TATHAM ENGINEERING

Enhancing our communities

2024 Powassan Building Assessments

TROUT CREEK COMMNITY CENTRE

181 MAIN STREET WEST, POWASSAN

Municipality of Powassan

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Issue	Date	Description
01	June 7, 2024	Draft Report
02	June 20, 2024	Final Report

Document Contents

Appendices

1 Introduction

Tatham Engineering Limited (Tatham) was retained to perform a Building Assessment of the Trout Creek Community Center, located at 181 Main Street West in Powassan. We visited the site in April, 2024 and spoke with Public Works Foreman, Trevor Tenant to identify any areas of concern and provide details on operating procedures. An overall photograph of the building has been included as Photograph 1.1 in Appendix A.

The primary purpose of this assessment was to review and document the existing condition of the building and to identify and quantify major defects which may require significant investment for repair or replacement over the next ten years. Our inspection is limited to observations made from visual evidence. No dismantling of any architectural finishes was performed. No destructive or non-destructive testing was undertaken. No calculations were completed to verify the suitability of the original design or existing conditions. The recommendations and our associated cost estimates are based on a visual survey of the portions of the buildings accessed during our investigation.

Expenditures for capital items, which are considered to be regular maintenance or operation in nature, have been excluded (note: items with an estimated replacement value of less than $500 are considered maintenance items). Cost estimates represent our opinion of probable cost and are provided for budget purposes only. Actual costs for work recommended can only be determined after the completion of a detailed investigation, preparation of repair specifications and tendering. The scope of work recommended in this report must be confirmed with a more detailed site investigation prior to implementation.

The ‘Estimate of Service Lives of Various System Components’ table from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Handbook was used to establish reasonable baselines for useful service life of various mechanical system components including boilers, fans, pumps, and other equipment. ASHRAE defines service life as the time during which a particular system or component remains in its original service application. In addition, recommended replacement of the equipment may be for any reason including but not limited to failure, general obsolescence, reduced liability, excessive maintenance cost, and changed system requirements due to such influences as building characteristics, energy prices, or environmental considerations.

The information and opinions expressed in this report are solely for the benefit of the Municipality of Powassan. No party shall distribute the final report or any portion or copy thereof without the express written permission of Tatham Engineering Limited. Any use which a third party makes of this report, or any reliance or decisions to be made based on it are the responsibility of such third

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Elements Reviewed

- Structure: exposed structural elements at the roof, walls, floors, and foundations;
- Interior: overall review of interior spaces to note any areas of deterioration or distress;
- Exterior: roofing materials, veneer/siding, windows, exterior doors;
- Electrical: overall lighting, incoming service and panel boards;
- Mechanical: HVAC, plumbing, and sanitary sewer systems; and
- Fire & Life Safety Systems: smoke alarms and exit signs.

2 Description

The Trout Creek Community Centre is a two-storey recreational facility. The main use is as an arena but it also has assembly areas and is able to accommodate large social gatherings. It has an assembly area on the second floor and a kitchen servery and a host of ancillary rooms to support recreation and entertainment for the community. The complex is approximately 28,300 square feet. It has multiple occupancy types supported by the following areas of use:

1. Skating ice surface and spectator area (open to above).
2. Arena entrance lobby including change rooms washroom and other associated ancillary rooms.
3. Arena Zamboni garage facility.
4. Second floor community hall, kitchen, bar, stage, washroom facilities and other ancillary rooms.
5. Emergency stairs, ramp and exit doors.

We were provided with two previous limited-scope assessment reports to serve as background information for our assessment:

- Building Condition Assessment by TSH Engineers, Architects, Planners dated October 2007; and
- Draft Building Condition Assessment by Tulloch Engineering dated October 2020.

Both previous assessments were related to the structure and building envelope conditions, however, only the 2007 assessment addressed the mechanical and electrical systems.

A cursory review of these past assessments has informed us there are some outstanding measures to be addressed. We have not restated the previous recommendations herein, but instead recommend these reports be read in conjunction with this current assessment and our findings be addressed within the context of, and in relation to the previously identified action items as part of an overall maintenance and repair strategy.

2.1 STRUCTURE & BUILDING ENVELOPE

The main arena structure spans over the ice surface area and is of wood truss construction supported on timber posts and beams of traditional pole barn construction. The ridge of the pitched roof is centered over the ice surface. The facility has been expanded to the rear with concrete block walls and wood roof joists (flat). A two-storey addition has been added to the

front of the arena structure. This is constructed of wood roof and floor framing supported on loadbearing concrete block walls, and concrete block foundation walls.

The high roof arena and community centre structure and the low roof area at the rear are covered with a thermoplastic (PVC) single-ply roofing system (Sarnafil). The building walls are metal clad at the exterior except for the back façade where the concrete block wall is exposed.

