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Prescott Forwarders' Museum Condition Study

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SUBMITTED BY: EVB Engineering &
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APPENDIX A – PHOTOS



1. INTRODUCTION

EVB Engineering was retained by the Town of Prescott to conduct an architectural and structural condition study of the Prescott Forwarders' Museum located at 201 Water Street in Prescott Ontario.

On October 24, 2017, Mr. Greg Esdale P.Eng, EVB Engineering and Mr. Brock Wilson M.A.A.T.O, C.E.T. Architectural Technologist with Architecture 49 Inc. visited the site to complete the investigative work.

The Forwarders' Museum is a designated Heritage Building located at 201 Water Street in Prescott. It is a two storey structure with a full basement originally built around 1820. The museum is constructed with stone rubble foundation walls and above grade walls with the roof and floor structures framed with wood timbers. The museum was originally used as a warehouse but currently functions as a museum and tourist information centre. The exterior dimensions of the building measure approximately 25' x 38'.

1.1 Previous Studies

Previous arena condition studies were completed and are presented below:

- *Structural Inspection Report*, prepared by R.M. Kostuch Associates Ltd, January 1975.
- *Structural Inspection Report*, prepared by Genivar Inc., November 2013.

It is our understanding building renovations were completed in 1977 with additional repairs and maintenance carried out over the years. Records of the 1977 renovation or subsequent repairs were not available.

1.2 Scope of Current Study

In discussions with the Town of Prescott, it was determined that the current study focus would be on the architectural and structural components of the building. Mechanical, electrical and site servicing inspections were not completed as part of this report. No existing drawings were available.

This study was limited to the accessible and visible areas of the structure. No destructive testing, excavations or imaging was completed as part of the work.

2. EXISTING CONSTRUCTION

2.1 Foundations

The building foundation is constructed with stone rubble of approximate 36" thickness. The east and west foundation walls have been stabilized with the construction of 8"+/- poured in place concrete walls extending north from the south extents of the building approximately 20'. The surrounding grade is at floor level on the north elevation. Water Street (north side) is separated from the building with a concrete curb to direct water and snow. The road is above the elevation

of the ground level floor. On the south elevation the grade is level at approximate basement floor elevation level with a gradual slope away from the building towards the south. The grades slope sharply on the east and west elevations.

2.2 Wall, Roof and Floor Framing - Structural

The building walls are constructed with full height stone masonry of approximate 36" thickness. Walls extend to the elevation of the roof eave on the sides and extend to the top of the gables on each end of the building. The roof structure is constructed with wood timbers spanning approximately 22' east-west between exterior stone rubble walls. The roof is sloped at approximately 6:12. Timber ceiling joists / ties span between the rafters. The 2nd floor structure is exposed from the ground floor level and is framed with a main 8x8 timber beam spanning north-south along the building centerline supported off the north and south exterior stone rubble walls and two interior 6x6 columns. Floor joists (5x8 timbers) span east-west between the 8x8 beam and exterior stone rubble walls. The basement ceiling is plastered with exception of the north kitchen and washroom area. In this area the floor structure has been reinforced and framed with 2x8 @ 12" joists spanning east west between the exterior stone rubble walls and a center spanning steel beam. It is assumed the south ground floor structure (concealed ceiling area) has been reinforced in a similar manner.

It was noted the south interior 2nd floor support column is not continuous into the basement level and is therefore supported off the ground floor structure. It is recommended this support condition be reviewed.

2.3 Basement

The basement area is partitioned by an east-west stone rubble wall located approximately 3m south of the north exterior wall. South of this wall is an open display area and north of the wall are two single toilet washrooms, a mechanical/electrical room and a storage room. The basement is accessed by a staircase from the ground floor and with an egress to the south (rear – grade level) exterior of the building that is currently not accessible. The flooring consists of a combination of carpeting and painted concrete. The wall construction consists of rubble stone, rigid insulation, lath and plaster and parging materials. A wood stud wall exists on the interior along the east wall. There is one window located within the display area located on the west wall.

