SILVER LLC McGEE CONSULTING

[redacted] 2015

[redacted]

Re: [redacted] / [redacted]
[redacted] File No. Not Provided

Dear [redacted],

The following report has been prepared to explain the roof and gutter conditions at the above site.

The Inspection

I inspected the above address on [redacted]/2015 with you. During our inspection we examined the front mansard roof and gutter from a number of positions along the roof eaves above the west entrance from a ladder. We also gained access to the inside of the soffit area at the same location. The interior soffit access allowed us to examine the composition of the roof framing and gutter assembly from the underside of the construction. Access to the gutter by walking in it was prohibited by the site manager. Access to any other portions of the low sloped roof was also prohibited.

There were a number of people in attendance at the inspection. Those attending included [redacted], the father of the injured, [redacted], the attorney for the plaintiff, [redacted], the attorney for [redacted], [redacted], the Property Manager for [redacted], [redacted], defense counsel, and [redacted] of [redacted] Contracting, a general contractor from Connecticut who was inspecting for the defense counsel. The purpose of my inspection was to determine the composition of the roof and gutter assembly at the front entrance of the supermarket and to comment on the viability of the roof and gutter assembly with regards to design, function, and maintenance.

Building Description

The building is a large commercial structure consisting of masonry and metal framing. The structure has over 51,000 sq. ft. of low sloped membrane roofs over its supermarket section and 14,000 sq. ft. of low sloped roofs above the retail shops and Chase bank located in the attached wing to the west. The 51,000 sq. ft. portion of the building houses the [redacted] supermarket. The front roof directly above the sidewalk is a metal roof with an integral gutter.

The siding on the facade at this area is EIFS (Exterior Insulated Finishing System). EIFS is a commonly used commercial siding system whose components include an insulation board, typically EPS (Expanded Polystyrene – similar to white foam coolers for the beach), and a

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

polymer-based water resistant coating reinforced with a scrim mesh (usually fiberglass). The system is usually applied by mechanically attaching the insulation to the sheetrock sheathing (can also be installed over wood, cement board, and masonry) of a commercial building and then covering the insulation with several applications of the coating with the reinforcing scrim embedded in the coating. The EIFS system has been in growing use since its introduction over 40 years ago. EIFS is a siding with a significant R-value (resistance to thermal conductance), has superior waterproofing resistance due to its polymer surface, and it incorporates aesthetically pleasing architectural details such as crown moldings, quoins, and water tables. The polymer coating employed in EIFS systems vary in their exact chemical composition based on the maker of the product. EIFS applications have resulted in extensive lawsuits associated with seepage, trapped moisture, and leaking and deteriorated wall assemblies. Trapped moisture in EIFS systems is often associated with poor workmanship. Trapped moisture in the wall assembly is also a result of the poor performance of EIFS at transitions and details. Details such as window sills, coping tops, and horizontal ledges where surfaces pond water are highly susceptible to failure. The freeze-thaw cycles in northern climates are often detrimental to EIFS. Originally when many vendors marketed their systems it was without any provision for flashing and water drainage in the wall cavity. Now, EIFS manufacturers have introduced barrier systems complete with extensive flashings to address trapped moisture and provide for proper drainage.

Roof and Gutter Drainage

An examination of the roof area, the downspouts' sizing, historical weather data, and the plumbing code yields a determination on the propensity of the gutter system to retain water.

The large flat (low sloped) roofs do not affect the area at the front sidewalk. Drainage of all the low sloped roofs is to the rear of the building and has no relationship to conditions on the front sidewalk at the west entrance to the supermarket. These roofs are not considered in the calculation.

The front of the supermarket and shops have a mansard roof containing a recessed gutter. This recessed gutter is known as a "built in gutter". The mansard roof is located above both the east and west entrances to the supermarket. Our inspection was conducted at the west entrance only. This red metal mansard roof is an apron roof lending an architectural detail at the front of the building. The roof consists of 24 gage steel, snap-lock, standing seam panels with ribs spaced 12 inches apart. The panels are installed over purlins laid perpendicular to metal rafters. The roofing panels are approximately 11 feet long. At the eaves the panels are laid over a drip edge but are not cleated onto the edge. The ends of each panel are not sealed. This provides an opportunity for seepage if the gutter floods. The built in gutter along the eaves is framed in plywood and lined with reinforced EPDM (rubber). The rubber gutter lining extends up behind the drip edge where it meets the mansard roof and up under the coping along the front edge of the building. The gutter has a higher back than front. The gutter shape is a right angle trapezoid with the angled leg in the plane of the roof. The effective cross sectional area of

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

the gutter is equal to the height at the front edge times the gutter width (10.75 inches x 5.0 inches = 53.75 square inches). This is an excessively large gutter given the drainage area it is servicing. The roof panels, installed on a 45 degree angle are 11 feet long but have an exposure to the sky of only 8.5 feet when measured in plan view. This smaller area is called the design area. The design area is used to calculate the needed size of the gutter and downspout drains for a given rainfall intensity. One running foot of built in gutter measures 4.47 cubic feet in volume and drains a roof area that is effectively only 8.5 sq. ft.

