MORRISON HERSHFIELD

November 20, 2015 MH Ref. 5150481.00

City of Victoria
c/o Thomas Soulliere
Director, Parks, Recreation and Facilities City of Victoria
1 Centennial Square, Victoria, BC, V8W 1P6

Dear Mr. Thomas Soulliere

Re: Chequers Pavilion, 500 Douglas Street, Victoria, BC
Facility Condition Assessment Report

Morrison Hershfield Limited (MH) was retained by The City of Victoria (the City) to conduct Facility Condition Assessments at various buildings owned and/or operated by the City. Following the submission of the original Facility Condition Assessment Report (dated October 14, 2015) MH was requested by the City to review and include a report on the Chequers Pavilion located in Beacon Hill Park (500 Douglas Street, Victoria, BC).

Contract Terms of Reference are identified under Contract RFP-15-004. This report should be read in conjunction with the terms and limitations presented in the original Facility Condition Assessment Report dated October 14, 2015.

The Chequers Pavilion building was constructed in 1936, with general use until it was boarded up in 1995. The pavilion was built in a symmetrical short cross shape, approximately 50 ft by 50 ft and 30 ft between valleys. The foundation is a concrete slab. In the pavilions original state, the perimeter concrete upstand walls supported fully glazed walls around the entire perimeter. The roof is a sloped assembly, between a 5:12 and 6:12 pitch, with hips and valleys built in. The roof has been covered with a cedar shake roof assembly. The ceilings rafters bear on the window headers below. The interior ceiling has a wood soffit installed, concealing the roof faming members.

The following documents were provided to our office for the development of this report:

- Composite drawings of the building, dated May 1982.
- Heritage Impact Study, authored by Donald Luxton Associated Inc. and dated January 2010.

A site review was completed by Chris Raudoy of MH, Stefan Alexander of SR Alexander Engineering Ltd. (SRAEng,) and a representative of the City. During this review the following was observed:

- The building is boarded up with no public access. There is no electrical, mechanical or plumbing services within the building.
- Due to evident deterioration and deflection in the wood framing components SRAEng. was retained to provide an opinion regarding the current condition and adequacy of the existing structure. A copy of the condition assessment report provided by SRAEng. has been included with this report in Appendix A.

- Steel posts have been added at the roof framing to provide additional support. Scaffold was set up in the middle of the structure. The purpose of the scaffold was not confirmed; however, it did not extend to the ceiling height or tie into any of the structure.

- Fire damage was evident at the south-east corner of the building. The damage has affected both the wood framing and concrete walls.

- The existing cedar shake roof is beyond its useful service life. Significant active water ingress through the roof was evident. Full replacement of the roof system, including gutters and fascia, can be expected.

- The windows and doors were removed circa 1971 leaving painted wood openings. The existing wood window openings were typically racked indicating deformation of the framing from settlement and/or overloading. Some of the members appeared to be showing signs of deterioration due to prolonged exposure to moisture.

- Interior finishes are limited to wood soffit and painted wood window openings. The wood soffit was damaged and/or missing in multiple locations. The majority of interior finishes have been vandalized.

- There was areas of cracking evident in the slab-on-grade. Refer to SRAEng. report.

Refer to Photos 1 through 8 in Appendix B for a general overview photos.

The building is generally in poor condition with areas of deterioration noted throughout the wood framing and finishes. Furthermore, the majority of interior finishes have been vandalized. The existing structural elements do not appear to have adequate design strength to meet current code requirements. Refer to the SRAEng. report. Areas of racking and deformation of the wood structure were present throughout.

Given the deficiencies observed, a major remediation project would be required to repair and replace damaged/missing elements and bring the existing structure up to current code requirements. In order to develop an accurate opinion of probable costs, a schematic design would need to be developed to determine if the existing structure can safely be retained and if so, what work would be required.

We trust the above provides the information required. MH and SRAEng. remain available to discuss the contents of this report.

MORRISON HERSHFIELD LIMITED

Chris Shaw-Raudoy, B.Arch.Sc, LEED AP
Principal / Building Science Consultant

APPENDIX A

SR Alexander Engineering Ltd. Report

SR ALEXANDER
ENGINEERING LTD.

Project Name: Chequers Pavilion Building Assessment Date: November 20, 2015

Intent

On October 28, 2015 SR Alexander Engineering Ltd. (SRAEng) accompanied a representative of Morrison Hershfield (MH) to Chequers Pavilion in Beacon Hill Park to conduct an assessment of the building. The intent was to review the existing structure and comment on potential structural issues.

