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Building Envelope Condition Report

for

Alameda Park
3235 West 4th Avenue
Vancouver, BC

PRESENTED TO:

The Owners, Strata Plan LMS 2744
C/o York West Asset Management Group.
260 – 6391 Westminster Highway
Richmond, BC V7C 4V4

September 10, 2002
File No. 2145

Aqua-Coast Engineering Ltd.

Alameda Park

1 INTRODUCTION

1.1 Terms of Reference

Aqua-Coast Engineering Ltd. (ACE) was engaged by the Owners Strata Plan LMS 2744 to complete site reviews and to comment on the condition of the building envelope at Alameda Park. This investigation is a follow-up study to a report submitted by Aqua-Thermal Consultants (1999) Ltd. on August 28, 1999. Repairs and modifications were completed as a result of that report, and this investigation is intended to confirm the success of those repairs.

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.
- Review of the Aqua-Thermal report and moisture content test results.

Field tests and observations were conducted on July 9, 2002.

1.3 Basic Information

The complex consists of 41 condominium units in a four story wood frame building on a below grade parkade, and is approximately 6 years old. The roof is low slope with a two-ply SBS modified bitumen membrane. The windows are aluminum framed thermally broken with sealed units, and the walls are clad with a cement stucco on plywood sheathing, accented with acrylic coated foam trim. The units have balcony decks covered with a liquid applied membrane and aluminum railings. Balconies are protected by the balcony above, with the exception of the upper balconies. (Photo 1). Some areas of the building have the benefit of overhanging eaves, which provide some protection to the stucco wall areas.

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

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 69 moisture probe tests were conducted with a result of a limited number of tests above the 20% threshold. The test results indicate the building envelope is generally performing satisfactorily. Test locations that exhibited moisture contents above 20% during the 1999 investigation were checked and all locations are below the 20% threshold. Photographs of some test locations or observations are available in Appendix A.

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 stucco cladding accented with EIFS detailing at limited areas.

3.1 Face-sealed Stucco Cladding

The stucco cladding system on this project is a face-sealed assembly consisting of cement-based stucco. Stucco is an absorbent product and relies on the asphalt impregnated building paper behind to separate the wet stucco from the dry wood substrate. If wetting is rare and drying weather more typical this system works well. However, in the coastal climate of the lower mainland drying times are limited and moisture is permitted to saturate the stucco for extended periods. Water reaches the sheathing and framing and is trapped, creating ideal conditions for decay fungi and other organisms to develop. The joints between the stucco and all other wall components and penetrations are usually not waterproof. Water can also migrate directly through the joints and since this moisture is slow to escape, it can cause rapid decay of the wood substrate.

The face sealed stucco must be carefully maintained and cracks in the stucco at exposed locations should be prepared and sealed as part of ongoing maintenance (Photo2).

The builder has installed wall cavity ventilation below the ground floor windows and those vents are protected with a hood vent as shown in Photo 3. We noted the caulking at the joint between the vent and the window sill frame is failing and requires replacement. The caulking should be inspected and repaired every two years.

A core test was conducted at the window head shown in Photo 4 to confirm the details of construction. The head flashing extends past the window jamb as required and the flashing has positive slope away from the wall. The building papers and self-adhering membranes are correctly lapped with the head flashing. The detail has self-adhering membranes at the sides but not at the head. The moisture content at this location was 11%. The detail at a window sill was inspected and we confirmed the presence of a self-adhering membrane installed on the outside of the window flange. The building paper is lapped behind the membrane as required (Photo 5).

We noted a disengaged gutter down pipe near the entry that may be directing water at the stucco wall. This deficiency should be corrected immediately in order to avoid damage to the substrate (Photo 6).

Testing by Aqua-Coast Engineering Ltd. did not reveal any locations of moisture located in stucco cladding at this time. We recommend all areas be monitored for future water ingress.

3.2 Windows and Patio Doors

The windows and patio doors are thermally broken aluminum framed assemblies. 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.

