ROOF INVESTIGATION

Prepared For: Sentry Management
224 N. 76th St.
Milwaukee, WI. 53213

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Location: River Crest Condominiums
2102 – 2178 N. Commerce St.
2105 – 2175 N. Riverboat Rd.
Milwaukee, W 53212

Project # 24EP10170

Prepared By:

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7/2/24

Date: July 2, 2024

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Roof Investigation

Association:	River Crest Condominiums	
Building Addresses:	**Building #1:**	2102, 2104, & 2106 N. Commerce St. 2105 N. Riverboat Rd.
	Building #2:	2110, 2112, 2114, 2118, 2120, & 2122 N. Commerce St. 2121 & 2125 N. Riverboat Rd.
	Building #3:	2126, 2128, 2130, 2134, 2136, & 2138 N. Commerce St. 2135 & 2139 N. Riverboat Rd.
	Building #4:	2142, 2144, 2146, 2150, 2152, & 2154 N. Commerce St. 2147 & 2151 N. Riverboat Rd.
	Building #5:	2158, 2160, 2162, 2166, 2168, & 2170 N. Commerce St. 2161 & 2165 N. Riverboat Rd.
	Building #6:	2174, 2176, & 2178 N. Commerce St. 2175 N. Riverboat Rd.
Dates of Inspections:	Tuesday, March 5, 2024 Monday, April 8, 2024 Thursday, April 25, 2024	
Present at Inspection:	Jake Peterson, PE - RCL Engineering Group Tim Goehrke - RCL Engineering Group Rachael Varin - RCL Engineering Group Various Unit Owners or Tenants	
Purposes of Investigation:	1) Assess the general condition of the roof systems 2) Estimate the remaining serviceable life of the roof system 3) Make recommendations for maintenance, repair and/or replacement 4) Provide budget estimates for long-term planning	
Methods of Investigation:	1) Visual Inspection of Roof Systems 2) Core Sampling of Roof Assembly Components 3) Nuclear Non-Destructive Moisture Testing	
Materials Reviewed:	1) Photographs and reporting of concerns reported by Unit Owners or Tenants 2) Building Plans retrieved from the City of Milwaukee dated 5/25/2004 3) Past Repair and Maintenance Records	
Secondary Sources:	1) Wisconsin Commercial Building Code	

EXECUTIVE SUMMARY

The River Crest Condominiums are located in the City of Milwaukee, Wisconsin. The complex comprises six buildings, designated as follows for reference: Building #1 at the west end, Building #2, Building #3, Building #4, and Building #5 in the center, and Building #6 at the east end. Building #1 and Building #6, situated at the respective ends of the complex, each contain four units. The remaining buildings, #2, #3, #4, and #5, are located in the center, consist of 8 units each.

This portion of the investigation focused on evaluating all exposed roof areas, related materials, and systems across each of these buildings. The overall condition of the roof system in each area is generally fair, although there are a few roof sections on Building #1 that have been identified as having a generally poor condition. However, all roof areas require attention. Additionally, there are spots of wetted and deteriorating EIFS (Exterior Insulation and Finish System) on the bottom edge of the walls, near or in contact with the roof surface, which will also require addressing. Planning and budgeting for roof replacement in the near future is strongly recommended.

INTRODUCTION

RCL Engineering Group (RCL) performed a limited investigation of the buildings at the River Crest Condominium complex located between North Humboldt Avenue, North Commerce Street, and North Riverboat Road in the City of Milwaukee. In addition to investigating the roofs of the building, the exterior walls and the balconies were investigated and are discussed in separate reports. The inspections were visual and non-destructive in nature. Information collected and evaluated in the investigation includes observations made during inspections, verbal and written reporting of issues by unit owners and tenants shared through management, review of repair and maintenance reports, and a review of the building construction plans.

BACKGROUND

The River Crest Condominiums complex consists of forty condominium units within six, three-and-a-half story buildings. There is generally two styles of buildings, with Buildings #1 & 6 consisting of four units and Buildings #2 – 5 consisting of eight units. The four-unit buildings are of similar design as the eight-unit buildings, but simply divided in half. The architect for the complex was Arquitectura Inc. of Milwaukee, the structural engineer was Pierce Engineers, Inc. of Milwaukee, and the developer was the Mandel Group of Milwaukee. The buildings were built between 2005 and 2006, with Building #1 being the first building built and Buildings #4-6 being the last building built, as observed from satellite imagery. The units located on Commerce Street are elevated one-to-two stories above the Riverboat Road units. The attached Site Pap indicates the location of each building. Overall photographs of each building are included in the attached Photography Record.

The condominium buildings consist of wood framing over concrete foundations. The units are separated by fire-rated separation walls, which create a structural separation between each unit. The floor joists consist primarily of open-web wood trusses. The walls consist primarily of wood stud wall construction, but some walls consist of concrete block masonry or reinforced concrete construction. The exterior of the building is clad with brick veneer, EIFS, and metal panels. Numerous doors and windows are located on each elevation. Some of the windows are typical residential window sizes, while others are full wall height and include doors to access balconies. Where balconies, terrace roofs, room projections, and canopy roofs are present, these areas are typically framed with cantilevered sawn lumber members extending beyond the exterior wall.

Building #1 features a main upper roof with two lower secondary roofs situated at different levels along the south end. On the west side, there are two small canopies, and one is located on the south side of the building.

Buildings #2, #3, and #4 each possess a main upper roof accompanied by three lower secondary roofs at varying levels along the south end. Additionally, there is a lower roof area on the north side of these buildings, situated between the two main wings. Each of these buildings also includes two smaller canopies at the south end.

Building #5 shares similarities with buildings #2, #3, and #4, except for the fact that two of the lower secondary roofs at the south end are covered with wooden decks.

Building #6 closely resembles Building #1, although one of the lower roof areas at the south end is also covered with a wooden deck.

The roofs of these buildings feature a low-slope design that has incorporated slope taper. All main roofs are equipped with ballasted EPDM (single-ply rubber) roof systems, while the canopy roofs are covered with fully adhered EPDM roof systems. The installers and the manufacturers of the roof systems remain unknown, although select boot flashings were manufactured by Firestone. Additionally, it is unclear whether there are currently active warranties in place.

Water is directed off the ballasted EPDM roofs of the main areas through interior roof drains. Spill-out scuppers are utilized to drain water off the canopy roofs. The perimeter edges are defined by short parapet walls topped with metal coping caps.

The main and lower roofs feature AC units, vent stacks, skylights, and satellite dishes, while the canopy roofs are free of any additional accessories.

Past repair attempts reportedly included roof repairs, application of sealant, installation of missing flashing, and brick masonry repairs. In 2020, the EIFS was reportedly recoated with a colored coating. Also in 2020, weeps were reportedly added to lintels above garage overhead doors and roof repairs at a terrace roof was performed. In 2021, EIFS restoration at one unit was performed as well as unspecified skylight repairs at two units. In 2022, flashing and sealant repairs were performed at a number of units at balconies. Brick masonry cracks were repaired at a number of units on most of the buildings. In 2023, water infiltaration at the 2012 terrace roof was identified and reportedly addressed by either making repairs to the membrane or replacing it. Additional leak repairs at roof flashings, skylights and wall flashings at balconies were identified and reportedly addressed. Brick deterioration and wood rotting was identified in a proposal recommending inspection openings above the garage door opening at 2105. Water infiltaration at 2166 was reported and deficiencies were reported. In 2024, a section of roof was reportedly replaced at 2105. At 2150, water infiltration due to improper wall flashing at the balcony was identified and reportedly addressed by reflashing. Water infiltration was again reported at 2102 and reportedly addressed by repairing seams and flashing. A skylight was reportedly leaking and repairs were reportedly made.

BUILDING INFORMATION

Buildings:	3-story on N. Commerce St. side / 4-story on N. Riverboat Rd. side	
Building Ages:	Buildings #1-3:	19 Years (*Year of construction completion: 2005*)
	Buildings #4-6:	18 Years (*Year of construction completion: 2006*)
Building Areas:	Buildings #1 & 6:	6,154 sq. ft. Net Floor Area (*Approximate*)
	Buildings #2-5:	11,814 sq. ft. Net Floor Area (*Approximate*)
Building Heights:	55 ft. (*Approximate*)	
IBC Construction Type:	Type 5B – Unrestricted/Unprotected (Historical: Type 8 – Wood Frame Unprotected)	
Climate Zone:	6A	

ROOF CONSTRUCTION DATA

Roof Ages:	Buildings #1-3:	19 Years (Y*ear of construction completion: 2005*)
	Buildings #4-6:	18 Years (Y*ear of construction completion: 2006*)

Roof Areas *(Approximate)*:

Building #1

Main Area Total:	2,350 sq. ft.
(2) Lower Areas (Ballasted):	768 sq. ft.
(1) Lower Area (Deck):	163 sq. ft.
(3) Canopy Areas Total:	54 sq. ft.
TOTAL ROOF AREA:	3,335 sq. ft.

Buildings #2, #3 & #4

Main Area Total:	4,450 sq. ft.
(3) Lower Areas (Ballasted):	1,788 sq. ft.
(2) Canopy Areas Total:	36 sq. ft.
TOTAL ROOF AREA:	6,274 sq. ft.

Building #5

Main Area Total:	4,450 sq. ft.
(1) Lower Area (Ballasted):	1,260 sq. ft.
(2) Lower Area (Deck):	528 sq. ft.
(3) Canopy Areas Total:	36 sq. ft.
TOTAL ROOF AREA:	6,274 sq. ft.

Building #6

Main Area:	2,350 sq. ft.
(1) Lower Area (Ballasted):	504 sq. ft.
(2) Lower Area (Deck):	427 sq. ft.
(3) Canopy Areas Total:	54 sq. ft.
TOTAL ROOF AREA:	3,335 sq. ft.

Roof Heights (from Grade): 12', 20', & 40' +/- *(Approximate)*

Roof Slope: 1/8":12" *(Approximate)*

Roof Assemblies:

Main Areas & Lower Areas

Manufacturer: Firestone *(Assumed)*
Surfacing: Stone Ballast – Washed River Rock
Size: 1"-2" Diameter
Weight: 10-12 lb. / sq. ft.
Membrane: Non-Reinforced EPDM (Ethylene Propylene Diene Monomer)
Thickness: 45 Mil – Buildings #1, #3, #4, #5 & #6
60 Mil – Building #2
Attachment: Loose Laid
Seams: 3" Splice Tape
Insulation: Polyisocyanurate – Buildings #1 & #2
Thickness: Tapered (1/8" approx.)
Attachment: Loose Laid
EPS (Expanded Polystyrene) – Buildings #3 – #6
Thickness: Tapered (1/8" approx.)
Attachment: Loose Laid

Canopies

Manufacturer: Firestone *(Assumed)*
Surfacing: None
Membrane: Non-Reinforced EPDM (Ethylene Propylene Diene Monomer)
Thickness: 45 Mil – Buildings #1, #3, #4, #5 & #6
60 Mil – Building #2
Attachment: Fully Adhered
Seams: 3" Splice Tape
Insulation: Polyisocyanurate – Building # 4
(Cored due to open flashing conditions)
Thickness: Tapered (1/8" approx.)
Attachment: Mechanically Fastened

Roof Deck Overburden: 2x6 Wood Deck Boards on 2x6 Sleepers *(Assumed)*

Perimeter Edge: Parapet Walls
7 ½" Wide Metal Coping Caps with Concealed Cleats

Drainage:
Main: Interior Drains
Canopies: Overflow Scuppers

Penetrations: AC Units, Pitch Pans, Miscellaneous Vent Stacks, Satellite Dishes

Comments

Roof assembly information based on a single core sample per building according to records taken by RCL Engineering Group during the initial investigation in 2014. Additional roof assembly information for the canopy roofs was gathered based on a single core sample on Building #4 as part of this investigation due to open flashing conditions.

OBSERVATIONS & FINDINGS

1. Roof Assemblies:

Each roof assembly consists of a single roofing system, originally installed at the time of construction. The primary and secondary roof areas feature a single-ply, EPDM membrane, which was loose-laid atop tapered polyisocyanurate or expanded polystyrene (EPS) substrates, as delineated previously. The insulation layer is situated upon a wooden deck. The complete roof assembly is secured via 10-12 pounds of river rock ballast. The canopy roofs are comprised of a singular layer of EPDM membrane, which is fully adhered to a tapered polyisocyanurate insulation layer mechanically fastened to a wood deck.

2. Drainage:

In the assessment of each roof, it was observed that tapered insulation is uniformly installed, ensuring positive drainage across all areas. Specifically, the main and lower roofs exhibit a slope directed from the perimeters towards interior roof drains strategically positioned near the centers of each roof area. Similarly, the canopy roof incorporate slope toward overflow scuppers located at the perimeters.

Regarding ponding water, the majority of the roofs show no evidence of significant accumulation. However, Building #1 displays minor ponding along the west wall of the lower southeast roof area, along with significant ponding in specific spots on the upper roof area (mainly near previous repair work.) Additionally, Building #2 experiences minor ponding around skylight and lower roof drain areas. While EPDM membrane demonstrates resilience to ponding conditions, the potential for significant water infiltration increases if a seam were to fail or a hole were to develop. Evidence of delamination is noted at repair patches and select seams near these areas.

The interior roof drains are uniformly sized at 3" – 4" in diameter. While these drain sizes appear suitable for their respective roof areas, formal drainage calculations were not conducted during this assessment. Furthermore, the exact sizes of all drains could not be determined due to the drain strainers being permanently affixed. However, a select few drains permitted the temporary removal of the strainers.

All drains are constructed of PVC material and are equipped with clamping rings secured by four bolts per ring. Additionally, each drain is outfitted with plastic strainers securely fastened in place. Although most drains remain clear of debris, some blockages were observed in specific areas. Notably, Buildings #2 and #3 exhibit minor debris blockage on the lower front-facing roof area, while Building #5 experiences substantial debris blockage in the lower front-facing roof area drain. Due to the extent of the drain blockage, there is a significant risk of water backing up onto the roof area. This could potentially lead to water infiltration behind the EIFS wall system and into the roof components. The likelihood of this occurring depends on whether the top of the membrane behind the EIFS is properly terminated and flashed. However, it is impossible to conclusively determine this detailing without conducting a destructive investigation.

3. Surfacing:

The roofs are covered with stone ballast, serving the primary function of securing the roof assembly in place. Both the membrane and insulation layers are loosely laid beneath the ballast. The recommended weight of the ballast is approximately 10-12 lbs. per square foot.

In general, the ballast is evenly distributed across most roof areas. However, specific observations indicate displacement in certain sections. On Building #2, ballast displacement is evident at the perimeter corners on the upper main area, particularly near the northwest corner. Similarly, Displacement is noted at the two northwest corners of Building #4 on the upper roof and at the west corner on the lower roof. The lower roof of Building #6 also exhibits similar conditions. This displacement typically occurs due to wind scouring, as wind uplift pressures are strongest at corners. Additionally, ballast displacement is observed around skylights and miscellaneous penetrations on the upper roofs of Buildings #5 and #6, as well as the lower south-facing roof area of Building #6.

On Building #1, the previous repair area on the main roof at the north end showing bucked and elevated insulation boards with accompanying ballast displacement appears to have been addressed, although the attempted repair has multiple deficiencies which are noted in the "Flashings" section of the report.

Overall, the ballast remains in good condition. Some scattered broken stones were observed, which is a common occurrence and does not pose a significant concern for the roof's integrity.

4. Membrane:

The membrane is non-reinforced EPDM (Ethylene Propylene Diene Monomer). EPDM is a single-ply, black membrane. The thickness of the EPDM is 45 mils on all buildings with the exception of Building #2 which has a 60 mil membrane.

EPDM is virtually unaffected by the elements. Moisture, temperature change, and ultra violet light have no real detrimental impact on EPDM. Its physical properties remain virtually unchanged as it ages.

The presence of stone ballast made 100% visual inspection of the EPDM membrane impossible. However, spot checks failed to uncover any concerns. No holes, tears, or open seams were identified in the main fields of the roof areas. However, some partially open/delaminated seams were discovered at miscellaneous flashing and repair areas at random locations throughout the roofs and will be further addressed in the "Flashings" section. The membrane appears to have good elasticity and typical tear/puncture resistance. No evidence of premature deterioration was observed.

All seams were sealed with 3" splice tape. The installation of the splice tape appears to have been satisfactory.

