

# 2018 RCI DOCUMENT COMPETITION WINNERS

The following pages profile the winning entries in the 2018 RCI Document Competition. Winners (and some stand-ins) were recognized and presented with plaques and RCI Dollars at the RCI Convention by President Michael Williams for Document Competition Chair Tim Barrett.



**Richard A. Froberg,  
RRC, AIA**

*Miller Dunwiddie Architecture*

**1st Place – Report Writing**



**Julie Palmer for  
Jeffrey Levine**

*Levine & Company, Inc.*

**1st Place – Large Project**



**Richard L. Cook Jr.,  
FRCI, RBEC, CCS, RRO,  
CSRP, SC ACEM**

*ADC Engineering Inc.*

**2nd Place – Special Project**

**3rd Place – Small Project**



**James W. Ripley, RBEC, RRO, RA**

*A/R/C Associates Inc.*

**1st Place – Small Project**

**1st Place – Special Project**

**2nd Place – Small Project**

**3rd Place – Large Project**

**3rd Place – Report Writing**



**Daniel Atwell, RRC, RWC,  
RRO, REWO, CDT**

*ADC Engineering Inc.*

**2nd Place – Report Writing**



**Christopher Klammer for  
Robert Fritz**

*Mott MacDonald*

**2nd Place – Large Project**



**Jonathan L. Solland,  
RRO**

*BTC Group*

**3rd Place – Special Project**





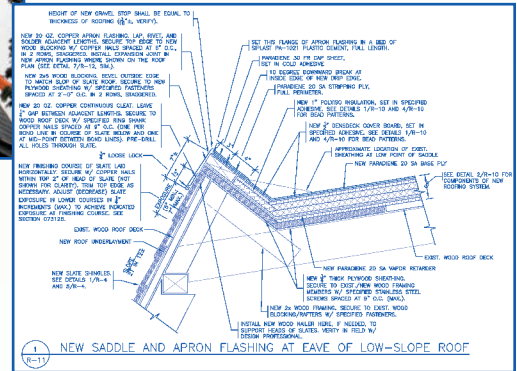
**Jeffrey Levine**  
Levine & Company, Inc.

## Roof Replacement, fifth phase Barclay Hall, Haverford College Haverford, Pennsylvania

Barclay Hall, Haverford College's first dormitory, was designed by renowned Philadelphia architect Addison Hutton, and constructed in 1876. A combination of 130-year-old Pennsylvania hard-vein and 70-year-old Pennsylvania soft-vein slate on the building's steep-slope roofs had reached the end of their service lives and needed to be replaced. The fifth phase of roof replacement involved installation of new slate roofing on the building's center wing, including new copper flashings, copper-lined pole gutters, and snow retention systems. Architectural woodwork at dormer windows was repaired and painted, new modified-bitumen roofing



*The project presented numerous design challenges, including this gusset where a dormer hip, two open valleys, a scupper, and the end termination of a pole gutter converge.*



*A detail drawing showing the eave of the low-slope roof, including the new saddle between scuppers, copper apron flashing, and finishing course of slate.*



*Installation of new slate roofing with copper flashings and gutter liners in progress. New hex-butt slate shingles match the shape and pattern of the originals, including the red band at the top of the slopes.*

systems with liquid-applied membrane flashings at penetrations were installed on low-slope roofs, and new flat-seam copper roofing was installed on a bay and an entrance porch roof.

Numerous challenges posed by the project required innovative solutions and detailed construction documents to achieve a long-lived, watertight roof system. Details included drawings overlaid on photographs, axon views, and multi-step illustrations in order to convey the scope of work and complexity of the detailing in the clearest possible way.

Levine & Company worked closely with the roofing contractor during construction, reviewing and discussing mock-ups, observing work in progress, and adjusting details when necessary to facilitate installation and accommodate unforeseen conditions. Attention to detail and frequent

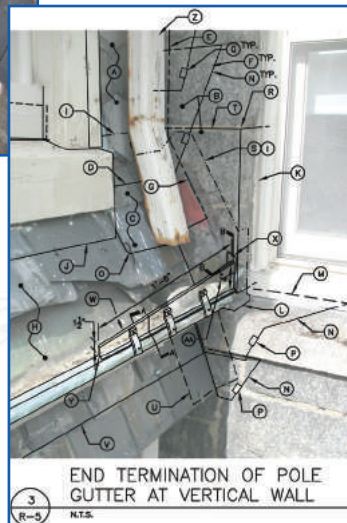
communication with the contractor helped ensure a smooth construction phase and a final product that is attractive, watertight, and will provide decades of worry-free service life for the owner.

Some of the improvements afforded by the design include the following:

• **Expansion**

spaces incorporated into new pole gutter liners and dormer windowsill caps permit thermal movement of the new gutter liners. In addition, raised expansion joints, cleats at the top edge of the gutter liners, and a loose lock between the gutter liners and gutter aprons ensure they can move freely with changes in temperature.

- New snow rails were installed where possible, and new snow guards were installed in every other course of slate on all roof slopes located above sidewalks and entrances in order to remedy ongoing problems with sheets of snow cascading off the roof during winter months.
- New wood poles were rigidly secured to roof decking/framing, better sloped toward the outlet tubes and wrapped by the new copper gutter liner and gutter apron to protect them from deterioration.
- New saddles were constructed between existing scuppers at the eaves of the low-slope roofs to eliminate ponding water issues.



*One of numerous photo details included in the drawing set to help define the scope of work.*



## Roof Replacement

### Rutgers College Avenue Gymnasium

New Brunswick, New Jersey

**Robert Fritz**

Mott MacDonald  
Architects, PC



Restoring a historic site at Rutgers University offers a glimpse into the rich past of one of New Jersey's oldest universities. The College Avenue Gym, with its extensive history, has stood proudly since 1932, and has even bounced back from devastating fires. However, by 2015 the building was beginning to show its true age in the form of wear and tear, particularly to its original slate roof and copper gutters.

Mott MacDonald was retained by Rutgers University to evaluate and document the existing conditions and prepare construction documents for the restoration of all steep and flat roofs and associated brick and stone masonry.

The gymnasium is square in shape, with multiple roof levels and types. The center portion consists of a flat roof on which four roof

monitors have been built with skylights facing north. All four sides have slate-covered steep-shed roofs with wood dormers and windows on the north and east sides. Another roof monitor includes a row of east-facing skylights on the west side. A flat lower roof shelters the swimming pool.

