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Roof Evaluation Report

Project	NW 2050 Cypress Point	**Date**	May 7, 2024	**Job Number**	24064
Address	7511, 7531 & 7651 Minoru Boulevard,	**Inspector**	Ted Neef	**Weather**	Sun/12°C
	Richmond, B.C.				

Attention: Audrey Montero
nw2050@telus.net

As per your request we have completed a roof survey of the address noted above and offer the following recommendations.

The flat roof membrane consists of a 2 ply SBS membrane. It appears that a smooth surface base ply was installed directly to the plywood roof deck. This layer is covered by a granular SBS cap sheet which was torch welded in place. Each layer should have independent stripping plies at the perimeter and at penetrations. The SBS is constructed by coating a polyester scrim with modified asphalt on both sides, and the cap ply will get a layer of granules embedded into the top surface. The granules protect the membrane from UV radiation, the high temperature and extreme weather that a roof will experience. The granule surface will also provide limited protection from foot traffic as well. There is a short attic of approximately 2”. Fiberglass batt insulation and a poly air barrier were noted on the attic floor.

The outer slope roofs have lightweight concrete tiles installed. Typically, these tiles are installed over spaced strapping. However, due to the steep slope, this could not be determined. Underlayment is a critical component of concrete tile roofs as the tiles are very porous and prone to leaking over time.

The roof vents and plumbing flashings are the typical vents seen on most large construction projects and are constructed from lead or galvanized steel. Plastic attic vents are installed to the slope roof. Roof flashings at the base of walls and valleys consists of lightweight pre-painted steel flashings. These flashings are joined together with standing seams or S-lock joints. The flashings are secured in place using nails or screws which were coated in caulking after installation.

The attached pictures, along with the following report, highlight typical problem areas, and provide recommendations and solutions to the problems.

1. A view of the roofs being inspected for reference purposes only. There is a main upper flat roof, lower roofs over living space (some of which are also roof decks for the owners) as well as a lightweight concrete tile on the steep slope outer roofs.

2. The flat roofs have a 2 ply SBS system installed. These roofs drain towards the center due to a built-in slope.

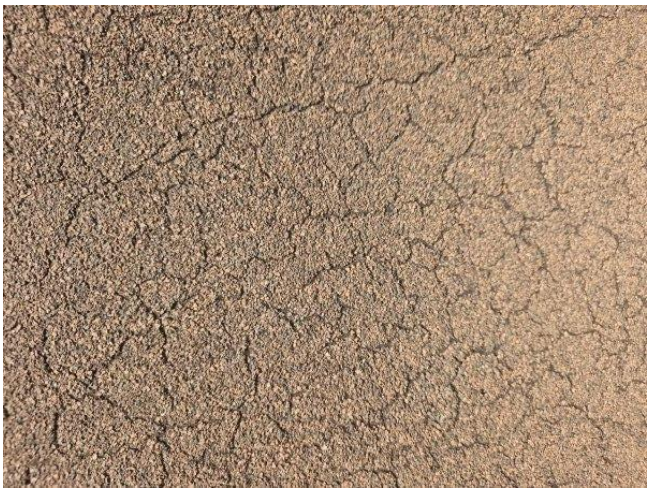
3. Large crickets were installed between the drains and between the drains and the end walls to help move water out of the common valley on building B. The other two buildings lack these crickets.

4. Vent hoods were removed to determine the roof make up. At all locations on all buildings a 2 ply SBS torched directly to the 5/8” plywood deck was noted. The roof trusses were cross strapped to provide air movement, though the space between the top of the insulation and the underside of the roof deck is small; 2” or less.

5. The quality of the membrane installation varies. In some locations there is the proper overlap at the end of the rolls while in other locations there isn’t. Some corners are cut as required and some are not. Pictured here is an overlap of 4” when the manufacturer requires 6”.

6. The top surface of much of the membrane has developed cracks throughout. The top layer of the modified asphalt is failing.

   It should be noted that all three buildings are represented in this photo.

