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Building Envelope Condition Report

for

**The Madison
2929 West 4th Avenue
Vancouver, BC**

PRESENTED TO:

**The Owners, Strata Plan, LMS 3457
C/o Cypress Properties Ltd.
#950 – 1200 West 73rd Avenue
Vancouver, BC V6P 3E5**

**September 30, 2002
File No. 2143**

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1 INTRODUCTION

1.1 Terms of Reference

Aqua-Coast Engineering Ltd. (ACE) was engaged by the Owners Strata Plan LMS 3457 to complete site reviews and to comment on the condition of the building envelope at The Madison. We were requested to recommend options and methods for repairs and maintenance at the project as required.

1.2 Scope of Work

This review is intended to afford the Client confirmation of the conditions of the building envelope at the cladding areas and balcony decks, to provide recommendations for maintenance. Inspections of balconies and flashings were included in the scope of our field review and this report.

The scope of work of this report includes:

- Completion of an on-site orientation visit.
- Testing as required and as appropriate to confirm the condition of the substrate behind the cladding.
- Investigation of the details of construction by means of minor destructive testing.
- Reviewing balcony deck membranes and roofing systems.
- Prepare and review of Resident Building Envelope Report Forms.

Field tests and observations were conducted on July 10, 2002.

1.3 Basic Information

The project consists of 63 condominium units and ten commercial retail units (CRUs). The building is clad with a combination of cavity wall brick, bevel cedar siding and quarry tile. The east and west walls are unit masonry firewalls with an elastomeric coating. The windows are vinyl frame at most locations and aluminum framed at the south elevation with aluminum slab band covers to as a curtain wall.

The units have balcony decks covered with a liquid applied membrane and aluminum railings. Most balconies are protected by the balcony above, with the exception of the upper balconies. The railings are applied to the fascia rather than on the deck thus eliminating perforations through the deck membrane. The roofing on the project is a built-up asphalt product and has good slope and drainage (Photo 1).

1.4 Limitations

This report discusses observed deficiencies and details of concern as well as any results for tests undertaken. Many of the observations that are presented in this report are based upon our experience with buildings of a similar design and construction in coastal British Columbia.

As the result of our firm's experience in the local area, we have become aware of problems that may arise or occur in wood frame buildings. Many of the observations may not be a violation of the B.C. Building Code, but are of concern based on our experience with similar buildings exhibiting failures.

This report is specifically designed for the owners' use and information. Our objective in producing this survey is to not only provide our client with a list of deficiencies, but to create an overall sense of awareness which we feel is required to properly maintain the property. The visual evaluation gives a clear picture of processes at work.

This report has been prepared in accordance with generally accepted building science engineering practices. No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

Conclusions, recommendations or opinions presented in this report must be viewed in light of the information available from the scope of work outlined. Our opinion cannot be extended to portions of the site which were unavailable for direct observation or situations reasonably beyond control of AQUA-COAST ENGINEERING LTD.

Statements and opinions made in this report are based, in part, on information provided by others. The possibility remains that unexpected conditions may be encountered at the site in specific locations not reviewed. If unexpected conditions are encountered at the site, AQUA-COAST ENGINEERING LTD. must be notified in order that we may determine if modifications to the opinions expressed herein are necessary.

2 REVIEW of TEST DATA

2.1 Owner/Occupant Questionnaire

Aqua-Coast Engineering Ltd. prepared a building envelope and window assembly questionnaire that was completed by some occupants for the purpose of identifying indications of moisture within the suites and common areas. We received 21 responses from the 73 units surveyed.

The results do not indicate that obvious water ingress is occurring at the project. The Owners of Units 406, 407, 410 reported indications of water entering the fireplace enclosures. ACE completed a review of the roof chimney caps and observations and recommendations can be found in Section 3.

Several Owners reported condensation on the window glass and frames, or on bathroom ceilings and this may be as a result of high in-suite humidity. These areas should be monitored by the occupants for indications that water is ingressing during rainy periods, and immediate action taken. Otherwise the occupants should follow the instructions found in Section 3.

