Shawville Arena
Limited Building Condition Assessment
and Summary of Systems

November 2024

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1.0 Introduction

This report has been prepared for the Town of Shawville to provide a multi-disciplinary review of the existing Shawville Arena structure. Due to the lack of available documents, a member from each major building engineering discipline (Structural, Architectural, Civil, Mechanical and Electrical) went to site to provide a high-level building condition assessment in order to better understand the building systems, surrounding environment, and major equipment within the building. Each discipline conducted a visual review of the Arena and documented key observations of each asset.

As a designated substance report (DSR) could not be provided prior to the site review, the investigation was limited only to items which were visible without moving any ceiling tiles or other obstructions potentially containing designated substances.

The building systems are described in the report by the disciplines including high-level feedback on observed deficiencies, anticipated remaining service life and suitability for possible upgrade or overhaul versus wholesale replacement. The objective of the review is to understand the different building systems, their equipment and their general conditions. The findings of this report will play an important role in assessing the feasibility of the renovation options and would ultimately be included as a separate section in the forthcoming feasibility study. Given the lack of as-constructed information and the accuracy of the information collected in the condition assessment, it is noted that the Town of Shawville will need to carry for additional risk factors which will be better described in the feasibility study.

Figure 1: Key Map

It is understood that a point cloud scan will be performed of the facility with the objective to convert the information into a base plan drawing as part of the next step of this project.

2.0 Methodology

A building condition assessment (BCA) is a total evaluation of the physical state of the structure. It is a multidisciplinary review involving visual inspection, documentation, and detailed analysis. The main goals of performing the BCA are to identify any defects or deterioration, assess the structures overall performance, estimate repair or maintenance needs to extend service life and to ensure safety and compliance with current building codes and standards.

The following report encapsulates the findings of a limited BCA, which differs from a typical BCA. The limited BCA does not include any detailed analysis, inspection or destructive testing. The purpose of the limited BCA is to gain a better understanding of the structure through visual review and any other information available through desktop review and discussion with arena staff. The conclusions made in the following report are high-level and are meant to aid in assessing the feasibility of renovation options with respect to the structure and its components.

The visual review was limited to items which were accessible without altering the building. Therefore, some of the components of the structure were not available for review. None of the ceiling tiles were altered; therefore, none of the components in those areas were reviewed. Additionally, any mechanical or electrical equipment which was inaccessible to the eye were not reviewed. The visual limitations limit the comprehensiveness of the review and should be noted.

Qualitative descriptors will be used within the report to describe the current state of the structures components. The terms used to describe the overall state of the components, ranked from least to highest quality are poor, fair and good. Poor items are critical and require the most immediate attention of the three classifications. Poor items are indicative that the component in question is nearing the end of its service life and should likely be considered for remediation or replacement. Fair items are less critical; however, they still show significant signs of aging and moderate wear. Fair items are indicative of requiring maintenance in the near future to prolong the service life. Good items are not critical and generally indicate the component is in working order. Although the component does not need immediate attention, they should still be regularly reviewed as part of a regular inspection schedule.

The review of local defects and deficiencies shall be described with minor and major descriptors. Minor items are not critical; however, they can be indicative of larger underlying issues and should be carefully considered and monitored. Minor items typically do not warrant immediate remedial works; however, they should be reviewed on a case-by-case basis. Major items may require immediate repairs on a case-to-case basis and should be taken into consideration as part of the remediation or replacement plan for the component in question.

A designated substance report (DSR) is a specialized assessment carried out to identify and document the presence of hazardous materials known as ‘designated substances’ within a structure. The DSR is used to make any persons on site aware of any potential dangers related to designated substances. It is a major control for safety on the worksite, and an essential practice before performing any altering actions to a structure. As a DSR was not provided for the Shawville Arena, the BCA was limited to a solely visual review without moving any

obstructions. The reasoning for this is purely for the safety of the JLR personnel on site and the dangers surrounding the unknown presence of designated substances.

3.0 Architectural Systems

A visual review of the interior and exterior of the Shawville Arena was performed by Justin Gauthier, Senior Technologist (Architecture) on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the building operator, which generally forms the understanding of the overall architectural systems. No record drawings of the existing building were made available to JLR.

3.1 Building Envelope

The building envelope is primarily pre-finished metal cladding with no insulation under the bleachers but was noted to be fully insulated for the remainder of the exterior walls, punched windows, and hollow metal doors throughout. The existing cladding is assumed to be original to the building's construction and appears to be in poor condition with areas of visible weathering and damaged sections at the bottom perimeter where daylight is observed from within. The building operator noted that in the spring there’s significant flooding/water infiltration along the west elevation due to improper grading and large holes within the cladding. The building operator indicated that the punched windows are recycled windows from the existing hospital. The hollow metal doors within the rink area were recently replaced, but the remainder of the doors are assumed original. Full replacement of the exterior wall assembly and windows should be considered to provide a sealed and properly insulated envelope.

3.2 Roof

The roof appears to consist of sloped, pre-finished metal cladding with an unknown assembly below, as the review was visual in nature only. It was noted by the operator that the roof is fully insulated, but the potential R-value is unknown. The roof appeared to be in fair condition with no indication of roof leaks.

3.3 Interior

The South portion of building consists of two levels with no basement. The south portion of the building is mainly occupied by the dressing rooms, main lobby, and auxiliary spaces (storage, canteen, water entry closet, etc.). The second floor consists of a community space, which is mainly open, with washrooms, a kitchen, and servery. The rink is located to the north of the lobby with bleachers on the east and west sides. The refrigeration plant is located at the northwest corner. The space under the west bleachers is used as storage with mix division and the remainder of the original refrigeration equipment. The ice resurfacing area is located near mid-rink on the west side with limited ceiling height that the Zamboni operator cannot be seated in an upright position without hitting the ceiling The east bleachers space is used for storage. A referee changeroom and washroom facility is located on the northeast corner of the footprint with direct exit to the exterior. It was indicated by the operator that the rink size does not currently meet Hockey Canada regulations and has been modified slightly during the last refurbishment of the ice plant. It was noted that the refrigerant slab extended beyond the ice surface which causes ice build up within the walking surface to access the bleachers.

The ground floor construction consists of a slab-on-grade. The second-floor assembly is unknown but appears to be wood-joist construction complete with subfloor and gypsum board finish on the underside. The rink seating/bleachers appear to be a steel structure with solid wood boards as flooring and risers. The building's interior walls throughout consist of painted plywood and painted concrete block within the lobby, dressing room area, and second level banquet hall. The rink area consists of painted plywood, painted block walls, pre-finished metal cladding, and exposed structure. The ceilings primarily consist of painted and/or PVC finished gypsum board ceiling tiles within the second-floor banquet hall and painted exposed structure within the rink area. The flooring throughout the building varies among carpet, ceramic tiles, vinyl sheet flooring, rubber flooring, and polished concrete. Overall, the interior paint finishes would require repainting, and the floor finishes would require full replacement. The washroom facilities on the ground floor are shared facilities within the roundhouse addition and not part of the lobby area of the rink. The second-floor washroom facilities appeared to be in fair condition. There are two kitchens, one located on the ground and the other one on the second level, full replacement of the interior fitments should be considered as part of any proposed renovation project. The washrooms within the dressing rooms and referee room are in very poor condition and full replacement should be considered as part of any proposed renovation project.

3.4 Accessibility

Due to the age of the building, accessibility within the facility doesn't meet current Quebec Construction Code (QCC 2015). Upgrading the facilities to meet current building code standards will require extensive renovations and could make it difficult and costly to accomplish. At a high level this consists of the following major items:

- Barrier-free washrooms.
- Elevator or lift for barrier-free access to all levels.
- Ramps and doors.
- Larger corridors.
- Barrier-free changerooms.

3.5 Building Code

Full building code review wasn't completed as part of this scope; therefore, it is unknown if current fire separation, egress, and washroom facilities are adequate to meet current code requirements.
Applicable codes for this facility would include:

- Quebec Construction Code, Chapter I – Building, and National Building Code of Canada 2015 (amended)
- Quebec Construction Code, Chapter I.1 – Energy Efficiency of Buildings
- Quebec Construction Code, Chapter II – Gas
- Quebec Construction Code, Chapter III – Plumbing
- Quebec Construction Code, Chapter IV – Elevators and Other Elevating Devices
- Quebec Construction Code, Chapter V – Electricity

4.0 Structural Systems

A visual review of the interior and exterior of the Shawville Arena was performed on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the building operator, which generally forms the understanding of the overall structural systems. No record drawings of the existing building were made available to JLR. The structure can be divided into two regions: The rink and the lobby/community space.

4.1 Rink Structure

The Shawville Arena is a steel-framed structure constructed using a typical pre-engineered building system. The rink footprint is wider than the lobby by approximately 3 m per side. Operators and other Shawville Staff indicated that the structure was provided by Butler Manufacturing and was constructed some 60 years ago.

The structural system is sub-divided into primary and secondary framing as described below.

4.1.1 Primary Framing

The main gravity system of the Shawville Arena consists of rigid steel frames made of tapered wide flange steel sections typical of pre-engineered structures of its era. The moment frame consists of tapered welded wide flange section columns with varying depth welded wide flange steel roof beams which span the width of the structure. Members have bolted connections at splice areas and bottom flange bracing to provide lateral stability. The steel frames appeared to be spaced at regular intervals along the length of the Arena.

Overall, the condition of the primary structure elements was generally good. Minor chips and scrapes on the surface coating of the steel members was observed in localized areas; however, the steel columns and roof beams appeared to be well maintained throughout. The bolted connections between beam and column elements appeared to be in fair-to-good condition with minimal, minor deficiencies observed. Minor deficiencies include scratch marks on the steel surface and light rust staining.

The majority of the steel column bases were not accessible and therefore not reviewed. The east side columns could not be reviewed given interferences with existing bleachers; however, approximately half of the west side columns baseplates could be reviewed from within the storage under the bleachers and displayed signs of moderate rusting. Signs of water infiltration on the western side of the structure under the bleachers was observed is likely the cause of the ongoing rusting. The space under the bleacher is also not conditioned and can likely be considered as exterior. The top of the visible concrete piers under the plate anchors was observed to be deteriorated with moderate cracking and spalling.

The lateral force resisting system consists of braced roof bays, rod bracing and moment frames. The braced roof sections provide lateral stability in the horizontal plane at the top of the structure. Lateral movement from seismic and wind forces is limited by transferring it to the vertical members of the structure. The braced roof sections available for review were observed

to be in fair-to-good condition. Minor deficiencies include scratch marks on the steel surface and light rust staining.

Cross bracing on the vertical wall sections were observed consist of rod bracing. The rod bracing in these locations aid in resisting lateral forces in the vertical plane. The diagonal rod braces connect the corners of a bay which inherently increases the stiffness of that section, allowing it to better resist shear forces. Lateral forces are then transferred more easily through the vertical members to the foundations. These vertical cross braces are typically placed in strategic locations where the most lateral loading is anticipated, which make them a critical component of the lateral force resisting system. Majority of the vertical rod bracing available for review was observed to be in fair-to-good condition. Minor defects such as scratch marks on the steel surface and light rust staining were observed in localized areas. Some of the rod braces were observed to be cast into concrete block walls. The remaining rod braces and end connections were unavailable for review in those areas.

