

Wynndel Community Center
5127 Wynndel Rd
Wynndel, BC, V0B 2N2

Project No. 2025-021
Date: 2025-03-11

Attention: **Mitchell Nelson, WCC President**

**Re: Structural Condition Review Report
Wynndel Community Center
5127 Wynndel Rd, Wynndel, BC**

1.0 Introduction

Bolen Engineering Inc. (Bolen Engineering) presents this report on the observed structural condition of the building at the above noted address. It is the understanding of Bolen Engineering that this report was commissioned to review the existing structural condition of the building for obvious, visible signs of structural distress, damage or displacement. It is also our understanding that this review is intended to be non-intrusive in nature and as such was limited to a review of exposed, visible structural components. The review of demolition procedures, demolition safety, design of temporary shoring/bracing, and the detailed design of structural repairs (if required) is considered beyond the scope of this report.

Chris Merrill, P. Eng, a structural engineer employed at Bolen Engineering, attended the site on March 3rd, 2025 and recorded observations, collected measurements and took photographs. A selection of relevant photographs has been included in this report.

2.0 Site Description

The building can be described as an approximately 5,800 square foot, single storey, wood frame, glulam arch building with a full basement, supported on conventional concrete foundations. The building appears to consist of the original building (approx. 4,600 square feet) with a large addition on the east side of the building (approx. 1,000 square feet) and a small addition at the north end of the building (approx. 200 square feet) added on at a later date.

Based upon discussion with the client, we understand original construction of the building is likely circa 1951. We also understand that construction of the east addition is likely circa 2001. Original building drawings were not available at the time of our review.

The original building structure generally consists of OSB roof sheathing of unknown specifications, over 2"x4" strapping, supported by glulam arches which extend down to the main floor, forming the roof and wall assembly. The main floor system consists of floor sheathing of unknown specifications, over 2"x10" rough sawn joists, supported by dimensional built-up beams and the perimeter foundation walls. The dimensional built-up beams are supported by round HSS (Hollow Structural Section) steel columns, which are assumed to be supported by pad footings. Exterior foundation walls are 10" thick conventional concrete walls, which are assumed to be supported on conventional strip footings.

The east addition structure generally consists of OSB roof sheathing of unknown specifications, over engineered wood plate trusses, supported by exterior wood frame walls. The exterior walls are supported by conventional concrete foundation walls, which are assumed to be supported on conventional strip footings. The north addition structure was concealed by interior and exterior finishes at the time of our review, and as such the structural components could not be confirmed or reviewed.



Photograph 1: Exterior east elevation view

3.0 Observations

3.1 Roof & Wall Structure – Original Building

The roof structure of the original building consists of OSB roof sheathing of unknown thickness over 2"x4" strapping spaced at 14" on center, supported by 2 3/8" x 7 1/8" glulam arches spaced at 4'-0" on center. The (8) southernmost arches appear to be handmade glulam arches, measuring 2 1/2" x 6 3/4". The glulam arches continue down to the main floor elevation, forming the wall structure of the hall. The flat ceiling in the hall consists of 2"x6" horizontal members extending across the arches, suspended from the arches with a combination of 1"x6" and 2"x4" diagonal members.

The roof sheathing and 2"x4" strapping generally appeared to be in reasonable condition at the time of our review.

The majority of the glulam arches (16 out of 24) were observed to be in very poor / failing condition, with significant delamination and cracking / broken plies observed. (6) of the (8) glulam arches that were observed to be in reasonable condition were located at the southernmost end of the building, and the remaining (2) glulam arches that were in reasonable condition were located at the northernmost end of the building. The majority of the damage observed to the central arches was located on the west side of the building, although some damage to the arches was also observed on the east side of the building. In addition, the 2"x6" horizontal members supporting the ceiling between the arches was observed to have sheared away from the arches on the west side in several locations.



Photograph 2: Cracked / broken glulam arch



Photograph 3: Cracked / delaminated arch



Photograph 4: Broken glulam arch



Photograph 5: Broken arch & ceiling support
(lower horizontal piece is broken off arch)



Photograph 6: Broken / delaminated arch at peak connection

Upon reviewing the roof structure from the exterior on the west side of the building, the roof surface was observed to have experienced displacement of the roof profile, with bulging and undulations noted across the roof surface, particularly in the mid-section of the building.



Photograph 7: Bulging / alteration of roof along central portion of west side



Photograph 8: Bulging / alteration of roof along central portion of west side

The majority of the glulam arches below the ceiling forming the wall structure of the building were concealed by interior and exterior finishes at the time of our review. As such, a structural review of the arches within the walls could not be completed. However, a visual review of the interior finishes showed several signs of cracking and displacement, particularly at panel edges and along the seams of the benches built into the walls.