2.2 Test Criteria

The accepted criteria for building envelope investigation normally focuses on the premise that wood must be kept below 19% to prevent decay and to preserve structural integrity. The condition of the wood may be jeopardized should the moisture content (MC) of the wood be allowed to rise above 20% and if temperatures are suitable. Moisture content in the 20% to 28% range does not provide conditions suitable for the germination of fungal spores, however that range will sustain fungal growth that may have been germinated when the substrate at the test location was subjected to higher moisture. Any initial decay and subsequent decay due to wetting cycles is cumulative, and it is for this reason that wood must be protected from frequent and prolonged wetting. Moisture content above 28% will provide conditions for fungal spores to germinate, and above 35% these conditions will cause flourishing growth and rapid decay of the substrate.

The MC sampling conducted for this report is a random sampling at specific locations on the building. The result of any test may vary significantly from the conditions a few feet away from the test location. The test result may vary significantly from a reading taken a few weeks previous to or subsequent to the actual test date. The reader should be reminded that MC testing is intended to provide some insight into the performance of the building envelope at a specific location and time. The Owners should understand that moisture content sampling is random and areas undergoing moisture penetration may be missed in the survey. It is not feasible to perform sufficient testing on all areas of the building to confirm that areas are not at risk.

A total of 32 moisture probe tests were conducted at various details and all tests were below 14%, indicating the building envelope is generally performing satisfactorily.

The conclusions of Aqua-Coast Engineering Ltd. contained in this report are based on moisture test results, observations of surface details and limited

minor destructive testing. Aqua-Coast Engineering Ltd. cannot assume any responsibility for concealed conditions and deficiencies.

3 REVIEW of ASSEMBLIES

The cladding on the project is a combination of cavity wall brick, bevel cedar siding and quarry tile. The east and west walls are unit masonry firewalls with an elastomeric coating.

3.1 Wood Siding and Wood Trim

The wood cladding system on this project is a concealed barrier assembly consisting of bevel cedar siding installed in a horizontal configuration with a four-inch exposure. The siding is the first defence against water infiltration and when properly applied and sealed, can be very effective. The system relies on the siding and surface caulking to deflect rain and moisture from the walls and substrate. The substrate is protected from incidental moisture ingress by the asphalt impregnated building paper placed between the siding and the sheathing.

Our review indicates the cladding is generally in good condition on all elevations observed. We did note a few details that should be repaired or redetailed, or monitored for future moisture ingress.

The window heads are detailed with a flashing located directly above the window and a second flashing located above the wood trim. The wood trim and corner boards are applied on the outside of the bevel siding. We reviewed the details at the window heads and noted the flashings extend past the vertical wood trim as recommended. The flashing directly above the window head is sloped and is detailed with a caulking end dam. There is a gap as required between the trim and the window frame to permit movement and drainage. The flashing above the wood trim is similar, however we recommend the installation of a caulking end dam. We noted a self-adhesive membrane installed outside the head flashing that should be monitored in the future for trapped moisture (Photo 10).

The wood trim detail at the window sill includes a slope on the top edge of the trim to disperse water away from the assembly. The trim is installed one-half inch down from the window frame to permit a proper caulk joint. That caulk should be inspected annually for loss of adhesion or cohesion (Photo 11).

3.2 Cavity Wall Brick and Face-applied Quarry Tile

The brick cavity wall cladding at The Madison has good ventilation and drying conditions provided by the $\frac{3}{4}$ inch air-space between the brick and the sheathing paper and is in effect a rain-screen assembly. The brick

cavity wall assembly is constructed with a drainage cavity that is directed to the outside at each floor level by the drainage weep holes indicated by the horizontal arrow in Photo 4, however, the system does depend on caulked joints as a primary defence and on the building papers as a final defense against water ingress. The areas of efflorescence on the brick surface are a result of naturally occurring soluble salts in the materials being carried to the surface of the brick by moisture and deposited as a residue when the water evaporates. Cleaning and sealing of the surface is required.

The first floor walls of the building at the CRUs are structural concrete with a quarry tile covering and the assembly appears to be in good condition. We noted minor areas of missing grout that should be repaired (Photo 5).

The east and west walls at the project are constructed as firewalls with unit masonry. The walls have been coated with what appears to be an elastomeric coating. This product requires maintenance of joints and cracks including caulking and painting as required. We noted efflorescence is leaching through the coating possibly because the masonry had not dried completely before application of the coating. The assembly has probably reached equilibrium at this time and cleaning and recoating is recommended (Photo 6).