The building is a steel-framed structure with steel purlins supporting an Insulite, Porete, and Nalecode concrete slab. Insulite, was first fabricated in the early 1900s as light, strong, uniform sheets. The Porete slabs installed over the Insulite were Portland cement concrete blown up with air, making them two-thirds lighter and a better fire-resisting material than concrete, as well as an excellent heat and sound insulator. Nalecode nailing concrete was installed on top of the Insulite/Porete assembly. It was developed in the early 1900s as an alternative to wood sleepers, fill, and sheathing to save costs and time. Nalecode is a compound of powdered and fibrous minerals mixed with Portland cement to make plastic mortar.

The existing structural systems presented a unique substrate for modern roofing systems. The material directly on top of the steel purlins,

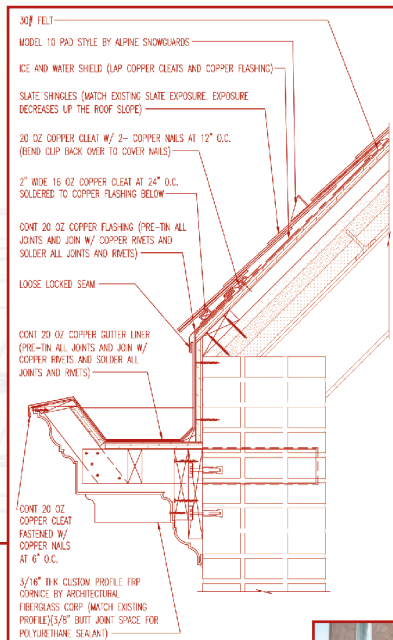


*Rutgers College Avenue Gymnasium*

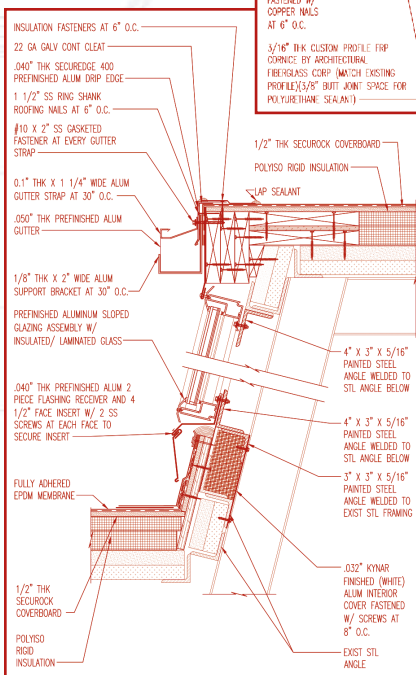
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The Porete and Nalecode materials both tested positive as asbestos-containing materials (ACM). Therefore, wood nailers and plywood sheathing were used to support the new slate roofing system, which consisted of blue-black slate over underlayment.

Yankee gutters and cornices were fabricated of fiberglass-reinforced plastic (FRP) to replace the historic originals, and included copper lining and flashing.



*Built-in gutter slate eave detail.*



*Sloped glazing detail.*



*Metal-lined built-in Yankee gutters.*





**James Ripley**

A/R/C Associates, Inc.

Roof Replacement and Repairs

**Brooksville Elementary School**

Brooksville, Florida

The owners asked A/R/C Associates to prepare for the replacement of nearly the entire campus of Brooksville Elementary School, which was approximately 63,327 sq. ft. in total. The campus was made up of a variety of roof systems, including existing single-ply roofing over lightweight concrete deck, single ply over tectum deck, shingles over existing insulation and metal deck, modified bitumen over metal deck, and a standing-seam

metal panel gazebo over metal framing. This variety of roofing, substrates, and assemblies presented us with an increased amount of resulting details and specifications.

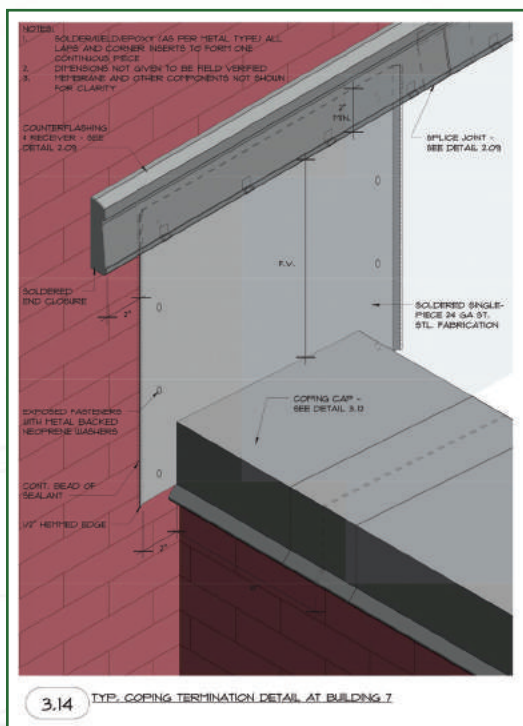
A/R/C has a long history of using computer-aided design (CAD) software exclusively, and we have been trying to move out of this, and further into building information modeling (BIM). This project presented us with a good opportunity to use it to better manage the end product.

The process began with hybrids of making the buildings and roof areas in BIM, but still producing details in CAD programs. This project was one of our first exclusively BIM projects.

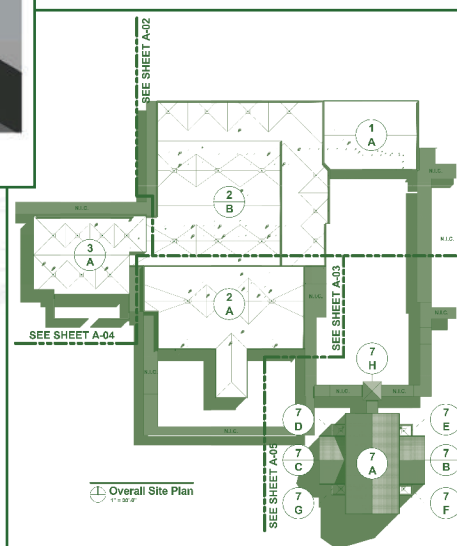
*Overall view of roof conditions nearing project completion.*



*More detailed view of new roof and metal flashings typical to project.*



*Coping cap termination detail as created using Revit.*



*Excerpt from overall roof plan produced in Revit.*

From a management perspective, BIM modeling made the process easier to hand off to less-experienced draftsmen who could be coached and taught along the way. As long as a draftsman understands how to use a BIM program correctly, resulting details are easier to edit. Producing finished details in BIM begins with rough skeletons of the 3-D model that slowly get fleshed out as you add extrusions and line work. We also found that as the details and plans came together, we had fewer errors, or they arose much faster since they stood out. Modeling the metal flashings in 3-D also more clearly demonstrates their intersection, and shows you what the final product will actually look like, and prevents any M.C. Escher-like details from coming across a contractor's desk.

