Structural Condition Assessment Report
Verner Municipal Building 11790 ON-64

June 2018

Prepared for:

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1.0 INTRODUCTION

J.L. Richards & Associates Limited (JLR) was retained by the Municipality of West Nipissing (MWN) to complete a visual Structural Condition Assessment (SCA) of the Municipal Building located at 11790 ON-64 in Verner, Ontario. The objective of the assessment was to determine the general condition of the building's structural elements, and make general recommendations for repair of any observed deficiencies. An Opinion of Probable Construction Costs (OPCC) for the recommended repairs was also requested to allow for planning of future capital expenditures.

Deficiencies noted in this report are supported, where possible, by photographs taken during the assessment and are provided in Appendices A and B of this report.

2.0 BACKGROUND

It is JLR's understanding that the building was constructed circa 1950 and was originally built and occupied as a school. It is also understood that the school was sold to the MWN (year unknown) and was since repurposed into offices and community program space.

On April 12, 2018, JLR received approval from the MWN to proceed with the undertaking of a SCA of the Municipal Building at the location noted above, as a result of observed displacements in the exterior masonry east wall, adjacent to the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) office area. Refer to SKS-1 in Appendix C.

On April 16, 2018, JLR was informed by the MWN that the Chief Building Official (CBO) had expressed safety concerns pertaining to the structural integrity of the building and had restricted access to the OMAFRA office area.

The MWN subsequently requested that JLR provide additional consulting services on a time-basis. The requested additional services were to provide further review of the building in an effort to determine if access to the OMAFRA office area could be reinstated. On April 17, 2018, Matthew Burtt, P.Eng., Patrick Rochefort, EIT, and Julie Duhaime, OAA, MRAIC, of JLR visited the site to review the current conditions of the OMAFRA office area. During the site visit, displacements were noted in gypsum board finishes and step-cracking was noted in the exterior masonry at the southeast corner; however, no structural members were visible to facilitate further review. It was recommended that access not be reinstated until such time that architectural finishes could be locally removed to allow JLR to complete a more thorough review of the structure.

On April 20, 2018, the MWN provided JLR with the CBO's formal Order to Comply stating the occupancy restrictions, and on April 23, 2018, Laura Grover, P.Eng., and Patrick Rochefort, EIT, of JLR visited the site to review the areas in the OMAFRA offices, adjacent boardroom, and side entrance vestibule only, where finishes had been removed. While on site, JLR observed displacements in both the exterior masonry and the interior gypsum board along the east wall of the OMAFRA offices. It was also observed that structural roof members from the adjacent low roof tie into the load-bearing wall on the west side of the OMAFRA office area, and are therefore dependent on the integrity of the roof and wall structure in the OMAFRA office area. Following this site visit, JLR issued a letter dated April 23, 2018, recommending that access be restricted to

the entire building, and that adequate temporary shoring be installed to support the OMAFRA office area roof structure. Once the shoring is in place, occupancy restrictions may be re-valuated. A copy of the letter is provided in Appendix D.

On April 27, 2018, JLR attended a site meeting with the MWN and their hired contractor, Al Lanteigne Steelwork Limited (ALSW), to discuss the potential temporary shoring design and installation. On April 30, 2018, the MWN requested that JLR cease all work pertaining to the temporary shoring design and investigations into crack and building movement monitoring, and proceed to complete the full SCA for the building as a whole.

On May 1, 2018, Laura Grover, P.Eng., and Patrick Rochefort, EIT, of JLR returned to the site to complete the visual SCA of the building.

On May 11, 2018, JLR submitted the draft SCA report without OPCC information to the MWN for client review. On May 15, 2018, a revised SCA report was submitted to the MWN, which included OPCC information pertaining to the presented recommendations. As part of the Recommendations section of the draft SCA report, JLR recommended that further investigation be completed along the east wall of the boy's washroom and the north wall of the library to determine if structural concerns exist pertaining to the assumed load bearing masonry walls behind the finishes. The draft SCA report also recommended that further investigation be completed for the north and south wing exterior masonry walls to determine construction of the walls, as it was unclear how the exterior brick is supported and tied back to the structure (i.e. veneer versus multi-wythe construction).

On May 15, 2018, a teleconference call was held between JLR and Mr. Jonny Bélanger of the MWN to discuss the factual results and contents of the SCA report, and to address any comments from the MWN. With the exception of minor clarifications and questions, the MWN had no major comments pertaining to the draft SCA report.

On May 23, 2018, JLR submitted a fee proposal to complete the additional investigation work outlined in the draft SCA report, as requested by the MWN.