2.2 ELECTRICAL

There are two incoming electrical services:

- 400-amp, 120/240-volt, single phase, 3-wire. The electrical meter number is J3018055.
- 200-amp, 480/600-volt, three phase, 4-wire. The electrical meter number is: J3282049.

Life safety exit signage, emergency lighting remote heads and battery units are installed throughout the building. A fire alarm system is installed in the building. Carbon monoxide detectors are installed at locations with fuel burning appliances.

Interior lighting consists of a combination of fluorescent tube wraps and open socket A19 style luminaries. NS LED luminaires are used in the ice rink. Exterior lighting consists of a combination of surface mounted wall-pack lighting and pole mounted lights.

2.3 MECHANICAL

Heating is provided to the changerooms, community room, and lobby using two natural gas forced air furnaces. Supply and return air terminal devices are located throughout this section of the building to circulate the conditioned air. Electric heaters of various types are also used to heat the building.

Cooling is provided to the community room in the upper level using a roof top mounted air conditioning unit. It is unclear if these units are equipped with gas heaters to provide heat during the winter.

There is a dehumidifier for the ice rink. There are exhaust systems for the change rooms and bathrooms.

A well is used to provide domestic cold water to the building. There are four natural gas hot water tanks providing domestic hot water to the building. The sanitary drainage goes to a septic tank.

Ice Plant

The ice rink is cooled using an ammonia-based chiller system with an evaporative condenser located outside and a chiller located inside the building with a brine pump. There is a gas

detection monitor in place to engage a ventilation system. There is an emergency combination eyewash and shower unit outside of the ice plant.

3 Findings

3.1 STRUCTURE & BUILDING ENVELOPE

Structure

The original structure was an outdoor arena with a canopy roof built of timber construction. The original structure and foundations were constructed as a pole barn. We assume the timber support columns are embedded into concrete piers augured into native soils in accordance with standard pole barn construction. Walls were later constructed beyond the canopy to extend and enclose the arena along each side, with new shed roofs fastened to the existing main structure. The exterior wood-framed walls are supported on shallow concrete grade beams between the outer column support piers (Photograph 3.1.1 to 3.1.5). Large steel brackets have been installed (prior to 2007) to reinforce the base of each of the interior wood posts.

Arena buildings are subject to significant changes in temperature and humidity throughout each season. Given this fact, coupled with the age of the original pole barn construction, and subsequent interior timber column steel bracket reinforcement, we assume the encased timber posts are deteriorating below grade and are relying on the steel reinforcement brackets to transfer vertical and horizontal loads to the slab-on-grade of unknown depth. Moreover, the outer wood columns are likely not able to properly dry-out due to the limitations of the existing building envelope. This is exasperated, by the high exterior grade level and snow which slides off the sloped roof and piles up adjacent to the exterior of building, amplifying the wet conditions (Photograph 3.1.6 to 3.1.8).

Structural observations are as follows:

1. We observed cracks in the slab-on-grade around the timber posts (Photograph 3.1.9 to 3.1.12). We are concerned this is likely the result of differential settlement of the timber posts or the slab is of insufficient strength or thickness to support the post loads. We recommend a detailed structural investigation including intrusive testing be completed at representative interior and exterior timber support columns. The investigation should include a structural analysis under the design loads to determine horizontal and vertical reactions at the bases of the column supports. Following shoring and excavation to obtain the sub-surface conditions and the historical as-built reinforcement details, a suitable retrofit can be designed and implemented throughout the arena for each post location as may be required.
2. We observed several structural modifications and/or alterations for which no engineering records have been provided (Photograph 3.1.13 to 3.1.16). Among these modifications,

various posts appear to be inadequately supported (Photograph 3.1.17 to 3.1.19). We recommend detailed analysis by a structural engineer of the various modifications to ensure they meet current Ontario Building Code requirements.

3. In many cases at the exterior structures, posts and exposed wood or timber framed structures are unprotected from the elements or in the case of posts, which are slender, are unprotected from vehicular impacts from snow removal equipment (Photograph 3.1.20 to 3.1.23).

4. We observed cracking around a block lintel over an opening in the back of the building. We recommend a steel lintel be provided and the cracked mortar to be routed and sealed (Photograph 3.1.24 and 3.1.25).

5. We observed an existing chimney is need of extensive repairs (Photograph 3.1.27). We recommend the chimney be rebuilt or removed if it is no longer required in service.

6. We observed deteriorated and cracked concrete around the arena slab-on-grade. We recommend minor patch repairs be completed in order to protect the floor and mitigate tripping hazards (Photograph 3.1.28).

7. At various locations on interior and exterior concrete block walls, we observed mortar cracking in need of repair (Photograph 3.1.29). We recommend routing and tuckpointing prior to completing envelope upgrades.