The owner's reaction to the plans and details was more positive, as they had a better understanding of how it came together, and contractors had fewer questions during bidding. This positive experience for us through design and bidding has given us momentum to focus more and more on BIM as we continue to work on other projects.



## Roof Replacement and Repairs

### Springstead High School

Spring Hill, Florida

**James Ripley**

A/R/C Associates Inc.



An opportunity to improve the interior hallways over the students' lockers at Springstead High School in Spring Hill, Florida, arose once the school requested that the metal roof panels above be replaced. The long central hallways were once open-air breezeways with 3,803 sq. ft. of structural standing-seam metal roofs over 4x4 aluminum framing, which had become enclosed in a previous project. The school had not originally contacted us to improve this space, but instead to replace 23,359 sq. ft. of existing low-slope built-up roofs that surrounded them. During our initial field investigations, we found the metal roof areas and existing clerestory windows were nearing the end of their service lives, and were contributing to leaks. After presenting our findings to the owner, replacement of the full system was added to our scope of work.



Existing roof and window conditions prior to renovation.

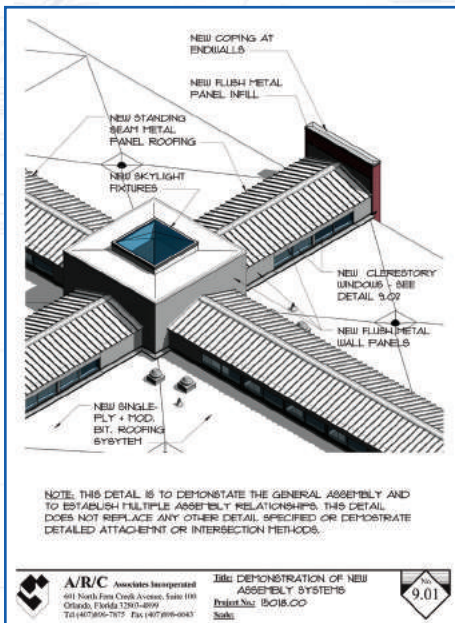
Roof and window conditions upon project completion.



The design started from the top down. With an existing metal panel roof spanning over aluminum framing, there was absolutely no thermal resistance. We decided to replace this with an architectural metal panel over rigid insulation and a new metal deck for support. After consulting a structural engineer, we decided to add an exposed acoustical metal deck to improve the noise in spaces below. The concrete walls around the clerestory windows were designed to be clad in metal, as well as to continue a monolithic system down to the low-slope roofing. The built-up roofing was replaced with a PVC single-ply over a gypsum cover board, insulation, and a fastened venting base sheet over the lightweight concrete to improve the overall thermal resistance of the entire building. By replacing the metal panel roofing and low-slope roofing at the same time, we

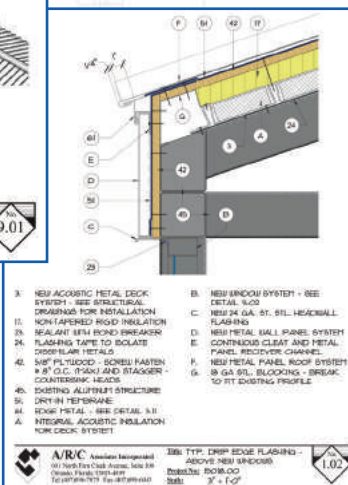
were able to improve the insulations of the entire roof system an additional R-20.

The overall result of the project was exactly what the owner wanted—a better-insulated building with a 20-year, no-dollar-limit roof system warranty. Thinking through multiple options through design resulted in an improved space below, where a high-traffic space was improved by noise reduction. We were also able to coordinate design by using a building information modeling (BIM) model, which produced plans and details concurrently so that we could better visualize the end result.



Aerial perspective of the various roof/wall systems.

Typical metal roof drip edge detail created using Revit.



Interior of corridor with clerestory windows and new acoustic roof deck.





**James Ripley**  
A/R/C Associates Inc.

## Partial Roof Replacement and Repairs

### Ketterlinus Elementary

St. Augustine, Florida



*View from south interior courtyard of completed roof and flashing.*

This project consisted of the removal and replacement of the existing roof system (6,642 sq. ft.) on the administration building of the Ketterlinus Elementary School, originally built in the 1960s. Design challenges included the “folded-plate” roof shape, which needed to be retained; increasing insulation levels; and correcting drainage

issues created by the shape and adjacent classroom buildings. The owner requested the majority of the stormwater be directed towards the north roof edge and to an underground storm system. A/R/C’s field investigation revealed the existing lightweight concrete (LWIC) was deteriorated and was no longer a viable roofing substrate.

The work consisted of removing both the existing roof membrane and cellular LWIC system to expose the existing concrete roof deck. Once the roof deck was cleaned and prepared, a single ply of smooth modified-bitumen membrane was torch-applied as a preliminary roof system. This was to allow for the installation of

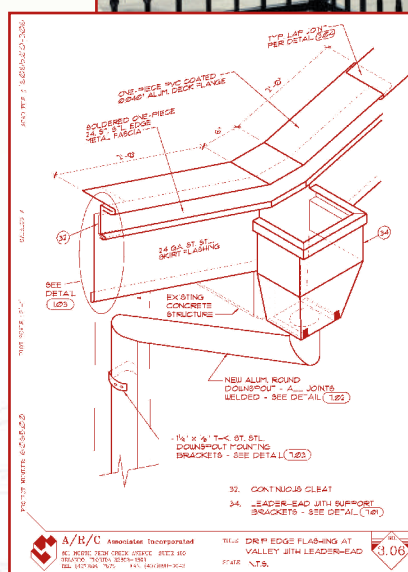
new perimeter edge blocking, area dividers, expansion joints, and equipment curbs.

After completion of that work, a new cellular (LWIC) system was then poured over integral rigid insulation (EPS), which was installed to aid in providing roof slope ( $\frac{1}{4}$  in. per ft.) and to help achieve a minimum thermal resistance value of R-20 to comply with the Florida Energy Code.