On June 4, 2018, JLR received approval from the MWN to carry out the additional investigation in accordance with the May 23, 2018 fee proposal, and on June 12, 2018, Alison Cuda, P.Eng., of JLR, along with Mr. Jonny Bélanger of the MWN and the MWN's hired contractor (WINMAR) , attended the site to remove select localized architectural finishes to complete the additional investigation.

3.0 SCOPE OF WORK & ASSESSMENT METHODOLOGY

The scope of the structural condition assessment included a visual cursory review of the readily visible portions of the building's structure, and at locations where architectural finishes were locally removed by the MWN. Refer to SKS-2 in Appendix C for the locations of locally removed architectural finishes.

For ease of identification of deficiency locations, JLR has identified each area/room of the existing building using alphabetical characters. Refer to SKS-1 in Appendix C for area/room identification.

Sampling or testing of materials, analysis of the existing structure to determine the capacity of the existing structural systems to support the intended loading, and detailed engineering of any recommended repairs were not part of JLR's scope, and were therefore not performed.

A review of the building's subsurface conditions and foundations, a review of architectural elements, and a review of electrical and mechanical equipment were not included as part of JLR's scope, and were therefore not performed. Where defects are noted in finishes, it is to highlight locations where this may indicate defects with the underlying structure.

In this report, the condition of concrete, steel, wood, and masonry deterioration has been quantified based on an adaptation of the procedures described in the Ontario Structures Inspection Manual (OSIM). Despite the fact that the OSIM provides procedures for bridge inspections, the OSIM procedures have been used to help provide a detailed ranking system for quantifying the state of deterioration (i.e. Light, Medium, Severe, Very Severe). Excerpts from the OSIM manual, Section 2 – Material Defects, which detail the ranking systems, are included in Appendix E.

The following concrete deficiencies, as suggested in the OSIM, were considered during the assessment:

- Scaling – Local flaking, or loss of the surface portion of concrete or mortar as a result of the freeze-thaw deterioration of concrete.
- Corrosion of Reinforcement - Deterioration of reinforcement by electrolysis.
- Delamination – A discontinuity in the surface concrete which is substantially separated, but not completely detached, from the larger concrete mass.
- Spalling – A portion of concrete that has been completely separated and detached from the larger concrete mass.
- Cracking – Linear fracturing of the concrete which may extend partly or completely through the member.
- Surface Defects – A weakness or potential weakness in the concrete. Defects include stratification, segregation, cold joints, surface deposits, honeycombing, pop-outs, abrasion, and wear.

The following steelwork deficiencies, as suggested in the OSIM, were considered during the assessment:

- Corrosion – Deterioration of the steel from exposure to air, moisture, or other chemicals and contaminants in the environment.
- Permanent Deformations – Bending, buckling, twisting, elongation, or any combination of these which may be caused by overloading conditions or impact.
- Cracking – A linear fracture in the steel due to fatigue,
- Connection Deficiencies – Loose, cracked, or corroded connections, and missing connectors.

The following wood deficiencies, as suggested in the OSIM, were considered during the assessment:

- Checks, Splits, and Shakes – Longitudinal tissue separations.

- Weathering – Gradual deterioration of wood due to exposure to the weather elements.
- Rot or Decay – Biological decomposition of wood caused by microorganisms call fungi.
- Insect Damage – Defects in wood caused by insects.
- Cracking, Splintering, Crushing, and Shattering – Forms of physical damage resulting from overloading of a member.
- Fire and Chemical Damage – Damage caused by fire and/or exposure to chemicals over time.
- Connection Deficiencies – Loosened or damage connections.

The following masonry deficiencies, as suggested in the OSIM, were considered during the assessment:

- Cracking – Incomplete separation into one or more parts with or without space in between.
- Splitting, Spalling, and Disintegration – Opening of seams or cracks in the masonry, chipping away of pieces of masonry, gradual breakdown of the masonry into small fragments.
- Loss of Mortar and Masonry – Due to the destructive actions of frost, erosion, plant growth, or softening by water.

4.0 LIMITATIONS OF REVIEW

Review of the building's interior structure was limited to areas where architectural finishes had been removed by the MWN to expose the structure, and in select locations where JLR removed ceiling tiles to review the structure above. The removal of architectural finishes was coordinated between JLR and the MWN, prior to the completion of the on-site SCA. Refer to SKS-2 in Appendix C for locations of locally removed architectural finishes. The architectural finishes that were removed for the additional investigation work are also indicated on SKS-2.

