

**B. M. ROSS AND ASSOCIATES LIMITED**  
**Engineers and Planners**  
62 North Street, Goderich, ON N7A 2T4  
p. (519) 524-2641 [www.bmross.net](http://www.bmross.net)

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**VIA EMAIL ONLY**

March 18, 2021

**DRAFT**

Dave Atthill  
Facility Services Coordinator  
Municipality of South Huron  
322 Main St. S., Box 759  
Exeter, ON N0M 1S6

**RE: Structural Review of the South Huron Recreation Centre**

At your request we completed a visual review of the structure of the Recreation Centre in Exeter on March 11, 2021.

It is assumed that the building was designed for live loads prescribed by the codes at that time. For this reason, the present review does not include any analysis of structural elements. The inspection was aimed at identifying areas of deterioration as compared to the probable as-constructed state.

Our review relates to structural elements only. We have not reviewed the building for compliance with barrier free guidelines. We are not qualified to review mechanical or electrical components.

Photographs are appended to the end of the report for review.

**Arena Structure**

The arena is a steel rigid frame building with eight lines of tapered columns and beams. The columns are connected to the beams with bolted moment connections. The three sections of beam are also fastened together with bolted connections. Steel purlins span between the rigid frames at close spacing. Review of the arena roof structure was assisted by use of a hydraulic, portable lift. The view was obstructed by reflective membrane over the entire rink surface and puck netting at each end of the rink. However, it was still possible to pull back the fabric at each beam, and at various joint locations between the beams to view the purlins and the purlin-to-girder connections, except in the areas of the puck netting. Based on the locations we were able to review, we are satisfied that the roof is in good condition.

We noted one nut missing from the base plate of the seventh column from the north end on the west side of the ice surface, and in Dressing Room 3. They should be replaced. We

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noticed one nut was loose at the base plate of the sixth column from the north end on the west side of the building. The nut should be tightened, or the space should be filled with flat washers.

We understand that the steel structure was painted in 2003. There are some minor paint failures and localized rusting on the top flange and at many of the bolts that connect the top flanges together. However, this deterioration is superficial and is not significant to the structure.

### **Exterior Masonry Walls**

The exterior walls consist of concrete masonry blocks clad in steel siding on the exterior side of the wall. It was not possible to review the outside face of the masonry block due to the steel siding. It is understood that the steel siding was installed at some point after the building was originally constructed. The design drawings show bond beams, vertical reinforcing steel, and loose insulation inside the masonry walls. As reported previously, there is evidence that water has penetrated the concrete block at some point. This is most evident at the east exterior wall of Mechanical Room 2, Dressing Rooms 3 and 4. There are also some moisture stains on the interior side of the west and north exterior walls around the ice surface. This leakage is unlikely a result of any recent wall penetration as the steel siding will act as a rain screen. It is also understood that staff has not observed any moisture problems since our last visit.

We noticed cracking in the concrete blocks of the west wall of the ice surface adjacent to the centreline of the rink. The cracking is located about two-thirds of the way up the wall and appears to be relatively recent. In this area, we also observed a horizontal shear ledge (8mm). We can't say for certain if the shear ledge formed recently because the area is partially covered by donor signboards and could have been missed during past inspections. The shear ledge spans most of the distance between the columns. We are not certain of the source of the shear ledge or the cracking. We recommend closely reviewing the roofing system / flashing adjacent to this area and sealing any gaps to prevent moisture ingress. We recommend removing and replacing the cracked blocks and mechanically reinforcing the shear ledge within the 1-to-5-year period. If the steel siding must come off the building for any reason, it would be ideal to repair the wall prior to the siding replacement. This may allow for a better repair and may allow investigation as to why the cracking has occurred.

It is recommended that any signs of moisture penetration be noted, and efforts be taken to find the source of the problem. It is recommended that the roof flashing be reviewed regularly and secured and repaired as required. Since there is no flashing at the edges of the roofing over the ice surface, it is recommended that the perimeter be sealed where gaps are present between the roofing and the flashing. Concrete block can potentially be weakened by the water leaching.