The membrane on the canopy roofs are fully adhered, non-reinforced EPDM. The inspection of the canopy roofs' main field membrane did not uncover any concerns; no holes, tears, or open seams were identified. However, a significant amount of miscellaneous debris was found on these roof surfaces, which could potentially puncture the membrane. Please refer to the "Flashings" section for other potential concerns regarding the canopies.

5. Flashings:

The flashings at the parapet walls and curbs are an extension of the EPDM field membrane. A reinforced securement strip was incorporated at each horizontal-to-vertical transition as required. The EPDM extends completely over the parapet walls and to the top of each curb. The flashings also turn vertically up the wall behind the EIFS membrane, and in other locations up and behind the brick veneer when present. Some flashings are accompanied by a metal counterflashing and others are not. Flashing conditions vary on the canopy roofs, and have locations that are finished with a termination bar.

The EPDM flashings are adhered to the walls and curbs. For the most part, the adhesive bond remains strong. However, there are a few areas where flashings have disbonded and "tenting" was present. "Tenting" is a condition where the shrinkage causes the flashing membrane to pull away from the walls and curbs.

Building #1
On the upper roof area, small sections of the membrane along the perimeter edge was either wrinkled or tented. Minor membrane tenting also exists under the coping cap adjacent to the windowsill posing a potential for membrane wear and tearing along the cement sill. On the previously attempted repair of the upper main roof area, there is an open flashing condition in the form of a repair patch on a pitch pocket and stack vent. The pitch pocket flashing repair is partially delaminated, and the sealant applied around the repair is failing. The pocket in the delaminated section is holding water and poses a potential for water infiltration. The stack penetration flashing repair patch is partially delaminating and appears there was insufficient initial bond between the repair and the stack flashing.

Building #2
On the lower south-facing roof, the membrane is tenting and taut against the bottom edge of the EIFS wall system. Also, on the lower southwestern roof area, there is minor membrane tenting under the coping and EIFS near the window on the brick-clad elevation. In close proximity to this area, there is also a gap between the blocking/raise portion of the roof and the brick veneer; the membrane is draped within this gap allowing for water and debris retention that could pose a potential for tears due to it being unsupported in nature. There is a delaminated previous repair patch on the lower southeastern roof area. The membrane along the EIFS roof-to-wall transition is tented in its entirety on the south-facing lower roof.

Building #3
On the lower southeastern roof area, the flashing underneath the coping has become delaminated and has an open seam. Also, there is a delaminated membrane seam patch on the skylight flashings and a delaminated flashing around a pitch pocket. A few additional concerns were noted with the partial delamination of flashings at the base of several penetrations on the upper main roof. Near the middle of the north parapet wall is an area of unsupported tented membrane with no securement and/or has lost its adhesion. On this inside corner, a membrane breach has developed and that may allow water infiltration. This deficiency should be corrected promptly.

Building #4
On the lower canopies, the roof-to-wall transition flashings have open / non-watertight conditions. This occurs at both sides of each canopy and is lacking termination. There are also partially open/delaminated seams in scupper locations on both flashings on both canopy roofs. On the upper roof area, there is a small section of base securement that has dislodged from the sheathing on the parapet wall eastern side of the roof area allowing the membrane in this area to tent. On the lower south-facing roof area it was observed that the insulation taper has left areas of unsupported membrane due to the drastic change in insulation layers; this would have been incorrectly installed during the time of the roof construction.

Building #5
The membrane along the EIFS roof-to-wall transition is tented in its entirety on the south-facing lower roof. The tenting is significant and has caused the EIFS wall system to become partially dislodged and cracked, bowing the system away from the substrate. On the upper roof area of this building, there have also been skylight flashing repairs. Additionally, there are small lengths of tenting membrane along the perimeter edges also accompanied by minor membrane wrinkling at the corners.

Building #6
On the lower south-facing canopies, the roof-to-wall transition flashings have open / non-watertight conditions. The termination on both sides of each canopy is lacking proper termination detailing. The membrane along the EIFS roof-to-wall transition is tented in its entirety on the south-facing lower roof. On the upper roof area of this building, there have also been skylight flashing repairs. There are a couple of partially delaminated membrane seam patches in areas with displaced ballast.

6. High Wall Transitions:

The building walls are made of standard yellow brick and an Exterior Insulated Finishing System (EIFS). Overall, the brickwork in locations bordering the roof areas appears to be in good condition, with no signs of spalling or deterioration. The mortar joints are well-bonded and also show no signs of deterioration.

Some issues were noted with the construction at the roof-to-wall transitions on the lower roof areas. Firstly, the roof membrane flashed up the wall behind the brick and EIFS. While this detail performs well from a waterproofing standpoint, it poses a concern. When the roof system needs to be replaced or maintenance work is required, it will be impossible to perform that work without disassembling a portion of the wall at the roof level. This condition can also be seen on one of the south-facing canopy roofs on Building #2.

Secondly, the EIFS is too close to the finished roof surface, measuring less than 2 inches in most locations. Ideally, the wall should terminate at least 8 inches above the roof surface. This would allow the roof flashings to be turned up the wall and properly terminated with a termination bar and counterflashing system. Such a design would prevent moisture from getting behind the EIFS and potentially penetrating the roof assembly. It would also help prevent the deterioration of the EIFS, which is a concern due to the potential buildup of snow and ice on the roof. Moisture scanning of these walls revealed that water has wicked up into the EIFS system. This issue was primarily found along the bottom edge and beneath select windows. This is concerning due to the advanced deterioration observed at the bottom edge of the system. Most areas along the bottom edge of the EIFS have exposed base coat and mesh. This exposure leaves no protection to prevent water ingress into the EIFS system.

Third, while it was observed that in some select locations, the EIFS wall system either had a water resistance barrier (WRB) drainage mat or a mat of mesh running behind the system, it is not clear if they are properly functioning as designed drainage. In other locations, there was no evidence of any drainage designed into the wall. This can only be assumed as there was no visible mat seen behind the EIFS.

Fourthly, the windowsills, like the walls, were installed too close to the finished roof surface. The buildup of snow on the roof could create conditions that allow water infiltration at the window locations.

Although in select locations some were present, many of the brick walls failed to reveal any weep holes at the bottoms of the walls. Some weep holes were blocked with debris, sealant, or mortar. Drainage/weep holes are essential in a wall assembly to allow moisture that infiltrates the wall to escape.

On the lower roof areas, all penetrations through the EIFS wall system have inadequately applied sealant. In these cases, the sealant joint is applied adhering to the penetration and failing in adhesion against the finish coat of the EIFS. Sealant bonds well to most finishes, so well in fact, that it rips the finish from the base coat of EIFS wall systems. On Building #6, a vertical sealant joint above the lower southeast roof section was inadequately applied. The lower half of the joint, approximately 10 inches in length, appeared to be improperly applied, resulting in failure due to the sealant coming into contact with the finish coat. Additionally, the upper half of the joint exhibited cohesive failure of the old caulk between the brick veneer and the EIFS.

7. Coping Caps:

All parapet walls are covered with pre-finished steel coping caps, secured using a continuous concealed cleat system. The coping caps are attached via a snap lock mechanism with no exposed fasteners. Each segment is 10 feet long, with cover plates at all joints.

The coping caps are well-secured with no signs of lifting. However, some areas show mechanical damage, such as gouges and marks, near presumed roof access points. On Building #5, some coping transition cover plates have loosened, causing the bottom hems to disengage.

8. Insulation:

The roof areas are insulated with tapered polyisocyanurate and expanded polystyrene (EPS) as specified. Multiple layers of tapered insulation with staggered joints, which help prevent thermal drift.

The overall insulation thickness suggests compliance with the code requirements for R-value, which indicates a minimum R-value of 30 for low-slope roofs.

Non-destructive nuclear moisture testing was performed across each roof area on a random sampling basis. Testing focused on perimeter edges, drainage points, and penetrations. Testing using the same scale as the previous investigation in 2014 was used, with readings of 8.0 and above indicating a wet insulation bed. Except for Building #1, all readings indicated dry materials, which is consistent with expectations since polyisocyanurate, and EPS typically resist moisture absorption unless subjected to prolonged, intense water exposure.

During RCL's 2014 investigation, the two lower south roof sections of Building #1 exhibited trapped moisture within the roof assemblies. However, the 2024 investigation revealed no trapped moisture along the north wall. A small portion of trapped moisture was detected in the insulation on the upper roof near previous repairs, specifically adjacent to the stack vent. Readings in this area registered 8.0, indicating a wet insulation bed. Core samples from the previous investigation confirmed that dry insulation on these roofs registers at 5.0 or lower, which was consistent with readings from all other areas of the condominium complex's roofs.

Following the 2014 investigation, it was identified as a concern that EPS insulation was used on Buildings #3 and #6. According to fire code regulations, EPS insulation cannot be placed directly on a wood deck. A fire barrier, such as ½" gypsum board, should have been installed on the deck first. Due to the absence of evidence indicating a reroofing project between 2014 and 2024, this issue remains unresolved.

The insulation on the canopy roofs was identified by a core sample taken on the south-facing roof canopy on Building #4. The core sample revealed, as stated in the "Membrane" section, a fully adhered roof system consisting of tapered polyisocyanurate mechanically fastened to a wood deck. Although it was discovered that the flashings on this roof system were in open / non-watertight condition as also stated earlier, the insulation bed was found to be dry. This is also consistent with expectations since polyisocyanurate typically resists moisture absorption unless subjected to prolonged, intense water exposure.

9. Penetrations:

All piping and conduits from the AC units that penetrate the roofs and are flashed with pitch pans filled with a pourable sealer, which seals around conduits and irregularly shaped objects. On the upper roofs, the pourable sealer in the north AC unit's pitch pan was dried out, shrunken, and cracked. On Building #2, the pitch pans of the two AC units on the middle-lower southern roof were not watertight, and similarly, one pitch pan for an AC unit on the upper main roof was also not watertight. All other pitch pans, while currently appearing watertight, should be closely monitored due to their advanced age.

All AC units and satellite dishes are properly set on protective pads.

10. Miscellaneous:

Sharp mechanical debris, such as wiring and sheet metal, was discovered at various locations on the main roof areas of each building. These sharp items pose a hazard to the roof membrane, particularly if stepped on.

CONCLUSIONS & GENERAL RECOMMENDATIONS – REPAIR/MAINTENANCE WORK

The River Crest Condominium Complex is in fair to poor overall condition. The roofs are expected to have a total lifespan of approximately 25 years, leaving an estimated remaining lifespan of 4 years or less based on the assumed age and current condition of the buildings. The first constructed building (Building #1) requires the most immediate attention for repairs or reroofing. To achieve this projected lifespan, the recommended work listed below must be completed. Note that even with these repairs and retrofit performed, the service life of the roof won't be extended, just fully realized. Roof replacement would provide a clean start on each of the roofs. Currently, there is only minimal wet insulation present on the buildings. The building code does not allow for reroofing to occur on wet insulation, so to minimize the cost impact of replacing insulation along with a roof, it is beneficial to replace a roof membrane before the insulation gets wet. Water under the roof membrane also often causes deterioration of wooden structural members like the decking and trusses. Addressing water entering roofs sooner rather than later by removing the wetness can in the long run prove to be the more cost-effective approach. A Recommended Roof Replacement Program outlining the projected estimates of replacing roofs incrementally over the next few years is provided at the end of this report. Regular inspections and routine maintenance are essential and are necessary no matter what direction the association takes.

I. IMMEDIATE MAIN REPAIR/MAINTENANCE

A. Roof Replacement – Lower Southeastern Roof Area of Building #1 – Approx. 264 sq.ft.
   1. Lift Coping Caps and save them for reuse.
   2. Remove and dispose of stone ballast.
   3. Remove and dispose of the field and flashing membrane.
   4. Remove insulation.
   5. Check decking for integrity
   6. Replace deteriorated decking as required. New decking should span 3 structural framing members.
   7. Add new tapered insulation as required to meet the current code requirement for R-value.
   8. Loose lay new EPDM membrane – Minimum 60 mil.
   9. Fully adhere EPDM flashings over walls and curbs.
   10. Distribute new stone ballast – 10-12 lb/sq. ft.

11. Reinstall coping caps.
12. Cut the EIFS wall system up at least 8” from the roof surface incorporating end closure piece, sealant, and weeps.
13. Cut masonry back at least 8” above the roof surface incorporating proper support for brick and incorporating weeps as required.
14. Add securement to membrane flashing up vertically and below the EIFS wall system and masonry.
15. Manufacturer’s warranty – Minimum 10-year

Total Estimate..... $ 10,000.00 – $ 15,000.00

B. Replace Wet Insulation and Repair Previous Repair Location – Upper Main Roof of Building #1
1. Remove ballast from around the stack vent *(approximately 1 square area or 100 sq. ft.)*
2. Sever membrane and flashing around stack vent and pitch pocket, remove & dispose.
3. Remove wet Insulation.
4. Check deck structure for integrity.
5. Replace any deteriorated sections of decking with new ones to match existing ones. Decking must span 3 structural framing members.
6. Clean the surrounding membrane with splice wash.
7. Replace insulation with new to match removed.
8. Install 6” seam tape to the edges of the existing membrane and new flashing around the ventilation opening or penetration.
9. Install 45 mil. non-reinforced EPDM membrane over the opening.
10. Roll the edges of the membrane into seam tape.
11. Apply a 6” pressure-sensitive stripping ply of EPDM over patch seams.
12. Re-distribute ballast.

Total Estimate..... $ 5,000.00 - $ 10,000.00

C. Correct EIFS to Membrane Transition on Lower Roof Areas – All Buildings.
1. Remove ballast from around the bottom edge of EIFS as required to salvage the membrane behind the EIFS wall system.
2. Cut the EIFS wall system up at least 8” from the roof surface. Ensuring not to cut EPDM or WRB behind the wall system.
3. Sever membrane and salvage for integration with main roof field.
4. Add securement to the membrane flashing up vertically below the EIFS wall system.
5. Clean the surrounding salvage membrane with splice wash.
6. Install 6” seam tape to the edges of the existing membrane around the salvaged perimeter.
7. Roll the edges of the membrane into seam tape.
8. Apply a 6” pressure-sensitive stripping ply of EPDM over patch seams.
9. Incorporate a two (2) piece, slip-mounted counterflashing as an end closure piece, sealant, and weeps on the bottom edge of EIFS.
10. Re-distribute ballast.

Building #1..... 45 Linear ft.
Building #2, 3, 4..... 140 Linear ft.
Building #5..... 92 Linear ft.
Building #6..... 21 Linear ft.
Total Approx. Length ..... 258 Linear ft

Total Estimate..... $ 18,500.00 - $ 25,000.00

D. Membrane Breach & Dislodged Securement Repair – Upper Main Roof of Building #3 & #4
1. Lift Coping Caps and save them for reuse remove ballast from around the immediate parapet wall.
2. Sever membrane and flashing around parapet wall corner as required to salvage the membrane of the main field.
3. Add new tapered insulation as required to provide a substrate for the membrane to match the current insulation height.
4. Add securement to the membrane flashing up the parapet wall.
5. Fully adhere the EPDM flashings over the parapet wall.
6. Clean the surrounding salvage membrane with splice wash.
7. Install 6” seam tape to the edges of the existing membrane around the salvaged perimeter.
8. Roll the edges of the membrane into seam tape.
9. Apply a 6” pressure-sensitive stripping ply of EPDM over patch seams.

Total Estimate..... $ 2,000.00 – $ 3,500.00

E. General Tented Membrane Along Parapet Walls and Copings – Refer to Roof Plans for Locations
   1. Lift Coping Caps and save them for reuse remove ballast from around the immediate parapet wall.
   2. Sever membrane and flashing along the parapet wall as required to salvage the membrane of the main field.
   3. Add new tapered insulation as required to provide a substrate for the membrane to match the current insulation height.
   4. Add securement to the membrane flashing up the parapet wall.
   5. Fully adhere the EPDM flashings over the parapet wall.
   6. Clean the surrounding salvage membrane with splice wash.
   7. Install 6" seam tape to the edges of the existing membrane around the salvaged perimeter.
   8. Roll the edges of the membrane into seam tape.
   9. Apply a 6" pressure-sensitive stripping ply of EPDM over patch seams.