Exterior

The exterior of the building was observed from grade at the perimeter. The following was observed:

8. We observed numerous envelope irregularities with respect to the existing metal siding. Further to structural finding 3.1.1, it is vital the envelope be of appropriate design and performance level to protect the original timber pole barn construction within. Snow slides off the pitched roof and piles up against the exterior walls of the building. On the parking lot side, during winter months, the snow removal equipment pushes snow against the metal cladding. We observed signs of damage, corrosion and age as well as discontinuities throughout the building. The back façade has exposed concrete block wall (Photograph 3.1.30 to 3.1.38). We recommend the building be reclad with a new building envelope system complete with insulation, and air and vapour barrier. This is required to preserve the remaining life span of the building.

9. We observed torn and repaired roof membrane. We recommend a new roof be designed and installed for the entire facility at the earliest opportunity. Additionally, we observed an unfinished soffit area and the absence of an eavestrough and rainwater leader system

(Photograph 3.1.39 to 3.1.41). This is compounding the problems with the snow pileup around the perimeter of the building. For enhanced surface drainage, a swale should be provided around the perimeter of the building to protect the building and foundations from water damage.

Additional

9. A ramp has been provided but is not current Ontario Building Code (OBC) or AODA compliant. Additionally, an egress door with panic bar needs to be replaced so it is in compliance with the OBC. We recommend an AODA review and a code review be performed throughout the building (Photographs 3.1.42 and 3.1.43).

3.2 ELECTRICAL

1. Interior lighting fluorescent tube luminaires have multiple units without housing covers which may be a concern if the fluorescent tube is damaged (Photograph 3.2.1). Replace existing cover wraps for wrap around luminaires.
2. There is a missing lightbulb (Photograph 3.2.2). Install a replacement bulb.
3. There is wiring in the electrical room appears to be damaged (Photograph 3.2.3). Replacement of this wiring is recommended.
4. Fuse panels should be upgraded to breaker panels (Photograph 3.2.4).
5. A disconnect is required for refrigeration units for the walk-in refrigerator (Photograph 3.2.5).
6. A junction box was found without cover plate. Install one as per code requirements (Photograph 3.2.6).

3.3 MECHANICAL

HVAC

1. The age of the two furnaces was not available. They appear to be in good condition. As per ASHRAE guidelines, the life expectancy of this equipment is 18 years. We recommend the furnaces be replaced at the end of their useful life.
2. The age of the electric heaters in the building was not available. They appear to be in good condition. As per ASHRAE guidelines, the life expectancy of this equipment is 13 years. We recommend the heaters be replaced at the end of their useful life.
3. The age of the roof top cooling units servicing the upper-level community room was not available. They appear to be in good condition. As per ASHRAE guidelines, the life

expectancy of this equipment is 15 years. We recommend the units be replaced at the end of their useful life.

4. The age of the ice rink dehumidifier was not available. It appears to be in good condition. Dehumidifiers typically last between five and ten years, although may be in service longer provided there is yearly maintenance. We recommend the dehumidifier be replaced at the end of its useful life.

5. The age of the exhaust fan servicing change room number 1 was not available. It is missing an exhaust grille and is very noisy. A replacement is recommended immediately (Photograph 3.3.1).

6. Some of the air grilles associated with the furnaces are in poor condition. Immediate replacements are recommended (Photograph 3.3.2). There is a return or exhaust, framed with hockey sticks, that doesn't appear to be in good condition and should be replaced.

7. There is damaged ductwork in the changeroom area. Immediate replacement is recommended (Photograph 3.3.3).

8. The age of the remaining exhaust fans servicing the change rooms was not available. They appear to be in good condition. As per ASHRAE guidelines, the life expectancy of this equipment is 25 years. We recommend the fans be replaced at the end of their useful life.

9. The installation date of the kitchen exhaust hood was not available. It appears to be in good condition and should be replaced at the end of its useful life which is typically at an age of 25 years.

10. The installation date of the kitchen exhaust fan was not available. There is visible damage to the fan, and it is mounted improperly. An immediate replacement is recommended (Photograph 3.3.4 and 3.3.5)

11. The installation date of the kitchen exhaust fire suppression system was not available. It appears to be in good condition. The hood should be inspected in accordance with the manufacturer's specifications, or every six months. It appears to be in good condition and should be replaced when at the end of its useful life which is typically at an age of 25 years.

Plumbing

12. The installation dates for the three natural gas hot water tanks in the electrical room were not available. They appear to be in good condition. Hot water tanks typically last between 10-12 years. We recommend the hot water tanks are replaced as is at the end of their useful life.