### **Community Centre (Hall)**

The roof structure above the community centre consists of engineered steel roof trusses supporting metal decking. The structure is hidden behind a drop ceiling. Panels were removed at five locations to access the steel trusses. We did not observe any signs of deterioration of the steel trusses. In the past we noted damage to the metal decking at about the centre of the roof. We suspect that the damage has existed since the building was constructed.

## **Foyer**

The roof structure above the foyer consists of engineered steel roof trusses supporting metal decking. The structure is hidden behind a drop ceiling. Panels were removed at five locations to access the steel trusses. We did not observe any signs of deterioration of the steel trusses.

## **Roof**

From previous discussions, we understand that a modified bitumen roof system was installed over the arena in 2000. We reviewed the roof as part of the overall structure review. It is understood that the Municipality engaged a qualified roofing contractor to review the roof since our last visit and no concerns were noted. We recommend sealing any gaps present between the edges of the roofing system and the metal fascia to reduce the likelihood of moisture penetrating the block walls.

The roofing system over the foyer/hall consists of built-up roofing covered with gravel. We assume it is the original system. It is understood that the Municipality engaged a qualified roofing contractor to review the roof since our last visit and that an additional roof drain was installed. The review was completed after a melting period, and minimal areas of water ponding were noticed. As such, it appears that the roof drains are taking water away from the roof adequately. We noticed several loose screws on the flashing over the east wall. We recommend the flashing be securely fastened down and reviewed each spring and fall. We recommend that the Municipality routinely check the roof drains for blockages.

The roofing system and flashing are key components to the lifespan of any structure. Due to the size of the recreation centre and the importance of the building we recommend that the Municipality establish a schedule where the roof and flashing are reviewed by a combination of staff and qualified contractors so that minor repairs may be completed before they become larger problems.

## **Ancillary Rooms**

We reviewed the space under the viewing stands, the mechanical rooms, dressing rooms and washrooms and found them to be in fair to good condition. As noted previously there are signs that water has leached through the east wall of Dressing Rooms 3 and 4, and Mechanical Room 2. However, there were no signs that the problem exists currently. The paint appeared to be well adhered to the wall and the area adjacent to the efflorescence stains in the Mechanical Room was dry. It is noted that staff have not observed any moisture penetration in these areas in recent years.

## **Support Structure for the Air Conditioner Unit**

We understand that the columns supporting the air conditioner unit were re-faced since the original columns were deteriorating. With the re-facing the columns appear to be substantial for the loads that they are required to carry. Vertical cracks in two of the four columns were noted in past visits and have since been sealed. We suspect the cracks reflect cracking in the original interior columns and are likely the result of corrosion. The sealant should help to slow

the rate of moisture ingress, and subsequently the rate of deterioration of the columns. However, we recommend replacing the columns in 1 to 5 years.

### **Fire Exit Stairway – East Side of Building**

The coating is peeling from the steel fire exit stairway. We did not observe any significant area loss or perforations. We recommend that the Municipality start budgeting to replace or repair / re-coat the stairway in the 6-to-10-year period.

### **Cooling System Supports**

At the time of the review, the exposed portion of the underground header and pipes for the cooling system below the floor slab of the ice rink were covered in frost. We agree with staff that it would be prudent to review supports for corrosion when the frost has melted. It may be possible to add additional supports between the existing if significant deterioration is observed.

### **Service Life of the Structural Components**

It is understood that the Municipality is considering a substantial renovation to the recreation centre and would benefit from an estimate of the remaining service life of the structural components. Considering that the building has been in service for about 45 years, we are of the opinion that you should expect 25 more years of service from the structural components. In that time, you should anticipate the following structural repairs to maximize the service life of the structural elements:

- Re-paint the structural steel framing over the ice surface.
- Paint or replace bolts in the top flange connections.
- Replace/repair the roofing membrane over the ice surface.
- Replace/repair the roof over the hall/foyer.