2.4 Ground Floor

The ground floor mainly consists of one large open area displaying the museum artifacts. There is access to the basement level and second floor level via a stairwell located on the east side of the building. There is access to the exterior from the north elevation, (main entry) the west elevation (side entry) and the south elevation exiting to a covered exterior deck. There is main storefront glazing located on the north elevation accompanied by two (2) glazed windows at the south elevation (rear). All windows units are wooden frame and muntin construction with single pane glazing. The flooring of the ground floor is finished natural wood planks and the ceiling material is heavy timber framing.

2.5 Second Floor

The second floor is accessed via a wooden staircase from the ground floor. This area is mainly utilized for historical documents and artifact storage. There is a total of five (5) windows constructed of painted wooden frame and muntin with single pane glazing. The ceiling is sloped

following the profile of the roof rafters and ties and is finished with metal lath and plaster. The flooring of the second floor is finished natural wood planks.

2.6 Exterior

The exterior of the building consists of a painted stucco finish with painted wood trims, soffit and fascia boards. There is a wooden entry stair and landing located on the west side of the building providing access to the west entry. There is also a covered wood deck on the south elevation (rear). The surrounding gradient slopes sharply from north to south with north being the higher elevation.

2.7 Roofing

The main roof and rear south deck roofing material is constructed with asphalt shingles. The small canopy cover above the west entry is constructed with wood shakes.

2.8 Flooring

Refer to each floor section for the flooring types.

2.9 Doors and Hardware

All exterior doors are constructed of painted wood construction and is essentially provided with its original hardware with new locking mechanisms for additional security.

2.10 Windows

The windows are typically wood frame and muntin construction with single pane glazing and a painted finish. As noted in previous sections, there is one single window located in the basement along the west wall directly below the west entry ground level deck. The ground floor has a large storefront window along the north elevation and two separate windows at the south-west corner. The second floor has two single windows on both the north and south elevations with a single window/dormer on the east elevation.

2.11 Stairs/Exit Stairs

There are two interior staircases providing access to both the basement and the second-floor levels off the main level. There is also an exterior staircase/walkway located on the west side of the building providing access to the west entry/exit.

2.12 Washrooms

There are two washrooms located in the north basement area adjacent the employee storage room. Both washrooms are provided with one (1) water closet and one (1) lavatory.

3. INSPECTION RESULTS

The following presents the results of the inspection:

3.1 Foundations

Significant wall cracking, gaps and movement joints are visible on all sides of the building (1.1A and 1.1B). The foundations were not excavated as part of this investigation. However, based on the previous 2013 report and photos, the above grade portion of the stone rubble walls are in poor condition. The below grade foundations are of similar construction and are expected to be in need of extensive repair following years of freeze thaw action, shifting and water infiltration that has caused mortar loss, crumbling and cracking of the stones. Full depth excavation on each side of the building to expose the exterior foundation walls, removal of the parging/stucco finish and re-pointing, and partial outer wythe stone replacement followed by waterproofing/drainage/foundation insulation measures is recommended.

If the Town elects to proceed with remediation of the Museum, further investigation into the wall conditions is recommended via excavation and stucco removal on each side of the building on both the exterior and interior face of the foundation to establish the full extent of required repairs.

3.2 Wall, Roof and Floor Framing

Based on photos from the 2013 report and understanding that the recommended remediation works were not completed, the above grade stone rubble walls remain in poor condition and continue to deteriorate. Significant cracking and gaps are visible in the stucco finish as noted in section 3.1 (refer to photos 2.1A and 2.1B). If the Town elects to proceed with remediation of the Museum, further investigation into the wall conditions are recommended via stucco and plaster removal on each side of the building on both the interior and exterior to establish the full extent of required repairs. Replacement of window and door lintels is recommended as part of the wall remediation work. Wood rot was observed in an exposed lintel as part of the previous investigation completed in 2013. A portion of the second-floor timber joists have been damaged by fire exhibiting charring and loss of section (refer to photos 2.2A and 2.2B). In conjunction with timber joist replacements of this area, an overall floor capacity engineering review of the ground floor, second floor and roof structure is recommended to ensure conformance to current Ontario Building Code load requirements (photo 2.3A). Ground floor reinforcing was previously completed with the addition of new floor joists and a center steel beam added. A design review of the south balcony floor and roof framing is recommended. Additional floor joists were added but improperly connected with double joist hangers each end (refer to photos 2.4A and 2.4B).