   Total Estimate..... $ 2,500.00 – $ 3,500.00

F. Replace Delaminated Flashings Around Penetrations and Other Delaminated Membrane Seam Patches Scattered Throughout All Roof Areas – Refer to Roof Plans for Locations.
   1. Remove ballast from the area if required. (Most areas with delamination occurring lack ballast.)
   2. Clean the surrounding membrane with splice wash.
   3. Install 6" seam tape to the edges of the existing membrane and new flashings around the previously delaminated location.
   4. Roll the edges of the membrane into seam tape.
   5. Apply a 6" pressure-sensitive stripping ply of EPDM over patch seams.
   6. Re-distribute or add ballast.

   Total Estimate..... $ 2,000.00 – $ 3,000.00

G. Repair Open / Non-watertight Conditions on Lower Canopies on Buildings #4 & #6
   1. Lift Coping Caps and save them for reuse.
   2. Clean the surrounding membrane with splice wash.
   3. Apply water cutoff mastic behind the top of the membrane and secure it with a termination bar.
      (if the repair cannot be made due to the height of the severed membrane off the roof it would be acceptable to apply liquid applied membrane as a temporary option until the canopy can be re-roofed)
   4. Slide new coping under shelf angle and over termination.
   5. Reinstall the coping cap and modify it as required to accept the new coping and transition cover plate.

   Total Estimate..... $ 2,000.00 – $ 3,500.00

H. Repair Miscellaneous Items on Building #5 and Others
   1. Remove and Reinstall Skylights and Flash as Required on Building #5
   2. Secure New coping transition cover plate section on Building #5
   3. Re-distribute Ballast Around Perimeter Edges, Skylights, and Other Misc. Penetrations
   4. Proactively remove sharp edges of metal on membrane
   5. Slide new coping under shelf angle and over termination.
   6. Reinstall the coping cap and modify it as required to accept the new coping and transition cover plate.

   Total Estimate..... $ 2,000.00 – $ 3,500.00

II. ROUTINE MAINTENANCE – ANNUAL INSPECTIONS

A. Inspect flashings and address any issues that have developed.
B. Inspect for damage caused by nature, weather, vandalism, etc.
C. Re-distribute any displaced ballast.
D. Clear drains of debris.
E. Check sealant on top of pre-fabricated flashing boots.
F. Check sealants in pitch pans.

Repair Budget:

We recommend budgeting $2,500.00 per year for the next several years to cover potential miscellaneous repair and maintenance work, regardless if repairs or replacement occurs. While it is unlikely that the entire budget will be utilized annually, it is recommended to have these funds available. After approximately 5+/- years, this budget may need to be reassessed and potentially increased.

III. FUTURE ROOF REPLACEMENT

When replacement is performed it should involve the following basic scope of work:

A. Design by a qualified Architect, Engineer, or Consultant as required by local code.
B. Lift Coping Caps and save them for reuse. Alternate for replacement.

C. Remove and dispose of stone ballast.
D. Remove and dispose of the field and flashing membrane.
E. Remove wet insulation.
F. Check decking for integrity.
G. Replace deteriorated decking as required. The new decking should span 3 structural framing members.
H. Add new tapered insulation as required to meet the current code requirement for R-value.
I. Loose lay new EPDM membrane – Minimum 60 mil.
J. Fully adhere EPDM flashings over walls and curbs
K. Distribute new stone ballast – 10-12 lb/sq. ft.
L. Reinstall coping caps.
M. Cut the EIFS wall system up at least 8" from the roof surface incorporating end closure piece, sealant, and weeps when required on lower roofs.
N. Add securement to membrane flashing up vertically and below the EIFS wall system.
O. Integrate, install new windows or raise windows through a redesign by a structural engineer to be at least 8" above the roof surface when applicable. (Not all windows require redesign.)
P. Manufacturer's warranty – Minimum 10-year

IV. NOTES

A. The stated pricing is based on 2024 costs. Material and labor pricing are currently very volatile. The amounts listed above are strictly budget estimates. Actual pricing can best be established through a competitive bidding process based on a common set of detailed specifications. For subsequent years, appropriate inflation adjustments should be applied. An inflation rate of 4% was applied to the Recommended Roof Replacement Program.
B. It is assumed that the roof structure was initially designed to accommodate a ballasted roofing system.
C. The proposed new roofing system for the lower southern section of Building #1 is based on the assumption that there will be no significant changes in building usage, such as increased humidity.
D. The work outlined above is general in nature and is not intended to serve as detailed roofing specifications suitable for the bidding process.

DISCLAIMER

1) This report was based upon an investigation that included visual evaluation as well as information provided by others. If new information is presented at a later date, RCL Engineering Group reserves the right to review that information and amend the opinions presented in this report as deemed appropriate.
2) This report is not a representation that all sources of water infiltration or types of deterioration have been identified. Additional locations may be uncovered as the recommended retrofits and repairs are made.
3) The recommended work listed above is general in nature. It is not intended to represent detailed specifications suitable for bidding or construction.

CLOSING

Refer to the following attachment:

A. Aerial Imagery
B. Annotated Building Drawings
C. Photographic Record
D. Recommended Roof Replacement Program
E. Nuclear Non-Destructive Moisture Testing

We trust that this roof investigation report will be valuable for the short-term and long-term management of the roof systems at River Crest Condominium Complex. Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,



Jacob J. Peterson, PE
Director of Engineering

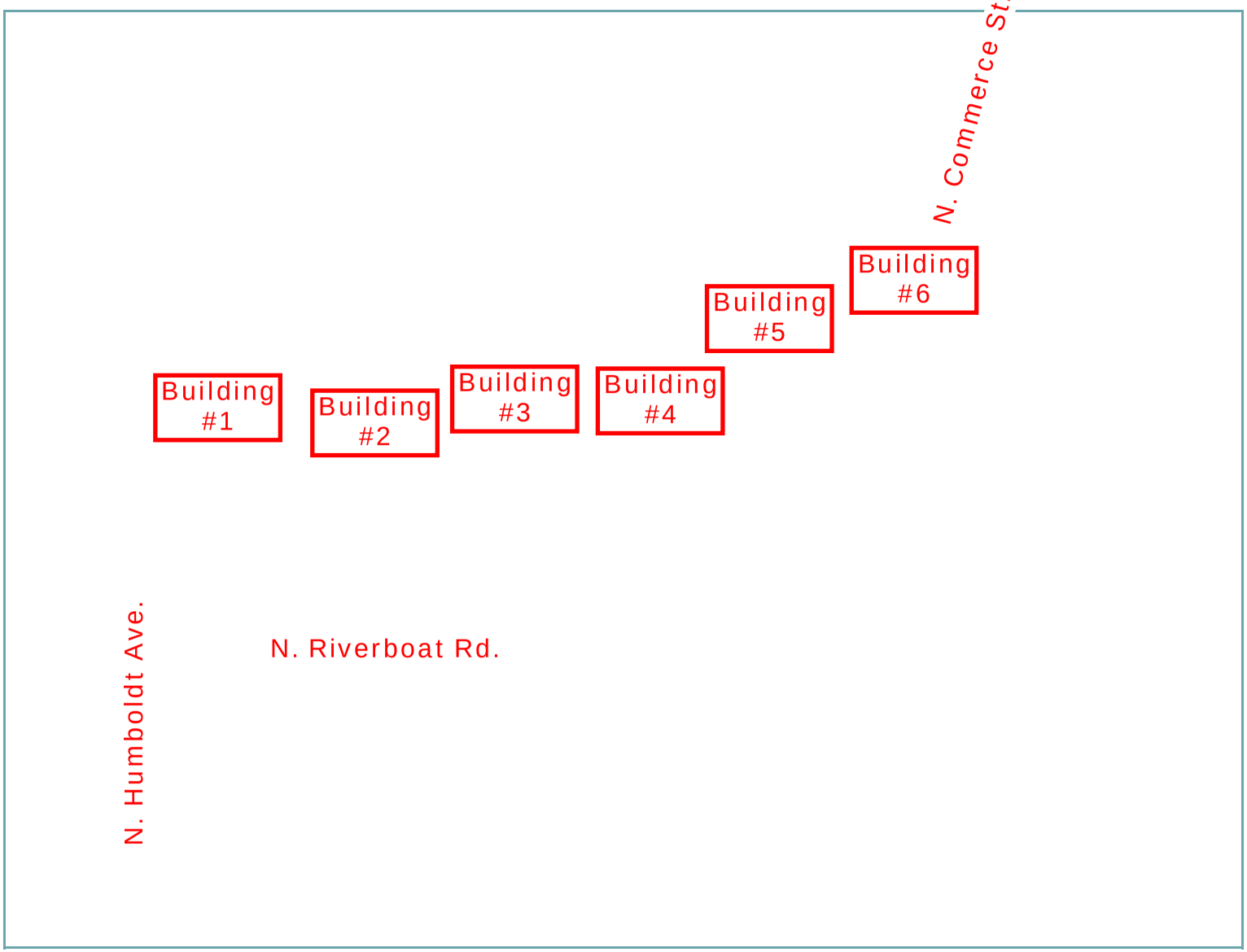


Tim Goehrke
Project Manager / Field Inspector



Louis Juhlmann
President

River Crest Condominiums



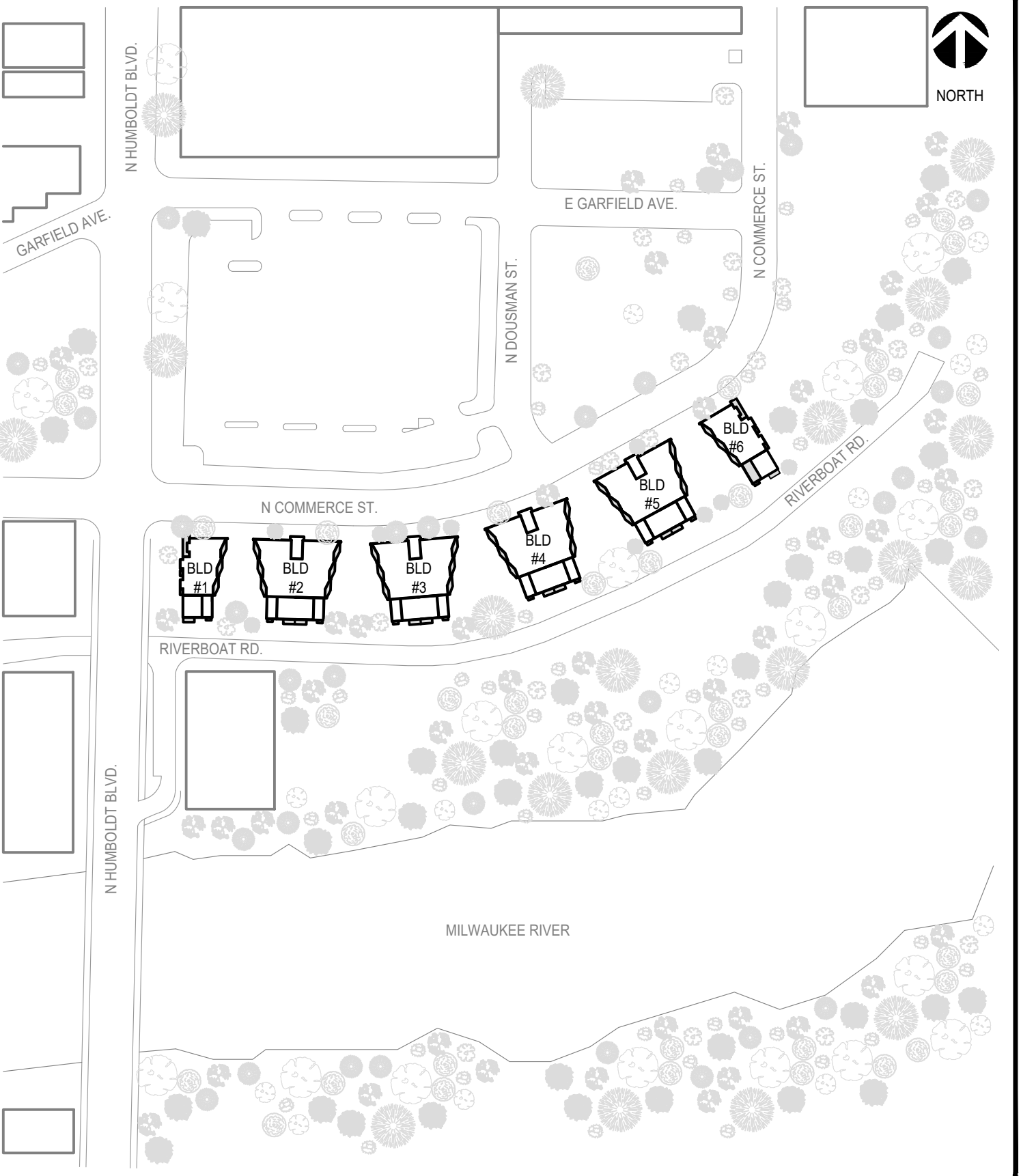
Legend

Notes

2024 Aerial

This map is a user generated static output from an Internet mapping site and is for reference only.
Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

MILWAUKEE COUNTY GIS AND LAND INFORMATION



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SHEET NO.	DRAWN BY:	SITE PLAN
A0	RV	PREPARED FOR: SENTRY MANAGEMENT
	DATE: 6/28/2024	RIVER CREST CONDOMINIUMS 2150 COMMERCE ST. MILWAUKEE, WI 53202
PROJECT #. 24EP10170	REV. 0	

Roofing Consultants, Ltd.
Engineers, Architects & Building Envelope Specialists
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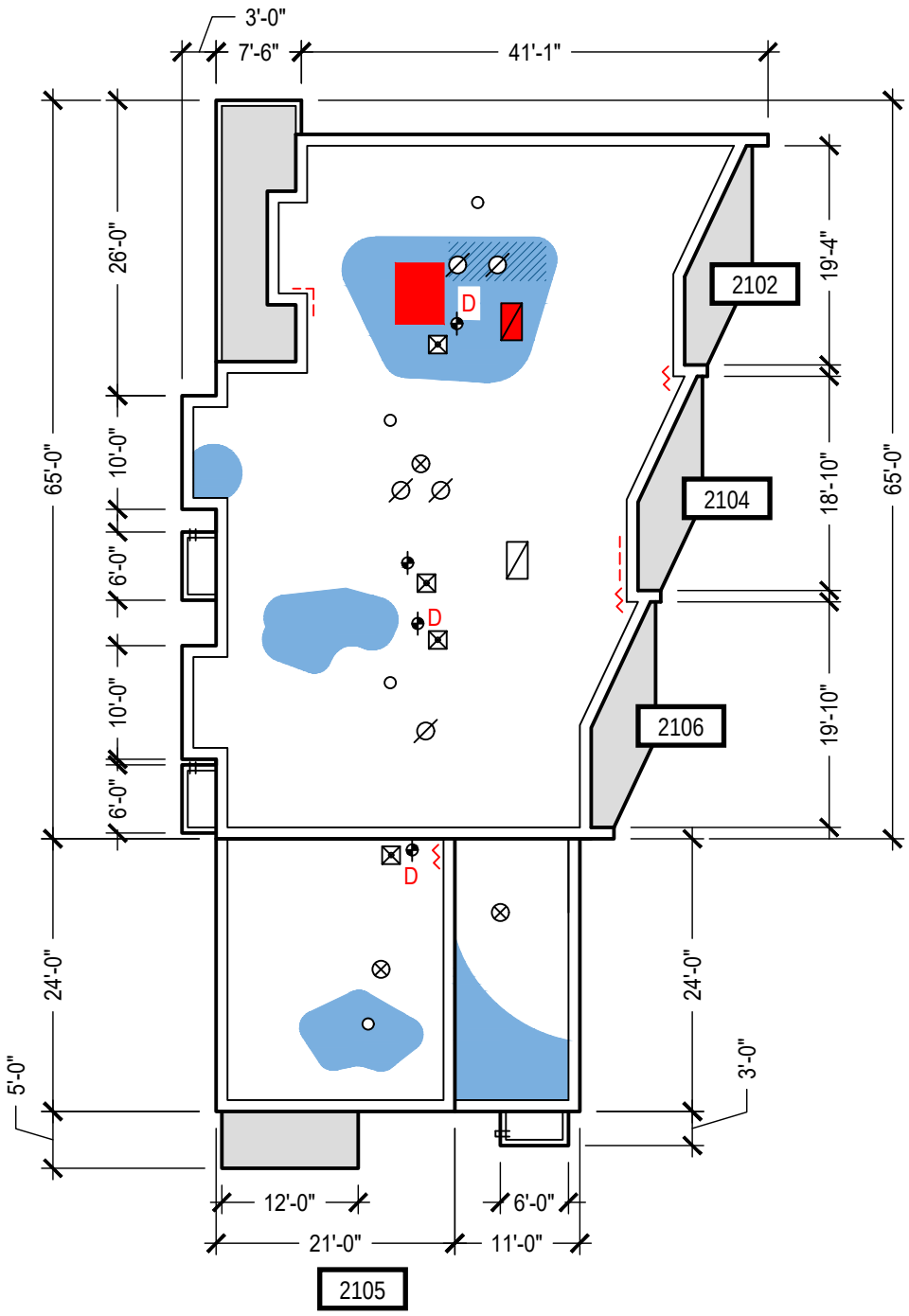
WWW.RCLENG.COM