Building Construction

The building was constructed in 1936, with general use until the window glazing was removed in 1971 and then boarded up in 1995. The pavilion was built in a symmetrical short cross shape, approximately 50 ft by 50 ft and 30 ft between valleys. The foundation is a concrete slab, of undetermined thickness, with a 2 foot upstand around the perimeter. In the pavilion's original state this concrete upstand supported fully glazed walls around the entire perimeter. Corners were built out of 3x3 dimensional lumber, most likely Douglas Fir and mullions spaced approximately 3-4 feet apart. These mullions and small posts support the rafter tails, valleys and ridges for the roof. The original flag pole that extended through the center of the roof is referred to as a "center support pole" on the building drawing. Unfortunately, at the time of review it was not possible to confirm the connection. However, visually there are some small steel straps which are visible on the pole. Ridges, hips and valleys are constructed out of dimensional 2x6 material with spans of approximately 19 feet. The valleys have had 3.5" O.D. steel posts added in effort to reduce the span. The ceiling rafters are also constructed out of 2x6 and bear on the window header constructed out of a 4x6 on the flat. This detail is still visible in the one construction document available for the Pavilion (see attachment). The exterior eves are sections of 2x4 which are sistered onto the interior rafters and cantilever approximately 2 feet past the building edge.

Element Condition

Roof:

Since the roof has both hips and valleys the roof pitch changes, alternating between what appears to be a 5 in 12 pitch and a 6 in 12 pitch. The framing members of the roof, as mentioned above are constructed out of 2x6 materials. The hips and valleys have roughly similar spans of 19 feet and rafters span a maximum of 13 feet. Using prescribed snow loads in the BCBC 2012 these members are well over capacity. The hip beams are more than an order of magnitude over capacity, the valley beams would be not be expected to perform as well as the hip beams due to snow accumulation. Although the valleys have had supports added inside the building, with the 3.5" O.D. posts, the members would still be more than 4 times over capacity with the design snow loads. There are clear signs of deflection and can be observed inside the building (Photo No. 1). In addition, around the exterior you can see areas of the roof which have undergone permanent deflection. There are signs of fire and water damage to the roof framing. However, as the majority of soffit material is present, it is not possible to make an accurate assessment of all the framing members. The central bearing post and is connection to the roof framing can be expected to be undersized/under engineered (Photo No.2). The rafter tails bear directly on a 4x6 header above the windows; there are no collar ties or any outward thrust reducing elements of note around the perimeter of the structure. The 4x6 is oriented 90 degrees to its strong axis

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which may have been a method to resist outward thrust to the outer walls, with minimal results. Past the 4x6 header are short pieces of 2x4 material, sistered and blocked to the rafter tails they create the exterior eve of the building (Photos 3 & 4). While the roof is intact it is not considered safe under normal loading condition, this includes snow as well as heavy wind and rain. While the schematic plan and construction have sound layout, the elements used are well undersized, and the lack of any lateral resisting system is of concern.

Walls:

The existing walls show signs of racking and thrust due to the combination of factors (Photos 5-9). These factors include: The lack of any thrust reducing elements or system (collar ties, floor diaphragm, etc.) and the lack of any lateral force reducing system to account for wind and seismic forces prescribed by the building code. It is reasonable to assume that the sheathing of the exterior walls and the limited amount of interior bracing across the window mullions are the main elements holding the structure intact. Both the design and construction of these systems are life safety concerns and are not part of the scope of this report, but required by the BCBC 2012 for any accessible space. Such work would require an adequate design period and construction phase. From a constructability point of view, due to the condition of the walls a secondary support system would be required to simply work on any elements within or on the structure. In current construction practices, moment frames made from structural steel are installed in walls with large openings in order to account for shear forces the building is exposed to, there are currently no elements that account for such forces in the pavilion.

The posts which break up the window spans or rabbeted jam are constructed out of 2 ½" x 2 ½" and spaced 3-4 feet apart. As many of these posts are out of plumb and racked further than allowed by the BCBC 2012 they are do not have adequate design strength and are capable of having less capacity the more they deviate from plumb.

The window system bears on a concrete upstand 2 feet above the slab. At the south entrance there is evidence of a fire, which has damaged some of the concrete. The concrete would need to be scanned to determine the amount of delamination.

Slab:

The concrete slab sows evidence of a cracking and potential settlement (Photo No. 10). The thickness of the slab cannot be determined from the design drawing; it does appear to be substantially thick in which case a crack of this nature would be a sign of settlement. A proper soils report should be conducted to evaluate the amount of consolidation which has taken place and if there is more expected. Any settlement issue combined with a lateral force event like an earthquake has the potential render the building unrepairable.

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SR ALEXANDER
ENGINEERING LTD.

Thank you for choosing SR Alexander Engineering Ltd. for your engineering needs. If you have any questions or future concerns please contact us using the contact information below.

