Manhole		AMH			0		0	0	0	0				
										Total									1	15	1	6				
										Quick									1100	4131						
7	SMH 04	SMH 05	200	PVC	99.2	-	3.1113E+10	Jun-21	07 Chilton Sub AMH SMH04 AMH smh05	0	Access Points	Manhole		AMH			0		0	0	0	0	7	1.0	2.0	1.9
8					39.9	-	3.1113E+10	Jun-21	08 Chilton Sub AMH SMH04 AMH smh05 107th Ave	0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										1.6	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										1.9	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										4.7	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										28.2	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										45.4	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										59.9	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										60.9	Miscellaneous	Survey Abandoned		MSA			0		0	0	0	0				
										60.9	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										71.4	Joint	Separated (open) Medium		JSM			0		1	0	1	0				
										88.6	Tap	Saddle	Intruding	TSI			OM Percent	<=10	0	2	0	1				
										95.9	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										99.2	Access Points	Manhole		AMH			0		0	0	0	0				
										Total									1	12	1	6				
										Quick									1100	2600						

9	SMH 05	SMH 06	200	PVC	111.5	-	3.1113E+10	Jun-21	09 Chilton Sub AMH smh05 AMH SMH06	0	Access Points	Manhole		AMH		0		0	0	0	0	4	**0.0**	**2.0**	**2.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										42.3	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										42.9	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										70.1	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										70.1	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										107.7	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										111.5	Access Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**8**	**0**	**4**				
										Quick								**0000**	**2400**						
10	SMH 06	SMH 07	200	PVC	108.3	-	3.1113E+10	Jun-21	10 Chilton Sub AMH SMH06 AMH SMH07	0	Access Points	Manhole		AMH		0		0	0	0	0	4	**0.0**	**2.0**	**2.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										20.2	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										24.6	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										57.4	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										57.8	Tap	Saddle	Intruding	TSI		OM Percent	<=10	0	2	0	1				
										108.3	Access Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**8**	**0**	**4**				
										Quick								**0000**	**2400**						
11	SMH 09	SMH 07	150	PVC	89.8	-	3.1113E+10	Jun-21	11 Chilton Sub AMH SMH09 AMH SMH07	0	Access Points	Manhole		AMH		0		0	0	0	0	4	**0.0**	**4.0**	**4.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										12.6	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										14	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										30.4	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										30.4	Line	Down		LD		OM Degree	>20	0	4	0	1				
										31.9	Miscellaneous	Camera Underwater		MCU		0		0	4	0	1				
										32.6	Tap	Saddle	-	TS		0		0	0	0	0				
										41.5	Miscellaneous	Camera Underwater		MCU		0		0	4	0	1				
										43.2	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										43.2	Line	Up		LU		OM Degree	>20	0	4	0	1				
										46.1	Miscellaneous	Water Level		MWL		0		0	0	0	0				
										89.8	Access Points	Manhole		AMH		0		0	0	0	0				
										Total								**0**	**16**	**0**	**4**				
										Quick								**0000**	**4400**						
12	SMH 07	LIFT STATION	200	PVC	1	-	3.1113E+10	Jun-21	12 Chilton Sub AMH SMH07 AMH LS	0	Access Points	Manhole		AMH		0		0	0	0	0	1	**0.0**	**5.0**	**5.0**
										0	Miscellaneous	Water Level		MWL	5	0		0	0	0	0				
										1.4	Deposits	Deposits Settled	Gravel	DSGV		OM Percent	>30	0	5	0	1				
										1	Miscellaneous	Survey Abandoned		MSA		0		0	0	0	0				
										Total								**0**	**5**	**0**	**1**				
										Quick								**0000**	**5100**						

Appendix C

NASSCO PACP Rating Guidelines

PACP© Condition Grading System

The Pipeline Assessment and Certification Program (PACP) developed by NASSCO provides a mechanism for creating reliable descriptions of pipe conditions. NASSCO has also developed a system based on the PACP codes to assign a condition rating to pipelines. Requirements of the grading system were as follows:

1. Like the PACP, the grading system should be direct and objective.

2. Provide the ability to qualitatively identify differences in pipe condition between one inspection and subsequent inspections, and to prioritize based on the significance of the defects different pipe segments.

Many other approaches to sewer pipe grading have been used in the United States as well as in other parts of the World. These approaches generally use some type of defect grading that is then used to calculate an overall pipe rating.

It is problematic to develop a single pipe segment rating that fully describes all of the important aspects of a pipe. Therefore the PACP Condition Grading System uses more than one method of rating pipe segment condition including a rating that considers the number of total defects within the pipe segment and a rating that considers the most severe defects within the pipe segment.

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in the PACP Condition Grading System. The PACP Condition Grading System should be used only as a tool for screening pipe segment inspections, allowing the User to quickly determine which pipe segments have significant defects. It is expected that as the PACP further develops the PACP Condition Grading System will expand to include other factors.

The PACP Condition Grading System provides condition ratings for Structural Defects and Operation and Maintenance Defects.

Approach

Using the PACP Code Matrix, Each PACP defect code is assigned a condition grade of from 1 to 5. Grades are assigned based on the significance of the defect, extent of

damage, percentage of flow capacity restriction, or the amount of wall loss due to deterioration.

The PACP Condition Grading System alone is inadequate for determining if a pipe segment should be rehabilitated or replaced. Many other factors in addition to the internal condition of the segment should be considered. The fact that a segment has significant Grade 4 or Grade 5 defects does not necessarily mean the pipe segment should be immediately rehabilitated. Recent experience by PACP Users has shown that pipe segments with serious defects such as hinge failures may remain largely unchanged for many decades if no deterioration factors such as surcharging, roots, or groundwater are present.

What is needed is improved estimates of remaining life or mean time before failure that are based on close monitoring of pipe segments over time. Once we know how much change occurs in pipe segments we can better understand the relationship between defects, deterioration factors, and pipe segment life expectancy. PACP continues to be an excellent tool for benchmarking pipe condition between one inspection and subsequent inspections of the same pipe.

Grades are assigned for two categories, Structural, and O&M defects.
Grades are as follows;
5 - Most significant defect grade
4 – Significant
3 – Moderate defect grade
2 – Minor to Moderate
1 –Minor defect grade

The PACP Condition Grading System results are entirely dependent on the quality of the PACP defect coding. Errors in the coding will directly result in errors in the Grading. All utilities, engineers, and contractors should make sure the data they are using was coded by experienced technicians who have successfully demonstrated their competence through a formal or informal apprenticeship program. PACP data from inexperienced technicians should be checked and corrected as needed. Errors found in coding should be corrected and the errors brought to the attention of the technician.

Grading of Continuous Defects

The PACP continuous defect feature is used to denote where long portions of a sewer pipe are affected by the same defect, without the User having to repetitively enter point defects. However to develop a grade for the pipe segment, a mechanism is needed to translate a continuous defect into an equivalent number of point defects.

The equivalent number (quantity) of "uninterrupted" and "joint repeating" continuous defects is calculated by dividing the length of the continuous defect by 5. Example, a 6-meter long continuous defect, grade 3, should equate to four Grade 3 defects. Fractions are rounded to the nearest whole number.

Pipe Ratings

The pipe rating is based on the number of occurrences for each condition grade. Ratings are calculated separately for **Structural Defects** and **O&M Defects**. Several ways of expressing pipe segment condition are used by the PACP Condition Grading System as follows.

Segment Grade Scores - Each pipe segment will have a Segment Grade Score for each of the five grades. The number of occurrences of each pipe grade is multiplied by the pipe grade to calculate the segment grade score. Example, six Grade 5 defects would be 6 times 5 and equates to a Segment Grade 5 Score of 30. If a pipe segment had no defects of a particular grade, then the Segment Grade Score for that grade would be 0.

Overall Pipe Rating –The five Segment Grade Scores are added together to calculate the **Overall Pipe Rating. Structural Pipe Ratings** are calculated using only Structural Defect grades, while **O&M Pipe Ratings** are calculated using only O&M Defect grades.

PACP Quick Rating – The PACP Quick Rating is a shorthand way of expressing the number of occurrences for the two highest severity grades. The PACP Quick Rating is a four character score as follows:

1. The first character is the highest severity grade occurring along the pipe length.
2. The second character is the total number of occurrences of the highest severity grade. If the total number exceeds 9, then alphabetic characters are used as follows- 10 to 14 – A; 15 to 19 – B; 20 to 24 – C; etc.
3. The third character is the next highest severity grade occurring along the pipe length.
4. The fourth character is the total number of the second highest severity grade occurrences, derived as in item 2 above.

For Example

4B27

This immediately shows that no grade 5 defects or grade 3 defects, however 15 to 19 grade 4 defects and seven grade 2 defects were found.

Another Example

3224

Two grade 3 defects and four grade 2 defects, however no grade 5 or grade 4 defects were found.

If a pipe segment only has defects of one grade, the first two characters are the grade and the quantity of defects, and the last two characters are 00 (denoting no other defect grades). A pipe segment with no defects would have a Quick Score of 0000 (all zeros).

The PACP Quick Rating provides the ability to summarize the number and severity of defects found within a pipe segment. As with the Pipe Rating, Quick Structural Ratings

are calculated using only Structural Defect Grades, and Quick O&M Ratings are calculated using only O&M Defect Grades.

The Quick Rating is an excellent screening tool to determine which pipe segments require closer scrutiny. If a pipe has not defects greater than Grade 1 or 2, then the pipe segment probably does not need any further investigation.

Pipe Ratings Index – This is an indicator of the distribution of defect severity. The Pipe Ratings Index is calculated by dividing the Pipe Rating by the number of defects. For example, the Structural Pipe Ratings Index would be the Structural Pipe Rating divided by the number of structural defects. Pipe Ratings Indexes are calculated for Structural, O&M, and Overall. A pipe segment with a Pipe Rating of zero (0) would have a Pipe Rating Index of zero (0).

Summary

The following procedures are used to calculate pipe segment ratings using the PACP Condition Grading System:

1. Determine the number of occurrences for each condition grade within the pipe segment. Calculate separately for Structural Defect Grades and O&M Defect Grades.
2. Calculate the Segment Grade Score by multiplying the number of occurrences by the respective grade 1 through 5. Calculate the Structural Segment Grade Score and the O&M Segment Grade Score separately, and then add together for the Overall Segment Grade Score.
3. Calculate the Pipe Rating for the pipe segment by adding the Segment Grade Scores. Add all five Structural Segment Grade Scores for the Structural Pipe Rating, and add all five O&M Segment Grade Scores for the O&M Pipe Rating. Add all five Overall Segment Grade Scores for the Overall Pipe Rating.
4. Determine the PACP Quick Rating by calculating the number of occurrences of the two highest severity grades.

5. Calculate the Pipe Ratings Index by dividing the Pipe Rating by the number of defects. If the pipe has no defects, the Pipe Ratings Index is zero.
6. Verify the PACP defect data used in accurate. The grading is a direct calculation from the defect data, and coding errors will be reflected in grading errors.

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
Structural	Crack (C)	Circumferential (C)		CC	1	
		Longitudinal (L)		CL	2	
		Multiple (M)		CM	3	
		Hinge (CH2)		CH2	4	
		Hinge (CH3)		CH3	5	
		Hinge (CH4)		CH4	5	
		Spiral (S)		CS	2	
Structural	Fracture (F)	Circumferential (C)		FC	2	
		Longitudinal (L)		FL	3	
		Multiple (M)		FM	4	
		Hinge (H2)		FH2	4	
		Hinge (H3)		FH3	5	
		Hinge (H4)		FH4	5	
		Spiral (S)		FS	3	
Structural	Pipe Failures (Silent)	Broken (B)		B	1 clock pos - 3, 2 clock pos - 4, >=3 clock pos - 5	
		Broken (B)	Soil Visible (SV)	BSV	5	
		Broken (B)	Void Visible (V V)	BVV	5	
		Hole (H)		H	1 clock pos - 3, 2 clock pos - 4, >= 3 clock pos - 5	
		Hole (H)	Soil Visible (SV)	HSV	5	
		Hole (H)	Void Visible (V V)	HVV	5	
Structural	Collapse (X)	Pipe (P)		XP	5	
		Brick (B)		XB	5	
Structural	Deformed (D)	(Pipe)		D	<=10% - 4,>10% - 5	
		(Brick)	Horizontally (H)	DH	5	
		(Brick)	Vertically (V)	DV	5	
Structural	Joint (J)	Offset (displaced) (O)	Med (M)	JOM	1	
			Large (L)	JOL	2	
		Separated (open) (S)	Med (M)	JSM	1	
			Large (L)	JSL	2	
		Angular (A)	Med (M)	JAM	1	
			Large (L)	JAL	2	
Structural	Surface Damage Chemical (S)	Roughness Increased (RI)	C	SRIC	1	
		Surface Spalling (SS)	C	SSSC	2	
		Aggregate Visible (AV)	C	SAVC	3	
		Aggregate Projecting (AP)	C	SAPC	3	
		Aggregate Missing (AM)	C	SAMC	4	

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Reinforcement Visible (RV)	C	SRVC	5	
		Reinforcement Projecting (RP)	C	SRPC	3	
		Reinforcement Corroded (RC)	C	SRCC	5	
		Missing Wall (MW)	C	SMWC	5	
		Other (Z)	C	SZC		
Structural	Surface Damage Mechanical (M)	Roughness Increased (RI)	M	SRIM	1	
		Surface Spalling (SS)	M	SSSM	2	
		Aggregate Visible (AV)	M	SAVM	3	
		Aggregate Projecting (AP)	M	SAPM	3	
		Aggregate Missing (AM)	M	SAMM	4	
		Reinforcement Visible (RV)	M	SRVM	5	
		Reinforcement Projecting (RP)	M	SRPM	3	
		Reinforcement Corroded (RC)	M	SRCM	5	
		Missing Wall (MW)	M	SMWM	5	
		Other (Z)	M	SZM	N/A	
Structural	Surface Damage Not Evident (Z)	Roughness Increased (RI)	Z	SRIZ	1	
		Surface Spalling (SS)	Z	SSSZ	2	
		Aggregate Visible (AV)	Z	SAVZ	3	
		Aggregate Projecting (AP)	Z	SAPZ	3	
		Aggregate Missing (AM)	Z	SAMZ	4	
		Reinforcement Visible (RV)	Z	SRVZ	5	
		Reinforcement Projecting (RP)	Z	SRPZ	3	
		Reinforcement Corroded (RC)	Z	SRCZ	5	
		Missing Wall (MW)	Z	SMWZ	5	
		Other (Z)	Z	SZZ	N/A	
Structural	Surface Damage (Metal Pipes)	Corrosion (CP)		SCP	3	
Structural	Lining Features (LF)	Detached (D)		LFD	3	
		Defective End (DE)		LFDE	3	
		Blistered (B)		LFB	3	
		Service Cut Shifted (CS)		LFCS	3	
		Abandoned Connection (AC)		LFAC		
		Overcut Service (OC)		LFOC	3	
		Undercut Service (UC)		LFUC	3	
		Buckled (BK)		LFBK	3	
		Annular Space (AS)		LFAS	3	
		Bulges (BU)		LFBU	3	
		Discoloration (DC)		LFDC	3	
		Delamination (DL)		LFDL	3	
		Pinholes (PH)		LFPH	3	
		Resin Slug (RS)		LFRS	3	
		Wrinkled (W)		LFW	3	
		Other (Z)		LFZ	N/A	
Structural	Weld Failure (WF)	Circumfrential (C)		WFC	2	
		Longitudinal (L)		WFL	2	

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Multiple (M)		WFM	3	
		Spiral (S)		WFS	2	
Structural	Point Repair (RP)	Localized Pipeliner (L)		RPL		
		Localized Pipeliner (L)	Defective (D)	RPLD	4	
		Patch Repair (P)		RPP		
		Patch Repair (P)	Defective (D)	RPPD	4	
		Pipe Replaced (R)		RPR		
		Pipe Replaced (R)	Defective (D)	RPRD	4	
		Other (Z)		RPZ		
		Other (Z)	Defective (D)	RPZD		
Structural	Brickwork (Silent)	Displaced (DB)		DB	3	
		Missing (MB)		MB	4	
		Dropped Invert (DI)		DI	5	
		Missing Mortar	Small	MMS	2	
			Medium	MMM	3	
			Large	MML	3	
O&M	Deposits (D)	Deposits Attached (DA)	Encrustation (E)	DAE		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Grease (G)	DAGS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Ragging (R)	DAR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Other (Z)	DAZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Deposits Settled (DS)	Hard/Compacted (C)	DSC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Fine silt/sand (F)	DSF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Gravel (G)	DSGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Other (Z)	DSZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Deposits Ingress (DN)	Fine silt/sand (F)	DNF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Gravel (GV)	DNGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
			Other (Z)	DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connecfion (C)	RFC		1
	Roots (R) at a Joint		N/A	RFJ	in software with a J	1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connecfion (C)	RTC		2
	Roots (R) at a Joint		N/A	RTJ		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connecfion (C)	RMC		3
	Roots (R) at a Joint		N/A	RMJ		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connecfion (C)	RBC		4
	Roots (R) at a Joint		N/A	RBJ		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
		Stain (S)		IS		
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Intruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		External Pipe or Cable In Sewer (P)		OBP		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Built Into Structure (S)		OBS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Construction Debris (N)		OBN		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Rocks (R)		OBR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other Objects (Z)		OBZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Vermin (V)	Rat (R)		VR		2
		Cockroach (C)		VC		1
		Other (Z)		VZ		1
O&M	Grout Test and Seal (G)	Grout Test Pass (GTP)				
			Joint (J)	GTPJ		
			Lateral (L)	GTPL		
		Grout Test Fail (GTF)				
			Joint (J)	GTFJ		
			Lateral (L)	GTFL		
		Grout Test Unable to Test (GTU)				
			Joint (J)	GTUJ		
			Lateral (L)	GTUL		
		Grout at a Location (not a joint) (GRT)		GRT		
Construction Features	Tap (T)	Factory Made (F)		TF		
			Capped (C)	TFC		
			Abandoned (B)	TFB		
			Defective (D)	TFD		2
			Intruding (I)	TFI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TFA		
		Break-In/Hammer (B)		TB		
			Capped (C)	TBC		2
			Abandoned (B)	TBB		
			Defective (D)	TBD		3
			Intruding (I)	TBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TBA		
		Saddle (S)		TS		
			Capped (C)	TSC		
			Abandoned (B)	TSB		

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
			Defective (D)	TSD		2
			Intruding (I)	TSI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TSA		
		Rehabilitated (R)		TR		
			Defective (D)	TRD		2
			Intruding (I)	TRI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Intruding Seal Material (IS)			IS		
		Sealing Ring (SR)		ISSR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Hanging (H)	ISSRH		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Broken (B)	ISSRB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Loose, Poorly Fitting (SRL)		ISSRL		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Grout (GT)		ISGT		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other (Z)		ISZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Line (L)	Left (L)		LL		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Up (LU)		LLU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Down (LD)		LLD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right (R)		LR		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Right/Up (RU)		LRU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right/Down (RD)		LRD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Up (U)		LU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Down (D)		LD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
Construction	Access Points (A)					
		Cleanout (CO)		ACO		
			Mainline (M)	ACOM		
			Property (P)	ACOP		
			House (H)	ACOH		
		Discharge Point (DP)		ADP		
		Junction Box (JB)		AJB		
		Meter (M)		AM		
		Manhole (MH)		AMH		
		Other Special Chamber (OC)		AOC		
		Tee Connection (TC)		ATC		
		WW Access Device (WA)		AWA		
		Wet Well (WW)		AWW		
		Catch Basin (CB)		ACB		
		End of Pipe (EP)		AEP		
Other	Miscellaneous (M)	Camera Underwater (CU)		MCU		4
		Dimension/Diam/Shape Change (SC)		MSC		
		General Observation (GO)		MGO		
		General Photograph (GP)		MGP		
		Material Change (MC)		MMC		
		Lining Change (LC)		MLC		
		Pipe Joint Length Change (JL)		MJL		
		Survey Abandoned (SA)		MSA		
		Water Level (WL)		MWL		
			Sag (S)	MWLS	<=30% - 2, <=50% - 3, >50% - 4	
		Water Mark (WM)		MWM		>=50% 4, >=75% 5
		Dye Test (Y)		MY		
			Visible (V)	MYV		5
			Not Visible (N)	MYN		3

Reasons for TV Inspection

We televise sewers for many different purposes, some of those purposes are:

- **Routine Operational Requirements** – Pro-active inspection to identify potential failures and for planning routine Operation and Management (O&M) and renovation programs.
- **Troubleshooting** – Investigation of problem incidents to select remedial action.
- **Compliance with Mandated Programs** – Inspection and data collection to support programs such as Capacity, Management, Operations and Maintenance (C-MOM) and Administrative Orders (AOs), Governmental Accounting Standards Board statement 34 (GASB-34), and Consent Decrees.
- **Acceptance Testing** – Inspection of new or renewed sewers to insure that construction met specifications and to document as-built conditions.
- **Infiltration/Inflow (I/I) or Capital Improvement Program (CIP) Projects** – Examples of the type projects normally conducted by specialty firms or engineering consultants.

Regardless of what purpose we televise sewers, it is important that TV inspection data is collected thoroughly and consistently. This approach insures better and more comprehensive data is collected, and will provide opportunities for a single TV inspection to serve multiple purposes. While obtaining a limited amount of information may meet the immediate data needs, it also means the information obtained as part of a comprehensive PACP inspection will not be available for other possible requirements in the future.

What We Need from TV Inspection Data

The basic information we need from TV inspection is as follows:

- Record and archive all descriptive data using standard procedures and data format
- Develop a condition rating for each line
- Provide follow-up recommendations
- Display results on a map
- Establish benchmarks to compare with future inspections of same line

Standardizing on the PACP codes as well as integration with other components of the PACP will meet the above objectives.

Why Standardization is Important

Some the benefits of standardization are as follows:

- Allows for more effort to be placed on consistency of data and utilization of data rather than development of utility-specific or project-specific standards
- Provides the capability of benchmarking sewers within a single utility as well as from one geographical area of the US to another
- Ability to detect change due to deterioration over time
- Provides better opportunities for integrating data from different software programs
- Improved confidence in the description of pipe conditions will provide cost savings during renewal
- Advances the professionalism of the TV inspection industry

Origin of Condition Codes

WRc first drafted the Manual of Sewer Condition Classification (MSCC) in 1980 for use in the United Kingdom. At that time, consistent assessment of sewer condition was needed in order to fairly set sewer rates charged to consumers by the private utility companies that operated throughout the UK, and those codes are now the mandated standard. The MSCC was most recently updated by WRc in 2004 (MSCC Fourth Edition) and are used extensively throughout the world. Other WRc-based coding systems have been implemented throughout the world including Australia, New Zealand, Southeast Asia, and Europe.

The PACP codes were developed by NASSCO and the Water Research Centre (WRc) in 2002. Prior to the development of the PACP, no standard TV inspection codes or procedures existed in the United States. While many agencies and engineering firms in the US used adaptations of the WRc codes, no single standard existed, nor was a standard training and certification program available.

Those familiar with the WRc codes will find the PACP codes very similar. Terminology has been changed to reflect terms used in the United States. Codes have been added to describe conditions found in renewed pipes and point repairs. The ability to describe pipe corrosion has been greatly improved. Coding of Operational and Maintenance problems in general has been improved. Codes have been added to describe observations and defects that otherwise would be noted in the remarks or comment section.

Contact
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2022 Budget - Capital Supplemental Item

Title:	Sewer System Repairs	**Environmental Services**
Division:	Sewer	**Chilton Sewer - 602**
Type:	Capital - Replacement	**High**

Description

These capital repairs are based on identified defects found in the 2021 Condition Assessment by McElhanney. The repairs/replacements include five, sewer pipe, manholes and lift station electrical.