3.3 Windows and Patio Doors

The windows on the project are vinyl frame at most locations in the residential units. The windows are aluminum framed at the south elevation and at the CRUs. The aluminum framed windows have insulating glass units which do not have the benefit of a spacer bar. The sealant material between the glass has lost adhesion and failed at some locations as shown in Photo 8. These units should be monitored and replaced as required.

The residential windows are complete with insulated aluminum slab band covers to form the curtain wall. Moisture content testing could not be performed on the window walls since the test holes through the aluminum slab band covers could not be repaired. However, we reviewed the soffits below those areas and did not see any indications of staining or moisture (Photo 9).

As noted previously the window and patio door assemblies has a self adhesive membrane installed outside the head flashing that should be monitored in the future for trapped moisture.

We recommend annual inspection of all windows and patio doors for damage including frame damage, cracked glass, condensation within the sealed units, and leaks into the suites. Occupants should be instructed to observe moisture on the glazing, particularly on colder days, and report to

the appropriate party. Moisture that forms on the warm side of the window glazing that can be wiped off by the occupants is a sign of excessive humidity in the suite. Investigate for proper use of humidistat devices, exhaust fans, and look for blocked exhaust ducts and vents. Moisture that forms in the air space between the two layers of glass indicates a failure of the sealed unit and prompt replacement is recommended to avoid further deterioration of the window and wall assemblies. Bi-annual inspection of the fastener penetration and frame miter sealant on the patio doors exposed to wind and rain is recommended.

3.4 Balcony and Deck Membranes

The balcony decks have a liquid applied polyurethane membrane and appears to be in good condition (Photo 14). The membrane on the exposed fourth floor decks appears to be thinning at some locations and we recommend application of a "top-coat" within two to five years. The Owners should plan for all deck membranes to be top-coated within eight years to extend the service life of the membrane.

The interface of the balcony decks and the masonry walls appears to be correctly detailed. The deck membrane extends up behind the brick support angle as required (Photo 7). Some balcony decks drain off the edge and into gutters. The railings are applied to the fascia as recommended (Photo 12).

Some balconies have partial height guard walls and the handrail fasteners penetrate the metal cap flashing on top of the wall. The fasteners have caused dimpling of the cap flashing and water is pooling as indicated by the stain on the cap flashings (Photo 16). The cap flashing was lifted to confirm there is a membrane under the cap as required. However we recommend neoprene gaskets be installed beneath the bases to keep water out. This detail should be monitored and the cap should be replaced with a sloping cap if water ingress occurs (Photo 17). The framing cavities of the balcony decks are ventilated as required by way of perforated aluminum soffit covers (Photo 13).

The deck at Unit 405 appears to have a carpet covering or has been painted green. Carpet covers should not be permitted since they are often installed oversized and trimmed in place, leading to cuts in the membrane. Painting should not be permitted since it may affect the bonding of a new topcoat. The deck at 405 should be reviewed for damage (Photo 15).

Some decks are located above occupied space and are detailed with an SBS modified bitumen membrane as shown in Photo 18. The membrane is protected with pavers installed on pedestals to permit drainage. The membrane returns up the wall as required and is protected with a metal flashing which is correctly lapped with the building papers.

3.5 Parking Garage

The parking garage is partially located below the residential building and partially below the landscape areas and the building entrances. The membrane appears to be a liquid applied product protected by pavers on drainage sand (Photo 20).

We reviewed the insulated ceiling of the parking garage and noted one area with indications of moisture ingress through the membrane above (Photo 19). Water ingress is occurring at the location shown in Photo 21 at the parking access ramp between P1 and P2. The concrete soffit is boxed down at a location north of and parallel to the light fixture shown in the photo. The box forms a drain trench above near the dumpster storage and the trench drain flows into the pipe indicated at the arrow. The trench box has a crack along its length and indications of active moisture penetration

Photo 22 shows the location above the drain shown in Photo 21. The liquid applied membrane was installed without adequate thickness and surface preparation and has failed (arrow). This area may be subject to heavy use of deicing salts that can cause corrosion of the steel reinforcing bars in the slab. We recommend this area have new membrane installed immediately. The membrane should extend under the grates and on the invert of the drainage trench, taking care to detail the drain pipe.