Photograph 9: Splitting / displacement at back of bench



Photograph 10: Displacement at southwest corner



Photograph 11: Finishes pulling apart at ceiling



Photograph 12: Wall displacement away from conduit

3.2 Roof & Wall Structure – Additions

The roof structure of the east addition consists of OSB roof sheathing of unknown thickness, over pitched, pre-engineered wood plate trusses spaced at 24" on center. In general, the roof sheathing and trusses were observed to be in good condition, with no obvious, visible signs of structural distress, damage or displacement observed.

The wood frame walls of the east addition were concealed by interior and exterior finishes at the time of our review, and as such the wall sheathing, stud size and configuration, as well as the structural condition of the walls could not be confirmed. No obvious, visible signs of structural distress, damage or displacement to the wall finishes was observed.

Due to the non-intrusive nature of our review, it was not possible to confirm the assemblies and structural condition of the roof or wall systems of the north addition, as the structural systems were concealed with interior and exterior finishes at the time of our review. No obvious, visible signs of structural distress, damage or displacement to the roof or wall finishes was observed.

3.3 Main Floor System & Supporting Components

The main floor of the original building consists of floor sheathing of unknown specifications, over rough sawn fir 2"x10" joists spaced at 12" o/c. The floor joists are supported by the concrete foundation walls around the perimeter, and by (3) interior bearing lines running longitudinally at quarter points across the width of the building. These interior bearing lines consist of (6) ply 2"x10" built-up fir dimensional beams, which are supported by 6" diameter steel HSS columns.

The majority of the floor sheathing and floor joists were concealed by interior finishes at the time of our review. No obvious, visible signs of structural distress, damage or displacement to the floor finishes was observed.

The steel columns were concealed by interior finishes at the time of our review. No obvious, visible signs of structural distress, damage or displacement to the column finishes was observed.

The main floor and supporting wood frame walls of the additions were fully concealed at the time of our review and could not be observed. No obvious, visible signs of structural distress, damage or displacement to the floor or wall finishes were observed.

3.4 Foundation System

The exterior foundation walls consist of 10" thick conventional concrete walls. Due to the non-intrusive nature of our review and the lack of original structural drawings, it was not possible to confirm the presence, sizing or configuration of reinforcement within the foundation walls. The building footings were fully concealed at the time of our site visit and as such could not be reviewed.

The majority of the interior face of the perimeter foundation walls was concealed at the time of our review. Approximately 50% of the exterior face of the foundation walls was exposed and could be reviewed. The portions of the foundation wall that could be reviewed were observed to be in reasonable condition given the age of the building. No obvious, visible signs of structural distress, damage or displacement to the foundation walls was observed.

The slab on grade floor systems were mostly concealed at the time of our review. The small portions of the slab that could be reviewed were observed to be in reasonable condition given the age of the building.

4.0 Discussion

It is the understanding of Bolen Engineering that this report was commissioned to review the existing structural condition of the building for obvious, visible signs of structural distress, damage or displacement. A structural analysis of the existing building was not completed as this is considered beyond the scope of work on this report.

4.1 Roof & Wall Structure – Original Building

The BC Building Code loading requirements have been revised over the years and in particular the climatic (snow) loading requirements. Buildings may have been designed and constructed to loading requirements at the time of construction, however some structural components may not meet current BC Building Code (2024) requirements. The BC Building Code recognizes this changing requirement and accepts or "grandfathers" previously conforming buildings under the current code requirements, provided there is not:

- a change in occupancy/use,
- major structural renovations,
- and the building is not exhibiting significant signs of structural distress/damage.

As the arches of the roof and wall structure on the original building are in a state of structural failure and are showing advanced signs of structural distress, the "grandfathering" of the building structure as previously conforming would not apply. As such, any structural repairs to the building would be

required to meet current BC Building Code requirements and any supporting structural components would also be required to meet current BC Building Code requirements.

The client indicated that they believe the east addition was constructed circa 2001, and that the roof cladding of the original building was changed at approximately the same time. It is worth noting that a common cause of structural failure for an arched roof system is when the arches are subjected to unbalanced loading (more snow on one side of the arch than the other). In fact, changes were made to the National Building Code of Canada (NBCC) in the 1970's to address this issue as the previous loading conditions specified in the code were deemed to be unsafe for arched roofs. Construction of the east addition would directly contribute to unbalanced snow loading, as snow shedding from the arched roof would be able to accumulate against the arched roof at the intersection of the east addition roof.

It is also worth noting that the original arched roof cladding was constructed of metal sheeting and that this cladding was replaced with asphalt shingles. Metal sheeting is considered a slippery surface that readily sheds snow, whereas the asphalt shingles would likely not shed snow as easily. This change in roof material could have contributed to additional snow remaining on the surface of the roof, increasing the overall load supported by the roof structure.