The main component of the lateral force resisting system are the moment frames. Moment frames consist of rigid connections between the columns and beams of the system which resist rotation and bending. When experiencing lateral forces, the moment frame absorbs them through internal moments created at the rigid member connections. Moment frames are used in structures requiring large open areas, such as a hockey rink, and are often combined with braced frames as observed in the Shawville Arena structure. Overall, the steel moment frames and rigid connections were observed to be in fair-to-good condition.

4.1.2 Secondary Framing

The secondary framing consists of the steel purlins, steel girts and lateral cross bracing members. The steel purlins were observed to rest on the main structural moment frames and span the entire length of the rink structure. They appeared to consist of Z shape steel profiles regularly spaced. The prefabricated steel panel roof system is attached to the top of the steel purlins with a series of bolts spanning longitudinally. The steel purlins were observed to be in fair condition with defects observed including minor deformations, scratch marks and minor rust staining.

The steel girts are likely installed between the exterior metal cladding and the interior liner panel and span between steel columns. Majority of the steel girts could not be observed, however based on the era of construction and traditional pre-engineered structures and fastening of the liner panels, it is expected that these would consist of Z or C shape steel profiles at regular spacing. At one location underneath the bleachers, a steel girt was visible for review and was observed to be a Z profile. It cannot be confirmed if this is the case throughout the structure but is likely anticipated. The observed orientation of fasteners on the exterior of the structure appeared to be regularly spaced and indicate the likely location of the steel girts.

4.1.3 Foundation and Slabs

As this was a non-intrusive investigation, none of the foundation elements could not be reviewed below grade. A small portion of exposed concrete foundation wall could be observed in some areas around the perimeter. However, JLR is unable to comment on the state of the foundation elements at this time.

The concrete base slab, where available for review, displayed significant signs of deterioration. Observed cracks ranged from moderate to wide at the base slab locations available for review. Instances of moderate and severe spalling and scaling of the concrete were observed in various locations including at the location of the Zamboni entrance as shown in Photo 9 of Appendix A and along the perimeter of the rink. The same was observed at other areas where the base slab was exposed including underneath the bleachers and in storage areas on the perimeter of the Arena. As the rink still had ice at the time of the original review the base slab at that location was unavailable for review. Additionally, when the team revisited the site, dirt was placed over the rink area in anticipation of an upcoming exposition. A dozer was positioned outside the access doors. Building operators have indicated that the refrigerant slab is in poor condition and have often gone through local repairs as a result of leaks. It is unlikely that the slab was designed for heavy equipment loads. This should be considered as part of future projects when replacing the refrigerant slab.

When returning to site a third time to perform 3D scanning of the arena, the slab was exposed and available for review. Multiple areas of minor-to-moderate localized scaling and spalling were observed throughout the slab. A large crack running in the east-west direction was observed at the south end of the rink slab. The areas where the hockey nets are installed displayed moderate scaling. Overall, the rink slab was observed to be in fair-to-poor condition.

Additionally, water infiltration was observed in various areas along the outer edge of the Arena, particularly on the western face where the exterior cladding has deteriorated. The pooling of water on the concrete slab surface induces corrosion of the reinforcing steel and leads to long term structural issues. Given limited insulation within the exterior walls, the rink slabs have been mostly exposed to exterior conditions through its services life.

4.1.4 Bleachers

The bleachers are constructed using wood framing and are supported on steel wide flange spanning longitudinally under the top step of the bleachers. Smaller steel wide flanges are placed perpendicular to the longitudinal beam parallel to the slope of the steps. The bleacher is tied back and supported on an additional beam that spans between main rink columns. Round Hollow structural steel (HSS) posts were observed to be used as columns and were bolted to the large longitudinal steel beam. The HSS posts appeared to be founded on concrete blocks which rested on top of the base slab.

The steel beams were observed to be in fair-to-poor condition, with moderate rusting observed throughout. Section loss was not visibly apparent, so it is assumed the rust observed is limited to the surface; however, the steel members should be regularly monitored to track the progression of rust. The concrete bases were observed to have some cracking and spalling. The steel supports were observed to be in fair condition with some minor scratch marks and light rusting.

4.2 Lobby and Community Space

The width of the lobby and community space structure is smaller than the rink by approximately 3 m on each side. The entrance structure is also taller than the Arena based on the distinction in roof levels. This area of the building has two floors. The first floor contains the lobby and a handful of spaces including offices, dressing rooms, canteen, mechanical rooms, etc. The second floor serves as a banquet hall and also has with restrooms, kitchen and bar/servery as

well as auxiliary spaces for Electrical and mechanical rooms. Although described as two sections, it assumed that the areas were constructed simultaneously with the rink and was provided by the same manufacturer.

4.2.1 Primary Structure

The primary structure appeared to consist of a rigid steel frame similar to the rink structure. Some of the steel columns were visible from the dressing rooms which shared a similar construction to the rink area. Interior steel columns were observed from the first floor from within various changerooms. The roof members were visible for review given a suspended ceiling construction and tiles could not be removed without a designated substance survey. It is anticipated however that the transverse system consists of similar roof beams to the members observed in the adjacent rink structure.

Although not visible throughout given the presence of drywall ceilings, a few areas within closet spaces and auxiliary spaces the structure of the second floor appear to consist of nominal wood joists with tongue and groove decking. A series of HSS columns is visible within the main lobby area indicated the likelihood of a supporting structure. It is unclear if some of the masonry partitions also act as load bearing elements for the second floor.

From what was available to be reviewed, the lateral force resisting system of the lobby and community space structure consists of vertical rod bracing and moment frames. Braced roof sections may be present but cannot be confirmed due to the limitations of the review. The vertical rod braces available for review were observed to be in fair-to-good condition. Minor defects such as paint chipping and light rust staining was observed in localized areas. Some of the rod braces were observed to be cast into concrete block walls. The remaining rod braces and end connections were unavailable for review in those areas. In one location in the yellow dressing room to the east of the lobby, a rod brace end connection was observed at the base of a steel column; however, no rod braces were present. It is possible that the rod braces were removed in this location.

The main component of the lateral force resisting system, the moment frames, were not available for review. The rigid connections between the column and beam members were obstructed and unable to be reviewed.

4.2.2 Secondary Structure

Given the similarities in construction type, it is assumed the secondary structure consists of steel purlins and steel girts; however, they were not able to be reviewed as they were not exposed.

4.2.3 Interior Rooms

The interior rooms were observed to have been primarily constructed with concrete block walls. It is unclear whether the walls are load bearing from the visual review. The concrete block walls were observed to be in fair condition with minor cracks and spalls observed. In the yellow-walled dressing room located to the east of the lobby, a major spall was observed adjacent to the interior column. Said spall should be repaired to prevent propagation of further deterioration.

Partitions appear to be constructed of masonry, it is unknown if the masonry is load bearing in some areas or if they have been reinforced. Given the era of construction it is anticipated that the unreinforced masonry would have been used at the time.

4.3 Exterior Structures

Two additions are located on the western face of the structure: a mechanical room on the northwest corner and a Zamboni storage room. Both additions were observed to have the same cladding as the rest of the structure. A section of cantilevered roof at the mechanical room structure is supported by wood columns founded on concrete piers. The wood columns appeared to be in fair condition. The concrete pier caps were observed to be in fair condition. The subsurface concrete piers were not accessible and therefore not reviewed.

5.0 Civil Assessment

A visual review of the interior, exterior and on-site services of the Shawville Arena was performed on August 16, 2024. The investigation was limited only to what was visually accessible. A limited description of the on-site services was provided by Brad Peck, which generally forms the understanding of the servicing. Mr. Peck was able to expose several storm and sanitary maintenance holes, which were visually reviewed from the surface. A description of the on-site services is provided below. No record drawings of the on-site services were made available to JLR.

5.1 Overview of the Site

The Shawville Arena is located at 215 Lang Street in Shawville, Quebec, a town of approximately 1,700 residents located in the Pontiac Regional County Municipality in the administrative region of Outaouais. The site is bounded by Lake Street to the west, Lang Street to the south, Clarendon Street to the east and PPJ Cycloparc bike path to the north. The site houses multiple buildings referred to as (from west to east): 4H building, Festival/Storage building, Octagon building (offices), the Shawville Arena, and multiple barns (see location map below). The Arena is accessed via the extension of Campbell Street north of Lang Street. The site of approximately 5.5 ha is mostly grassed with the exception of a gravel parking area of approximately 0.45 ha located at the front of the Arena. There is a +/-7.5 m wide asphalt strip directly in front of the buildings that extend from building 4H to the east side of the Arena. There is also a gravel access road abound the Arena and two additional gravel roads to Clarendon Street and the rear of the property.

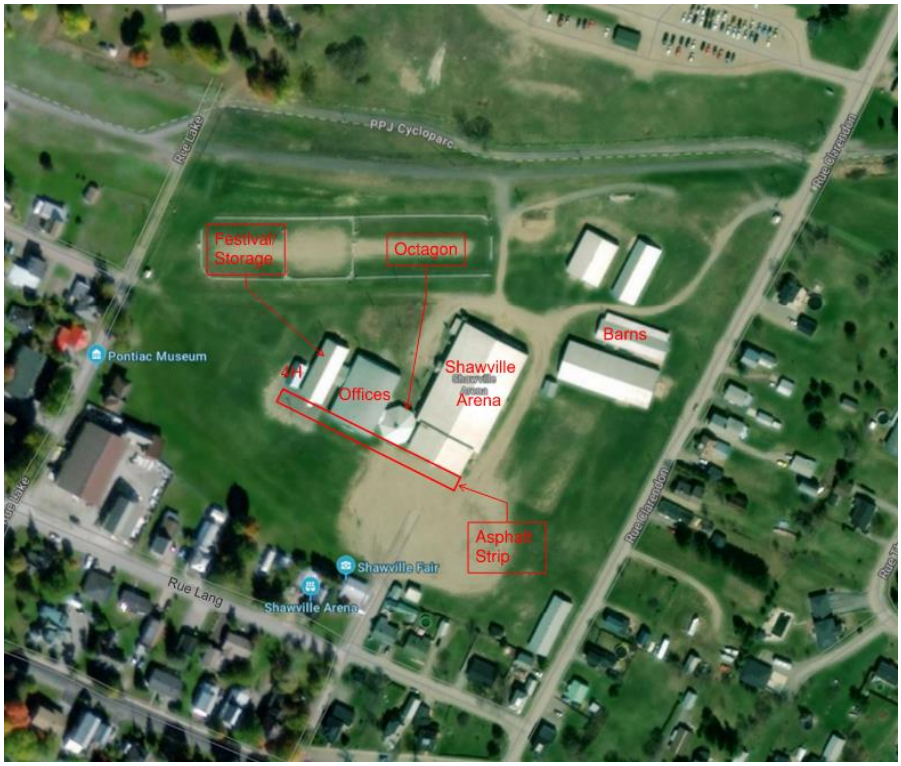

Figure 2: Shawville Arena Site Overview

5.2 Water

Based on discussions with the building operator and city Staff, it is understood that the Site is serviced from Lang Street (150 mm) and Clarendon Street (150 mm). The main adjoined buildings are serviced by a single 38 mm connection to the 150 mm service from Lang Street, located near the main entrance of the Arena. The front part of the Arena is serviced by a 38 mm service, branching off the 38 mm service connected to the main 150 mm line. Two internal areas in the rear of the Arena and the adjacent “Octagon” building (mainly offices) are serviced by an existing 50 mm galvanized steel water service, which connects to the 38 mm service for the front portion of the Arena. This service first crosses beneath the Octagon building, then under the Arena itself. A third branch (38 mm) services the adjacent “festival/storage” building. A hydrant is installed near the main entrance of the building, connected to the 150 mm service off the Lang Street watermain.