3.6 Roofing

The roofing on the project is a built-up asphalt product with good slope and drainage, and the ventilation appears to be adequate (Photo 23). The roof drain screens should be inspected every three months and cleared as required (Photo 24). The roof perimeter curb was lifted and the presence of a membrane confirmed (Photo 25).

The staining of the roof area shown in Photo 26 appears to indicate standing water caused by a blocked roof drain, or by inadequate slope. This area should be monitored and corrected as required. Standing water can reduce the useful life of a BUR by five years or more.

The roof area above Unit 407 and shown in Photo 27 was reported to have leakage at the fireplace flue enclosure. The repairs included soldering of the chimney cap to the B-vent and pouring and asphalt product at the north end of the penetration. Proper repairs are required including removal and reinstallation of the flashings and the felts in the area should be completed. The repair should include an area five feet all around the penetration and extending north to the perimeter curb. A RCABC contractor should be engaged to complete the work.

A leak was also report near Unit 408 in the hallway ceiling. The hallway pressurization unit is located directly above that area and we suggest the apparent leakage may be related to condensation in the unit since there were no obvious breaches in the membrane (Photo 28).

The east and west ends of the building have small alcoves as shown in Photo 30. These areas can only be accessed for maintenance from the roof, or from the adjacent properties. The Owners may wish to consider installation of an access door or hatch form the stairwells subject to architectural and City review.

A qualified building envelope consultant should inspect the roofing systems every two years.

3.7 Caulking

Caulking is a flexible sealant compound primarily used to seal joints between dissimilar materials in the building envelope assemblies. We recommend a thorough inspection of all caulking joints every two years by a qualified caulking contractor including a repair program for any locations with missing or failed caulking. Failed joints should be should be cleaned and recaulked. The contractor should inspect for missing or discontinuous caulk, remove and replace caulk that has dried or hardened, lost adhesion with the substrate, or which has lost cohesion as exhibited by splitting. We caution against installing caulking at horizontal joints since caulking applied at horizontal locations may cause water to be trapped.

The wood trims and associated assemblies on the project have dried and settled as expected in the first years of the life of the building. These assemblies have reached equilibrium and inspection, recaulking as required, and painting is recommended (Photos 31 and 32).

There are several exposed penetrations through the cladding, such as the light fixture shown in Photo 3, which do not have caulking at the top and sides. The bottom should be left unsealed to permit incidental moisture to drain.

Penetrations through the cladding should be inspected and the head flashings should have caulked end dams installed similar to the window head flashing discussed in Photo 10 (Photo 33).

There are several caulking joints on the South elevation similar to the one shown in Photo 34. The gap between the window frame and the brick is greater than an inch and has been closed with caulking. The configuration of the joint exceeds the profile recommended by sealant manufacturers

leaving these joints at high risk of failure and water ingress. These joints should be inspected annually and repaired as required.

The glass and steel canopies above the entrances to the CRUs are detailed with a “gum-lip” caulking joint that should be inspected annually for failure (Photo 35).

The joints between the brick and wood cladding are detailed with a caulk joint and what appears to be polyurethane sealant. The joints should be inspected bi-annually for loss of adhesion or cohesion Photo 36.

The wood trim detail at the window sill includes a slope on the top edge of the trim. The trim is installed one-half inch down from the window frame to permit a proper caulk joint. That caulk should be inspected annually for loss of adhesion or cohesion (Photo 11).

We recommend vertical joints be sealed to prevent water from entering the substrate. Horizontal joints should generally be left open to permit drainage. Penetrations through the cladding such as at light fixtures should be sealed at the top and sides, with the bottom left open to permit drainage of incidental moisture.

The unit masonry fire-walls at the east and west ends of the building are coated with what appears to be an elastomeric coating. Some cracks have developed in the masonry due to shrinkage and movement. The walls should be inspected, cracks filled, and the surface recoated with a similar product (Photo 37).