3.3 Basement

The basement contains a musty smell and shows signs of prior water infiltration. Specifically, inside the north-east corner washroom there are signs of water infiltration from the corner of the room likely seeping through the stone foundation. Foundation Waterproofing and a drainage system is recommended around the entire perimeter of the building (refer to photos 3.1A and 3.1B).

3.4 Ground floor

The ground floor is generally in good condition. There are signs of fire damage to timber floor joists around the fireplace (second floor framing – refer to photos 2.2A and 2.2B). The fire place

has been decommissioned and should remain out of service pending the completion of safety upgrades. The front north entry of the building exterior is at a higher elevation than the ground floor with a sloped wooden door sill providing the potential for water infiltration (refer to photo 4.2A). An existing exterior trench drain along the sidewalk was noted at this location..

3.5 Second floor

The second floor is generally in good condition. Misalignment of windows and trim and cracking of finishes around the windows are indicative of building movement/settlement refer to photos 5.1A, 5.2A). There is evidence of water infiltration at the south fireplace possibly due to improper flashing construction at the chimney. Note the flashing could only be inspected from ground level. The staircase guardrail (30" high) does not meet current OBC height requirements. Headroom clearance is inadequate due to the sloping ceilings.

3.6 Exterior

The exterior stucco exhibits significant cracking on all elevations (refer to photos 6.1A, 6.1B, 6.1C). A portion of the east elevation stucco material has been removed and cladded with painted plywood that is showing signs of buckling. The south exterior balcony floor structure appears poorly constructed and it is recommended that balcony access be restricted until an engineering review and any required upgrades are completed. The southeast balcony post is buried below grade level. This should be elevated above grade to prevent wood rot.

3.7 Roofing

The main roofing appears to have been recently replaced and is in good condition. The roof above the west entry is showing signs of deterioration and replacement is recommended (photo 7.2A). It would appear that the balcony roofing was replaced at the same time as the building roofing. The flashing for the chimney appears to be improperly constructed causing water infiltration at the second-floor ceiling. Note the flashings could only be inspected from ground level. Reconstruction of the flashing is recommended. (refer to photos 7.1A, 7.1B)

3.8 Flooring

All flooring appears to be in acceptable condition apart from the washrooms. See section 3.12.

3.9 Doors and Hardware

All doors and hardware appear to be in acceptable condition.

3.10 Windows

All windows appear to be in acceptable condition. Recommend refinishing of exterior windows that are showing signs of weathering to ensure protection from deterioration/rotting (refer to photo 8.1A).

3.11 Stairs/Exit Stairs

The interior staircase to both the basement and the second-floor levels appear sound however the handrails for these staircases do not meet current OBC height requirements (refer to photo 9.1A, 9.1B).

3.12 Washrooms

The washroom facilities and fixtures appear to be in working condition however, the flooring within the washrooms show signs of water damage/infiltration and the ceilings have been removed. Due to the moist conditions of the basement the potential for mould exists and should be investigated further. The water appears to enter via at the northeast corner of the north washroom (refer to photos 10.1A).

Table 1: DEFICIENCIES – REFER TO APPENDIX A (PHOTOS)

DEFICIENCY	DESCRIPTION	PRIORITY	TIMELINE	BUDGET	PHOTO(S)
1.0 FOUNDATIONS AND SLABS					
1.1	Foundation repairs	High	< 1 yr	\$150,000	1.1A, 1.1B
SUBTOTAL				\$150,000	
2.0 WALL, ROOF AND FLOOR FRAMING – STRUCTURAL					
2.1	Above grade exterior wall assembly repairs	High	< 1 yr	\$200,000	2.1A, 2.1B
2.2	2 nd Floor Framing Repairs – Charred Timbers	High	< 1 yr	\$4,000	2.2A, 2.2B
2.3	Engineering review Ground, 2 nd floor and roof framing	Medium	< 3 yrs	\$6,000	2.3A
2.4	Balcony Engineering Review and Repairs	High	< 1 yr	\$8,000	2.4A, 2.4B
2.5	Window/Door Lintels	Medium	< 3 yrs	See 2.1	2.5A
SUBTOTAL				\$218,000	
3.0 BASEMENT					
3.1	North Corner/waterproofing	High	< 1yr	See 1.1	3.1A, 3.1B
3.2	Service room fire separation	High	< 1yr	\$5,000	3.2A
SUBTOTAL				\$5,000.00	
4.0 GROUND FLOOR					
4.2	Front entry sill	High	< 1yr	\$500	4.2A
SUBTOTAL				\$500.00	
5.0 SECOND FLOOR					
5.1	Window Misalignment	High	< 1yr	See 2.1	5.1A
5.2	Water infiltration	High	< 1yr	\$2,000	5.2A
5.3	Guardrail height	Medium	< 3 yrs	\$500	
SUBTOTAL				\$2,500.00	
6.0 EXTERIOR					
6.1	Cracking Stucco	High	< 1yr	See 2.1	6.1A, 6.1B, 6.1C
SUBTOTAL					
7.0 ROOFING					
7.1	Chimney flashing	High	< 1yr	\$1,500	7.1A, 7.1B
7.2	West entry	Medium	< 3 yrs	\$1,000	7.2A
SUBTOTAL				\$2,500.00	