4.2 Remaining Portions of the Building

The majority of the remaining structural components of the building, including the addition roofs & walls, main floor system, bearing lines, foundation walls and footings were concealed by interior and / or exterior finishes at the time of our review. Generally, if a structural member is experiencing structural distress, damage or displacement, the interior and / or exterior finishes will also be affected and will show signs of distress such as drywall cracking, out of plumb elements, evidence of water staining, etc. No obvious, visible signs of significant structural distress, damage or displacement were observed on any of the interior or exterior finishes of the remaining structural components of the building that could be reviewed.

The life span and functionality of any structural system is limited and eventually failure will occur. This report is not intended to suggest that the original anticipated life span has been extended due to our review of the structural damage.

The remaining portions of the building were not reviewed by Bolen Engineering for BC Building Code compliance. Any and all comments made in this report refer only to the observed structural elements of the building. The condition of "Non-Structural" items, including but not limited to architectural, finishes, occupant safety, fire protection, civil, geotechnical, mechanical, electrical and building envelope, or any other non-structural items have not been reviewed by Bolen Engineering.

5.0 Opinions & Recommendations

Based upon the above noted observations and discussion, Bolen Engineering provides the following opinions and recommendations:

- 1. Roof & Wall Structure – Original Building: It is the opinion of Bolen Engineering that the existing glulam roof arches of the original building are currently in a state of structural failure and collapse of the structure is likely imminent. It is also the opinion of Bolen Engineering that the components of the roof and wall structure that have not failed are**

likely undersized and would not meet the loading requirements of the current edition of the BC Building Code. Due to the extensive damage to the roof arches, combined with the undersized structural components, it is the opinion of Bolen Engineering that structural repairs to the existing arch system would be extensive and are likely not economically feasible. It is the recommendation of Bolen Engineering that the existing arch structure be removed and replaced with a new structure meeting the current requirements of the BC Building Code.

2. **Occupant Safety:** It is the opinion of Bolen Engineering that the observed structural failure of the arched roof system over the original building has resulted in a significant risk to occupant safety within the building. It is the recommendation of Bolen Engineering that until repair or reinstatement of the building structural integrity is complete, no person be permitted to enter the building. In addition, in order to minimize additional damage, it is the recommendation of Bolen Engineering that no snow or rainwater be allowed to accumulate on the roof. It is also the recommendation of Bolen Engineering that the owner monitor the building until repair/reinstatement is completed. Should any signs of further structural distress or displacement be observed, Bolen Engineering should be contacted immediately for review.
3. **Roof & Wall Structure - Additions:** The portions of the addition roof and wall structures that could be reviewed appeared to be in good condition with no obvious signs of structural distress observed. **Based upon these observations it is the opinion of Bolen Engineering that the roof and wall structures of the north and east additions of the building are performing satisfactorily and will likely continue to do so in the future. No modifications or repairs are recommended at this time.**
4. **Main Floor System & Supporting Components:** The portions of the main floor system & supporting components that could be reviewed appeared to be in reasonable condition with no obvious signs of structural distress observed. **Based upon these observations it is the opinion of Bolen Engineering that the main floor system & supporting components of the building are performing satisfactorily and will likely continue to do so in the future. No modifications or repairs are recommended at this time.**
5. **Foundation System:** The majority of the existing foundations of the building were concealed at the time of our site visit and as such could not be reviewed. It is the opinion of Bolen Engineering that where accessible, the existing foundation system of the building appears to be in reasonable condition considering the age of the structure, however a more in-depth review of the exposed foundation system would be required to comment on the full extent of foundation conditions.

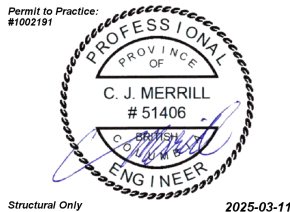
6.0 Limitations:

This report has been compiled in a fashion consistent with the standard of care and skill which can ordinarily be expected of a member of the engineering profession under similar conditions. No warranty is made, whether implied or expressed. This document has been prepared for the sole use and benefit of this project and client only and represents the professional opinions and judgements of Bolen Engineering based upon the knowledge and information available at the time this report was prepared. Any and all recommendations provided by Bolen Engineering are based upon our non-intrusive site review as well as any information provided by the client. It is common for other issues to exist in a building which may not be detected during our review as they are not readily accessible or are hidden from view. As such, should additional issues be noted during demolition, construction or at a later date, Bolen Engineering should be notified immediately. Bolen Engineering cannot be held responsible in any way for unknown or hidden site conditions. Any persons relying on this report do so at their own risk. The observations, opinions, recommendations, and all other content contained within this report are specific and applicable to this project only and are not applicable to any other project. If reference is to be made to this report, it must be made to the report in its entirety.

We trust that this report satisfies your requirements for this project. If you have any additional questions or concerns, please contact the undersigned at (250) 464-9268.

Sincerely,

Reviewed



Chris Merrill, P. Eng
Structural Engineer

Brandon Bolen, P. Eng
Structural Engineer