13. The installation date of the one hot water tank in a separate room from the three others, was not available. It appears to be in good condition. Hot water tanks typically last between 10-12 years. We recommend the hot water tank is replaced as is at the end of its useful life.
14. The installation dates of the two electric hot water tanks in the ice plant were not available. They appear to be in good condition. Hot water tanks typically last between 10-12 years. We recommend the hot water tanks are replaced as is at the end of their useful life.
15. The installation date of the combination emergency eyewash and shower unit in the chiller room was not available. It appears to be in good condition. These units typically last up to 25 years. We recommend this equipment be replaced at the end of its useful life.
16. It appears that black PE piping is being used with stainless steel clamps downstream of the DCW well bladder tank. Replacement is required per the OBC.

Ice Plant

17. The insulation surrounding the ice plant piping appears to be in good condition.
18. The intake damper for the ventilation system does not open when the exhaust fan is running, preventing the space from being purged of ammonia gas. A motorized damper interlinked with the exhaust fan should be installed immediately (Photograph 3.3.6).
19. The installation date of the chiller was note determined. It appears to be in good condition. The typical life expectancy is 20 years.
20. The installation dates of the pumps were not determined. They appear to be in good condition. As per ASHRAE guidelines, the life expectancy of this equipment is 20 years.
21. The MYCOM compressors appear to be well used and replacement should be considered. Compressors should be replaced after 12-15 years.
22. The evaporative condenser was not accessible but appeared to be in good condition. The typical life expectancy for this equipment is 20 years.

Additional

23. There is a propane gas detector in the Zamboni room but there is no associated ventilation system. A ventilation system should be installed to comply with article 6.2.2.3 of the OBC.
24. There is domestic water piping routed above electrical equipment in the electrical room. This is a safety hazard and should be addressed immediately (Photograph 3.3.7).
25. The domestic water piping is uninsulated. Insulation should be added as per best practice.
26. No thermostatic mixing valves were found at the hot water tanks or at the sinks where checked. Install a thermostatic mixing valve as per section 7.6.5 of the OBC.

27. There is no exhaust system in the referee changeroom. An exhaust system is required as per section 6.2.3.8 (14) of the OBC.
28. No make up air for kitchen and is required to prevent negative pressurization of the building.
29. Install backflow preventor on the domestic cold-water line as per OBC section 7.6.2.2 code requirement. An expansion tank will also be required downstream of the backflow preventer.
30. There is exhaust venting running a considerable distance exterior to the building with partial insulation. The manufacturer installation guide should be referred to for the equipment to ensure the length of pipe external to the building is acceptable. There should be additional insulation added to the sections currently uninsulated (Photograph 3.3.8).
31. The gas detection system doesn't appear to have been calibrated since October 17, 2023 and needs to be recalibrated every 12 months as per CSA B52.
32. The mechanical/electrical room containing the three DHW heaters, does not appear to have a dedicated combustion air supply and high level vent and should be added in accordance with CSA B149.1.
33. There doesn't appear to be a mechanical ventilation system installed in the building in accordance with OBC 6.2.2 and ASHRAE 62.1. A more thorough review of the design and installation requirements of an HRV or ERV is required.

4 Summary & Recommendations

In summary, we recommend detailed analysis and major repairs for the building as part of an overall modernization plan. From a hierarchical point of view, it is important to perform a detailed structural analysis of the overall building including an intrusive testing plan including interior excavations. We expect the results of this could point towards extensive structural reinforcement to the existing pole barn structural post foundations throughout the arena portion of the complex. Following the excavations, it would be appropriate to provide a new apron slab-on-grade around the entire arena. We have also recommended a new roof and building envelope system for the Community Center. We understand building condition audits were completed in 2007 and 2020 without the recommendations being fully implemented. We have concluded it is now an appropriate time to complete major upgrades to the structure, roof and envelope to sustain the building for the next 20 years. Energy efficiency upgrades can be achieved in the process and as a result, financial assistance may be realized through various provincial and federal programs.

Upon visual review of the electrical and mechanical equipment, they appear to be in good condition aside for the deficiencies noted. The toxic gas detection system needs to be re-calibrated and the ventilation system needs to be addressed as it is not currently functioning as intended. There are a few code related items to address.

We recommend the maintenance and repairs outlined in Table 1. Items identified as requiring immediate attention are those items representing health and safety risks, could affect use of the building, or which could cause costlier damage if not addressed. Short-term items are suggested to be replaced within the next two to three years. These include equipment still functional, but which may fail very soon due to age, equipment still functional although not optimally, and equipment no longer functioning but does not require immediate attention.

The table includes high level cost estimates for each repair item. The estimates were prepared based on an assumed amount of labour and materials required to complete each item and typical average hourly construction rates and material costs were used. Where engineering is recommended, an estimate of the fee is included. We note costs could vary depending on time of year, availability of contractors, and the specific construction methods and materials used.