At the rear of the property, a second 150 mm water service from Rue Clarendon is provided for approximately 200-250 m with three additional hydrants connected along the run. It is understood this watermain is dead ended adjacent to the “4H” building. This 150 mm water line also supplies the “4H” building with potable water.

5.3 Sanitary

It is understood that sanitary servicing for the Arena is from Lang Street via a 150 mm asbestos concrete sewer within the municipal road allowance, and a 150 mm bituminous-fibre pipe (i.e., NoCorrode or similar) within the fair grounds. The sanitary service for the Arena connects to a maintenance hole at the upstream end of the municipal sewer line in Lang Street, located approximately 25 m west of the Campbell Street. Closer to the building, operators indicated that recent excavation works revealed that part of the sewer line had been replaced with PVC pipe. City staff indicated that past CCTV inspections performed on this line have not identified any significant defects.

There are two existing sanitary maintenance holes located near the Arena entrance that receive sewer flow from several branching 125 mm sanitary sewers servicing the adjacent buildings and Arena dressing rooms. It is understood that only portions of the Arena building are serviced in this way. It was indicated that in some areas at the north end of the building, floor drains are routed to the storm sewers and not to the sanitary sewer system.

A separate holding and percolation tank septic system is located to the north of the Arena. This system only services the referee room bathrooms in the northwest end of the Arena.

5.4 Storm

A visual review of the site suggests that the majority of storm runoff coming from lands to the north and Clarendon Street to the east converge to an existing catch basin located in a major low point within the field east of the Arena. Storm servicing for the site is mostly captured and conveyed via two perforated pipe systems along the back and east side of the Arena. The first one consists of 100 mm perforated pipe (“Big-O” type black corrugated HDPE or similar) that provides drainage to an adjacent barn and to the area behind the Arena. The second consist of 150 mm perforated pipe (white PVC - slotted) that runs behind the Arena and connects directly into an existing 600 mm sewer that outlets to the Clarendon Street storm sewer. It was noted that internal floor drains for low areas within the Arena building and Zamboni room are connected to the perforated pipe system.

There is another storm sewer system east of the Arena that captures storm runoff at a low point in Clarendon Street via two roadside catch basins connected to a storm maintenance hole located on the Arena property. From that point, flows are redirected southerly via a 300 mm storm sewer to a second on-site maintenance hole before discharging to a maintenance hole in Clarendon Street via a 600 mm diameter storm sewer. This 600 mm diameter storm sewer receives storm runoff from the perforated pipe systems described above.

Site staff noted that a drainage issue exists in the rear of the Arena, in close proximity to the Chiller manifold vault. Visually, there appears to be a low-lying area at the rear of the Arena, bounded by the Arena itself, the Octagon building, and the Storage/festival. Water infiltration on the west portion of the building suggest negative grades around the building. City staff also indicated that areas under the bleachers often fill with water in the spring and during major storm events.

5.5 Third-Party Utilities

Site electrical servicing was observed to be from an assumed easement located to the north of the property. It was noted that some adjacent areas are serviced separately. For example, exterior pole mounted lighting at the south parking lot appears to be serviced through the private properties along Lang Street, and some barns/site lighting from fly-taps located on Clarendon Street. Several Hydro poles complete with transformers are located in the building area located to the rear and west side of the Arena building. Potential locations for buried services were noted in the main parking area at pole mounted outlets.

Propane tanks were noted throughout the site. Site staff noted there is no natural gas service to the Arena.

An existing Bell service line was noted from Lang Street, running along the existing sanitary service. This was confirmed by the town during excavation work where the buried bell was encountered. Other overhead services were observed at the main entrance. It is not known if those also directly service the main buildings.

6.0 Mechanical Assessment

A visual review of the interior and exterior of the Shawville Arena was performed on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the building operator, which generally forms the understanding of the overall mechanical systems. No record drawings of the existing building were made available to JLR.

6.1 List of Equipment

- One oil furnace
- One propane furnace
- Six hot water tanks
- One ammonia cooling system
    - One evaporator and accumulator (chiller).
    - Two compressors (and their motors).
    - Two oil separators.
    - One water tank.
    - One brine tank.
    - One brine circulation pump (and motor).
    - One cooling tower.
    - One ammonia room exhaust fan (and ammonia detection system).
- Two indoor air conditioning units.
- Several washroom exhaust fans.
- Two kitchen exhaust hoods (with fire suppression systems).
- Two dehumidifiers (one serves only as a fan)
- Various sinks and water closets.
- Four radiant tube heaters.
- One propane DHW heater (in Zamboni room)

- Two electric heaters (one in referee room, one in ammonia room).
- Baseboard electric heaters (in VIP viewing box.
- Several fire extinguishers
- Sprinkler system.
- Nine outdoor fuel storage tanks.
    - One large propane tank.
    - One set of four smaller propane tanks.
    - One set of three smaller propane tanks.
    - One oil tank.

6.2 Mechanical Systems

6.2.1 Furnace Systems

There is one Jackson & Church oil-fired furnace located on the second floor serving the lobby and dressing room 1. The age of the furnace could not be determined at the time of the visit. The expected useful life for this type of equipment is 18 years. Judging by the amount of dust and it is expected that it was installed more than 18 years ago, and therefore should be considered for replacement.

There is one Rheem propane-fired furnace located on the second floor serving the upstairs, the sprinkler room, and dressing rooms 2, 3, and 4. It has a capacity of 112,000 Btu/hr and is expected that it was installed in 2016. The life expectancy of furnaces is approximately 18 years and therefore should be considered for replacement in 2034.

Ventilation rates could not be verified and no evidence of outdoor air (OA) or exhaust air (EA) ducting or louvres were found during the visit. Ventilation should be further analysed for code compliance. Based on available information, it is assumed the ventilation system is not code compliant.

6.2.2 Domestic Hot Water (DHW) Systems

There are two propane DHW heaters located in the mechanical room near the front entrance of the building which services the washrooms and changerooms. The first heater is a 65-gallon AO Smith heater installed in March of 2011. The heater has a capacity of 251,000 Btu/hr. The useful life expectancy of DHW tanks is approximately 15 years and therefore should be considered for replacement in 2026. The second is a 62-gallon John Wood DHW heater and is currently being used in series to the AO Smith heater as a storage tank, with its heater function disabled. It had a capacity of 270,000 Btu/hr installed in 1987. It has passed its useful life and therefore should be replaced.

There is one propane 65 US GAL Rheem DHW heater located in the Zamboni room on the ground floor which serves the Zamboni. It has a capacity of 360,000 Btu/hr and was manufactured in 2011. DHW heaters have a useful life of 15 years and therefore this heater should be considered for replacement in 2026.

There is one 240V electric 45 US GAL Giant DHW heater located under the stairs located on the first floor. It has an input capacity of 10,236 BTU/hr 3kW). The areas being served by this

DWH heater could not be determined at the time of the visit. The heater was installed in 2002 and therefore has surpassed its useful life and should be replaced.

There is one 240V electric 48.6-gallon Giant DHW heater located in the kitchen on the second floor that services the kitchen. It has an input capacity of 10,236 BHU/hr (3kW). It was installed in July of 2021 and has an expected life cycle of 15 years. The tank should be considered for replacement in 2036.

Operators indicated that there is also one electric DHW heater located in the referee's changeroom. JLR was not able to find the unit therefore the unit's age, capacity, and condition were not observed and cannot be commented on.

6.2.3 Chiller Systems

An ice rink ammonia refrigeration system is located in a dedicated mechanical room (ammonia room). The system comprises the evaporator and accumulator barrels, two belt-driven reciprocating compressors, oil separators, brine tank and pump, open cooling tower tank and a dedicated pump, interconnecting pipework including valving and instrumentation. The cooling tower is located externally, just outside of the mechanical room. The equipment appears to be of varied condition with no clear and consistent age and installation date.

Evaporator and Accumulator:
The evaporator and accumulator barrels were manufactured (and most likely installed) by CIMCO in 2018. The internal condition of the heat exchanger is not known. The units were dirty at the time of review. Dirt traps moisture and promotes deterioration of surfaces and speeds up equipment aging. If kept in good conditions the shell-and-tube heat exchangers can operate for decades. It is recommended internal condition assessment is performed in 2038, and replacement scheduled based on condition.

Compressors:
Two reciprocating, belt-driven compressors are serving the rink chiller installation and are installed in the mechanical room.

One compressor was installed in 2015 and based on visual assessment it appears to be in fair to poor condition. The unit, the belt guard as well as the motor are dirty, with the compressor body showing evidence of leaks, and corrosion in various places. The expected useful life of compressors within a refrigeration system is approximately 25 years, but largely dependent on quality of maintenance performed. It is suggested that this compressor be considered for replacement in 2040.

The other one compressor's manufacturing and installation dates are unclear. The compressor is in poor condition, with significant corrosion on unit's body as well as belt guard, electric motor and base frame. Evidence of leaks were also noted. It is assumed that it has reached the end of its service life and should be replaced.

Motors:
There is one 600V, 60HP AO Smith AC motor serving the newest of the compressors (installed 2015); however, its age could not be confirmed at the time of the visit. If kept in good condition, the approximate useful life for AC motors is approximately 18 years, but his motor appears to be

in fair to poor condition, with significant dirt buildup and some corrosion visible. Therefore, it should be considered for replacement in the next two to three years.

There is one 600V, 40HP Lincoln Motors motor serving the older of the two compressors. The motor is in poor condition, with significant corrosion on motor's body as well as belt guard and base frame. It is assumed that it has reached the end of its service life and should be replaced.

Oil Separators:
There are two oil separators connected to the compressors within the system. The first separator is from Henry Technologies and its age could not be determined at the time of the site visit. The useful life for this type of equipment is approximately 20 years. There was no identification tag found for the second separator. It appeared to be in good condition, but its age could not be determined at the time of the visit. The expected useful life for this type of equipment is 20 years.

Tanks:
There is one water tank that supplies the compressors with cooling water as well as the cooling tower. Its age could not be determined at the time of the visit. The tank appears to be in fair condition but dirty, and corrosion was observed on associated piping connections and fittings.

There is one brine tank containing the brine which circulates beneath the surface of the ice. Its age could not be determined at the time of the visit. Tank is in fair condition, but evidence of leaks (corrosion of equipment standing below the tank) and brine residue were noted.

Cooling Towers:
There is one B.A.C. cooling tower located outside of the chiller room. The cooling tower was installed in 2013 and appears to be in good condition. No evidence of leaks or extensive deterioration have been observed. The expected useful life for steel cooling towers is approximately 20 years. Cooling tower replacement to be considered in 2033, based on its condition at the time.

Brine Circulation Pump:
There is one Armstrong brine circulation pump located in the ammonia room. The expected useful life for circulation pumps is approximately 15 years. The installation date could not be determined at the time of the visit, but it is very rusted and deeply corroded and should be considered for replacement

Brine Circulation Pipes:
The brine circulation pipes serve below the ice rink. The connections and valves at the brine circulation pump are in similar rusted and corroded condition to the pump itself. The cooling header is very dirty, and its condition is difficult to assess. The refrigerant lines branching from the header could only be observed at their connection points, which are held in place my rusted hose clamps in poor condition. The installation date could not be determined at the time of visit. If kept in good condition, the useful life of circulation pipes is approximately 35 years. It was noted by the operator that a number for pipe under the slab have failed in the past and required repairs.

