



LE17-006SA -19401

July 21, 2017

The Town of Tecumseh
12021 McNorton Street
Tecumseh, Ontario N8N 4P3

Attention: Mr. Ray Hammond

rhammond@tecumseh.ca

**Re: Lacasse Park Grandstands
Structural Assessment
590 Lacasse Blvd.
Tecumseh, Ontario**

Dear Mr. Mr. Hammond,

1 Terms of Reference

IRC Building Sciences Group (IRC) was authorized by Ray Hammond the Town of Tecumseh (Owner) to perform structural investigation services of the Lacasse Grandstands at 590 Lacasse Blvd in Tecumseh, Ontario.

As part of this structural review, IRC was to perform a preliminary investigation to assess current conditions of the grandstand and provide recommendations with regards to structural integrity and safety.

2 Scope of Work

IRC was requested to perform a structural investigation and evaluation of the grandstand structure and to provide a written report on its condition. IRC was also requested to provide recommendations for repairs along with budgetary costs.

The following is the agreed upon scope of work:

- i. Review all available documentation made available to IRC.
- ii. Visit the site to visually observe the existing condition of the grandstand.
- iii. Access the underside of the structure using ladders and lift equipment.
- iv. No destructive testing will be conducted.
- v. Prepare a letter report that outlines the findings of the review along with a photographic record.
- vi. Report will address structural integrity and Building Code deficiencies.
- vii. Provide in the report recommendations and cost estimates for remedial work if required

3 Document Review

A Condition Report prepared by A. A. Boscariol and Associates Limited dated 1980 along with select drawings from 1993 were made available for IRC to review as part of the preliminary investigation. The following drawings were referenced:

Drawing No.	Designer	Date
5R-160, DWG 1-3	A.A. Boscariol & Associates	June 1993

4 Component Review

A review of the grandstand was conducted on May 24, 2017. The structure was visually reviewed from the ground and the bleachers. An articulating boom lift was used to visually review the roof components.

Photographs were taken during the course of the investigation with a select number presented throughout the report.

4.1 Structure Description

The grandstand is an open timber bleacher type structure covered by a light-gauge metal roof supported on gang nail trusses. There are 13 rows of seats in the grandstand that are angled around the backstop of the baseball diamond. The seating capacity for the bleachers is about 800. The structure was constructed circa 1955.

A study was conducted in 1980 by A. A. Boscaroli and Associates Limited to assess the condition of the grandstand. A recommendation of completely dismantling and replacing the structure with an updated design was made. It is apparent that this recommendation was not followed and that general repair and reinforcement of the structure was conducted per drawings again prepared by A. A. Boscaroli and Associates Limited dated 1993.

IRC has been told anecdotally that at some point in time there was fire that partially destroyed the roof of the structure. The presence of newer gang-nail trusses and metal roofing suggest that this is likely to have happened.

Based on the site review and the drawings provided, the building structure incorporates the following components:



Photo 1: Lacasse Grandstand.



Photo 2: Roof System.

4.2 Roofing

The corrugated steel roofing is generally in good condition with little or no corrosion (Photo 3). The top side exhibits some evidence of paint erosion (Photo 4). The bottom side has post applied paint that is severely peeling likely due to poor surface preparation (Photo 5 and 6). Colourmate screws used to secure the steel roofing to the wood purlins were observed to be loose and backing out in a few locations (Photo 7). Eave troughs are for the most part secure with some separation and leaking at seems (Photo 8).



Photo 3: Typical metal roof condition.



Photo 4: Paint erosion and minor corrosion.



Photo 5: Peeling paint on underside of deck.



Photo 6: Peeling paint on underside of deck.



Photo 7: Loose metal roof screws.



Photo 8: Eave trough separation.

4.3 Gang-Nail Trusses

Below the metal roof system 2x4 wood purlins are present which are in turn supported on gang-nail trusses which do not appear to be original to the structure (Photo 9, 10 and 11). The trusses are in good condition and are secured via hold down anchors to a perimeter wood plate which is also in good condition (Photo 12). The wood plates are bolted to perimeter steel angles (Photo 13). The gable ends of the roof structure are enclosed with steel cladding (Photo 14).



Photo 9: Purlin, truss, plate connection.



Photo 10: Typical truss layout.



Photo 11: Gang-nail connection.



Photo 12: Perimeter hold down anchor.



Photo 13: Perimeter steel angles.



Photo 14: Typical Gable end from interior.

4.4 Steel Framing

The roof trusses are supported on a steel framing system that is composed of steel columns spaced at 12'-0" on centre at the front of the grandstand (Photo 15). Steel channels span between the columns (Photo 16). The framing at the back of the grandstand is steel angle posts lagged to wood columns spaced at 6'-0" on centre (Photo 17). Steel angles span between the posts (Photo 18). Steel angles also span from front to back at post locations.

The steel frame is laterally stabilized via horizontal and vertical knee braces that are located in both directions at every post location (Photo 19 and 20). The intersection of the bracing has created a water trap which in numerous locations has led to advanced and severe corrosion of the steel elements (Photo 21, 22, 23 and 24).



