

Request for Decision

Lily Creek Boardwalk Options

Presented To: City Council

Presented: Wednesday, Oct 26, 2011

Report Date Tuesday, Oct 18, 2011

Type: Managers' Reports

Recommendation

THAT Council approve Option ___ in accordance with the report dated October 26, 2011 from the General Manager of Community Development.

Finance Implications

A \$35,000 contribution from Science North will be used to offset the expenditures for either removal of the structure or repair and retrofit the structure. Should Council approve option 3, the City would be required to contribute a one-time allocation up to \$40,000 in 2012 by amending the Capital Budget to incorporate this initiative. In addition, approval of this option would also require ongoing maintenance costs of \$10,000, which would be allocated to the 2013 Operating Budget.

Signed By

Report Prepared By

Real Carre
Director of Leisure Services
Digitally Signed Oct 18, 11

Recommended by the Department

Catherine Matheson
General Manager of Community
Development
Digitally Signed Oct 18, 11

Recommended by the C.A.O.

Doug Nadorozny
Chief Administrative Officer
Digitally Signed Oct 20, 11

Background

In 1991, Science North entered into an agreement with the former City of Sudbury for the usage of a portion of the Lily Creek Marshland. The twenty (20) year license expired in March 2011. Science North confirmed in March 2010 that they are not interested in extending or renewing the agreement.

Science North has indicated that it would contribute \$35,000 either to the demolition, repair or replacement of the boardwalk. As part of the 2011 Budget, staff submitted 2 enhancement options. The options included replacing the existing boardwalk and the expansion of the boardwalk to link James Jerome Sports Complex. The options valued at \$300,000 (replacement) and \$150,000 (expansion) were not approved for 2011 Budget. Attached are the copies of the options as submitted.

On May 25th, 2011, the boardwalk was temporarily closed pending a safety review of the site. The engineering firm R. V. Anderson Associates was hired to conduct a structural review of the boardwalk. For Council's information, the final copy of the structural review is attached.

The structural review provides options related to immediate repairs and the replacement of the boardwalk within a two (2) year period. The cost for the immediate repairs is estimated between \$30,000 - \$40,000.

The repairs would extend the life of the boardwalk for the next two (2) years. The replacement of the entire

structure is estimated between \$225,000 - \$300,000 which includes replacing 75 panels (8ft x 12ft) using pressure treated lumber.

Rainbow Routes Association expressed interest in revitalizing the Lily Creek Boardwalk post the 2011 Budget. Rainbow Routes Association is applying for a Job Creation Project Grant from the Ministry of Training, Colleges and Universities for the Lily Creek Boardwalk. As part of the project application, the association is interested in including the restoration and upgrades to the Lily Creek Boardwalk (attached is a copy of their proposal). The application if approved would include:

1. Removal of approximately 120 meters of the existing boardwalk from the west end including the bridge.
2. Build a new 40 meter boardwalk to connect the remaining (approximately) 150 meters of boardwalk to James Jerome Sports Complex.
3. Refurbish the remaining easterly portion of the existing section of the boardwalk (150 meters) per recommendations made by R.V. Anderson and Associates.

The total project cost to complete the restoration and upgrade is estimated between \$70,000-\$90,000 (total labour cost will be covered by the grant). In terms of funding the project, Rainbow Routes Association will access the Science North one-time allocation in the amount of \$35,000 and will include \$15,000 for labour costs.

A balance in the amount of \$40,000 would be required from the City to realize this project should the grant be approved. In addition, the association is requesting the City cover the cost of any tipping fees re: disposal of materials. Rainbow Routes Association will receive confirmation in the spring of 2012 related to the status of their grant application. The restoration work will be per the engineer's recommendation.

Staff have prepared options for Council's consideration:

Option 1 - Utilize \$35,000 from Science North to remove the existing Lily Creek Boardwalk structure at no cost to the City of Greater Sudbury.