Benefits

The capital works will support the the ongoing integrity and functionality of the asset by maintaining its service life.

Risks

Further repairs or upgrades may be identified during the course of contruction.

Financial Information

Capital

Funding Sources	2022	2023	2024	2025	2026	5 Year Total
Area D Gas Tax	186,190					186,190
						0
						0
	186,190	**0**	**0**	**0**	**0**	**186,190**

Expenses	2022	2023	2024	2025	2026	5 Year Total
Manhole repairs - infrastructure	32,500					32,500
Sewer line repairs - infrastructure	91,000					91,000
Lift station repairs	32,690					32,690
Construction oversight	30,000					30,000
						0
						0
						0
						0
	186,190	**0**	**0**	**0**	**0**	**186,190**

Administration

Author: Daris Gillis **Date Prepared: November 10, 2021**

Approval Date

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: ENV-RBAC-037

From: Daris Gillis, Environmental Services Manager — Date: November 25, 2021

Subject: Friesen Sewer 2022 Condition Assessment & Capital Request

RECOMMENDATION #1:

That the Rural Budgets Administration Committee approve the supplementary request of $123,500 payable from the Area D Community Works Gas Tax fund, to be issued to Function 604 - Friesen Sewer, as outlined in the 2021 Friesen Sewer Condition Assessment.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee allocate $20,000 from Area D Fair Share to be transferred into the capital reserve for Function 604 - Friesen Sewer in the 2022 budget.

BACKGROUND/RATIONALE:

The Friesen Sewer Collection system was originally constructed in 2005, with approximately 900m of sanitary sewer installed along Highway 97 and the Friesen Subdivision. The sanitary sewer system transports flows from thirteen connections in the subdivision into the City of Dawson Creek's system.

Aligning with the current Regional Board Strategic Plan, a condition assessment of the Friesen Sewer Collection system was conducted in 2021 by McElhanney. The scope of the assessment was to determine the current condition and remaining service life of the system, and to identify required system repairs along with associated costs. The Friesen system is estimated to have over 30 years of remaining service life with proper maintenance and repairs. The cost for total replacement of the collection system in 2021 dollars is $1,107,000.

Table 1 highlights the areas within the system that will require immediate repairs in order to maintain proper functioning of the collection system. Cost estimates have been built with a 30% contingency.

Table 1. Cost of Repairs and Maintenance for 2022.

Repairs/Immediate Maintenance	Estimated Cost of Repairs/Replacement
Sewer Piping	$ 89,000
Sewer Manholes	$ 4,500
Construction Oversight	$30,000
Total:	**$ 123,500**

A supplemental capital request form is attached for the Committee's consideration.

Staff Initials: DG   Dept. Head: KB   CAO: Shawn Dahlen

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

 ☒ Develop a Corporate Asset Management Program

FINANCIAL CONSIDERATION(S):

The current parcel tax requisition for the Friesen function is $7,680. In order to cover the cost of replacement in 2051, staff are recommending that the full requisition limit of $17,000 permitted through bylaw be applied starting in the 2022 budget.

As of October 31, 2021 the balance available after the remaining commitments in Electoral Area D are as follows:

- Peace River Agreement: $592,594.35,
- Gas Tax Reserve fund: $1,238,444.68, and
- Fair Share Reserve fund: $1,854,311.67.

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

None at this time.

Attachments:

1. 2021 Friesen Sewer Condition Assessment
2. 2022 Friesen Sewer Capital Request Form

Peace River Regional District Friesen Assessment

October 29, 2021 | Revision 1

Submitted to: Peace River Regional District
Prepared by: McElhanney Ltd.

Contact
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Prepared by
Bain Konway, EIT

Reviewed by
Larry Sawchyn, P.Eng.

Our file: 3111-26522-00

Your Challenge.
Our Passion.

October 29, 2021

Peace River Regional District
1981 Alaska Avenue
Dawson Creek, BC V1G 4H8

Peace River Regional District Friesen Sewer Assessments

McElhanney performed CCTV inspection on approximately 900 metres of sanitary gravity sewer in the Friesen subdivision located west of the City of Dawson Creek.

The gravity sewer was found to be generally in good condition, with an estimated 30+ years of service remaining. There are some areas of repair required to eliminate sags in the sewer that are difficult to inspect and that may accelerate pipe deterioration; the repairs required have an estimated cost of $93,500. Long-term, the pipe should be flushed and reinspected every 5 to 10 years to continuously monitor structural stability; once pipe replacement is required, the replacement cost for the gravity sewer system is an estimated $819,000 (in 2021 dollars).

Sincerely,
McElhanney Ltd.

[redacted]

PERMIT TO PRACTICE
McElhanney Ltd.
PERMIT NUMBER: 1003299
Engineers and Geoscientists of BC

Justin Todd, P.Eng.
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Contents

Figures

Tables

Appendices

1. Introduction

As part of its 2021 operations and maintenance plan, the Peace River Regional District (PRRD) contracted McElhanney Ltd. (McElhanney) to conduct a condition assessment of their Friesen subdivision sanitary sewer system. Located just outside the City of Dawson Creek (the City), the Friesen subdivision sanitary sewer system conveys flows from the subdivision into the City's system, which leads to their wastewater treatment facility. The goals of the assessment were to determine the current condition and remaining service life of the system and to identify required system repairs and upgrades along with associated costs.

1.1. BACKGROUND

The Friesen sewer servicing system was originally constructed in 2005, with approximately 900m of 200mm PVC SDR35 gravity sanitary sewer installed along Highway 97 and the Friesen subdivision. A map of the area and the sanitary system can be seen in *Figure 1*.

Figure 1: Map of the Friesen Gravity Sanitary Sewer Network

The gravity main pipe is sloped at 1.5% to 3.0% with approximately 2.5m of cover. The sanitary sewer was constructed on the boulevard outside of the roadway, with an as-constructed cross-section as shown in *Figure 2*. According to as-built drawings, pipe bedding is primarily Class "B" bedding consisting of fine granular material (sand and gravel) above and below the pipe, compacted to 95% SPD.

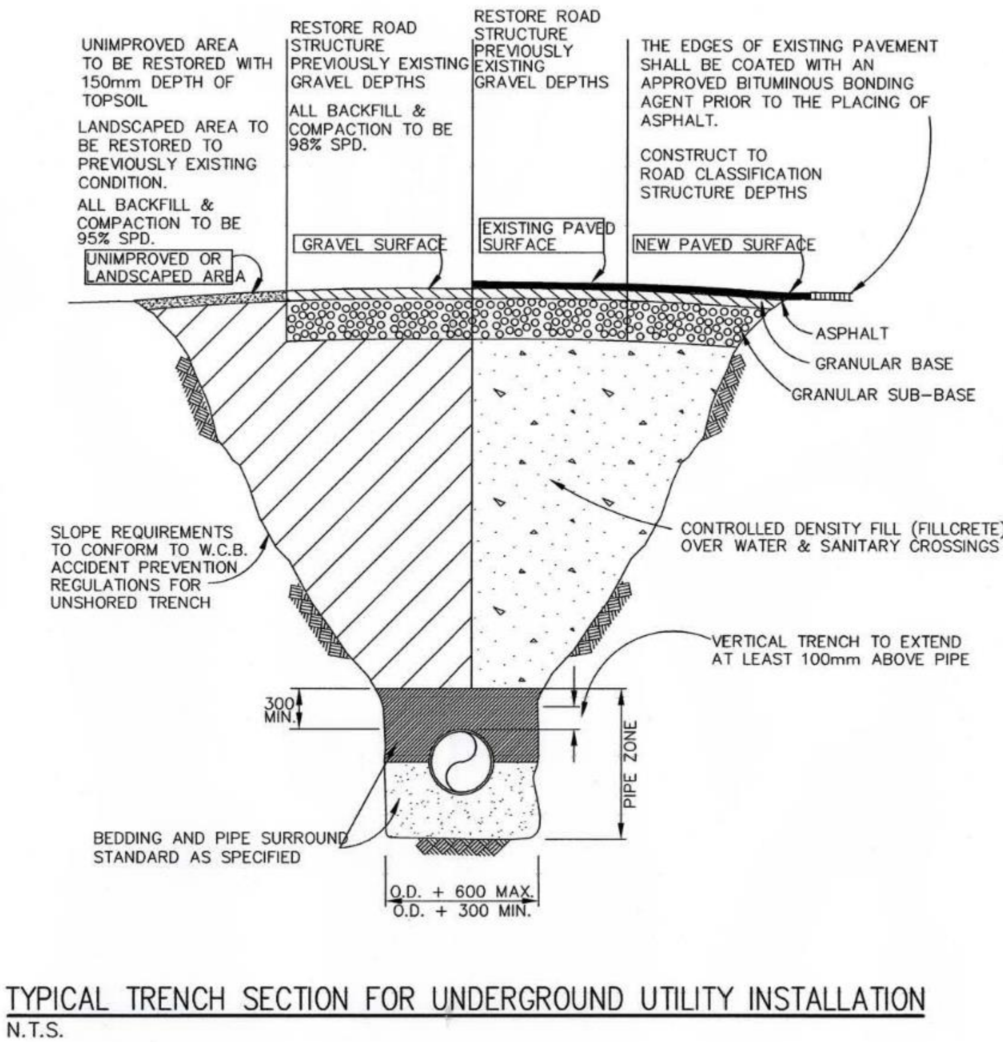

Figure 2: Typical Trench Detail for Friesen Gravity Sewer Installation

2. CCTV Inspection Assessment

This section summarizes the findings and recommendations for the gravity sanitary sewer main of the Friesen subdivision based on Closed-Circuit Television (CCTV) inspection. The analysis will assist the PRRD with determining the current condition, identifying required repairs, estimating the remaining service life, providing a cost estimate for repairs that are required immediately, and to estimate the replacement cost for the whole system in 2021 funds.

2.1. METHODOLOGY

McElhanney contracted Northern Lites Technologies to inspect each section of sanitary sewer in the Friesen subdivision. The pipe segments were flushed when necessary and video was recorded using a CCTV camera mounted on a remote operated tractor. The operator stopped the camera and noted defects based on the National Association of Sewer Service Companies (NASSCO) defect codes during the inspection. When surveys needed to be abandoned due to water levels or other obstructions, an attempt would be made to send the camera from the opposite direction. The collected videos were then watched, verified, and scored according to the NASSCO Pipeline Assessment Certification Program (PACP) rating guidelines.

The pipe segments were analyzed using the NASSCO PACP Condition Grading System. For each segment of pipe, a list of defects and a score associated with that defect was identified. The scores vary from 1 to 5, with 5 being the most severe; separate scoring is completed for structural defects as well as operational and maintenance defects. The full table can be seen in *Appendix B*.

The PACP Quick Scoring method has four (4) digits and represents the two most severe defects and their number of occurrences. For example, a PACP Quick Score of 3224 identifies that the segment of pipe has two (2) grade 3 defects and four (4) grade 2 defects. Using such a system allows quick identification of pipe that may require closer scrutiny.

The Index Rating method takes a sum of all the defect scores and divides it by the number of defects, essentially calculating an average defect score for the segment of pipe. This method is to be applied with caution, as a severe defect can become diluted by many less severe defects; hence, the two rating systems are used in conjunction to allow the review to focus on pipe segments that may need more attention and closer scrutiny.

The pipe rating system used is in accordance with the NASSCO Pipeline Assessment and Certification Program, Version 6.0.1, dated November 2010. Refer to *Appendix C* for an excerpt from the PACP training manual that describes the rating methods described above. Also included are two pages taken from the PACP training manual that briefly describe the reasons for CCTV inspection, the information needed from CCTV inspection data, reasons for standardization in CCTV inspection reporting and the origin of condition codes.

Manholes were assessed using a remote camera suspended from a tripod that was capable of taking 3D scans of the interior of the manhole. The camera was lowered to different heights and a 360° view of the manhole was then compiled at each depth. From these 3D views, the manholes were assessed using the NASSCO MACP system. The MACP system collects information on the manhole and is divided into Level 1 and Level 2 assessments. Level 1 MACP assessments gather information for a general condition assessment with observations and helps to determine whether a more comprehensive inspection (Level 2) is required. If a Level 2 inspection is warranted, the MACP uses coded defect ratings similar to the NASSCO PACP rating system.

2.2. NASSCO PIPE AND MANHOLE ANALYSIS

The following sections provide a summary of the defects found in each of the branches assessed. The sections below identify the sewer segments with any structural defect, any operational defect of severity 4 or higher, or any other defect of note. Defects of a lower severity are associated with minor infiltration or deposits in the main, which could be addressed by flushing as part of a regular maintenance program.

2.2.1. Pipe Segment CCTV Inspection

The Friesen segment of the CCTV assessment generally had PVC sanitary sewer main in good to very good structural condition for the segments able to be viewed by CCTV. Typically, laterals were installed using inserta-tees and manufactured wyes, with services largely in good condition. Pipe installed to specifications is typically expected by manufacturers to have a lifespan of 100+ years, but repair costs may begin to mount near the end of the pipe's lifespan, leading to the conservative useful lifespan of 75 years used for this report.

Some segments in this area had encrustation and settled gravels but, unless otherwise noted, maintained minimum 80% pipe cross-section. Below is a summary of each segment; details are in *Appendix B*.

- SMH-01 to SMH-02; 200mm PVC: Pipe is in fair condition, one instance of underwater camera with the pipe 80% full of water (with water level at 30% before and after) indicating sag in the pipe grade. Pipe also shows early signs of structural failure, with several circumferential cracks, as seen in *Figure 3*. These circumferential cracks may also be PVC repair couplings from past maintenance. The cracks are uniform and lack the characteristic longitudinal crack propagation that PVC pipe usually exhibits under stress failures, so these likely aren't a current cause for concern but should be monitored.

Figure 3: Circumferential Crack with Minor Infiltration

- SMH-02 to SMH-03; 200mm PVC: Pipe is in fair condition, one instance of underwater camera with pipe 80% full of water (with water level at 30% before and after) possibly indicating sag in the pipe grade. Note that this instance of the camera going underwater was within a short distance of the manhole with the sewer having approximately 30% flow (*Figure 4*), so the underwater camera may have been due to a hydraulic jump at the manhole interface.

Figure 4: CCTV Image Taken During Period of Moderate Flow
Flow may have led to a hydraulic jump condition causing an instance of underwater camera

- SMH-03 to SMH-04, 200mm PVC: Pipe in good condition, no defects of note.
- SMH-04 to SMH-05, 200mm PVC: Pipe in good condition, no defects of note.
- SMH-05 to SMH-06; 200mm PVC: Pipe in poor condition, one location of a circumferential crack combined with moderate mineral encrustation. Survey also showed an instance of underwater camera, indicating possible pipe failure and/or collapse beyond the surveyed extent. Note that this pipe is installed in a steel encasement pipe across Highway 97, as shown in *Figure 5*.

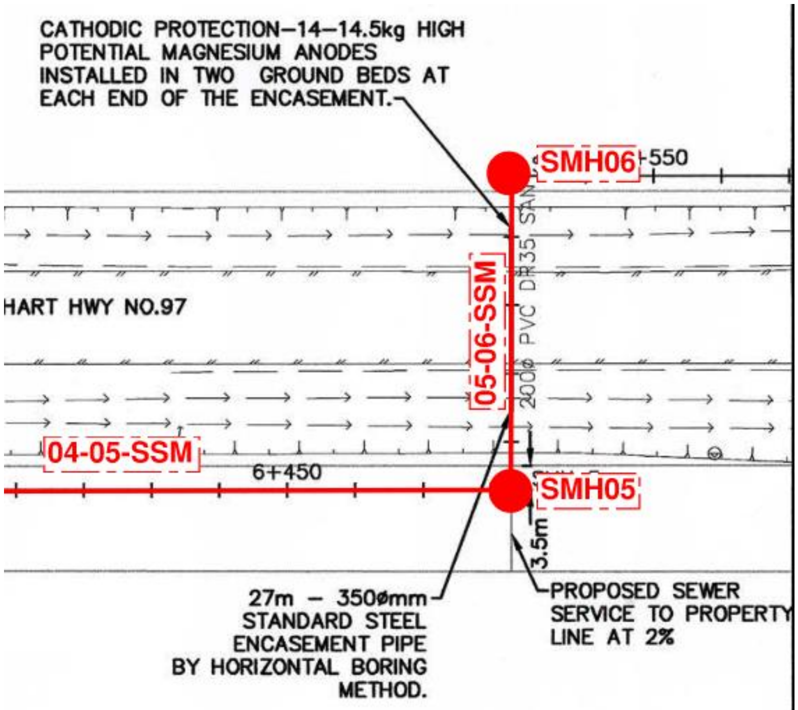

Figure 5: SMH-05 to SMH-06 Installed in 350mm Steel Carrier Pipe to Cross Highway 97

- SMH-21 to SMH-04, 200mm PVC: Pipe in good condition, no defects of note.
- SMH-22 to SMH-21, 200mm PVC: Pipe in good condition, no defects of note.
- SMH-23 to SMH-22, 200mm PVC: Pipe in good condition, some gravel deposits.

Table 1 provides an overview of the pipe conditions and the PACP ratings for the surveys conducted.

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Table 1: NASSCO PACP Pipe Segment Rating and Index

Upstream MH	Downstream MH	PACP Quick (Structural)	PACP Quick (O&M)	Structural Index	O&M Index	Overall Index	Rating per m	Defects per m
SMH-01	**SMH-02**	1300	4212	1	2.5	1.86	0.092	0.050
SMH-02	**SMH-03**	0000	4100	0	4	4	0.028	0.007
SMH-03	**SMH-04**	0000	0000	0	0	0	0.000	0.000
SMH-04	**SMH-05**	0000	0000	0	0	0	0.000	0.000
SMH-05	**SMH-06**	1100	4221	1	3.33	2.75	2.391	0.870
SMH-21	**SMH-04**	0000	0000	0	0	0	0.000	0.000
SMH-22	**SMH-21**	0000	3100	0	3	3	0.023	0.008
SMH-23	**SMH-22**	0000	3200	0	3	3	0.039	0.013

2.2.2. Manhole 3D Scan Inspection

The Friesen manhole assessment indicated that the manholes were generally in good condition. The manholes are all precast manufactured concrete with aluminum stepladder rungs, manufactured benching, and cast-iron manhole covers. Manholes of this type installed to specifications are expected to have a lifespan of 50+ years but can last for significantly longer in low corrosivity environments.

Several manholes exhibited some minor infiltration, typical of all manholes, and a few exhibited some encrustation around the manhole benching and manhole base. All assessments were completed to NASSCO MACP Level 1 standards. Below is a summary of each manhole; details can be found in *Appendix B*.

- SMH-01, 1050mm concrete manhole: Manhole in good condition.
- SMH-02, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near the manhole base joint, as seen in *Figure 6*.

Figure 6: Infiltration Stains and Minor Encrustation Near Base Joint of SMH-02

- SMH-03, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-04, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining and encrustation near a service on top of the benching.
- SMH-05, 1050mm concrete manhole: Manhole in good condition.
- SMH-06, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration staining.
- SMH-21, 1050mm concrete manhole: Manhole in good condition.
- SMH-22, 1050mm concrete manhole: Manhole in good condition. Some minor infiltration and encrustation near the manhole benching, as seen in *Figure 7*.

Figure 7: Encrustation Around Benching of SMH-22

- SMH-23, 1050mm concrete manhole: Manhole in good condition.

2.3. RECOMMENDATIONS

McElhanney recommends the following:

- Continuing the monitoring and maintenance program, with flushing every 5 years (or more often as required) and reinspection and assessment every 10 years.
- Locating and replacing the segments of pipe exhibiting sagging between SMH-01 and SMH-02, SMH-02 and SMH-03. This work could be performed as point repairs to the system with disturbance only required in the vicinity of the repair. This may require work to reconnect service connections at the new grade if services are located at the underwater sections.
- Replacing the SMH-05 to SMH-06 segment. This segment is exhibiting some structural defects in addition to a large, sagged section with settled gravels. This pipe segment is also located in a casing pipe under the highway, which makes repairs difficult without full replacement. McElhanney recommends locating and reusing the casing pipe to avoid highway disturbance. Reusing the casing pipe may require some modifications to the existing manholes on either side of the highway to match grades. After removal of the carrier pipe, the casing pipe should be inspected by CCTV for defects. Cleaning of all manholes by pressurized water and/or mechanical tools, with attention paid to manholes with encrustation. After cleaning is completed, any deficient manhole construction causing infiltration and encrustation should be noted and repaired with concrete patching.

2.4. COST ESTIMATE

The system has defects that require attention, but is in good condition, with an estimated lifespan of another 30+ years with proper maintenance. All costs are listed as 2021 dollars with a 30% contingency. *Table 2* provides an overview of the repairs, on-going maintenance, replacement costs, and the estimated lifespan for each asset.

Table 2: Cost Estimate for Friesen Sanitary Sewer Repairs, Maintenance, and Replacement

Asset		Cost of Current Repairs Required	Cost of Maintenance (Yearly)	Cost of Replacement	Estimated Lifespan (Years)
PIPES	SMH01 to SMH-02	$15,000	$200	$146,000	59
	SMH02 to SMH-03	$15,000	$200	$146,000	59
	SMH03 to SMH-04	$0	$200	$94,000	59
	SMH04 to SMH-05	$0	$200	$113,000	59
	SMH05 to SMH-06	$59,000	$200	$59,000	59
	SMH21 to SMH-04	$0	$200	$140,000	59
	SMH22 to SMH-21	$0	$200	$138,000	59
	SMH23 to SMH-22	$0	$200	$158,000	59
MANHOLES	SMH-01	$500	$100	$12,000	34
	SMH-02	$500	$100	$12,000	34
	SMH-03	$500	$100	$12,000	34
	SMH-04	$500	$100	$12,000	34
	SMH-05	$500	$100	$12,000	34
	SMH-06	$500	$100	$12,000	34
	SMH-21	$500	$100	$12,000	34
	SMH-22	$500	$100	$12,000	34
	SMH-23	$500	$100	$12,000	34

2.4.1. Repairs

Pipes

McElhanney recommends carrying out point repairs on the sagging areas of the sewers to MMCD standards, including new sections of PVC SDR35 sanitary sewer installed with new bedding and repair couplings. While repairs are carried out, the subgrade should be inspected for suitability and removed if unsuitable or if deleterious materials are found, as soft ground may be the cause of the pipe sags. Once repaired, the pipes should be re-inspected. McElhanney also recommends full replacement of the segment of pipe from SMH-05 to SMH-06 in the existing casing pipe, if the casing pipe is in good condition.

Estimated Cost of Repairs: $89,000

Manholes

Cleaning all manholes to clear encrustation is recommended. Once complete, perform concrete patching as required.

Estimated Cost: $500 per manhole, $4,500 total

2.4.2. Maintenance

Pipes

Flushing and reinspecting every 5 to 10 years to watch for signs of pipe failure is recommended. Pipes showing signs of early failure (cracking, root intrusion, additional sagging) should be repaired as necessary until full replacement is warranted. Pricing assumes that the entire system is cleaned and inspected together. Individual segments inspected more frequently would lead to a higher overall maintenance cost.

Estimated Cost: $200 per segment per year with an expected $16,000 total per inspection and flushing cycle.

Manholes

Cleaning and reinspecting every 5 to 10 years to watch for signs of structural failure is recommended. Manholes showing signs of early failure (cracking, root intrusion, major encrustation) should be repaired as necessary until full replacement is warranted.

Estimated Cost: $100 per manhole per year with a total expected spend of $9,000 total every inspection cycle.

