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EKISTICS PLANNING + DESIGN

Sept. 19, 2017

1 Starr Lane, Dartmouth, NS

www.ekistics.net

Attention: Mr. Chris Crawford NSAA, B.EDS, MARCH, LEED AP

Re: **Kejimikujik National Park Administration Building Roof Anchorage**

Chris:

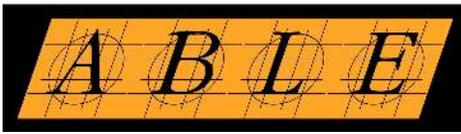
During my site visit last year looking strictly from the viewpoint of adding to the administration centre, I noticed that the roof trusses appeared to have a lack of anchorage. I was asked to verify the situation and provide a design to anchor the new pitched roof to the existing structure. I was on site Sept 15th to investigate further the anchorage of the roof trusses at the Administration Centre.

Background:

The original building was designed with a flat roof structure. The ballasted roofing was supported on a plywood deck, that was supported on 2x10 roof joists. The roof joists were anchored down to timber plates on block walls or steel beams, but mainly to glued laminated timbers. (Details of the anchors are shown on the existing drawings and during my initial site visit a sheathing panel was removed and their existence verified.) The existing roof was sloped to in various areas to drains. At some point in time, a theatre was added and the breezeway infilled. Either at that time or later, the ballasted roofing was removed and a pitched roof system was installed. From further information I gathered last Friday, and from wind load calculations we made, we have determined that the roof does not comply with NBC as is.

View down the centre of attic. Piggyback trusses are above the main trusses on each side.





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The problem is a lack of anchorage back to the original structure, and from piggyback trusses to lower trusses. The lower (not piggyback trusses) were placed on 2x6 timber plates. There are either 1, 2 or 3 layers of plates depending on location. Additional shimming of plates was done also making for a maximum height of approximately 6" at drain locations.



The timber plates are nailed down to the plywood sheathing generally with 2 nails every 16" to 24". The main trusses are nailed down to the plates with either 2 or 3 nails. At quite a few locations the bottom chord is split from improper nailing.

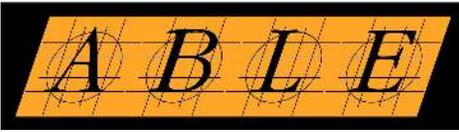


The piggyback trusses bear on top of the main trusses with either a 1x4 or 2x4 separating them. The upper piggy back trusses are only nailed down to the plate with no direct connection between the trusses.

To comply with NBC additional connections must be made to anchor the roof down to the existing structure.

Remediation:

We have determined that a system of hold down ties and screws can be introduced to provide the required uplift capacity for the pitched trusses.



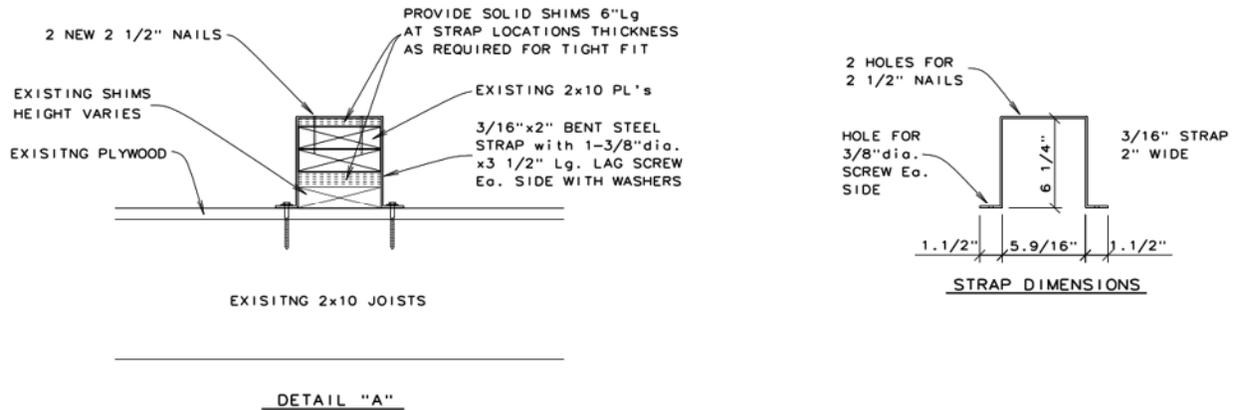
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Each piggyback truss should have a new Simpson H2A anchor installed to connect the piggyback truss to the lower main truss across the 1x4 or 2x4 plate that separates them. That should be done at each end of the piggyback truss.

Each main truss should be connected to the double plates at each end of the trusses with a Simpson H2.5 anchor.

The double plates need to be connected to the 2x10 joists below the sheathing. Due to the fact that the distance from the top of the double plates to the existing joists below the sheathing varies due to the slopes for drains, two systems are required. Where double plates and shims do not exceed 3 1/2" in height, one 5" long Simpson Strong-Drive SDW EWP-PLY screws should be screwed through the plates and existing plywood deck, into every joist where existing joist spacing is 16". Where existing joist spacing is 12", use one Simpson Strong-Drive SDW EWP-PLY screw every second joist. Where the double plates and shims are in excess of 3 1/2" high and up to 4 1/2" high, use 6" Simpson Strong-Drive SDW EWP-PLY screws. At locations where double plates and shims exceed 4 1/2" in height use steel strap and screws as shown on detail A.



Also enclosed is a pdf of the original roof structure indicating existing joist spacing. The red dashed lines represent double plate locations.

Jack Robaczewski
Project Manager