3.8 Indoor Air Quality

An additional possible source of high moisture in the walls of modern residences is moisture escaping from the suites caused by high humidity within the suites. This humidity can permeate to the exterior wall assembly at poorly sealed penetrations of the vapour barrier and condense at colder points in the wall cavity such as near corners or at window openings, which are generally not as well insulated. The suites are equipped with humidistat devices on the bathroom fans in order to reduce the in-suite humidity to acceptable levels. The humidistat will detect excessive moisture and cause the bathroom fan to start and stop automatically to exhaust the moisture. The occupants must maintain the in-suite humidity at acceptable limits. The correct year round setting for this location is 40%. The occupants should be advised to use the kitchen and bath exhaust fans when moisture-producing activities are on-going. The dryer exhaust ducts should be checked for proper connection or blockage and the occupants should clear the dryer lint trap after every use. Several dryer exhaust vents exhibit excessive amounts of lint.

An indication of high in-suite humidity is condensation on the interior glass surface of the windows, particularly on a cool morning. Occupants should be instructed to observe moisture on the glazing, particularly on colder days and report accordingly. Moisture that forms on the warm side of the window glazing that can be wiped off by the occupants is a sign of excessive humidity in the suite. Inspect for similar conditions and investigate for properly used exhaust fans and blocked exhaust ducts and vents. The maintenance personnel should review these conditions and take appropriate corrective action.

4 RECOMMENDATIONS for REPAIR and MAINTENANCE

This section summarizes the repair and maintenance strategies that Aqua-Coast Engineering recommends for The Madison. We recommend the following repairs, maintenance, or monitoring items be implemented in the near future.

The Owners should anticipate the following budget for the repairs outlined in Table 4.1. These repairs should be completed in the immediate future.

Item of Work	Est. Cost
1. Painting and caulking of wood trims/siding	8000
2. Seal cracks and repaint East and West masonry walls (future)	11000
3. Balcony deck membrane top-coat/repairs	7000
4. Repair/replace membrane at dumpster storage area	3000
5. Repair roof membranes near the chimney enclosure at 407 extending to perimeter	4000
6. Replace all chimney enclosure cap flashings complete with back-up membrane	2000
7. Replace window seals (future over 10 years)	30000

The following instructions were prepared for use as general guidelines for the maintenance of the building envelope of the building located at 2929 West 4th Avenue, Vancouver, BC. The use of the instructions by any other party on any other building is not permitted without the prior written consent of the Consultant. These instructions should be reviewed by the builder, the architect and the construction phase building envelope consultant and agreed in writing prior to implementation. Liabilities and warranties may otherwise be voided. Aqua-Coast Engineering Ltd. recommends the maintenance and inspections described in the following sections be performed by technically qualified trades only.

The frequencies indicated with each maintenance activity is the minimum recommended. Additional maintenance should be performed in response to

complaints and observations from the Owners and Strata Council. Annual maintenance items should be performed in the spring or early summer when adequate dry weather occurs to allow sufficient time for the proper repair of any defects, well in advance of the next rainy season. The rainy season in the Lower Mainland generally begins late October or early November and extends into March or April of the following year. The exception is roof drain and gutter cleaning, which should be done in late fall after trees have shed leaves and prior to the rainy season.

4.1 Brick Masonry

The brick cladding at this project is installed with a pressure equalized drainage cavity and air-barrier system and should provide many years of trouble free service with minimum maintenance.

- Bi-annually inspect all masonry for signs of cracking, or other failure, and for staining caused by excessive moisture. The building tends to settle and move during the first years until reaching equilibrium. At locations where the brick and mortar joints have loosened, inspection and repairs by a qualified contractor should be completed as part of the maintenance program.
- Cleaning of the masonry exterior is not a maintenance requirement to ensure adequate performance of the building envelope. However, if cleaning is required for cosmetic reasons, only low-pressure washing should be performed with brushes using clean, potable water.
- All cleaning procedures and solutions should be applied to a sample test area of approximately 20 sq. ft. (1.9 m²). The effectiveness of the cleaning method should be judged by inspection of the sample test area after a period of not less than one week.
- Detergent or soap solutions may be used to remove mud, dirt and soil. A solution of 1/2 cup of trisodium phosphate and 1/2 cup of laundry detergent dissolved in one gallon of clean water is recommended.
- We recommend a cleaning strategy that includes a pre-rinse from the bottom to the top, followed by washing from the top to the bottom. The pre-rinse should saturate the masonry, and this will cause the pores to fill with clean water, and help avoid water borne dirt particles entering the pores and staining the brick and mortar.
- Also, dry masonry may absorb the cleaning solution and may result in "mortar smear", "white scum", or the development of efflorescence or "green stain". Saturation of the surface prior to cleaning reduces the absorption rate, permitting the cleaning solution to stay on the surface rather than be absorbed. Presoak or saturate the area to be cleaned and the areas below, clean the area, and flush with water, from the top down. Maintain the brick masonry areas below in a saturated condition. Flush walls with large amounts of clean water from top to bottom before they can dry. Failure to completely flush the wall of cleaning solution and dissolved matter may result in soiled areas.