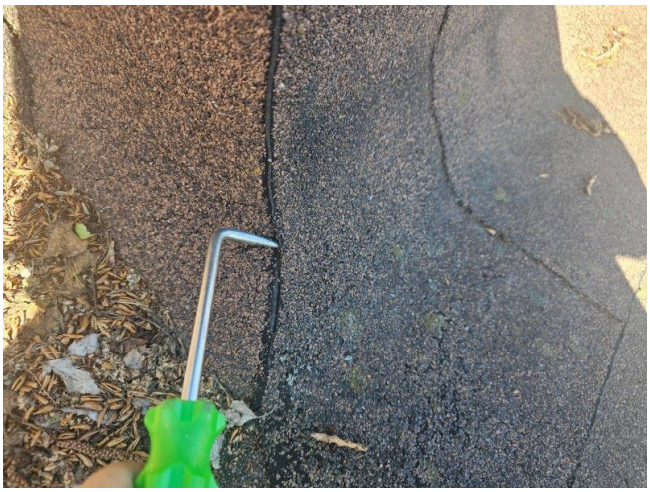


7. These cracks are occurring not only in the field but the perimeter stripping as well, particularly on the North and East sides that receive the Sun.

8. Partially open seams were noted in the field membrane. Over time, water will infiltrate the seams, forcing them open further when the water freezes over the winter months. This freeze/thaw cycle will occur many times throughout the year.

   Asphaltic bleed out is required by all membrane manufacturers which will help keep the seams sealed. The bleed out at the edges of the membrane is very inconsistent on all roofs.

9. Partially open seams were also discovered in many of the stripping plies at the perimeter or at the base of curbs.

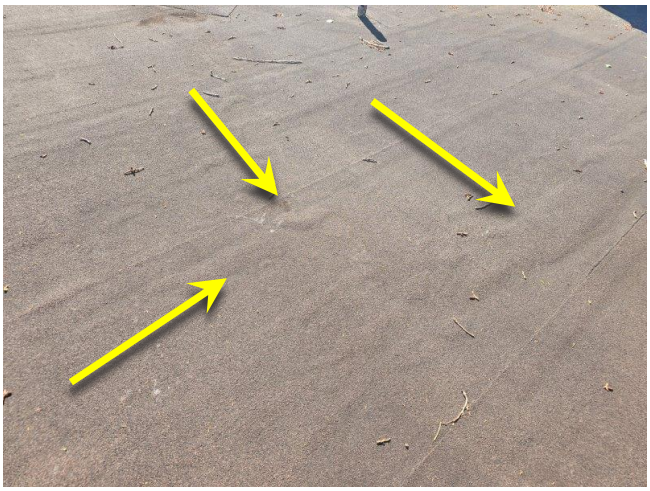


10. The membrane bond at some of the overflows is also failing.

11. Large buckles were noted throughout the roof area. These buckles are usually a result of poor adhesion between the layers of the membrane. Movement in the roof deck can also cause the membrane to develop buckles. The buckles will pull at the seams, causing them to eventually separate.

12. Blisters were noted, ranging in size and shape from small to very large. Some could be a result of water leaks though the majority are a result of a poor bond between the layers. On a hot day, we would expect to find more blisters as they have a tendency to puff up when heated.

    The blistering is the worst on Building C.



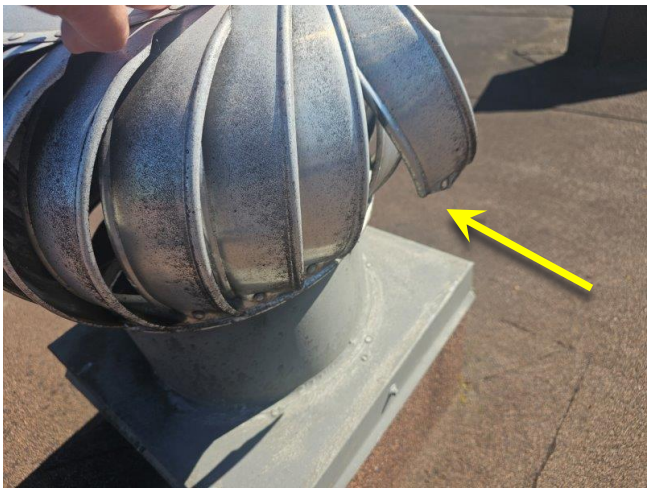
13. Small blisters were also discovered in areas. These are a result of a manufacturing defect. Fortunately, they occur on the walls, well above the water level if the drains were plugged.

14. As the roof membrane ages, it will start to shrink. Here we can see that the end laps are pulling apart. In many areas the membrane has slid apart as much as 1". This number is one of the many indicators that we use to determine remaining service life.