3.3 Balcony and Deck Membranes

The balcony deck membrane is a liquid applied product and is in good condition. The Owners should plan for the membrane to be top-coated in approximately five years to extend the service life of the membrane (Photo 8). The interface of the deck and the stucco wall has been caulked at the vertical joints. This caulking should be inspected every two years. The handrail base and fasteners should be sealed at that time (Photo 9). We noted at least one interface where sealant was not installed. All similar locations should be caulked for missing or failed sealant.

The framing cavities of the balcony support columns are not vented as required. Enclosed and unheated cavities should be vented to allow incidental moisture to escape (Photo 27).

Some balconies drain off the edge into gutters and these gutters should be inspected and cleaned once per year or as required (Photo 10).

Some balconies have a partial height railing sitting on a curb. The curb is detailed with a sloping cap flashing and backup membrane. The caulking at the interface should be checked every two years (Photo 11).

The soffits of the balconies have a perforated cover with a gypsum board backing. Non-vented framing cavities tend to trap moisture and may lead to decay. The cavities should be ventilated or monitored for moisture. There were no indications of moisture during our visit. These conditions should be monitored for indications of moisture related problems (Photo 12).

The balcony support columns are clad with an acrylic stucco applied over EPS insulation (EIFS). The framing cavities of the columns have vents installed near the base. Additional vents should be installed near the top of the columns to provide cross-ventilation (Photo 14). The cavities of all wood frame columns at the balcony decks should be vented (Photo 15).

3.4 Parking Garage

The parking garage is partially located below the residential building and partially below the landscape areas and the building entrances. We reviewed the insulated ceiling of the parking garage and there were no indications of moisture ingress through the landscape membrane above (Photo 16).

3.5 Roofing

The roof on the project is a two-ply SBS modified bitumen membrane and appears to be properly sloped and vented (Photo 17). The perimeter curbs

have a sloping metal cap flashing with standing seam joints and a back-up membrane.

The roof drains are recessed to improve drainage. We noted the drains are not being maintained as required. Debris should be removed from the roof and drains on a regular basis, monthly if required (Photo 18).

The acrylic skylight assemblies are in good condition and are mounted on eight-inch curbs as required (Photo 19). The skylights should be monitored for moisture. Moisture forming between the layers of glass indicates a failed unit and requires replacement. Moisture forming on the suite side of the glass indicated excessive in-suite humidity.

The elevator roof drain spills directly onto the wall and the roof below. The drain should be piped down to the lower roof and spilled onto a splash pad to avoid early deterioration of the SBS granules and membrane (Photo 20).

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

3.6 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.

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.

3.7 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

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

4.1 Face-Sealed Stucco Cladding

- Monitor exposed stucco areas at all exposed locations for cracking or water ingress.
- Repair areas of cracked and missing stucco immediately.
- Repair disengaged gutter down pipe near the entry to avoid damage to the substrate.
- The Owners must be cognizant that exposed face-sealed wall areas on the project left in place are at a high risk of water infiltration and associated damage. Rigorous monitoring, inspection and maintenance may extend the service life of the assembly.

4.2 Windows, Patio Doors, and Skylights

- We recommend annual inspection of all windows patio doors, and skylights 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.

- Failed sealed glass units should be replaced promptly.

4.3 Balcony Decks and Guard Walls

- Owners plan for the balcony deck membrane to be top-coated in approximately five years to extend the service life of the membrane.
- Inspect the interface caulking at the deck and the stucco walls every two years and seal the handrail base and fasteners. All locations should be caulked for missing or failed sealant.
- The framing cavities of the balcony support columns should be vented to allow incidental moisture to escape or monitored for indications of trapped moisture.
- Inspect gutters at balconies which drain off the edge and clean once per year or as required (Photo 10).
- Inspect the caulking at the interface of the guard wall and building wall every two years.
- The soffits of the balconies should be ventilated or monitored for moisture related problems.
- The balcony support columns framing cavities should have additional vents installed near the top of the columns to provide cross-ventilation.
- The cavities of all wood frame columns at the balcony decks should be vented.