LEGEND

○	SOIL VENT	⊗	DRAIN
⊠	HVAC	⊕	ELECTRICAL CONNECTION
⊘	STACK VENT	▨	SKYLIGHT
▯	SCUPPER	═	PARAPET WALL

DEFICIENCIES

D =	DETERIORATED PITCH PAN SEALER		PONDING WATER
	ATTEMPTED PREVIOUS REPAIR		MOISTURE DETECTED
	OPEN SEAM/SEALANT		DISPLACED BALLAST
	DELAMINATION	⊗	DEBRIS CLOGGED DRAIN
	TENTING MEMBRANE		INTERIOR DRYWALL CRACKING & STAINING

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SHEET NO.	DRAWN BY:
A1	RV
	DATE: 6/28/2024
PROJECT #. 24EP10170	REV. 0

ROOF PLAN - BUILDING #1

PREPARED FOR: SENTRY MANAGEMENT

RIVER CREST CONDOMINIUMS
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MILWAUKEE, WI 53202

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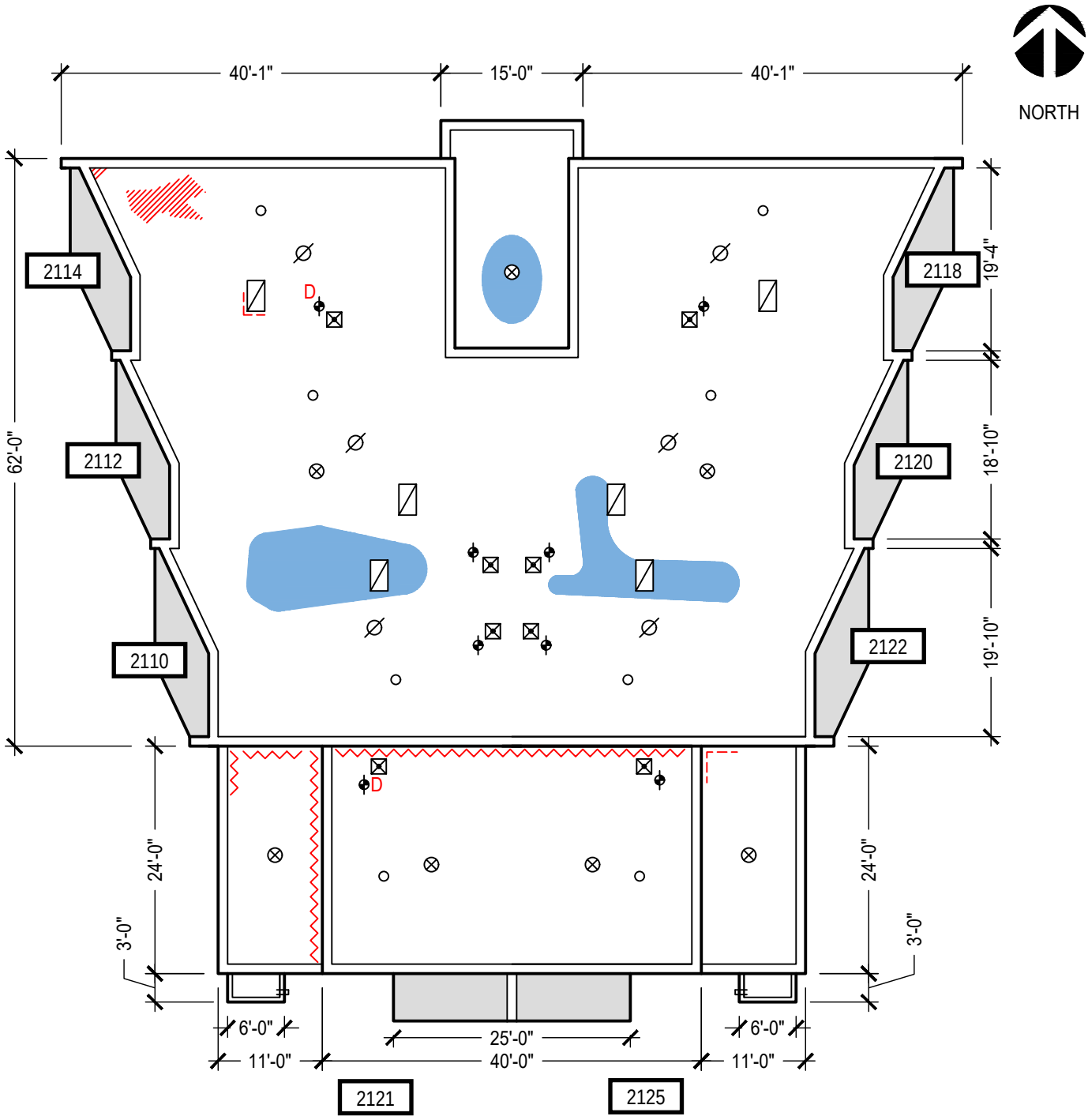

LEGEND

○	SOIL VENT	⊗	DRAIN
⊠	HVAC	⊕	ELECTRICAL CONNECTION
∅	STACK VENT	▨	SKYLIGHT
⊓	SCUPPER	═	PARAPET WALL

DEFICIENCIES

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	ATTEMPTED PREVIOUS REPAIR		MOISTURE DETECTED
	OPEN SEAM/SEALANT		DISPLACED BALLAST
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	TENTING MEMBRANE		INTERIOR DRYWALL CRACKING & STAINING

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SHEET NO.	DRAWN BY:
A2	RV
	DATE: 6/28/2024
PROJECT #. 24EP10170	REV. 0

ROOF PLAN - BUILDING #2

PREPARED FOR: SENTRY MANAGEMENT

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MILWAUKEE, WI 53202

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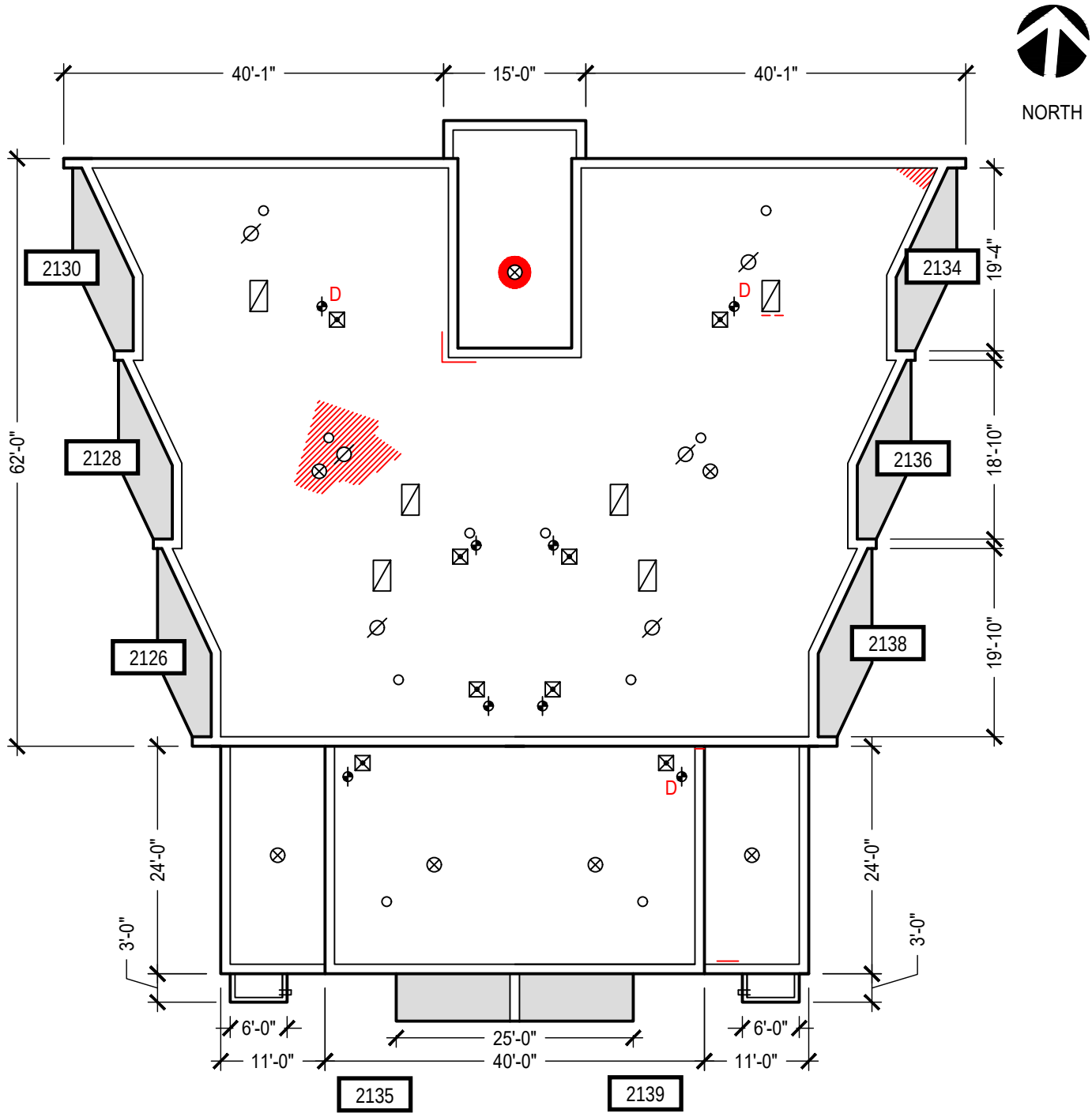

LEGEND

○	SOIL VENT	⊗	DRAIN
⊠	HVAC	⊕	ELECTRICAL CONNECTION
∅	STACK VENT	▨	SKYLIGHT
▯	SCUPPER	═	PARAPET WALL

DEFICIENCIES

D =	DETERIORATED PITCH PAN SEALER		PONDING WATER
	ATTEMPTED PREVIOUS REPAIR		MOISTURE DETECTED
	OPEN SEAM/SEALANT		DISPLACED BALLAST
	DELAMINATION	⊗	DEBRIS CLOGGED DRAIN
	TENTING MEMBRANE		INTERIOR DRYWALL CRACKING & STAINING

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SHEET NO.	DRAWN BY:
A3	RV
	DATE: 6/28/2024
PROJECT #. 24EP10170	REV. 0

ROOF PLAN - BUILDING #3

PREPARED FOR: SENTRY MANAGEMENT

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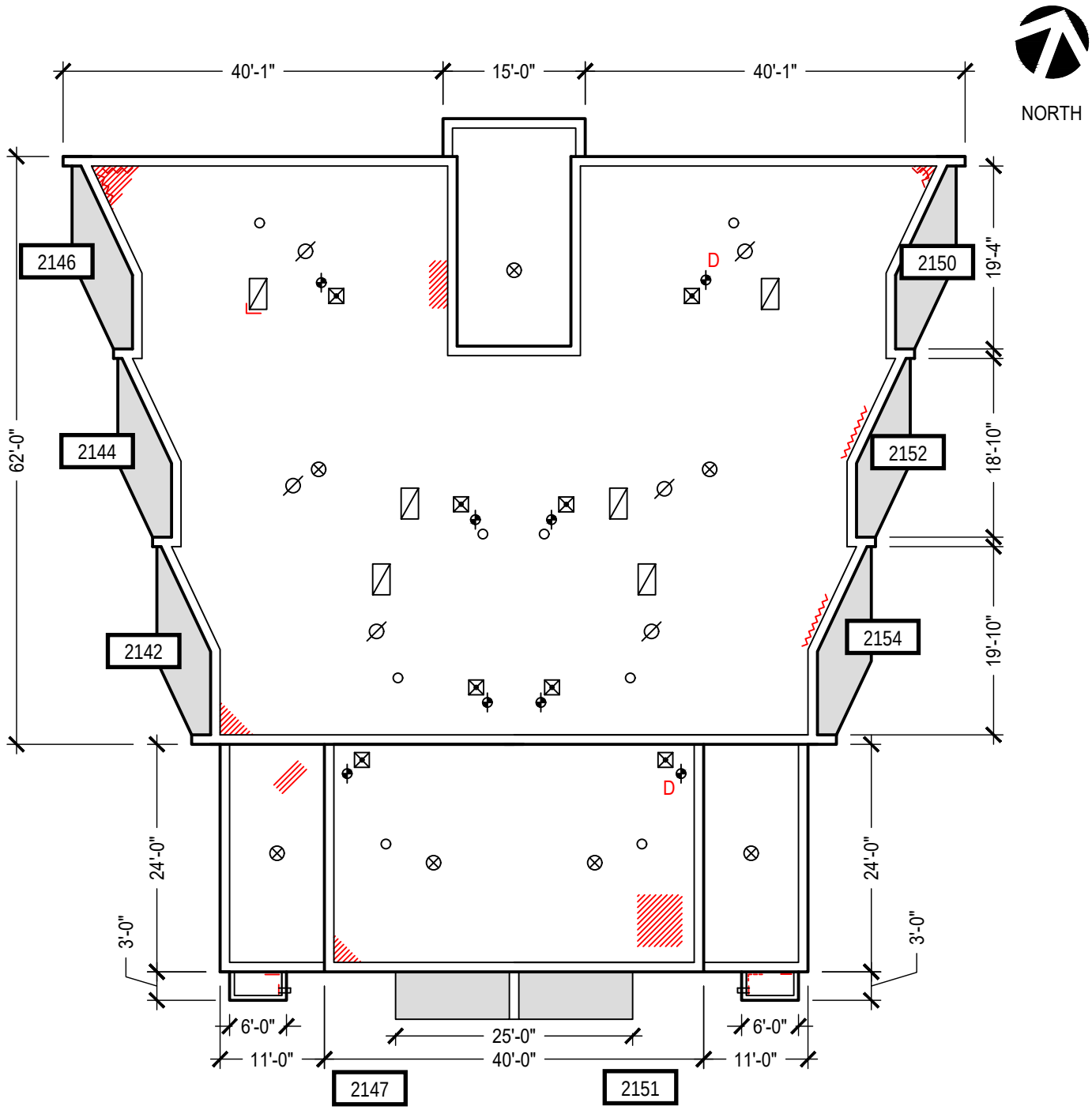

LEGEND

○	SOIL VENT	⊗	DRAIN
⊠	HVAC	⊕	ELECTRICAL CONNECTION
∅	STACK VENT	▨	SKYLIGHT
⊓	SCUPPER	═	PARAPET WALL

DEFICIENCIES

D =	DETERIORATED PITCH PAN SEALER		PONDING WATER
	ATTEMPTED PREVIOUS REPAIR		MOISTURE DETECTED
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SHEET NO.	DRAWN BY:
A4	RV
	DATE: 6/28/2024
PROJECT #. 24EP10170	REV. 0