This was followed by the installation of a thermoplastic (PVC) single-ply membrane directly adhered to the newly poured LWIC roof deck. To ensure proper flashing heights for the new roof system, new rooftop equipment curbs were used to replace the existing ones. This was required due to



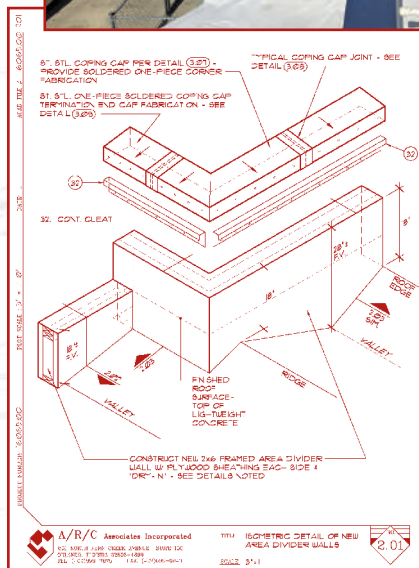
*View of front (north) of completed roof, flashing and drainage.*



*Typical edge and drainage detail at valley of folded plate roof.*



*View of south edge looking west as construction nears completion.*



*Detail of new area dividers used to control and redirect storm runoff.*

the new roof elevations caused by the new LWIC. In addition to a new roof membrane, new two-piece perimeter edge metals consisting of PVC-clad aluminum deck flange interlocked with stainless steel fascia metal were provided. New stainless steel conductor heads with extruded aluminum downspouts connected into the existing stormwater drainage system have been installed along the north roof edge at the valley of each “folded plate.”

A 20-year, no-dollar-limit (NDL) warranty, along with a 120-mph wind rider, was provided by the roofing system manufacturer. To aid in maintaining a watertight building envelope, double-curbed, metal-capped expansion joint systems were provided at the two buildings adjacent to this roof area, and elastomeric coating was applied to the masonry walls of the adjacent building that extends an additional story above this roof area.



## Roof Replacement

# Medical University of South Carolina

Charleston, SC

**Richard Cook Jr.**

ADC Engineering, Inc.



ADC contracted with the Medical University of South Carolina under an open-end contract for building envelope (roofing, waterproofing and exterior walls) consulting services to implement roof replacement based on field investigation.

*Medical University of South Carolina.*

The scope of the project was unique in that the project had to adhere to the Board of Architectural Review (BAR) reviews and approvals as a historical project in Charleston, SC. Renovations and "new" conditions were required to match the historical conditions. The issues to be corrected by the design included asbestos abatement, wood deck repairs, BAR (historical) submissions/approvals, and competitive/low bid.

The work was completed in two phases:

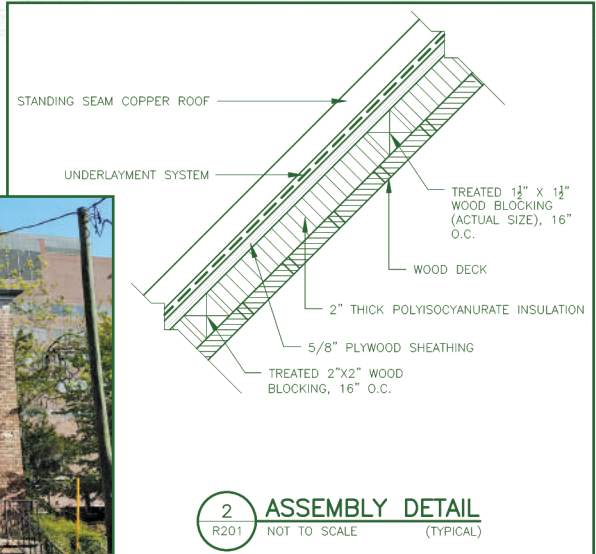
- Phase I - Investigation and written report
- Phase II - Design services, including construction administration and milestone site visit(s)

Specifications included front-end criteria for the owner's unique requirements, including submittal lists, close-out documents list, and abatement of asbestos-containing roofing material (ACRM).

The project included total removal of the existing roofing system down to the structural deck for approximately two squares of low-sloped (Area B) and 12 squares of steep-sloped (Area A) roofing. Roof replacement included deck repairs/overlay, rough carpentry, and roof insulation (including taper) and a cold-applied modified cap sheet roof system for the low-sloped area and a traditional hand-crimped standing-seam copper roof system for the steep-sloped area. All associated sheet metal components and accessories were included. Removal of non-friable ACRM for low-sloped and steep-sloped roof areas was included.

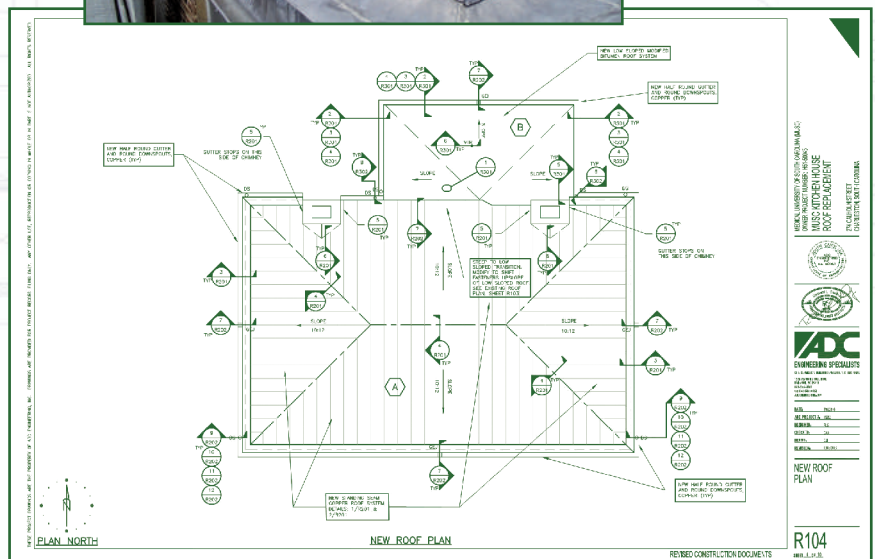
The project ran smoothly and was completed within the time constraints.