Option 2 - Repair existing structure as per scope of work identified by R.V. Anderson estimated between \$30,000 - \$40,000. Science North funds in the amount of \$35,000 to be allocated for the immediate repairs.

Option 3 - Rainbow Routes Association is applying for a Job Creation Project Grant from the Ministry of Training, Colleges and Universities and is interested in including the restoration and upgrade to the Lily Creek Boardwalk. The Association has estimated the cost of materials and supplies between \$70,000-\$90,000 to complete the restoration. The association will be applying for \$15,000 for labour as part of their grant application and will be including the Science North one-time allocation of \$35,000. The City would be requested to fund a maximum \$40,000.

June 30, 2011

RVA 112369

City of Greater Sudbury
Bag 5000, Station A
Sudbury, ON. P3A 5P3

Attention: Mr. Bruce Drake
Risk Management/Insurance Officer

Dear Bruce:

**Re: *Structural Assessment of Lily Creek Boardwalk
Revised Final Report (DRAFT)***

1.0 INTRODUCTION

At the request of the City of Greater Sudbury (City), R.V. Anderson Associates Limited (RVA) undertook a cursory review of the Lily Creek Boardwalk. This review was carried out with the following objectives:

- Provide a review of the condition of the boardwalk;
- Determine the necessary short-term repair work required to return the boardwalk to service; and
- Provide recommendations to extend the life of the boardwalk over the long-term.

This report presents our findings and provides general recommendations for repairs to the Lily Creek Boardwalk to return to service this season. The recommendations are based on visual observations made during a site inspection performed on May 30, 2011, and a review of the original design drawings completed by RVA in 1991.

1.1 Background Information

The Lily Creek Boardwalk was originally designed and constructed in the early 1990s for Science North. The boardwalk is 2.43m (8-ft) wide and constructed of cedar decking over polystyrene billets, which floats over the marshland for an approximate total length of 270m (900

ft). The boardwalk is made up of 75 individual 2.43m x 3.66m (8-ft x 12-ft) panels fastened together by hinged metal connections. There is one seating area mid-way along the boardwalk and an observation deck with seating at the end. There is also a structural steel pedestrian bridge over the main channel of Lily Creek where it is crossed by the boardwalk. There was originally a handrail on both sides of the boardwalk for its entire length, which has been previously removed by City staff.

We understand that Science North has issued correspondence to the City in March 2010 indicating that the boardwalk had become a safety and maintenance concern. After some discussion between the Community Development Department, City Council and Rainbow Routes, RVA was approached by the City to carry out this assignment. The boardwalk is currently closed to pedestrian traffic as a precautionary measure.

2.0 ASSESSMENT

A visual site inspection was conducted by Robert Langlois, P.Eng., of RVA on May 30, 2011, who was accompanied by staff from the City's Parks Department. The inspection reviewed the entire length of the boardwalk, and a series of digital photos of the inspection were taken and have been enclosed for reference. City staff removed deck boards at four (4) random locations to allow inspection below the walking surface, including the skirting, deck braces and polystyrene billets.

2.1 Boardwalk Surface

The boardwalk surface (decking) is generally in fair to poor condition. The cedar deck surface has weathered due to exposure to the elements. There is fungus/mould visible at the ends of the deck boards in some areas, which is indicative of rot occurring in the wood. We estimate 15 to 20% of the deck boards are showing signs of rot (see Photo 1) and are in need of replacement.

In some areas it was observed that the boardwalk surface slopes to one side (see Photo 2). In these areas this sloped surface appears to be the result of a portion of the boardwalk bearing on land, and a portion floating. This distortion of the boardwalk appears to be the result of a shift in the position of the boardwalk, possibly due to the action of the winter ice.

2.2 Boardwalk Sub-Structure

Along the sides of the boardwalk the upper skirting boards above the water level of the wetland are in fair condition, similar to the deck surface. This applies to the other substructure

components, such as the corner posts, deck braces (joists) and anchor boards for the foam billets.