4.4 Roofing and Parkade

- Monitor the parking garage for indications of moisture ingress through the landscape membrane.
- 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.

4.5 Caulking and Painting

- Caulk all dissimilar material interfaces and joints.
- Complete a thorough inspection of all caulking joints every two years by a qualified caulking contractor, incorporating a repair program for any locations of missing or failed caulking.
- 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.
- Exercise caution against caulking installed at horizontal joints since caulking applied at horizontal locations may cause water to be trapped.
- Seal penetrations through the cladding at the top and sides, with the bottom left open to permit drainage of incidental moisture.

- Inspect, seal, and paint the wood at the eaves and roof rakes on the project.

4.6 Indoor Air Quality

- Maintain the in-suite humidity at acceptable limits at all times. The correct year round setting for the conditions found in the Lower Mainland area is 40%.
- Check dryer exhaust ducts for proper connection or blockage and have occupants clear the dryer lint trap after every use.
- Use exhaust fans when moisture-producing activities are on-going.
- Monitor building for condensation on the interior glass surface of the windows and take appropriate corrective action.

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:

Dave Sheppard

Reviewed by:

L.M. Wood, P. Eng.

6 APPENDIX A: Photographs

Photo 1
Alameda Park, LMS 2744
3235 West 4th Avenue
Vancouver, BC

Alameda Park is a residential condominium project with 32 units in a four story wood frame complex. The building is clad with a face sealed stucco accented with EIFS trims. The cladding is applied on building paper over plywood sheathing.

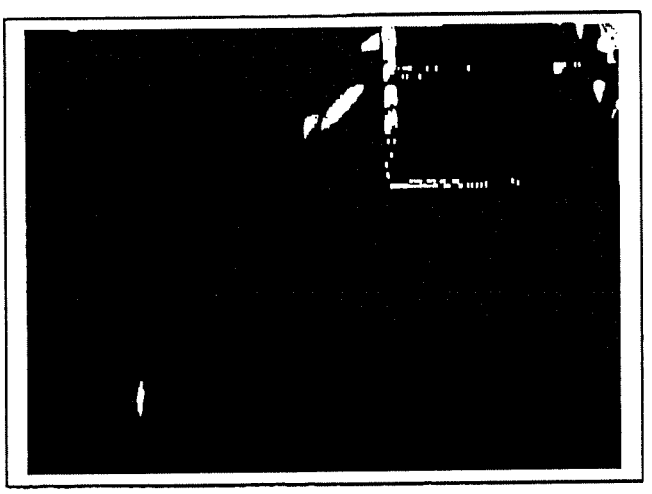

Photo 2
Some minor cracks in the stucco, such as the crack at the lower left corner of this window (arrow) should be repaired as part of ongoing maintenance.

Photo 3
The builder has installed wall cavity ventilation below the ground floor windows and those vents are protected with a hood vent as shown here. We noted the caulking at the joint between the vent and the window sill frame is failing and requires replacement (arrow).

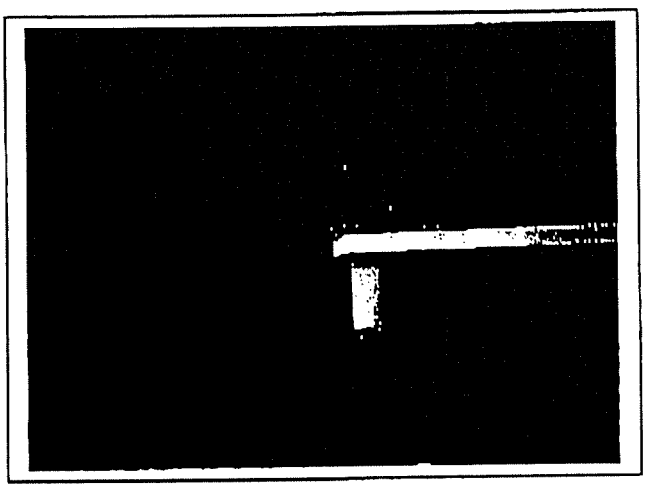

Photo 4
A core test was conducted at this window head to confirm the details of construction. The head flashing extends past the window jamb as required and the flashing has slope. The building papers and self-adhering membranes are correctly lapped with the head flashing. The detail has self-adhering membranes at the sides but not at the head. The moisture content at this location was 11%.