Table 1: Cost Estimates for Recommended Repairs

FINDINGS	DESCRIPTION	TIMEFRAME	COST ESTIMATE
3.1.1	Structural Review & Intrusive Testing	Immediate	$35,000
3.1.2	Structural Alterations Review	Immediate	$3,500
3.1.3	Block wall repairs and Lintel	Within 1 year	$7,500
3.1.4	Chimney Repairs	Within 1 year	$8,500
3.1.5	Slab-on-grade repairs	Within 1 year	$20,000
3.1.6	Block wall repairs	2-3 years	$5,000
3.1.7	Roof replacement	2-3 years	$250,000
3.1.8	Building envelope replacement	2-3 years	$750,000
3.2.1	Replace existing cover wraps for wrap around luminaires	Within 1 year	$1,000
3.2.3	Investigate exposed conduit and cable and ensure power has been disconnected and make safe terminations.	Immediately	$1,000
3.2.4	Upgrade fuse panels to breaker panels	Immediately	$5,000
3.2.5	Install disconnect for walk-in refrigerator units	Immediately	$750
3.3.1	Replace furnaces	5-10 years	$17,000
3.3.2	Replace electric heaters	5-10 years	$10,000
3.3.3	Replace roof top cooling units	5-10 years	$24,000
3.3.4	Replace ice rink dehumidifier	5-10 years	$70,000
3.3.5	Replace change room 1 exhaust fan	Immediately	$2,000
3.3.6	Replace air grilles in poor condition	Within 1 year	$1,000
3.3.7	Replace damaged ductwork	Immediately	$2,000

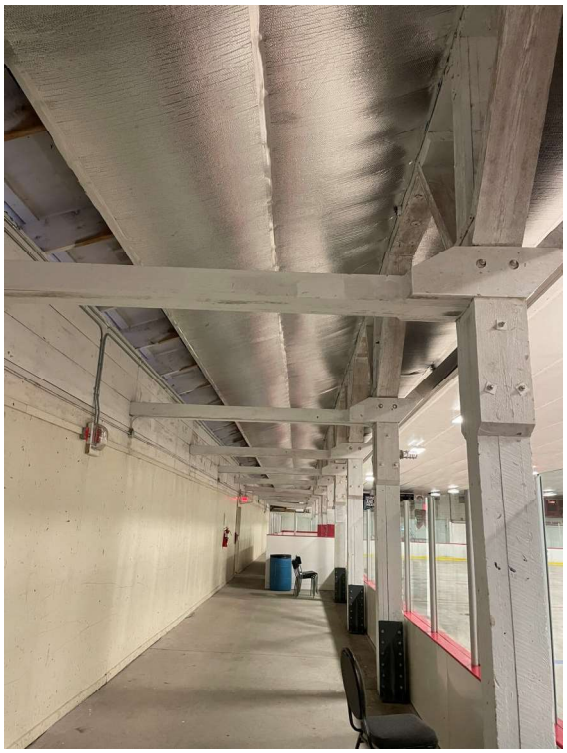
FINDINGS	DESCRIPTION	TIMEFRAME	COST ESTIMATE
3.3.8	Replace remaining change room exhaust fans	5-10 years	$5,000
3.3.9	Replace kitchen exhaust hood	5-10 years	$25,000
3.3.10	Replace kitchen exhaust fan	Immediately	$21,000
3.3.11	Replace kitchen exhaust fire suppression system	5-10 years	$7,000
3.3.12	Replace natural gas hot water tanks in electrical room	5-10 years	$12,000
3.3.13	Replace hot water tank in separate room	5-10 years	$4,000
3.3.14	Replace electric hot water tanks in ice plant	5-10 years	$5,000
3.3.15	Replace combination eyewash and shower unit	5-10 years	$5,000
3.3.18	Replace motorized intake damper in ice plant	Immediately	$3,000
3.3.19	Replace Chiller	5-10 years	$40,000
3.3.20	Replace condenser and brine pumps	5-10 years	$100,000
3.3.21	Replace MYCOM compressors	2-3 years	$100,000
3.3.22	Replace evaporative condenser	5-10 years	$25,000
3.3.23	Install toxic gas ventilation system in Zamboni room (including exhaust fan, intake and exhaust louvers, motorized dampers)	Immediately	$20,000
3.3.25	Insulate domestic hot water piping	Immediately	$2,000
3.3.26	Install thermostatic mixing valves	Immediately	$1,500
3.3.27	Install exhaust fan for referee changeroom	Immediately	$750
3.3.28	Install make-up air unit in kitchen	Immediately	$50,000

FINDINGS	DESCRIPTION	TIMEFRAME	COST ESTIMATE
3.3.29	Install backflow preventor and expansion tank	Immediately	$2,000
3.3.30	Insulate kitchen exhaust vent piping	Immediately	$2,000