Below the water level the skirting boards and posts exhibit deterioration and rot (see Photo 3). These components are either completely immersed in water or are continually exposed to a cycle of wet/dry from the buoyant boardwalk structure. City staff were easily able to make indentations in the soft wood in these areas.

2.3 Metal Components

The spiral ardox nails used to fasten the deck boards to the sub-structure are exhibiting corrosion, but generally remain effective. There are a number of nail heads protruding along the sides of the walkway (see Photo 4).

The connections (hinges) that fasten the boardwalk panels together are generally in good to fair condition, with most showing signs of surface corrosion only and the occasional connection showing more significant corrosion (see Photo 5). It is evident that some of the cotter pins have been replaced over the years as some appear to be relatively new.

The other metal plates, connections and carriage bolts of the boardwalk above the water level are also in fair to good condition (i.e. surface corrosion only). However, those components below the water line exhibit more significant corrosion; including rust and delamination (see Photo 6).

2.4 Foam Billets

The polystyrene foam billets below the boardwalk generally did not succumb to deterioration from immersion in water. Accordingly, apart from dirt and some minor abrasions, the billets are generally in good condition.

In some areas, however, the billets have been subjected to what appears to be gnawing (see Photo 7). We observed billets that have had a significant volume eaten away, and small pieces of foam were visible floating in the water below and adjacent to the boardwalk. We were informed by City Parks staff that this physical deterioration of the billets is the result of muskrats, which use the foam bits to construct nests.

2.5 Handrails and Observation Platforms

The condition of the observation platforms appear to match that of the overall boardwalk. Those

components above the water level show some signs of deterioration, and those components below the water level are in much worse condition.

The handrails in the seating areas show some signs of deterioration, particularly the bases of the posts at the connection to the boardwalk skirt where the posts and anchors are below the water line. The handrails deflect relatively easily when force is applied, and the connections of one handrail to another (e.g. corners of observation platform) are generally not effective (see Photo 8).

2.6 Connection to Land (Entrance to Boardwalk)

The City has previously placed a temporary ramp over the concrete abutment at the entrance to the boardwalk, presumably to mitigate a tripping hazard that has resulted from a step at the abutment. In spite of the temporary ramp, the tripping hazard remains. It appears the concrete abutment has shifted over the years such that it is tipping towards the wetland (see Photo 9).

The metal connections of the boardwalk structure to the concrete appear to be in fair condition, exhibiting mild corrosion only. However, the wooden members to which the metal connections are fastened are showing signs of deterioration and need replacement. It appears this connection has been changed previously as there are abandoned bolt holes visible beyond the existing metal plates.

2.7 Bridge Over Lily Creek

A structural steel pedestrian bridge spans over the principal creek channel, roughly mid-way along the boardwalk. The cedar decking and handrail of this bridge appeared to be in fair condition, and exhibited the same general weathering as was observed on the boardwalk surface elsewhere. We also observed mild corrosion of the structural steel components of the bridge that were visible from the side (see Photo 10).

Because a review of this bridge was not included in our original scope of work as discussed with Mr. Bruce Drake on May 27, 2011, we have not made any observations related to the piles or bridge sub-structure. Should the City wish to prepare a detailed “terms of reference” for an investigation of the bridge, RVA can provide a fee estimate for this work.

At the request of the City, we have assumed a scope of work for a more detailed assessment of the pedestrian bridge and hereby provide a fee estimate of **\$5,000.00**. This assessment will

include the following elements:

- Field visit by a senior structural engineer;
- Review of original design drawings compared to as-constructed structure;
- Assessment of level of deterioration or distortion (if any) of the structure;
- Calculation of capacity of bridge to sustain required loads; and
- Brief report summarizing findings and recommendations.