2.4.3. Replacement

Once replacement is warranted, the entire gravity system should be removed and replaced. Services should be scoped as the replacement takes place, with deficient services being replaced and transferred at property line. Replacement is usually required when the cost of on-going repairs is too high or when the pipes begin to exhibit excessive structural failures in the NASSCO PACP ratings system. Full replacement is not warranted at this time. The system condition is consistent with the age of the assets. The system should be expected to last 30+ years with proper maintenance and repairs.

Estimated Cost for Total Replacement: $1,107,000

Appendix A

Statement of Limitations

Statement of Limitations

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Effect of Changes. All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the site assessment and report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Construction activities can significantly alter soil, rock and other geologic conditions on the site. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, c) new information is discovered in the future during site excavations, construction, building demolition or other activities, or d) additional subsurface assessments or testing conducted by others.

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Construction Cost Estimates. This construction cost estimate has been prepared using the design and technical information currently available, and without the benefit of Geotechnical, Environmental, and Archaeological information. Furthermore, McElhanney cannot predict the competitive environment, weather or other unforeseen conditions that will prevail at the time that contractors will prepare their bids. The cost estimate is therefore subject to factors over which McElhanney has no control, and McElhanney does not guarantee or warranty the accuracy of such estimate.

Appendix B

Pipe Condition Tables

Pipe Segment	U/S MH#	D/S MH#	Pipe Size (mm)	Material	Length (m)	Grade (%)	Report #	Report Date	Video #	Station	Defect: Group	Descriptor	Modifier	Defect	Defect (Input)	Continuous (Match Codes)	Numeral Mod	Percent/Count	Structural Rating	O&M Rating	# of Structural Defects Count	# of O&M Defects Count	Total Number of Defects	Structural Rating Index	O&M Rating Index	Overall Index
1	AMH_SMH 01	AMH_SMH 02	200	PVC	140.6	-	31112652200	Jun-21	01_Friesen_Sub_AMH_SMH01_AMH_SMH02	0	Access_Points	Manhole		AMH			0		0	0	0	0	7	1.0	2.5	1.9
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										20	Tap	Factory_Made	Activity	TFA			0		0	0	0	0				
										34.3	Tap	Factory_Made	Activity	TFA			0		0	0	0	0				
										54.7	Crack	Circumferential		CC			0		1	0	1	0				
										58.7	Crack	Circumferential		CC			0		1	0	1	0				
										58.7	Infiltration	Stain		IS			0		0	0	0	0				
										94.8	Tap	Factory_Made	Activity	TFA			0		0	0	0	0				
										95.4	Tap	Factory_Made	Activity	TFA			0		0	0	0	0				
										107.6	Crack	Circumferential		CC			0		1	0	1	0				
										107.6	Infiltration	Stain		IS			0		0	0	0	0				
										111.8	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										127	Miscellaneous	Camera Underwater		MCU			0		0	4	0	1				
										127	Line	Up		LU			OM_Degree	<=10	0	1	0	1				
										132	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										132	Line	Down		LD			OM_Degree	<=10	0	1	0	1				
										138.3	Tap	Factory_Made	-	TF			0		0	0	0	0				
										138.3	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										139.1	Miscellaneous	Camera Underwater		MCU			0		0	4	0	1				
										140.6	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									**3**	**10**	**3**	**4**				
										Quick									**1300**	**4212**						
2	AMH_SMH 02	AMH_SMH 03	200	PVC	140.8	-	31112652200	Jun-21	02_Friesen_Sub_AMH_SMH02_AMH_SMH03	0	Access_Points	Manhole		AMH			0		0	0	0	0	1	0.0	4.0	4.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										29.4	Tap	Factory_Made	-	TF			0		0	0	0	0				
										88.1	Tap	Factory_Made	Activity	TFA			0		0	0	0	0				
										135	Miscellaneous	Camera Underwater		MCU			0		0	4	0	1				
										140.8	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										140.8	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									**0**	**4**	**0**	**1**				
										Quick									**0000**	**4100**						
3	AMH_SMH 3	AMH_SMH 4	200	PVC	89.7	-	31112652200	Jun-21	03_Friesen_Sub_AMH_SMH3_AMH_SMH4	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										35.3	Tap	Saddle	-	TS			0		0	0	0	0				
										43	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										89.7	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									**0**	**0**	**0**	**0**				
										Quick									**0000**	**0000**						
4	AMH_SMH 04	AMH_SMH 05	200	PVC	114	-	31112652200	Jun-21	04_Friesen_Sub_AMH_SMH04_AMH_SMH05	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										69.5	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										114	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									**0**	**0**	**0**	**0**				
										Quick									**0000**	**0000**						
5	AMH_SMH 05	AMH_SMH 06	200	PVC	4.6	-	31112652200	Jun-21	05_Friesen_Sub_AMH_SMH05_AMH_SMH06	0	Access_Points	Manhole		AMH			0		0	0	0	0	4	1.0	3.3	2.8
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										1.1	Crack	Circumferential		CC			0		1	0	1	0				
										1.6	Deposits	Deposits_Attached	Encrustation	DAE			OM_Percent	<=10	0	2	0	1				
										3.3	Miscellaneous	Camera Underwater		MCU			0		0	4	0	1				
										4.5	Deposits	Deposits_Settled	Gravel	DSGV			OM_Percent	<=30	0	4	0	1				
										4.6	Miscellaneous	Survey Abandoned		MSA			0		0	0	0	0				
										Total									**1**	**10**	**1**	**3**				
										Quick									**1100**	**4221**						
6	AMH_SMH 21	AMH_SMH 4	200	PVC	135.8	-	31112652200	Jun-21	06_Friesen_Sub_AMH_SMH21_AMH_SMH4	0	Access_Points	Manhole		AMH			0		0	0	0	0	0	0.0	0.0	0.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										135.8	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									**0**	**0**	**0**	**0**				
										Quick									**0000**	**0000**						
7	AMH_SMH 22	AMH_SMH 21	200	PVC	131.8	-	31112652200	Jun-21	07_Friesen_Sub_AMH_SMH22_AMH_SMH21	0	Access_Points	Manhole		AMH			0		0	0	0	0	1	0.0	3.0	3.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										0	Deposits	Deposits_Attached	Encrustation	DAE			OM_Percent	<=20	0	3	0	1				
										1	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										2	Miscellaneous	Water Level		MWL			0		0	0	0	0				
										128.4	Tap	Saddle	Activity	TSA			0		0	0	0	0				
										131.8	Access_Points	Meter		AM			0		0	0	0	0				
										Total									**0**	**3**	**0**	**1**				
										Quick									**0000**	**3100**						
8	AMH_SMH 23	AMH_SMH 22	200	PVC	153.7	-	31112652200	Jun-21	08_Friesen_Sub_AMH_SMH23_AMH_SMH22	0	Access_Points	Manhole		AMH			0		0	0	0	0	2	0.0	3.0	3.0
										0	Miscellaneous	Water Level		MWL	5		0		0	0	0	0				
										1.9	Miscellaneous	General Observation		MGO			0		0	0	0	0				
										3	Deposits	Deposits_Settled	Gravel	DSGV			OM_Percent	<=20	0	3	0	1				
										19.4	Deposits	Deposits_Settled	Gravel	DSGV			OM_Percent	<=20	0	3	0	1				
										153.7	Access_Points	Manhole		AMH			0		0	0	0	0				
										Total									**0**	**6**	**0**	**2**				
										Quick									**0000**	**3200**						

Appendix C

NASSCO PACP Rating Guidelines

PACP© Condition Grading System

The Pipeline Assessment and Certification Program (PACP) developed by NASSCO provides a mechanism for creating reliable descriptions of pipe conditions. NASSCO has also developed a system based on the PACP codes to assign a condition rating to pipelines. Requirements of the grading system were as follows:

1. Like the PACP, the grading system should be direct and objective.

2. Provide the ability to qualitatively identify differences in pipe condition between one inspection and subsequent inspections, and to prioritize based on the significance of the defects different pipe segments.

Many other approaches to sewer pipe grading have been used in the United States as well as in other parts of the World. These approaches generally use some type of defect grading that is then used to calculate an overall pipe rating.

It is problematic to develop a single pipe segment rating that fully describes all of the important aspects of a pipe. Therefore the PACP Condition Grading System uses more than one method of rating pipe segment condition including a rating that considers the number of total defects within the pipe segment and a rating that considers the most severe defects within the pipe segment.

The PACP Condition Grading System only considers internal pipe conditions obtained from TV inspection. While other factors such as pipe material, depth, soils, and surface conditions also affect pipe survivability, those factors have not been included in the PACP Condition Grading System. The PACP Condition Grading System should be used only as a tool for screening pipe segment inspections, allowing the User to quickly determine which pipe segments have significant defects. It is expected that as the PACP further develops the PACP Condition Grading System will expand to include other factors.

The PACP Condition Grading System provides condition ratings for Structural Defects and Operation and Maintenance Defects.

Approach

Using the PACP Code Matrix, Each PACP defect code is assigned a condition grade of from 1 to 5. Grades are assigned based on the significance of the defect, extent of

damage, percentage of flow capacity restriction, or the amount of wall loss due to deterioration.

The PACP Condition Grading System alone is inadequate for determining if a pipe segment should be rehabilitated or replaced. Many other factors in addition to the internal condition of the segment should be considered. The fact that a segment has significant Grade 4 or Grade 5 defects does not necessarily mean the pipe segment should be immediately rehabilitated. Recent experience by PACP Users has shown that pipe segments with serious defects such as hinge failures may remain largely unchanged for many decades if no deterioration factors such as surcharging, roots, or groundwater are present.

What is needed is improved estimates of remaining life or mean time before failure that are based on close monitoring of pipe segments over time. Once we know how much change occurs in pipe segments we can better understand the relationship between defects, deterioration factors, and pipe segment life expectancy. PACP continues to be an excellent tool for benchmarking pipe condition between one inspection and subsequent inspections of the same pipe.

Grades are assigned for two categories, Structural, and O&M defects.
Grades are as follows;
5 - Most significant defect grade
4 – Significant
3 – Moderate defect grade
2 – Minor to Moderate
1 –Minor defect grade

The PACP Condition Grading System results are entirely dependent on the quality of the PACP defect coding. Errors in the coding will directly result in errors in the Grading. All utilities, engineers, and contractors should make sure the data they are using was coded by experienced technicians who have successfully demonstrated their competence through a formal or informal apprenticeship program. PACP data from inexperienced technicians should be checked and corrected as needed. Errors found in coding should be corrected and the errors brought to the attention of the technician.

Grading of Continuous Defects

The PACP continuous defect feature is used to denote where long portions of a sewer pipe are affected by the same defect, without the User having to repetitively enter point defects. However to develop a grade for the pipe segment, a mechanism is needed to translate a continuous defect into an equivalent number of point defects.

The equivalent number (quantity) of "uninterrupted" and "joint repeating" continuous defects is calculated by dividing the length of the continuous defect by 5. Example, a 6-meter long continuous defect, grade 3, should equate to four Grade 3 defects. Fractions are rounded to the nearest whole number.

Pipe Ratings

The pipe rating is based on the number of occurrences for each condition grade. Ratings are calculated separately for **Structural Defects** and **O&M Defects**. Several ways of expressing pipe segment condition are used by the PACP Condition Grading System as follows.

Segment Grade Scores - Each pipe segment will have a Segment Grade Score for each of the five grades. The number of occurrences of each pipe grade is multiplied by the pipe grade to calculate the segment grade score. Example, six Grade 5 defects would be 6 times 5 and equates to a Segment Grade 5 Score of 30. If a pipe segment had no defects of a particular grade, then the Segment Grade Score for that grade would be 0.

Overall Pipe Rating –The five Segment Grade Scores are added together to calculate the **Overall Pipe Rating.** **Structural Pipe Ratings** are calculated using only Structural Defect grades, while **O&M Pipe Ratings** are calculated using only O&M Defect grades.

PACP Quick Rating – The PACP Quick Rating is a shorthand way of expressing the number of occurrences for the two highest severity grades. The PACP Quick Rating is a four character score as follows:

1. The first character is the highest severity grade occurring along the pipe length.
2. The second character is the total number of occurrences of the highest severity grade. If the total number exceeds 9, then alphabetic characters are used as follows- 10 to 14 – A; 15 to 19 – B; 20 to 24 – C; etc.
3. The third character is the next highest severity grade occurring along the pipe length.
4. The fourth character is the total number of the second highest severity grade occurrences, derived as in item 2 above.

For Example

4B27

This immediately shows that no grade 5 defects or grade 3 defects, however 15 to 19 grade 4 defects and seven grade 2 defects were found.

Another Example

3224

Two grade 3 defects and four grade 2 defects, however no grade 5 or grade 4 defects were found.

If a pipe segment only has defects of one grade, the first two characters are the grade and the quantity of defects, and the last two characters are 00 (denoting no other defect grades). A pipe segment with no defects would have a Quick Score of 0000 (all zeros).

The PACP Quick Rating provides the ability to summarize the number and severity of defects found within a pipe segment. As with the Pipe Rating, Quick Structural Ratings

are calculated using only Structural Defect Grades, and Quick O&M Ratings are calculated using only O&M Defect Grades.

The Quick Rating is an excellent screening tool to determine which pipe segments require closer scrutiny. If a pipe has not defects greater than Grade 1 or 2, then the pipe segment probably does not need any further investigation.

Pipe Ratings Index – This is an indicator of the distribution of defect severity. The Pipe Ratings Index is calculated by dividing the Pipe Rating by the number of defects. For example, the Structural Pipe Ratings Index would be the Structural Pipe Rating divided by the number of structural defects. Pipe Ratings Indexes are calculated for Structural, O&M, and Overall. A pipe segment with a Pipe Rating of zero (0) would have a Pipe Rating Index of zero (0).

Summary

The following procedures are used to calculate pipe segment ratings using the PACP Condition Grading System:

1. Determine the number of occurrences for each condition grade within the pipe segment. Calculate separately for Structural Defect Grades and O&M Defect Grades.
2. Calculate the Segment Grade Score by multiplying the number of occurrences by the respective grade 1 through 5. Calculate the Structural Segment Grade Score and the O&M Segment Grade Score separately, and then add together for the Overall Segment Grade Score.
3. Calculate the Pipe Rating for the pipe segment by adding the Segment Grade Scores. Add all five Structural Segment Grade Scores for the Structural Pipe Rating, and add all five O&M Segment Grade Scores for the O&M Pipe Rating. Add all five Overall Segment Grade Scores for the Overall Pipe Rating.
4. Determine the PACP Quick Rating by calculating the number of occurrences of the two highest severity grades.

5. Calculate the Pipe Ratings Index by dividing the Pipe Rating by the number of defects. If the pipe has no defects, the Pipe Ratings Index is zero.
6. Verify the PACP defect data used in accurate. The grading is a direct calculation from the defect data, and coding errors will be reflected in grading errors.

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
Structural	Crack (C)	Circumferential (C)		CC	1	
		Longitudinal (L)		CL	2	
		Multiple (M)		CM	3	
		Hinge (CH2)		CH2	4	
		Hinge (CH3)		CH3	5	
		Hinge (CH4)		CH4	5	
		Spiral (S)		CS	2	
Structural	Fracture (F)	Circumferential (C)		FC	2	
		Longitudinal (L)		FL	3	
		Multiple (M)		FM	4	
		Hinge (H2)		FH2	4	
		Hinge (H3)		FH3	5	
		Hinge (H4)		FH4	5	
		Spiral (S)		FS	3	
Structural	Pipe Failures (Silent)	Broken (B)		B	1 clock pos - 3, 2 clock pos - 4, >=3 clock pos - 5	
		Broken (B)	Soil Visible (SV)	BSV	5	
		Broken (B)	Void Visible (V V)	BVV	5	
		Hole (H)		H	1 clock pos - 3, 2 clock pos - 4, >= 3 clock pos - 5	
		Hole (H)	Soil Visible (SV)	HSV	5	
		Hole (H)	Void Visible (V V)	HVV	5	
Structural	Collapse (X)	Pipe (P)		XP	5	
		Brick (B)		XB	5	
Structural	Deformed (D)	(Pipe)		D	<=10% - 4,>10% - 5	
		(Brick)	Horizontally (H)	DH	5	
		(Brick)	Vertically (V)	DV	5	
Structural	Joint (J)	Offset (displaced) (O)	Med (M)	JOM	1	
			Large (L)	JOL	2	
		Separated (open) (S)	Med (M)	JSM	1	
			Large (L)	JSL	2	
		Angular (A)	Med (M)	JAM	1	
			Large (L)	JAL	2	
Structural	Surface Damage Chemical (S)	Roughness Increased (RI)	C	SRIC	1	
		Surface Spalling (SS)	C	SSSC	2	
		Aggregate Visible (AV)	C	SAVC	3	
		Aggregate Projecting (AP)	C	SAPC	3	
		Aggregate Missing (AM)	C	SAMC	4	

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Reinforcement Visible (RV)	C	SRVC	5	
		Reinforcement Projecting (RP)	C	SRPC	3	
		Reinforcement Corroded (RC)	C	SRCC	5	
		Missing Wall (MW)	C	SMWC	5	
		Other (Z)	C	SZC		
Structural	Surface Damage Mechanical (M)	Roughness Increased (RI)	M	SRIM	1	
		Surface Spalling (SS)	M	SSSM	2	
		Aggregate Visible (AV)	M	SAVM	3	
		Aggregate Projecting (AP)	M	SAPM	3	
		Aggregate Missing (AM)	M	SAMM	4	
		Reinforcement Visible (RV)	M	SRVM	5	
		Reinforcement Projecting (RP)	M	SRPM	3	
		Reinforcement Corroded (RC)	M	SRCM	5	
		Missing Wall (MW)	M	SMWM	5	
		Other (Z)	M	SZM	N/A	
Structural	Surface Damage Not Evident (Z)	Roughness Increased (RI)	Z	SRIZ	1	
		Surface Spalling (SS)	Z	SSSZ	2	
		Aggregate Visible (AV)	Z	SAVZ	3	
		Aggregate Projecting (AP)	Z	SAPZ	3	
		Aggregate Missing (AM)	Z	SAMZ	4	
		Reinforcement Visible (RV)	Z	SRVZ	5	
		Reinforcement Projecting (RP)	Z	SRPZ	3	
		Reinforcement Corroded (RC)	Z	SRCZ	5	
		Missing Wall (MW)	Z	SMWZ	5	
		Other (Z)	Z	SZZ	N/A	
Structural	Surface Damage (Metal Pipes)	Corrosion (CP)		SCP	3	
Structural	Lining Features (LF)	Detached (D)		LFD	3	
		Defective End (DE)		LFDE	3	
		Blistered (B)		LFB	3	
		Service Cut Shifted (CS)		LFCS	3	
		Abandoned Connection (AC)		LFAC		
		Overcut Service (OC)		LFOC	3	
		Undercut Service (UC)		LFUC	3	
		Buckled (BK)		LFBK	3	
		Annular Space (AS)		LFAS	3	
		Bulges (BU)		LFBU	3	
		Discoloration (DC)		LFDC	3	
		Delamination (DL)		LFDL	3	
		Pinholes (PH)		LFPH	3	
		Resin Slug (RS)		LFRS	3	
		Wrinkled (W)		LFW	3	
		Other (Z)		LFZ	N/A	
Structural	Weld Failure (WF)	Circumfrential (C)		WFC	2	
		Longitudinal (L)		WFL	2	

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Multiple (M)		WFM	3	
		Spiral (S)		WFS	2	
Structural	Point Repair (RP)	Localized Pipeliner (L)		RPL		
		Localized Pipeliner (L)	Defective (D)	RPLD	4	
		Patch Repair (P)		RPP		
		Patch Repair (P)	Defective (D)	RPPD	4	
		Pipe Replaced (R)		RPR		
		Pipe Replaced (R)	Defective (D)	RPRD	4	
		Other (Z)		RPZ		
		Other (Z)	Defective (D)	RPZD		
Structural	Brickwork (Silent)	Displaced (DB)		DB	3	
		Missing (MB)		MB	4	
		Dropped Invert (DI)		DI	5	
		Missing Mortar	Small	MMS	2	
			Medium	MMM	3	
			Large	MML	3	
O&M	Deposits (D)	Deposits Attached (DA)	Encrustation (E)	DAE		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Grease (G)	DAGS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Ragging (R)	DAR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Other (Z)	DAZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Deposits Settled (DS)	Hard/Compacted (C)	DSC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Fine silt/sand (F)	DSF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Gravel (G)	DSGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Other (Z)	DSZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Deposits Ingress (DN)	Fine silt/sand (F)	DNF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Gravel (GV)	DNGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
			Other (Z)	DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connecfion (C)	RFC		1
	Roots (R) at a Joint		N/A	RFJ	in software with a J	1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connecfion (C)	RTC		2
	Roots (R) at a Joint		N/A	RTJ		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connecfion (C)	RMC		3
	Roots (R) at a Joint		N/A	RMJ		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connecfion (C)	RBC		4
	Roots (R) at a Joint		N/A	RBJ		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
		Stain (S)		IS		
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Intruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		External Pipe or Cable In Sewer (P)		OBP		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Built Into Structure (S)		OBS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Construction Debris (N)		OBN		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Rocks (R)		OBR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other Objects (Z)		OBZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Vermin (V)	Rat (R)		VR		2
		Cockroach (C)		VC		1
		Other (Z)		VZ		1
O&M	Grout Test and Seal (G)	Grout Test Pass (GTP)				
			Joint (J)	GTPJ		
			Lateral (L)	GTPL		
		Grout Test Fail (GTF)				
			Joint (J)	GTFJ		
			Lateral (L)	GTFL		
		Grout Test Unable to Test (GTU)				
			Joint (J)	GTUJ		
			Lateral (L)	GTUL		
		Grout at a Location (not a joint) (GRT)		GRT		
Construction Features	Tap (T)	Factory Made (F)		TF		
			Capped (C)	TFC		
			Abandoned (B)	TFB		
			Defective (D)	TFD		2
			Intruding (I)	TFI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TFA		
		Break-In/Hammer (B)		TB		
			Capped (C)	TBC		2
			Abandoned (B)	TBB		
			Defective (D)	TBD		3
			Intruding (I)	TBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TBA		
		Saddle (S)		TS		
			Capped (C)	TSC		
			Abandoned (B)	TSB		

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
			Defective (D)	TSD		2
			Intruding (I)	TSI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Activity (A)	TSA		
		Rehabilitated (R)		TR		
			Defective (D)	TRD		2
			Intruding (I)	TRI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Intruding Seal Material (IS)			IS		
		Sealing Ring (SR)		ISSR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Hanging (H)	ISSRH		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Broken (B)	ISSRB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Loose, Poorly Fitting (SRL)		ISSRL		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Grout (GT)		ISGT		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other (Z)		ISZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Line (L)	Left (L)		LL		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Up (LU)		LLU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Down (LD)		LLD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right (R)		LR		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4

NASSCO PACP Condition Grading System
Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Right/Up (RU)		LRU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right/Down (RD)		LRD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Up (U)		LU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Down (D)		LD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
Construction	Access Points (A)					
		Cleanout (CO)		ACO		
			Mainline (M)	ACOM		
			Property (P)	ACOP		
			House (H)	ACOH		
		Discharge Point (DP)		ADP		
		Junction Box (JB)		AJB		
		Meter (M)		AM		
		Manhole (MH)		AMH		
		Other Special Chamber (OC)		AOC		
		Tee Connection (TC)		ATC		
		WW Access Device (WA)		AWA		
		Wet Well (WW)		AWW		
		Catch Basin (CB)		ACB		
		End of Pipe (EP)		AEP		
Other	Miscellaneous (M)	Camera Underwater (CU)		MCU		4
		Dimension/Diam/Shape Change (SC)		MSC		
		General Observation (GO)		MGO		
		General Photograph (GP)		MGP		
		Material Change (MC)		MMC		
		Lining Change (LC)		MLC		
		Pipe Joint Length Change (JL)		MJL		
		Survey Abandoned (SA)		MSA		
		Water Level (WL)		MWL		
			Sag (S)	MWLS	<=30% - 2, <=50% - 3, >50% - 4	
		Water Mark (WM)		MWM		>=50% 4, >=75% 5
		Dye Test (Y)		MY		
			Visible (V)	MYV		5
			Not Visible (N)	MYN		3

Reasons for TV Inspection

We televise sewers for many different purposes, some of those purposes are:

- **Routine Operational Requirements** – Pro-active inspection to identify potential failures and for planning routine Operation and Management (O&M) and renovation programs.
- **Troubleshooting** – Investigation of problem incidents to select remedial action.
- **Compliance with Mandated Programs** – Inspection and data collection to support programs such as Capacity, Management, Operations and Maintenance (C-MOM) and Administrative Orders (AOs), Governmental Accounting Standards Board statement 34 (GASB-34), and Consent Decrees.
- **Acceptance Testing** – Inspection of new or renewed sewers to insure that construction met specifications and to document as-built conditions.
- **Infiltration/Inflow (I/I) or Capital Improvement Program (CIP) Projects** – Examples of the type projects normally conducted by specialty firms or engineering consultants.