- Water spray should be directed in a downwards angle and avoid spraying into openings or caulking joints. Wooden or other non-metallic tools may be used to remove stubborn particles. Do not use metal scrapers or chisels since metal marks will oxidize and cause staining. High-pressure water blast and sand blasting may damage the surface of the masonry and should be avoided.
- White efflorescent salts can be removed by dry brushing or with clear water and a stiff brush. The appearance of efflorescence on a masonry area which has been free of efflorescence may be attributable to a new source of water in the masonry assembly. This condition should be investigated for water ingress, since moisture may penetrate the mortar and lead to softening or deterioration or visible cracks. When this is the case, tuck-pointing may be necessary to reduce moisture penetration. Tuck-pointing is a process of cutting out old mortar to a uniform depth and placing new mortar in the joint, and should be done by a qualified mason only.

4.2 Wood Siding and Wood Trim

- The wood trims and siding are applied directly to the building paper and sheathing with no allowance for drainage. Moisture content sampling should be performed bi-annually to check for trapped moisture. An approved building envelope consultant should be hired to perform this work and will select likely problem areas by close observation and review of previous conditions.
- Annually inspect all siding and wood trim for signs of failure or damage. Inspect for disengaged panels or trim, for signs of cracking, open joints, or staining caused by excessive moisture.
- Annually inspect all flashings for integrity ensuring all sections are securely fastened and all joints are properly attached and sealed.
- Annually inspect all sealants for any signs of failure such as loss of adhesion and cohesion and for drying and cracking.
- Annually inspect all vents for blockages. Dryer lint around a dryer vent is an indication the dryer lint trap is not cleaned after each use. This may contribute to blocked ducts and lead to unacceptable in-suite humidity.
- Annually inspect all penetrations through the cladding including wires, pipes, vents and fasteners. Ensure all penetrations are sealed at the top and sides.
- Cleaning of the exterior cladding is not a maintenance requirement to ensure adequate performance of the building envelope. If cleaning is required for cosmetic reasons, only low-pressure washing should be performed with brushes using clean, potable water. Do not use soaps, detergents, cleaning agents or any chemicals or solvents. Water spray should be directed in a downwards angle and avoid spraying into openings or caulking joints.

- Annually (fall) shut off all exterior hose bibs and disconnect garden hoses prior to onset of freezing temperatures to prevent cracking of pipes due to freezing.

4.3 Windows and Patio Doors

- Annually inspect all windows and patio doors for damage including frame damage, cracked glass, condensation within the sealed units and leaking into the suites.
- Annually inspect all flashings around the windows and patio doors for signs of failure.
- Annually inspect window and door flashings for integrity ensuring all sections are securely fastened and all joints are properly attached and sealed.
- Instruct occupants to observe moisture on the glazing, particularly on colder days, and report to appropriate party. Moisture that forms on the warm side of the window glazing and can be wiped off by the occupants is a sign of excessive humidity in the suite. Investigate for properly used humidistat devices, exhaust fans, and blocked exhaust ducts and vents. Moisture that forms in the air space between the two layers of glass indicates a failure if the sealed unit and prompt replacement is recommended.
- Bi-annually inspect and test moisture in the framing around the window and patio door openings. The flange is sealed to the substrate at some locations investigated and the waterproof membrane may cause moisture to be trapped, leading to decay if left un-checked.
- Annually test the moisture content of the framing below the windows in stucco and exposed wood siding. Exposed south and east facing windows should be selected for testing.
- Refer also to manufacturer's warranty and maintenance information.