Using the entire contiguous run of the west mansard roof allows us to examine all the roof areas with respect to the cumulative drainage areas of each downspout in the connected segments of the built in gutter trough. The gutter on the west mansard has three main segments totaling 116 feet. There are four drain locations totaling 15.75 square inches of combined area. The total design area of the roof is 952 square feet. According to the 2010 Plumbing Code of New York State, Section 1106, Rockland County, as indicated in Figure 1106.1 in the Plumbing Code, will have a 3.0 inch per hour rainfall once in a 100 year period. Often rain-carrying systems are designed for a 10 year storm. Using this high standard of a "100 year storm" and examining Table 1106.2 in the Code, we can determine that 15.75 square inches of cumulative leader diameter can service 218,000 sq. ft. of roof areas (design area) during a 3 inch per hour rainfall. Since our roof design area of 952 sq. ft. is a mere 0.4% of the maximum drainable roof area, the gutter and drains are more than sufficient in size to properly handle even the most intense rainstorm given the size of the mansard roof. Only blockage of the drains would allow for gutter overflow.

Figure 1106.1, 100-Year, 1-Hour Rainfall (Inches)
2010 Plumbing Code of New York State

Design and Workmanship Issues

The roof, siding, and gutter have some design and workmanship issues which are leading to seepage into the soffit and drainage onto the sidewalk below. This is evident by the staining on the masonry columns and the deterioration of the building finishes.

- There are no snow guards installed on the metal roofs. The width of the gutter and coping provide a significant margin of safety from sliding ice and snow; however, the gutter and coping area may not be sufficient to arrest sliding ice and snow in a severe winter. Sliding ice and snow can also damage the rubber gutter lining which in turn creates seepage during meltoff.

- The coping in front of the gutter is laid flat. Water can drain off the coping into the gutter or onto the sidewalk. The coping should have been installed with a slight pitch toward the gutter instead of flat. This would ensure that rain and snow would drain into the gutter and not onto the sidewalk. The coping top is a full 10 inches wide. This is a considerable area of shedding given the total linear footage of the coping. The coping is fastened with un-caulked face nails in a number of locations.
- The EIFS system is deteriorated and failed just above the red metal water table band at the bottom of the façade. Some sections of soffit and EIFS to the west and south are delaminated and drooping, indicating chronic seepage into the soffit area. Separations in the caulk joints between the water table detail and the start of the EIFS occur in many locations.
- The open ends of the standing seam panels can lead to minor seepage during wind driven rains as can the gap between the panels and the drip edge.
- The entire built in gutter and roof area exist above an unheated soffit space. The gutter system will cease functioning (draining water) as soon as the temperature drops below freezing. The likelihood of long periods of winter freezing of the interior drain lines is high. The interior drains run inside the masonry columns on the north side of the building. The masonry columns are almost perpetually shaded as is the entire front of the building. These internal drains, when exposed to multiple days of temperatures below freezing, would be expected to remain frozen for many days and even weeks while the mansard metal roofs that receive winter sunlight drain water/melted snow into the gutter and into the drains. This dynamic of frozen drains and melting snow would almost certainly result in repeated overflow of the gutter.
- Some of the drain outlets are constructed with copper drain tubes inserted into the larger PVC pipe below without a positive connection. Others are positively connected using PVC piping from the drain fixture and downward. The non-connected drains will overflow inside the framing of the soffit during the winter when the drain lines inside the masonry columns are frozen. Staining on the plywood gutter lining seen from inside the soffit indicated that this type of seepage was occurring.
- The rubber gutter lining had accumulated debris blocking one drain completely and two other drains partially during our inspection. The large sizing of the drain lines and gutters is moot if the drain outlets are blocked. Blockage of the outlets with leaves and debris results, obviously, in the overflow of the gutter.
- The rubber gutter lining has un-adhered portions of seams. This could result in leakage into the soffit. The uncured rubber patches required at the seam joints when they transition at a slope were not installed. This is a workmanship issue with the original installation which may result in seam failure in the lower corners of the gutter and subsequent seepage.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

Required Maintenance

The gutter trough on the north side of the building above one of two main entrances needs to be cleaned of leaves and debris at least twice each year. The clogging of the drains evident during our inspection and the failed and drooping soffit indicate a lack of proper maintenance. The soffit failure has occurred over a time period of many months at a minimum and likely over a time period of more than a year.