Regardless of what purpose we televise sewers, it is important that TV inspection data is collected thoroughly and consistently. This approach insures better and more comprehensive data is collected, and will provide opportunities for a single TV inspection to serve multiple purposes. While obtaining a limited amount of information may meet the immediate data needs, it also means the information obtained as part of a comprehensive PACP inspection will not be available for other possible requirements in the future.

What We Need from TV Inspection Data

The basic information we need from TV inspection is as follows:

- Record and archive all descriptive data using standard procedures and data format
- Develop a condition rating for each line
- Provide follow-up recommendations
- Display results on a map
- Establish benchmarks to compare with future inspections of same line

Standardizing on the PACP codes as well as integration with other components of the PACP will meet the above objectives.

Why Standardization is Important

Some the benefits of standardization are as follows:

- Allows for more effort to be placed on consistency of data and utilization of data rather than development of utility-specific or project-specific standards
- Provides the capability of benchmarking sewers within a single utility as well as from one geographical area of the US to another
- Ability to detect change due to deterioration over time
- Provides better opportunities for integrating data from different software programs
- Improved confidence in the description of pipe conditions will provide cost savings during renewal
- Advances the professionalism of the TV inspection industry

Origin of Condition Codes

WRc first drafted the Manual of Sewer Condition Classification (MSCC) in 1980 for use in the United Kingdom. At that time, consistent assessment of sewer condition was needed in order to fairly set sewer rates charged to consumers by the private utility companies that operated throughout the UK, and those codes are now the mandated standard. The MSCC was most recently updated by WRc in 2004 (MSCC Fourth Edition) and are used extensively throughout the world. Other WRc-based coding systems have been implemented throughout the world including Australia, New Zealand, Southeast Asia, and Europe.

The PACP codes were developed by NASSCO and the Water Research Centre (WRc) in 2002. Prior to the development of the PACP, no standard TV inspection codes or procedures existed in the United States. While many agencies and engineering firms in the US used adaptations of the WRc codes, no single standard existed, nor was a standard training and certification program available.

Those familiar with the WRc codes will find the PACP codes very similar. Terminology has been changed to reflect terms used in the United States. Codes have been added to describe conditions found in renewed pipes and point repairs. The ability to describe pipe corrosion has been greatly improved. Coding of Operational and Maintenance problems in general has been improved. Codes have been added to describe observations and defects that otherwise would be noted in the remarks or comment section.

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CANADA BEST MANAGED COMPANIES

2022 Budget - Capital Supplemental Item

Title:	Sewer System Repairs	**Environmental Services**
Division:	Sewer	**Friesen Sewer - 604**
Type:	Capital - Replacement	**High**

Description

These capital repairs are based on identified defects found in the 2021 Condition Assessment by McElhanney. The repairs/replacements include three sections of sewer pipe and nine manholes.

Benefits

The capital works will support the the ongoing integrity and functionality of the asset by maintaining its service life.

Risks

Further repairs or upgrades may be identified during the course of contruction.

Financial Information

Capital

Funding Sources	2022	2023	2024	2025	2026	5 Year Total
Area D Gas Tax	123,500					123,500
						0
						0
	123,500	**0**	**0**	**0**	**0**	**123,500**

Expenses	2022	2023	2024	2025	2026	5 Year Total
Manhole repairs - infrastructure	4,500					4,500
Sewer line repairs - infrastructure	89,000					89,000
Construction project assurance	30,000					30,000
						0
						0
						0
						0
						0
	123,500	**0**	**0**	**0**	**0**	**123,500**

Administration

Author: Daris Gillis **Date Prepared: November 5, 2021**

Approval Date

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-116

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: Grant Request – Clearview Arena Society

RECOMMENDATION:

That the Rural Budgets Administration Committee authorize a grant in the amount of $5,000, payable from the COVID-19 Reserve Fund, to be issued to Clearview Arena Society to assist with revenue shortfalls incurred as a result of the COVID-19 restrictions on public events.

BACKGROUND/RATIONALE:

Clearview Arena Society is requesting a grant in the amount of $5,000 to help offset some of their financial losses. The applicant indicates these losses are directly related to the COVID-19 public safety restrictions implemented by the Province to help prevent the spread of COVID-19 in communities. The attached grant application demonstrates that a lower number of arena users and the inability to operate the arena concession greatly reduced the amount of annual profit typically generated compared to the amount of profit generated when operating within parameters of the imposed public restrictions.

Since 2005, the Regional District has provided a total of $2,583,071.63 in grant contributions to Clearview Arena Society. A total of $2,283,050 has been issued to support the annual operating and management of the Clearview Arena, and $300,021.63 has been issued to assist the various improvement projects to maintain the facility.

Clearview Arena Society is a registered not-for-profit society in good standing with the *Societies Act of BC* who operates within the boundaries of Electoral Area B. Their primary function is to operate and manage Clearview Arena in a safe and efficient manner to promote physical activity through skating for individuals and teams.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee respectfully deny the grant application from Clearview Arena Society and provide no grant funding to assist with the organization's revenue shortfalls incurred as a result of COVID-19 restrictions.

2. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ New and Emerging Issues

  ☒ COVID-19 Response and Recovery Plan

FINANCIAL CONSIDERATION(S):

- A total of $216,800 was allocated from the COVID-19 Reserve Fund to provide grants to not-for-profit organizations.

- As of October 31, 2021, a total of $16,280 in grant funding has been paid out resulting in a remaining balance of $200,520.

COMMUNICATIONS CONSIDERATION(S):

The applicant will be notified in writing of the Rural Budgets Administration Committee's decision, and if grant funding is approved, will be asked to recognize the Regional District for its contribution.

OTHER CONSIDERATION(S):

None at this time.

Attachments:

1. Grant Application – Clearview Arena Society

External Links:

1. COVID-19 Safe Restart Grant-in-Aid Policy 0340-64

PRRD PEACE RIVER REGIONAL DISTRICT

COVID-19 SAFE RESTART GRANT APPLICATION

Date: Oct 24/21

Society #: S-0059688

Organization Information

Name: Clearview Arena Society

Address: Box 73

Mailing Address:
(if different)

City: Goodlow BC **Postal Code:** V0C 1S0

Contact Person: Debbie Smith **Phone Number:** [redacted]

Email: [redacted]

Grant Request Information

Grant funding, up to a maximum grant of $5,000 per organization, is intended to assist eligible organizations that support and/or provide core community services (projects, programs or services) that benefit and improve the well-being of rural communities, who have been impacted financially by COVID-19.

1. Which Core Community Services does your organization provide and/or support?

- ☐ The provision and availability of arts and culture services and amenities
- ☐ Creating or enhancing economic opportunities
- ☐ Improvement, protection and preservation of the environment
- ☐ Foster and encourage the region's heritage values
- ☐ Support health, wellness and diversity of all individuals and communities
- ☒ Support the provision of sports or recreation activities, tournaments or events

2. Identify which electoral area(s) your organization serves.

- ☒ Electoral Area B
- ☐ Electoral Area C
- ☐ Electoral Area D
- ☐ Electoral Area E
- ☐ Sub-Regional

3. What services, programs, or activities are provided by your organization?

The arena is used by the school for gym classes, by minor hockey, youth hockey, ladies hockey, 4on4 & Old timers hockey. by the community and surrounding areas.

4. How has COVID-19 impacted your organization's operations?

Covid 19 has negativly impacted the arena, such as not having a concession open. Minor hockey could not have any games or tournaments therefore the arena lost revenue throughout the year.

PEACE RIVER REGIONAL DISTRICT

5. How has COVID-19 impacted your organization's financial situation? Please explain any revenue losses or gains your organization has experienced.

2019/2020 Season	2020/2021 Season	Income Lost
Total Revenue - $ 36545.48	Total Revenue $ 16427.35	Revenue - <20118.13>
Ice Rentals - $ 17485.00	Ice Rentals - $ 12569.00	Ice Rentals - <4916.00>
Skate Sharpening - $ 935.05	Skate Sharpening $ 409.00	Skate Sharpening <526.05>
Room Rentals - $ 175.00	Room Rentals $ 150.00	Room Rentals <25.00>
Concession - $ 17798.82	Concession $ 718.80	Concession <17080.02>

6. How much grant funding are you requesting (*up to a maximum of $5,000/organization*)? 5000.00

7. What will this funding be used to assist with?

This funding will be used to help out assist in the day to day operational expenses. ex. Lights, power, wages propane for zamboni

8. Have you applied to other organizations or agencies for financial support? ☐ Yes ☒ No
If yes, please indicate below:

Amount: ____________ Source: ____________

Amount: ____________ Source: ____________

Amount: ____________ Source: ____________

Amount: ____________ Source: ____________

PEACE RIVER REGIONAL DISTRICT

Applicant Declaration

☑ I confirm that the information in this application is accurate and complete, including plans and financial information, is fairly presented.

☑ I understand that the information provided in this application may be accessible under the Freedom of Information (FOI) Act.

☑ I understand that the information provided in this application may be shared with the Board of Directors, Committee(s), Regional District staff and consultants.

☑ I understand that the following information must be included with my application:

- Project budget, including all sources of funding
- Current financia[redacted]avings

Applicant Signature: [redacted]

:learview Arena Society
ıalance Sheet As at 10/19/2021

SSET

Current Assets		
Chequing Bank Account	134,383.42	
PETTY CASH	*460.00*	
Platinum Plan Savings Account	133,910.66	
Total Cash		268,754.08
5 Yr Redeemable Term Deposit	0.00	
Credit Union Shares	76.92	
Total Term Deposits		76.92
Accounts Receivable	0.00	
receivable	0.00	
Payroll Advances	0.00	
Total Receivable		0.00
Purchase Prepayments		0.00
Total Current Assets		268,831.00
'OTAL ASSET		268,831.00

.IABILITY

Current Liabilities		
Accounts Payable		-33,459.94
Vacation payable		0.00
EI Payable	157.15	
CPP Payable	419.94	
Federal Income Tax Payable	656.70	
Total Receiver General		1,233.79
WCB Payable		1,802.91
PST Payable		0.00
GST Charged on Sales	0.00	
GST Paid on Purchases	-1,429.83	
GST Owing (Refund)		-1,429.83
Total Current liabilities		-31,853.07
'OTAL LIABILITY		-31,853.07

:QUITY

Owners Equity		
Retained Earnings - Previous Year		214,986.48
Current Earnings		85,697.59
Total Owners Equity		300,684.07
TOTAL EQUITY		300,684.07
.IABILITIES AND EQUITY		268,831.00

:learview Arena Society
ncome-Statement 01/01/2021 to 10/19/2021

ŁEVENUE	
Sales Revenue	
Yerly Ice Rentals	0.00
Other Ice Rentals	*2,580.00*
Skate Sharpening	309.00
Room Rentals	0.00
Concession Revenue	458.75
Consession Rentals	0.00
RD Annual Grant	135,000.00
Grants	11,771.25
Net Sales	150,119.00
Other Revenue	
Interest Revenue	932.12
Donations	0.00
Advertising revenue	0.00
Miscellaneous Revenue	9.00
Total Other Revenue	941.12
'OTAL REVENUE	151,060.12
:XPENSE	
Project Development	
Purchases	0.00
Freight Expense	456.75
Project Total	456.75
Payroll Expenses	
Wages & Salaries	23,014.59
Concession Wages	70.20
EI Expense	510.62
CPP Expense	1,156.00
WCB Expense	153.01
Employee Benefits	0.00
Total Payroll Expense	24,904.42
General & Administrative Expe...	
Accounting & Legal	3,600.00
Advertising & Promotions	0.00
Bad Debt Account	0.00
Concession Expense	249.50
Custodial Expense	978.06
Fuel Expense	173.78
Oil and Diesel Conditioner	0.00
GST Expense	0.00
License & Permits	190.00
Insurance	5,115.00
Interest & Bank Charges	38.00
Office Supplies	242.06
Safety Expense	0.00
Miscellaneous	0.00
Repair & Maintenance-Building	21,179.04
Repair & Maintenance-Equipment	6,481.64
Repair & Maintenance-yard	0.00
Small Tools & Equipment Rentals	0.00
Staff Training	0.00
Telephone	1,219.02
Travel & Entertainment	0.00
Utilities	535.26
Total General & Admin. Expen...	40,001.36
TOTAL EXPENSE	65,362.53

IET INCOME	85,697.59

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-117

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: Grant Request – Golata Creek Recreation Society

RECOMMENDATION:

That the Rural Budgets Administration Committee authorize a grant in the amount of $5,000, payable from the COVID-19 Reserve Fund, to be issued to Golata Creek Recreation Society to assist with facility reopening and operating costs incurred as a result of the closure of the facility due to COVID-19.

BACKGROUND/RATIONALE:

Golata Creek Recreation Society's primary function is to operate and manage Golata Creek Hall to provide a community gathering place for recreational and cultural activities and events. The Society has not been able to operate the hall since the Province implemented COVID-19 health pandemic restrictions in March of 2020. This has led to a significant reduction in revenue, with only a small amount being generated from the renting out of tables and selling of some historical books.

Unfortunately, in addition to the negative impacts from COVID-19, the hall suffered some damage due to a major power outage in the area which caused the water system to freeze. As a result, the water has been shut off to the facility and a number of repairs need to be made before the hall can once again be safely used by the public. Golata Creek Recreation Society is seeking a grant of $5,000 to assist with the replacement of the water tank, pressure pump, pressure, and plumbing fittings as well as complete some repairs to the roof. A quote for the cost of the repairs has been provided with the attached grant application. A portion of the grant funding will also be used to assist with the payment of some utilities expenses.

The Regional District has provided a total of $108,546.92 in grant contributions to assist Golata Creek Recreation Society with operating of the Golata Creek Hall, since 2006. Golata Creek Recreation Society is a registered not-for-profit society in good standing with the *Societies Act of BC* who operates within the boundaries of Electoral Area B.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee respectfully deny the grant application from Golata Creek Recreation Society and provide no grant funding to assist with facility reopening and operating costs incurred as a result of the closure of the facility due to COVID-19.

2. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ New and Emerging Issues

☒ COVID-19 Response and Recovery Plan

FINANCIAL CONSIDERATION(S):

- A total of $216,800 was allocated from the COVID-19 Reserve Fund to provide grants to not-for-profit organizations.

- As of October 31, 2021, a total of $16,280 in grant funding has been paid out resulting in a remaining balance of $200,520.

COMMUNICATIONS CONSIDERATION(S):

The applicant will be notified in writing of the Rural Budgets Administration Committee's decision, and if grant funding is approved, will be asked to recognize the Regional District for its contribution.

OTHER CONSIDERATION(S):

None at this time.

Attachments:

1. Grant Application – Golata Creek Recreation Society

External Links:

1. COVID-19 Safe Restart Grant-in-Aid Policy 0340-64

PRRD PEACE RIVER REGIONAL DISTRICT

COVID-19 SAFE RESTART GRANT APPLICATION

Date: Oct 18/21

Society #: S - 18626

Organization Information

Name: Golata Creek Recreation Society

Address: Box 98

Mailing Address: (if different)

City: Cecil Lake BC

Postal Code: V0C 1G0

Contact Person: Debbie Smith

Phone Number: [redacted]

Email: [redacted]

Grant Request Information

Grant funding, up to a maximum grant of $5,000 per organization, is intended to assist eligible organizations that support and/or provide core community services (projects, programs or services) that benefit and improve the well-being of rural communities, who have been impacted financially by COVID-19.

1. Which Core Community Services does your organization provide and/or support?

- [ ] The provision and availability of arts and culture services and amenities
- [ ] Creating or enhancing economic opportunities
- [ ] Improvement, protection and preservation of the environment
- [ ] Foster and encourage the region's heritage values
- [x] Support health, wellness and diversity of all individuals and communities
- [ ] Support the provision of sports or recreation activities, tournaments or events

2. Identify which electoral area(s) your organization serves.

- [x] Electoral Area B
- [ ] Electoral Area C
- [ ] Electoral Area D
- [ ] Electoral Area E
- [ ] Sub-Regional

3. What services, programs, or activities are provided by your organization?

The Golata Creek Hall provides a space where the community can gather to develope a community recreational, culturae and Sporting activities.

4. How has COVID-19 impacted your organization's operations?

The Hall has been unable to operate any functions to raise funds to pay for upkeep and operational costs.

5. How has COVID-19 impacted your organization's financial situation? Please explain any revenue losses or gains your organization has experienced.

2019 Revenue	2020 Revenue	2021 Revenue
4538.46	$320.33 we received Grant 2850.00 3170.33	$714.00

6. How much grant funding are you requesting (*up to a maximum of $5,000/organization*)? 5000.00

7. What will this funding be used to assist with?

This funding will be used to pay for the utilities and Building repairs needed such as reseal leak in roof, repair drywall in mens washroom from leak and repairs to water system when BC Hydro's fuse at power pole broke & hall had no power & froze up water system

8. Have you applied to other organizations or agencies for financial support? ☐ Yes ☒ No
If yes, please indicate below:

Amount: ______ Source: ______

Amount: ______ Source: ______

Amount: ______ Source: ______

Amount: ______ Source: ______

PEACE RIVER REGIONAL DISTRICT

Applicant Declaration

☑ I confirm that the information in this application is accurate and complete, including plans and financial information, is fairly presented.

☑ I understand that the information provided in this application may be accessible under the Freedom of Information (FOI) Act.

☑ I understand that the information provided in this application may be shared with the Board of Directors, Committee(s), Regional District staff and consultants.

☑ I understand that the following information must be included with my application:

- Project budget, incl[redacted]
- Current financial sta[redacted]

Applicant Signature: ___[redacted]

GOLATA CREEK RECREATION SOCIETY
Financial Statement for December 31, 2020

Opening Balance from January 1, 2020 -- $2820.38

INCOME:

Bank Interest-	$0.33	
Memberships-	$0	
Entertainment-	$0	
Donations-	$0	
Book Sales-	$320.00	
Grants-	$2850.00	
TOTAL-		$3170.33

EXPENSES:

Entertainment-	$0	
PNG-	$125.79	
BC Hydro-	$1273.89	
General-	$0	
Service charges-	$29.50	
Water-	$210.00	
Insurance-	$810.00	
TOTAL-		$2449.18

Closing Balance for December 31, 2020--- $3541.53

Equity Shares Balance December 3.1, 2020 -------------------- (Interest $2.10) $214.36

Golata Creek Recreation Society
Financial Statement for Oct 24/2021

Opening Balance from January 1/ 2021 ------------------------ -$ 3541.53

INCOME:

Entertainment-	-$4.00
(Left over from Dec 2019 missed being deposited)	
Book Sales -	- $560.00
Table Rentals-	- $ 150.00

TOTAL- $714.00

EXPENSES:

PNG-	- $213.36
BC Hydro-	- $756.01
Building-	- $100.00
Bank Service charges-	- $42.75

TOTAL- $1112.12

Closing Balance October 24, 2021----------------------------------- $3143.41

Dion Brekkaas **Quote**

Box 100
Cecil Lake, BC
V0C 1G0

250 781 3589
250 262 8632
email dion.brekkaas@gmail.com

SOLD TO:

Golata Creek Hall

INVOICE NUMBER 10
INVOICE DATE October 27, 2021

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
			-
1	hot water heater, presure pump, presure tank, plumbing fittings	1,900.00	1,900.00
1	drywall, tape and mud	100.00	100.00
1	flashing and screws	250.00	250.00
30	hours two men	70.00	2,100.00
	remove damaged fixtures, test water lines for leaks		-
	replace fixtures with new and repair water lines		-
	install flashing on roof and retar roof		-
	fix hole in siding		-
	fix ceiling water damage		-
	repaint ceiling		-
			-
			-
			-
		Total	4,350.00

MAKE ALL CHECKS PAYABLE TO:
Dion Brekkaas

Box 100
Cecil Lake, BC V0C 1G0

THANK YOU FOR YOUR BUSINESS!

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee | Report Number: FN-RBAC-120

From: Teri Vetter, Chief Financial Officer | Date: November 25, 2021

Subject: Grant Request – Chetwynd Public Library

RECOMMENDATION:

That the Rural Budgets Administration Committee authorize a grant in the amount of $4,000, payable from Electoral Area E Fair Share, to be issued to the Chetwynd Public Library in support of the Elders and seniors Christmas Pen Pals program in 2021.

BACKGROUND/RATIONALE:

The Chetwynd Public Library (CPL) is once again celebrating Elders and seniors during the holiday season. In collaboration with local schools, Saulteau First Nations, and West Moberly First Nations, the CPL is launching a pen pal project that involves linking students to Elders and seniors through the writing of Christmas cards and/or letters. This project fosters and supports education and cultural awareness for the students, Elders and seniors throughout the community. A total of 350 cards and/or letters will be distributed to Elders or seniors residing in the communities of Saulteau First Nations, West Moberly First Nations, and Chetwynd, and each will contain a gift card resourced locally.

This initiative was started in 2020 to replace the Annual Young @ Heart Community Christmas Dinner that was cancelled due to the public restrictions implemented by the Province as a result of COVID-19. This year, CPL has decided to continue this program in support of the health and well-being of local Elders and seniors as they are not able to host an annual dinner as a result of the ongoing health pandemic. In prior years, the Regional District has provided the following grants to CPL for similar initiatives:

- 2019 $3,000 Annual Seniors Community Christmas Dinner
- 2020 $3,000 Elders and Seniors Christmas Pen Pals project

CPL operates as a public library association governed by a CPL Board of Directors which consists of a representative from the PRRD, a liaison from the District of Chetwynd, eight elected community volunteers and a Library Director. The Board is responsible for providing library services and programs in Chetwynd and operates under the authority of the *Library Act of BC.*

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee respectfully deny the grant application from Chetwynd Public Library and provide no grant funding to assist with the Elders and Seniors Christmas Pen Pals program in 2021.

2. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Not Applicable to Strategic Plan

FINANCIAL CONSIDERATION(S):

- As of October 31, 2021 the balance after remaining commitments for Area E Fair Share was $2,757,404.00

COMMUNICATIONS CONSIDERATION(S):

The applicant will be notified in writing of the Rural Budgets Administration Committee's decision, and if grant funding is approved, will be asked to recognize the Regional District for its contribution.

OTHER CONSIDERATION(S):

None at this time.

