

Structural Condition Investigation, Report and Review for
Rick MacLeish Memorial Community Centre
91 Elliot Street, Cannington, ON
The Corporation of the Township of Brock



BBA PROJECT NO. 22124

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PART 1 – INTRODUCTION

1.1 AUTHORIZATION

This structural condition assessment has been undertaken by Barry Bryan Associates, Architects, Engineers, and Project Managers (BBA), for the existing arena at the Rick MacLeish Memorial Community Centre located at 91 Elliot Street, Cannington, on behalf of The Corporation of the Township of Brock. Authorization to undertake this study was received from Ingrid Svelnis, Chief Administrative Officer from The Corporation of the Township of Brock.

1.2 OBJECTIVES

The objective of the structural assessment of the Rick MacLeish Memorial Community Centre arena, as outlined in the BBA Proposal for Structural Engineering Services for Structural Condition Audits and Reports dated June 15, 2022, are as follows:

1. Perform a visual review of all accessible areas of the building structure and note the condition and status of the items observed.
2. Identify any items of structural concern.
3. Prepare a summary report outlining the structural condition of the building based on the visual review.

1.3 REVIEW METHODOLOGY

BBA completed a non-intrusive, non-destructive, visual review of the building structure on July 28, 2022. During the investigation, the structural and non-structural elements were investigated for evidence of varying levels of deterioration, distress, and/or corrosion and any areas of concern were documented. Vertical access to the existing arena roof framing was achieved via scissor lift operated by Township of Brock personnel.

In brief, the structural assessment included review of the following:

- Surface deterioration and/or corrosion of structural framing.
- Deterioration of structural components including, but not limited to concrete, wood and engineered wood products, bearing walls, and slabs.
- Deterioration/cracking of external wall systems.
- Excessively deflected structural elements.

Reference drawings of the existing structure were not available at the time of review. After completion of the review, BBA obtained a drawing package issued as final print, dated 1964, that was used as reference during the completion of this report.

Where reference is made in this report to a Code or other standard, the most recent edition of that reference material was used.

1.4 STATEMENT OF LIMITATION

All comments and observations in this report are based on visual observations made during the inspection on July 28, 2022.

No intrusive or destructive testing or opening of the building system was completed during the inspection. Further, a detailed structural review of the steel connections was not completed.

There are no comments on the components that were not exposed to view.

Any design and/or construction deficiencies not recorded were not evident at the time of the inspection.

PART 2 – BUILDING DESCRIPTION

The Rick MacLeish Memorial Community Centre arena is located at 91 Elliot Street in Cannington, Ontario. We understand that the original structure was constructed in 1964, with renovations to the rink slab and refrigeration systems completed in 1990. In 2004, accessibility renovations were completed, which included the addition of an elevator and accessible washroom. Most recently, insect damage required isolated replacement of the timber roof decking.

The facility includes a single pad arena with an ice resurfacing vehicle room, ground level viewing area, kitchen, change rooms, storage and maintenance rooms, and second floor gathering/viewing area.

The arena roof structure generally consists of pre-finished metal roof deck on 1" thick wood decking on 2x12 purlins at 16" c/c. The purlins are supported by timber bowstring trusses that span 95'-0" and bear on 7"x11-3/8" glulam columns.

The roof structure of the viewing area consists of 2x12 joists at 16" c/c, supported by 7"x30-7/8" glulam beams. The glulam beams frame into 7"x13" glulam columns and 10" concrete masonry block piers. The floor framing consists of 2x12 joists and multi-ply wood beams and columns. The ice-resurfacer room consists of concrete slab-on-grade, concrete masonry block walls, and wood framed roof.

PART 3 – OBSERVATIONS

BBA attended the Rick MacLeish Memorial Community Centre arena on July 28, 2022, to visually review the condition of the structural building components and exterior façade. A summary of findings is itemized as follows:

3.1 BUILDING INTERIOR

3.1.1 ROOF FRAMING

The existing roof framing system within the arena consists of pre-finished metal roof deck on 1" thick wood decking on 2x12 wood purlins spaced at 16" centres. These purlins are supported by timber bowstring trusses at 20'-0" centres (Photo 01). The existing roof framing system in the viewing area consists of 2x12 joists supported by 7"x30-7/8" glulam beams. The glulam beams frame into 7"x13" glulam columns (Photo 02).