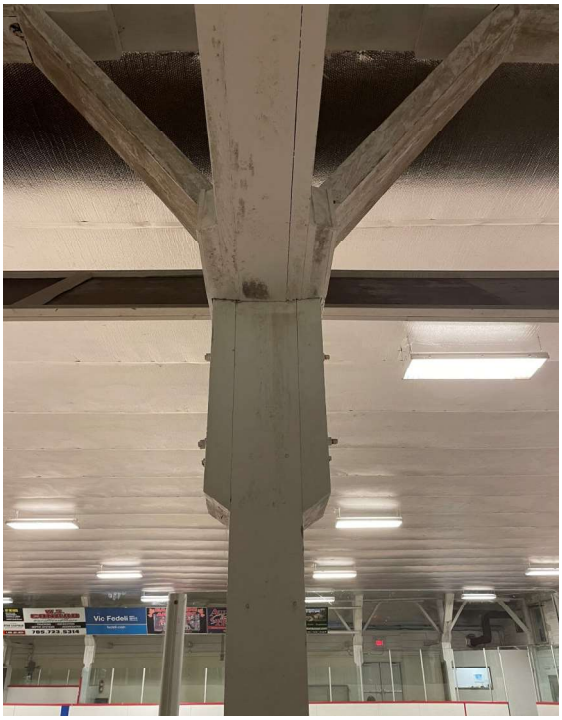
The contents of this report are based on professional judgement given the information available (i.e., visual observation). While this evaluation is the result of professional care and competence, there is no warranty expressed or implied, and nothing in this report should be construed as a guarantee. As a result, this report may be used as a tool for making financial decisions including future capital expenditure planning.

Appendix A: Photographs

Photograph 1.1



Photograph 3.1.1



Photograph 3.1.2

Photograph 3.1.3

Photograph 3.1.4

Photograph 3.1.5

Photograph 3.1.6

Photograph 3.1.7

Photograph 3.1.8

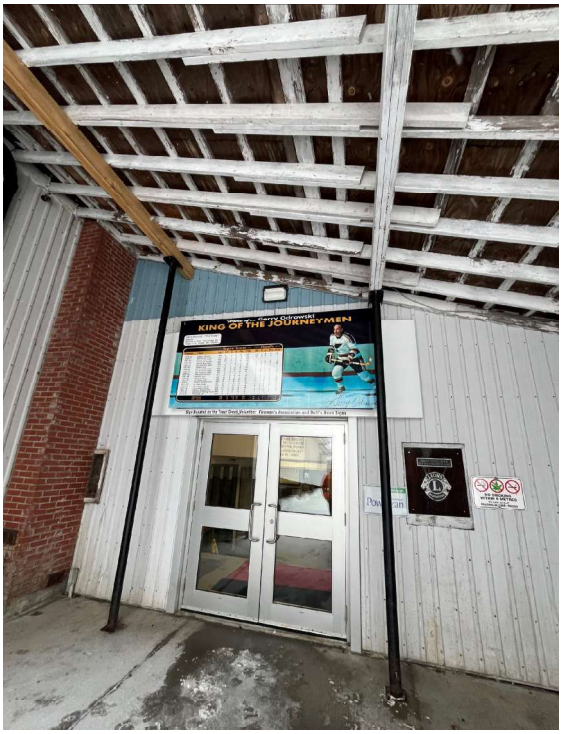
Photograph 3.1.9

Photograph 3.1.10

Photograph 3.1.11

Photograph 3.1.12

Photograph 3.1.13



Photograph 3.1.14

Photograph 3.1.15

Photograph 3.1.16

Photograph 3.1.17

Photograph 3.1.18

Photograph 3.1.19

Photograph 3.1.20

Photograph 3.1.21

Photograph 3.1.22

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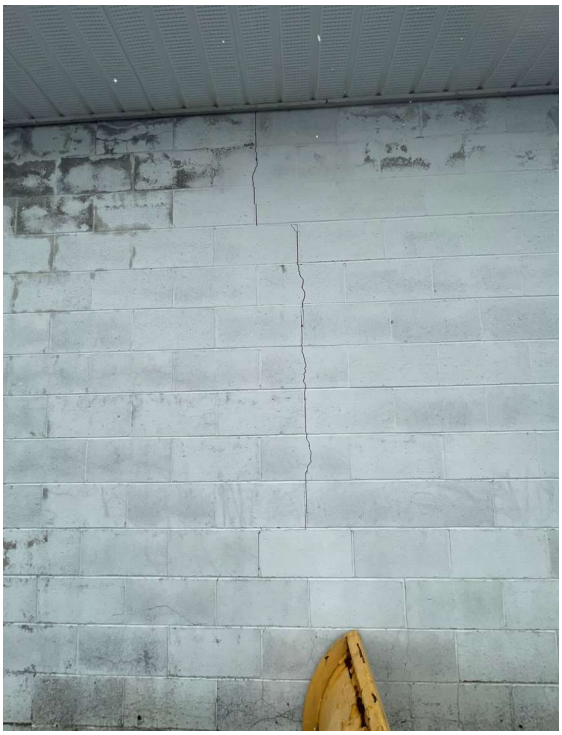
Photograph 3.1.24