Refrigerant Piping:

The refrigerant piping age could not be determined at the time of the site visit however it appears to be in fair condition overall, with most pipes painted or insulated to protect them from further corrosion, but their current condition under the paint and insulation is difficult to assess. Flanges and connections show more corrosion and are in poorer condition than most of the piping. One section of ammonia supply piping is in very poor condition, with visible rust and excessive peeling paint. If kept in good condition, the expected life cycle for refrigerant piping is 40 years.

6.2.4 AC Units

There are two ThermoPlus II AC units located in upstairs in community room. The age of the units could not be determined at the time of the visit. AC units have an expected life cycle of approximately 15 years. It is assumed that the AC units were installed more than 15 years ago and should be replaced.

6.2.5 Exhaust Fan Systems

The washrooms were served by exhaust fans. They are installed in the ceiling space and the physical condition could not be observed at the time of the visit.

The ammonia room is equipped with one wall vented exhaust fan interconnected with the ammonia detection system. A remote display in the Zamboni mechanical room also alerts the operator if high concentrations of ammonia are detected. The age of the fan could not be determined, but it appears to be in fair condition.

There is one Zehnder Rittling exhaust fan located in the Zamboni room. The age of the unit could not be determined at the time of visit, though it appears to be in good condition with no corrosion or dirt visible.

There are two Canarm fans located on the second floor. One is located in each of the furnace rooms, as controlled by a wall-mounted thermostat. The fans were installed in 1999 and based on their age have passed their service life and should be replaced.

There is one exhaust hood servicing the stove in the upstairs kitchen. The building operator indicated that there are immediate plans to remove this equipment. The hood is equipped with a fire suppression system “Pryo Chem” complete with a remote release panel. There were no inspection/certification tags visible at the time of visit. A paper filter was observed inserted in the exhaust port of the hood – a fire hazard.

There is one exhaust hood servicing the stove in the ground floor “canteen” kitchen. This fan is interlocked to disconnect the gas supply to the stove. Its condition has not been reviewed due to limited access. This exhaust hood appears to be equipped with a fire suppression system (visible discharge nozzles), but no gas cylinder/release mechanism or control panel was found. The metal baffle filters on the hood were very dirty and appear to be corroded. Those should be cleaned regularly and replaced as required. A pressure cleaning tag was observed on the hood with date: April 2022. Observed. A flexible, non-fire rated duct appears to be connecting the hood with the exhaust system.

The commercial kitchen hood systems require certification and periodic inspections. No inspection or certification tags were found during the site review on either of the hoods. This item, as related to life safety and building insurance coverage should be further verified.

6.2.6 Dehumidification Systems

There are two dehumidifiers located in the rink area of the building. The first dehumidifier is a silica gel-type Concepts and Designs Inc. unit and has a 3HP supply fan with a 2000cfm capacity, a 1.5HP reactivation fan with a 553cfm, propane burner 120,000 Btu/hr. It was installed in 2007 and has a useful life of approximately 20 years. It should be considered for replacement in 2027.

The building operator indicated that the second dehumidifier is currently being used as a fan in the rink area. From the factory, this unit was a 600V CIMCO unit equipped with a 7.5HP compressor motor, a 1HP fan motor, 1,433.10 BTU/hr (420W) drain heater, and 13 lbs of R-22 refrigerant. It should be noted that R-22 has been phased out and is no longer serviceable, therefore it is recommended that this unit be replaced.

6.2.7 Plumbing

Domestic water is supplied from the municipal supply. The first main water service entry point was found at the front of the building, and a secondary entry point is at the side serving the Zamboni mechanical room. Neither entry point is metered or protected by a backflow preventor.

There are two washrooms on the second level of the building. The women's washroom contained two water closets and one lavatory. The men's washroom contained two water closets, two urinals, and one lavatory. The plumbing fixtures appeared to be in good condition. It is suggested that the fixtures be replaced as required. There are two double sinks located in the upstairs kitchen. They appeared to be in good condition.

There is one double sink located in the canteen room. It appears to be in good condition. It is suggested that the plumbing fixtures be replaced as required. There is a bar area on the second level of the building. As it was locked, this area was not available for review.

There is one water closet and one shower located in the referee room on the ground floor. The shower and water closet appeared to be in poor condition at the time of visit and it is suggested that they be replaced. There is one mop sink located in the Zamboni room on the ground floor. The sink appeared to be in good condition at the time of visit. It is suggested that it be replaced when required. There is one mop sink located in the custodian's closet on the ground floor. It appeared to be in poor condition, and it is suggested that it be replaced.

The lifespan of plumbing infrastructure is generally 30 years, and if the plumbing is original to the building, it is assumed to be at or well past its service life.

6.2.8 Ductwork

Very little of the ductwork was observable at the time of the site visit, however the useful life of the ductwork is 50 years. If original or nearly original to the building, it is assumed that this ductwork is at the end of its serviceable lifespan.

6.2.9 Heaters

There are four propane radiant tube heaters located in the rink area of the building. The heaters and their reflecting shields are in poor condition and their replacement is recommended.

There is one Ouellet electric heater located in the Zamboni room. The age of the unit could not be determined at the time of visit, though it appears to be in good condition with no corrosion or dirt visible.

There is one electric heater located in the referee room on the ground floor. The brand and age of the heater could not be determined at the time of the visit. However, it is rusted and appears to be passed its service life and should be replaced.

There is one 600V, 10kW Westcan electric heater located in the ammonia room. It was installed in 1988 and appears to be in poor condition. The useful life of a radiant heater is approximately 18 years. The heater has surpassed its useful life and should be replaced.

There is one electric baseboard heater located in the VIP viewing box in the Arena. The brand and age of the heater could not be determined at the time of the visit.

6.3 Fire Protection Systems

6.3.1 Fire Extinguishers

The building is equipped with wall mounted portable fire extinguishers that are observed to be in good condition. The extinguishes appear to not be regularly maintained, with the last inspection done in October of 2020 for some of them. It is recommended to ensure that all portable fire extinguishers are inspected monthly and to replace the extinguishers as directed by the inspectors.

6.3.2 Sprinkler Systems

A single-zone dry-pipe sprinkler system serves the entire building. The valves and compressor in the mechanical room appear to be in fair condition, and updated tags indicate that the system is tested regularly. 96 of the sprinkler heads were replaced the week of August 5th. At the time of the visit, a hissing noise was audible at several of the capped and valved ends of various branches of the sprinkler system. This is presumed to be related to the recent/ongoing sprinkler head replacement project.

The building is equipped with a sprinkler monitoring system (Paradox). The panel is installed in the water heater room at the main entrance vestibule along with a direct PSTN telephone line connecting to a remote constantly attended fire signa receiving center (GMS) through an auto-dialer. The OS&Y main valve on the dry sprinkler system is supervised with a tamper switch. The dry pipe system is also equipped with an air pressure switch to confirm water release. All these supervisory devices are connected to the sprinkler monitoring system (Paradox panel).

6.4 Fuel Tanks

Oil is stored in one location and propane is stored in three locations around the outside of the building. All nine tanks appear to be in fair to poor condition, with scratches and rust visible. It is unknown whether these tanks are owned or rented.

One Superior Propane branded 1000-gallon tank was installed between the Arena and the adjacent building in 1980 serves the radiant tube heaters (west side stands), the silica gel dehumidifier, and the Zamboni's domestic hot water heater.

Four Superior Propane branded 375-liter tanks are located at the side of the building and serve the radiant tube heaters (east side stands), and the Rheem furnace.

Two Superior Propane branded 375-liter tanks and one Budget branded 375-liter tank are located at the front of the building and serve the canteen and the domestic hot water tank in the mechanical room near the front entrance of the building.

Oil is stored in one Clemmer LS branded 581-gallon (2200L) tank installed between the arena and the adjacent building in 2005. It serves the Jackson & Church furnace.

7.0 Electrical Assessment

A visual review of the interior and exterior of the Shawville Arena was performed on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the electrical technician subcontracted by the municiplity, which generally forms the understanding of the overall electrical systems. The review was non-intrusive except for the few electrical enclosures (disconnects, panels, etc.,) where the Arena's electrical technician was able to provide access for JLR's visual review. No record drawings of the existing building were made available to JLR.

7.1 Service Entrance Feeders

The main electrical service entrance consists of three pole-mounted single phase transformers managed by Hydro Quebec feeding two separate service entrance feeders (400A, 600V each) located in the ice rink equipment room.

A third service entrance feeder rated 600A at 120/240V is located on the second floor of the Arena building. It was not clear where the 120/240V incoming feeder is originating from.

The first service entrance feeder located in the ice rink equipment room feeds into a 400A, 3P 600V main disconnect switch and metering cabinet. The feeder splits to supply the rink lighting panel, a unit heater in the ice rink equipment room, a feed for a Bell mobility transformer through wall mounted disconnect switches and a 200A splitter. The second splitter feeds two propane powered dehumidifiers as well as a legacy phase indicator panel.

The second service entrance feeder located in the ice rink equipment room feeds into a 400A, 3P 600V main disconnect switch and metering cabinet. The feeder splits to supply the barn, dance hall, west steel building and the rink building through wall mounted disconnect switches.

The third service entrance feeder located on the second floor of the arena building feeds into a 120/240V, 600A, 3P main disconnect switch and metering cabinet. The feeder splits to supply the following panels: Panel A, Panel B at ground floor arena, outdoor flood lights, 100A arena QOB panel, 1st floor panel and a 400A, 3P disconnect feeding power for the annual Expo Shawville fair.

Majority of the electrical equipment appears to be legacy and has exceeded their average useful life. Rust has been noticed on major electrical enclosures within the arena.

During our site review, we have noticed a deficiency in the wiring termination at the 200A, 3P disconnect of the secondary splitter in the ice rink equipment room. We have also noticed mismatching fuse brand and ratings within the same disconnect switch which is hazardous.

7.2 Electrical Distribution

Panel A (120/240V, 200A, 3P, 4W) - General Electric Load Center 24 ways equipped with Siemens breakers. It has exceeded its average useful life. Signs of rust on the panel enclosure was noticed.

Panel B (120/240V, 200A, 3P, 4W) - General Electric Load Center 24 ways equipped with Siemens breakers. It has exceeded its average useful life. Signs of rust on the panel enclosure was noticed.

Panel 213 (347/600V, 100A, 3P, 4W) – Commander CGL-2 24 ways equipped with Eaton circuit breakers. The panel is 25 years old and has had its cover door removed. It has exceeded its average useful life.

Q0 Load Center (120/240V, 200A, 3P, 4W) – Square D load center 30 ways equipped with Square D breakers.

Siemens EQ load center. No information on rating and/or schedule.

Square D QO Load Center (120/240V, 100A, 2P) installed in storage area near Zamboni parking.

Siemens EQ Load Center (120/240V, 200A, 3P, 4W) installed at second floor Lions Hall electrical room.

Disconnect switches: Square D, 600V, fusible. Switches have reached their average useful life and should be replaced. Fuses within the disconnect switches should be replaced with new of same make, class and rating.

Control panel for Ice Rink Equipment (brine pump, water pump, evap fan, compressors). Starters are across the line for 50HP compressors and for 20HP pumps that will create high starting currents during start-up affecting the power system within the arena.