We understand the City is seeking a cost allowance to replace this bridge. In the absence of a detailed scope of work or design drawings, we are unable to provide a detailed cost estimate for a new pedestrian bridge. From our experience in similar pedestrian bridges elsewhere, a new pedestrian bridge similar to the existing one could range in cost from \$140,000 to \$160,000. In addition, the City would have to include an allowance for demolition of the existing bridge of \$80,000 to \$100,000. We note these are order-of-magnitude cost estimates and are for preliminary discussion purposes only.

3.0 DISCUSSION

Our initial impression of the Lily Creek Boardwalk is that it is in fair condition considering the age of the structure (+/- 20 years), the materials used for construction (cedar lumber with no preservative treatment) and the location/environment in which it was constructed (floating in wetland). However, we noted a number of deficiencies with the structure that should be addressed prior to the boardwalk going back into service.

Our cursory review has revealed that much of the lower substructure (i.e. 2x10 skirting, posts) has deteriorated due to rot or corrosion of the components. However, the deterioration of these components does not appear to have significantly compromised the integrity of the boardwalk since the principal structural components are above the water level. The wooden and metal components in these areas should be replaced over time.

The broken/rotten deck boards (estimated at 15-20% of the surface area) and protruding nail heads represent a hazard to pedestrians on the deck surface and should be addressed prior to re-opening the boardwalk. Also, the sloping surface should be levelled.

We also recommend that the tripping hazard and issues related to the entrance to the boardwalk be rectified as soon as possible. These items include the tripping hazard on both sides of the concrete abutment, the corroded metal connections and the deteriorated deck

braces. Though the temporary ramp has helped mitigate these issues, it is not a permanent solution.

The polystyrene billets appear to be functioning adequately; however they are subject to damage by animals, which will ultimately compromise their ability to provide flotation to the boardwalk. Further, the bits of foam that are chewed off create a mess in the wetland. Accordingly, over the long term the City should consider replacing the polystyrene billets with a different flotation system, such as high-density polyethylene (HDPE) barrels. We understand from speaking with City Parks staff that such a system was successfully implemented by the City for a new floating dock arrangement at the boat launch off Ramsey Lake Road.

We have noted that the majority of the boardwalk is currently not equipped with a pedestrian handrail. The regulation of this boardwalk is not governed by the Ontario Building Code, therefore the requirement for a handrail is ultimately a risk management issue for the City and not an issue related to engineering. The City will have to decide if this boardwalk is to be compliant with the Accessibility for Ontarians with Disabilities Act (AODA), and consequently whether or not the structure needs to be modified accordingly.

4.0 RECOMMENDATIONS

We have separated our recommendations into those requiring immediate action to bring the boardwalk back into service, and those proposed to extend the serviceable life of the boardwalk into the future.

4.1 Immediate Issues

The following items should be addressed by the City immediately:

- All deck boards that show significant signs of rot or deterioration be replaced;
- All protruding nail heads should be removed and replaced with deck screws;
- In areas where the boardwalk has shifted (i.e. sloped surface), it should be manoeuvred back into position to level the sloped surface; and
- During replacement of deck boards, the sub-structure (skirting, deck braces) should be inspected more thoroughly and replaced as required.

In addition, the arrangement at the boardwalk entrance should be revised to eliminate the tripping hazard so as to safely accommodate pedestrian traffic. We recommend replacing the

wooden deck braces and metal connections on the wetland side of the concrete abutment. Also, the grading on the other side of the abutment should be raised with granular material and landscaped properly with topsoil and seed.

Our preliminary estimate of the cost of this immediate work is \$30,000 to \$40,000 if pressure-treated lumber is used. The material cost for cedar lumber is roughly double the cost of pressure-treated lumber, which would have the effect of increasing the total construction cost by 20-25%.

We understand the City has requested a fee estimate for preparation of drawings and specifications of the immediate repair works, as well as tendering of the project and field inspection. It is our feeling that use of an engineering consultant to provide these services for the immediate repair works would not be cost-effective, and that this would be best left to City Parks staff.