Photo 15: Steel columns at front of grandstand.



Photo 16: Front column and channel beam.



Photo 17: Steel angle and wood post.



Photo 18: Steel angle between rear posts.



Photo 19: Diagonal bracing in horizontal plane.



Photo 20: Diagonal knee bracing in vertical planes.



Photo 21: Severe corrosion at water trap.



Photo 22: Knee brace corrosion.



Photo 21: Steel corrosion at joint.



Photo 22: Typical steel corrosion.

4.5 Wood Framing

The bleachers of the grandstand are composed entirely of wood elements. The seats and floor boards are supported on wood stringers at 6'-0" on centre (Photo 23 and 24). The stringers are supported on footings at the front and posts on footings at the rear with two sets of mid span posts (Photo 25 and 26). There is diagonal wood bracing that provides lateral load paths between the stringer bays and between post in line with the stringers (Photo 27 and 28). Given the age of the original structure many of these components have been replaced or augmented over time.

In general the wood elements, deck boards as well as stringers, posts and bracing, are all at some level of deterioration which ranges from peeling paint to rot resulting in loss of section (Photo 29, 30, 31, 32, 33, 34, 35 and 36).



Photo 23: Typical bleacher structure.



Photo 24: Floor boards and seats on stringers.



Photo 25: Stingers, posts and diagonals.



Photo 26: Stringers, posts and diagonals.



Photo 27: Bracing between stringer bays.



Photo 28: Typical stringer bay.



Photo 29: Typical wood deterioration.



Photo 30: Wood rot at seat board.



Photo 31: Wood rot at diagonal bracing.



Photo 32: Wood rot at horizontal tie.



Photo 33: Structurally augmented stringer.



Photo 34: Typical paint and wood deterioration.



Photo 35: Wood rot at floor boards.



Photo 36: Deterioration of seat boards.

4.6 Post and Stringer Bases

Wood posts that support the bleachers as well as parts of the roof structure along with the front edge of the stringers bear on concrete footings (Photos 37 and 38). The footings are of an unknown depth, are flush with or below grade and in some locations appear to have shifted (Photo 39 and 40).

Column and stringers and post bases in numerous locations are rotting and steel anchors are in an advanced state of corrosion (Photo 41, 42, 43 and 44). Wood posts were also noted to have large vertical splits in a number of locations (Photo 45 and 46).



Photo 37: Typical stringer at steel column base.



Photo 38: Post and diagonal at buried anchor.



Photo 39: Typical post on footing.



Photo 40: Typical stringer base.



Photo 41: Rotted stringer base.



Photo 42: Stringer on buried footing.



Photo 43: Corrosion of anchor to footing.



Photo 44: deteriorated post and stringer.



Photo 45: Typical post base deterioration.



Photo 46: Split post at base.

4.7 OBC Compliance

Bleacher structures are regulated by sections of the Ontario Building Code 2012 (OBC). In general existing structures are not required, when in non compliance with new editions of the OBC, to be brought up to date. When presented with the opportunity to do so Building Officials would typically require that existing structures should be brought into compliance.

At the Lacasse Grandstand there were two significant areas of non compliance that were noted. The first is that the risers on stairs are inconsistent within a given flight. Riser heights varied between 7" to 9-1/2" (Photo 47 and 48). In addition it was noted that the gap between the seat board and the floor board exceeded the maximum 4" allowed by the OBC (Photo 49 and 50).



Photo 47: Measured riser height of 7".



Photo 48: Measured riser height of 9-1/2" in same flight.



Photo 49: Typical gap between floor board and seat.



Photo 50: Maximum gap allowed is 4".

Miscellaneous Components

As well as the main bleacher/grandstand there are other components of the facility that are integral to the structure. These include the announcer's box which for the most part was in good condition (Photo 51).

There is a storage shed that is supported on a wood footing on grade and has very poor roofing detailing at penetrations (Photo 52 and 53).

It was also noted that the backstop screen for the baseball diamond is braced back to the grandstand structure (Photo 54).



Photo 51: Storage shed on wood footing.



Photo 52: Poor waterproofing detail.



Photo 53: Announcers booth.



Photo 54: Backstop connection to grandstand.

5 Conclusions and Recommendations

As a result of the structural assessment IRC is of the opinion that the Lacasse Grandstand is at or near the end of its useful service life. Although there is no immediate concern regarding the structural integrity of the structure there are numerous deficiencies and areas of deterioration which will require attention within the near future. These items are summarized below.

5.1 Structure

The grandstand structure was original constructed circa 1955 and has seen numerous repairs and modifications over the years. Given that it is primarily of wood construction the structure is at the end of its useful service life with out a major repair being undertaken.

5.2 Roofing

The steel roofing is general considered to be in good condition with little or no corrosion and only minor issues with loose fasteners. The underside of the roofing has a global issue with peeling paint that is unsightly. The roofing does not appear to be original to the structure.