Visual cursory review of the interior structure was completed from floor level and from a stepladder, where required. Select interior structural elements reviewed included: underside of the wood tongue and groove roof deck, wood roof joists, steel wide flange girders, round steel support posts, wood bridging, floor terrazzo (which may indicate deficiencies in the concrete floor below), interior wall finishes (which may suggest deficiencies in the structure), ceiling finishes (which may indicate deficiencies in the roof structure above), and visible portions of OMAFRA office area steel roof joists.

No access was permitted to Room 'I' at the time of review.

Review of the building's exterior structure was limited to readily visible areas and elements such as the exterior masonry walls, the visible portions of the foundation walls, the front and side entrance canopy support posts and associated anchorage, and exterior entrance concrete slabs on grade. Review of the exterior elements was completed from ground level. Access to the roof was not available at the time of review on May 1, 2018, however during the additional investigation on June 12, 2018, partial roof access was provided via ladder only at the northeast corner of the north wing.

With the exception of a main floor general arrangement plan, no other drawings of the building and/or existing documentation are not known to exist and were therefore not available to JLR

during the assessment or preparation of this report. Therefore, the construction and structural systems of the building, as witnessed during the assessment, are noted in the Observations section of this report.

5.0 OBSERVATIONS

The following sections summarize the visual observations made by Laura Grover, P.Eng., and Patrick Rochefort, EIT, during the condition assessment site visits performed on April 23, 2018 and May 1, 2018, and by Alison Cuda, P.Eng., during the additional investigation site visit held on June 12, 2018. Locations of deficiencies are included on SKS-3 (interior deficiencies) and SKS-4 (exterior deficiencies), and are accompanied by itemized lists of all noted deficiencies, provided in Appendix C.

5.1 Building Construction & Structural Systems

The following is a summary of the building construction and structural systems, which is based solely on JLR's observations made during the assessment. No existing drawings or documentation are known to exist to substantiate the observations.

5.1.1 OMAFRA Office Area (former school gymnasium)

The OMAFRA office area is understood to have served as the gymnasium when the building was previously occupied as a school. The construction of the OMAFRA office area appears to consist of wood tongue and groove roof deck supported by steel roof joists spanning east-west. Only portions of the steel roof joists were visible at the time of review, and therefore the depth and overall construction of the steel roof joists are unknown at this time. The joists are supported by load-bearing masonry walls on the east and west sides of the OMAFRA office area. It appears that the load-bearing masonry walls comprise an exterior brick wythe with header courses inserted at every seventh course, that interlock with a concrete masonry wythe of unknown thickness. Cast-in-place concrete foundations support the masonry walls. The north and south walls of the OMAFRA office area, though not load-bearing, appear to be of the same construction as the east and west walls.

5.1.2 Remainder of Building (rooms A to AH, as identified on SKS-1)

The construction of the remainder of the building appears to consist of wood tongue and groove roof deck supported by wood roof joists of varying depths and spans. The wood roof joists span parallel to the south exterior wall in the south section of the building and parallel to the east and west walls in the north wing of the building. The wood roof joists appear to frame into either steel wide flange girders, exterior load-bearing masonry walls, or interior load-bearing wood framed walls. Roof joists appear to be supported by exterior load-bearing walls in three (3) locations. Refer to SKS-1 for these locations. The steel wide flange girders are supported by round steel posts along exterior walls and steel wide flange columns along interior walls. It appears that the interior walls between the former classrooms are load-bearing.

The construction of these walls appears to consist of wood framing. The exterior walls appear to be constructed of a brick veneer and a masonry block backing wall. It appears that the brick and masonry block walls are tied together with brick header courses, although this could not be confirmed during the assessment as no brick header courses were visible where architectural finishes were locally removed. It appears that steel angle lintels support the brickwork and masonry block above the windows, and that the steel wide flange girders on the interior of the building are cantilevered over a short distance beyond the round steel posts below, and provide direct support to the steel lintels. The exact construction of the steel lintels and their connections could not be confirmed.

5.2 Interior Observations

5.2.1 Floors Systems

The floor system in the OMAFRA office area appears to consist of a wood subfloor covered with hardwood and Click-Lock vinyl flooring. No deficiencies of the floor were observed in this area.

The floor system in the hallways and washrooms is terrazzo tile, which is assumed to be supported on a concrete slab-on-grade. The terrazzo tile demonstrated hairline to wide sized cracking in multiple locations throughout the building. Refer to items 16 to 19, and 21 on SKS-3.

The floor system in the offices and community program rooms appears to consist of a wood-framed sub-floor over a concrete slab-on-grade. The sub-floor and concrete slab below were exposed in two locations, as identified on SKS-2. Refer to items 34 and 52 on SKS-3.

The floor appears to slope towards the north side of the building in Rooms ‘Q’ and ‘K’. Refer to items 35 and 37 on SKS-3.