7.3 Wiring and Conduits

During our site review, we have noticed the following types of wiring:

- BX cables used for wiring receptacles, switches, lighting, door controllers,
- Flexible cords for connection of mechanical equipment such as compressor, TV, emergency battery units, etc.
- TEW wires without conduits for connecting fire alarm bells, sprinkler supervisory devices and loudspeakers
- Romex cable for wiring water heaters.
- EMT conduits with RW90 wiring for sprinkler monitoring panel, fire alarm manual pull stations, fire alarm end-of-line resistors,
- Metallic flexible conduit with RW90 wiring used for connecting humidifiers, ice rink compressors, pumps, etc.
- Bare copper ground connected to the main disconnect switch

Wiring observed in multiple locations do not comply with current electrical and building codes.

7.4 Lighting Fixtures

We have distinguished the following types of lighting fixtures in the building:

- 2x4 fluorescent recessed panels with frosted diffusers mainly used in changing rooms, entrance vestibule, and washrooms
- 1x4 surface mounted strip lights at the main reception
- Incandescent lamps on holder sockets in storage and technical rooms
- Spotlights in washrooms and shower areas
- High bay fluorescent lights with protective wire guard within the arena rink
- Industrial pendant lamp with incandescent bulb
- Wall packs for exterior perimeter lighting
- 2x4 fluorescent surface mounted panels with opal diffuser installed in kitchen at second floor.

Many of the 2x4 fluorescent recessed panels were found with damaged or broken diffusers.

Using incandescent bulbs on holder sockets risk overlamping and becomes a fire hazard.

120V downlight in shower areas may present a risk of electrocution and should be replaced if found to be non-compliant.

Some exterior wall packs were damaged which presents risk of water infiltration and short circuits.

7.5 Emergency Lighting and Exit Signs

The arena is equipped with emergency battery units (EBUs) with dual heads and exit signs throughout all the entrance and exit doors.

EBUs are Lumacell connected through a dual receptacle mounted adjacent to it.

Exit signs consist of lighted signs, reading SORTIE in six-inch LED red letters.

The system was not tested, and maintenance logs could notbe located.

7.6 Fire Alarm System

The Arena is not equipped with a dedicated fire alarm system. However, it seems that the fire alarm system installed in the adjacent building is serving the Arena with three zones: arena lobby, lions hall and arena. However, the fire alarm system is not supervising the fire protection systems installed at the Arena.

Fire alarm system was not tested during the visit and annual inspection reports were not available.

7.7 CO & Gas Detection

The Arena is equipped with the following CO detection systems:

- A local CO detector c/w siren and strobe at the main entrance
- A local CO detector at the kitchen on the second floor Lions Hall.
- Wall mounted Honeywell controllers and gas detectors for monitoring carbon monoxide (CO), nitrogen dioxide (NO2), hydrogen sulfide (H2S), oxygen (O2), methane (CH4), hydrogen (H2) and propane (C3H8) installed near Zamboni's parking and within the arena near the gas operated humidifiers.

7.8 Barrier Free Doors

The main entrance doors are equipped with automatic swing door operators (Ditec).

7.9 Other Systems

We have noted the presence of the following systems:

- Sound system consisting of loudspeakers and head-end equipment
- Scoreboard system

7.10 CCTV System

A CCTV system is installed since 2022 at the Arena. The head end is installed in the office at the arena's reception and CCTV cameras are installed at the main entrance vestibule and around the perimeter of the arena building.

8.0 Key Observations

8.1 Structural Key Observations

- Slab were observed to be in poor condition, with noted spalls, delaminations and cracks throughout. Particularly in the regions with noted water infiltration, the slab was severely deteriorated.

- Water infiltration at various locations was noted. Water observed to be pooling at steel column base plates causing rusting and deterioration.
- Multiple spalls of concrete block wall elements in interior rooms were observed.
- The observed grade on the western face of the structure was observed to be tight to the cladding causing buildup of water and flooding and has led to severe rusting and deterioration of the exterior cladding. The cladding in some locations is completely rusted causing significant section loss which has led to water infiltration inside the building.
- Altered cross brace observed in entrance structure dressing room raises concern. Cross braces are meant to support the lateral system of the structure and should not be altered. Some sections of lateral braces were not available for review due to unmovable obstructions.

8.2 Architectural Key Observations

- Exterior building wall envelope was observed to be in poor condition, with noted large openings, damaged and corroded areas
- Exterior building wall envelope thermal performance was observed to be poor with the bottom section under the bleachers were un-insulated.
- Washroom facilities within the dressing rooms and referee room was observed to be in poor condition and limited space.
- Accessibility within the existing facility for circulation and to access to the second-floor banquet hall, the bleacher area, the ice surface and the washroom facilities within the dressing rooms was observed to be non conforming to barrier-free design requirements of current codes.

8.3 Civil Key Observations

- Noted that internal floor drains are in some cases connected to the storm sewer system.
- Perforated pipe systems were installed in relatively long runs that form the minor system on site, some of which pass under existing structures (i.e., barns) could have future maintenance impacts, and potentially have limited functionality during spring thaw.
- Noted drainage issues in the rear of the Arena, adjacent to mechanical chiller manifold vault and (potentially) septic tank system.
- Unknown quantity of stormwater is received from outside of the property (adjacent properties and ROW).
- Visual review the field adjacent to the field forms a major low point.
- An assessment of the adequacy of the existing storm servicing should be completed.
- Shallow domestic services with many Tees pose potential for freezing. It was noted there is historical potential for freezing water services under existing rink to referee rooms.
- Water service of unknown age passes beneath the existing octagon building, limiting opportunity to repair if needed.
- Domestic water service for all buildings connection to existing 6” fire supply should be reviewed against Construction Code to verify requirements.
- Secondary Hydrant service from Rue Clarendon is long with minimal servicing and could create a stagnant water supply for the existing 4H building.
- Poor quality or hazardous materials were reported in the sanitary system (i.e., bituminous fibre pipe, asbestos concrete pipe).

- Tee connections for Sanitary were noted (i.e., junctions not at a maintenance hole) and typically create potential for clogs & freezing with limited ability to correct.
- Existing Sanitary septic system of unknown age and functionality partially services the Arena.

8.4 Electrical Key Observations

- Wiring termination at the 200A, 3P disconnect in the ice rink equipment room is loose and requires immediate intervention (risk of ground faults and fire incidents).
- All fuses within the disconnect switches shall be replaced as soon as possible with new of same make, class and rating.
- Investigate and replace if required all lighting fixtures in shower and other wet areas.
- Replace all broken diffusers on light fittings (indoor and outdoors) – risk of electrocution and other hazards.
- Review fire alarm system in its entirety; remedial works are likely to include the following:
    - Connect the sprinkler supervisory modules to the fire alarm system. Connect the auto-dialer to the fire alarm system.
    - Provide new supervisory modules in the kitchen suppression systems.
    - Maitain annual test reports for the fire alarm system
    - Battery fault on exiting fire alarm system to be rectified immediately.
- Connection to the water heaters to be retrofitted. Consider ground fault interruption.
- Replace all lamp holders with industrial weatherproof light fittings.
- Replace all electrical components (light switches, light fittings, receptacles, etc.) adjacent to wet areas with weatherproof devices or relocate.
- Provide ground bar in equipment room and ensure equipotential bonding.
- Lightning protection and surge protection requirements should be reviewed.
- Maintain annual and monthly test reports for the exit and emergency lighting systems.

8.5 Mechanical Key Observations

- The chiller system which creates and maintains the ice surface is comprised of equipment of various age, condition, and lifespan, with motors, a pump, and piping due for replacement.
- The radiant propane heaters serving the stands and the furnace serving the lobby are also at the end of their service life.
- The dehumidification system (as noted by the building operator) has difficulty keeping up with the first few months of the ice-making season.
- At least four of the six domestic hot water tanks located around the building have reached the end of their service lives.
- Commercial kitchen hoods certification and inspection could not be verified, and some fire-hazard items were noted related to the kitchen exhaust hoods.
- Approximately half of the mechanical equipment appears to be in need of replacing urgently (or within the next five years). It appears the ventilation in the building is not code compliant. We recommend major overhaul of mechanical systems in the building.

9.0 Conclusion and Recommendation

This report has been prepared for the Town of Shawville to provide a multi-disciplinary review of the existing Shawville Arena structure. Due to the lack of available documents, it was proposed that JLR send a member from each discipline (Structural, Architectural, Civil, Mechanical and Electrical) to site to provide a high-level building condition assessment to better understand the structure, surrounding environment, and equipment within the building. Each discipline conducted a visual review of the structure, documenting key observations of the systems.

During our site review we have noticed deterioration and poor or missing thermal insulation with the exterior envelope as well the relatively poor condition of the washrooms and kitchens. Barrier-free access to the washrooms, changerooms, second floor and most public areas of the Arena is not provided. Based on the preceding observations, we would recommend that a short-term renovation project should prioritize the following:

- Replacement of exterior cladding, doors, and windows.
- Replacement and upgrade of thermal insulation within the exterior envelope.
- Complete refurbishment of washrooms, changerooms, and kitchens.
- Provision of barrier-free access to key areas of the building (if and where feasible) by adding ramps, elevators, or lifts.

In the case that the feasibility and cost of a proposed major renovation should need to be compared with the feasibility and cost of constructing a brand-new facility, we would recommend the following be undertaken:

- Designated substances survey of the entire Arena.
- Intrusive openings within exterior walls and roof to determine their current thermal performance and gain a detailed understanding of the condition of the wall and roof assemblies.
- Point cloud scanning of the building with the intent of producing record drawings.
- Detailed code review of the building.

From a mechanical perspective, some items have been identified for immediate action. As discussed, the commercial kitchen hoods certification and inspection could not be verified, and some fire-hazard items were noted related to the kitchen exhaust hoods. Items indicating potential fire hazards should be rectified immediately. From an electrical perspective, deficiencies in the wiring terminations at the 200A, 3P disconnect in the ice rink equipment room were noted. Multiple fuse mismatching within a single disconnect was also noted. These deficiencies should be investigated further and rectified with immediate effect. All feeders and conduit appear to be in good condition with organized and neat runs. The wiring appears to be from the original construction of the building but does not show signs of excessive wear. In certain locations where conduit runs appeared untidy or in dangerous locations such as on the floor in wet or damp locations, conduit runs should be revised to mitigate risk.

Following the limited BCA, the next steps for a potential renovation of the Arena are to create as-built base plans and subsequently write the feasibility report. The base plan will assist in mapping the areas in need of renovation. The intent of the feasibility report will be to discuss the

feasibility of renovations and the methodology for each element in need of renovation. The report will aid greatly in decision-making for the future of the Arena.

As there is a fair amount of missing information for the structure and site, it is recommended that the following investigations be performed to aid in the overall understanding of the structure and the reliability of the feasibility report:

- A foundation investigation alongside a geotechnical investigation.
- Topographic survey of the surrounding site and Arena.
- In-depth investigation of building humidity control requirements.
- Electrical – enhance the as-constructed electrical drawings (layouts, diagrams, risers, etc.) with the help of the electrician.

The topographic survey shall be useful for the Town's record as well as aid in the full assessment of the stormwater distribution network. Inverts, slopes and locations will help better understand the surrounding network. It was discussed with the building operator that the space does not dehumidify well the first months the ice is instated which results in poor quality ice. An in-depth investigation would provide a better understanding of the building humidity control requirements and aid in providing recommendations.