Observations of the interior roof framing are as follows:

- We understand that previously completed banding repairs to the bowstring trusses, purlins, girts, and columns were completed at various locations (Photo 03). It appears that the repairs included the caulking and banding of truss elements with severe checking. Previously repaired elements do not appear to be further deteriorated. At some locations, banding showed signs of surface corrosion. Banding corrosion should be monitored to maintain the structural integrity of previously completed repairs.
- Checking, delamination, and damage was observed at additional, unaddressed, bowstring truss elements, girts, and columns (Photo 04, 05). We recommend these areas be repaired to maintain the structural integrity of these elements.
- Localized evidence of moisture was observed on the purlins, truss elements and on the underside of the wood decking (Photo 06, 07). Moisture penetration should continue to be monitored. Further investigation into the source may be required.
- Surficial corrosion was observed on most bracing rods (Photo 08). The corrosion levels appear minor at this time, however they should continue to be monitored for continued degradation.
- Short thread extensions were observed at various truss and column connections (Photo 09), as well as at column connections. Short threads should be extended to achieve the required design capacities. Further investigation is required to determine the specific requirements and potential methods of executing this repair.
- It appears that a figure skating support hoist has been installed along one of the frames near the South end of the arena. It is unclear whether the hoist connections or supporting framing have been engineered or analyzed for the required loading conditions. Further review is required to determine whether the existing system is sufficient, or if previous analysis has been completed verifying the capacity.

Generally, the arena roof framing appeared to be in fair condition.

3.1.2 CONCRETE RINK SLAB

The concrete rink slab was exposed at the time of visit. We understand that renovations to the rink slab and refrigeration system were completed in 1990. Observations are as follows:

- Hairline surface cracks were observed throughout the rink slab. These are not a structural concern at this time however should continue to be monitored for further propagation.
- More significant cracking was observed at the south end of the rink slab (Photo 10). These cracks should be repaired to protect against continued deterioration.

The concrete rink slab generally appeared to be in fair condition.

3.1.3 BLEACHER SEATING AREA

The existing concrete bleachers are located along the west side of the ice surface (Photo 11). Observations of the existing bleacher seating are as follows:

- Minor cracks were observed throughout the concrete bleachers, however these are not structural concerns at this time (Photo 12).
- Spalling and delaminating concrete were observed at a single location on the southernmost stair (Photo 13). This area requires to be repaired.

The bleacher seating area generally appeared to be in fair condition.

3.1.4 CONCRETE APRON SLAB

The reinforced concrete apron slab-on-grade extends around the perimeter of the rink. Most areas were concealed below rubber tread coverings and other visual obstructions. Existing conditions could not be verified at these locations. Where visible, apron slab observations are as follows:

- Minor hairline/shrinkage cracks were observed on the surface of the apron slab (Photo 14). This surface cracking is typical of slab-on-grade and is not currently a structural concern. These should continue to be monitored for further deterioration.
- Concrete ramps around the apron slab appeared to be in good condition with no notable deterioration or damage.

Generally, the concrete apron slab is in fair condition.

3.1.5 CONCRETE SLAB-ON-GRADE

The concrete slab-on-grade was only able to be observed in the mechanical rooms, including the ice-resurfacer and ice-making plant. Observations are as follows:

- Significant damage, deterioration and rutting was observed in the ice-resurfacer room (Photo 15). Localized areas of settlement may have also occurred around trench drains. Given the current condition, we recommend that the ice-resurfacer room slab be repaired or replaced.
- In the ice-making plant, the slab-on-grade appeared to be in good condition, with only minor hairline cracks observed. These cracks are not a structural concern at this time.
- Damage to the housekeeping pads within the ice-making plant was observed (Photo 16). We recommend these areas to be repaired.

Generally, the areas with exposed slab-on-grade appeared to be in fair condition however the ice-resurfacer room slab is in poor condition.

3.1.6 CONCRETE BLOCK MASONRY WALLS

The concrete block masonry walls consist of 8" thick masonry units. Observations are as follows:

- Staining and efflorescence were observed on the interior face of the concrete block masonry walls in the ice-making plant, indicating the presence of moisture (Photo 17, 18). These areas should be cleaned and monitored for worsening conditions.
- Minor cracking, deteriorated mortar joints and other damage were observed in the ice-resurfer and mechanical rooms (Photo 19, 20, 21). These areas should be cleaned and monitored for worsening conditions.
- Deteriorated mortar joints were observed at some locations throughout the partition walls at the ground floor (Photo 22). It is recommended that these be routed and repointed with appropriate repair mortar.

The concrete block masonry walls generally appear to be in fair condition.

3.1.7 SECOND FLOOR & ROOF FRAMING

The second floor framing was not fully observable at the time of visit due to the floor finish and fixed ceiling. Further intrusive investigation is required to confirm the existing conditions.

The roof framing consists of steel deck on 2x12 joists at 16" c/c, supported by 7"x30-7/8" glulam beams that bear on 7"x13" glulam columns and masonry piers (Photo 23, 24). Observations are as follows:

- Staining on suspended ceiling tiles indicate presence of moisture (Photo 25, 26, 27). Further investigation is required to determine the source and severity of moisture infiltration.
- Glulam beams and columns appeared to be in good condition with no notable damage or deterioration.

Generally, the observable structural elements on the second floor were in good condition.