Attachments:

1. Grant Application – Chetwynd Public Library

PEACE RIVER REGIONAL DISTRICT

GRANT APPLICATION FORM

Society #: 106912439

Name: Chetwynd Public Library

Civic Address: 5012 46th Street

Mailing Address: PO Box 1420

City: Chetwynd

Postal Code: V0C 1J0

Contact Person: Melissa Millsap

Tel: 250-788-2559

Email: librarydirector@chetwynd.bclibrary.ca

Alternate Person: Kayla MacDonald

Tel: 250-788-2559

Email: assistantdirector@chetwynd.bclibrary.ca

SOCIETY EXECUTIVES

President: Dana Bergen

Vice President:

Treasurer:

PROJECT COSTS

Total Cost of Project: 9300

Amount Requested per 4000

For how many years? 1 yr (●) 2 yrs ( ) 3 yrs ( )

Have you applied to a municipality for funding? Yes ( ) No (●) If so, how much did you apply for?

Was your application successful? Yes ( ) No ( ) If so, how much did you receive?

Describe the project for which your organization is requesting a grant and the reason for your request.
If more space is needed, please add it as an attachment to your application.

The Chetwynd Public Library usually hosts an Annual Young @ Heart Community Christmas Dinner. This is a heartfelt event where our Elders and seniors enjoy a turkey dinner together with all the fixings. Due to the pandemic last year, we still wanted to do something for our Elders and seniors to let them know they are thought of during the holiday season. We decided to do a Christmas Pen Pal Program where the local students wrote personalized letters and we put gift cards in each card. Gift cards were from local stores, restaurants, and grocery stores. This turned out to be a heartfelt surprise for our Elders and seniors and helped them to feel loved and thought of during a time of social isolation. Although we would love to host the turkey dinner this year, with the Provincial Health Orders we are finding ourselves in a similar situation. Not only because of the outpour of thankyous we received from the Elders and seniors to the library and generous sponsors, but also because of the health and wellbeing it provides to our senior population; we have decided to do the Senior/Elder Christmas Pen Pal Program again this year. We want to let our senior population know they are valued, loved, and cared for. We will reach approximately 350 seniors and Elders from Chetwynd, Saulteau First Nations, and West Moberly First Nations. Your consideration in contributing to the spread of Christmas cheer for our Elders and seniors is greatly appreciated. Thank you and please feel free to contact me if you require any further information.
Sincerely, Melissa.

ATTACHMENTS REQUIRED:

- Project budget, including all sources of funding
- Current financial statements showing expenses, revenues & savings

Signature of Applicant: [redacted]

Date: Nov 04/21

For Office Use Only

Fair Share: B C D E Gas Tax:

PRA: B C D E Other:

BCR/PRA: B C D E

Senior & Elder Christmas Pen Pals 2021
5-Nov-21

Chetwynd Public Library
PO Box 1420
Chetwynd, BC   V0C 1J0

EXPENSES	
Christmas Cards	$ 350.00
Postage	$ 200.00
Gift Cards	$ 8,750.00
TOTAL	$ 9,300.00

CHETWYND PUBLIC LIBRARY

Statement of Financial Position

December 31, 2020

(Unaudited - See Review Engagement Report)

		2020		2019
ASSETS				
CURRENT				
Cash	**$**	**1,289,163**	$	1,134,545
Receivables		**128**		900
Goods and services tax receivable		**6,400**		6,515
Prepaid expenses		**14,295**		14,776
		1,309,986		1,156,736
TANGIBLE CAPITAL ASSETS *(Note 3)*		**412,374**		528,117
	$	**1,722,360**	$	1,684,853
LIABILITIES AND FUND BALANCES				
CURRENT				
Trade payables	**$**	**22,008**	$	11,738
Source deductions payable		**4,717**		5,318
Wages payable		**4,287**		2,774
		31,012		19,830
FUND BALANCES				
Invested in tangible capital assets		**412,374**		528,117
Externally restricted		**73,430**		36,966
Internally restricted		**1,186,025**		812,359
Unrestricted		**19,519**		287,581
		1,691,348		1,665,023
	$	**1,722,360**	$	1,684,853

[redacted] Director

Director

See accompanying notes to the financial statements

Sander Rose Bone Grindle LLP
CHARTERED PROFESSIONAL ACCOUNTANTS

CHETWYND PUBLIC LIBRARY
Statement of Revenue and Expenditures
Year Ended December 31, 2020
(Unaudited - See Review Engagement Report)

	Operating Fund	Externally Restricted Fund	Internally Restricted Fund	Capital Fund	**2020**	2019
REVENUE						
Book Sales	$ 79	$ -	$ -	$ -	**$ 79**	$ 229
Fundraising	2,052	8,625	1,115	-	**11,792**	14,703
Grants						
Peace River Regional District	460,150	3,000	-	-	**463,150**	463,150
Provincial operating	27,482	-	-	-	**27,482**	16,720
Interlibrary loan	1,958	-	-	-	**1,958**	1,958
Early years service	-	39,900	-	-	**39,900**	13,300
Equity	9,680	-	-	-	**9,680**	9,680
One card program	7,400	-	-	-	**7,400**	7,400
Canadian summer student	2,916	-	-	-	**2,916**	-
CALP	-	14,950	-	-	**14,950**	10,450
Other	500	10,239	-	-	**10,739**	16,409
Interest and miscellaneous	5,644	1,375	87	-	**7,106**	12,823
Overdue and damaged book fees	75	-	-	-	**75**	184
Photocopies	2,090	-	-	-	**2,090**	5,201
Rent - Bistro	4,855	-	-	-	**4,855**	8,724
Rentals	4,246	-	-	-	**4,246**	3,999
	529,127	78,089	1,202	-	**608,418**	584,930
EXPENSES *(page 11)*	395,819	52,815	9,244	124,215	**582,093**	511,619
EXCESS (DEFICIENCY) OF REVENUE OVER EXPENSES	$ 133,308	$ 25,274	$ (8,042)	$ (124,215)	**$ 26,325**	$ 73,311

Sander Rose Bone Grindle LLP
CHARTERED PROFESSIONAL ACCOUNTANTS

See accompanying notes to the financial statements

CHETWYND PUBLIC LIBRARY

Statement of Changes in Fund Balances

Year Ended December 31, 2020

(Unaudited - See Review Engagement Report)

	Operating Fund	Externally Restricted Fund	Internally Restricted Fund	Capital Fund	**2020**	2019
FUND BALANCES, beginning of the year	$ 287,581	$ 36,966	$ 812,359	$ 528,117	**$ 1,665,023**	$ 1,591,712
EXCESS (DEFICIENCY) OF REVENUE OVER EXPENSES	133,308	25,274	(8,042)	(124,215)	**26,325**	73,311
	420,889	62,240	804,317	403,902	**1,691,348**	1,665,023
INTERFUND TRANSFERS						
Tangible capital asset purchases	(8,472)	-	-	8,472	**-**	-
Transfer to (from) operating fund	(11,190)	11,190	-	-	**-**	-
Transfer to (from) Externally restricted fund	(381,708)	-	381,708	-	**-**	-
FUND BALANCES, end of year	$ 19,519	$ 73,430	$1,186,025	$ 412,374	**$ 1,691,348**	$ 1,665,023

See accompanying notes to financial statements

Sander Rose Bone Grindle LLP
CHARTERED PROFESSIONAL ACCOUNTANTS

CHETWYND PUBLIC LIBRARY
Statement of Cash Flows
Year Ended December 31, 2020
(Unaudited - See Review Engagement Report)

	2020	2019
OPERATING ACTIVITIES		
Excess of revenue over expenses	$ 26,325	$ 73,311
Items not affecting cash		
Amortization of capital assets	124,215	35,064
Changes in non-cash working capital accounts		
Receivables - decrease (increase)	772	(744)
Goods and services tax receivable - decrease (increase)	115	(3,840)
Prepaid expenses - decrease (increase)	481	(47)
Payables - increase (decrease)	10,270	(3,403)
Source deductions - (decrease) increase	(601)	5,318
Wages payable - increase	1,513	2,414
Net cash from operating activities	163,090	108,073
INVESTING ACTIVITIES		
Purchase of tangible capital assets	(8,472)	(19,637)
Net cash from investing activities	(8,472)	(19,637)
INCREASE IN CASH	154,618	88,436
CASH - BEGINNING OF YEAR	1,134,545	1,046,109
CASH - END OF YEAR	$ 1,289,163	$ 1,134,545

DRAFT

See accompanying notes to the financial statements

Sander Rose Bone Grindle LLP
CHARTERED PROFESSIONAL ACCOUNTANTS

CHETWYND PUBLIC LIBRARY
Schedule of Expenses
Year Ended December 31, 2020
(Unaudited - See Review Engagement Report)

	Operating Fund	Externally Restricted Fund	Internally Restricted Fund	Capital Fund	**2020**	2019
Advertising and promotion	$ 4,390	$ 178	$ 1,064	$ -	**$ 5,632**	$ 5,802
Amortization	-	-	-	124,215	**124,215**	35,064
Books	31,591	2,297	-	-	**33,888**	35,055
Insurance	4,677	-	-	-	**4,677**	4,673
Janitorial	14,965	-	-	-	**14,965**	21,763
Memberships	1,038	-	-	-	**1,038**	761
Office Expenses	18,753	368	29	-	**19,150**	10,342
Photocopier	6,754	-	-	-	**6,754**	8,472
Professional development	91	-	-	-	**91**	615
Professional fees	8,915	-	-	-	**8,915**	6,851
Program supplies	1,898	25,616	8,151	-	**35,665**	38,029
Repairs and maintenance	13,398	-	-	-	**13,398**	4,313
Technical support	21,518	-	-	-	**21,518**	24,947
Telephone and utilities	15,079	-	-	-	**15,079**	15,781
Travel and conference	2,747	318	-	-	**3,065**	3,002
Wages and benefits	250,005	24,038	-	-	**274,043**	296,149
	$ 395,819	$ 52,815	$ 9,244	$ 124,215	**$ 582,093**	$ 511,619

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-119

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: Area B Unspent Prior Year Allocations

RECOMMENDATION #1:

That the Rural Budgets Administration Committee authorize $5,985.00 unclaimed funding commitment from the original allocation of $5,985.00, approved in 2019 from Area B Fair Share reserve allocated to Clearview Arena for operational costs, be returned to the funding area.

RECOMMENDATION #2:

That the Rural Budgets Administration Committee authorize the remaining $2,667.67 unclaimed funding commitment from the original allocation of $15,000.00, approved in 2018 from Area B Fair Share reserve allocated to North Peace Light Horse Association, be returned to the funding area as the indoor arena improvements are complete.

RECOMMENDATION #3:

That the Rural Budgets Administration Committee authorize the remaining $1,205.46 unclaimed funding commitment from the original allocation of $10,000.00, approved in 2017 from Area B Fair Share reserve allocated for rural fire protection expansion in Charlie Lake, be returned to the funding area as the feasibility study is complete.

RECOMMENDATION #4:

That the Rural Budgets Administration Committee authorize the remaining $30.00 unclaimed funding commitment from the original allocation of $1,500.00, approved in 2019 from Area B Peace River Agreement reserve allocated to Cecil Lake Recreation, be returned to the funding area as the halls exterior steps are complete.

RECOMMENDATION #5:

That the Rural Budgets Administration Committee authorize the remaining $90,010.91 unclaimed funding commitment from the original allocation of $300,000.00, approved in 2018 from Area B Peace River Agreement reserve allocated to Clearview Recreation facility, be returned to the funding area as the upgrade projects are complete.

BACKGROUND/RATIONALE:

At the July 15th, 2021 Rural Budgets Administration Committee meeting, it was discussed that the CFO would meet with each of the Electoral Area Director's to determine what commitments could be removed from their PRA, Gas Tax and Fair Share reserves. This is merely a housekeeping item so the remaining commitments in Area B reserve funds will accurately reflect current allocations.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Not Applicable to Strategic Plan

FINANCIAL CONSIDERATION(S):

The balance of Area B Fair Share will increase by $9,858.13 once old commitments are returned to the funding area.

The balance of Area B Peace River Agreement will increase by $114,754.43 once old commitments are returned to the funding area.

COMMUNICATIONS CONSIDERATION(S):

None at this time.

OTHER CONSIDERATION(S):

None at this time.

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-112

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: Community Works Gas Tax Grant Policy

RECOMMENDATION:

That the Rural Budgets Administration Committee recommend that the Regional Board adopt the Community Works Gas Tax Grant Policy, which sets out the principles and guidelines governing the issuance of grant funding for eligible capital and capacity building infrastructure projects for public use or benefit, in compliance with the terms set out in the Administrative Agreement on Federal Gas Tax Fund in BC, and administered by the Rural Budgets Administration Committee.

BACKGROUND/RATIONALE:

In alignment with the PRRD Strategic Plan, a comprehensive review of the Rural Budgets Administration Committee (RBAC) Funding Policies booklet, comprised of some formal policies and other additional guidelines the Committee routinely follows and were included in the booklet for convenience, was launched. The RBAC Funding Policies booklet was approved by RBAC in 2014, to assist staff and Directors with funding decisions, as a 'one stop shop' for information regarding grant policies and guidelines.

The various RBAC Funding Policies were written to assist RBAC in their decision making process for the award of grants to support improvements and increase programs and services for those communities located in the rural areas of the PRRD. The RBAC Funding Policies booklet, in its current form, functions as a large multiple page manual that contains various guidelines for a number of different grant funding options that is not user friendly, easy to follow, or interpret. In an effort to streamline this document, enhance and clarify for staff and RBAC consistency around grant administration, and to make it easier for potential grant applicants to understand the eligibility, application, and reporting requirements, four new policies have been created based on the information contained in the existing RBAC Funding Policies booklet. These new policies are consistent with and reflective of local government legislative requirements and best practices. This report provides information on the new Community Works Gas Tax Grant policy.

This new Community Works Gas Tax Grant policy establishes guidelines to assist RBAC in providing grants to eligible organizations to support capital or capacity building infrastructure projects that primarily support public use or benefit. The policy contains clear and concise information for all readers and is written in the appropriate formatting style that is consistent with other grant policies. In addition to providing a purpose, scope and definitions, the policy section of the document outlines the principles, applicant criteria, how to apply and payment of funds.

The policy is written to ensure it supports compliance with the specific eligibility criteria for recipients and projects guided by the eligibility framework developed for the Community Works Fund to deliver the Canada Community - Building Fund (formerly Gas Tax Fund). The Community Works Gas Tax Grant policy is unique as it outlines specific examples of the type of projects (see Appendix A) and related costs that can be supported. In the building of the policy, staff collaborated with a Union of BC Municipalities representative, who reviewed the policy for compliance, provided information for inclusion and concurred that the policy correctly reflects the intention of the Canada Community – Building Fund.

If new types of projects are deemed eligible for Community Works Funding grants, as administered by UBCM to local governments, the new eligibility rules will need to be added to the policy, to ensure that the framework imposed on local governments as a condition of the funding being shared with them, is consistent with the policy framework adopted by the Regional Board. The agreement would override the policy in any event; however, the policy is the public facing document and should therefore also be kept current.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness
  ☒ Comprehensive Policy Review

FINANCIAL CONSIDERATION(S):

Community Works Gas Tax grant contributions will be provided from the Community Works Gas Tax Reserve Fund per each Electoral Area B, C D, and E.

COMMUNICATIONS CONSIDERATION(S):

Once the Community Works Gas Tax Grant policy is adopted by Regional Board, it will be posted on the PRRD website.

OTHER CONSIDERATION(S):

Upon the approval of the Community Works Gas Tax grant policy, the existing rural grant application will be updated by staff to ensure it aligns with the information that is reflected in the new adopted policy.

In the RBAC Funding Policies booklet, the existing “Gas Tax Grant Funding” page does not indicate an “adopted” date, and it is unknown if it was a guideline adopted by RBAC to self-govern their determinations, or if it was Board approved as a policy that RBAC must adhere to as part of the delegation of the authority to administer Fair Share and other funds, such as Gas Tax, to the Committee (via Bylaw 1166). In any event, the existing “Gas Tax Grant Funding” information, and in fact the entire RBAC Funding Policies booklet will be considered repealed and obsolete.

Attachments:

1. Final Draft Community Works Gas Tax Grant Policy

External Links:

1. Rural Budgets Administration Committee Funding Policies

Community Works Gas Tax Grant Policy

Department	Finance	Policy No.	
Section	Grants	Date Approved by Board	
Repeals	RBAC Funding Policies	Board Resolution #	

Amended		Board Resolution #	
Amended		Board Resolution #	
Amended		Board Resolution #	

Repealed		Board Resolution #	

1. Purpose

1.1 The Community Works Gas Tax Grant policy establishes clear guidelines for the Rural Budgets Administration Committee (RBAC) for the distribution of financial assistance provided through the Community Works Fund (CWF) while ensuring compliance with the eligibility criteria and terms set out in the Administrative Agreement on Federal Gas Tax Fund in BC (Gas Tax Agreement – April 1, 2014), which provides the administrative framework for the delivery of the Canada Community – Building Fund (formerly Gas Tax Fund).

2. Scope

2.1 This Policy applies to RBAC, PRRD and all external organizations eligible for consideration of funding via grants from the Community Works Gas Tax fund.

3. Definitions

3.1 *Canada Community-Building Fund:* refers to predictable, long-term and stable funding to local governments in British Columbia for investment in infrastructure and capacity building projects that support local priorities.

3.2 *Community Works Fund:* refers to the program stream established under the Canada Community-Building Fund for the annual transfer of federal revenues to local governments in British Columbia.

3.3 *Grant Contribution:* refers to non-repayable funds disbursed or given by one party, often a government or other organization, to a recipient for a particular purpose.

3.4 *Infrastructure:* refers to municipal or regional, publicly or privately owned tangible capital assets primarily for public use or benefit.

3.5 *Not-for-Profit Society:* refers to an organization which is not driven by profit, who is registered and in good standing with the Societies Act of BC.

3.6 *Public Use or Benefit:* refers to accessibility to the public and not limited to a private membership, or confers a tangible benefit on a sufficiently large segment of the public or community.

3.7 *Rural Budgets Administration Committee:* refers to a Standing Committee of the Regional Board comprised of the Director from each Electoral Area in the Peace River Regional District who has the authority, by delegation of the Regional Board, to administer the rural budgets as identified in the Annual Financial Plan of the Peace River Regional District and in accordance with the "Rural Budgets Administration Bylaw No. 1166, 1998".

4. Policy

4.1 RBAC is responsible for the investment of Community Works Fund (CWF) allocations granted to support capital and capacity building infrastructure projects that primarily support public use or benefit.

4.2 RBAC has the sole authority to approve or deny grant contributions to eligible organizations with funding providing through CWF federal and provincial allocations.

4.3 <u>Eligibility Criteria:</u>
RBAC is to determine eligibility in accordance with the Eligibility Framework established by the CWF agreement by use of the three-step process established provided below:
a) **Eligible Recipients** - Must meet the definition of an "Ultimate Recipient" set in the Gas Tax Agreement (GTA) as follows:

i. a Local Government or its agent (including its wholly owned corporation);
ii. a non-municipal entity, including for-profit, non-governmental and not-for-profit organizations, on the condition that the Local Government where the eligible project would be located, has indicated support for the project and the transfer of funds through a formal resolution;
iii. any other entity that delivers core local government services agreed to, in advance, by the parties; and,
iv. BC Transit, subject to the agreement of the appropriate Local Government, through its council or board.

b) **Eligible Project Categories** - Funds must be applied towards the eligible expenditures of an eligible project as set in the GTA which stipulates that eligible investments are those associated with acquiring, planning, designing, constructing or renovating a tangible capital asset; or strengthening the ability of local governments to improve local and regional planning and asset management; and associated joint communications activities or federal signage. Eligible categories are listed below and full description of the categories can be found in *Appendix A* of this policy.

Infrastructure Projects	
Local Roads, Bridges, Active Transportation	Culture Infrastructure
Drinking Water	Tourism Infrastructure
Wastewater	Disaster Mitigation
Community Energy Systems	Broadband Connectivity
Public Transit	Brownfield Redevelopment
Solid Waste	Regional and Local Airports
Sport Infrastructure	Short-line Rail
Recreation Infrastructure	Short-sea Shipping
Capacity Building Projects	
Asset Management	
Integrated Community Sustainability Plans	
Long-term Infrastructure Plans	

c) **Public Use or Public Benefit** – Projects must primarily support public use or public benefit. If "yes" is the answer to each of the following questions, then the criteria for public use or benefit is met. If not, then consideration should be given to whether the project provides sufficient public use or benefit.

i. **Public Use*:***
- Does the proposed project primarily provide a service that is available or open to the public?
- Does the proposed project result in a service that is not limited by private membership?
- Does the proposed project primarily result in a publicly owned asset or deliver a public service that a local government traditionally provides?

ii. **Benefit*:***
- Does the project provide a service that is a tangible benefit that aligns with the national outcomes of productivity and economic growth; a clean environment; or strong cities and communities?
- Does the project result in a service that benefits a sufficiently large segment of the public or community?

4.4 Grant contributions cannot be used to support any expenses associated with the following ineligible costs as outlined in the GTA:

a) Leasing equipment
b) Overhead – salaries, employment benefits of any employees
c) Direct or indirect operating or administration costs
d) Costs related to planning, engineering, architecture, supervision, management or other activities normally carried out by a staff person
e) Investments in health infrastructure (hospitals, medical clinics, convalescent and seniors centres)

f) Investments in emergency response related infrastructure (fire halls/equipment, police stations and emergency operations centres)
g) Feasibility Studies
h) Childcare Centres
i) Social Housing
j) Public Art
k) Detailed design plans for projects are not considered eligible costs until capital works commence
l) Small equipment purchases as stand-alone projects
m) Purchase of land or any interest therein, and related costs
n) Legal fees
o) Churches or religious centres

4.5 Application Criteria:
a) Applications are accepted on a continuous intake throughout the year from January 1st to December 31st.
b) A grant application form must be completed and must include a project budget and a copy of the applicant's most recent financial statements.
c) Applications must include a quote to support costs.

4.6 Disbursement of Funds:
a) Grant contributions are payable through a reimbursement process that requires the submission of a claim form and supporting documentation to prove the recipients expenses paid towards the project.
b) RBAC may wish to enter into an agreement that sets out the commitments of both parties for the fuse of funds, reporting project outcomes, public access to the infrastructure and access to documentation of audit purposes.

4.7 Grant recipients will be required to recognize the Regional District, and under certain conditions the federal government, for their grant contribution.

