



TOWN OF GANANOQUE

2020 OSIM INSPECTIONS FINAL SUMMARY REPORT



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Summary Listings

OSIM Reports

1 Introduction

The Town of Gananoque (The Town) has retained Jewell Engineering Inc. (JE) to complete detailed visual biennial OSIM inspections of bridges and culverts throughout its jurisdiction in accordance with Part 2 of the Ontario Structure Inspection Manual (OSIM). As part of the assignment, the Town also required the completion of this Summary Report including a bridge capital priority program to be completed with the 2020 biennial inspections and reporting.

The Town maintains an inventory of nine (9) structures, each inspected as part of this assignment.

The Town's main objectives of this assignment were:

- To protect and prolong the useful life of all structures;
- To identify maintenance, repair, and rehabilitation needs of the structures;
- To provide a basis for a structure asset management system for the planning and funding of the maintenance, rehabilitation and replacement of structures.

To provide a comprehensive overview of the Town's assets, JE has provided four (4) lists summarizing the results of the inspections in addition to the individual inspection reports. These lists can be used as an asset management tool for this group.

List 1 – Summary Listing of all structures. This includes Bridge Condition Index, deck area, structure type and estimated replacement value.

List 2 – Structures Recommended for Rehabilitation

List 3 – Structure Maintenance Requirements

List 4 – List of Recommended Additional Investigations

2 Categorization of Structures

The following definitions were used when classifying the structures in the inventory:

Bridge – a structure carrying a travelled path above a road, railroad, river, ravine, or any other impassable obstacle.

Culvert – a structure providing an opening through earth. Structures with more than 300mm of cover and/or depend on earth backfill for strength.

3 Inspections and Procedure

A total of 9 structures are owned and maintained by the Town and they were each visually inspected in accordance with Part 2 of the Ontario Structure Inspection Manual using prescribed OSIM forms. The inspections were performed by a two-person inspection team led by Mr. John Landry, EIT.

For each structure, components were screened for visual signs of deterioration. The components were then given a rating (on the inspection forms) using the MTO extent and severity philosophy, whereby the components are proportioned (m, m², %, etc.) based on their observed deterioration for each component. Explanatory statements accompany each of the component's ratings, where deemed applicable by the lead inspector.

The inspection forms also provide information regarding suggested engineering investigation and repairs and associated budgetary estimates of expected costs. Suggested engineering investigations are subdivided based on time of need as either None, Normal (required between now and the next visual inspection, scheduled in 2 years) and Urgent (required immediately). Repairs and associated budgetary estimates are subdivided based on time of need as either none, 6 to 10 years, 1 to 5 years or less than 1 year. The basis of selection for budget costs are further discussed in section Determination of Costs found below.

Photographs of each inspected structure are included with the inspection sheets including one photograph of an approach, an elevation as well as any significant deterioration. Individual inspection forms for the structures are included in with the individual OSIM Reports.

4 Replacement and Rehabilitation

A rehabilitation list has been provided that includes all rehabilitations and repairs expected within the next 10 years. It is estimated that the Town will need to invest ±\$755,000 in the next 1 to 5 years. Please note that the estimated costing for recommended capital work is for construction only, and other costs related to the following may be required for the completion of a bridge project: additional investigations, approvals, engineering, administration and taxes. Prior to the completion of budgeting for a proposed project, or the completion of funding applications, the Town is advised to seek advice from an engineering firm in regards to estimated project costs.

5 Bridge Condition Summary

Black (Snapper) Bridge

This structure is a railway bridge constructed in 1924. It crosses the Gananoque River. The bridge is located north of the Town of Gananoque and is part of the Gananoque Waterfront Trail. The last significant rehabilitation of the structure was in 2006, when a pedestrian/cyclist barrier was erected inside the truss. Approximately 35 new timber ties were installed at this time. The steel superstructure is generally in good condition with minor surface corrosion and some rust jacking noted on the main diagonal members. Numerous deck ties have significant rot and deterioration and should be spot replaced. Two railing posts in the southwest are missing anchorage bolts and should be secured. The concrete abutments have started to disintegrate and will require patch repairs.

Wood Bridge

Wood Bridge is part of Gananoque's trail system. The bridge was constructed in 2004 and has had no significant rehabilitations to date. This structure is generally in good condition. One of the rakers in the southwest quadrant has detached and should be refastened.

Hudson Bridge

The Hudson Bridge was replaced in 2019 with a double-double configuration acrow style bridge. The abutment walls have been modified to suit the new configuration. The structure remains in new condition. The only notable deficiency is that water appears to be ponding on the bridge deck as there are no deck drains on the bridge. This should be monitored during the winter months for ice forming.

Rail to Trail Bridge

This structure was originally part of the Thousand Islands Railway and is now a pedestrian trail bridge. Pressure treated running boards were added over the original rail ties to convert the structure for pedestrian use. The railing was constructed with outrigger braces to the outside of the rail ties. The railings were updated in 2008 to conform with the bridge code geometric requirements. Several of the deck boards are cracked and should potentially be replaced to prevent tripping hazards. The timber blocking between the rail ties is significantly deteriorated and will need to be replaced in the future. The girder ends at the piers and abutments are perforated and crippled in locations. There are six lines of large girders which is more than sufficient for pedestrian traffic however the girder ends should be repaired to prolong the life of the structure. The deck has numerous rotting and decayed deck ties and a full deck replacement is recommended.