We feel the above-noted items will allow the City to extend the life of the boardwalk for a maximum of two (2) years. At that time, we recommend the City arrange to have the structural integrity of the boardwalk assessed again.

4.2 Long-Term Issues

The boardwalk sub-structure components (e.g. skirting, posts) are in poor condition and will continue to deteriorate over time. In order to extend the life of the boardwalk into the future, these components will all need to be totally replaced, including the foam billets. Replacing these sub-structure components can not be accomplished without disassembling the boardwalk decking. Therefore, we recommend the City implement a program to replace all 75 of the 2.43m x 3.66m (8-ft x 12-ft) panels with equivalent panels of a similar design.

We recommend the individual panels of the boardwalk be disassembled and replaced with equivalent panels of similar construction following the original design (i.e. floating deck, 8-ft x 12-ft, hinged connection, HDPE barrels). The metal components of the boardwalk that are currently only lightly corroded can either be replaced or re-furbished and re-installed to reduce costs.

Our preliminary estimate of the total cost of this work is \$3,000 to \$4,000 per panel if pressure-treated lumber is used, for a total cost of \$225,000 to \$300,000. The material cost for cedar lumber is roughly double the cost of pressure-treated lumber, which would have the effect of increasing the total construction cost by 20-25%.

4.3 Fee Estimate

At the request of the City, we have prepared an order-of-magnitude fee estimate to complete the design of the boardwalk reconstruction, preparation of contract drawings and specifications, tendering, contract administration, field inspection and preparation of as-built drawings. We estimate our total fees to be **\$30,000** to **\$40,000** for this scope of work. We note this estimate does not include provision for the pedestrian bridge, as discussed earlier.

5.0 SUMMARY

Based on the site visit by RVA personnel and City Parks staff of the Lily Creek boardwalk and subsequent review of the condition of the boardwalk original design drawings, we recommend the City implement a two-phased approach to address the deficiencies of the structure. We recommend the City begin by addressing the immediate safety-related concerns for pedestrians at the boardwalk. Further, we recommend the City implement a program to replace the boardwalk with new materials.

We trust this report meets your needs at this time. Should you have any questions or require additional clarification, please do not hesitate to contact the undersigned.

Yours truly,

R. V. Anderson Associates Limited

Robert G. Langlois, P. Eng.
Project Manager

Shawn N. Scott, P. Eng.
Project Director

Encls. Figures 1-8

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Photo 1 – Deck boards exhibiting rot.



Photo 2 – Boardwalk sloping to side.



Photo 3 – Boardwalk sub-structure – rot and corrosion below water line.



Photo 4 – Nail heads protruding



Photo 5 – Panel connection showing mild corrosion.



Photo 6 – Metal connections corroded below water line.



Photo 7 – Chewed polystyrene billets.



Photo 8 – Observation deck and handrail.



Photo 9 – Start of boardwalk and connection to abutment.



Photo 10 – Pedestrian bridge.

CGS Budget Option

Year: 2011

Category: Departmental Submission

Type: Enhancement

Fund: Operating

Department: 4401 Parks Services Administration

Division: Community Development Service

Request: Provide funding for the expansion of the Lily Creek Boardwalk to James Jerome Sports Complex

Description/Impact:

Given Council approval for replacement of existing Lily Creek Boardwalk, this option provides Council with an opportunity to further enhance the boardwalk by constructing an expansion of the rebuilt boardwalk to the James Jerome Sports Complex. The expansion of the boardwalk to link James Jerome Sports Complex would provide an opportunity for the users of James Jerome Sports Complex to enjoy the use of the Lily Creek Boardwalk by linking the boardwalk with a walkway leading to the facility.

Impact on Staffing (Negative if Reduction)

Full Time Position(s): 0
Crew Hours: 250

Net Budget Increase (Negative if Reduction)

Permanent: \$10,000
One-time: \$150,000

Notes:

Given approval of the replacement of the Lily Creek Boardwalk option, permanent funding \$25,000 and One-Time \$300,000.