Cheers,

NOV 2 0 2015

Stefan Alexander, P.Eng, LEED AP BD+C, GSC

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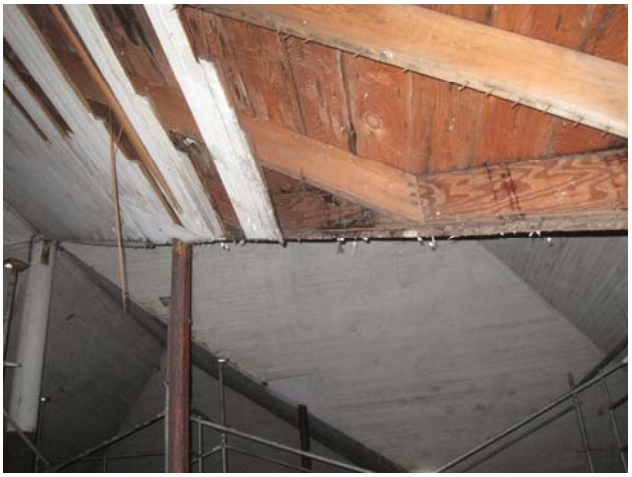
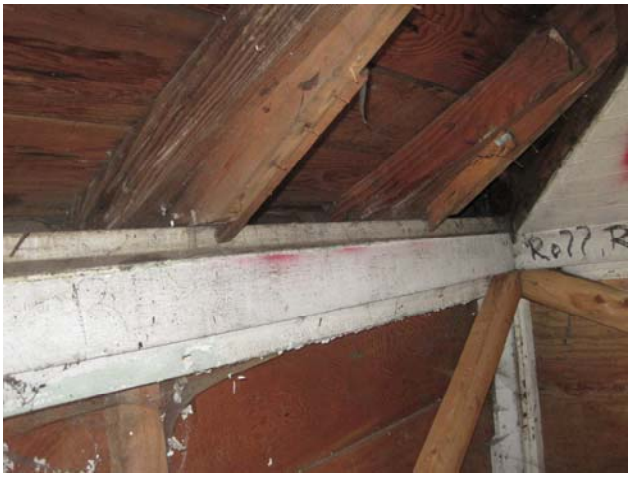
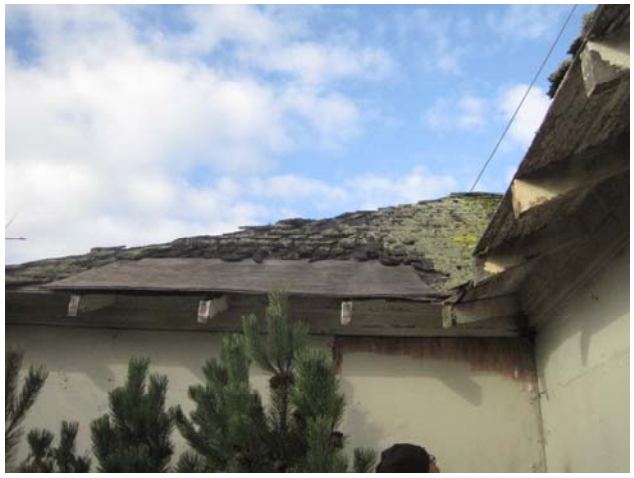