Power Canal Pedestrian Bridge

This structure was constructed in 2015 to replace the existing structure which was not constructed to appropriate design standards. No concerns were noted for this structure. There is some cracking present at the deck ends and in the concrete walls of the canal that should be monitored.

Power Canal Dam Bridge

The power dam canal bridge was constructed in 2015. The structure consists of four spans over the length of the dam. A new concrete deck was installed in 2016, and the steel deck pan which supports it was installed in 2015. The railing was recycled from the previous structure but appears to be in good overall condition with localized areas of corrosion. The north abutment and piers were refaced in 2015. There is some minor cracking and efflorescence present on the concrete abutments and piers, but the structure is in overall good condition.

King Street Bridge

King Street Bridge was originally constructed in 1930. This structure has been identified by the province of Ontario as being historically significant. The structure was rehabilitated in 2006, including removal of the existing concrete deck, replacement of seven (7) girders, strengthening of the remaining girders, cleaning and painting of all structural steel, a new concrete deck, new concrete parapet walls, and rehabilitation of approaches. This structure appears to be in good overall condition. There are some shrinkage cracks present in the concrete parapet walls that should be monitored, and some concrete deteriorated around the base of the north pier that should also be monitored. The expansion joints should be cleaned as part of the structure's on-going maintenance.

King Street Pedestrian Bridge

This structure was constructed in 1927 and was originally a rail bridge. The structure has been converted for pedestrian use by installing a wooden deck on the rail ties. The bridge consists of two spans constructed using riveted plate girders. The timber deck of the structure has had repairs since the 2016 OSIM inspections. Several of the structural steel elements of the bridge exhibit severe corrosion and section loss. Potential improvements to this structure include the replacement of several of the structural steel elements such as the stringers, localized repairs to the steel girders and floor beams, and cleaning and painting of the structural steel. The southeast corner and the face of the center pier is experiencing some undermining which should be monitored. In addition, there is some concrete deterioration around both bearings of the center pier that should be addressed. The concrete repairs and the structural steel repairs/coating may be completed at different times. It was recommended in 2016 that the structure be closed by 2025 by Keystone Bridge Management Corp. Due to the uncertainty around the steel elements and floor system this recommendation remains prudent until a thorough enhanced inspection and structural evaluation is completed.

Water Street Swing Bridge

The Water Street Swing Bridge was constructed in 1894 and has been identified by the province as being historically significant. The bridge was converted from rail to road use in 1981. The structure is an equal arm swing bridge constructed using riveted steel plate girders. The abutments and center pier are stone masonry. The turning mechanism is manually operated and located at the center pier. The existing triple load posting of 24, 24, and 32 tonnes was imposed in 1990, based on an analysis by Proctor and Redfern. Repairs were conducted after 2010 inspections that included: replacement of steel elements in the centre

pier mechanism and installation of a concrete wear surface on the deck above the mechanism for protection against salt exposure through the open deck grating. A bridge rehabilitation was performed in 2005 which mainly involved masonry repairs. Mortar was added to the masonry abutments and pier to address the deteriorated pointing present. In 2006, hydraulic wedges were installed at the bearings to eliminate bridge rocking. This structure is in good overall condition. Some minor cracks are present in the abutments, but they are in good overall condition. The concrete caps on the masonry abutments are experiencing some concrete deterioration around the bearings. The structural steel coating (paint) appears to be in good condition on the girders and turning mechanism. The steel coating on the floor beams and stringers continues to deteriorate. There is significant concrete deterioration occurring on the southeast and southwest wingwalls, which would require the use of a bridge inspection vehicle or lift, to confirm the extents.

In addition to the standard inspection procedure completed for this structure, an enhanced inspection was also undertaken on the pier and pinion mechanism via a small boat and step ladder. Although we were not able to view the bridge rotating up close at the time of our inspection, the key observation from this inspection noted the loss of two teeth in the main gear pinion that could affect the bridge's ability to close once it is fully opened. In addition, isolated locations of section loss and corrosion were noted in the main gear components and structural support.

Continued maintenance of the bridge including regular lubrication of gear components is recommended to ensure the best function of moving parts.

6 Conclusions

It has been the pleasure of JE to complete the Town of Gananoque's 2020 Biennial Bridge Inspections and provide our findings and recommendations moving forward. The Town's structures remain in good to fair condition with some exceptions. It is recommended that the Town continue to invest in its bridge inventory to maintain or improve current conditions. JE also recommends completing annual bridge cleaning each spring for structures with elements exposed to direct contact with chlorides used in winter maintenance, most notably the Petworth Bridge.

If you have any questions or concerns, please contact the writer.



Engineer's Stamp

Sincerely,

A handwritten signature in dark ink, appearing to read "Chris Bent". The signature is fluid and extends to the right.

Chris Bent, P.Eng.
Jewell Engineering Inc.
Belleville Office

CB/jl + cb