BODIS GROUP INC.
ROOF CONSULTING FIRM

March 21, 2016

Mr. Mark Barnes
Colorado Commercial Roofing, Inc.
4200 N Weber St.
Colorado Springs, CO

REF: Destructive Analysis Results
Roof Assembly Replacement Specifications
Castle Rock Community Recreation Center
2301 Woodlands Blvd.
Castle Rock, Colorado

Mr. Barnes:

The following report includes our findings of existing roof conditions, roof assembly core analysis and a roof specification for wet roof deck section and gable and face wood panel removal and replacement over the swimming pool and curb and wall flashing installations.

Roof Assembly Core Analysis Results

We observed the two cores cut through the roof assembly to the steel deck conducted by Colorado Commercial Roofing which indicated that the OSB, Oriented Strand Board/closed cell Polyisocyanate, foam core roof assembly was wet in an area over the east section of the swimming pool and next to the west upper section of the front entryway skylight. (white arrows roof photo) In other areas throughout the roof assembly areas over the swimming pool wet and deteriorated wood deck was observed.

We cut two cores through the roof assembly in the lower northeast and upper north areas over the swimming pool. (black arrows roof photo) The roof assembly we cut through consisted of 3.5” of fiber reinforced faced closed cell Polyisocyanate foam insulation board topped with a laminated 7/16” OSB, Oriented Strand Board. The roof assembly was installed over a black plastic vapor retarder installed over the steel deck.

Exhibit 1

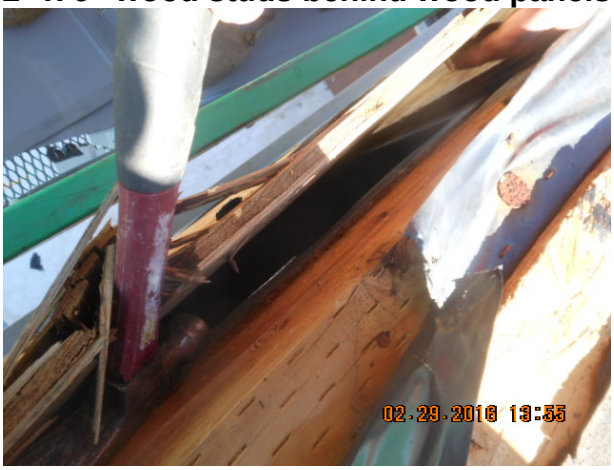
When we were installing the insulation pieces in the northeast core hole area, we noted air running through the steel deck flutes pushing the insulation pieces out of the hole. The core taken in the upper north roof area was taken out in one piece. We could feel the air flowing up through the core hole from the steel flutes. This probably indicates that air is coming from the wall areas inside the swimming pool and flowing into the steel deck flutes. This could be causing the moist pool area air to damage the roof assembly in areas that are not directly above the pool.

Insulation pieces blowing out of the northeast core hole area

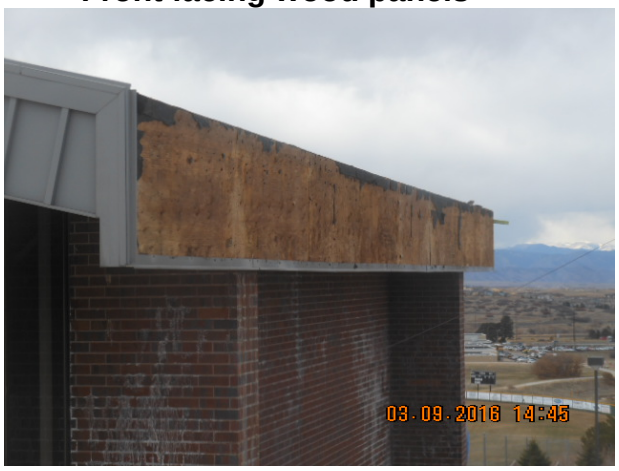
Roof Gable and Front Facing Wood Panels

After the roofing contractor removed the standing seam metal panels off the gable and facing vertical walls we observed wet underlayment asphalt membrane and water stained and weathered wood panels. The roofing contractor removed part of the top north facing vertical wood panel. Under the panel we observed 2” x 6” wood framing and the side of the steel deck that was rusted. Based on the condition of the wood paneling in the north facing vertical wood panels and the rusted steel deck side that this area has been a source of water leaks or condensation for a number of years.