15. Granule loss is occurring in areas, particularly where water is dropping from the parapets back onto the roof or in areas that experience a higher flow of water. Granule loss is part of the natural aging process of the membrane.

16. The membrane seal at the base of stacks and vents is starting to break down in areas, which will allow water to leak in between the SBS and the penetration. Asphaltic mastic was used at these locations, which will break down over time. Modern sealants have replaced this product and are nearly maintenance free for the life of the roof.

17. Turbine vents were installed on the flat roofs. Some of the vents are noisy as the bearings have worn out while others are falling apart. Turbine vents are typically not used on flat roofs.



18. The caulking at the B-vent storm collars on both the single pipes and chimney caps is still in fair condition and appears to have been well maintained.

19. Condensation was noted on some of the skylights.

20. Over time, the seal between the plastic bubbles will fail, which can cause condensation. This skylight has been re-caulked at one time. It should be noted that this style of skylight is not energy efficient and is prone to air leakage.

21. Caulking at the gum lip flashing at the elevator room walls is breaking down. All exterior caulking, particularly at the roof level needs to be periodically re-applied.

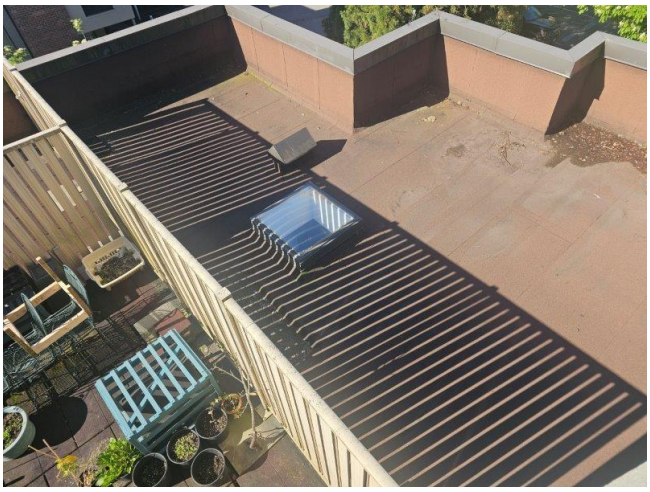
22. The caulking at the flashing joints is starting to fail. This is a maintenance item.

23. Debris is accumulating on areas of the flat roof, particularly along the West end of the complex.

24. One drain was noted to be blocked with debris on Block C.

25. As noted previously, large crickets were installed between the drains on the one building only. Unfortunately, they were not designed correctly resulting in water pooling before the drains. Some standing water can be expected, though it shouldn't be a large amount. When the membrane is replaced, these crickets will need to be redesigned and should be added to the other two buildings.

26. Complicating the future roof membrane replacement are the lower flat roofs that are over living space and extend under the decks of some of the owners. We know that SBS will last longer if protected from the Sun (such as hidden under deck boards). However, when the membrane is only partially protected, the entire membrane over the roof area will require replacement. The condition of the exposed membrane is similar to what is found on the upper roof of all three buildings.

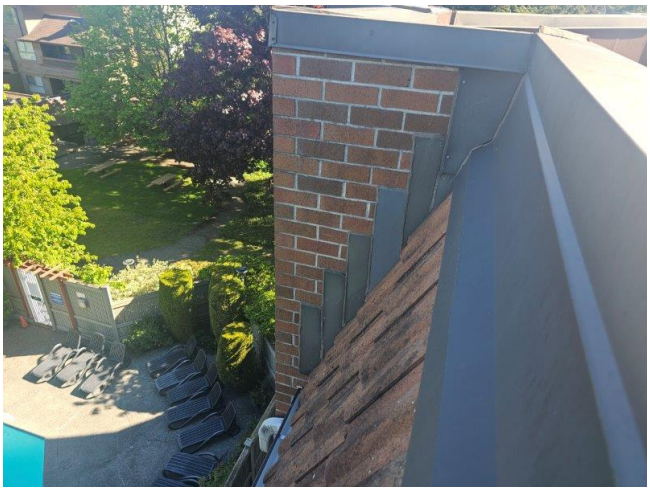


27. The tall chimneys do not have a traditional metal cap installed, instead the top was covered with SBS along with the corresponding B-vent flashings. This is a non-typical installation.