4.4 Balcony Membranes

- Annually clean and inspect membranes for any signs of wear or failure and correct as required. Obvious signs of distress include blistering, membrane delaminating or scaling, loose exposed edges, indications of objects beneath the membrane.
- Annually inspect flashings for integrity ensuring all sections are securely fastened and all joints are properly attached and sealed.
- Regularly inspect all drains for blockages and membrane wear or failure.
- Instruct occupants to move deck furniture carefully to avoid membrane damage. Out-door carpets and other coverings should not be permitted. Cutting these products in-situ frequently causes damage to deck membranes.

- Refer also to manufacturer's and installer's warranty and maintenance information.

4.5 Parkade

- Monitor the parking garage for indications of moisture ingress through the landscape/driveway membrane. Repair as required.

4.6 Roof Membranes

- Bi-annual inspection should be performed by a qualified roofing contractor or building envelope consultant.
- Inspect flashings for integrity ensuring all sections are securely fastened and all joints are properly attached and sealed.
- During rainy season, inspect all roof drains for blockages and membrane wear or failure, or loss of adhesion with drain rim. Ensure all drain screens are in place and adequately restrained; clear debris from drains.
- Inspect all through roof plumbing vents and flashings. Ensure all caps are in place. Inspect all vents. Clear all obstructions.
- Refer also to manufacturers and installers warranty and maintenance information.
- A qualified building envelope consultant should inspect the roofing systems every two years.
- Maintain roof drains as required. Debris should be removed from the roof and drains on a regular basis, monthly if required.
- Extend the elevator roof drain down to the lower roof and spill onto a splash pad to avoid early deterioration of the SBS granules.

4.7 Caulking and Painting

The building tends to settle and move during the first years until reaching equilibrium. A qualified caulking contractor should be retained to inspect and repair all caulked joints on the project in the next 12 months. Bi-annually inspect caulked joints for indications of failure such as excessive drying and hardness, cracking, loss of adhesion, loss of cohesion. Remove failed caulk, clean substrate, install bond breaker as required, replace with new material in accordance with manufacturers recommendations. Avoid horizontal caulking except with careful analysis.

- Bi-annually inspect caulked joints for indications of failure such as excessive drying and hardness, cracking, loss of adhesion or loss of cohesion. Remove failed caulk, clean substrate, install bond breaker as required and replace with new material in accordance with manufacturer's recommendations. Avoid horizontal caulking except with careful analysis.
- Bi-annually inspect the painted wood surfaces for deterioration. Observe scaling or loose paint, signs of excessive moisture, open joints and cracks

and loose material. Refasten, seal and caulk, remove loose coatings by scraping and prime and repaint during favorable weather conditions with compatible products.

- Ensure penetrations such as light fixtures and electrical devices through the EIFS and brick cladding are sealed as required.

4.8 Other Concerns

- All occupants must pay close attention to any incidents that may indicate the existence of water ingress inside the suites and common areas. A conscientious effort must be made by all occupants to record any problems promptly and report them to a designated party. Successful repair of water ingress problems requires proper recording of all pertinent conditions including date, time, weather, wind direction, frequency and prompt action to repair the problem. Signs which may indicate water ingress include traces of visible water inside the suites or water stains on wall or ceiling finishes, or dampness on surfaces.
- Occupants should notify the appropriate party of unusual moisture or other concerns anywhere on the project.
- We recommend setting humidistats at 40% year round. Occupants must be instructed to use kitchen and bathroom exhaust fans whenever any steam or water vapour is generated inside the suites. Excessive humidity in the suites may diffuse into the exterior walls and roof and cause condensation to occur. Avoid spilling water or liquids on the floors or window ledges. Wipe up spills promptly. Monitor windows for condensation which is a sign of excess in-suite moisture.

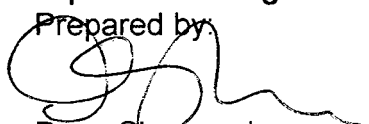
5 SUMMARY

The repairs and maintenance recommended should be scheduled in the near future to prevent water ingress and the associated deterioration of the building components.

Aqua-Coast Engineering Ltd. is available review the contents of this report at your convenience. Please contact the undersigned for further assistance.


Aqua-Coast Engineering Ltd.

Prepared by:



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