Photograph 3.1.25

Photograph 3.1.26

Photograph 3.1.27

Photograph 3.1.28



Photograph 3.1.29

Photograph 3.1.30

Photograph 3.1.31

Photograph 3.1.32

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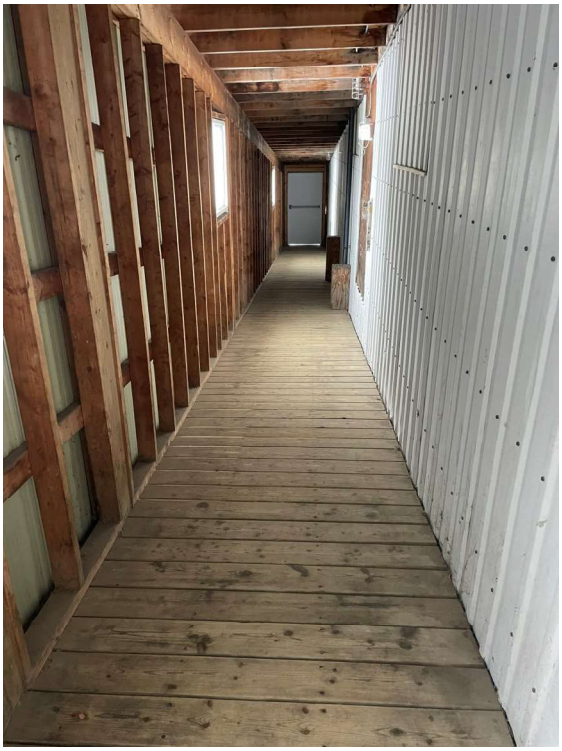
Photograph 3.1.37