3.2 BUILDING EXTERIOR

3.2.1 NORTH ELEVATION

The north elevation generally consists of concrete block masonry (Photo 28). Located on the north elevation are two building entrances with cantilevered canopies, as well as the more recent addition of the elevator shaft. The addition consists of split-face concrete block masonry walls. The canopy framing was concealed from view during our investigation. Observations are as follows:

- Minor deterioration and staining were observed on the split-face block at the elevator room roof down spout location; it appears that the downspout has been removed (Photo 29).
- Deteriorated mortar joints, damage and staining were observed below the windows (Photo 30). It is recommended that cracked joints be routed and repointed with appropriate repair mortar.
- Significant cracking was observed in the concrete landscaping retaining walls and stairs (Photo 31). Repair is recommended as to avoid further damage and deterioration from water penetration and freeze-thaw action.

The north elevation was generally in fair condition.

3.2.2 EAST ELEVATION

The exterior east elevation generally consists of full height pre-finished metal cladding (Photo 32). Observations are as follows:

- Minor corrosion was observed on the metal cladding below windows (Photo 33). These areas should continue to be monitored for further degradation.
- Damaged and deformed metal cladding observed at various locations (Photo 34, 35).

The east elevation generally appeared to be in fair condition.

3.2.3 SOUTH ELEVATION

The south elevation generally consists of concrete masonry block walls with pre-finished metal cladding above (Photo 36). Located on the south elevation is the ice-resurfacer and ice-making plant extensions, as well as a mechanical unit support structure (Photo 37). Observations are as follows:

- Paint peeling and deterioration were observed along timber roof framing at the ice-resurfacer and mechanical rooms. Any areas of rot should be removed and replaced. Other areas should be re-painted.
- Concrete block masonry walls appear to be in fair condition (Photo 38).
- Minor surface corrosion was observed throughout original metal cladding (Photo 39). Corrosion should continue to be monitored.

The exterior south elevation generally appeared to be in fair condition.

3.2.4 WEST ELEVATION

The exterior west elevation generally consists of full height metal cladding (Photo 40). Also located on the east elevation are two external steel stairs. Observations are as follows:

- Minor surface corrosion was observed throughout original metal cladding (Photo 41). Corrosion should continue to be monitored.
- Surface corrosion and paint peeling was observed on the steel stair. Corroded steel and peeling paint should be cleaned and the framing re-coated.
- The north-most steel stair column is not bearing on proper foundation and is missing anchor bolts (Photo 42). A suitable foundation should be installed below support posts. Further analysis would be required to confirm the adequacy of the stair framing for support of current dead and live loading.

The west elevation generally appeared to be in fair condition.

PART 4 – CONCLUSIONS AND RECOMMENDATIONS

BBA has completed our structural condition investigation at the Rick MacLeish Memorial Community Centre arena on July 28, 2022. The existing building framing, external façade, and other structural elements were visually reviewed where possible.

The general review of the interior and exterior of the building identified several areas of concern which should be addressed to improve the long-term serviceability of the structure. A summary of remedial recommendations is as follows:

RECOMMENDED IMMEDIATE REPAIRS (Repairs to be completed within next 6 – 12 months):

1. Complete an analysis of the figure skating support hoist system and support framing, if not previously complete.
2. Repair concrete at bleacher stairs.
3. Extend short erection bolts at roof framing connections.
4. Provide proper support of exterior stair posts.

RECOMMENDED REPAIRS (Recommended to be completed within next 2-5 years):

1. Repair or replace concrete slab-on-grade at ice-resurfacers room.
2. Repair or replace concrete housekeeping pads.
3. Repair cracks in rink slab.
4. Rout out and repoint deteriorated/open/cracked mortar joints.
5. Repair damage to landscaping concrete retaining/stair structures.
6. Clean staining/efflorescence from concrete block walls.

The structural framing and exterior walls are generally in fair condition, however remedial repair work is required to preserve the integrity of the existing building structure and restore the building envelope to original conditions.

We trust the above information meets your requirements. Should you have any further questions, please do not hesitate to contact our office.

Yours very truly,

BARRY BRYAN ASSOCIATES

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APPENDIX

PHOTOGRAPHS

DRAFT



Photo 01



Photo 02



Photo 03

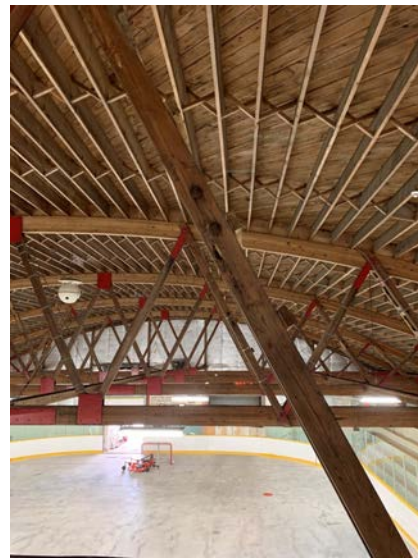


Photo 04



Photo 05



Photo 06



Photo 07



Photo 08



Photo 09



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30



Photo 31



Photo 32



Photo 33



Photo 34



Photo 35



Photo 36



Photo 37



Photo 38



Photo 39



Photo 40



Photo 41



Photo 42