5.3 Gang-nail Trusses

Trusses are considered to be in good condition. The trusses do not appear to be original to the structure.

5.4 Steel Framing

Steel framing is considered to be in poor to fair condition. There are areas of significant corrosion which will require repair. The existing detailing is problematic from drainage perspective and should be modified to prevent future accelerated deterioration. Steel will need to be cleaned and painted.

5.5 Wood Framing

Wood framing is generally in poor condition. Although there have bee ongoing repairs and maintenance to replace and reinforce rotten and broken seat boards, foot boards and framing elements on an individual basis, a full assessment of the framing and wood condition should be conducted to determine areas requiring repair. It is estimated that up to 30% of the wood elements will require replacement. The wood structure is also in need of repainting.

5.6 Post and Stringer Bases

The wood post and stringers are in very poor condition especially where they are near grade. The concrete footings, which are of indeterminate construction, are not high enough to provide separation from grade as required by the current building code. Additionally the wood material is not isolated from the concrete allowing for a continuous absorption of moisture from the damp concrete. Extensive modification to the grading and footings along with repair of post and stringers is recommended.

5.7 OBC Compliance

The existing grandstand does not comply with some aspects of the current OBC. These items should be addressed when the next phase of repair is undertaken.

In addition IRC is of the opinion that the are a number of areas where the existing guarding, although in compliance with the current OBC with respect to bleacher structures, is oriented in such a way to facility climbing and potential injury to persons accessing the grandstand. IRC would recommend that the more restrictive requirements of the guarding section of the OBC be followed to minimize risk to users of the grandstand and potential liability to the Owner.



5.8 Miscellaneous Components

The storage shed that is built into the grandstand structure is poorly detailed with respect to foundation and roof penetrations.

The existing backstop for the baseball diamond is braced back to the grandstand structure. If modifications are made to the grandstand it is likely that the backstop will require additional support or replacement.

In conclusion IRC is of the opinion that the Lacasse Park Grandstand as it is now configured has reached the end of its useful service life. Repair to the structure is possible and IRC has provided a budget number for this option. It should be noted however that any repair effort will not stop the ongoing deterioration of the structure due to the nature of the primary wood components, their age and the exposure of these components to the elements.

IRC recommends that the existing grandstand be demolished and that a new replacement open bleacher structure or covered grandstand be considered. Budget costs for both of these options are presented in the next section of the report.

6 Budgetary Costing

Budget costing for the repair or replacement of the grandstand structure was obtained through discussion with local suppliers and installers of the various options presented. The primary purpose of the budget cost is to provide a basis for selection of a replacement structure. For an inclusive budget estimate a +/- 25% variance should be allocated to costs provided in the table presented below for the recommended remedial wall replacement.

It is important to realize that the prices are in current dollars and not based on tendered specifications, but instead on general approaches and assumed quantities. The actual repair or replacement costs will depend on the prices received at the time of tendering and/or the actual quantities removed during the replacement contract. Please note that the listed prices do not include applicable taxes or engineering fees associated with the preparation of specifications, and inspections for conformance with same.

Option	Recommended Actions	Estimated Costs
Repair Existing Grandstand	Design and implement repairs for existing deteriorated steel and wood components. Repaint the entire structure. Upgrade structure to conform to current OBC requirements	\$150,000.00
Build New Uncovered Bleacher Structure	Demolish existing and install new bleachers.	\$175,000.00
Build New Covered Grandstand	Demolish existing and install new covered grandstand and bleachers.	\$350,000.00
Total Estimated Expenditures		\$ 150 to \$350,000.00

7 Limitations

IRC prepared this report solely for the client named. The responsibilities of IRC are as described in the Terms of Reference and the Scope of Work. The material in this report reflects the opinion of IRC at the time of preparation and within the terms of reference as agreed. Any use, which a Third Party makes of this report, or any reliance on decisions based on it, are the responsibility of such Third Parties.

IRC does not warrant the accuracy of the identified information provided by others at the time of the report preparation. Unless provided in writing, but not limited to, mistakes, contacts, insufficient information or certification of such information is not the responsibility of IRC.

Only the specific information or locations noted in the report have been reviewed. Although every reasonable effort was taken to identify defects, latent and hidden defects may affect the accuracy of this report. No physical or destructive testing and no design calculations have been performed unless indicated elsewhere in this report.

The assessment provided is based on visually observed defects at a limited number of locations and our experience with similar types of structures. Deficiencies may exist at other areas not referenced in this report or that are not visually apparent given the level of evaluation. No responsibility is therefore assumed concerning these matters, or for failure to carry out technical or engineering techniques which would be required to discover any inherent or hidden conditions of the property since such an investigation was not included in the scope of work.

We trust that the above is satisfactory for your purposes. If you have any questions regarding the enclosed, please contact the undersigned at your convenience.

Yours Truly

IRC Building Sciences Group



Scot S. McCavour, P.Eng., BDS
Executive Director