No. 1 – Valley Span Deflection

No. 2 – Center Support Pole



No. 3 – Header over window and rafter tails



No. 4 – Eve construction

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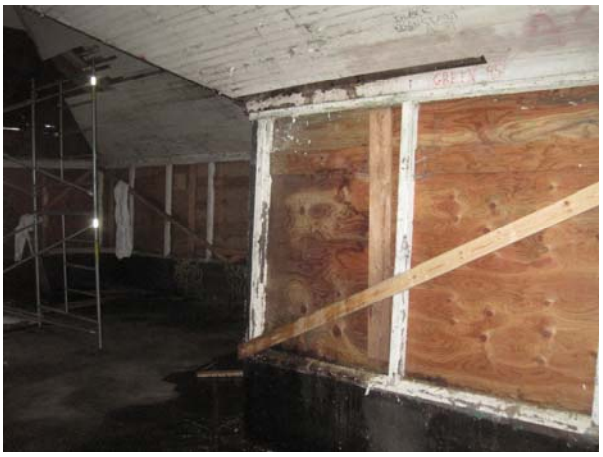
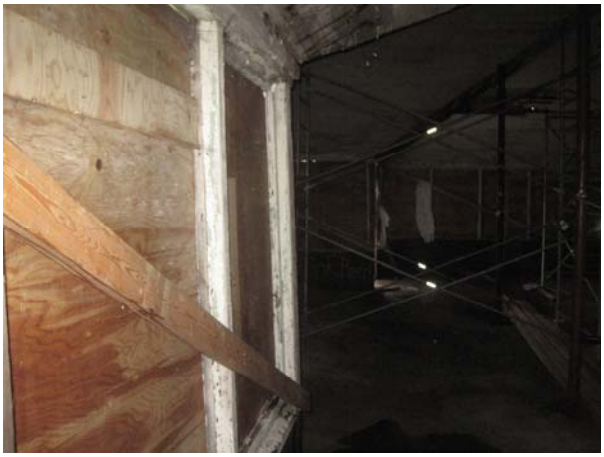
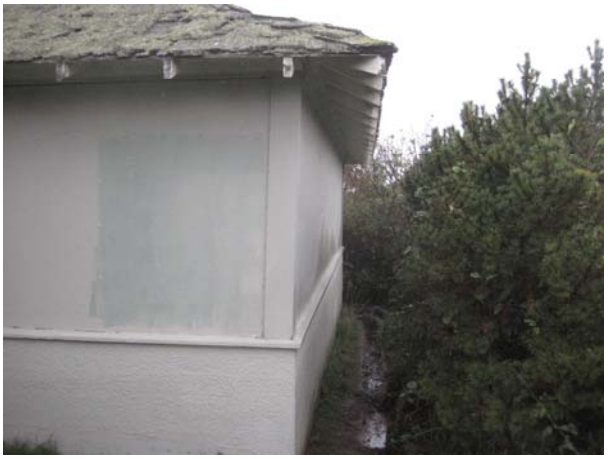
No. 5 – Interior wall bracing



No. 6 – Wall bracing, racking and outward thrust

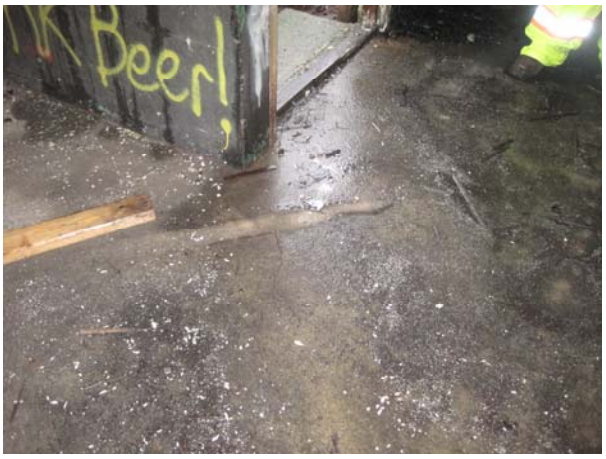


No. 7 – Wall bracing, racking and outward thrust



No. 8 – Wall bracing, racking and outward thrust

No. 9 – Wall bracing, racking and outward thrust



No. 10 – Slab cracking

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APPENDIX B

Report Photos

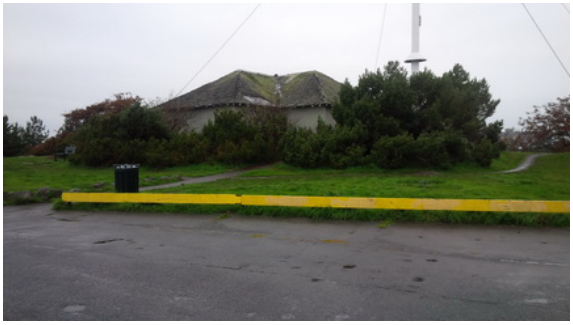

Photo 01

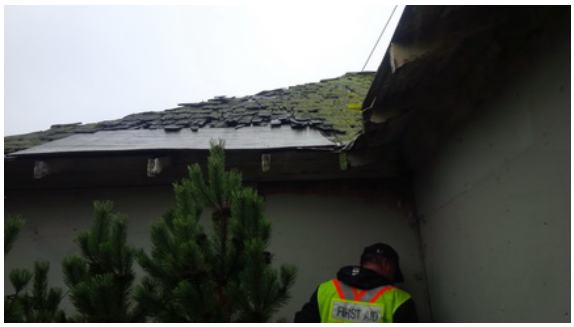

Photo 02

Photo 03

Photo 04

Photo 05

Photo 06

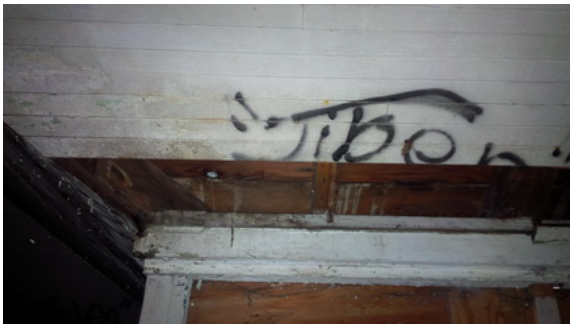

Photo 07

Photo 08