Guy W. Blood, M.Sc., P.Eng.
Structural Engineer

October 2, 2014

To Whom It May Concern:

Re: Entwistle Community Hall
4921 – 51 Street
Entwistle, Alberta
Lots 13,14,15 Block 6 Plan 7471V

Inspection Report

On September 25th, at the request of Lenny Richer of Parkland County, I visited the above hall to examine structural components and conditions of concern to the County and the Entwistle Community League.

The foundation, walls and roof all appear to be stable, with no obvious signs of movement, except on the basement walls. Most of the building has a crawl space under the floor, but the part of the building under the stage has a basement, where the foundation walls are visible. Some time ago, the south basement wall had cracked and moved inwards (at the top) and was then stabilized with two abutment walls. The west wall has cracked and it may at some time be prudent to support this wall in a similar manner.
The usual practice is to build a floor above grade to protect the floor edge boards and wall sill plates from moisture induced rot. At some locations on this building, the floor is level with grade, and is subject to wood rot. It's not an obvious problem yet, but it can be expected to develop sometime.
It is apparent that the building was built in at least three stages with a lot of time in between each stage. In support of this conclusion, I note that the roof consists of a central portion with visible interior lateral tie rods, and wood chip insulation. The north portion was built over top of the original roof with an on-site rafter construction and vermiculite insulation, and the south portion with manufactured trusses, fiberglass insulation, and a layer of fibre fill over the fiberglass. All of these connected roof systems appear to be functioning well. There may be deterioration (wood rot) at points where water has entered. This could be determined if or when the trusses are exposed.

The main issue of concern to the users is water coming through the roof, onto the floor, in large quantities, at several locations. I did not actually see this water, but Dan Harris reported it to me. Dan mentioned that over the last three years water has come in during the spring. This condition is of course untenable, and must be stopped. Besides the mess created, and the unusable time at the hall, water causes damage to insulation, drywall, flooring, and possibly the roof rafter/trusses themselves. It's also a starter condition for mold growth.

181, St Andrews Dr, Stony Plain, Alberta, T7Z 1K9
Telephone: 780 916-9558
e-mail: gwblood@telus.net
Business Number: 87067 4405 RT0001

Roofing is outside my expertise. However, with my construction and practical background experience, as well as consulting with a roofing specialist, and checking an Internet source, http://inspectapedia.com/ventilation/Attic_Condensation_Ice_Dams.htm I would like to offer my observations, analysis, and recommendations.

Observations and Reported Issues:

1. The water problems have been mainly in the late winter and early spring.
2. The water quantities have been large, requiring buckets to collect.
3. Water has enter at several locations: one big one on the south side lower roof level, and at locations where there is a change in the roof shape, i.e. at flashing and capping locations.
4. The wood chip insulation is minimal, over the oldest and highest portion of the ceiling, and a vapour barrier was not detected.
5. The vapour barrier in other locations is of minimal thickness.
6. Water has come through the ceiling.
7. Some roof penetrations have inadequate flashing and deteriorated caulking.
8. The roof ridge cap seal is loose and/or has moved out of position.
9. Some flashing at roof slope change locations is inadequate.
10. Roof to wall flashing is inadequate.
11. Some roof fasteners are loose and/or missing their seals.
12. Most roof fasteners are not placed in the recommended location, i.e. next to a rib.
13. Ceiling insulation extends right to the outside edges of the roof, blocking any air that might come from the outside, through the perforated soffit on the eves.

Analysis:

The water coming through loose fasteners and around roof penetrations, although problematic, would not be the major problem. In my opinion, the large quantity of water comes from snowmelt, mostly held back by ice dams. The water then runs through the seams in the metal roof. On the main roof sloped portions, these seams are simply between metal sheets. At roof slope changes, and at roof to wall connections, the flashing to roof metal provides an opening. This particular metal roof construction does not protect against standing water over about 1" deep.

Recommendations:

1. Prevent the build up of ice dams. This can be done by keeping the roof clear of snow all winter, by using heat tape, or by preventing the attic space from getting warm. It would be labour intensive, on an ongoing basis, to keep snow off the roof, so that solution is not a good one. Heat tape should be considered a temporary solution. The preferred remedy is to keep the attic at outside ambient temperature.
2. Replace inadequate flashings and re-seal where necessary with a thermo plastic caulking (normal silicone, tar, and latex not recommended).