Photograph 3.1.38

Photograph 3.1.39

Photograph 3.1.40

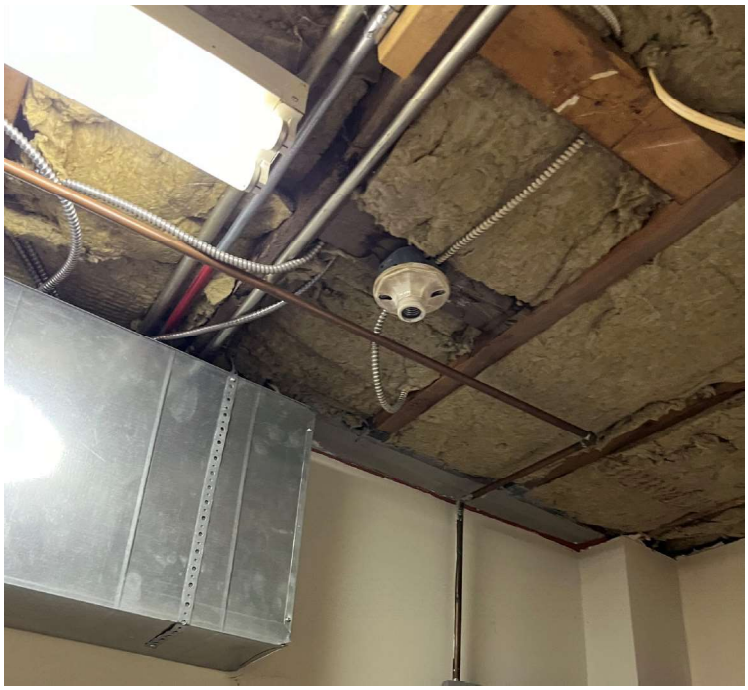
Photograph 3.1.41



Photograph 3.1.42

Photograph 3.1.43

Photograph 3.2.1



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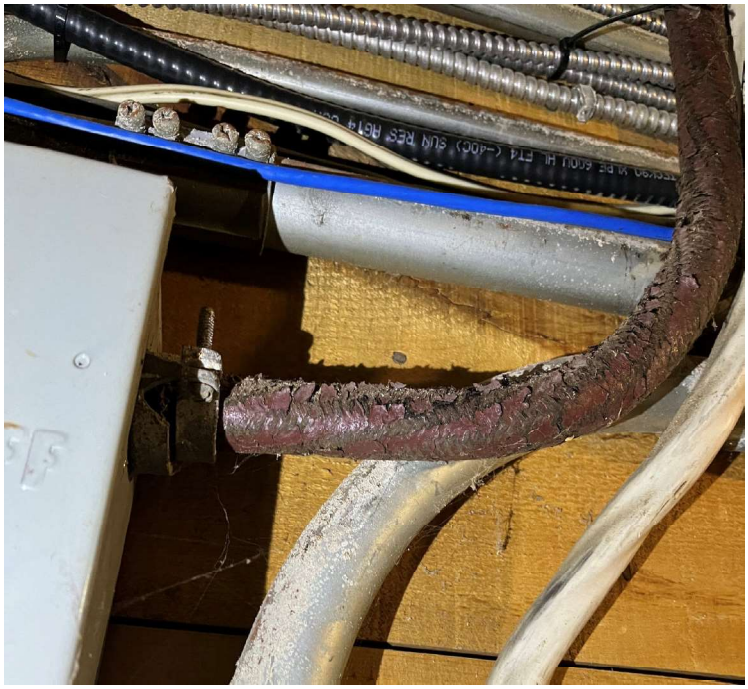


Photograph 3.2.3

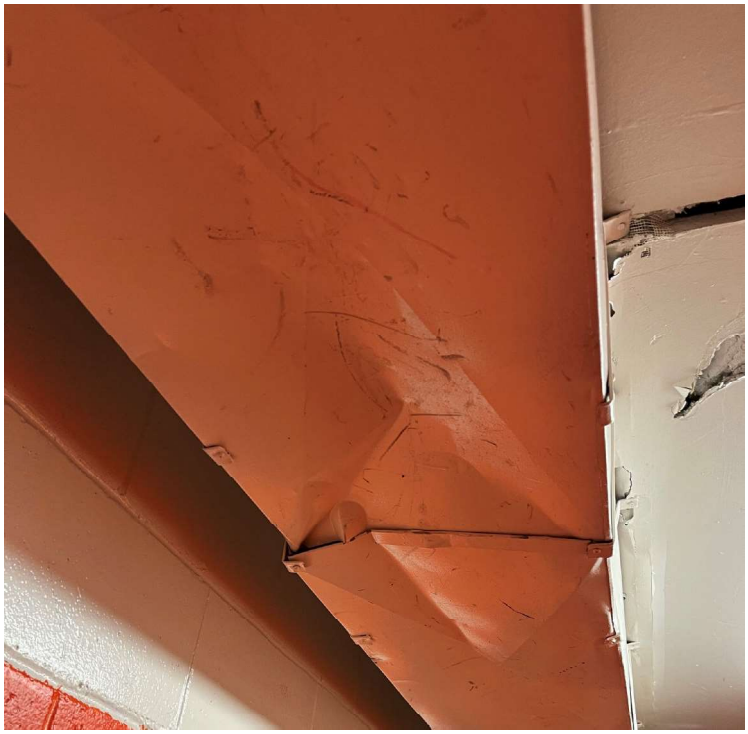
Photograph 3.2.4

Photograph 3.2.5

Photograph 3.2.6

Photograph 3.3.1

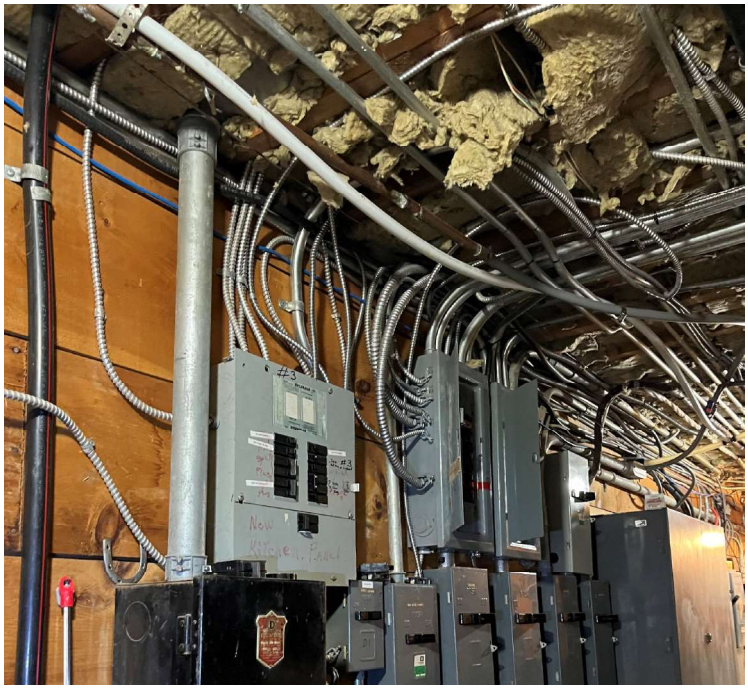
Photograph 3.3.2



Photograph 3.3.3

Photograph 3.3.4

Photograph 3.3.5



Photograph 3.3.6

Photograph 3.3.7

Photograph 3.3.8