5.2.2 Interior Walls and Finishes

The interior walls of the OMFRA office area consist of gypsum board on steel stud framing and freestanding wooden office partition walls. The stud-framed walls are offset from the inside of the masonry walls. A significant gap between the east wall and the interior finishes (partition wall, stair stringer, baseboard) is visible at the east access to the stage. Refer to items 4 to 6 on SKS-3.

JLR also observed cracking and significant separation of the gypsum board finishes along the east wall, above the drop ceiling. It appears that water infiltration has resulted in damage to the former wall openings, and medium corrosion of the lintel above the opening south of the exterior HVAC unit. Separation between the original ceiling tile (directly below the steel joists) and the top of the east wall is also apparent in multiple locations. Refer to items 8 to 10 on SKS-3.

The interior walls in the hallways and washrooms consist of plaster covered with mid-height terrazzo tile. Narrow to medium/wide cracks in the terrazzo tile and plaster were observed in multiple locations. Refer to items 29 to 30, and 40 on SKS-3.

The walls in the offices and community program rooms appear to consist of a combination of gypsum board and plaster walls, depending on the location. JLR observed narrow to medium sized cracks and out-of-plane displacements in the plaster in various locations. Refer to items 14, 22, 26, 31, 32, 33, and 51 on SKS-3.

Upon further investigation of the observed cracking along the east wall in Room 'D' and along the north wall in Room 'AE', JLR observed that the cracking was only present in the architectural finishes, and the structure behind was in good condition. Refer to items 57 and 58 on SKS-3.

JLR observed exterior light passing through the space between the exterior wall and the window frame in Room 'AF', thus a space exists between the wall and the window frame. Refer to item 59 on SKS-3.

5.2.3 Ceilings and Interior of Roof Structure

Water staining was observed on the drop ceiling tiles in a few locations throughout the OMAFRA office area. Refer to item 3 on SKS-3. Only portions of the east end of two (2) steel roof joists were visible at the time of review. However, no signs of steel deterioration were observed on the visible portions of the joists. Minimal water staining was observed on the underside of the wood roof deck. No signs of rot or deterioration of the roof deck were observed. Refer to item 11 on SKS-3.

Water staining of the drop ceiling tiles as well as the original ceiling tiles was observed in multiple locations throughout the remainder of the building. Refer to items 13, 20, 32, 36, 38, 41, and 42 on SKS-3. Water staining was also observed on the underside of the wood roof deck and the wood roof joists in multiple locations. Refer to items 14, 22, 26, 31, 32, 33, and 51 on SKS-3. No deterioration of wood joists, roof deck or steel members was observed on the visible portions of the roof structure. The wood bridging was detached from the wood roof joints in Room 'A'. Refer to item 15 on SKS-3.

JLR observed exterior light passing through at the location of the removed architectural ceiling finishes in Room 'AF'. It is unclear if the exterior light is passing through an opening in the roof or in the wall. Refer item 60 on SKS-3.

5.3 Exterior Observations

5.3.1 Front Entrance Canopy Area

The front entrance canopy has a pitched roof supported by the adjacent load bearing masonry wall to the east and four (4) round steel support posts to the west.

It appears that the canopy originally had a flat roof. One of the steel support posts showed signs of very severe corrosion and full section loss at the bottom of the post, near the base plate. Full section loss was observed over approximately 50% of the circumference of the post. Refer to item 26 on SKS-4. Two (2) posts are missing one (1) anchor bolt each. Refer to item 27 on SKS-4. The proximity of the support post anchor bolts to the edge of the concrete slab-on-grade has resulted in concrete breakout of the anchors and cracking of the slab. Refer to item 28 on SKS-4.

JLR observed medium to wide cracking of the slab on grade and access ramp near the front entrance. Refer to item 29 on SKS-4.

5.3.2 Exterior Brick Walls

In general, JLR observed several deficiencies regarding the exterior brickwork. In several locations, mortar joints have demonstrated significant mortar loss, ranging from medium to severe. The mortar appears brittle and is easily dislodged in several locations. Refer to items 35, 44, 47, 57, 59, 62, 66, 67, 72, 73, 75, 77, and 81 on SKS-4. Signs of water infiltration and erosion are apparent near and around windows, and coincide with areas of severe mortar loss. Refer to items 2, 11, 16, 23, 45, 63, 64, 69, and 74 on SKS-4. Wide step-cracking was also observed through mortar joints near windows, extending outward and downward from the bottom corner of the window toward the foundation. Refer to items 1, 9, 14, 22, 36, 42, 65, and 78 on SKS-4. JLR also observed that several brick faces have fully spalled, while others were partially spalled. Refer to items 44 and 56 on SKS-4. The exterior brick walls appear to be out-of-plumb in multiple locations.