The gutter effectively ceases to function as a gutter each year after prolonged winter conditions. Water/snow regularly dripping off the coping and off the mansard roof elevations that have are exposed to sunlight, combined with frozen downspouts drains is an ongoing dynamic requiring vigilant maintenance of the sidewalk surface. This same configuration facing south instead of north would have far fewer problems with respect to sidewalk icing.

Conclusion

The built in gutter is properly sized and has sufficient drainage to allow for proper function in months where temperatures are continually above freezing. The same system is at risk of overflow and seepage during months where extended periods of sub-freezing temperatures occur. Issues with the design of the coping and the lack of snow guards and the workmanship on the gutter ends of the standing seam panels can, and most likely do, exacerbate the seepage. Clear evidence exists indicating a lack of maintenance to the EIFS siding and soffit to the west and south of the west entrance.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

Louis R. Silver
Managing Partner
Silver McGee

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

The [redacted] building in [redacted]. The west entrance roof is indicated. Note the shading of the front columns in this image taken in March of 2011.

Aerial view of the building straight down with the west entrance roof indicated.

Access hatch for soffit.

The plywood seen here is the framing of the recessed built-in gutter. Note the water staining.

The drains for the gutter run inside the masonry columns, an almost perpetually shaded area in the winter.

Staining at the masonry column at the west entrance from water flowing off the red metal detail known as a water table.

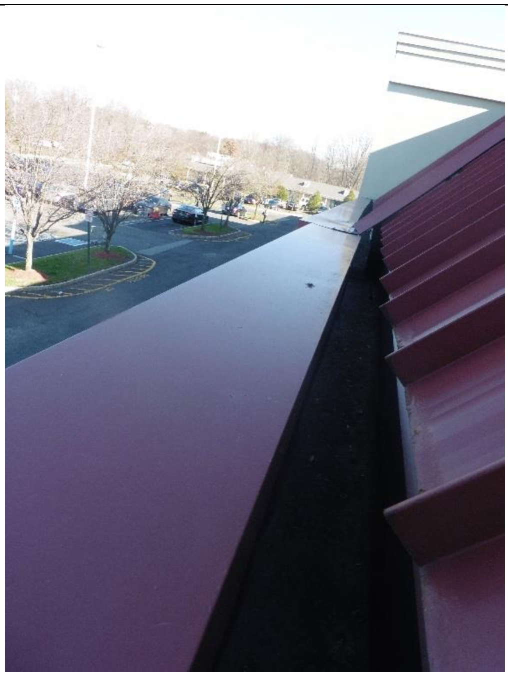
PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

Separating caulking above the metal clad water table shelf. The EIFS siding is above.

Deterioration of the EIFS is from water that accumulates on the water table band. This same water reaches the sidewalk.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

Deterioration and separation in the EIFS where it was used on a horizontal surface with no flashings.



This image of the recessed built-in gutter and coping show the lack of slope in the coping.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

Face nails in the coping are not caulked.

This accumulated debris is at a roof drain near the hatch.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

The mansard roof is constructed of standing seam, snap-lock, 24 gage steel panels, approximately 11 feet long.

The built in gutter is 5 inches wide.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

The gutter is approximately 10.75 inches deep at the front.

EIFS deterioration.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

This 2 inch diameter copper drain tube is inserted into, but not sealed to, the PVC internal drain pipe.

This 3 inch diameter Smith drain on the south leg of the built in gutter is sealed to the PVC pipe.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

This close up photo of the standing seam roof panel shows the open seam end is susceptible to wind driven rain.

Drain location on east end of the gutter above the west entrance.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com


Failure of the caulking joint at the corner jog in the front facade.


Drooping, failing EIFS at soffit on west portion of west entrance roof. This is a result of chronic seepage into soffit and lack of maintenance.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com

Soffit separation.

Failing seam in rubber gutter lining lacks an uncured patch required during original installation.

Soffit damage (yellow) and efflorescence (red, mineral stains) in the masonry from chronic seepage from the gutter above.

The areas of the worst soffit damage are to the left of the [redacted] bank.

PO BOX 351 ◊ Garnerville ◊ New York 10923
845.947.5003 ◊ www.silvermcgee.com