*Steep-sloped roof assembly detail.*



*Hand-crimped standing-seam roof.*

*New roof plan.*







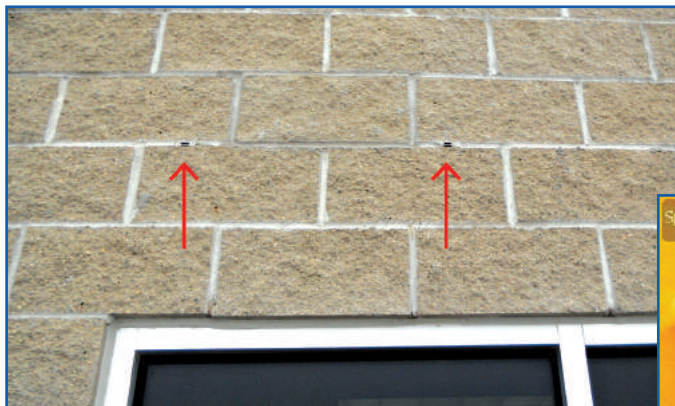
**Richard Froberg**

Miller Dunwiddie Architecture

## Infrastructure and Environmental Report

### Mason City Municipal Airport

Mason City, Iowa



*Single-wythe through-wall flashing.*

*Interior infrared photo of a single-wythe wall.*



The Aircraft Rescue Fire Fighting (ARFF) Facility at the Mason City, Iowa Municipal Airport was constructed in 2012. The facility started to experience leakage shortly after the facility was completed, and the leakage has continued until the present day.

The ARFF Facility is a one-story concrete masonry unit building. The apparatus bay, where the fire trucks are located, was constructed with a cavity wall consisting of an 8-in. concrete block inner wythe and a 4-in. concrete block outer wythe. The operations area, where the offices are located, was constructed with a single-wythe 8-in. concrete block with a 1/4-in. thermal break directly on the interior of the block, followed by an insulated steel stud wall with gypsum board wall surfacing on the interior.

Leakage was reported at numerous locations on the operations area portion of the building. The owner had applied solvent-based water repellent on a section of this end of the building, which decreased the volume of leakage but had not completely stopped it. A contractor had provided a mechanical balancing report that indicated that negative pressure from the mechanical system was the cause of the leakage and recommended an extensive balancing project.

Miller Dunwiddie was retained to review previous mechanical information, includ-

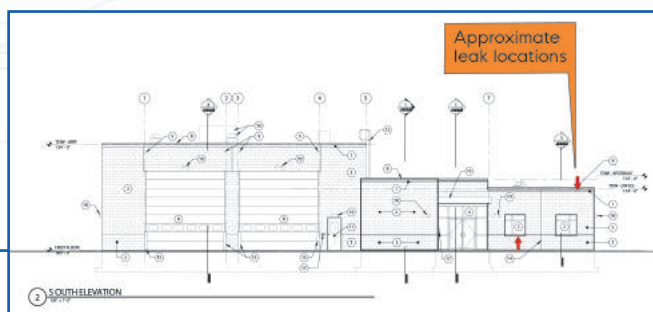
ing review of the original design (LKPB Engineering provided mechanical expertise) and to review the existing building envelope conditions.

The mechanical calculations determined the slight existing negative pressure was insufficient to cause the water infiltration. The fully adhered EPDM roof system was in good condition with only very minor deficiencies. The cavity wall construction of the apparatus bay appeared in good condition with through-wall flashing installed as it should be.

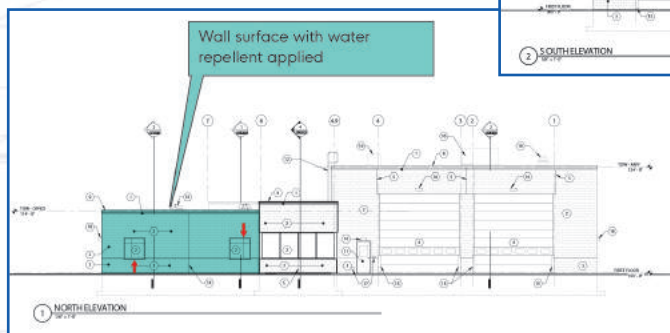
Visual observation of the exterior and interior

of the operations area of the building found that the single-wythe split-face concrete block was typically porous, and through-wall flashing was inconsistent. Infrared scans revealed that leakage was occurring near through-wall flashing locations, and the non-continuous insulation and steel studs were providing a high amount of thermal bridging. The 1/4-in. thermal break was inadequate.

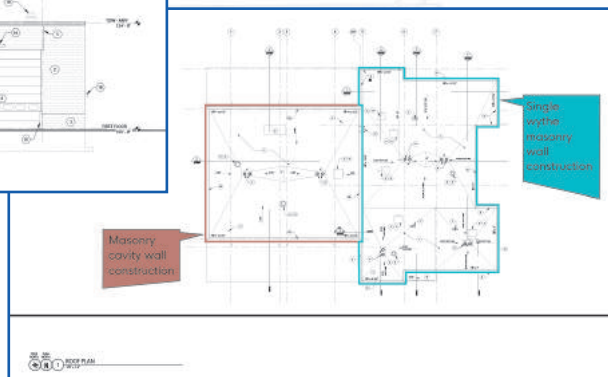
The single-wythe wall deficiencies found are certainly not uncommon, and when installed improperly, can be difficult to repair, especially without inconveniencing the occupants. We recommended installation of a water repellent as a short-term measure and the installation of a metal panel screen wall-type assembly with continuous insulation as a long-term solution.



*South elevation.*



*North elevation.*



*Roof plan.*



## Building Envelope Review

### First Baptist Church of Orangeburg

Orangeburg, South Carolina

**Daniel Atwell**

ADC Engineering



A report was created for the First Baptist Church of Orangeburg, SC, summarizing recommended steps for the owner to proceed with over the next five years to be able to provide reasonable maintenance and have an understanding of budgeting needs for the near future and for many years to come.

The scope of the project was to review the building envelope, including roofing, exterior walls, fenestrations, and below-grade waterproofing. The roof survey was conducted for the entire complex, and the exterior walls, fenestrations, and below-grade waterproofing were limited to the McClain Building.