The brickwork that forms the east wall adjacent to the OMAFRA office area is showing signs of significant deterioration and displacements. The top portion of the brickwork appears to be displacing inwards and other portions of the brickwork, mainly the middle section, appear to be displacing outward. The shape and magnitude of the displacement suggests the brick is buckling. Medium to wide step-cracking through mortar joints and bricks was also observed near the top of the north and south walls where they intersect the east wall, with visible out-of-plane displacements. Refer to items 53, 54, 57, and 58 on SKS-4.

The brickwork above the windows along the east wall adjacent to Rooms ‘AB, AF, and AG’ and between windows along the south wall adjacent to Rooms ‘Q, K, I, G, and F’ is showing signs of significant displacements. Refer to items 66, 67, 69, 72, 73, 75, 77, and 78 on SKS-4. The brickwork in these locations appears to be displacing outwards. The brickwork above the windows along the east wall noted above appears to have undergone severe mortar loss and deterioration. Refer to items 36, 39, 44, 46, and 47 on SKS-4.

Significant water leakage from the south side entrance canopy roof was observed at the west corner, adjacent to the entrance doors. The brickwork below has undergone damage as a result of the leakage. Refer to item 48 on SKS-4.

Insufficient support of brickwork was observed above window openings in multiple locations along the perimeter of the building. More than 50% of the bottom of the brick was visible beyond the bottom horizontal leg of the steel lintel, in several locations. Refer to items 5, 6, 21, and 79 on SKS-4.

Previous mortar joint repairs were observed in several locations throughout the exterior wall brickwork. Many of these repairs have also deteriorated. Refer to items 22, 55, 57, 59, 65, and 78 on SKS-4.

The elevation of the exterior grade is above the bottom course of brick along the north wall adjacent to Rooms 'AG and AE'. This has resulted in damage to the bottom courses of brickwork. Refer to item 82 on SKS-4.

5.3.3 Concrete Foundation

The visible portions of the concrete foundation demonstrated medium to wide vertical cracking throughout the perimeter of the building. In some instances, the vertical cracks extended upwards through the brick and mortar joints. Refer to items 4, 8, 12, 17, 18, 19, 20, 30, 32, 37, 43, 50, 55, and 76 on SKS-4.

5.3.4 Miscellaneous Steel

In locations where mortar joints have failed between windows, JLR has observed steel members of unknown size and length, embedded between brick courses. Similar members were also observed between the bottom brick course and the top of the foundation. All observed instances noted above occur between window locations. Refer to items 41 and 70 on SKS-4.

Steel lintels above window openings throughout the perimeter of the building showed signs of light to medium corrosion.

The steel lintels supporting the brick above the openings in the east wall of the OMAFRA office area are visibly deflecting.

6.0 DISCUSSION & RECOMMENDATIONS

6.1 Discussion

6.1.1 OMAFRA Office Deficiencies

It appears that the long-term effects of water infiltration have negatively affected the integrity of the exterior masonry walls, especially the east load-bearing wall of to the OMAFRA office area, where significant displacements were observed. Over time, water can infiltrate the building envelope, and through multiple freeze-thaw cycles, it is possible for masonry units to contract and expand and ultimately fail. It is suspected that water may have infiltrated the masonry walls of the building and the header course bricks that connect the exterior brick wythe to the interior block

wythe may have undergone similar freeze-thaw action. After numerous freeze-thaw cycles, these header course bricks may have failed in various locations resulting in a lack of connectivity between the wythes. Consequently, the exterior brick wythe no longer has sufficient lateral stability, and can experience out-of-plane displacements. The shape and magnitude of the displacement observed in the east wall suggest that the brick wythe is buckling on account of the lack of support.

The gypsum board finishes on the interior of the building along the east wall adjacent to the OMAFRA offices have undergone out-of-plane displacements. This would suggest that the interior masonry wythe may also have undergone similar displacements. This is a concern because the steel roof joists directly bear on the interior wythe of block.

It was also observed that wood joists supporting the lower roof in adjacent rooms tie into the load-bearing west wall of the OMAFRA office area, and are therefore dependent on the integrity of the roof structure and wall in the OMAFRA office area.

6.1.2 Interior Deficiencies (remainder of the building)

Upon reviewing the structural systems of the building, and observing that roof members are generally supported by steel girders and span parallel to exterior walls, it can be determined that the majority of the observed cracking of floor and wall finishes is primarily aesthetic in nature. Even though signs of water infiltration (i.e. water staining) were observed in multiple locations along the interior roof structure, it was observed that wood members did not show any signs of wood deterioration or rot, and steel members did not show any signs of corrosion. The cracking observed in the terrazzo suggests settlement of the concrete slabs-on-grade below, however these cracks appear to have been present for several years and do not present a structural concern.