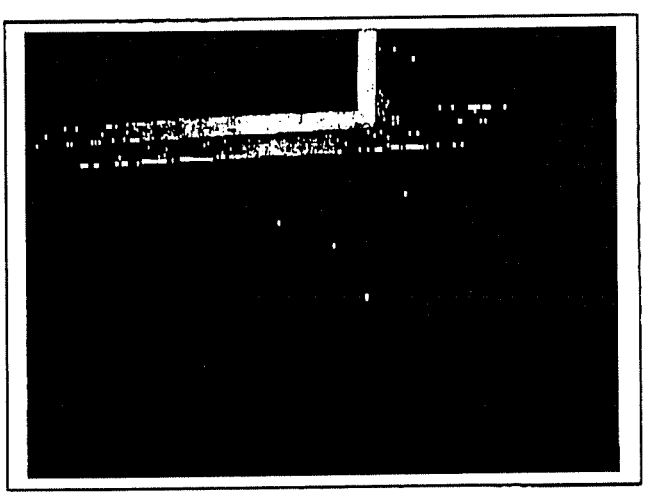

Photo 5
The detail at the window sill was inspected and we confirmed the presence of a self-adhering membrane installed on the outside of the window flange. The building paper is lapped behind the membrane as required.

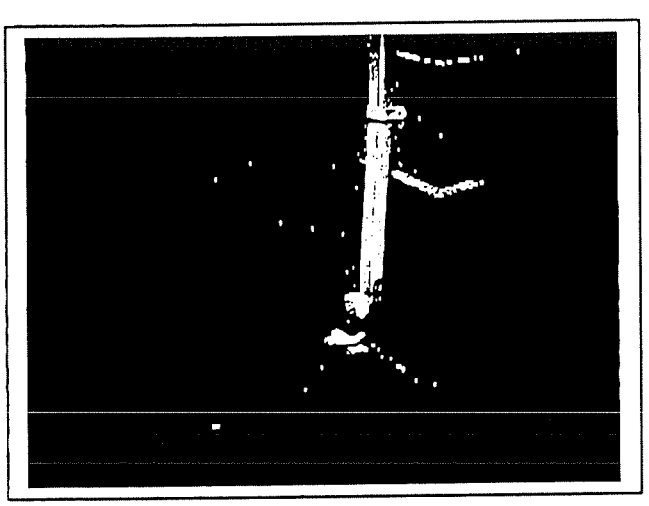

Photo 6
We noted a disengaged gutter down pipe near the entry that may be directing water at the stucco wall. This deficiency should be corrected immediately.

Photo 7
The landscaping materials are installed a suitable distance from the walls to avoid moisture damage, and to permit drying of the walls.

Photo 8
The balcony deck membrane is a liquid applied product and is in good condition. The membrane should be top-coated in approximately five years to extend the service life of the membrane.

The interface of the deck and the stucco wall has been caulked at the vertical joints. This caulking should be inspected every two years. The handrail base and fasteners should be sealed at that time.

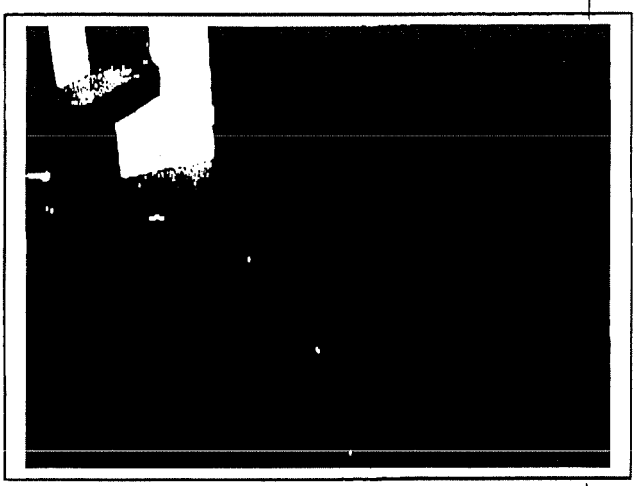

Photo 9
We noted at least one interface where sealant was not installed. All similar locations should be caulked for missing or failed sealant.