Due to the budget, the recommendation was to separate the project into two phases:

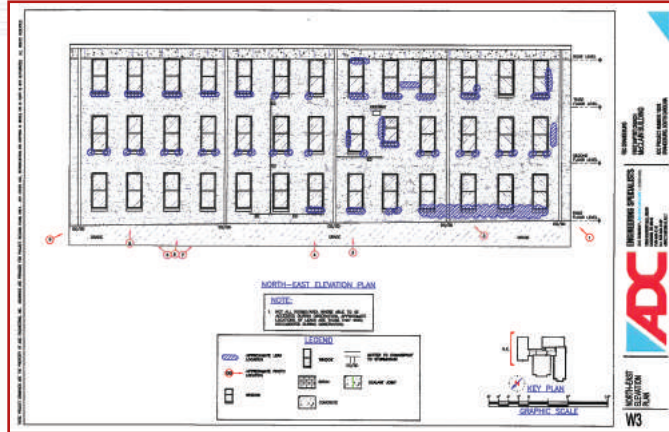
- Phase I – Investigation and written report
- Phase II – Design services, including

The problems with the exterior elements of the building envelope at the McClain Building were initially noted in the following “existing symptoms” to include, on multiple floor levels:

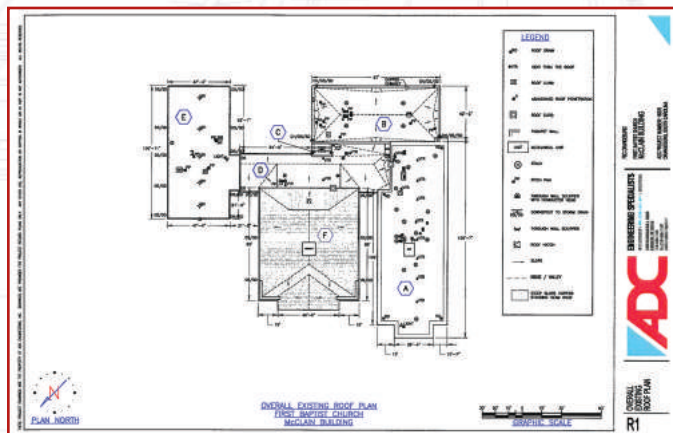
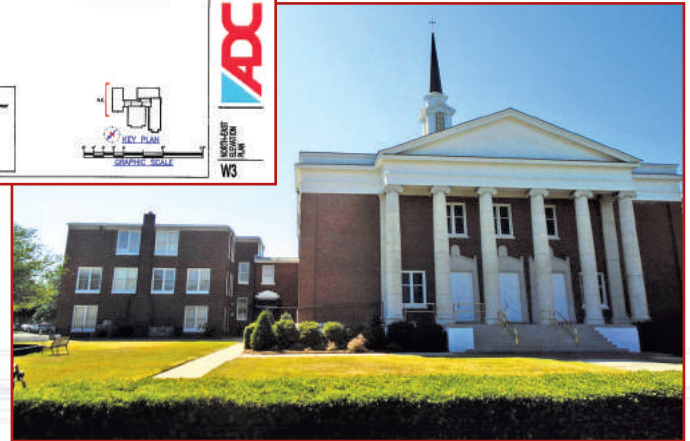
- Efflorescence stains
- Rotted wood members
- Damaged interior finishes
- Damaged ceiling tiles
- Water staining

The obvious pattern

*Northeast elevation plan.*



*First Baptist Church of Orangeburg.*



*Aerial view drawing.*



*McClain Building.*

is significant moisture infiltration within the brick wall assemblies, showing up in the masonry surfaces, at/around fenestrations (wall openings, such as windows), at below-grade portions of the first floor, and at structural terminations into adjoining structures.

Specified conclusions were:

- Roofing – The modified-bitumen and SPUF roof systems should be repaired to address active leaks until the budget allows for full replacement.
- Exterior Walls – Moisture infiltration within the wall assemblies, mainly at window locations, was noted. Window unit replacements with proper flashings were required.
- Below-grade Waterproofing – A portion of the below-grade waterproofing needed to be repaired. Surrounding site drainage should be reworked.

All data were collected and input into a building envelope management plan to document findings and provide specific repair/replacement/maintenance recommendations for the next five years.





**James W. Ripley**

A/R/C Associates, Inc.

Exterior Wall Repair

## Waterstreet at Celebration Condo

Celebration, Florida

A/R/C Associates was not a part of the initial construction at Celebration, but the company was invited to repair the buildings after significant water intrusion had been identified. We specifically worked with the Waterstreet at Celebration Condominium Association, which owned 12 large three-story buildings. The buildings were wood-frame construction with stucco and fiber cement lap siding. The roofing consisted of modified bitumen and shingles. The majority of water intrusion was wall-related, resulting from a lack of an effective waterproofing barrier within the wall system, which caused the wood framing and sheathing beneath to rot.

We first became involved to observe and analyze some isolated destructive investigations being performed by the associa-

*Field investigation in progress. Drilling stucco walls caused minimal disturbance to the facility.*



tion, the results of which were included in this report. Those investigations convinced the association of the severity and widespread nature of the water intrusion in the complex, which somehow needed to be quantified. To prioritize the repairs, we performed additional testing on each building to determine the amount of deterioration. The testing method selected on the stucco buildings was to use a concrete drill bit to drill through the wall at suspect areas (such as at the bottom corners of the windows).

The drill bit would penetrate the stucco easily, but find resistance at the underlying wood/OSB sheathing beneath if it was in good condition. This proved to be an effective and accurate method of testing, verified as we moved into the construction phase after bidding.

Based on the test results and

the selective destructive demolition, the report also was used to summarize and prioritize the buildings with the most damage and in the most need of repair. The report was presented as an interactive Adobe PDF file with hyperlinks to related portions of the report so the users could follow their concerns and obtain the desired information quickly. The scope of repair work was established by this report, which was to remove the building's sheathing down to the existing OSB sheathing or framing, perform repairs, install an effective waterproofing barrier, and then re clad the buildings to their original appearance.

This report and the resulting repairs were the basis of a presentation at the 30th RCI International Convention in San Antonio, Texas, in March 2015; the article may be found on RCI's website here: <http://rci-online.org/wp-content/uploads/2015-cts-ripley.pdf>.