The sloping of the floor towards the north side of the building observed in Rooms ‘Q’ and ‘K’ is not believed to be of structural significance. The sloping of the floor is suspected to be due to early stage settlement of the fill materials below the slab resulting in a crack in the slab and its settlement along the south side of the building.

Upon further investigation of the east wall in Room ‘D’ and the north wall in Room ‘AE’, it was determined that the observed cracking in the finishes is aesthetic in nature, and does not present a structural concern.

6.1.3 Exterior Deficiencies

Although the front entrance canopy structure does not appear to be directly related to the overall structural integrity of the building, several deficiencies were observed in the area. The concrete slab-on-grade has multiple medium to wide cracks as well as medium pieces of spalled concrete throughout the slab. These deficiencies are believed to be the result of settlement of the soil below as well as the proximity

of the round steel support post anchorage to the slab's edge. When anchor bolts are not placed in accordance with the code recommended edge distances (as per CSA A23.3-04 Annex D), concrete breakout of the anchor bolts is possible. Concrete breakout results in cracking and spalling of the concrete surrounding the anchor bolts, and has occurred in this case. The round steel posts that support the canopy roof structure appear to consist of non-structural pipe, as opposed to structural HSS posts. In general, the posts appear to be in good condition, with the exception of the very severe corrosion and full section loss observed at the bottom of one of the posts. Such severe section loss greatly reduces the load carrying capacity of the member, as it no longer has its original cross sectional area, which largely composes the member's resistance.

Although the building envelope is typically considered an architectural component, its condition and behaviour should be considered closely when assessing the overall structural condition of this building due largely to the load-bearing masonry components. Even though the interior structural components are generally in good condition, the global structure appears to be directly dependent on the integrity of the exterior masonry walls and overall building envelope.

Similar to the east wall of the OMAFRA office area, water infiltration and freeze-thaw cyclic action is also suspected to have caused the mortar and brickwork deterioration along the east wall adjacent to Rooms 'AB, AF, and AG'. Significant mortar loss was observed above the windows in this area, and out-of-plane displacement is also visible. It is believed that the condition of the mortar and brickwork is also a cause of similar water infiltration along the south wall adjacent to Rooms ' Q, K, I, G, and F'.

The north and south wing exterior masonry walls appear to be constructed of brick veneer with a masonry backup wall. It is JLR's opinion that the brick and masonry block walls are tied together with header brick courses to provide stability to the brick veneer. However, this assumption could not be verified during the assessment, as no brick header courses were visible at the locations of the removed architectural finishes. The interior masonry block wall appears to be in good condition.

The observed exterior light passing between the wall and the window, and near the roof in Room 'AE', does not currently appear to have affected the structure, however this discontinuity in the building envelope will negatively impact the structure over time. The presence of gaps and spaces in the building envelope allows the exterior elements, such as snow and rain, to enter the building, and ultimately cause moisture issues, which can lead to the deterioration of structural elements, especially if said moisture is unable to exit the envelope efficiently.

The elevation of the exterior grade that overlaps the bottom course of brick along the north wall adjacent to Rooms 'AG' and 'AE' has caused damage to the mortar and brickwork. The high elevation of the grade allows for water runoff from the adjacent parking lot area to easily reach the brickwork and can entrap moisture beneath it. This action can allow water and moisture to enter the building envelope and lead to further deterioration of materials.

The cracks observed in the concrete foundations do not appear to be recent, as multiple cracks show remains of what appears to be epoxy caulking from a previous repair attempt. These cracks are not believed to be of structural significance. It is common for buildings to undergo minimal settlement over time, which can cause cracks to form in the foundations.

The brick supported by the steel lintels above the window openings on the east and west walls of the north wing is overhanging the horizontal leg of the lintel. In several locations, this overhang is 50% or more of the brick width. It is unclear if this is a construction deficiency or due to movement of the wall.

6.2 Recommendations

As a result of the discussion provided above, JLR provides the following recommendations for remediation and repair of the structure. All design items shall be completed by a Professional Engineer licensed in the Province of Ontario.

6.2.1 Interior Deficiencies

6.2.1.1 Non-Structural Deficiencies

a) Generally, the interior floor and wall finishes demonstrate deficiencies that are generally aesthetic in nature, and are therefore not of structural significance. Localized repairs of floor and wall finishes can be completed to return the finishes to their original state, if so desired. Such repairs are beyond the scope of a structural condition assessment, and may be addressed in a subsequent architectural condition assessment to be performed at a later date.

b) The sloping of the floor in Rooms ‘Q’ and ‘K’ is not of structural significance and no further action is required. However, should it be desired to remediate to area, the following can be competed:
   - Remove the sub-floor;
   - Install self-levelling grout to level the surface;
   - Install new sub-floor.