ROOF PLAN - BUILDING #4

PREPARED FOR: SENTRY MANAGEMENT

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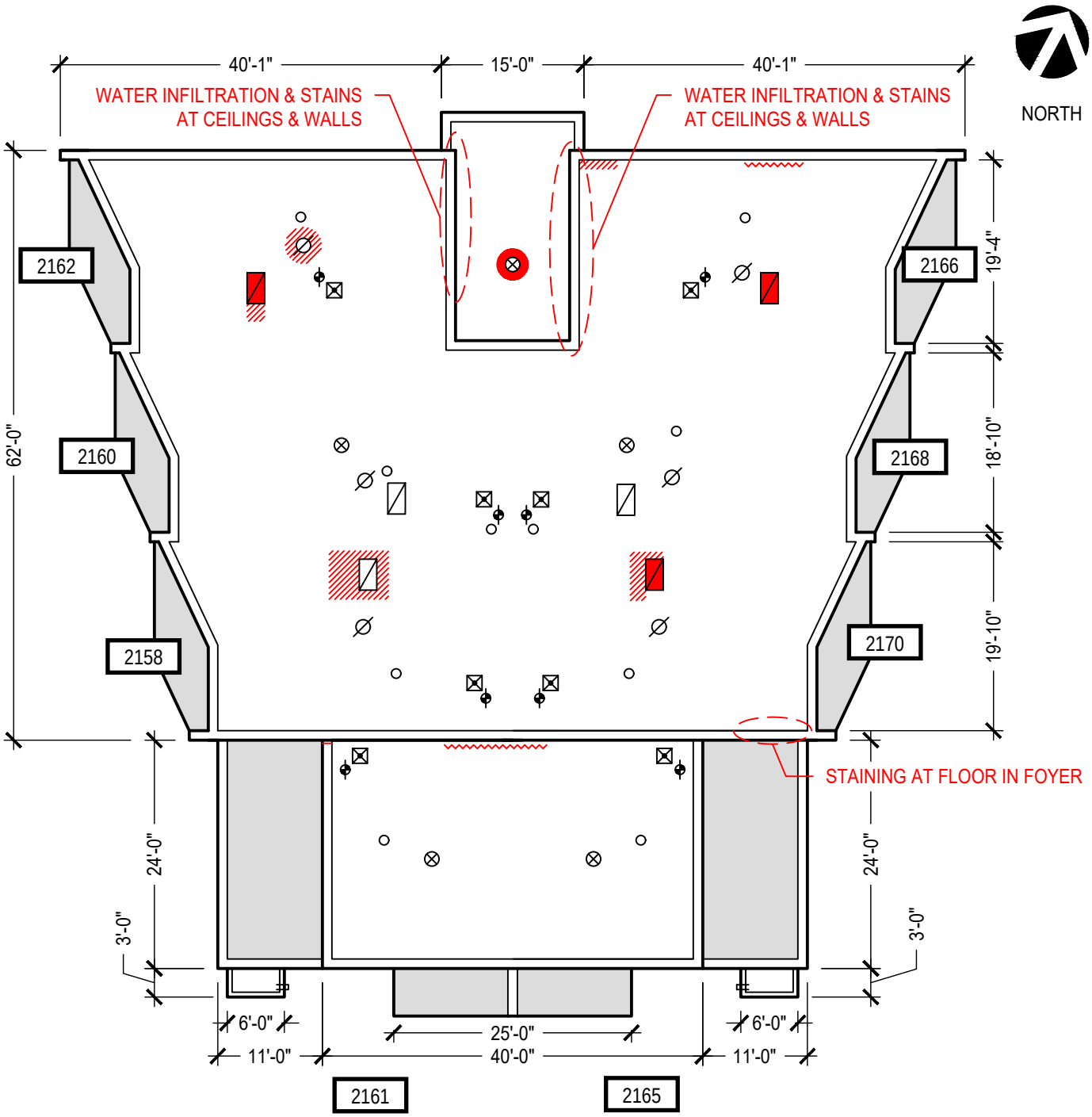

LEGEND

○	SOIL VENT	⊗	DRAIN
⊠	HVAC	⊕	ELECTRICAL CONNECTION
∅	STACK VENT	▨	SKYLIGHT
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DEFICIENCIES

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	ATTEMPTED PREVIOUS REPAIR		MOISTURE DETECTED
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	DELAMINATION	⊗	DEBRIS CLOGGED DRAIN
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SHEET NO. A5	DRAWN BY: RV	ROOF PLAN - BUILDING #5 PREPARED FOR: SENTRY MANAGEMENT
	DATE: 6/28/2024	RIVER CREST CONDOMINIUMS 2150 COMMERCE ST. MILWAUKEE, WI 53202
PROJECT #. 24EP10170	REV. 0	

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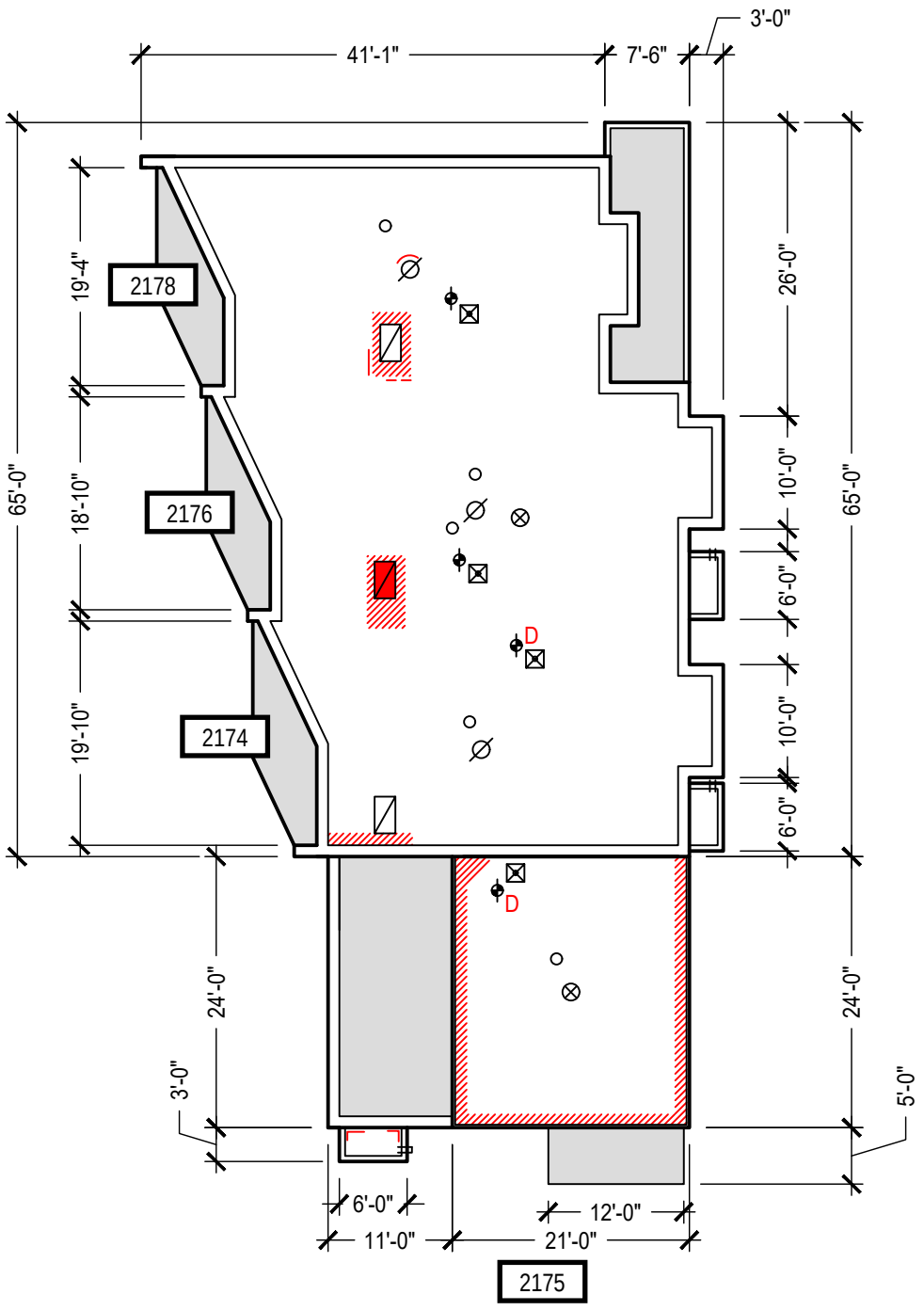

LEGEND

○	SOIL VENT	⊗	DRAIN
⊠	HVAC	⊕	ELECTRICAL CONNECTION
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SHEET NO.	DRAWN BY:
A6	RV
	DATE: 6/28/2024
PROJECT #. 24EP10170	REV. 0

ROOF PLAN - BUILDING #6

PREPARED FOR: SENTRY MANAGEMENT

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2150 COMMERCE ST.
MILWAUKEE, WI 53202

Roofing Consultants, Ltd.
Engineers, Architects & Building Envelope Specialists
1 (800) 549-0802
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River Crest Condominiums
N. Commerce Street, Milwaukee, WI
Site Identification



1. Site Identification of the 6 River Crest Condominium Buildings.



2. Building #1
   2102, 2104, 2105, 2106



3. Building #2
   2110, 2112, 2114, 2118
   2120, 2121, 2122, 2125

River Crest Condominiums
N. Commerce Street, Milwaukee, WI
Site Identification



4. Building #3
   2126, 2128, 2130, 2134
   2135, 2136, 2138, 2139



5. Building #4
   2142, 2144, 2146, 2147
   2150, 2151, 2152, 2154



6. Building #5
   2158, 2160, 2161, 2162
   2165, 2166, 2168, 2170

River Crest Condominiums
N. Commerce Street, Milwaukee, WI
Site Identification



7. Building #6
   2174, 2175, 2176, 2178

River Crest Condominiums
2102-2106 N. Commerce Street, Milwaukee, WI
Building 1



1. Site identification.



2. Overview of the south facing elevation on North Riverboat Road.



3. Overview of the south facing canopy.



4. The canopy is covered with a fully adhered single ply EPDM membrane. No issues uncovered.



5. One of the two canopys on the west side of the building.



6. Overview of the roof showing the same EPDM roof assembly. Minor debris including fastener heads and miscellaneous sharp items; clean up recommended.



7. Overview of the second canopy on the west facing side.



8. Overview of canopy roof. No issues uncovered.



9. Overview of the main upper roof area. The roof system on this building consists of ballasted EPDM.



10. Shrunken, cracked and deteriorated pourable sealer in an AC unit pitch pan. This is a potential leak source.



11. Typical skylight curb detail. No issues uncovered.



12. Overview of substantially ponded roof area.



13. Approx. ¾" standing water.



14. Attempted previous repair area.



15. Open repair patch flashing conditions; pocket in repair holding water.



16. Sealant failing in adhesion and patch delaminated.



17. Repair around stack penetration delaminating.



18. Non-destructive moisture scan was conducted through roof and focus was narrowed in the previous repair area.



19. Moisture readings indicated a small area of wet insulation around stack vent.



20. Miscellaneous sharp debris like this electrical wiring can be hazardous to the roof membrane.



21. Wrinkled and taut membrane tenting away from perimeter edge.



22. Additional areas of membrane patches delaminating.



23. Additional areas of ponding near perimeter of roof.



24. Copings appeared to be generally secure.



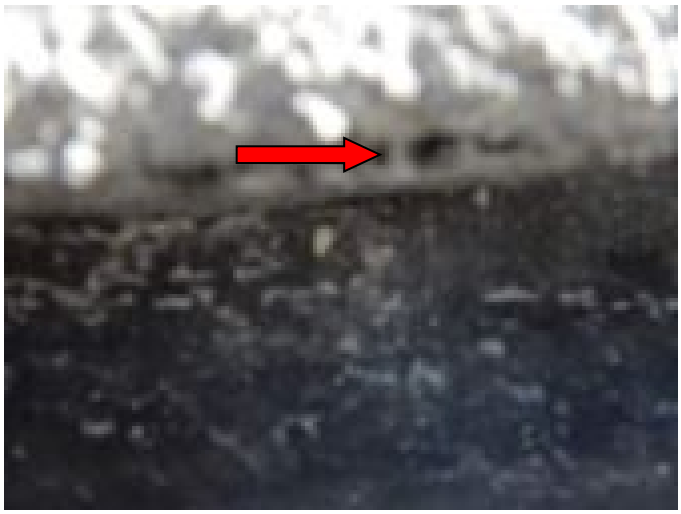
25. Overview of the western lower roof area.



26. EIFS wall system exists extremely close to the roof surface.



27. This view shows the typical height of the EIFS wall system from the roof surface.



28. Bottom edge of EIFS appears to be inconsistent in its finish coat; long exposure to moist conditions could allow for moisture to wick into the system and cause deterioration.



29. Typical drain detail. No issues uncovered.



30. Wall detail at the corner involve membrane flashed up and behind the brick veneer and EIFS wall system.



31. Shrunken, cracked and deteriorated pourable sealer in an AC unit pitch pan. This is a potential leak source.



32. Overview of the lower eastern roof. Ponding water along the wall to the right was discovered.



33. Wall detail at masonry locations; membrane is flashed up and behind the brick veneer.



34. Ponding water apparent upon partial clearing of ballast.



35. Typical drain detail. No issues uncovered.



36. Minor membrane tenting under coping cap along window sill; potential for membrane wear along cement sill.



37. ¾” ponding water in contact with bottom of EIFS wall. EIFS wall has become heavily deteriorated; base coat, mesh and EPS all exposed.



38. Moisture meter indicates moisture in wall system.



39. The windowsill is positioned excessively close to the roof surface, creating a risk of water infiltration if snow accumulates on the roof.

River Crest Condominiums
2102-2106 N. Commerce Street, Milwaukee, WI
Building 1 – Unit 2102



1. Damage to drywall finishes under skylight and staining.



2. Damage to drywall finishes under skylight and staining.

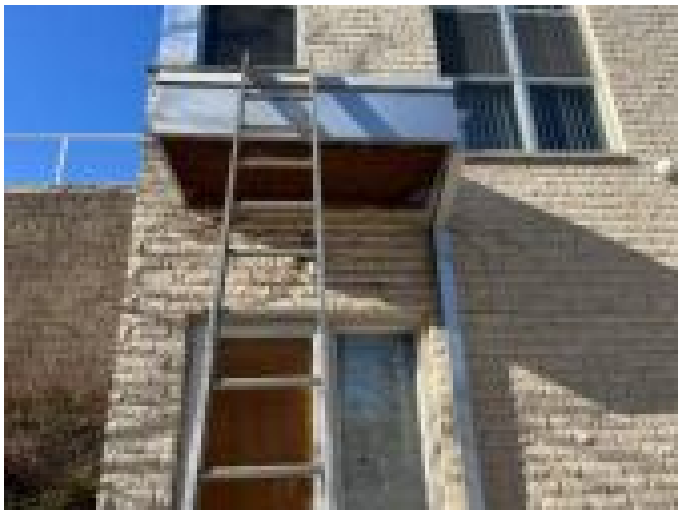


3. Damage to drywall finishes in the vicinity of the skylight and staining.

River Crest Condominiums
2110-2125 N. Commerce Street, Milwaukee, WI
Building 2



1. Site Identification.



2. View of the west-side canopy on south side on North Riverboat Road.



3. Wall system significantly close to the roof surface



4. View showing veneer within 2” of roof surface.



5. View of the east-side canopy on south side on North Riverboat Road.



6. No issues were found with the roofing; note the termination of the brick veneer above the roof surface.



7. Overview of lower roof on the north facing side above the front entrance.



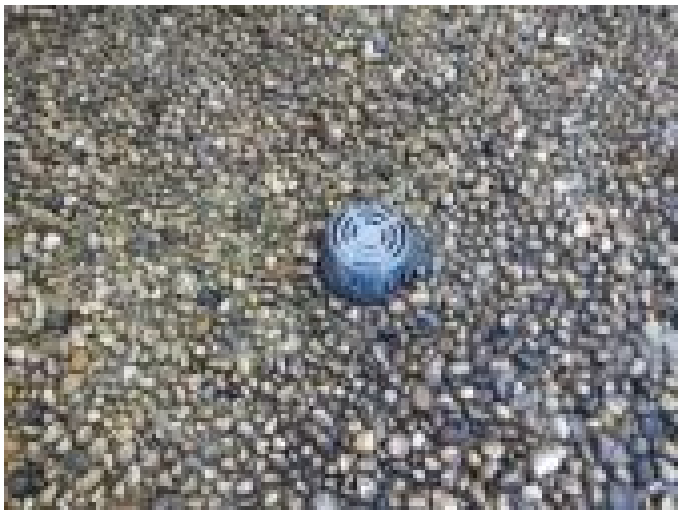
8. Overview of the lower roof facing south.



9. The typical wall and roof construction at roof level presents a potential issue, as both elements are positioned too close to the finished roof system, which may lead to water infiltration.



10. View of bottom edge of EIFS wall system; finish coat applied to the underside although EPS exposed on the front surface.