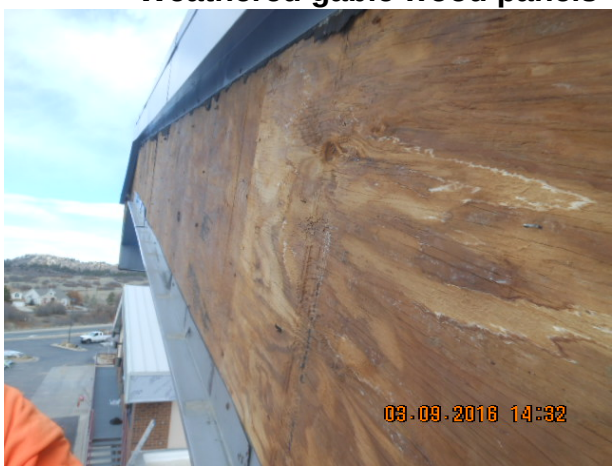
2” x 6” wood studs behind wood panels



Front facing wood panels

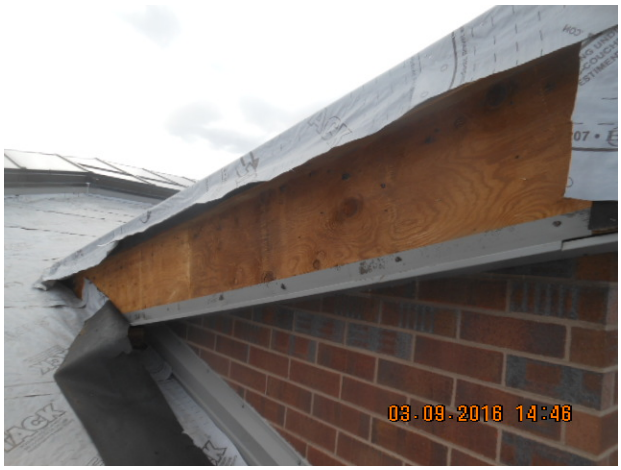


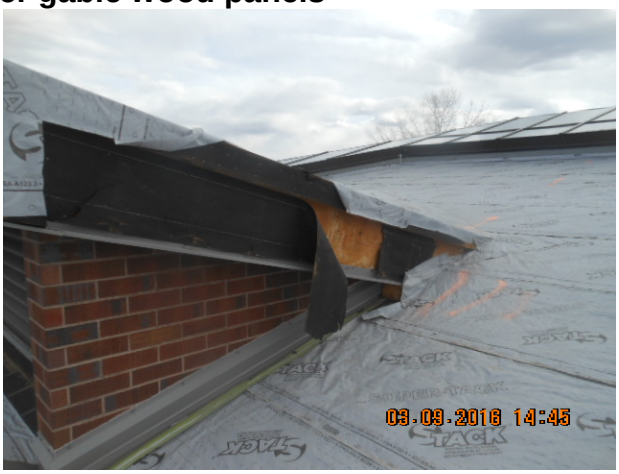
Weathered gable wood panels



The same condition, wet and weather wood gable panels, was observed after the gable standing seam metal panels were removed.