6.2.1.2 Structural Deficiencies

a) Repair the detached bridging between the roof joists in Room ‘A’.

6.2.2 Exterior Deficiencies

Given the current condition of the exterior masonry walls throughout the perimeter of the building, remediation and/or repair is recommended. Failure to implement

an appropriate remediation/repair strategy could result in significant structural damage or failure of portions of the walls.

6.2.2.1 East Wall of the OMAFRA office area

JLR recommends the undertaking of one of the following options:

a) Temporarily shore the OMAFRA office area's roof structure and locally remove the exterior brick wythe in an effort to determine if the interior masonry wythe has undergone damage and displacements. Should the interior masonry wythe appear to be of sound condition, construct a new brick façade tied back to the existing masonry block. Should the interior masonry wythe be in a condition unsuitable to re-use as part of the load-bearing structure, demolish and re-construct the east wall using reinforced load bearing masonry units. The temporary shoring design shall be completed and signed/sealed by a qualified Professional Engineer licensed in the Province of Ontario. The review of the interior masonry wythe shall also be completed by a qualified Professional Engineer licensed in Province of Ontario.

b) Fully demolish and re-construct the OMAFRA office area (former gymnasium).

c) Fully demolish the OMAFRA office area, and install cladding on the exterior of the former west wall of the OMAFRA office to serve as an exterior wall and occupy the remainder of the building.

6.2.2.2 Remainder of Exterior Walls

JLR recommends the undertaking of one of the following options:

a) Remove and replace the brickwork above and below the windows along the east wall of the north wing (adjacent to Rooms 'AA', 'AB', 'AF', and 'AG') and along the south wall (adjacent to Rooms 'Q', 'K', 'I', 'G', 'F', and 'A'). Repoint the mortar in all areas around the perimeter of the building where mortar joints have experienced significant deterioration. It should be noted that this repair strategy will only remedy the issues pertaining to the structural aspects of the masonry walls, and will not resolve potential moisture infiltration issues caused by the lack of an air gap and weep holes that would allow moisture to exit the building envelope. A rain screen could be added around the building to mitigate such moisture infiltration, however this is beyond the scope of a structural condition assessment, and may be addressed in a subsequent architectural condition assessment performed at a later date.

b) Remove and replace the brickwork along the east wall (adjacent to Rooms 'AA', 'AB', 'AF', and 'AG') and along the south wall (adjacent to

Rooms ‘Q’, ‘K’, ‘I’, ‘G’, ‘F’, and ‘A’), and re-construct in a manner that will provide an air gap to allow moisture to exit the building envelope. Existing block backup wall is assumed to remain in place. Repoint mortar in all areas around the perimeter of the building where mortar joints have experienced significant deterioration.

JLR also recommends that the presence of the exterior light passing through the building envelope be further investigated during the architectural building condition assessment, to further understand where exterior elements may be entering the building envelope.

6.2.3 Front Entrance Canopy Structure

JLR recommends the undertaking of the following:

a) Replace the round steel pipe support posts with adequately sized structural HSS posts, complete with new base plates and anchor bolts with adequate edge distance to prevent future cracking/spalling.

b) Locally repair or fully replace the slab-on-grade and ramp.

6.2.4 Foundation

Given the discussion provided above, JLR recommends that no further action be taken at this time.

6.2.5 Grading

JLR recommends the undertaking of the following:

a) Regrade the exterior adjacent parking lot area on the north side of the building and ensure that grade slopes away from the building. The design of such work shall be completed and signed/sealed by a qualified Professional Engineer licensed in the Province of Ontario.

7.0 OPINION OF PROBABLE CONSTRUCTION COSTS

The following information outlines our opinion of probable construction costs (OPCC) for the recommended repairs, as provided in Section 6.2 of this report.

Please note that in providing OPCCs, one should understand that JLR has no control over the cost or availability of labour, equipment or materials, or over market conditions or the Contractor’s method of pricing, and that our OPCCs are made on the basis of our professional judgment and experience. We make no warranty, express or implied, that the bids or the negotiated cost of the Work will not vary from our OPCC.

This OPCC is presented as a Class 'D', which is defined as a preliminary OPCC which, due to little or no site information, indicates the approximate magnitude of costs of the proposed work, based on the broad requirements. This overall OPCC may be derived from lump sum or unit costs for a similar project. It may be used in developing long term capital plans for preliminary discussion of proposed capital projects.