8.0 WINDOWS					
8.1	Refinish exterior windows	Medium	< 3 yrs	\$8,000	8.1A
SUBTOTAL				\$8,000.00	
9.0 STAIR/EXIT STAIRS					
9.1	Stair handrails	High	< 1 yr	\$3,000	9.1A, 9.1B
SUBTOTAL				\$3,000.00	
10.0 WASHROOMS					
10.1	Ceilings	High	< 5yrs	\$2,500	10.1A
10.2	North corner water infiltration	High	< 1yr	Refer to item 1.1	
SUBTOTAL				\$2,500.00	
TOTAL				\$392,000.00	

+2nd floor and roof framing reinforcement if required

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Recommendations

Based on the noted deficiencies, the following recommendations are presented:

- Additional investigative work to remove stucco/plaster and expose portions of the foundation wall and exterior walls to determine the extent of deterioration and the wall repair methodology;
- Based on the above investigation, excavate and expose foundations. Stabilize with repointing and partial stone replacement. Waterproof foundation exterior and provide proper drainage;
- Based on the above investigation, expose above grade stone walls. Stabilize with repointing and partial stone replacement;
- Replace timber lintels;
- Replace 2nd floor timbers charred in fire and complete design review of the ground floor, second floor and roof framing;
- Balcony engineering review and reinforcement. Restrict access until work is complete;
- Provide proper fire separation of service room equipment;
- Replace guards and handrails;
- Remove exterior stucco (renovate stone masonry walls);
- Refinish windows;
- Inspect and repair chimney flashing;
- Decommission the fireplace;
- A designated substance survey (DSS) is recommended.

4.2 Conclusions

The Forwarder's museum is now approaching 200 years of age. As presented above, significant structural and architectural deficiencies have been identified requiring immediate attention as would be expected with a building of this age. The major building deficiency is associated with the exterior wall conditions. Significant foundation and above grade repairs of the stone masonry and exterior finish stucco are required. The full extent of which cannot be determined without removal of architectural finishes. However, based on the photos of the exposed portion of the east wall from the previous 2013 report, significant wall repairs are anticipated and have been presented in the budgets provided with this report.

In addition, roof and 2nd floor reinforcing may be required pending an engineering analysis. Floor, roof and guardrail/handrail upgrades are necessary to meet current Building Code requirements.

It is recognized that the building is a Heritage Building of high importance to the history of the Town of Prescott. Renovating and upgrading is a viable option and understood however, it should be emphasized that additional unforeseen expenses may be encountered during detailed design and construction with a building of this age. If the Town elects to continue to use the building, planning for renovations and upgrades should be undertaken as soon as possible.



January 17, 2018

APPENDIX A

PHOTOS



Photo 1.1A / Photo 2.1A



Photo 1.1B / Photo 2.1B



Photo 2.2A



Photo 2.2B



Photo 2.3A



Photo 2.4A



Photo 2.4B



Photo 2.5A



Photo 3.1A



Photo 3.1B



Photo 3.2A



Photo 4.2A



Photo 5.1A



Photo 5.2A



Photo 6.1A



Photo 6.1B



Photo 6.1C

Photo 7.2A



Photo 7.1A



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Photo 7.1B



Photo 7.2A



Photo 8.1A



Photo 9.1A



Photo 9.1B



Photo 10.1A