It should be noted that performing the listed investigations prior to the feasibility report will reduce risk in the Arena recommendations and assessment as more information will be made available. The overall reliability of the feasibility report shall increase with more knowledge of the site and structure.

Based on the noted electrical system items, we recommend moving forward with the Arena upgrade feasibility study which will include:

- A code review of the existing architecture and life safety systems.
- Multiple options proposal for repairing/upgrading/replacing existing systems at the Arena c/w high level scope of services, class D opinion of probable construction cost and schedule.

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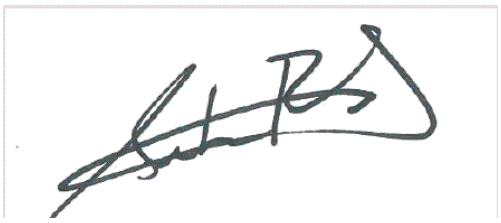

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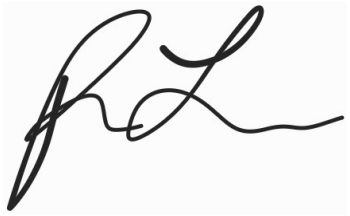

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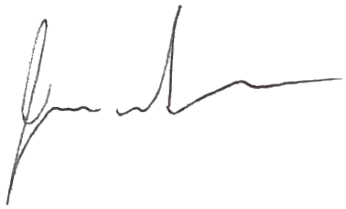

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Encl. APPENDIX A – Structural Photos
APPENDIX B – Architectural Photos
APPENDIX C – Civil Photos
APPENDIX D – Electrical Photos
APPENDIX E – Mechanical Photos
APPENDIX F – Preliminary As-Constructed Electrical Single Line Diagram

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Appendix A

Structural Photos

32824-000 – Shawville Feasibility Investigation
Appendix A – Structural Photos

Photo 1: Front face of entrance structure.

Photo 2: East face of structure.

32824-000 – Shawville Feasibility Investigation
Appendix A – Structural Photos

Photo 3: West face of structure facing south.

Photo 4: West face of structure facing north.

Photo 5: Rear of arena.

Photo 6: Arena interior.

Photo 7: Tapered steel columns in arena.

Photo 8: Cross brace connection to steel roof beam at southeast end arena.

Photo 9: Steel roof beam.

Photo 10: Cross bracing at back wall of arena.

Photo 11: Opening observed at interior steel cladding wall.

Photo 12: Exposed base slab at Zamboni entrance.

Photo 13: Exposed base slab underneath west bleachers.

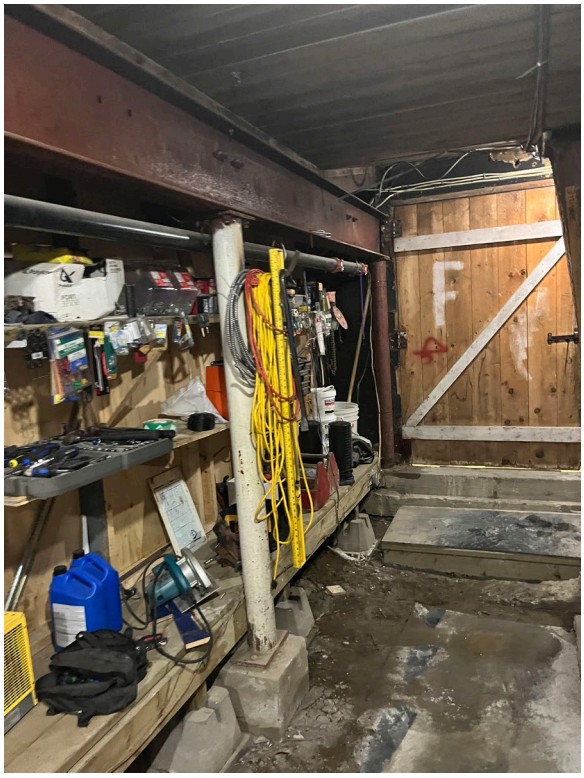


Photo 14: Exposed deteriorated base slab underneath west bleachers.

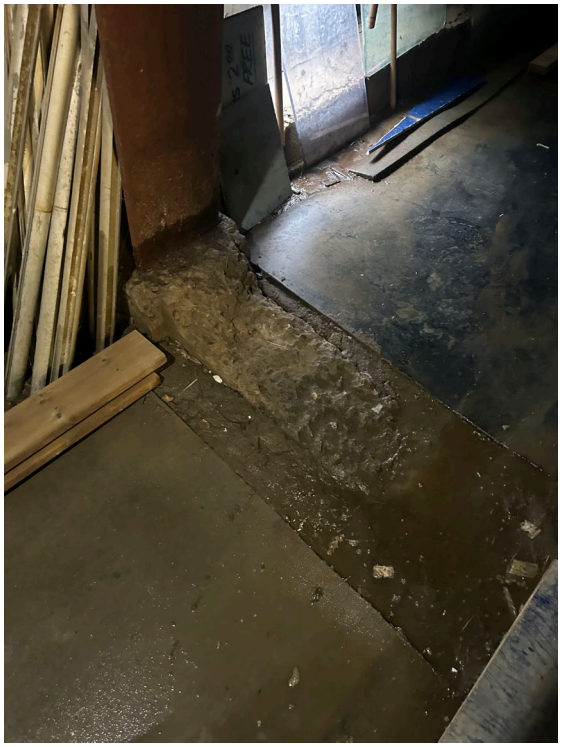


Photo 15: Exposed base slab underneath bleachers.

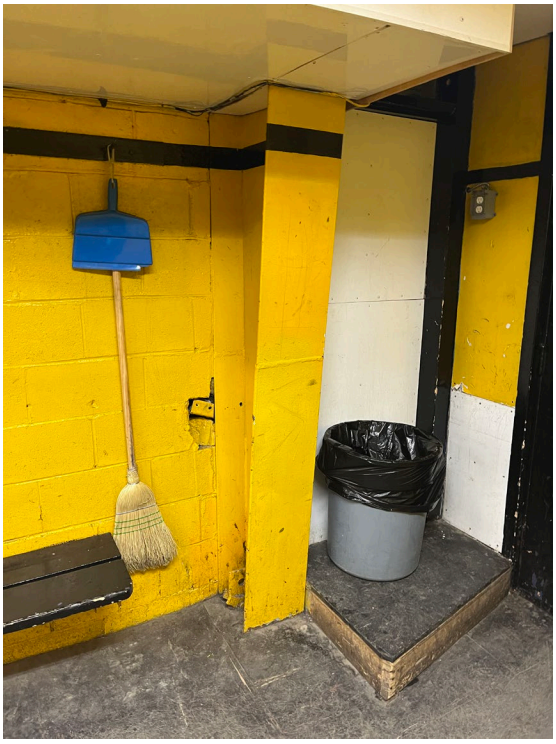


Photo 16: Exposed base slab underneath bleachers.

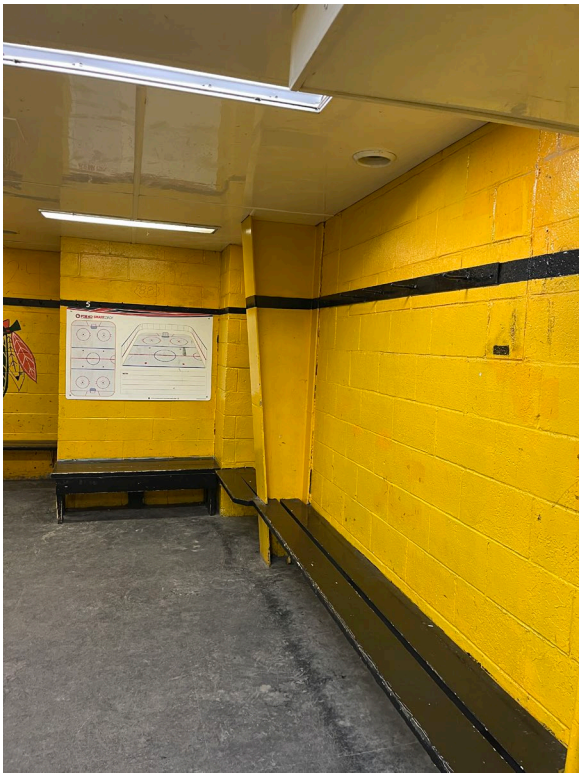


Photo 17: East side dressing room.

Photo 18: Cross bracing at east side dressing room.

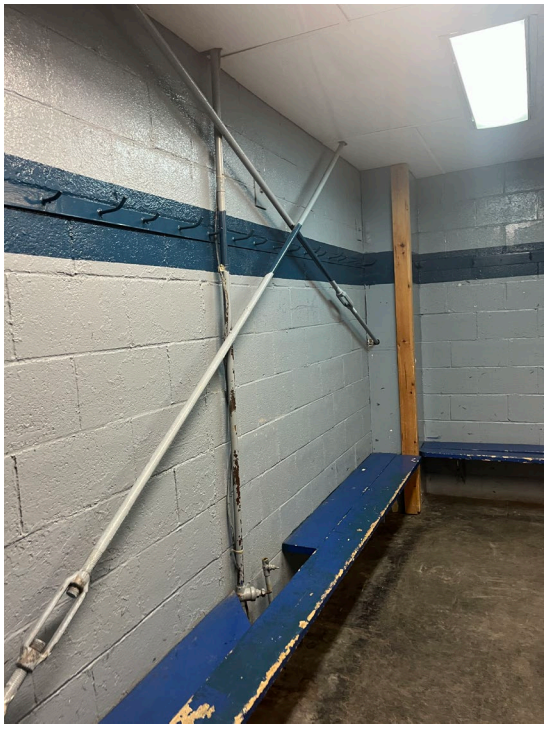


Photo 19: Interior column at east side dressing room.

Photo 20: Interior column at entrance structure office.

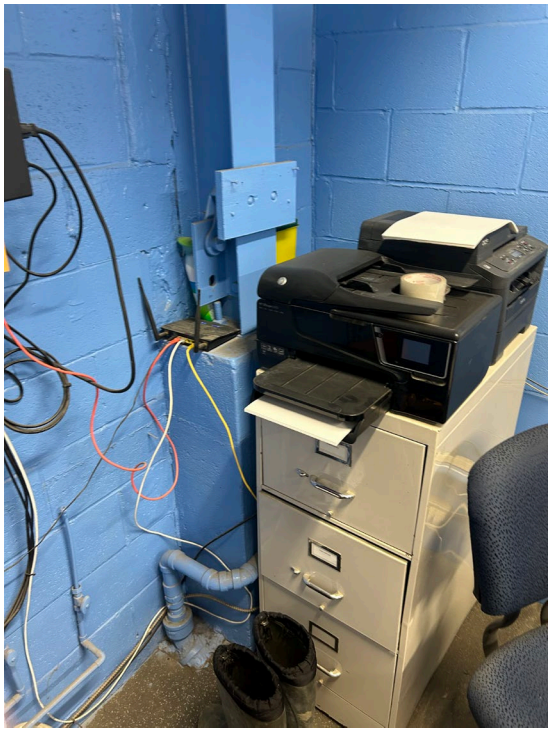


Photo 21: Cross bracing observed to go through concrete block wall.

Photo 22: Cross bracing observed to go through concrete block wall.