We are of the opinion that the concrete masonry block is in fair enough condition to support the loads they must carry. However, it is difficult to establish the condition of the masonry blocks in locations where they have been penetrated with moisture. Removing a few blocks at various locations may help to establish their condition. Another option could be to reinforce the walls with structural steel strapping (as opposed to light gauge strapping) if the exterior steel siding must be replaced for any reason.

### **Renovations**

General discussions regarding possible renovation items were discussed as noted below. All items should be reviewed in detail early in the design phase.

- It is possible to establish which walls are load bearing through a review of the design drawings and a site visit.
- The masonry block wall separating the men's washroom and the foyer is a load bearing wall, as well as the masonry block wall separating the women's washroom from the large hall area. Removal of these walls or portions of these walls would require structural

reinforcement to support vertical loads. The block wall between the two washrooms does not appear to be a load bearing wall.

- The masonry block wall separating the hockey / skating dressing rooms from the narrow hallway appear to be load bearing walls. Removal of these walls or portions of these walls would require structural reinforcement to support vertical loads.
- The exterior masonry block walls between the columns may have been designed to provide stability for the structure. Removal of portions of exterior masonry block to construct openings should not be undertaken without consideration to the lateral stability of the building as a system. However, we do anticipate that measures can be put in place to provide stability.
- It appears that a vapour / air barrier was applied to the interior side of the masonry block walls surrounding the ice surface sometime after the building was constructed. The membrane has peeled in some locations but is adhered to the wall for most of its surface area. If it is determined that the membrane is to be removed as part of the renovations, a new vapour / air barrier system should be applied. Discussions regarding the most appropriate location for the vapour barrier (inside or outside of the blocks) should take place with an architect or building scientist. We are of the opinion that it would not be appropriate to have a vapour barrier on both sides of the block wall. It would be prudent to complete a hazardous material survey for the existing vapour / air barrier material prior to finalizing the design.
- The design drawings show concrete filled bond beams at regular intervals and vertical reinforcing at regular intervals in the exterior masonry walls. Typically cores filled with reinforcing steel are filled with grout / concrete as well – but the drawings do not specifically indicate this. The drawings show that the cores are to be filled with loose fill insulation. It would be prudent to investigate these details further before finalizing design drawings, which may require some localized removals. It would be prudent to complete a hazardous materials survey for the insulation.

## Recommendations

There are some maintenance recommendations for the continuation of the structural strength of the building components:

- Fasten loose screws holding down the flashing over the east foyer wall in 2021.
- Replace the missing nuts and tighten the loose nut at the bases of three columns in 2021.
- Reinforce the cracked west masonry wall of the ice surface (1 to 5 years).
- Replace the cracked columns supporting the mechanical unit (1 to 5 years).
- Replace / repair the fire exit stairway (6 to 10 years).
- Establish routine review system for the roofing and flashing using a combination of qualified roofing contractors and arena staff.
- Make repairs to the roofing and flashing as per the results of routine reviews.
- If the netting and ceiling fabric covering has to come down for any reason in the future, the top flanges and bolts of the beams over the ice surface should be reviewed, and re-coated.

## Summary

It is our opinion that the South Huron Community Centre is structurally adequate for its normal occupancy. We recommend that it be inspected again in 2026. The maintenance repairs mentioned above are not conditional requirements for our opinion of safety at this time but would be prudent to maintain structural capacity.

As outlined above, we did not review any electrical or mechanical components. We could assist you in hiring specialists in these fields if you require.

Please call if you have any questions.

Yours very truly,

B. M. ROSS AND ASSOCIATES LIMITED

Per \_\_\_\_\_  
Ryan Munn, P. Eng.

Per \_\_\_\_\_

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Encl.



**Arena Facing South**



**Typical Coating Condition**





**Bolts at Top of Beam Over Ice Surface**



**Missing Nut at Base of 7<sup>th</sup> Column from North End Wall – West Side of Ice Surface**





**Cracking and Shear Ledge in West Masonry Wall of Ice Surface**



**East Masonry Wall of Dressing Room 4**





**Loose Flashing Screws – East Wall of Hall**



**Gap Between Roofing and Flashing over Ice Surface – East Wall**



**Header and Pipes for Ice Surface Cooling**