Weather vertical dormer gable wood panels





Conclusion

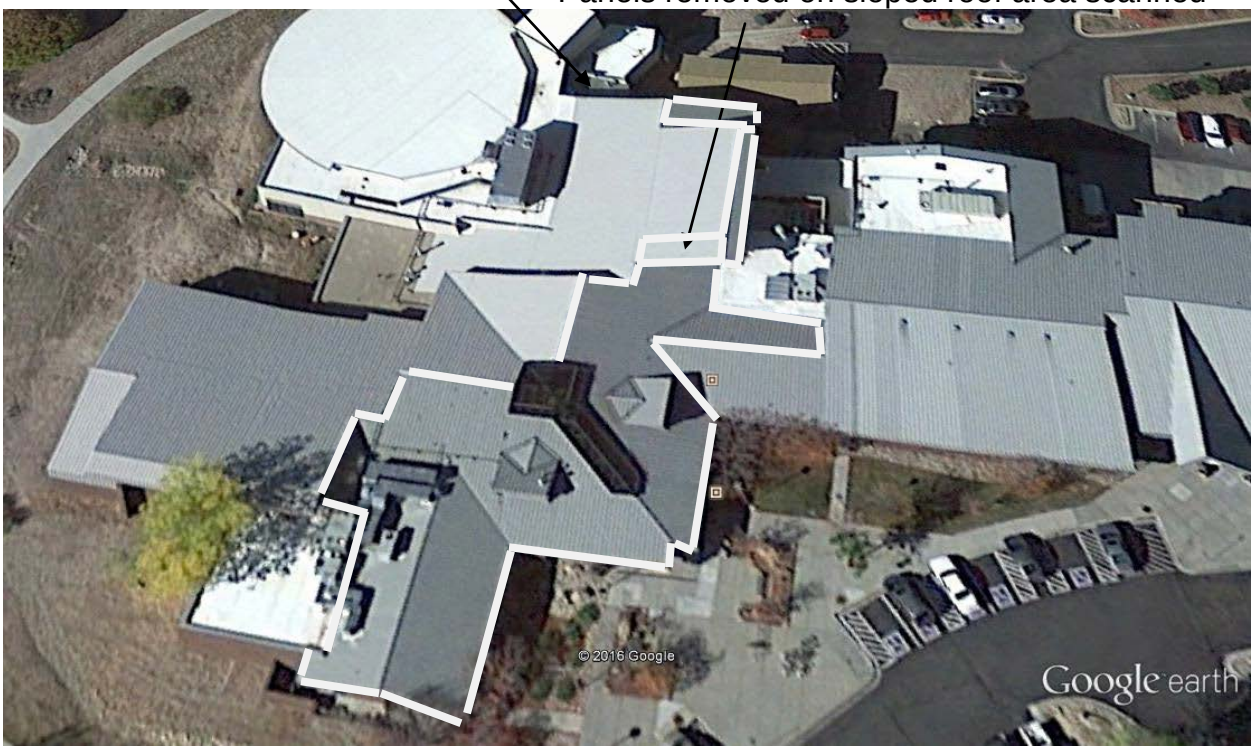
A non-destructive infra-red scan was conducted in the areas marked in the roof photo below. The Therographer indicated that because of the type of roof assembly the ThermaCam B-2 Camera and Thamex RWS Moisture Meter could only detect wet OSB wood, which is part of the roof assembly, not wet insulation. The scan report, attached, shows that a large sections of the roof area, delineated in yellowish areas on the scan photos, has water saturated OSB wood and the complete roof assembly has to be torn out and replaced. The roofing contractor cannot install his standing seam roof over wet water saturated OSB wood. The new roof assembly installation will provide the roofing contractor with a sound roof assembly to install his standing seam roof.

Some east section standing seam roofing panels, in the marked section of the existing newer south sloping standing seam metal roof over the pool, were removed for the scan and then reinstalled. The scan indicated wetness of the OSB wood at the roof assembly joints. Based on observations by the roofing contractor of water running from under the standing seam panels at the overlap and the scan results in the sampled area we have to assume there is additional wet OSB wood in the remainder of the south sloping standing seam roof. If we assume moisture follows air flow then we have to assume that the moist air from the pool is moving through the metal decking flutes then through the roof assembly joints.

White lines outline areas scanned

Small lower roof (not shown) was scanned

Panels removed on sloped roof area scanned



We recommend that the gable and front facing wood panels will have to be torn off and replaced so the roofing contractor has a solid wood surface to properly secure the standing seam panels.

It is our opinion that, if you do not stop the air flow in the metal deck flutes, moisture vapor will continue to build within the roof assembly and along the walls. This vapor build-up could cause future roof assembly damage and possible roof leaks. We recommend that you get a mechanical and/or a curtain wall consultant to inspect the situation and make positive recommendations.

Roof Specifications

Roof Assembly Replacement

Based on the infrared scan results the roofing contractor knows where the wet roof deck areas are located. With that knowledge he should do the following:

All wet roof assembly areas should be cut out to the deck and removed. Any rusted metal decking will either need to be cleaned and painted or replaced if the rust has rendered an area non-structurally sound. This will need to be assessed as sections of the existing roof assembly are removed.

At the front facing and gable ends we recommend that the synthetic felt that is planned for this area be upgraded to a high quality Ice & Water membrane. This membrane needs to seal to the new vapor barrier (see below), and seal off the metal deck flutes ends.

If at interior and side monitor walls the Ice & Water Shield membrane cannot be extended over the steel deck ends, because the steel deck runs under the framing, install a foam closure strip into the flutes. The foam closure shall be the type designed for the steel deck configuration.

After the roof assembly is removed, apply a self-adhering asphalt modified vapor barrier as manufactured by Soprema (Sopravap'R) or Carlisle (Vapair Seal MD Air and Vapor Barrier) or equal. This type of product is installed by peeling back the release film on the underside of the sheet applied to the steel deck with hand pressure. Once the sheet is in place roll entire sheet with a weighted roller. The longitudinal joints shall overlap a minimum of 3".

At the end of the roll install a metal plate (24 or 26 gauge depending on flute width) or vapor barrier membrane 6" x 42" to support the membrane end lap between flutes ensuring a complete end lap seal. End lap should overlap a minimum of 6".