28. Lightweight concrete tiles are installed to the slope roofs. These roofs are what are known as a mansard style roof and are closer to a wall than a typical roof.

29. The extreme steep slope will extend the life of the roofing material as water will run off quickly, debris will not accumulate, nor will most snow.

30. Some areas that will require maintenance are the caulking in the flashing joints against the brick walls. However, most of this caulking is well shaded and is still in fair condition where observed.



31. A few spare tiles were noted on Building B- these should not be disposed of when the flat roof system is replaced as lightweight concrete tiles are no longer manufactured or stocked locally.

32. Though not roof related, the coating on the exterior wall of the elevator shaft is heavily deteriorated.

Conclusions and Recommendations

The flat roof membrane installed to the roofs of all three buildings is in poor condition. Numerous buckles and blisters were noted. Some of these buckles and blisters are occurring at seams, which are starting to be forced apart. The blister count may be higher during warm weather as the increase in temperature will cause the blister to expand and lift off the roof deck. Moderate to heavy granule loss was noted in many locations. The membrane surface is cracking and losing granules in most areas. Partially open seams were noted in both the main roof (field ply) as well as the perimeter stripping plies or stripping plies at curbs. All of these items are signs of advanced deterioration. This roof system relies heavily on the skill of the installers. Insufficient heat at the side laps results in seams that appear to be sealed only to have them open as the membrane ages. Inconsistent asphalt coverage or heating will result in blisters forming over time.

The membrane would have carried a 10 to 15-year limited warranty, and the key word is limited. The warranty is based on manufacturing defects, not wear-life. Manufacturer's will only cover defects resulting in leaks. Buckling, blistering, cracking, and granule loss for example would not be covered, even though we know that these conditions will lead to eventual roof leaks. Not following the manufacturer's installation instructions will void the warranty. All standard SBS warranties are heavily pro-rated which greatly reduces the payout during the warranty period and will only cover the cost of the membrane itself; no payout for removal, disposal, and installation of the new SBS as well as no money for accessories (vents, screws, insulation and flashings). In order to obtain a warranty, the project also needs to be registered with the manufacturer.

We must remember that the term of the warranty is not necessarily related as to how long the membrane will last. In our experience, this roof system when installed to manufacturer's installation instructions will last 20 years with longevity directly related to the quality of the installation.

The concrete tiles on the slope roof are still in fair condition. As they are not subjected to standing water such as we would see on a lower slope roof, the tile surface is still relatively smooth and doesn't appear to be overly worn.

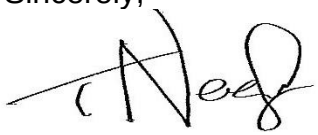
It appears that the Strata Council has been proactive with taking care of the roofs and maintaining them over time, with repair patches and new sealant noted in areas. Care must be taken with repairs however, as it is easy to repair too much of a roof that will soon need replacing.

It is our opinion that the SBS installed to the roofs of all three buildings is failing and should be replaced soon. Ideally, it would all be done at once as there is cost savings for the owners. The project could be done in phases, with Building B done this fall and the remainder in 2025. Council would need to decide if the lower roofs and decks would be replaced at this time as well (which they should be in our opinion). We would suggest the installation of a composite insulation board/base ply with SBS cap sheet. This would also include replacing all vents, drains and flashings. While the roofs may last longer, prolonging the inevitable replacement project comes with the risk of roof leaks and cost increases due to a rise in labour and materials.

For budgetary purposes, please consider the following: The cost to remove all old roofing and to install a new 2 ply SBS membrane as described above to the upper flat roofs can be estimated at $2,800,000.00 - $3,200,000.00 plus GST. These prices do not include inspection fees or a contingency reserve, nor the lower roofs as the decking complexity can greatly increase the total. These prices are budget numbers and must not be used to raise funds. Note that this price is at today's costs and price increases in materials are likely before the project starts. Pre-pandemic, we would expect 3-5% per year increase while 2021 saw an average increase in roof material costs of 35%. A full set of specifications should be drawn up and the roof replacement be put out to tender to gather real numbers.

Should you have any questions regarding this report or require specification and tendering on this complex please do not hesitate to call at 604-317-3786.

Sincerely,



Ted Neef, RRO
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