The following OPCC values do not include the following:

- Any cost associated with report recommendation items 6.2.1.1 a) or b), or any other costs associated with the repair and/or replacement of architectural finishes.
- Any cost associated with the disposal of removed/demolition materials.
- Any cost associated with the detailed design and/or engineering pertaining to any identified repairs.
- Harmonized Sales Tax.
- Costs associated with building permits.

The following OPCC values include a 30% construction contingency value.

- Report item item 6.2.1.2 a) – Repair detached bridging in Room 'A':
    - Includes: labour and material costs associated with the repair of detached bridging between roof joists in Room 'A'.
        - **Total Cost: $ 2,900.00**

- Report item 6.2.2.1 – Exterior east wall of the OMAFRA office area (costing for 6.2.2.1 'a' recommendation only):
    - *Base Work:* includes costs associated with the supply and installation of the temporary shoring of the OMAFRA office area roof structure, partial removal of the exterior brickwork to facilitate the engineering review of the masonry wall, and engineering review of the masonry wall. Does not include finish and partition wall removals inside the OMAFRA office area.
        - **Total cost for Base Work: $200,500.00**

    - *Case 1 – (if the masonry block wythe is of sound condition):* includes costs associated with the demolition of the remaining brickwork and construction of a new brick wythe tied to the existing masonry block wythe and new metal roof flashing.
        - **Total cost for Option 1: $62,00.00 (+ Base Work costs)**

    - *Case 2 – (if the masonry block wythe is in a condition unsuitable for re-use):* includes costs associated with the demolition of the remaining brickwork, demolition of the existing masonry block wythe, construction of a new load-bearing masonry block wythe, construction of an exterior brick wythe tied back to the masonry block wythe, localized concrete repair work, temporary hoarding, and installation of new metal roof flashing.
        - **Total cost for Option 2: $155,000.00 (+ Base Work costs)**

- Report item 6.2.2.2 – Remainder of exterior walls (costing for 6.2.2.2 'b' recommendation only, assuming the existing masonry block wythe will remain):

  - Includes: Removal and replacement of the brickwork along the east wall (adjacent to Rooms 'AA', 'AB', 'AF', and 'AG') and along the south wall (adjacent to Rooms 'Q', 'K', 'I', 'G', 'F', and 'A'). Repoint mortar in all areas around the perimeter of the building where mortar joints have experienced significant deterioration.
    - **Total cost: $160,000.00**

- Report item 6.2.3 a) – Replace round steel pipe support posts:
  - Includes: temporary shoring of existing canopy roof, removal of existing round pipe support posts (including base plates and anchor bolts), supply and installation of new structural HSS steel posts (including base plates and anchor bolts). Assumes slab is being replaced.
    - **Total cost: $16,000.00**

- Report item 6.2.3 b) – Full replacement of the slab-on-grade and access ramp:
  - Includes: removal of existing slab-on-grade and access ramp concrete, supply and installation of concrete, reinforcing steel, formwork, and finishing of concrete for new slab-on-grade and access ramp. Assumes posts are being replaced. No additional shoring is included.
    - **Total cost: $20,000.00**

- Report item 6.2.5 – Regrade the exterior adjacent parking lot area on the north side of the building:
  - Includes: completion and preparation of a topographic survey and construction costs associated with the regrading work.
    - **Total cost: $16,000.00**

8.0 CONCLUSION

The repair of the deficiencies listed in this report should be implemented as noted in the recommendations listed above, in order to preserve the safety and long-term integrity of the structure. Failure to implement an appropriate remediation/repair strategy could result in significant structural damage and/or failure of portions of the walls.

9.0 STATEMENT OF QUALIFICATIONS & LIMITATIONS ON USE

The opinions and recommendations expressed within this report are based solely on our professional opinion of visual observations gathered during the assessment on the dates noted above, as outlined below:

J.L. Richards & Associated Limited accepts no responsibility for any events or changes in conditions that may have occurred since the date outlined above.

Any opinions of probable construction cost (OPCC) included within this report are based on the existing described construction as of the date of JLR's visual observation. The costs included are provided as order-of-magnitude costs for capital planning purposes and are not a prediction of the tender prices. Tendered prices will be influenced by factors such as the tenderers' methods of pricing and/or interpretations of their probable effort, current or pending projects by others and

level of competitiveness in the market at the time of tender, availability of labour and materials, etc., which are not within our control, knowledge and/or ability to predict.

This report has been prepared for the exclusive use of The Municipality of West Nipissing, for the stated purpose, for the named facility. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of The Municipality of West Nipissing and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

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