Photo 7
The landscaping materials are installed a suitable distance from the walls to avoid moisture damage, and to permit drying of the walls.

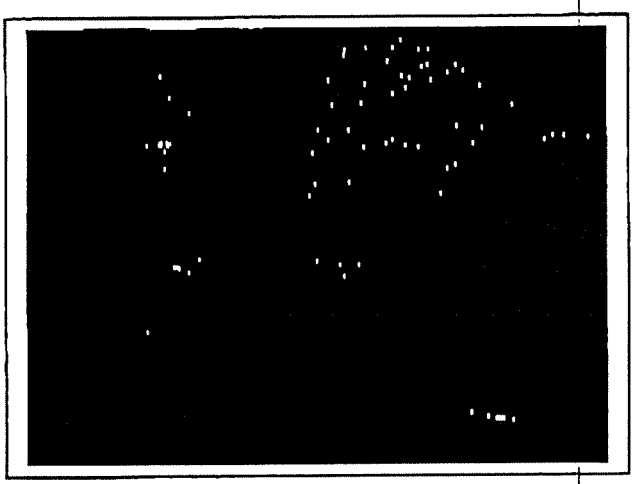

Photo 8
The balcony deck membrane is a liquid applied product and is in good condition. The membrane should be top-coated in approximately five years to extend the service life of the membrane.

The interface of the deck and the stucco wall has been caulked at the vertical joints. This caulking should be inspected every two years. The handrail base and fasteners should be sealed at that time.

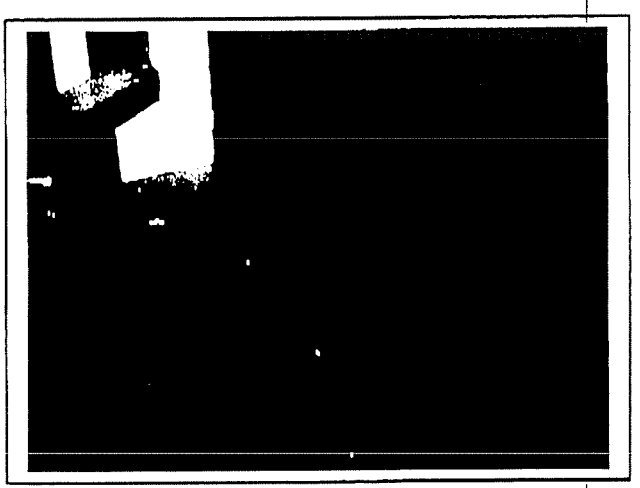

Photo 9
We noted at least one interface where sealant was not installed. All similar locations should be caulked for missing or failed sealant.

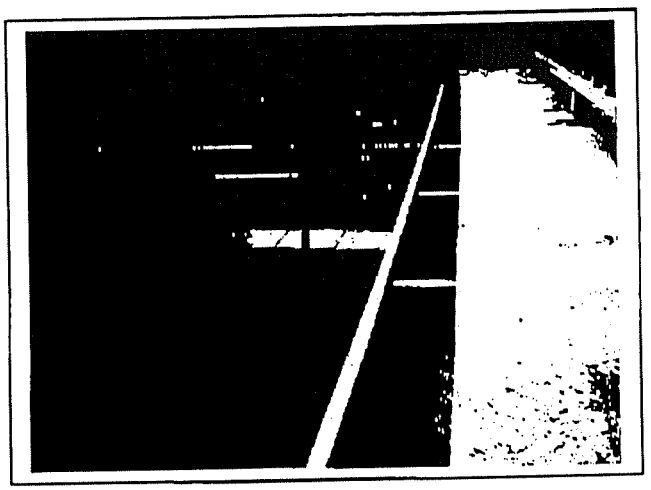

Photo 10
Some balconies drain off the edge into gutters. These gutters should be inspected and cleaned once per year or as required.