Affiliated Procedure	

Appendix A - Examples of Eligible CWF Projects

The following projects examples are ineligible uses of Community Works funding:

- Fire truck purchases as stand-alone projects
- Emergency Operations Centres and Search and Rescue Facilities
- City halls, public works buildings and other administrative buildings
- Child care centres
- Social housing
- Seniors care facilities and housing
- Health care related infrastructure
- Small equipment purchases as stand-alone projects
- Feasibility studies and detailed design plans (without additional capital spending)

Infrastructure Projects

Category	**Description**	**Examples**
Local Roads, Bridges, & Active Transportation	Roads, bridges and active transportation (active transportation refers to investments that support active methods of travel)	- New construction and rehabilitation of local roads, bridges, cycling lanes, sidewalks paths, and hiking trails - Intelligent Transportation systems - Additional capacity for high occupancy/ transit lanes, grade separations, interchange structures, tunnels, intersections and roundabouts
Drinking Water	Infrastructure that supports drinking water conservation, collection, treatment and distribution systems	- Drinking water treatment infrastructure - Drinking water distribution system (including metering)
Wastewater	Infrastructure that supports wastewater and storm water collection, treatment and management systems	- Wastewater collection systems and or wastewater treatment facilities or systems - Separation of combined sewers and or combined sewer overflow control, including real-time control and system optimization - Separate storm water collection systems and or storm water treatment facilities or systems

		- Wastewater sludge treatment and management systems
Community Energy Systems	Infrastructure that generates or increases efficient use of energy	- Renewable electricity generators - Electric vehicle infrastructure/fleet vehicle conversion - Hydrogen infrastructure (generation, distribution, storage) - Wind/solar/thermal/geothermal energy systems - Alternative energy systems that serve local government infrastructure - Retrofit of local government buildings and infrastructure not captured in any other eligible category.
Public Transit	Infrastructure which supports a shared passenger transport system which is available for public use	- Transit infrastructure such as rail and bus rapid transit systems, and related facilities - Buses, rail cars, ferries, Para-transit vehicles, and other rolling stock and associated infrastructure - Intelligent Transport Systems such as fare collection, fleet management, transit priority signaling, and real time traveler information system at stations and stops - Related capital infrastructure including bus lanes, streetcar and trolley infrastructure, storage and maintenance facilities, security enhancement, and transit passenger terminals
Solid Waste	Infrastructure that supports solid waste management systems including the collection, diversion and disposal of recyclables, compostable materials and garbage	- Solid waste diversion projects including recycling, composting and anaerobic digestion facilities that are clearly linked to a solid waste management plan or sustainability plan. - Solid waste disposal projects including thermal processes, gasification, and landfill gas recovery - Solid waste disposal strategies that reduce resource use that are clearly linked to a solid waste management plan or sustainability plan

Sport Infrastructure	Amateur sport infrastructure (excludes facilities, including arenas, which would be used as a home of professional sports teams or major junior hockey teams	- Sport infrastructure for community public use - Sport infrastructure in support of major amateur athletic events
Recreation Infrastructure	Recreational facilities or networks	- Large facilities or complexes which support physical activity such as arenas, gymnasiums, swimming pools, sports fields, tennis, basketball, volleyball or other sport--specific courts, or other facilities that have sport and/or physical activity as a primary rationale; - Community centers that offer programming to the community at large, including all segments of the population; - Networks of parks, fitness trails and bike paths
Cultural Infrastructure	Infrastructure that supports arts, humanities, and heritage	- Museums - The preservation of designated heritage sites - Local government owned libraries and archives - Facilities for the creation, production, and presentation of the arts - Infrastructure in support of the creation of a cultural precinct within an urban core
Tourism Infrastructure	Infrastructure that attracts travelers for recreation, leisure, business or other purposes	- Convention centers - Exhibition hall-type facilities - Visitor centres

Disaster Mitigation	Infrastructure that reduces or eliminates long-term impacts and risks associated with natural disasters	- Construction, modification or reinforcement of structures that protect from, prevent or mitigate potential physical damage resulting from extreme natural events, and impacts or events related to climate change - Modification, reinforcement or relocation of existing public infrastructure to mitigate the effects of and/or improve resiliency to extreme national events and impacts or events related to climate change *Note: this category is related to disaster prevention (such as dykes, berms, seismic upgrades etc.) and not response (such as fire trucks, fire halls, etc.)*
Broadband Connectivity	Infrastructure that provides internet access to residents, businesses, and/or institutions in British Columbia	- High-speed backbone - Point of presence - Local distribution within communities - Satellite capacity
Brownfield Redevelopment	Remediation or decontamination and redevelopment of a brownfield site within municipal boundaries, where the redevelopment includes: the construction of public infrastructure as identified in the context of any other category under the GTF, and/or the construction of municipal use public parks and publicly---owned social housing.	- New construction of public infrastructure as per the categories listed under the Federal Gas Tax Agreement - New construction of municipal use public parks and affordable housing

Regional and Local Airports	Airport related infrastructure (excludes National Airport System)	- Construction projects that enhance airports and are accessible all year--round, through the development, enhancement or rehabilitation of aeronautical and/or non--- aeronautical infrastructure (includes runways, taxiways, aprons, hangars, terminal buildings etc.) - Non-aeronautical infrastructure such as groundside access, inland ports, parking facilities, and commercial and industrial activities
Short-line Rail	Railway related infrastructure for carriage of passengers or freight	- Construction of lines to allow a railway to serve an industrial park, an intermodal yard, a port or a marine terminal - Construction, rehabilitation, or upgrading of tracks and structures, excluding regular maintenance, to ensure safe travel - Construction, development or improvement of facilities to improve interchange of goods between modes - Procurement of technology and equipment used to improve the interchange of goods between modes - Operators must offer year-round service
Short-sea Shipping	Infrastructure related to the movement of cargo and passengers around the coast and on inland waterways, without directly crossing an ocean	- Specialized marine terminal intermodal facilities or transshipment (marine to marine) facilities - Capitalized equipment for loading/unloading required for expansion of short---sea shipping - Technology and equipment used to improve the interface between the marine mode and the rail/highways modes or to improve integration within the marine mode including Intelligent Transportation Systems (ITS)

		Note: The purchase of vessels, infrastructure that supports passenger-only ferry services, rehabilitation and maintenance of existing facilities such as wharves and docks, and dredging are not eligible for funding
Fire Halls and Fire Stations	Fire hall and fire station infrastructure* * Exclusive to the fire station category, costs must have been incurred after April 1, 2021 to be eligible for investment	- New fire hall (building) for housing fire-fighting apparatus and staff (may include attached dorms, basic training facilities and administration areas) - Retro-fit and modernization of existing fire halls and attached building space - Acquisition of a fire-truck as a capital asset **as part of an overall** capital upgrade to an existing fire hall or construction of a new fire hall *Note: the following investments are **not eligible** in the fire hall category:* - Acquisition or replacement of fire trucks or other vehicles as a standalone project - Personal protective equipment (PPE) and gear and other fire station related equipment - Fire hydrants and reservoirs - Communications devices (Ex.: Cell phones, radios, pagers) - Structural Protection Units and contents

Capacity Building Projects		
Category	**Description**	**Examples**
Asset Management	Increase local government capacity to undertake asset management planning practices.	- Asset Management Practices Assessment - Current State of Assets Assessment - Asset Management Policy - Asset Management Strategy - Asset Management Plan - Long-Term Financial Plan - Asset Management Practices Implementation Plan - Asset Management Plan Annual Report

Integrated Community Sustainability Plans	Increase local government capacity to undertake integrated community sustainability plans	- Integrated community sustainability plans - Regional growth strategies - Community development plans - Community plans
Long-term Infrastructure Plans		- Transportation plans - Infrastructure development plans - Liquid waste management plans - Solid waste management plans - Long-term cross-modal transportation plans - Water conservation/demand management plans - Drought management contingency plans - Air quality plans - GHG reduction plans - Energy conservation plans

Table Source: https://www.ubcm.ca/funding-programs/canada-community-building-fund/community-works-fund

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-114

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: Electoral Area Grant-in-Aid Policy

RECOMMENDATION:

That the Rural Budgets Administration Committee recommend that the Regional Board adopt the Electoral Area Grant-in-Aid Policy, which sets out the principles and guidelines governing the issuance of PRRD grant funding to support community led projects or initiatives that service or benefit rural communities and fall outside the regular service functions of the PRRD, as administered by the Rural Budgets Administration Committee.

BACKGROUND/RATIONALE:

In alignment with the PRRD Strategic Plan, a comprehensive review of the Rural Budgets Administration Committee (RBAC) Funding Policies booklet, comprised of some formal policies, and other additional guidelines the Committee routinely followed and were included in the booklet for convenience, was launched. The RBAC Funding Policies booklet was approved by RBAC in 2014, to assist staff and Directors with funding decisions, as a 'one stop shop' for information regarding grant policies and guidelines.

The various RBAC Funding Policies were written to assist RBAC in their decision making process for the award of grants to support improvements and increase programs and services for those communities located in the rural areas of the PRRD. The RBAC Funding Policies booklet, in its current form, functions as a large multiple page manual that contains various guidelines for a number of different grant funding options that is not user friendly, easy to follow or interpret. In an effort to streamline this document, enhance and clarify for staff and RBAC consistency around grant administration, and to make it easier for potential grant applicants to understand the eligibility, application, and reporting requirements, four new policies have been created based on the information contained in the existing RBAC Funding Policies booklet. These new policies are consistent with and reflective of local government legislative requirements and best practices. This report provides information on the new Electoral Area Grant-in-Aid policy.

This new Electoral Area Grant-in-Aid policy establishes guidelines to assist RBAC in the award of grant contributions to eligible organizations to assist with community led projects or initiatives that fall outside the regular service functions, and serve or benefit the rural communities of the Peace River Regional District. The policy contains clear and concise information for all readers and is written in the appropriate formatting style that is consistent with other grant policies. In addition to providing a purpose, scope and definitions, the policy section of the document outlines the principles, applicant criteria, how to apply and payment of funds.

Key components of the policy are noted below:

- Addition of multi-year grants and reporting requirements
- Increased maximum of $75,000 (from $50,000) for grants awarded to support operations for more than three years be considered for a service function
- Grants for the purpose of capital projects, not owned by the PRRD, may require a Service Partnership agreement between the recipient organization and the PRRD
- Guidelines for Fire Equipment, Fire Hall Construction or Renovation, and Fire Trucks were combined to create one section for Fire Services related grants
- Increase from $10,000 to $50,000 for grants awarded to support feasibility studies
- Increase from $30,000 to $50,000 for grants awarded to support rural capital grants
- Removal of the obsolete guidelines for grants to support Fringe Area projects, Joint Ventures, Recreational and Cultural projects, Seniors Housing, Sewer and Water Extension Services, Telephone Services and Water Wells/Springs for Public Use.
- Inclusion of the previously separate guidelines applicable to Feasibility Studies, Fixed Capital Equipment (renamed as Rural Capital Grants), and Parent Advisory Councils, into the Electoral Area Grant in Aid Policy.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

  ☒ Comprehensive Policy Review

FINANCIAL CONSIDERATION(S):

Electoral Area Grant-in-Aid contributions may be provided from either the Fair Share, Peace River Agreement, or BCR/PRA Reserve Funds as chosen by each Electoral Area Director.

COMMUNICATIONS CONSIDERATION(S):

Once the Regional Board approves the Electoral Area Grant-in-Aid policy, it will be posted on the PRRD website.

OTHER CONSIDERATION(S):

Upon the approval of the Electoral Area Grant-in-Aid policy, the existing rural grant application will be updated by staff to ensure it aligns with the information that is reflected in the new adopted policy.

In the RBAC Funding Policies booklet, the following pages have been incorporated into the Electoral Area Grant in Aid Policy:
Feasibility Study Fund
Fire Equipment – Minor Capital Projects, Rural Fire Hall Construction or Renovation, Fire Trucks, (combined into Fire Services)
Fixed Capital Equipment (renamed Rural Capital Grants)

Additionally, the following pages from the RBAC Funding Policies Booklet have either been covered by the new overarching Electoral Area Grant-in-Aid policy, or deemed obsolete and no longer required, and therefore the information was intentionally not included in the new policy:
Fringe Area Funding Joint Ventures, Recreational and Culture Grants, Seniors Housing, Sewer and Water Extension Services, Telephone Service, Animals, and Water Wells/Springs for Public Use.

Some but not all of these pages indicate an "adopted" date, therefore some are assumed to be guidelines adopted by RBAC to self-govern their determinations, (RBAC approved the entire booklet in March of 2014), while some were Board approved as policies to be followed by RBAC in the administration of the various funds and budgets delegated to the Committee via Bylaw 1166, 1998 (such as Gas Tax and Peace River Agreement funds).

In any event, the pages listed above, and in fact the entire RBAC Funding Policies Booklet will be considered repealed and obsolete upon Board adoption of the four new policies written to replace the booklet in its entirety.

Attachments:

1. Final Draft - Electoral Area Grant-in-Aid Policy

External Links:

1. Rural Budgets Administrative Committee Funding Policies

ELECTORAL AREA GRANT-IN-AID

Department	Finance	Policy No.	
Section	Grants	Date Approved by Board	
Repeals	RBAC Funding Policies	Board Resolution #	

Amended		Board Resolution #	
Amended		Board Resolution #	
Amended		Board Resolution #	

1. Purpose

1.1 The Electoral Area Grant-in-Aid Policy establishes clear guidelines for the Rural Budgets Administration Committee (RBAC) for the award of rural grant contributions to assist eligible organizations requesting financial assistance to support community led projects or initiatives that fall outside the regular service functions, and serve or benefit the rural communities of the Peace River Regional District.

1.2 The Electoral Area Grant-in-Aid policy is intended to be flexible to provide RBAC the ability to be responsive to emerging needs or unique opportunities in rural communities.

2. Scope

2.1 This Policy applies to the RBAC, PRRD and all external organizations that apply for grant-in-aid funds from the Rural Budgets Administration Committee.

2.2 This Policy applies to all rural funded grant-in-aid, excluding those grants with stand-alone policies, which are:

a) Cemetery Grants
b) COVID-19 Safe Restart Grant-in-Aid
c) Community Works Gas Tax Grants
d) Rural Loan Fund Grants
e) Rural Recreational and Cultural Grants-in-Aid
f) Utility Extension Grants

3. Definitions

3.1 *Capital Costs:* refers to expenses incurred to purchase or improve physical assets such as buildings, vehicles, or equipment.

3.2 *Event:* refers to either social, economic or recreational in nature that may occur on a one-time or annual basis with a defined start and finish date.

3.3 *Feasibility Study:* refers to an assessment of the practicality of a proposed project or initiative resulting in the analysis of the economic factors, viability, risks and the likelihood of its success.

3.4 *Grant Contribution:* refers to a non-repayable funds disbursed or given by one party, often a government or other organization, to a recipient for a particular purpose.

3.5 *Infrastructure:* refers to a municipal or regional, publicly or privately owned tangible capital assets primarily for public use or benefit.

3.6 *Initiative:* refers to an activity that tries out a specific idea or purpose which is intended to provide a benefit or result in a service to rural areas or the community at large.

3.7 *Not-for-Profit Society:* refers to a community organization which is not driven by profit, who is registered and in good standing with the Societies Act of BC.

3.8 *Operational Costs:* refers to expenses incurred that relate directly to the routine functions and activities of an organization.

3.9 *Project:* refers to an undertaking that is planned to achieve a particular outcome or result with a specific set of goals, objectives, start and finish date.

3.10 *Program:* refers to an activity designed for specific purpose which is led by a community organization and leads to the improvement to the quality of life for rural residents.

3.11 *Rural Budgets Administration Committee:* refers to a Standing Committee of the Regional Board comprised of each Electoral Director from each Electoral Area in the Peace River Regional District who has the authority, by delegation of the Regional Board, to administer the rural budgets as identified in the Annual Financial Plan of the Peace River Regional District and in accordance with the “Rural Budgets Administration Bylaw No. 1166, 1998”.

3.12 *Service:* refers to a function led by a community organization which provides the public with an opportunity to benefit or improve the rural areas or community at large.

4. Policy

4.1 RBAC is responsible for the review and approval of all grant contributions provided through Electoral Area Grants-in-Aid.

4.2 RBAC has the sole discretion to respectfully deny any grant application.

4.3 Grants contributions must support projects or initiatives that are rural in scope and that encourage innovation in the delivery of services in rural communities and benefit the community at large.

4.4 RBAC must ensure the approval of grant contributions is equitable and transparent to make sure the grant application process is consistent with all organizations regardless of the type of grant being applied for.

4.5 RBAC must ensure the approval of grant contributions is information based using adequate, un-biased research analysis with recommended options.

4.6 Where appropriate, the Rural Budgets Administration Committee may require a decision impact analysis for intended and unintended consequences prior to grant approval.

4.7 Requests for financial assistance to support new services must have a feasibility study to identify the service, the need, the financial viability and its integration into other services.

4.8 Projects supported with grant funds that involve construction or renovations are required to adhere to building, plumbing, electrical, health, fire, zoning, gas and other codes and regulations, prior to the start of the project.

4.9 At the discretion of each Electoral Area Director, grant contributions may be provided for the same project, initiative, service, event, program or feasibility study intended to support the same purpose from more than one Electoral Area.

4.10 Grants provided to an organization for the purpose of capital projects, not owned by the PRRD, may require a Service Partnership agreement between the recipient organization and the PRRD contingent on the grant amount.

4.11 Grant funding may be authorized to support multi-year contributions up to a maximum of three consecutive years.

4.12 Grant contributions to support operational funding for more than three consecutive years and in excess of $75,000 per year, will be evaluated by RBAC to determine whether or not a recommendation to the Regional Board to establish a service function should be made.

4.13 Organizations approved for multi-year grants must provide an annual report that includes the following:

a) Progress of the project (completed/ongoing)
b) Summary of the funding spent to date
c) Number of participants (where applicable)
d) Photographs (when available).

4.14 Organizations failing to abide by the conditions of the grant and/or reporting requirements may be subject to:

a) Cancellation of future grant payments for multi-year contributions;
b) Repayment of grant funds
c) Being deemed ineligible for future grant consideration.

4.15 Grant recipients must be accountable for the use of funds in accordance with their grant application and conditions of the grant approval.

4.16 Grant contributions will not be approved for projects or initiatives that have begun prior to the request for funding assistance.

4.17 Grant contributions may not be used to support individuals, families or businesses.

4.19 <u>Eligibility Criteria for Applicants:</u>

Applicants must be:

a) Not-for-profit organizations who are registered and in good standing with the Societies Act of BC who operate in one or more of the Electoral Areas; or operate in a Municipality but provide benefit to one of more of the Electoral Areas;
b) Local Government, First Nations Government, Band or Council; or

c) School District or a rural school parent advisory council (PAC) that is legitimized by the *School Act*.

4.20 Application Criteria:

a) Applications will be accepted on a continuous intake from January 1st to December 31st.

b) Applications must include a relevant project budget, quotes (where applicable) and a copy of the applicant's most recent financial statements.

c) Grants applications specific to Rural Fire Services must comply with and provide reference to the guidelines set in conjunction with the National Fire Protection Act (NFPA), Fire Underwriters Survey and WorkSafeBC prior to approval.

d) Grant applications for capital projects must include a comprehensive Capital Project budget indicating all sources of income and expenditures; and information on how it will be paid for and maintained in the future.

4.21 Eligible Costs:

a) Applicants may request grant funds to support projects, events (one time or recurring), capital investment, operational investment, programs, initiatives and feasibility studies.

b) Funding assistance issued to support any of the categories listed below must meet the following specific criteria outlined in the chart below:

Feasibility Studies
Funding support to assist with the assessment of a proposed project or initiative that results in an analysis of the economic factors, viability, risks and the likelihood of its success. Examples included Community halls, recreations facilities, fire departments, or other projects or initiatives deemed appropriate by RBAC. 1. Maximum grant contribution of $50,000 2. The study must not have begun prior to the request for financial assistance. 3. Each Electoral Area may contribute the maximum grant amount for the same feasibility study. 4. Grant funds provided for a feasibility study that results in the completion of a project and the establishment of a service function, will be recovered through that established function.

Fire Services
Grant contributions intended to support rural fire protection/services in the Electoral Areas of the PRRD may be authorized to support the purchase of fire equipment, new construction or renovation of an existing fire hall, and purchase of fire trucks. 1. **Fire Equipment** – maximum grant of $20,000 for new or replacement equipment on vehicles, in fire hall or used by firefighters; request must be made by Fire Department's Society Board or Council 2. **Fire Halls** – New Construction or Renovations; limited to no more than one fire hall construction or renovation grant for a fire department during the life of the grant program; maximum grant of 50% of the cost estimate provide by an engineer or quantity surveyor; must be supported by a report from the fire underwriters survey, fire department master plan, fire department review or audit prepared by an independent consultant or authority. 3. **Fire Trucks** - maximum grant of 50% of the purchase price of the truck limited to one grant every 5 years to any one Fire Department; truck must be new to the fire department and supported by a Fire Underwriters Survey, part or a fired department master plan, or fire department review or audit prepared by an independent consultant or authority; this grant does not apply to a Fire Department within an established specified area shared with a municipality.
Rural Capital Grants
Grant funding may be used to support eligible organizations requesting financial assistance to purchase capital items for use by the organization that result in an overall benefit to the rural community at large. 1. Maximum grant $50,000 is available. 2. The applicants must be able to support all ongoing maintenance and future costs. 3. Each Electoral Area may provide a grant for the same specific project.
Parent Advisory Councils
Grant funds may be used to support Parent Advisory Councils (PAC) seeking assistance to purchase playground equipment, or improvements to community recreation facilities located on school property provided: 1. The PAC is legitimized by the *School Act*; and 2. Supports a rural community school where no hall exists and the school is used as the community meeting place. 3. Grant contribution would provide 75% of the total project cost, to a maximum grant of $10,000 4. Contribution from the community (in-kind, labour or materials) must cover a minimum of 25% of the total cost of the project. 5. Upgrades to facilities inside a school, such as a gymnasium, the School District must be in agreement that the facility can be used as a community centre and must be willing to maintain it.

4.23 Disbursement of Funds:

Approved Grant funds will be payable to the recipients upon ratification by the Rural Budgets Administration Committee.

4.24 Grant recipients will be required to recognize the Regional District for their grant contribution.

Affiliated Procedure	

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-111

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: Rural Loan Fund Policy

RECOMMENDATION:

That the Rural Budgets Administration Committee recommend that the Regional Board adopt the Rural Loan Fund Policy, which sets out the principles and guidelines governing the issuance of loans and grants from the Rural Loan Fund Reserve administered by the Rural Budgets Administration Committee.

BACKGROUND/RATIONALE:

In alignment with the PRRD Strategic Plan, a comprehensive review of the Rural Budgets Administration Committee (RBAC) Funding Policies booklet, comprised of some formal policies and other additional guidelines the Committee routinely followed and were included in the booklet for convenience, was launched. The RBAC Funding Policies booklet was approved by RBAC in 2014, to assist staff and Directors with funding decisions, as a 'one stop shop' for information regarding grant policies and guidelines.

The various RBAC Funding Policies were written to assist RBAC in their decision making process for the award of grants to support improvements, and increase programs and services for those communities located in the rural areas of the PRRD. The RBAC Funding Policies booklet, in its current form, functions as a large multiple page manual that contains various guidelines for a number of different grant funding options that is not user friendly, easy to follow, or interpret. In an effort to streamline this document, enhance and clarify for staff and RBAC consistency around grant administration, and to make it easier for potential grant applicants to understand the eligibility, application, and reporting requirements, four new policies have been created based on the information contained in the existing RBAC Funding policies. These new policies are consistent with and reflective of local government legislative requirements and best practices. This report provides information on the new Rural Loan Fund policy. To date, the Rural Loan Fund has not benefited from a formal policy document governing its administration; this is a new policy drafted to provide clarity for the use of the Rural Loan Fund.

The proposed Rural Loan Fund Policy establishes guidelines to assist RBAC in providing loans and non-repayable grants to organizations. This new policy contains clear and concise information for all readers and is written in the appropriate formatting style that is consistent with other grant policies. In addition to providing a purpose, scope and definitions, the policy section of the document outlines eligibility criteria, application criteria, disbursement and payment of loans and non-repayable grants.

Existence of a clear policy outlining eligibility requirements and what will be considered when making a determination will be helpful to new Directors, staff that are not intimately familiar with the history and practices around grant decision making, and the public, who will be able to discern if they are eligible, what information to supply, and how their application will be processed.

Key components of the policy are noted below:

- Eligibility has been expanded; not only member municipalities but also Local Governments, First Nation Government, Bands or Councils are deemed eligible applicants
- The stipulation that loans will be charged interest at a rate of prime plus one percent (1%), fixed for the duration of the repayment schedule has been clarified and included.
- The ability to award funding in the form of non-repayable grants from the interest earned on the fund, never granting more than 80% of the interest in the fund has been added.
- The requirement for all applications to include business case, current financial statements and cash flow, and a detailed explanation of how the loan will be repaid has been clarified and included
- Non-repayable grants will be payable upon ratification by RBAC

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

☒ Comprehensive Policy Review

FINANCIAL CONSIDERATION(S):

Loans and non-repayable grants are provided from the Rural Loan Fund Reserve.