### Building 1: Elevations

The Amherst  
Page 2 of 3

Click to go to: [Map](#)

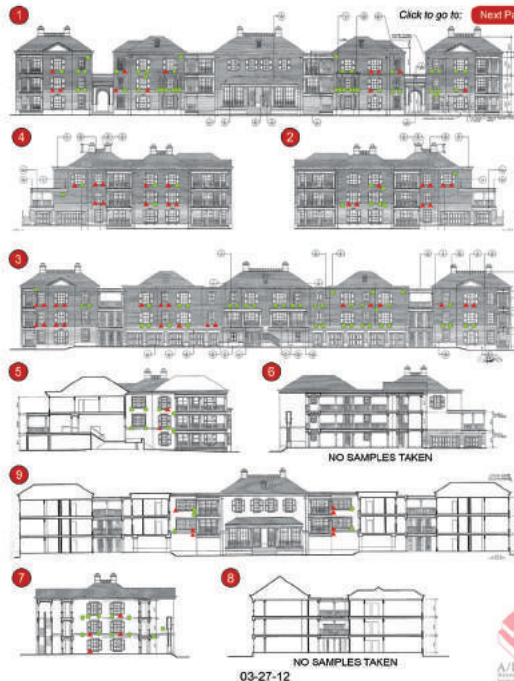
Click to go to: [Summary](#)

Click to go to: [Conclusion](#)

● Sufficient ▲ Insufficient

Click to go to: [Bldg. Summary](#)

Click to go to: [Next Page](#)



*Page 4 from the report showing elevations of a typical building. Note green circles and red triangles at drilled locations.*

### Site Inspection of: Waterstreet at Celebration

332 Waterstreet  
Celebration, FL 34747  
A/R/C Associates, Inc.  
801 N. Fern Creek Ave., Suite 100  
Orlando, FL 32803  
Phone: (407) 999-7875  
Fax: (407) 999-6943



03-27-12

*Page 1 from report showing overall site plan of 12 buildings.*

*Damaged stairtower during reconstruction as defined by the report and subsequent documents.*





## Reroof

# Volusia County Firestation 22

Oak Hill, Florida

**James W. Ripley**

A/R/C Associates, Inc.



This project started as a typical low-slope roof replacement of the existing roof system (4546 sq. ft.) on this free-standing rural fire station, located along the east coast of Florida, and originally built in 1989. The primary design challenge was the discovery that the existing cellular lightweight insulating concrete (LWIC) over the engine bay had deteriorated and was no longer a viable roofing substrate, and the underlying deck was only 25-gauge steel. If the LWIC were removed, we would need to install an entirely new 22-gauge steel roof deck.

The solution was to leave the existing roof and deck in place over the engine bay and install a prefabricated wood truss system bearing on the perimeter CMU walls that spanned over the engine bay. The trusses were configured in a hip roof shape, with plywood sheathing and a self-adhesive modified-bitumen underlayment applied. Due to the proximity to the Atlantic Ocean and the desire for minimal maintenance, a 0.040-in. mill-finish alumi-

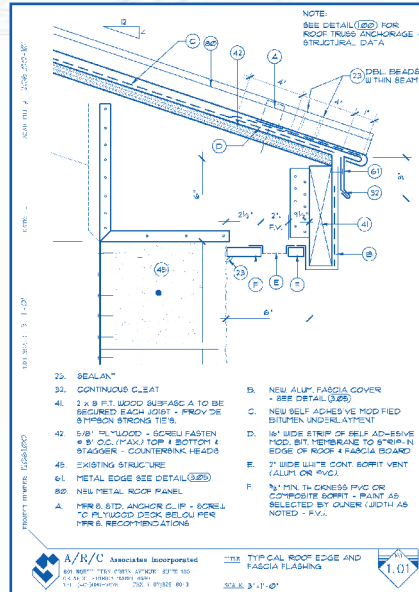
num standing-seam roof was installed over the engine bay. There are no roof penetrations, and a custom ridge vent was designed to only vent along the west side due to the prevailing winds from the east.

Although less expensive than demolishing the engine bay roof deck and installing a new steel deck, this solution did increase the cost of the project slightly, but was partially offset by the reduced demolition and the longer service life of the new roof system. An added benefit was that the fire station could remain in operation during the roof replacement.

The two remaining roof areas over the hose bay and crew quarters were low-sloped, wood-framed decks where the existing roof system was removed, and a new rigid-insulation, gypsum cover board and 3-ply modified-bitu-

men roof system were installed. The west roof edge thickness at the crew quarters was adjusted to allow for a future building addition to expand the crew quarters and allow for the continuation of the existing roof plane. A 20-year, no-dollar-limit (NDL) warranty, along with a 120-mph wind rider, was provided by both roofing system manufacturers.

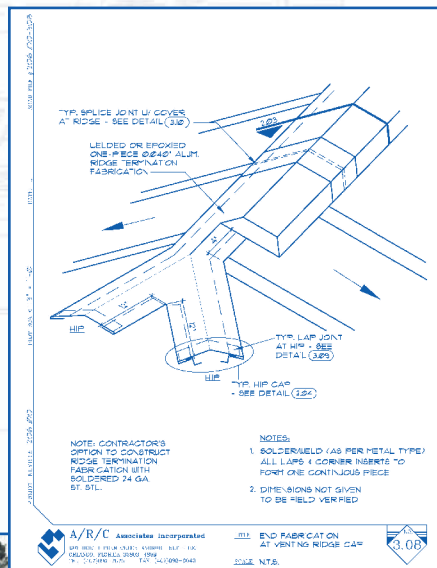
*Typical drip edge and anchorage detail for new roof-over system.*



*New metal roof over engine bay and modified-bitumen roof at hose-drying bay.*



*Detail of hips at ridge with ridge vent offset to one side.*



*New metal roof over engine bay and modified-bitumen roof at crew quarters.*



*View of metal roof over engine bay and low-slope roof at office entrance.*





**Richard Cook Jr.**  
ADC Engineering, Inc.

## Leak Abatement University of South Carolina DLES Facility Columbia, South Carolina

This project covered leak abatement at the Division of Law Enforcement and Safety (DLES) facility at the University of South Carolina. It included exterior walls, fenestrations, and below-grade waterproofing of the critical communications center, where leaks were found to be continuous and had disturbed day-to-day activity.

This was a fast-tracked project with security implications and vulnerable equipment. An abbreviated scope of work with drawings and technical specifications was developed to accelerate bidding and award. An investigation was initially completed for the overall building envelope, including the roof, exterior walls, fenestrations, and waterproofing. All known leaks were identified, numbered, and prioritized.