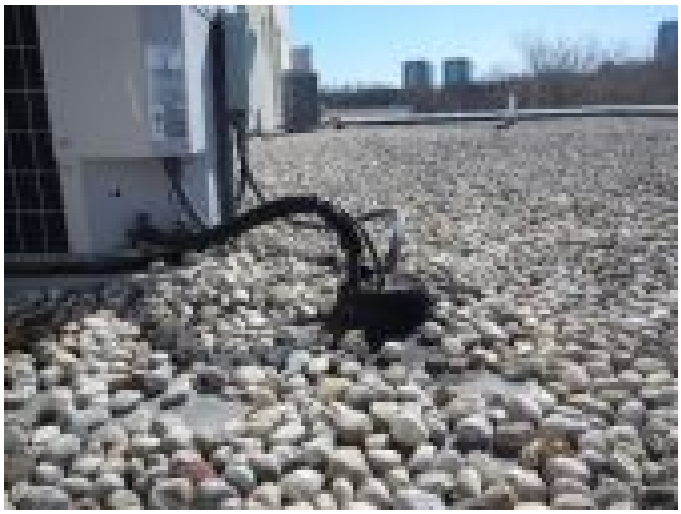
11. Typical drain detail; minor debris around drain.



12. Minimal ponding water on roof surface.



13. EIFS wall systems distance from roof varied depending on roof taper; height shown within 6” of roof surface.



14. Roof level overview of south facing lower roof.



15. Perimeter edge copings appeared to be secure; minor mechanical marks along trafficked roof access locations.



16. Shrunken, cracked and deteriorated pourable sealer in pitch pan. Craters have potential for holding water.



17. View of the typical wall detail; note excessively close distance of EIFS to roof surface.



18. Membrane tenting and taut against bottom of EIFS wall system; drainage is not present at any location at the bottom of the EIFS wall. Inconsistent bottom edge finishing and EIFS mesh exposed.



19. Inconsistencies along bottom edge; appears base coat is painted and does not utilize finish coat.



20. Inconsistencies in EIFS finish coat.



21. Incorrect application of sealant failing against finish coat; sealant not permitted to contact finish coat.



22. View of lower southwestern roof area.



23. General overview of wall detailing along brick veneer.



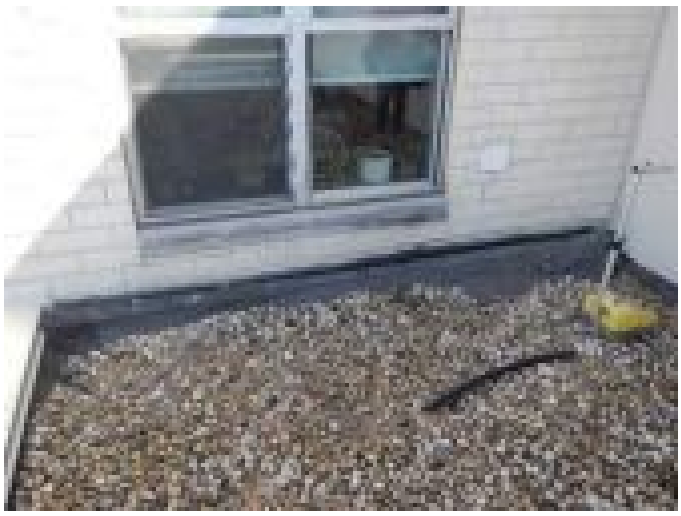
24. Minor membrane tenting under coping.



25. Additional membrane tenting along roof to wall transition.



26. Gap between blocking and brick veneer; membrane draped within gap allowing for water and debris retention.



27. It appears that no weeps where present above roof membrane or blocked by mortar application.



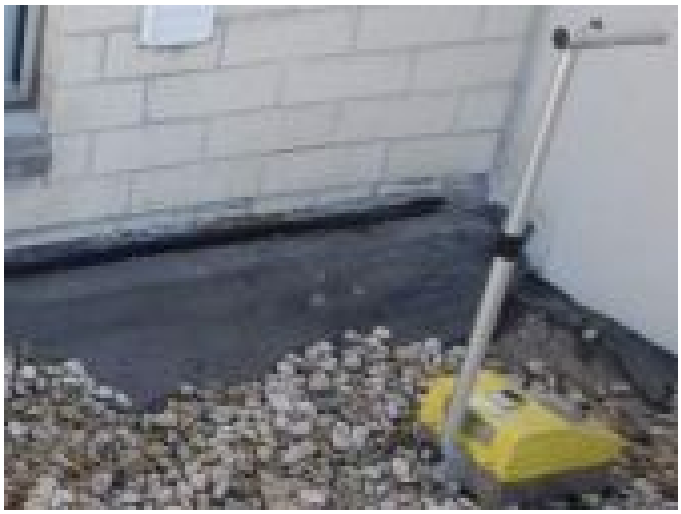
28. Typical 3” drain free of debris.



29. View of EIFS wall system in contact with moisture and roof surface.



30. EIFS base coat and mesh exposed; previously painted over.
Moisture appears to be present on lower edge of EIFS system; fungus/moss growth present.



31. Non-destructive moisture scanning indicated no presence of moisture.



32. Perimeter edge copings appeared to be secure; minor mechanical marks along trafficked roof access locations.



33. Overview of southeastern lower roof area.



34. General overview of wall detailing along brick veneer.



35. Weeps apparent above membrane.



36. EIFS wall system deterioration; exposed base coat and mesh painted over.



37. Mesh deteriorated and falling apart.



38. Meter indicates moisture in EIFS wall system.



39. Non-destructive moisture scan indicated no moisture in roof system.



40. Delaminated previous repair patch.



41. Perimeter edge copings appeared to be secure; minor mechanical marks along trafficked roof access locations.



42. General overview of upper roof section.



43. Displaced ballast near roof perimeter edge.



44. Minor wind scoring in roof perimeter corners.



45. Cracking and deteriorated sealant pitch pocket.



46. Delaminated cured corner patch on skylight.



47. Typical skylight detail.



48. Typical drain detailing; free of debris.



49. Minor ponded water near skylights.



50. Areas of seams on the roof system with 2” seam tape.



51. Miscellaneous sharp debris such as electrical wiring can be hazardous to the roof membrane.

River Crest Condominiums
2126-2139 N. Commerce Street, Milwaukee, WI
Building 3



1. Site Identification.



2. View of the west-side canopy on south side on North Riverboat Road.



3. A view of the roof assembly at the roof-to-wall transition of this canopy shows how the membrane was turned up the walls and secured with a termination bar as required.



4. Note there are weep holes as required at the bottom of the walls.



5. No issues were found with this canopy roof system.



6. Wall system sufficient height from roof surface.



7. View of the east-side canopy on south side on North Riverboat Road.



8. No issues were discovered with the roof system on this canopy.



9. A similar roof-to-wall detail was utilized. This is an acceptable detail.



10. Note there are weep holes as required at the bottom of the walls.



11. Overview of lower roof on the north facing side above the front entrance.



12. Overview of the lower roof facing south.



13. The typical wall and roof construction at roof level presents a potential issue, as both elements are positioned too close to the finished roof system, which may lead to water infiltration.



14. Some areas on bottom edge of EIFS system appear to have exposed base coat.



15. Some areas EIFS wall system within 3” of roof surface.



16. Some areas have visible drainage wrap behind EIFS wall system.



17. Typical drain detail; obstructed debris around drain basket.



18. Bottom edge of EIFS wall system in contact with roof surface and ballast; note fungus/moss growth.



19. Deteriorated and broken-down EPS from inside EIFS wall system on roof surface.



20. Meter indicates moisture along bottom edge of EIFS wall system.



21. Overview of lower south-facing roof area.



22. Typical drain detail; free of debris.



23. EIFS wall system excessively close to roof surface.



24. Some areas have visible drainage wrap behind EIFS wall system.



25. Incorrect application of sealant failing against finish coat; sealant not permitted to contact finish coat.



26. Shrunken, cracked and deteriorated pourable sealer in pitch pan.



27. Sealant failing along EIFS and coping.



28. Non-destructive moisture scanning was conducted; no moisture indicated within roof system.



29. Some scattered broken stones observed.



30. Perimeter edge copings appeared to be secure.



31. View of lower southwestern roof area.



32. Typical drain detail; free of obstructions



33. Counterflashing integrated along roof to masonry locations under window.



34. Weeps incorporated above counterflashing.



35. Sealant appears to be incorrectly applied over EIFS finish coat.



36. Moisture observed along bottom edge of EIFS wall; exposed EPS in corner location.



37. Overview of southeastern lower roof area.



38. Typical drain detail; free of debris/obstructions.



39. EIFS wall system excessively close to roof surface.



40. View of bottom edge of EIFS wall; exposed base coat and mesh.



41. Delaminated/open seam.



42. Counterflashing integrated along roof to masonry locations under window.



43. Weeps incorporated above counterflashing.



44. General overview of upper roof area.



45. Typical drain and penetration details; ballast clear around select locations.



46. 45mil EPDM.



47. Minor wind scoring in roof perimeter corners.



48. Areas of seams on the roof system with 2-3” seam tape.



49. Typical skylight detail; no issues observed.



50. Cracking and deteriorated sealant pitch pocket.



51. Membrane breach in area of unsupported membrane; EPS insulation appears to be shrunken and deteriorated.



52. Delaminated membrane patch on skylight.



53. Delaminated flashing around pitch pocket.

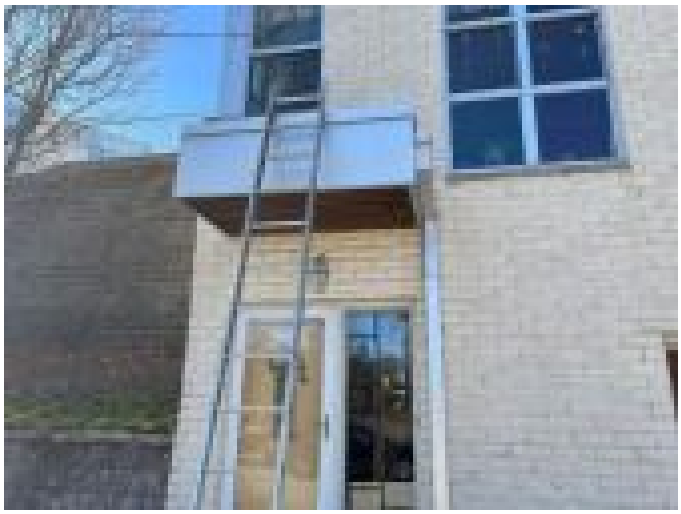


54. Perimeter edge copings appeared to be secure.

River Crest Condominiums
2142–2154 N. Commerce Street, Milwaukee, WI
Building 4



1. Site Identification.



2. View of the west side canopy on the south side on North Riverboat Road.



3. A view of the roof assembly at the roof-to-wall transition; the membrane was turned up the wall lacking securement.



4. Open / non-watertight condition; membrane turned up under brick veneer lacking termination.



5. Additional view showing lack of termination; base securement visible. Varying height of roof surface from shelf angle; mid roof approximately 5”.



6. Partially open seam in scupper location.



7. View of the east-side canopy on the south side on North Riverboat Road.



8. A view of the roof assembly at the roof-to-wall transition; the membrane was turned up the wall lacking securement.



9. Open seam along scupper location.



10. Delaminating membrane corner patch.



11. Open / non-watertight condition; membrane turned up under brick veneer lacking termination.



12. The core sample revealed a fully adhered EPDM roof system consisting of tapered polyisocyanurate adhered to a wood deck. Insulation was found to be dry.



13. Overview of the lower roof on the north facing side above the front entrance.



14. Overview of the lower roof facing south.



15. The typical wall and roof construction at roof level presents a potential issue, as both elements are positioned too close to the finished roof system, which may lead to water infiltration.



16. Finish coat applied in adequately / finish coat delaminating off of base coat on bottom edge of EIFS wall system.



17. Inconsistency in bottom edge in finish coat; cracking along finish coat edge.



18. Typical drain detail; free of obstructions.



19. Bottom edge of EIFS wall system is excessively close to roof surface; higher potential for water wicking and ingress into the wall system.



20. Bottom edge of EIFS deteriorating; EPS seen disintegrated on roof surface.



21. Bottom edge of EIFS wall appeared to contain moisture.



22. Perimeter edge copings appeared to be secure; mechanical marks along trafficked roof access locations.



23. Additional view of copings mechanical marks.



24. Overview of lower south facing roof area.



25. Shrunken, cracked and deteriorated pourable sealer in pitch pan.



26. Typical drain detail; free of obstructions.



27. Roof insulation taper installation has left areas of unsupported membrane due to drastic change in insulation layers.



28. Wind scoring in roofs perimeter corners.



29. Incorrect application of sealant failing against finish coat; sealant not permitted to contact finish coat.



30. View of bottom edge of EIFS wall; exposed base coat and mesh.



31. EIFS wall system excessively close to roof surface.



32. Perimeter edge copings appeared to be secure; mechanical marks along trafficked roof access locations .



33. View of lower southwestern roof area.



34. Typical drain detail; free of obstructions.



35. EIFS wall system excessively close to the roof surface.



36. View of the bottom edge of the EIFS wall system; deteriorated and exposed base coat.



37. Counterflashing integrated along roof to masonry locations under window.



38. Some weeps above counterflashing in masonry.



39. Some weeps appear to be blocked with sealant.



40. Areas in which sealant is in contact with finish coat and failing in adhesion.



41. Exposed base coat and improper application of finish coat.



42. Overview of the lower southeastern roof.



43. Additional view of the southeastern lower roof; EIFS is excessively close to the roof surface.



44. Inconsistent bottom edge of EIFS and finish coat.



45. View showing the bottom edge of the EIFS wall system with exposed base coat and mesh.



46. Typical drain detail; free of obstructions.



47. Counterflashing integrated along roof to masonry locations under window.



48. Sealant appears to be in contact with EIFS finish coat.



49. Weeps appear to be blocked with sealant.



50. General overview of upper roof area.



51. Minor wind scoring in roof perimeter corners.



52. Typical skylight detail.



53. Delaminated / partially open seam on corner.



54. Select locations of displaced ballast along perimeter edge.



55. Additional and larger area of wind scoring; tenting developing.



56. Additional area of wind scoring and wrinkling.



57. Non-watertight condition around conduit line.



58. Securement fastening disengaged in substrate on parapet wall; a small section of tented membrane due to failed securement.



59. Sharp debris in the form of scrap sheet metal on the roof surface.



60. Sharp debris in the form of excess wire on the roof surface.

River Crest Condominiums
2158–2170 N. Commerce Street, Milwaukee, WI
Building 5



1. Site Identification.



2. View of the west side canopy on the south side on North Riverboat Road.



3. A view of the roof assembly at the roof-to-wall transition; the membrane was turned up behind brick veneer.



4. View showing membrane turned up behind brick shelf angle and veneer.



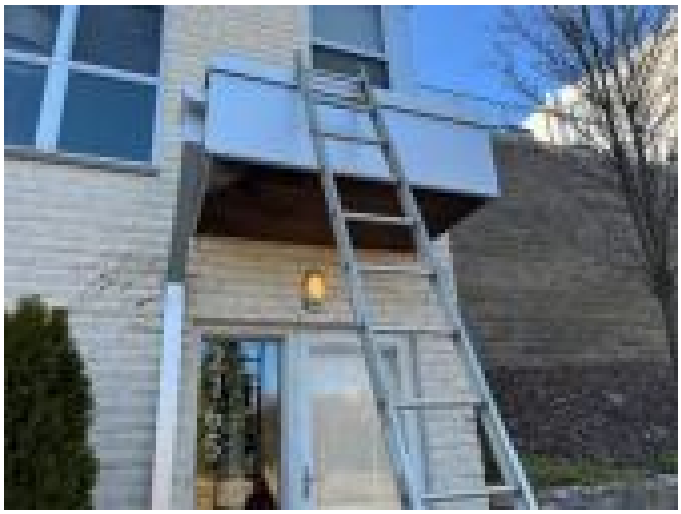
5. View showing WRB up between membrane and shelf angle.



6. Membrane appears to be terminated up behind WRB.



7. Miscellaneous debris and deteriorated masonry material on roof surface.



8. View of the east-side canopy on the south side on North Riverboat Road.



9. A view of the roof assembly at the roof-to-wall transition; the membrane was turned up behind brick veneer.



10. Additional view showing membrane turned up behind brick shelf angle and veneer.



11. Miscellaneous debris on roof surface.



12. Overview of the lower roof on the north-facing side above the front entrance.



13. Typical drain detail; obstructed debris in and around drain basket.



14. The wall and roof construction at the roof level presents a potential issue, as both elements are positioned excessively close to the finished roof system, which may lead to water infiltration.