COMMUNICATIONS CONSIDERATION(S):

Once the Regional Board approves the Rural Loan Fund policy, it will be posted on the PRRD website.

OTHER CONSIDERATION(S):

Upon approval of the Rural Loan Fund Policy, a loan/grant application will be created by staff to ensure it aligns with information that is reflected in the new adopted policy.

In the RBAC Funding Policies booklet, the existing “Rural Loan Fund” page does not indicate an “adopted” date, and it is unknown if it was a guideline adopted by RBAC to self-govern their determinations, or if it was Board approved as a policy that RBAC must adhere to as part of the delegation of the authority to administer the Rural Loan Fund, (and other funds, such as Gas Tax and Peace River Agreement funds), to the Committee (via Bylaw 1166, 1998). In any event, the existing “Rural Loan Fund” page, and in fact the entire RBAC Funding Policies Booklet will be considered repealed and obsolete upon Board adoption of the attached policy.

Attachments:

1. Final Draft – Rural Loan Fund Policy

External Links:

1. Rural Budgets Administration Funding Policies

RURAL LOAN FUND

Department	Finance	Policy No.	
Section	Grants	Date Approved by Board	
Repeals	RBAC Funding Policies	Board Resolution #	

Amended		Board Resolution #	
Amended		Board Resolution #	
Amended		Board Resolution #	

Repealed		Board Resolution #	

1. Purpose

1.1 The Rural Loan Fund policy establishes clear guidelines for the Rural Budgets Administration Committee (RBAC) to provide financial assistance to eligible organizations in the form of either a repayable loan or a non-repayable grant, to support infrastructure projects, initiatives for programs, or services that benefit the rural areas of the Peace River Regional District (PRRD) and the communities at large.

2. Scope

2.1 This policy applies to RBAC, the Peace River Regional District and all external organizations eligible for consideration to receive funds in the form of a repayable loan, or an outright grant, from the Rural Loan Fund.

3. Definitions

3.1 *Grant:* Non-repayable funds disbursed or given by one party, often a government or other organization, to a recipient for a particular purpose.

3.2 *Infrastructure*: Municipal or regional, publicly or privately owned tangible capital assets primarily for public use or benefit.

3.3 *Initiative:* An activity that tries out a specific idea or purpose which is intended to provide a benefit service to rural area residents, or the community at large.

3.4 *Loan:* Repayable funds that are borrowed from an institution, local government or organization and lent to a recipient for a fee at a set interest rate to be used for a specific purpose.

3.5 *Not-for-Profit Society:* refers to a community organization which is not driven by profit, who is registered and in good standing with the Societies Act of BC.

3.6 *Program:* An activity designed for a specific purpose which is led by a community organization and leads to the improvement to the quality of life for rural residents.

3.7 *Project:* An undertaking that is planned to achieve a particular outcome or result with a specific set of goals, objectives, and a start and finish date.

3.8 *Rural Budgets Administration Committee:* refers to a Standing Committee of the Regional Board comprised of the elected Director from each Electoral Area in the Peace River Regional District who has the authority, by delegation of the Regional Board, to administer the rural budgets as identified in the Annual Financial Plan of the Peace River Regional District and in accordance with the "Rural Budgets Administration Bylaw No. 1166, 1998".

3.9 *Service:* A function led by a community organization which provides the public with an opportunity to benefit or improve the rural areas or community at large.

4. Policy

4.1 RBAC has the sole discretion to determine if an organization applying for financial assistance is eligible to receive funds from the Rural Loan Fund, in accordance with this policy.

4.2 Financial assistance from the Rural Loan Fund may be used to support infrastructure projects, initiatives for programs, or services that will benefit rural residents and the community at large and are provided to eligible organizations as follows:

a) Transfer of funding as a revenue source to an established Peace River Regional District service function, to fund the improvement or maintenance of Peace River Regional District infrastructure or assets, in the form of a repayable loan, or a grant.

b) To a Local Government, First Nation Government, Band or Council for projects that will benefit rural residents, in the form of a repayable loan or a grant; or

c) To a registered not-for-profit society, in good standing with the *Societies Act of BC*, in the form of a repayable loan or a grant.

4.3 RBAC has the sole discretion to accept or reject any application based on the following:

a) An incomplete application; or

b) Failure to maintain society status; or

c) Failure to rationalize the need for funding or merit of the program, initiative or service.

4.4 All loans will be charged a fixed interest at the rate of prime plus one percent (1%) at the time the loan is granted, to offset the loss of interest revenue that could have been earned if the monies were invested.

4.5 Funding used to support non-repayable grant contributions, may be provided utilizing the interest earned by the Rural Loan Fund Reserve, on the condition that it does not exceed eighty percent (80%) of the total interest earned.

4.6 <u>Eligible Applicants:</u>

a) Not-for-profit organizations who are registered and in good standing with the *Societies Act of BC* who operate in one or more of the Electoral Areas; or operate in a Municipality but provide benefit to one of more of the Electoral Areas.

b) Local Governments, First Nation Government, Band or Council.

c) School District or a Parent Advisory Council (PAC) from a rural school and legitimized by the *School Act.*

4.7 Application Criteria:

a) Applications are accepted on a continuous intake from January 1st to December 31st.

b) All loan applicants must submit a completed application that includes:

   i. a business case outlining the rationale for the project and its estimated costs;

   ii. current financial statements and a cash flow forecast; and

   iii. a detailed explanation on how the loan will be repaid.

4.8 Loan Repayment

Loan funds are repayable and recipients must repay the loan by one of the following methods:

a) By payment over a set period of time from the service function taxation or service fees, for internal loans; or

b) By payment as set out in a formal loan agreement with the recipient.

4.9 Grant Terms

a) All approved grants are non-repayable and recipients will not be required to pay back funds.

b) All external recipients who receive financial assistance through the Rural Loan Fund, by way of a loan OR a grant, are required to recognize the Regional District for their financial contribution.

4.10 Disbursement of Funds:

a) Loans will be payable as established in the formal loan agreement.

b) Non-repayable grant funds will be payable to the recipients upon approval of the Rural Budgets Administration Committee in the form of a resolution introduced and endorsed by the Committee in a legal RBAC Committee meeting.

Affiliated Procedure	

REPORT

To: Rural Budgets Administration Committee | Report Number: FN-RBAC-113

From: Teri Vetter, Chief Financial Officer | Date: November 25, 2021

Subject: Utility Extension Grant Policy

RECOMMENDATION:

That the Rural Budgets Administration Committee recommend that the Regional Board adopt the Utility Extension Grant Policy, which sets out the principles and guidelines governing the issuance of PRRD grant funding for the extension of electrical or natural gas utility services to registered property owners within the Electoral Areas of the PRRD administered by the Rural Budgets Administration Committee.

BACKGROUND/RATIONALE:

In alignment with the PRRD Strategic Plan, a comprehensive review of the Rural Budgets Administration Committee (RBAC) Funding Policies booklet, comprised of some formal policies and other additional guidelines the Committee routinely followed and were included in the booklet for convenience, was launched. The RBAC Funding Policies booklet was approved by RBAC in 2014, to assist staff and Directors with funding decisions, as a 'one stop shop' for information regarding grant policies and guidelines.

The various RBAC Funding Policies were written to assist RBAC in their decision making process for the award of grants to support improvements, and increase programs and services for those communities located in the rural areas of the PRRD. The RBAC Funding Policies booklet, in its current form, functions as a large multiple page manual that contains various guidelines for a number of different grant funding options; it is not user friendly, easy to follow, or interpret. In an effort to streamline this document, enhance and clarify for staff and RBAC consistency around grant administration, and to make it easier for potential grant applicants to understand the eligibility, application, and reporting requirements, four new policies have been created based on the information contained in the existing RBAC Funding Policies booklet. These new policies are consistent with and reflective of local government legislative requirements and best practices. This report provides information on the proposed Utility Extension Grant policy which will replace the previous guidance included in the Policies Booklet.

The proposed Utility Extension Grant Policy establishes guidelines to assist RBAC with administration of grants to rural property owners seeking improved hydro electrification and natural gas services to their properties. This new policy contains clear and concise information for all readers and is written in the appropriate formatting style that is consistent with other grant policies. In addition to providing a purpose, scope and definitions, the policy section of the document outlines the principles for the calculation of a Utility Extension grant, the maximum allowable, applicant criteria, how to apply and payment of funds.

Existence of a clear policy outlining eligibility requirements and what will be considered when making a determination will be helpful to new Directors, staff that are not intimately familiar with the history and practices around grant decision making, and the public, who will be able to discern if they are eligible, what information to supply, and how their application will be processed.

ALTERNATIVE OPTIONS:

1. That the Rural Budgets Administration Committee provide further direction.

STRATEGIC PLAN RELEVANCE:

☒ Organizational Effectiveness

  ☒ Comprehensive Policy Review

FINANCIAL CONSIDERATION(S):

Utility Extension grant contributions are provided from the Fair Share Reserve from each of the Electoral Areas.

COMMUNICATIONS CONSIDERATION(S):

Once the Utility Extension Grant policy is approved by the Regional Board, it will be posted on the PRRD website.

OTHER CONSIDERATION(S):

Upon approval of the Utility Extension Grant Policy, the existing Electrical and Natural Gas Extension grant applications will be updated by staff to ensure they align with information that is reflected in the new adopted policy.

In the RBAC Funding Policies booklet, the existing “Electrical Extension Grant Policy and Applicant Guide” does not indicate an “adopted” date, and it is unknown if it was a guideline adopted by RBAC to self-govern their determinations, or if it was Board approved as a policy that RBAC must adhere to as part of the delegation of the authority to administer Fair Share and other funds, such as Gas Tax and Peace River Agreement funds, to the Committee (via Bylaw 1166, 1998). In any event, the existing “Electrical Extension Grant Policy and Applicant Guide” and in fact the entire RBAC Funding Policies Booklet will be considered repealed and obsolete upon Board adoption of the attached policy.

Attachments:

1. Final Draft Utility Extension Grant Policy

External Links:

1. Rural Budgets Administration Committee Funding Policies

Utility Extension Grants Policy

Department	Finance	Policy No.	
Section	Grants	Date Approved by Board	
Repeals	RBAC Funding Policies	Board Resolution #	

Amended		Board Resolution #	
Amended		Board Resolution #	
Amended		Board Resolution #	

Repealed		Board Resolution #	

1. Purpose

1.1 The Rural Utility Extension Grant policy establishes clear guidelines for the Rural Budgets Administration Committee (RBAC) for the distribution of grant funds to support the extension of public utility services for electrical and natural gas to registered property owners within the Electoral Areas of the Peace River Regional District (PRRD).

2. Scope

2.1 This Statement of Policy applies to the RBAC, PRRD and all external organizations that apply for grant-in-aid funds from the Rural Budgets Administration Committee.

3. Definitions

3.1 *Grant Contribution:* refers to non-repayable funds disbursed or given by one party, often a government or other organization, to a recipient for a particular purpose.

3.2 *Utility Company:* refers to a public utility company that provides services such as electricity or natural gas to customers. (BC Hydro, Pacific Northern Gas, FortisBC).

3.3 *Rural Budgets Administration Committee:* refers to a Standing Committee of the Regional Board comprised of each Electoral Director from each Electoral Area in the Peace River Regional District who has the authority, by delegation of the Regional Board, to administer the rural budgets as identified in the Annual Financial Plan of the Peace River Regional District and in accordance with the "Rural Budgets Administration Bylaw No. 1166, 1998".

4. Policy

4.1 The Rural Budgets Administration Committee is responsible for the review and approval of all Utility Extension grant applications.

4.2 Utility Extension grants are limited to a one time only per applicant, regardless if the property owner is a registered owner of multiple properties.

4.3 Grant funding is limited to the mainline extension costs on public maintained roads to serve residential customers.

4.4 All costs related to the service line from the main line to the residence are the responsibility of the property owner.

4.5 The maximum grant contribution available to extend Electrical Services is $4,000 and is subject to the following:

   a) The property owner is responsible for the first $1,000 of the main line service costs; therefore when the main line cost to the property is $1,000 or less, no grant funds will be provided.

   b) When the main line cost to the property is from $1,001 or greater, grant funds may be provided at a rate of 50% on the balance over $1,000 to a maximum grant of $4,000.

   c) An example on how to calculate the grant is outlined on the Utilities Extension Grant Application - Electrical.

4.6 The maximum grant contribution available to extend Natural Gas Services is $5,000 and is subject to the following:

   a) An Electoral Area may contribute up to 75% of the total cost to the property owner less any other contribution (Provincial grants, etc.) to a maximum amount of $5,000.

   b) An example on how to calculate the amount is provided on the Utilities Extension Grant Application – Natural Gas.

4.7 <u>Applicant Criteria</u>:

   a) All applicants must be registered owners of a rural property located in one of the four Electoral Areas B, C, D, or E of the PRRD.

4.8 <u>Application Criteria:</u>

   a) Applications are accepted on a continuous intake from January 1st to December 31st.

   b) Applications must be completed by the rural property owner and submitted to the PRRD.

   c) The appropriate Utility Company is required to complete the calculation section of the application to provide the amount and sign off on the mainline extension.

4.9 <u>Disbursement of Funds</u>:

   a) Grant payments will be issued to the Utility Company and mailed to the applicant, who is responsible for providing the cheque to the Utility Company.

   b) Grant applicants may request payment be made payable to themselves provided they can provide to the PRRD, proof of payment to the Utility Company for the cost of the project.

Affiliated Procedure	

PEACE RIVER REGIONAL DISTRICT

REPORT

To: Rural Budgets Administration Committee — Report Number: FN-RBAC-115

From: Teri Vetter, Chief Financial Officer — Date: November 25, 2021

Subject: October 2021 Financial Report

RECOMMENDATION:

That the Rural Budgets Administration Committee receive the report titled "October 2021 Financial Report – FN-RBAC-115", which details balances and commitments in various reserves, for information.

BACKGROUND/RATIONALE:

Not Applicable.

ALTERNATIVE OPTIONS:

Not Applicable.

STRATEGIC PLAN RELEVANCE:

☒ Not Applicable to Strategic Plan

FINANCIAL CONSIDERATION(S):

None.

COMMUNICATIONS CONSIDERATION(S):

None.

OTHER CONSIDERATION(S):

None.

Attachments:

1. Fair Share Commitments
2. Peace River Agreement Commitments
3. Community Works (Gas Tax) Commitments
4. BCR/PRA Commitments
5. Loans Fund Commitments
6. Reserve Balances
7. Grants in Aid Scholarship and Bursary Awards

Staff Initials: JR — Dept. Head: Teri Vetter — CAO: Shawn Dahlen — Page 1 of 1

Fair Share Commitments	October 2021			K. Goodings Area B	B. Sperling Area C	L. Hiebert Area D	D. Rose Area E	Total Fair Share
January 1, 2021 opening balance				**1,620,628.23**	**1,228,962.31**	**3,250,869.19**	**2,868,738.97**	**8,969,198.70**
Total interest earned				**12,914.80**	**9,888.13**	**26,389.31**	**23,595.53**	**72,787.77**
								-
COMMITMENTS	**Date Committed**	**Commitment Amount**	**Previous Yrs. Payments**	**Fair Share Payments This Year**				**Remaining Commitment**
Area B								-
Clearview Arena; Service Operational Costs	Feb 20, 2019	5,985.00						5,985.00
CL Fire Boundary Expansion Public Engagement (toward Red Cr Sub)	Jan 21, 2021	10,000.00						10,000.00
Electrical Extension Grants	Ongoing	4,000.00		4,000.00				-
Facility Asmts; Cache Cr, Halfway Graham, Golata Cr Halls, NP Fall Fair Grounds	Jan 21, 2021	60,000.00		16,566.36				43,433.64
FSJ Public Library Assn; (60,000 in 2022, 2023)	Jan 21, 2021; Sep 27, 2021	180,500.00		60,500.00				120,000.00
NP Light Horse Assoc; Indoor Arena Improvements	Mar 15, 2018	15,000.00	12,332.33					2,667.67
NP Fall Fair Society; Adeline Kelly Building Architectural Drawings	Sep 27, 2021	6,500.00		6,500.00				-
Red Creek Sub Windstorm Cleanup Bins	Aug 19, 2021	2,500.00		2,500.00				-
Rural Fire Protection Expansion Feasibility (CL)	Feb 16, 2017	10,000.00	8,794.54					1,205.46
Rural Gasification (Includes possible 5k for Blueberry Commune per Apr 16/15)	Oct 20, 2001; Apr 16, 2015	680,000.00	32,367.25					647,632.75
Sagitawa Christian Camp; Archery Pole Shed Funding	April 22/21	10,000.00		10,000.00				-
Taylor; NP Rural Roads Coalition Funding	Mar 4, 2021	112,500.00		61,268.25				51,231.75
Waste Water Receiving Facility (Operating Deficit 75%)	Nov 27, 2014	-						-
								-
		1,096,985.00	53,494.12	161,334.61	-	-	-	**882,156.27**
Area C								-
Charlie Lake Potable Water Feasibility Study	July 15, 2021	5,000.00						5,000.00
FSJ Airport Sub Water; Emerg Repair & Infrastructure Upgrade	Dec 17, 2020	160,000.00			95,928.50			64,071.50
FSJ Public Library Assn (5,000 in 2021, 2022)	Jan 21, 2021	10,000.00			5,000.00			5,000.00
FSJ Public Library Assn; CLICK Program	Jan 21, 2021	10,000.00			10,000.00			-
Lake Harvester Environmental Mgmt Plan	Oct 28, 2021	50,000.00						50,000.00
NPAS; Airport Swr Pumps & Maintenance	Dec 7, 2015	26,289.38	4,157.98					22,131.40
Waste Water Truck Receiving Facility (Operating Deficit 75%)	Nov 27, 2014	-						-
								-
		261,289.38	4,157.98	-	110,928.50	-	-	**146,202.90**
Area D								-
*Bear Mtn Nordic Ski Assn; Snow Cat Funding	Jul 15, 2021	45,000.00						45,000.00
Dawson Creek Public Library; D Parton Imagination (1,800 in 2021-23)	May 20, 2021	5,400.00				1,800.00		3,600.00
Dawson Creek Sportsman's Club; Indoor Range Expansion	Jun 18, 2015	80,000.00				80,000.00		-
DCSCL; Rural Seniors Aging in Place	Aug 19, 2021	150,000.00				150,000.00		-
Kelly Lake Community Centre Reno Project	Sep 17, 2020	260,000.00						260,000.00
Lake Harvester Environmental Mgmt Plan	Oct 28, 2021	50,000.00						50,000.00
Mile 22 Comm Park Assn; Operations, Heater, Rink Base Liner	Jul 15, 2021	4,000.00				4,000.00		-
Pouce Coupe; Fire Hall Engineered Design Funding	Feb 18, 2021	25,000.00						25,000.00
Pouce Coupe; RCMP Office Setup Funding	Mar 18, 2021	7,037.09				7,037.09		-
Rural Gasification	Oct 20, 2011; Sep 17, 2020	740,000.00	72,390.26					667,609.74
Seniors Meal Project; Public Engagement & Approval Process	Jan 21, 2021	15,000.00						15,000.00
Step Up & Ride (18,750 in 2021, 2022, 2023)	Jan 21, 2021	56,250.00				18,750.00		37,500.00
Swan Lake Weir; PRRD Parks Budget Funding	Nov 19,2020	50,000.00						50,000.00
Synergy Group Establishment	Jan 21, 2021	7,650.00						7,650.00
		1,495,337.09	72,390.26	-	-	261,587.09	-	**1,161,359.74**
Area E								-
*Bear Mtn Nordic Ski Assn; Snow Cat Funding	Jul 15, 2021	15,000.00						15,000.00
Camp Sagitawa; Phase 1 Climbing Wall	Feb 20, 2014	20,000.00	5,869.50					14,130.50
Dawson Creek Public Library; D Parton Imagination (1,800 in 2021-23)	May 20, 2021	5,400.00					1,800.00	3,600.00
Dawson Creek Sportsman's Club; Indoor Range Expansion	Jun 18, 2015	20,000.00					20,000.00	-
DCSCL; Rural Seniors Aging in Place	Aug 19, 2021	50,000.00					50,000.00	-
Electrical Extension Grants	Ongoing	4,000.00						4,000.00
Step Up & Ride (6,250 in 2021, 2022, 2023)	Jan 21, 2021	18,750.00					6,250.00	12,500.00
Synergy Group Establishment	Jan 21, 2021	7,650.00						7,650.00
								-
		140,800.00	5,869.50	-	-	-	78,050.00	**56,880.50**
Total Fair Share Bank Balance at Month End				**1,472,208.42**	**1,127,921.94**	**3,015,671.41**	**2,814,284.50**	**8,430,086.27**
Total Remaining Commitment				**882,156.27**	**146,202.90**	**1,161,359.74**	**56,880.50**	**2,246,599.41**
Balance After Remaining Commitments				**590,052.15**	**981,719.04**	**1,854,311.67**	**2,757,404.00**	**6,183,486.86**
				Area B	**Area C**	**Area D**	**Area E**	
*Conditions Apply								