Status: Accepted

CGS Budget Option

Year: 2011

Category: Departmental Submission

Type: Enhancement

Fund: Operating

Department: 4401 Parks Services Administration

Division: Community Development Service

Request: Provide funding for the replacement of the Lily Creek Boardwalk

Description/Impact:

In 1991, Science North entered into an agreement with the former City of Sudbury for the usage of a portion of the Lily Creek Marshland. The twenty year license will be expiring in March 2011. Science North has confirmed that they are not interested in extending or renewing the agreement.

The department is recommending that the existing boardwalk be removed due to health and safety concerns. The option is to provide capital funding to replace the existing boardwalk.

Impact on Staffing (Negative if Reduction)

Full Time Position(s): 0

Crew Hours: 600

Net Budget Increase (Negative if Reduction)

Permanent: \$25,000

One-time: \$300,000

Notes:

Science North has confirmed that \$35,000 is available to remove the existing boardwalk.

Status: Accepted

**Rainbow ROUTES Association
Lily Creek Boardwalk
Proposal 10.11.11**

The City has presented 2 options for the Lily Creek Boardwalk:

Option 1: Utilize \$35,000 from Science North to remove the existing Lily Creek Boardwalk structure at no cost to the City of Greater Sudbury

Option 2: Repair the existing structure as per scope of work identified by R.V. Anderson estimated between \$30,000 to \$40,000. Science North funds in the amount of \$35,000 to be allocated for the repairs. Council to consider replacement of the structure during the 2014 Budget process.

Rainbow Routes Association at its Board meeting of Oct 11, 2011 passed the following motions:

Motion 10.11.03: The Board of Directors of RRA sees the value in the restoration of the Lily Creek Board Walk.

Motion 10.11.07: Given that Rainbow Routes Association wishes to be a part of the solution to restore and upgrade the Lily Creek Boardwalk we offer the attached 3rd option to the City of Greater Sudbury for its consideration.

Option 3:

Fact: The Boardwalk is currently 270 meters long.

1. Remove approximately 120 meters of the existing boardwalk from the west end including the bridge (noted in **red** on the attached map).
2. Build a new 40 meter boardwalk to connect the remaining approximately 150 meters of boardwalk to James Jerome Park (noted in **purple** on the attached map).
3. Refurbish the remaining older section of the remaining easterly portion of the boardwalk (150 meters) per recommendations made by RV Anderson. (the yellow line indicates both the existing gravel path and boardwalk to be refurbished).

Total Estimated Cost for Option 3 as prepared by Rainbow Routes in consultation with RV Anderson Report and local volunteer engineers: \$70,000 to \$90,000.

Benefits:

1. Create a connected loop to the playing fields thus encouraging more use of the boardwalk.
2. There will be less board walk to maintain 185m vs 270m (40m will be brand new)
3. Removal of the bridge will vastly reduce the engineering, cost and any risk of use.



Rainbow Routes Association Proposal:

1. Apply for a Job Creation Project grant from the Ministry of Training, Colleges and Universities to complete the work to offset up to \$15,000 in the above noted estimated cost.
2. Rainbow Routes will produce an environmental assessment with a list of mitigations to safe guard the marsh, its fish and bird life prior to any work being done.
3. RRA to work with the Park's Department to ensure work completed meets their specifications.
4. That the City will cover the costs of any tipping fees for docks to be disposed of.
5. Rainbow Routes will produce a letter stating that the new section of the boardwalk meets the appropriate flotation requirements.

In summary:

Rainbow Routes is prepared to work with the City to save and enhance a piece of valued community infrastructure for considerably less cost than estimated by the RV Anderson report.

In order to apply for a Job Creation Grant we require a response to our proposal from the City of Greater Sudbury by November 10, 2011.