15. Additional view showing the window and bottom of the EIFS wall system excessively close to the roof surface.



16. View of the underside of the EIFS wall system; it appears that mesh is running behind wall system. Bottom edge of EIFS has inconsistencies in finish coat.



17. Other areas of the underside of the EIFS wall system appear to have WRB or a drainage mat behind the system; finished bottom edge appears to be blended.



18. Other areas of the underside of the EIFS wall system have exposed mesh the is required to be embedded within the base coat during back-wrapping.



19. Areas in which are in contact with the roof surface due to the accumulation of debris read as wet; note exposed mesh at bottom edge of EIFS.



20. Note EIFS wall system when scanned with moisture meter under windows detected moisture.



21. Overview of lower south-facing roof area.



22. EIFS wall system excessively close to roof surface; minor membrane tenting along roof wall transition.



23. Note the failing sealant between coping and masonry.



24. Note the failing sealant between coping and EIFS wall.



25. Inconsistent finish coat application on bottom edge of EIFS.



26. It appears that the sealant was incorrectly applied, resulting in it failing against the finish coat. Note that the sealant should not have been allowed to come into contact with the finish coat.



27. Additional view of tenting membrane against EIFS.



28. Sealant was applied in an attempt to repair. Repair is improper. Note that the sealant should not have been allowed to come into contact with the finish coat.



29. Additional view showing sealant failing in adhesion.



30. View showing the excessive distance between the roof surface and the EIFS wall system.



31. General overview of upper roof area.



32. Typical stack penetration detailing; no issues.



33. Typical skylight penetration; previous repair attempts including application of sealant to skylight between glass and frame.



34. Misc. debris including nails on roof surface; poses potential for puncturing membrane.



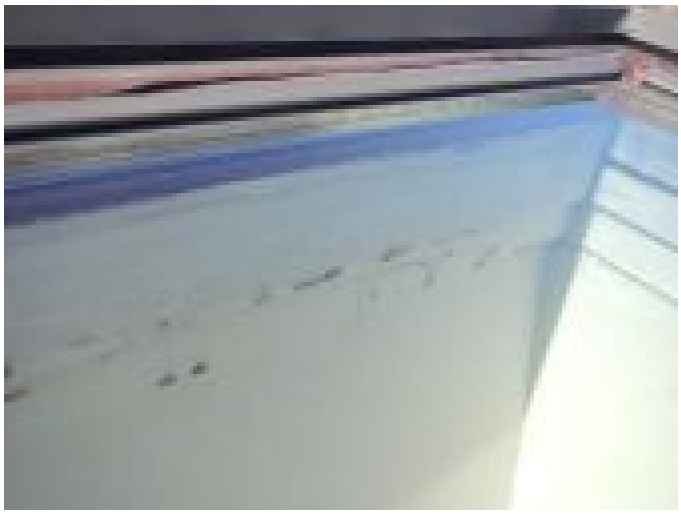
35. Typical drain detailing; no issues.



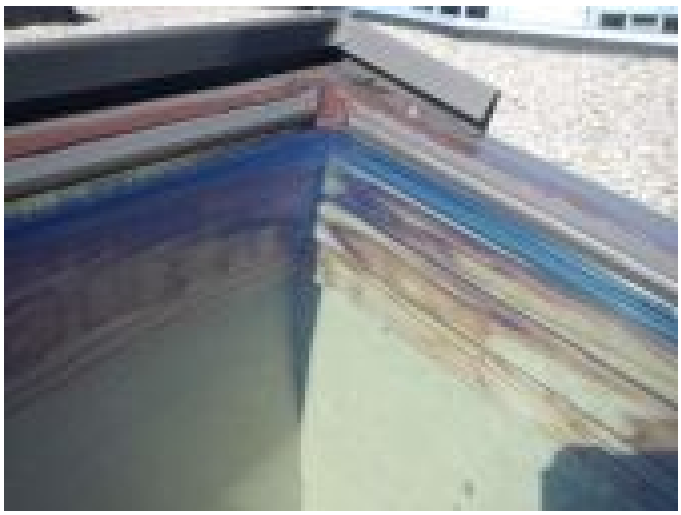
36. Typical skylight penetration; previous repair attempts including cured EPDM flashings around skylight frame.



37. Typical skylight penetration; previous repair attempts include the application of sealant to the skylight between glass and frame.



38. Some moisture staining on the drywall on the inside of the skylight.



39. Other skylights had some moisture staining on the wood members on the inside of the skylight.



40. Some ballast cleared around select skylights.



41. Some minor wind scoring in the roofs corners.



42. Some coping transition cover plate sections have become loosened popping over the bottom hem; the membrane beneath has begun to tent.



43. Rivets appear to have begun to back out on select coping transition sections.



44. Some minor membrane wrinkling in the corners of the roof.



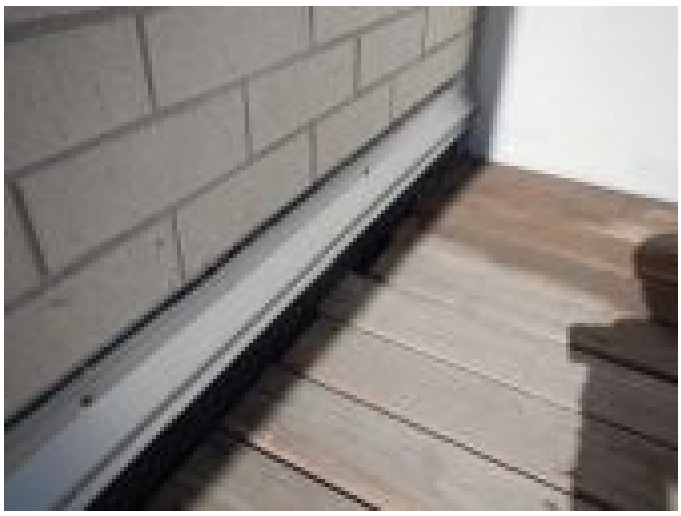
45. Some scattered broken ballast stones throughout.



46. Overview of the deck over the southwestern roof.



47. EIFS shown to run below wood deck which would indicate that it is excessively close to the roof surface.



48. Counterflashing and weeps shown above the termination of the membrane.



49. Overview of the deck over the southeastern roof.

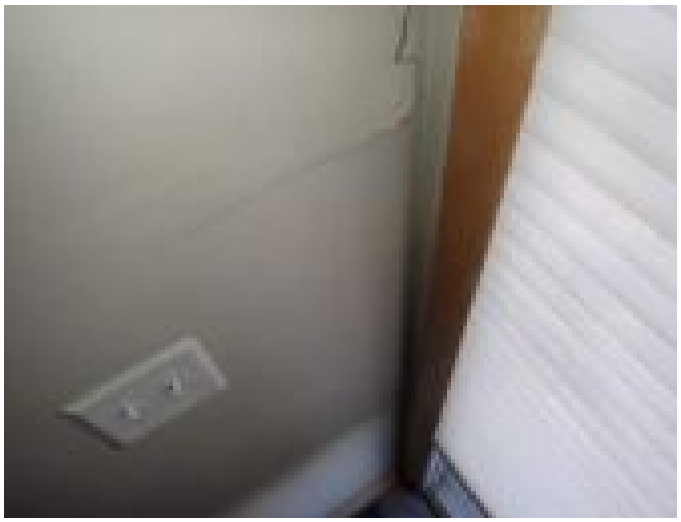


50. Counterflashing and weeps shown above the termination of the membrane.

River Crest Condominiums
2158–2170 N. Commerce Street, Milwaukee, WI
Building 5 – Unit 2162



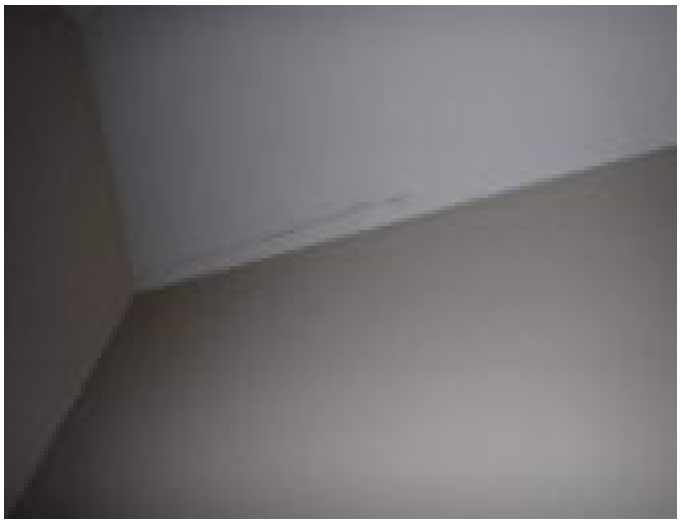
1. Cracking at corner drywall tape joint next to the front entry door unit.



2. Cracking and damage to the wall at the tape joints in the wall adjacent to the front entry door unit.



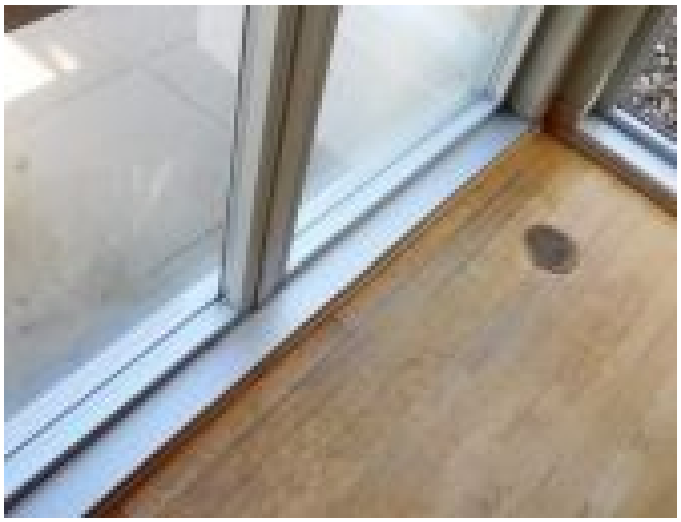
3. Cracking at the wall at the other end of the foyer from the entry door.



4. Cracking, staining and damage to the wall in the Den on the opposite side of the wall from the foyer.



5. Staining and damage to the wall in the Den on the opposite side of the wall from the foyer.



6. Staining at the window units next to the north low roof.



7. Staining at the window units next to the north low roof.

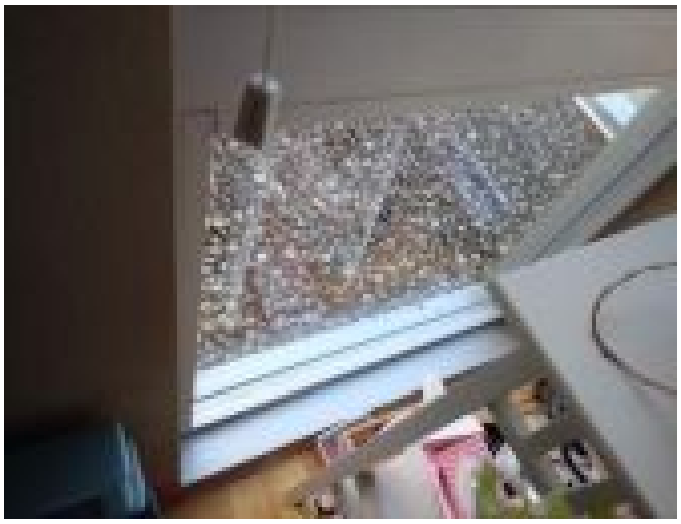


8. Staining and drywall damage to the window return next to the north low roof.

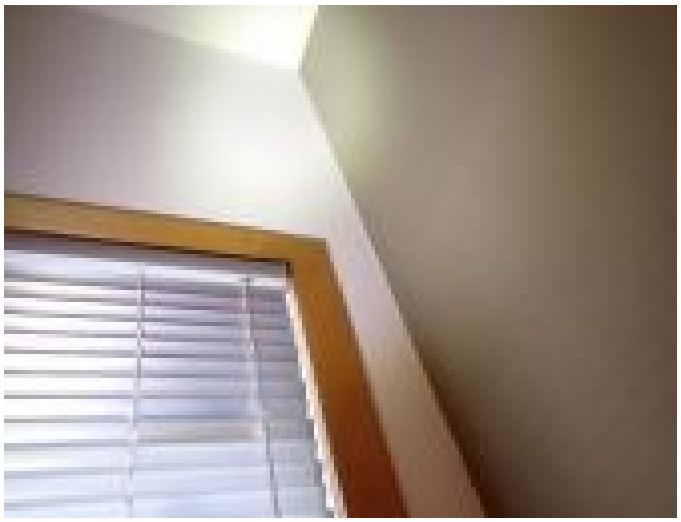


9. Staining and drywall damage below the skylight.

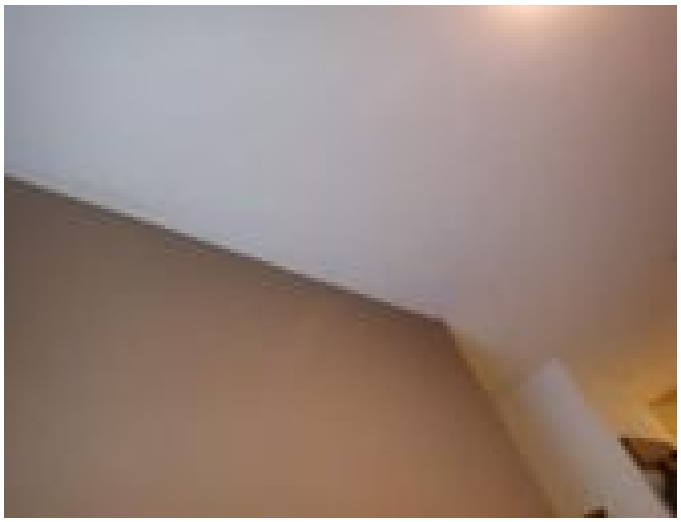
River Crest Condominiums
2158–2170 N. Commerce Street, Milwaukee, WI
Building 5 – Unit 2166



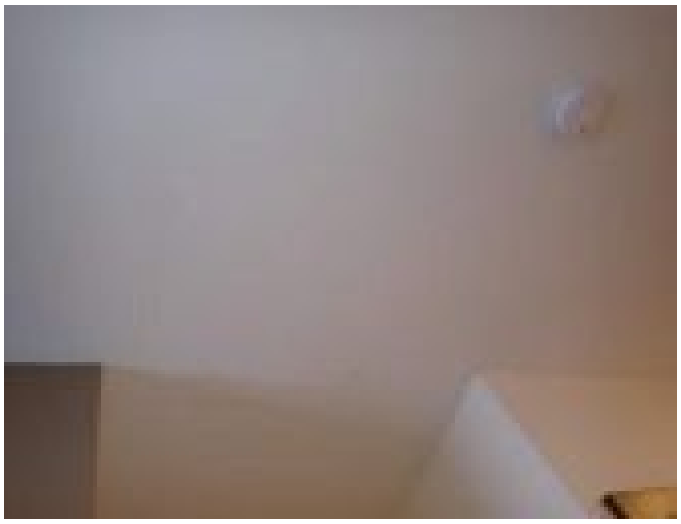
1. No staining at the window unit next to the north low roof.



2. Cracking, staining and damage to the wall adjacent to the front entry door unit.



3. Staining and damage to the ceiling and wall in the foyer.



4. Staining and damage to the ceiling and wall in the foyer.



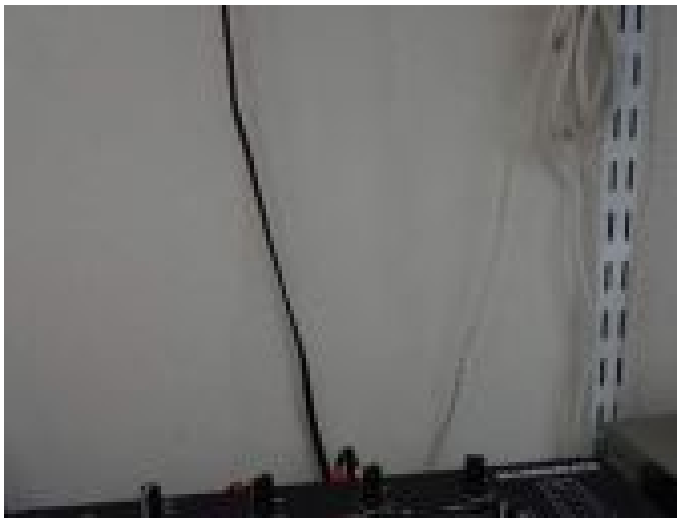
5. Staining at the floor finishes below the stained and damaged ceiling areas.