181, St Andrews Dr, Stony Plain, Alberta, T7Z 1K9
Telephone: 780 916-9558
e-mail: gwblood@telus.net
Business Number: 87067 4405 RT0001

Explanation of Ice Dam Formation and Prevention:

To form, ice dams need a warm roof, with freezing temperatures at the edges. Heat to warm the roof comes from the interior of the building, through the ceiling and into the attic. On cold days, that interior heat changes the roof snow to water, which runs down the roof to the cold edge where it freezes, forming a barrier to any more water flowing down. The ice barrier keeps getting bigger until the dammed up water finds a place to go, that is, into the building.

To prevent ice dams from forming:

a) Insulation is used to keep heat flow to a minimum, from the interior to the attic, and
b) Attic ventilation is required to take that heat to the outside.

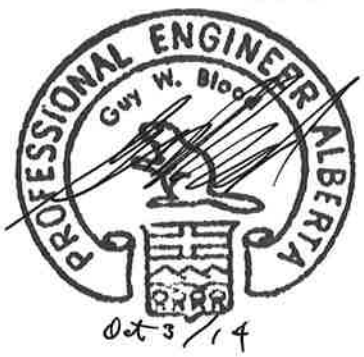
On this building, there is a problem with both: insulation and ventilation.

Work Recommendations:

1. To provide some protection this winter, install and use heat tape on all eves and above all locations where water came through the roof in previous years. Over the winter, examine eves periodically to check on and remove any ice dams that may have formed.
2. Replace the ridge cap seal.
3. Re-flash and caulk, according to the metal roofing manufacturer's recommendations, all roof joints at slope changes.
4. Properly apply flashing and caulking for all roof penetrations.
5. Replace any roof fasteners that are missing or have deteriorated seals.
6. Tighten or replace loose fasteners.
7. On the inside, remove ceiling sheeting from around the perimeter, and from areas where water has come through.
8. Remove any insulation, and other obstructions, that are blocking eve ventilation openings.
9. Remove and replace all wet insulation.
10. Install eve vent protection so that new insulation will not block airflow.
11. Apply a vapour barrier; meeting the requirements of the Alberta Building Code 2006, (ABC) article 9.25.4 to exposed ceiling joists, and all other ceiling areas where there is no vapour barrier.
12. Rebuild the attic access openings so that when closed, they are insulated and sealed against airflow.
13. Apply drywall to the ceiling, where necessary.
14. Apply blown-in insulation on top of the existing insulation, such that an R40 rating, or the ABC requirement, whichever is greater, is achieved.
15. Provide roof ventilation as required by 9.19.1 of the ABC.

Conclusions:

1. There is potential for deterioration, but the building structure is currently functioning well.
2. In my opinion, the roof leaking can be remedied by completing the work recommendations, listed above.



181, St Andrews Dr, Stony Plain, Alberta, T7Z 1K9
Telephone: 780 916-9558
e-mail: gwblood@telus.net
Business Number: 87067 4405 RT0001

Guy W. Blood, M.Sc., P.Eng.
Structural Engineer

Entwistle Community Hall
4921 – 51 Street
Entwistle, Alberta
Lots 13,14,15 Block 6 Plan 7471V

Addendum to the Inspection Report

The Three Quotes:

I have reviewed the three work proposals submitted for consideration. The least costly one had no detail, so it is very difficult to ascertain what would be done.

The most expensive one is unconvincing. There is an incomplete plan to handle the ice dam problem: 1) installing a new metal roof, 2) the addition of some insulation. There is nothing about attic ventilation. The provision of an underlayment roof membrane may work where there is a solid roof surface, but would not have adequate support on top of the strapping already in place. The majority of the existing metal roof is still in good shape, and in my opinion, there is no need to remove and replace it.

The middle estimate comes closest to understanding and fixing the leakage, but it has not addressed the flashing or ventilation issues. With an adjustment to include a plan for those two, more detail would still be needed to determine if that proposed work would solve the problem.

181, St Andrews Dr, Stony Plain, Alberta, T7Z 1K9
Telephone: 780 916-9558
e-mail: gwblood@telus.net
Business Number: 87067 4405 RT0001