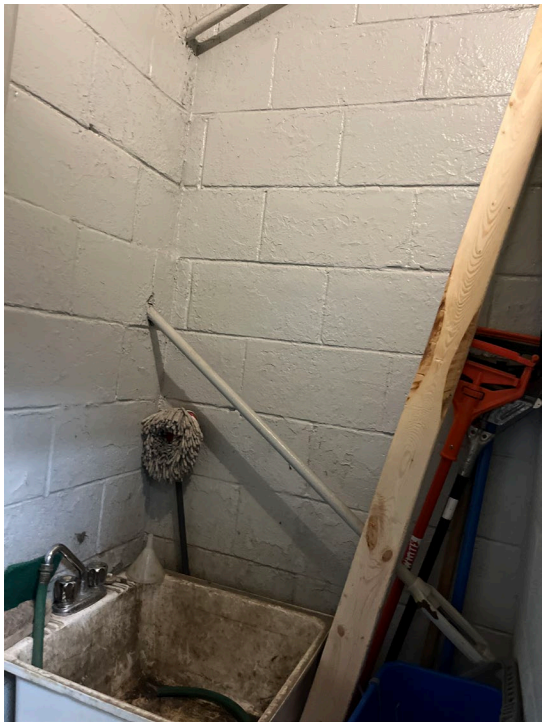


Photo 23: Wood beam elements under mezzanine.

Appendix B

Architectural Photos

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 1: Overview of arena entrance.

Photo 2: Section loss at exterior cladding seen from inside the structure.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

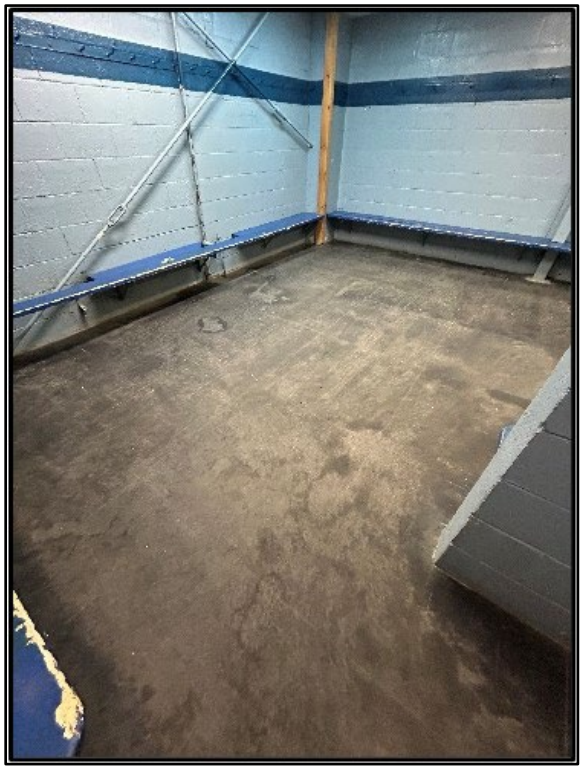
Photo 3: Deformed exterior cladding on east side of rink structure.

Photo 4: Exterior cladding with visible rusting.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 5: Lobby area facing west.

Photo 6: Dressing room located east of lobby.



32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 7: Dressing room located west of lobby.

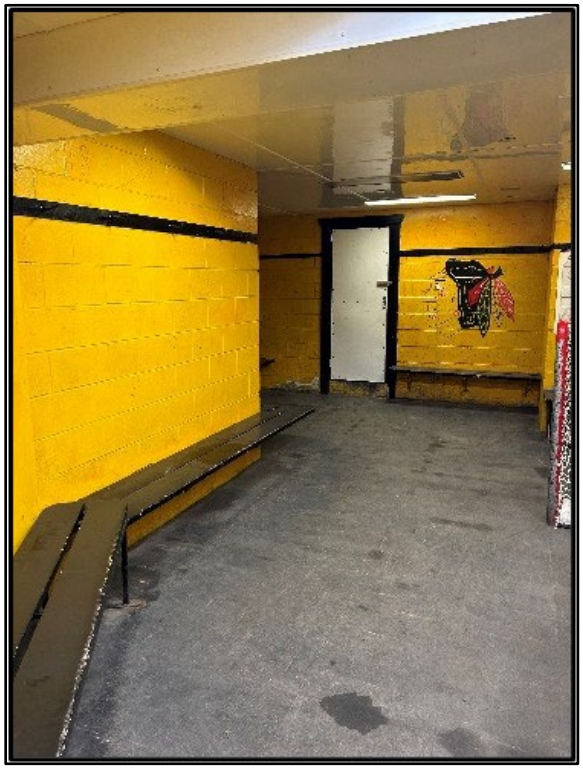


Photo 8: North end of arena.

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Appendix B – Architectural Photos

Photo 9: Northwest end of arena.

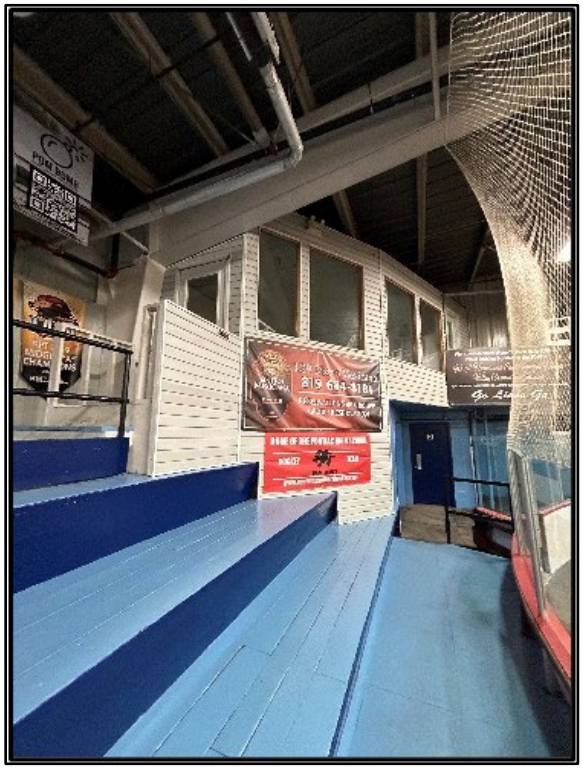

Photo 10: Underneath wooden bleachers.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 11: Washroom within dressing room on southeast side of lobby.

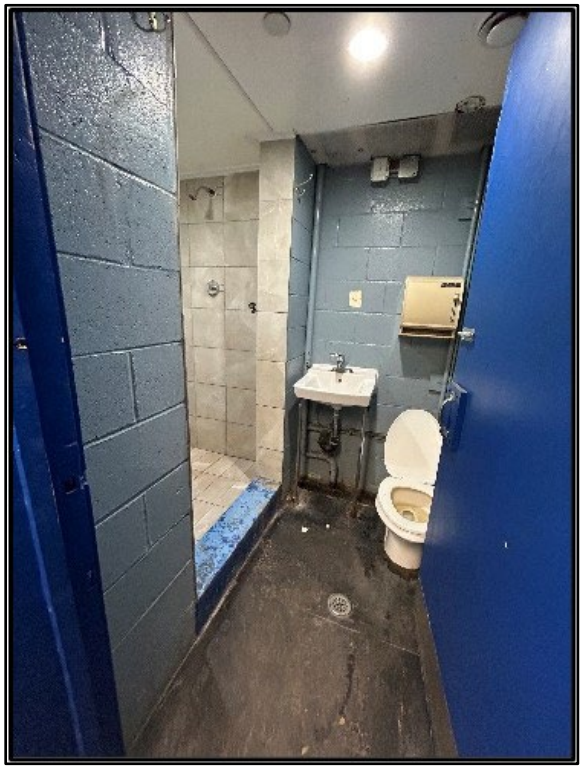

Photo 12: Kitchen at second floor community space.

Photo 13: Second floor community space.

Photo 14: Second floor deck underside.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 15: Northeast end of arena.

Photo 16: Underside of roof panels.

Appendix C

Civil Photos

32824-000 – Shawville Arena Feasibility Investigation
Appendix C- Civil Photos

Photo 1: Front entrance manhole interior (closest to arena).

Photo 2: Front entrance parking lot manhole interior.

32824-000 – Shawville Arena Feasibility Investigation
Appendix C- Civil Photos

Photo 3: Wide shot of front entrance manholes.

Photo 4: Manhole at west side of arena.

32824-000 – Shawville Arena Feasibility Investigation
Appendix C- Civil Photos

Photo 5: Manhole at west side of structure.

Photo 6: East field manhole.

32824-000 – Shawville Arena Feasibility Investigation
Appendix C- Civil Photos

Photo 7: East field manhole interior.

Photo 8:Manhole west of arena.

32824-000 – Shawville Arena Feasibility Investigation
Appendix C- Civil Photos

Photo 9: Manhole west of arena.

Appendix D

Mechanical Photos

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 1: AC Unit 1

Photo 2: AC Unit 2

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 3: AO Smith Motor

Photo 4: Brine of Glycol Circulation Pipes

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 5: Chiller

Photo 6: Glycol Circulation Pump

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 7: Compressor Units

Photo 8: Cooling Tower

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 9: Large Dehumidifier

Photo 10: Small Dehumidifier

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 11: DHW Heater (Kitchen)

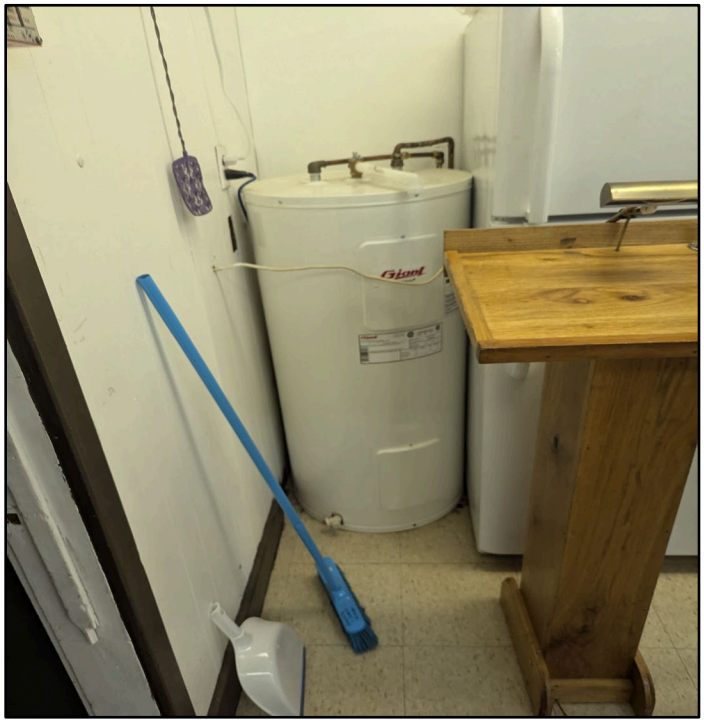

Photo 12: DHW Heater (Stairs)

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Appendix D – Mechanical Photos

Photo 13: DHW Heater (Zamboni Room)

Photo 14: DHW Heaters (Mechanical Room)