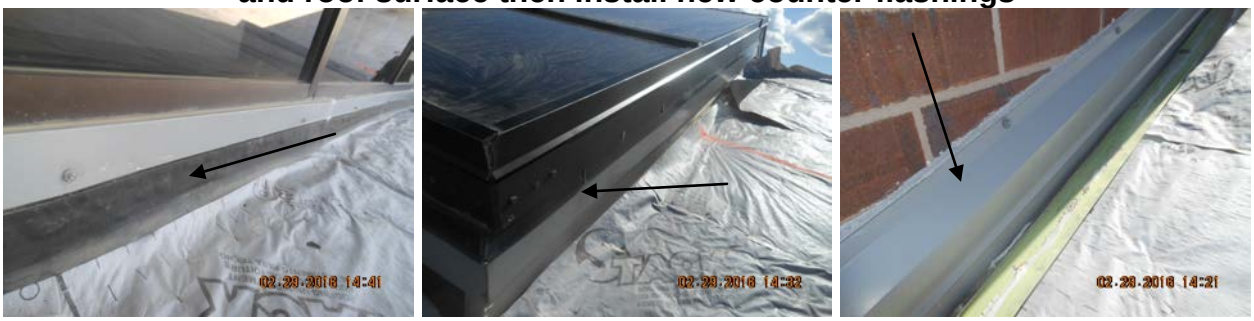
Where roof assembly is torn out and replaced against a wall the vapor barrier shall extend up the vertical portion of the wall to the height of the new assembly panel.

Install 3.5" closed cell Polyisocyanate foam core insulation with fiber reinforced facer panels with 7/16" thick laminated OSB, Oriented Strand Board, as manufactured by Hunter Panels or equal secured with screws and plated as per the manufacturer's installation guidelines and fastening pattern as per local building code wind uplift requirements.

Over the cleaned roof assembly panels install a 40-mil thick cold applied, self-adhering membrane composed of a high strength polyethylene film coated on one side with a layer of rubberized asphalt adhesive with a disposable release sheet such as manufactured by Grace Ice & Water Shield or equal. Peel back the release film on the underside of the sheet applied to the panels with hand pressure. The membrane shall extend a minimum of 18" onto the surrounding existing roof assembly. The sheet shall have 3 ½" side laps and 6" end laps. Install membrane such that all laps shed water.

After the wall and curb counter flashings are removed in the swimming pool and curb leak areas install an Ice & Water Shield membrane up the wall overlapping the roof surface by 6". Install new sheet metal counter flashings.

Curb and wall counter flashing to be removed, Ice& Water Shield applied to wall and roof surface then install new counter flashings



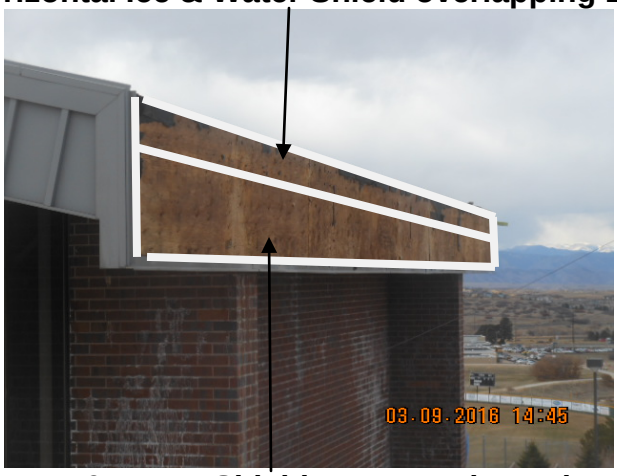
Roof Gable and Front Facing Wood Panels

Remove and replace the gable and front facing front panels on the sloping roofs and on the dormer gables.

Between the 2" x 6" wood studs install either Johns Manville or Owens Corning or equal R-19 Kraft paper faced fiberglass insulation 6.25" wide x 15" wide x 39.2" long roll.

Install the new wood panels then over the vertical wood panels install the Ice & Water Shield membrane. Extend the horizontal Ice & Water Shield membrane that is installed to the new roof assembly down the vertical portion of the panels 12"

Horizontal Ice & Water Shield overlapping 12"



Ice & Water Shield over wood panels

Exhibit 1

CASTLE ROCK COMMUNITY RECREATION CENTER

Water saturated and wet roof OSB wood areas outlined in white are areas that were infrared tested and showed as wet. The area outlined in red is expected to be wet because of the test area on this slope that tested as wet and other evidence (i.e: water seeping from the seams). The blue area is where the existing TPO tested wet, and is suggested that also be replaced.