6. Staining and damage to the ceiling by the stair landing.



7. Staining and damage to the ceiling and wall in the closet on the other side of the foyer wall.



8. Staining and damage to wall in the closet on the other side of the foyer wall.



9. Staining and drywall damage below the skylight.

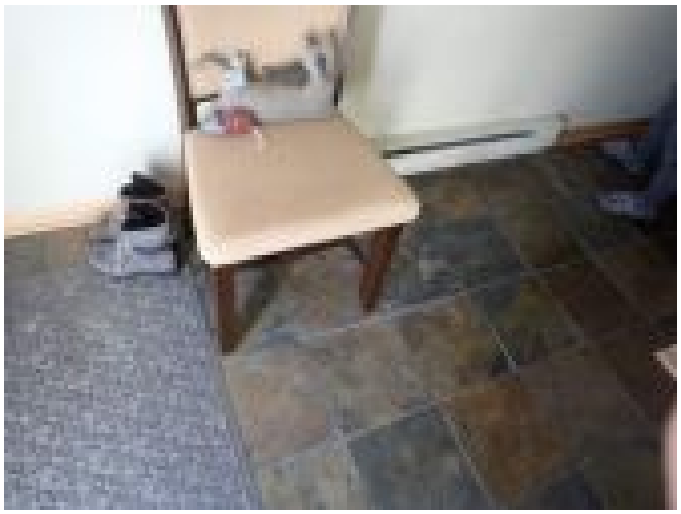


10. Staining and drywall damage below the skylight.



11. Staining and drywall damage below the skylight.

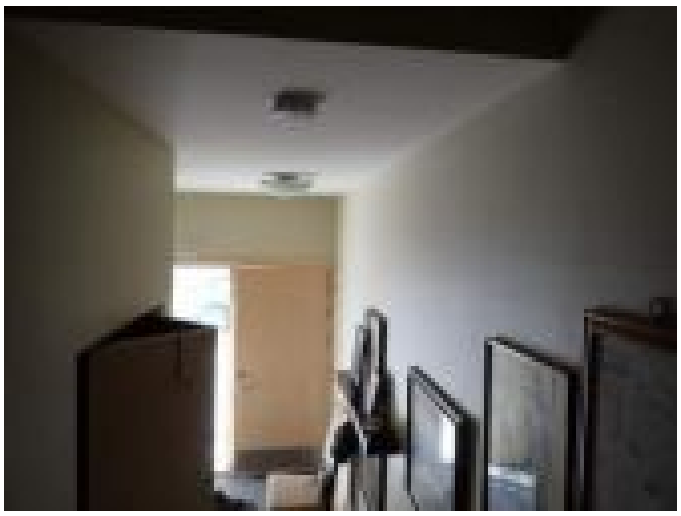
River Crest Condominiums
2158–2170 N. Commerce Street, Milwaukee, WI
Building 5 – Unit 2170



1. The unit owner reported finding water along this wall.



2. This wall abuts the neighboring unit.



3. The lower roof of 2165 is located about midway up the wall of 2170's first level.

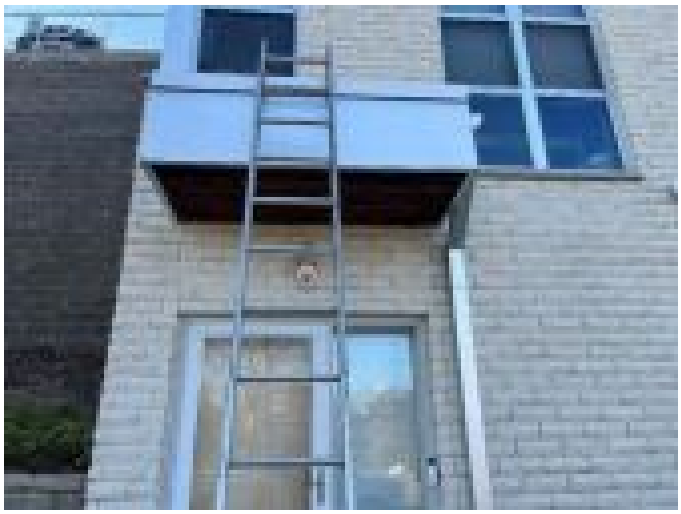


4. Water stains and damage to drywall finishes underneath the skylight.

River Crest Condominiums
2174–2178 N. Commerce Street, Milwaukee, WI
Building 6



1. Site Identification.



2. Overview of the south-facing canopy.



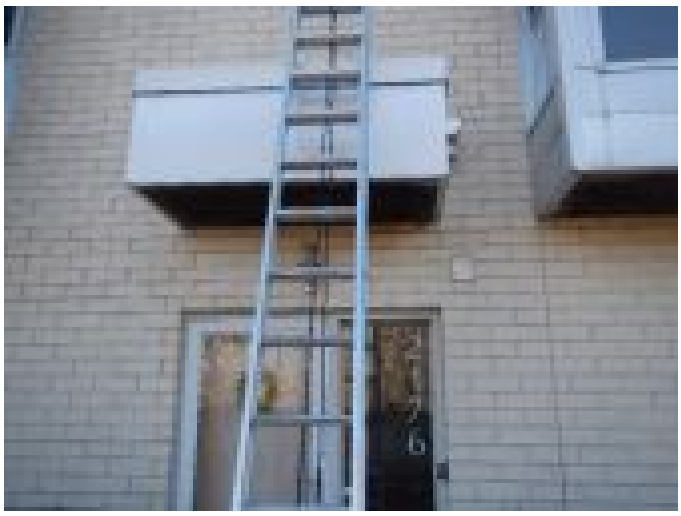
3. A view of the roof assembly at the roof-to-wall transition; the membrane was turned up behind the brick veneer.



4. Open / non-watertight condition; membrane turned up under brick veneer lacking termination.



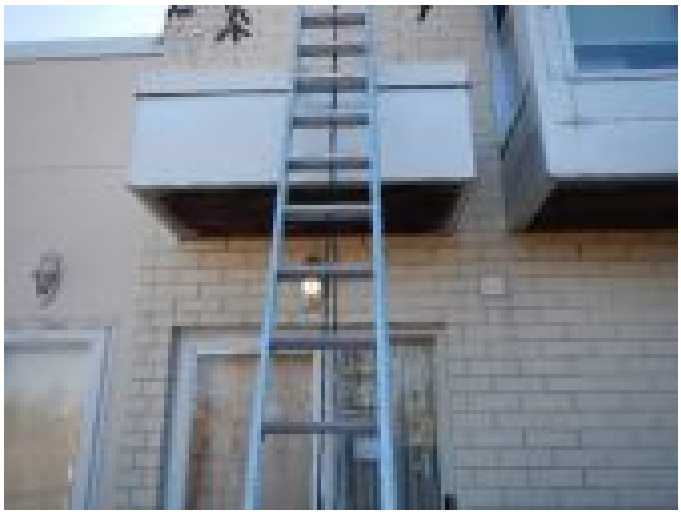
5. Open / non-watertight condition on the opposing side of the canopy; membrane turned up under brick veneer lacking termination.



6. One of the two canopies addressed 2176 on the east side of the building.



7. Overview of canopy roof. Securement on vertical surface. No issues were uncovered.



8. Overview of the second canopy on the east-facing side of the building.



9. Overview of canopy roof.



10. Securement on the vertical surface. No issues were uncovered.



11. Overview of the lower eastern roof area.



12. Typical drain detail; no issues uncovered.



13. Displaced ballast along the edges of the roof area.



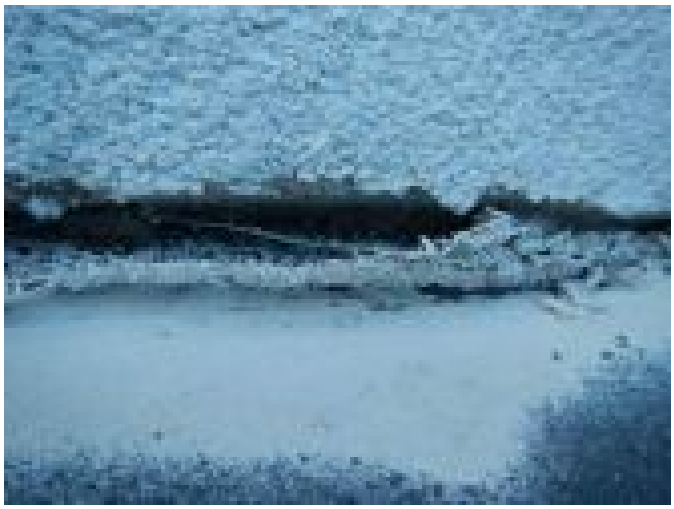
14. Pitch pan in non-watertight condition.



15. Additional view of displaced ballast along the edges of the roof area; wrinkling present.



16. Typical wall detail at the corner of the roof; EIFS excessively close to the roof surface.



17. View of the underside of the EIFS wall system; it appears that mesh is running behind the wall system. The bottom edge of EIFS has inconsistencies in the finish coat.



18. The upper portion of the wall was not properly caulked, however. Note adhesive failure of joint.



19. Additional view of failure in sealant between finishes.



20. Membrane tented and taut against the bottom edge of EIFS wall system. Note exposed mesh and base coat.



21. View of bottom edge of EIFS wall; exposed base coat and mesh.



22. Overview of the main upper roof area. The roof system on this building consists of ballasted EPDM.



23. Shrunken, cracked and deteriorated pourable sealer in an AC unit pitch pan.



24. 45mil EPDM.



25. Typical drain detail; free of debris/obstructions.



26. Displaced ballast around select skylights.



27. Partially deteriorated skylight flashings.



28. Partially delaminated membrane seam patch.



29. Additional displaced ballast around the skylight.



30. Partially delaminated membrane seam patch.



31. Deteriorated sealant on stack penetrations.

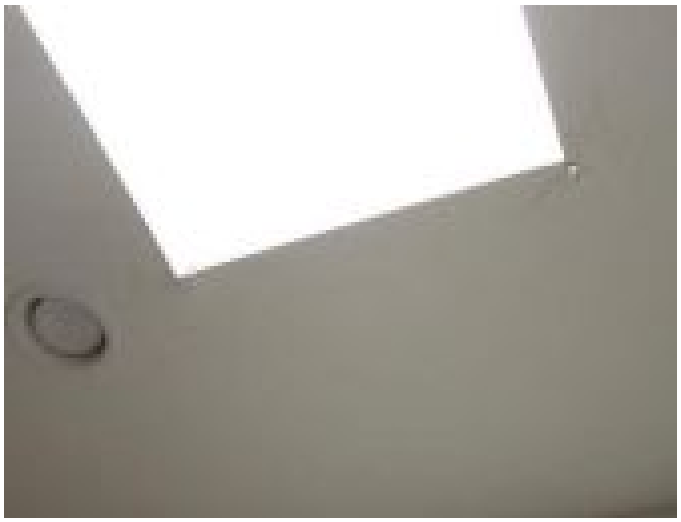


32. Lower southwestern roof section covered with a wood deck.

River Crest Condominiums
2174–2178 N. Commerce Street, Milwaukee, WI
Building 6 – Unit 2176



1. Staining and drywall damage below the skylight.



2. Staining and drywall damage below the skylight.



3. Staining and drywall damage below the skylight.

Recommended Roof Replacement Program ***Prospect Management***

River Crest Condominium Association

Milwaukee, WI 53212

Building	Address	Size (Sq. Ft.)	Type	2024	2025	2026	2027	2028
#1	2102 - 2106	3,335	A	$173,500				
#2	2110 - 2125	6,274	B		$236,000			
#3	2126 - 2139	6,274	B			$245,500		
#4	2142 - 2154	6,274	B				$255,500	
#5	2158 - 2170	6,274	C					$265,500
#6	2174 - 2178	3,335	D					$203,000
TOTAL		**31,766**		***$173,500***	***$236,000***	***$245,500***	***$255,500***	**$468,500**

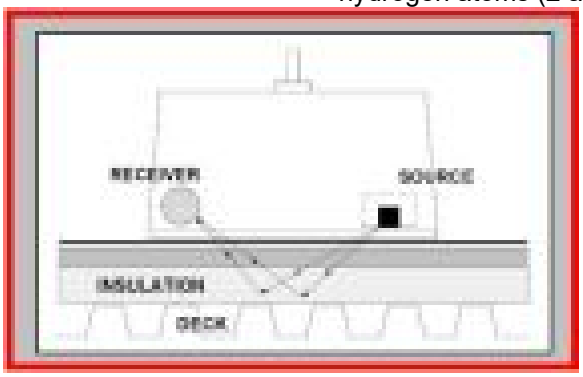
NOTES:

1) A = 4-Roof Areas (1 with Terrace Decks) 3-Canopies
   B = 5-Roof Areas 2-Canopies
   C = 5-Roof Areas (2 with Terrace Decks) 2-Canopies
   D = 4-Roof Areas (2 with Terrace Decks) 3-Canopies
2) Budget estimates based on pricing from comparable projects in 2024-25 with inflation factor applied per year.
3) Condition of roofs should be monitored and the program adapted as necessary.
4) Material and labor pricing are currently very volatile. The amounts listed above are strictly budget estimates. Actual pricing can best be established through a competitive bidding process based on a common set of detailed specifications.
5) Budget amounts do not take into account potential unforeseen conditions like structural deck replacement, potential pavement or landscaping costs related to downspout relocation, insulation work, rerouting of ducts in the attic space or new skylights.
6) An annual inflation rate of 4% was utilized in these estimates.

May 23, 2024

NON-DESTRUCTIVE MOISTURE TESTING: TROXLER NUCLEAR HYDROTECTOR METER

Non-destructive testing is a method of detecting moisture in the insulation bed of a roof assembly that requires limited penetration of the roof membrane, or core sampling of the roof. Testing utilizes a statistically reliable sampling technique that involves the layout of a 5' x 5' or 10' x 10' grid on the surface of the roof deck. Readings are taken with a nuclear moisture meter at each grid point. A moisture contour map is constructed from the reading data. In some cases, acceptable data is obtained by taking random readings in sections of the roof that have been identified as problem areas.



Core samples are taken to determine what the relative meter readings indicate in terms of the relative wetness or dryness of the roof insulation materials. Subsequent test data need not be core sample verified because of the consistent homogeneous nature of the roof assembly components. The type of roof membrane, chemical makeup and thickness of roof insulation bed, and overall thickness of the roof assembly components must be considered in the analysis of the test result data. Anomaly readings can be generated by non-water-related elements of the roof assembly.

The nuclear moisture meter is an instrument used to record the presence of high concentrations of hydrogen atoms. The radioactive component of the nuclear moisture meter emits a stream of neutron particles that are about the same size as a hydrogen atom. When the neutron stream comes into contact with a concentration of hydrogen atoms, a backscatter effect, similar to that of billiard ball movements on the opening break, is produced.
The concentration of back-scattered neutron particles is recorded by the nuclear moisture meter counter. A number is then generated and compared to baseline data. The number is an indication of the level of concentration of hydrogen atoms found within the immediate area of the moisture meter (three square feet).

The theory behind the moisture meter is that water molecules contain a large quantity of hydrogen atoms (2 atoms of hydrogen for 1 atom of oxygen) and that the nuclear moisture meter would register high readings in the presence of large quantities of water, found within the roof assembly components. Accordingly, the lack of high readings would indicate that the neutron particle stream did not come into contact with any significant concentration of hydrogen atoms, i.e. water. The nuclear moisture meter is unaffected by the presence of water or dampness sitting on the surface of the roof.

Although no method of non-destructive moisture testing achieves perfect results 100% of the time, nuclear testing has proven to be more consistently accurate than other methods (infrared, capacitance, etc.). The skill and experience of the nuclear moisture meter operator are very important considerations in the accuracy of the test results and inferences that are drawn therefrom.