Photo 15: Exhaust Fan

Photo 16: Jackson and Church Furnace

32824-000 – Shawville Feasibility Investigation
Appendix D – Mechanical Photos

Photo 17: Plumbing Fixtures

Photo 18: Radiant Heater - Ammonia

Photo 19: Radiant Heater - Furnace

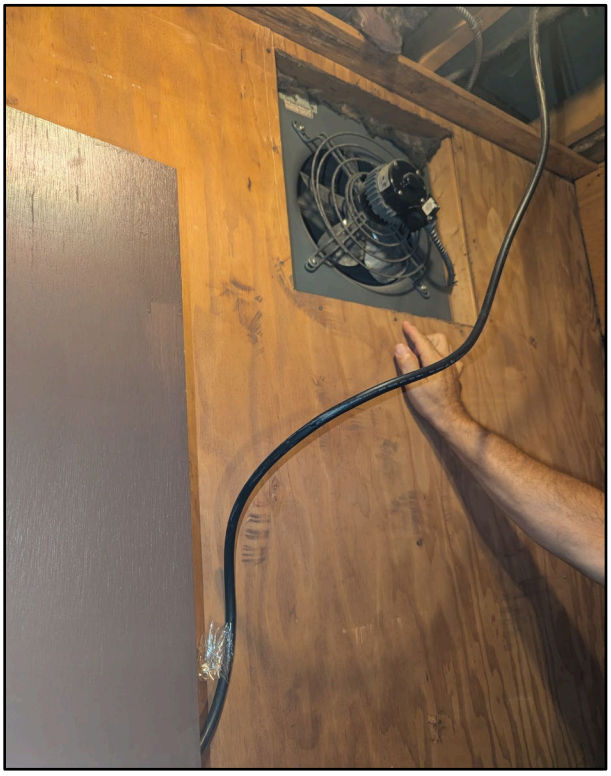

Photo 20: Radiant Heater – Referee Room

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Appendix D – Mechanical Photos

Photo 21: Radiant Heater – Zamboni Room

Photo 22: Radiant Heater – Zamboni Room

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Appendix D – Mechanical Photos

Photo 23: Radiant Heater – Furnace 1

Photo 24: Radiant Heater – Furnace 2

Photo 25: Separator 1

Photo 26: Separator 2

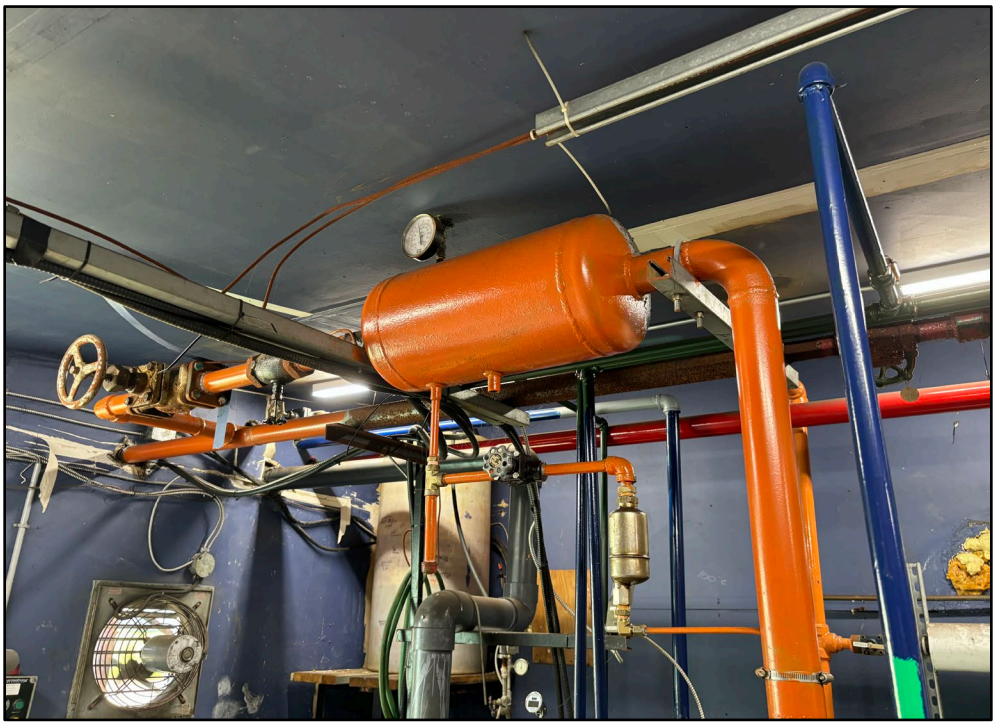

Photo 27: Sprinkler System

Photo 28: Tube Radiant Heater

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Appendix D – Mechanical Photos

Photo 29: Zamboni Room Water Entry

Photo 30: Water Tank

Appendix E

Electrical Photos

32824-000 – Shawville Feasibility Investigation
Appendix E – Electrical Photos

Photo 1:Pole Mounted Transformers

Photo 2: Service Entrance

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Appendix E – Electrical Photos

Photo 3: 400A, 600V Disconnect

Photo 4: 400A, 600V Disconnect

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Appendix E – Electrical Photos

Photo 5: Panelboard Rust

Photo 6: Panelboard Rust

32824-000 – Shawville Feasibility Investigation
Appendix E – Electrical Photos

Photo 7: Equipment Rust

Photo 8: Disconnect Rust

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Appendix E – Electrical Photos

Photo 9: Wire Termination Issues

Photo 10: Non-Matching Fuses

32824-000 – Shawville Feasibility Investigation
Appendix E – Electrical Photos

Photo 11: More Non-Matching Fuses

Photo 12: Wiring Issues

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Appendix E – Electrical Photos

Photo 13: Conduit Runs

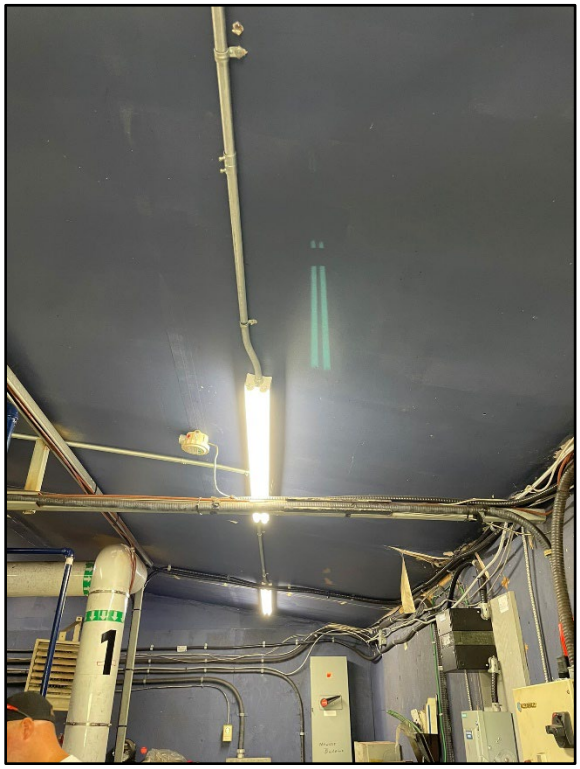

Photo 14: Damaged Lighting Fixtures

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Appendix E – Electrical Photos

Photo 15: Lighting Fixture in Shower

Photo 16: Outdoor Wall Pack

32824-000 – Shawville Feasibility Investigation
Appendix E – Electrical Photos

Photo 17: Damaged Wall Pack

Photo 18: Exit Signage

32824-000 – Shawville Feasibility Investigation
Appendix E – Electrical Photos

Photo 19: EBU

Photo 20: Dry-Type Sprinkler System

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Appendix E – Electrical Photos

Photo 21: Fire Alarm Bell

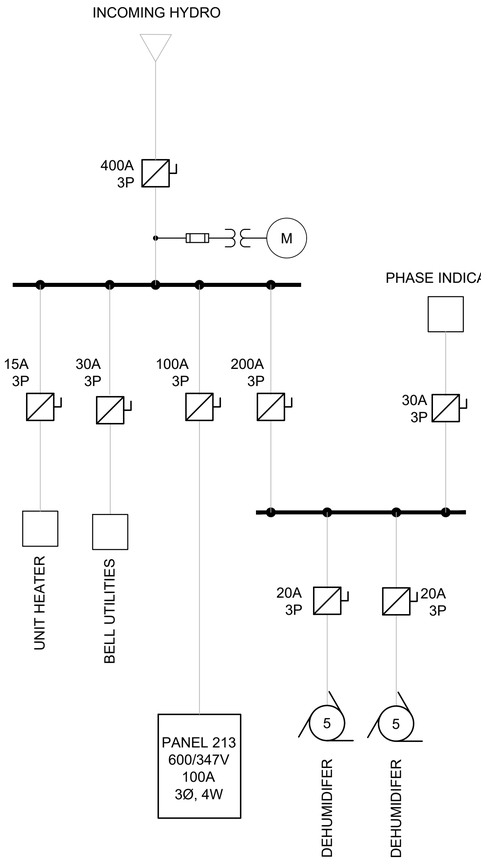
Photo 22: Carbon Monoxide Detector

32824-000 – Shawville Feasibility Investigation
Appendix E – Electrical Photos

Photo 23: Security Camera

Appendix F

Preliminary As-Constructed
Electrical Single Line Diagram



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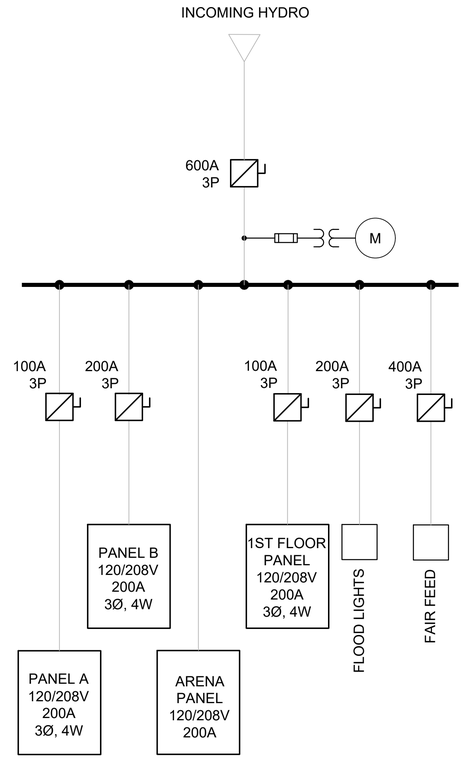
N.T.S.



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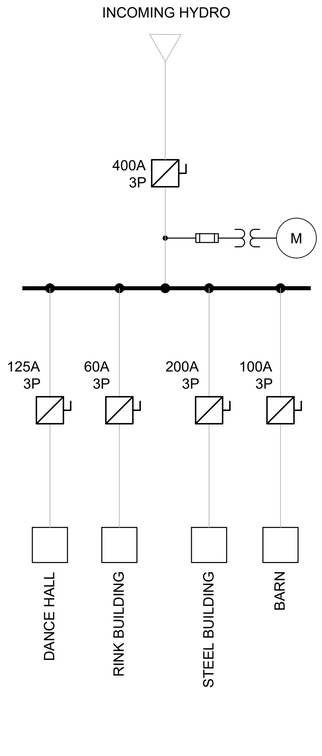

03 E100 FIRST FLOOR LIONS HALL FEEDER
N.T.S.

LEGEND

	FUSED DISCONNECT SWITCH
	ELECTRICAL PANEL
	ELECTRICAL SPLITTER
M	METERING EQUIPMENT
HP	MOTOR CONNECTION

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