Upon completion of the investigation, a series of projects were developed into phases based on the prioritization. The



*Rubberized asphalt sheet waterproofing system, including prefabricated drainage mat and protection board, at excavation at east elevation.*

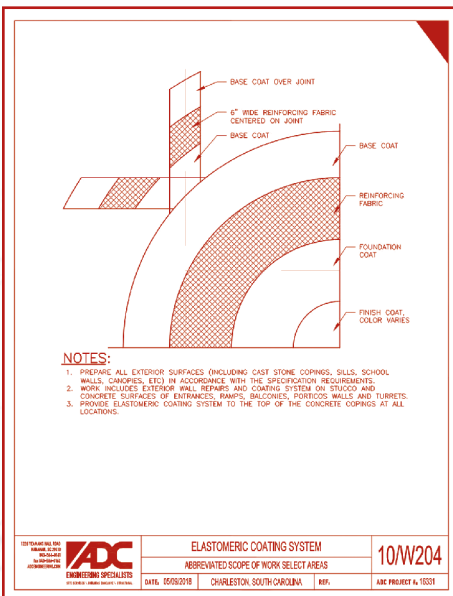
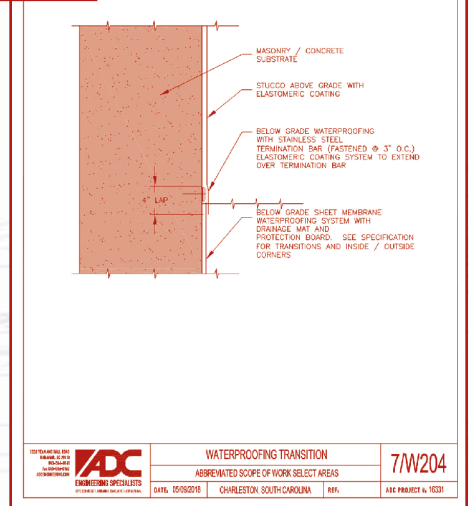
*Waterproofing transition detail.*

work included improvements and modifications to site drainage, concrete repairs, and below-grade waterproofing. Also included were above-grade substrate repairs, including crack repairs, installation of elastomeric coating, sealants, and wet glazing.

Throughout the duration of the project, the facility remained completely functional and fully protected at all times.

The scope of work included:

- Removing concrete slab and hand excavating around the concrete box and along the wall
- Excavation, extending below grade to one foot below the bottom floor/foundation
- Removal of temporary PVC pipe that ran downspout to adjacent property
- Cleaning and preparing all vertical and horizontal surfaces to provide new sheet membrane waterproofing below grade and elastomeric coating



*Elastomeric coating system detail.*

*Existing concrete structure cleaned and with primer installed, receiving application of rubberized asphalt sheet waterproofing system at excavation at east elevation.*



above grade with all penetrations flashed

- Backfilling the area in 12-in. lifts, compacting each lift, then providing new expanded concrete slab
- Completing repairs to cracks in stucco substrate to provide new elastomeric coating system
- Removing and replacing all exterior sealant joints
- Providing sheet metal closures on elevations, lowered conductor head, modified drain scupper, and modified downspout transition at grade.

The project ran smoothly and was completed within the time constraints and with no cost increases. To date, the communications center has not reported leak events since work has been completed.



## Drainage Issues

### Schmidt Home

Olds, Alberta

## Jonathan Sollard

BTC Group



*The existing installation did not allow drainage of the stucco system at the transition from the wood-framed stud wall to the concrete foundation wall.*

The Schmidt residence is a two-story wood-framed single-family home located in Olds, Alberta, Canada. It was constructed with a cement stucco cladding system installed over sheathing membrane.

There had been ongoing problems with water infiltration in the walls, causing mold and moisture damage in the basement level of the house on the north and west walls. The owners of the home contacted a basement waterproofing contractor. The result was a costly and ineffective solution to install dampproofing, drainage board, and a sump pump system.

The moisture infiltration continued. The owner sought the opinion of a stucco contractor, who recommended repainting the stucco with an acrylic paint to reduce water infiltration. The exterior of stucco should not be considered the water-resistive barrier of the cladding system; therefore, that solution was flawed.

After reviewing the building from a wider perspective, BTC suspected the cause of the leak was the lack of through-wall flashings and poor attention to detail on the existing metal flashings. A destructive test was used to confirm.

Options were presented clearly to the client for both repair to the existing stucco



*Existing drainage flashings over the windows were sealed due to poor understanding of the system drainage characteristics.*

cladding system and replacement with a new cladding system. The options are dependent on the timeline chosen by the owner. The owners decided that they would like to keep the house for a long period, and opted to replace the entire cladding system with a new engineered wood system to modernize the exterior.

The report highlights the importance of three points: spreading industry knowledge to contractors, gaining a larger total building perspective if involved in diagnostics or forensics, and addressing localized issues with solutions that can be applied to both the short and long term.

1. **Knowledge of contractors.** The stucco contractor, who wanted to paint

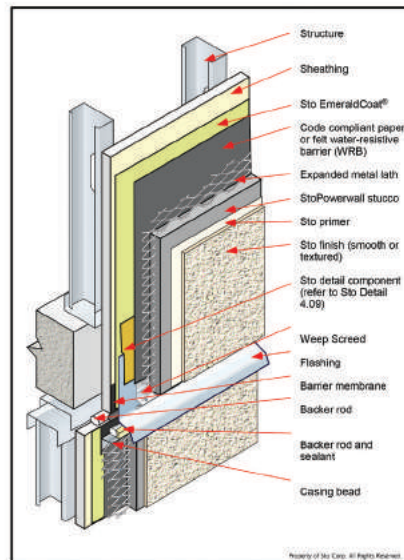
the stucco with an acrylic coating, did not fully understand how drainage planes worked, and that stucco itself was not the water control barrier.

2. **Total building perspective.** Specialized knowledge in consultants, although useful, can create a narrow-minded approach to diagnosing problems. A broad understanding is necessary for roles requiring investigation and diagnostics.
3. **Addressing localized issues.** Although the issue was determined to be relatively localized, the repair solution would not renew the service life of the entire system. It is important to give the owners multiple repair options that they can choose from using their own perspective on the desired life cycle and other metrics.

#### StoPowerwall® Floor Line Joint with Nested Track

Detail No.: 4.50

Date: December 2015



#### Notes:

- 1) Do not attach upper sheathing to nested track. Only attach lower sheathing to nested track.
- 2) The maximum allowable sheathing span at the floor line is 8' (200mm) or as recommended by the sheathing manufacturer.
- 3) A barrier membrane is installed over the joint in the sheathing to provide air barrier continuity and secondary weather protection at the joint location.
- 4) Provide a minimum 3/4" (20mm) joint to accommodate deflection of the floor slab.
- 5) Install a flashing to direct water beyond the face of the cladding below.

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*The manufacturer's detail shows the effective way to allow water to drain towards the exterior.*