Peace River Agreement Commitments	October 2021				K. Goodings Area B	B. Sperling Area C	L. Hiebert Area D	D. Rose Area E	Total
January 1, 2021 Opening Balance					**203,429.90**	**3,366,579.16**	**1,790,167.72**	**2,596,144.05**	**7,956,320.83**
Total interest					**6,608.13**	**32,889.08**	**19,760.55**	**26,597.53**	**85,855.29**
Subscription PRA $					**780,300.00**	**780,300.00**	**780,300.00**	**780,300.00**	**3,121,200.00**
COMMITMENTS	**Date Committed**	**Commitment**	**Previous Yrs. Payments**	**Category Code**	**Peace Agreement Payments This Year**				**Remaining Commitment**
Area B									-
Cecil Lake Rec Comm; Hall Exterior Steps	May 27, 2019	1,500.00	1,470.00	**8**					30.00
CDC; Fire Training Centre (4,375/year 2018-2022)	Apr 16, 2018	21,875.00	8,750.00	**5**	4,375.00				8,750.00
Clearview Arena Society; Upgrade Project	Aug 16, 2018	300,000.00	209,989.09	**2**					90,010.91
Clearview Rec Facility; Property Assessment	Jan 19, 2017	50,000.00	25,286.48	**2**					24,713.52
King's Valley Christian Camp; Facility Upgrades & Equipment	Apr 22, 2021	25,112.00		**4**	25,112.00				-
North Pine Tower Condition Assessment	Dec 17, 2020	50,000.00		**11**	50,000.00				-
Osborn Comm Hall; New Hall Construction Feasibility	Feb 20, 2020	13,828.44	3,234.00	**8**	5,655.00				4,939.44
PNG; Gas Extension in Wonowon Subdivision	Oct 28, 2021	40,000.00		**10**					
Wonowon Function Feasibility Study	Dec 19, 2019	21,067.10	19,106.90	**3**	1,960.20				-
Wonowon Subdivision Improvement Public Engagement	Jan 21, 2021	18,000.00		**3**					18,000.00
		541,382.54			87,102.20	-	-	-	**146,443.87**
Area C									
CDC; Fire Training Centre (6,562.50/year 2018-2022)	Apr 16, 2018	32,812.50	13,125.00	**5**		6,562.50			13,125.00
CLFD; Temporary Firetruck Storage Building	May 20, 2015	150,000.00		**6**					150,000.00
Potable H2O Feasibility Study	Sep 27, 2021	200,000.00		**1**					200,000.00
NP Airport Sub Sewer; 2021 System Repairs	Dec 17, 2020	800,000.00		**9**		49,058.25			750,941.75
NP Airport Sub; Water Distribution Maintenance Initiative	Dec 1, 2016	15,000.00	12,000.00	**1**					3,000.00
		1,197,812.50				55,620.75			**1,117,066.75**
Area D									-
CDC; New Fire Hall	Apr 16, 2018	600,000.00		**6**					600,000.00
CDC; Fire Training Centre (15,312.50/year 2018-2022)	Apr 16, 2018	76,562.50	30,625.00	**5**			15,312.50		30,625.00
Chilton Sewer; Upgrades	Jan 16, 2020	50,000.00	23,350.51	**9**					26,649.49
DC/PC Fire; Expansion Service Contract (25,000/year 2022-2024)	Aug 19, 2021	75,000.00		**6**					75,000.00
Encana Events Centre; Sport Court	Feb 18, 2021	100,000.00		**8**					100,000.00
Harper/Imperial Sub Sewer; Upgrades	Jan 16, 2020	50,000.00	33,073.10	**9**					16,926.90
KL Comm Centre; Renovation Project	Sep 17, 2020	765,000.00		**8**					765,000.00
KL Comm Centre; Grant Application Costs (Green & Inclusive/NDTI)	May 2021	7,000.00		**8**			4,237.50		2,762.50
KL Sewer Lagoon; Upgrades and Repairs	Feb 21/19; Mar 14/19; Jan 6/20	145,342.51	124,116.85	**9**			7,399.38		13,826.28
PC/DC Fire; Pouce Coupe Fire New Tender	Feb 20, 2020	250,000.00		**6**			250,000.00		-
Rolla Dike; Legal Risk Assessment	Jan 16, 2020	50,000.00	21,075.63	**1**			15,612.17		13,312.20
Rolla Sewer; Condition Assessment	Nov 19, 2020	50,000.00		**9**			13,440.00		36,560.00
SP Dist Crime Prevention Assn (1400/year 2018-2021 One Call Now)	Dec 20, 2018	5,600.00	4,200.00	**4**			1,400.00		-
Tomslake FD; Computer Aided Dispatch Units	Feb 20, 2020	9,570.00		**6**			1,706.60		7,863.40
		2,234,075.01					309,108.15		**1,688,525.77**
Area E									-
Boreal Centre for Sustainability; Rural Food Security Awareness	Jun 18, 2019	5,150.00	4,713.08	**4**				436.92	-
Chetwynd Fire; Operations	Feb 20, 2020	15,000.00	8,945.40	**6**				2,034.44	4,020.16
Chetwynd Public Library; Concept Designs, Cost Estimates	Jan 24/18;May 17/18;Jun 21/18;May 20/21	269,695.00	45,364.64	**7**					224,330.36
Chetwynd Public Library; New Library Construction	Jan 17/19; Jan 31/19, Aug 19/21	775,669.64		**7**					775,669.64
Chetwynd Rural Fire; Public Engagement/Boundary Expansion	Jan 21, 2021	15,000.00		**6**				116.05	14,883.95
CDC; Fire Training Centre (8,750/year 2018-2022)	Apr 16, 2018	43,750.00	17,500.00	**5**				8,750.00	17,500.00
Iver Johnson Park; Recreation Facility Upgrades	Feb 21, 2019; Aug 19, 2021	3,297.63		**8**				3,297.63	-
ML Fire; Operations/Needs Assessment	Oct 17, 2019; Feb 20, 2020	75,502.00	51,937.77	**6**					23,564.23
ML Rural Fire; Public Engagement/Operations	Jan 21, 2021	29,538.00		**6**					29,538.00
Seniors Meal Project; Public Engagement & Approval Process	Jan 21, 2021	15,000.00		**4**					15,000.00
		1,247,602.27						14,635.04	**1,104,506.34**
Total Peace River Agreement GL Balance at Month End					**903,235.83**	**4,124,147.49**	**2,281,120.12**	**3,388,406.54**	**10,696,909.98**
Total Remaining Commitment					**146,443.87**	**1,117,066.75**	**1,688,525.77**	**1,104,506.34**	**4,056,542.73**
Balance available after remaining commitments					**756,791.96**	**3,007,080.74**	**592,594.35**	**2,283,900.20**	**6,640,367.25**
					Area B	**Area C**	**Area D**	**Area E**	

Spending Item Numbers:

1 Potable Water and Water Security/Studies
2 Arenas
3 Halls, Trails and Walking Paths
4 Assistance to Other Organizations
5 Dawson Creek Fire Training Centre
6 Fire Protection
7 Libraries, Museums and Art Galleries
8 Year-Round Recreation Facility Upgrades
9 PRRD Sewer Services Assistance
10 Natural Gas
11 Connectivity

Community Works (Gas Tax) Commitments	October 2021			K. Goodings Area B	B. Sperling Area C	L. Hiebert Area D	D. Rose Area E	Total
January 1, 2021 opening balance				**597,303.38**	**1,779,198.43**	**1,694,511.51**	**1,672,166.28**	**5,743,179.60**
Total Interest Earned				**5,860.35**	**15,854.32**	**14,459.94**	**14,949.42**	**51,124.03**
Subscription				**520,083.60**	**520,083.59**	**520,083.60**	**520,083.60**	**2,080,334.39**
COMMITMENTS	**Date Committed**	**Commitment Amount**	**Previous Yrs. Payments**	**Payments made from October 1, 2020**				**Remaining Commitment**
Area B								-
Buick Creek Community Club; Hall Furnace	Jun 18, 2019	7,832.00						7,832.00
Cecil Lake Rec; Fencing, Ball Diamonds, Dugout, Bleachers	Apr 16, 2020	86,000.00	51,726.51	34,273.49				-
Cecil Lake Rec; Building Improvements; Additional Storage	Apr 22, 2021	39,746.00						39,746.00
Clearview Arena Soc.; Ventilation/Dehumidification System	Feb 20,Apr 16,Jun 18/20; Feb 18/21	175,000.00		9,371.25				165,628.75
*Goodlow Comm Club; Dugout, Campsite, Gazebo Upgrades	Apr 22, 2021	23,456.00						23,456.00
Legal Fees; Community Group Property Transfer	Jan 21, 2021	5,000.00						5,000.00
*NP Fall Fair Soc; A. Kelly Building & Grounds Improvements	April 22, 2021	31,435.00						31,435.00
*Prespatou Planning Cmte Soc; Comm Walking Trail	April 22, 2021	100,000.00						100,000.00
								-
		468,469.00	51,726.51	43,644.74				**373,097.75**
Area C								-
Charlie Lake Fire Hall Condition Assessment	Jan 21, 2021	15,000.00			7,930.85			7,069.15
								-
		15,000.00	-		7,930.85			**7,069.15**
Area D								-
Chilton Sub Sewer; Condition Assessment & Upgrades	Dec 17, 2020	50,000.00				41,047.82		8,952.18
Cutbank Comm Club; Exterior Façade Improvement	Oct 15, 2020	40,806.87				40,806.87		-
Friesen Sub Sewer; Assessment & Upgrades	Dec 17, 2020	50,000.00				30,370.39		19,629.61
Harper Imperial Sub Sewer; Assessment & Upgrades	Dec 17, 2020	50,000.00				36,453.44		13,546.56
Hats & Chaps Gymkhana Soc; Livestock Pens; Grounds	Apr 22, 2021	27,000.00						27,000.00
Kelly Lake Sewer System Assessment & Upgrades	Nov 19, 2020	100,000.00				17,381.09		82,618.91
McLeod Rec & Soc Services Soc; Zamboni Building	Apr 22, 2021	3,403.50						3,403.50
Peace Region Internet Soc; Rolla Fiber Project	Jul 25, 2019	15,000.00						15,000.00
Rolla Dike Decommissioning Plan Submission	Sep 27. 2021	50,000.00						50,000.00
Rolla Sewer System Upgrades & Municipal WW Compliance	Nov 19, 2020; Sep 27,2021	604,400.00				141,656.41		462,743.59
								-
		993,844.37	3,234.00			307,716.02		**682,894.35**
Area E								
Chetwynd & Dist. Rod and Gun Club; Interior Lighting	Apr 16, 2020	10,445.41					10,445.41	-
Chetwynd Public Library; New Library Construction	Aug 19, 2021	1,000,000.00						1,000,000.00
Hats & Chaps Gymkhana Soc; Livestock Pens; Grounds	Apr 22, 2021	9,000.00						9,000.00
McLeod Rec & Soc Services Soc; Zamboni Building	Apr 22, 2021	10,210.50						10,210.50
Moberly & Jackfish Lake Comm Halls; Condition Asmt	Jan 21, 2021	30,000.00					8,203.68	21,796.32
Moberly Lake Fire Hall; Condition Asmt	Jan 21, 2021	15,000.00					7,596.85	7,403.15
Legal Fees; Community Group Property Transfer	Jan 21, 2021	6,000.00						6,000.00
								-
		1,131,303.72	50,647.81				26,245.94	**1,054,409.97**
Total Community Works (Gas Tax) Balance at month end				**1,079,602.59**	**2,307,205.49**	**1,921,339.03**	**2,180,953.36**	**7,489,100.47**
Total Remaining Commitment				**373,097.75**	**7,069.15**	**682,894.35**	**1,054,409.97**	**2,117,471.22**
Balance After Remaining Commitments				**706,504.84**	**2,300,136.34**	**1,238,444.68**	**1,126,543.39**	**5,371,629.25**
				Area B	**Area C**	**Area D**	**Area E**	
*Conditions apply								

BCR/PRA Commitments	October 2021	Area B	Area C	Area D	Area E	Total BCR/PRA
	2021 Opening Balance	**48,436.93**	**39,975.86**	**17,781.58**	**38,530.46**	**144,724.83**
	Interest	**357.14**	**307.83**	**147.17**	**318.90**	**1,131.04**
Commitments Remaining						
Arras Fire Brigade; Prespatou Mtg Appreciation		500.00				
CLFD; Hose Lay Competition Banquet			65.87			
Total Commitments		**500.00**	**65.87**	**-**	**-**	**565.87**
2021 Expenditures						
NP Ride for the Disabled; 2021 Operations Funding		5,000.00	5,000.00			
High School Rodeos of BC; Host Rodeo Event Funding		4,500.00				
Total Expenditures		**9,500.00**	**5,000.00**	**-**	**-**	**14,500.00**
Month End GL Balance		**39,294.07**	**35,283.69**	**17,928.75**	**38,849.36**	**131,355.87**
Balance available		**38,794.07**	**35,217.82**	**17,928.75**	**38,849.36**	**130,790.00**
		Area B	**Area C**	**Area D**	**Area E**	

Rural Loan Fund Reserve October 2021		Uncommitted Rural Loan Funds Available:		4,319,000.00
		Unissued Loans Approved:		181,000.00
		Rural Loan Fund Balance:		4,500,000.00
Loans in Rural Loan Fund	**Date Committed**	**Loans Approved**	**Loans Issued**	**Outstanding Balance**
NP Farmers Institute; Grain Elevator Upgrades (2021)	21-Jul-16	300,000.00	300,000.00	-
Whiskey Jack Nordic Ski Club; Beatton Park Day Lodge	17-Jan-19	181,000.00		
Total		**481,000.00**	**300,000.00**	**-**

RLF Interest:	**948,495.42**

Rural Loan Fund Reserve Balance:	**5,450,383.43**

RESERVES

All Regional District Reserve Balances as of October 31, 2021

Reserve Fund	Balance	2020 Interest
911 Emergency Capital	$ 331,470.62	$ 3,519.40
Area B Potable H2O Capital	$ 150,414.17	$ -
Area B Potable H2O Operating	$ 150,414.17	$ -
*BCR/PRA	$ 131,355.87	$ 1,930.05
Buick Creek Arena Capital	$ 298,288.02	$ 2,734.76
Buick Creek Arena Operating	$ 134,003.56	$ 1,076.27
Building	$ 1,382,194.01	$ 15,295.06
Charlie Lake Fire Capital	$ 395,139.01	$ 11,170.54
Charlie Lake DCC	$ 283,089.55	$ 3,600.72
Charlie Lake Fire Operating	$ 79,035.40	$ 498.99
Charlie Lake Sewer Capital	$ 673,092.80	$ 6,847.82
Charlie Lake Sewer Operating	$ 104,542.15	$ 1,329.70
CL Sewer Treatment/Disposal	$ 370,095.60	$ 4,707.38
CL Waste Water Truck Facility	$ 599,717.21	$ 6,187.50
Chetwynd Arena Capital	$ 2,128,173.83	$ 24,352.56
Chetwynd Arena Operating	$ 50,138.06	$ -
Chetwynd Leis Ctr Capital	$ 2,838,535.44	$ 28,260.16
Chetwynd Leis Ctr Operating	$ 150,414.17	$ -
Chilton Sewer Capital	$ 35,135.60	$ 446.89
Chilton Sewer Operating	$ 34,460.70	$ 387.43
Clearview Arena Operating	$ 92,439.53	$ 1,175.77
*Community Works (Gas Tax)	$ 7,489,100.47	$ 79,160.93
*Covid Operating	$ 938,149.48	$ -
DC/PC Fire Capital	$ 246,960.59	$ 2,200.44
Election	$ 99,920.86	$ 1,098.71
Emergency Plan Operating	$ 422,740.76	$ 3,759.03
*Fair Share	$ 8,430,086.27	$ 118,607.90
Feasibility	$ 357,869.73	$ 4,098.24
Financial Services Operating	$ 116,279.45	$ 216.72
Friesen Sewer Capital	$ 17,858.87	$ 145.23
Friesen Sewer Operating	$ 21,297.99	$ 249.59
FSJ Airport Sewer Capital	$ 73,874.49	$ 803.77
FSJ Airport Sewer Operating	$ 52,645.95	$ 669.63
FSJ Airport Water Capital	$ 39,856.31	$ 321.10

Reserve Fund	Balance	2020 Interest
FSJ Airport Water Operating	$ 30,498.19	$ 387.91
Green "Carbon" Project	$ 158,626.95	$ 919.67
Harp/Imp Sewer Capital	$ 27,224.38	221.27
Harp/Imp Sewer Operating	$ 36,516.63	199.38
Human Resources Operating	$ 463,531.24	577.99
Information System Plan	$ 290,942.92	3,700.62
Information Tech Operating	$ 97,613.55	125.87
Insurance	$ 480,747.08	6,427.96
Kelly Lake Comm Ctr. Operating	$ 27,748.73	352.96
Kelly Lake Comm Ctr. Capital	$ 58,369.86	448.76
Kelly Lake Sewer Capital	$ 12,191.42	155.07
Kelly Lake Sewer Operating	$ 863.69	348.69
Landfill Closure	$ 1,689,035.59	$ 16,447.56
Med. Health Care Scholarship	$ 106,821.77	$ 1,358.70
Moberly Lake Fire Capital	$ 24,173.11	$ 283.32
North Pine TV	$ 26,946.86	$ 413.40
NP Leisure Pool Building Repl	$ 3,760,074.47	$ 47,825.74
NP Leisure Pool Capital	$ 2,805,783.03	$ 27,576.18
NP Leisure Pool Operating	$ 50,138.06	$ -
*Peace River Agreement	$ 10,696,909.98	$ 128,116.84
Peace River Agreement Cmte	$ 1,075,577.16	$ 13,680.65
Regional Parks Capital	$ 152,424.38	$ 1,367.58
Regional Parks Operating	$ 64,162.48	$ 624.79
Rolla Creek Dike Operating	$ 163.83	$ 2.08
Rolla Sewer Capital	$ 10,640.38	$ 135.32
Rolla Sewer Operating	$ 7,688.50	$ 97.79
*Rural (Loan Fund)	$ 5,450,383.43	$ 53,048.81
*Rural Fringe	$ -	$ 15,380.26
Solid Waste Capital	$ 4,972,070.30	$ 80,076.68
Solid Waste Operating	$ 2,673,344.48	$ 14,044.82
Sub-Regional Recreation	$ 197,066.33	$ 1,886.86
Tomslake Fire	$ 39,380.21	$ 320.65
Vehicle (Fleet)	$ 152,274.17	$ 3,763.97
TOTAL	**$ 64,358,723.85**	**$ 745,170.44**

Rural Bursary_Scholarship Recipient List

Area B Bursary

Year	Name		Amount	Amount Remaining	Date Claimed
2021	**Katherine Hotston** *only one application in 2021		**1,000**	**1,000**	
2020	Amanda Willms		2,000	0	17-Aug-20
2019	Iris Wenger		1,000	0	13-Sep-19
2018	Grace Giesbrecht		1,000	0	31-Dec-18
		TOTAL	**5,000**	**1,000**	

Area C Scholarship

Year	Name		Amount	Amount Remaining	Date Claimed
2021	**Colton Dyck**		**1,000**	**1,000**	
2021	Harrison Sewell		1,000	0	9-Sep-21
2020	Austin Lewis		1,000	0	18-Oct-20
2020	Adam Rogers		1,000	0	10-Jul-20
2020	Emily Ruehl		1,000	0	21-Aug-20
2020	Nicolas Guliov		1,000	0	28-Apr-21
2020	Shane Bontron		1,000	0	13-Oct-20
2019	Celine Quigley		1,000	0	27-Sep-19
2018	Allison Ostle		1,000	0	21-Sep-18
		TOTAL	**8,000**	**1,000**	

Area E Bursary

Year	Name		Amount	Amount Remaining	Date Claimed
2021	Lyndsey Derkoch		500	0	14-Oct-21
2021	**Kylie Bodo**		**500**	**500**	
2020	**Tristan Gerry**		**500**	**500**	
2020	Nicole Eddy		500	0	6-Nov-20
2019	Ethan Cameron		500	0	20-Jan-20
2019	Blaine Dixie		500	0	21-Nov-19
2018	Sierra Neuls		500	0	5-Dec-18
2018	Treydon Nichols		500	0	2-Jan-19
		TOTAL	**4,000**	**1,000**	

Sub-Regional Bursary & Scholarship

Year	Name		Amount	Amount Remaining	Date Claimed
2021	Miya Devust - Scholarship		1,500	0.00	31-Aug-21
2021	**Tucker Esau - Trades**		**1,500**	**1,500.00**	
2020	Austin Riley - Trades		1,500	0	24-Jul-20
2020	Sydnee Stewart - Scholarship		1,500	0	28-Aug-20
2019	Ashton Jobson - Did not claim, Rtn to funding area November 30, 2020		1,500	0	
2019	Rory Todd		1,500	0	28-May-20
2018	Prestin Sorken		1,500	0	28-Sep-18
2018	Connor Riley		1,500	0	5-Dec-18
		TOTAL	**12,000**	**1,500**	

Rural Budgets Administration Committee

Diary Items

	Item	Status	Notes	Diarized
1.	Potable Water	On-going	Area C potable water service	March 21, 2019
2.	Potable Water	On-going	Area D potable water	December 19, 2019
4.	Bulterys Community House	On-going		September 17, 2020
5.	Creating a BC Hydro Legacy Fund	On-going		September 17, 2020
6.				

PEACE RIVER REGIONAL DISTRICT

Rural Budgets Administration Bylaw No. 1166, 1998

Effective Date – November 26, 1998

CONSOLIDATED FOR CONVENIENCE ONLY

This is a consolidation of the bylaws listed below. The amending bylaws have been combined with the original bylaw for convenience only. This consolidation is not a legal document. Certified copies of the original bylaws should be consulted for all interpretations and applications of the bylaw on this subject.

Original Bylaw	**Date of Adoption**
Bylaw No. 1166, 1998	November 26, 1998
Amending Bylaw	
Bylaw No. 1617	January 26, 2006
Bylaw No. 1853	May 14, 2009 (repealed)
Bylaw No. 2299	August 19, 2017
Bylaw No. 2432	February 11, 2021

PEACE RIVER REGIONAL DISTRICT
BYLAW No. 1166, 1998

A bylaw to establish a Standing Committee of the Board and
delegate administrative powers to the committee

WHEREAS the Regional District has signed a Memorandum of Understanding with the Province of British Columbia which contributes a share of oil and gas revenue to the Electoral Areas of the Regional District;

AND WHEREAS there are certain services which are provided in one or more Electoral Areas, OR in a member municipality for the benefit of electoral area residents;

AND WHEREAS pursuant to **the Local Government Act,** the Chair of a regional district may appoint a standing committee;

AND WHEREAS pursuant to **the Local Government Act** a Regional Board may, by bylaw adopted by at least 2/3 of the votes cast, delegate its powers duties and functions not limited by the ***Local Government Act****, to* its committees;

AND WHEREAS the Chair has appointed the electoral area directors to a standing committee;

NOW THEREFORE the Board of the Peace River Regional District, in open meeting assembled, enacts as follows:

Citation

1. This Bylaw may be cited for all purposes as “Rural Budgets Administration Bylaw No. 1166, 1998".

Committee

2. The name of the committee appointed by the Chair is “Rural Budgets Administration Committee”.

Membership

3. Membership in the committee is limited to the Electoral Director from each Electoral Area in the Peace River Regional District.

Duties

4. Schedule “A” is attached hereto and forms part of this by-law.

5. The Rural Budgets Administration Committee is delegated the authority to authorize spending of Fair Share Memorandum of Understanding, Peace River Agreement, Community Works Gas Tax, BC Rail Grants in Lieu, and COVID Restart funds received by the Peace River Regional District and directed to the electoral areas and considered rural allocations of these funding sources; all such funds that are budgeted as revenues into the rural functions listed in in Schedule A, attached to and forming part of the Bylaw, shall be administered by the Rural Budgets Administration Committee in accordance with Clause 5a below.

5a) For clarity, nothing in this bylaw relieves a person or the Rural Budgets Administration Committee from compliance with all applicable legislation, Provincial Grant expenditure parameters, and Peace River Regional District Board Bylaw or Policy in effect, and as may be adopted or amended from time to time by the Regional Board.

6. The persons elected annually as Chair and Vice-Chair of the Electoral Area Directors Committee also become the Chair and Vice-Chair of the Rural Budgets Administration Committee.

7. The committee must keep minutes of its activities which will be provided to the Board for information.

Dispute Resolution

8. Should the committee be deadlocked on an issue it must refer that matter to the Regional Board for resolution.

9. A person may appeal a decision of the committee in writing to the Regional Board.

10. The decision of the Regional Board under section 8 and 9 is binding.

READ A FIRST TIME THIS ___________________ day of _____________________________, 1998.

READ A SECOND TIME THIS ___________________ day of _________________________, 1998.

READ A THIRD TIME THIS _______________________ day of ___________________________, 1998.

ADOPTED BY A 2/3 VOTE THIS _____________ day of ________________, 1998.

CERTIFIED A TRUE AND CORRECT COPY of "Rural Budget Administration Bylaw No. 1166, 1998".

____
Moray Stewart, Administrator

THE CORPORATE SEAL of the Peace River Regional District was hereto affixed in the presence of:

____
Karen Goodings, Chair

____
Moray Stewart, Administrator

Schedule "A" – Delegation of Spending Authority

A. Spending authority for Fair Share and Peace River Agreement Funds, BC Rail Grant in Lieu funds, Community Works Gas Tax funds, and COVID Restart funds that are revenue sources in the following budgets are delegated to the Rural Budgets Administration Committee:

Function 120 – Legislative - Electoral Areas

Function 275 - Grants to Community Organizations:

Function 280 – Recreation and Cultural Services

Function 221 – Sub Regional Recreation and Cultural Services

Function 210 – Community Parks

Function 285 – Cemeteries

Function 295 – Library Services

Function 525 - North Pine Television Rebroadcasting

B. Spending authority for the following reserve accounts is delegated to the Rural Budgets Administration Committee:

Community Works Gas Tax

Fair Share Memorandum of Understanding Electoral Area Funds

Peace River Agreement Electoral Area Funds

BC Rail Grants in Lieu Electoral Area Funds

COVID-19 Reserve Fund

CERTIFIED A TRUE AND CORRECT COPY
of Schedule "A" to "Rural Budget
Administration Bylaw No. 1166, 1998".

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Moray Stewart Administrator