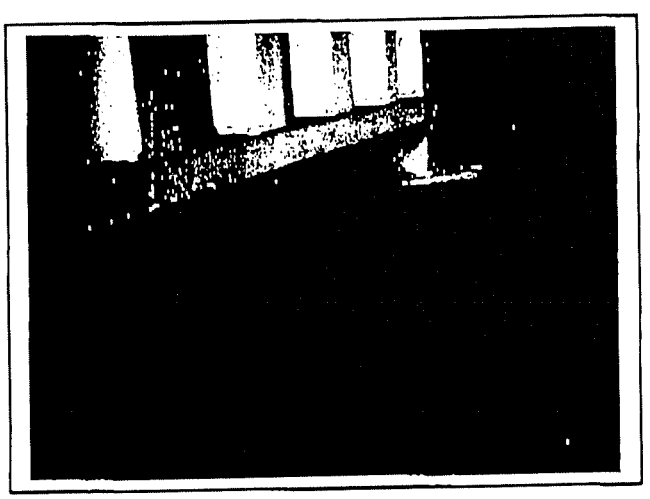

Photo 11
Some balconies have a partial height railing sitting on a curb. The curb is detailed with a sloping cap flashing and backup membrane. The caulking at the interface should be checked every two years.

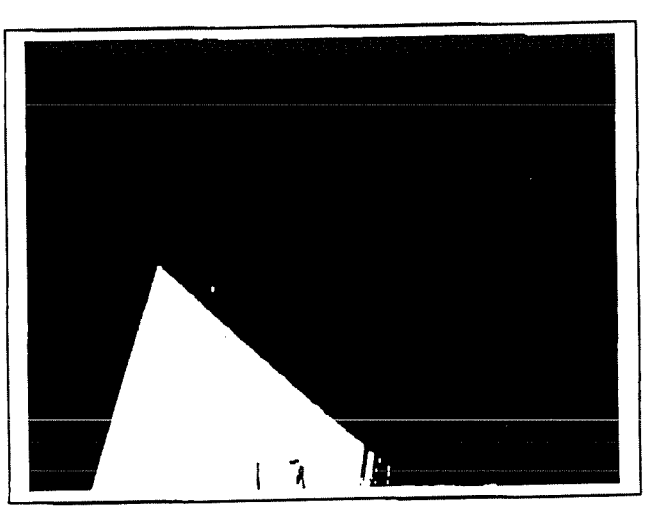

Photo 12
The soffits of the balconies have a perforated cover with a gypsum board backing. Non-vented framing cavities tend to trap moisture and may lead to decay. The cavities should be ventilated or monitored for moisture. There were no indications of moisture during our visit.

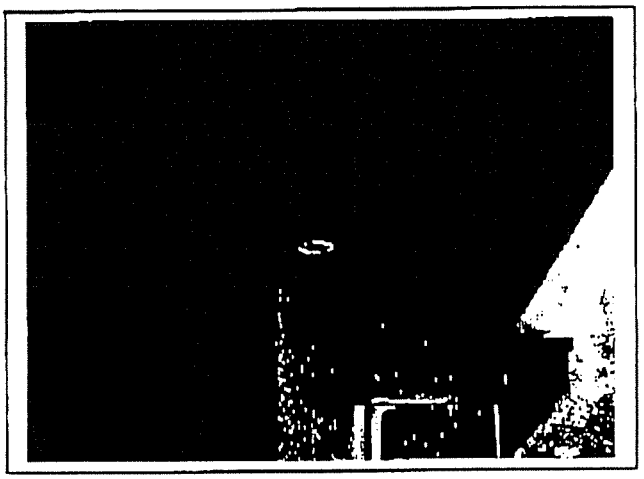

Photo 13
The framing cavity of the floor overhangs have vents installed as required.

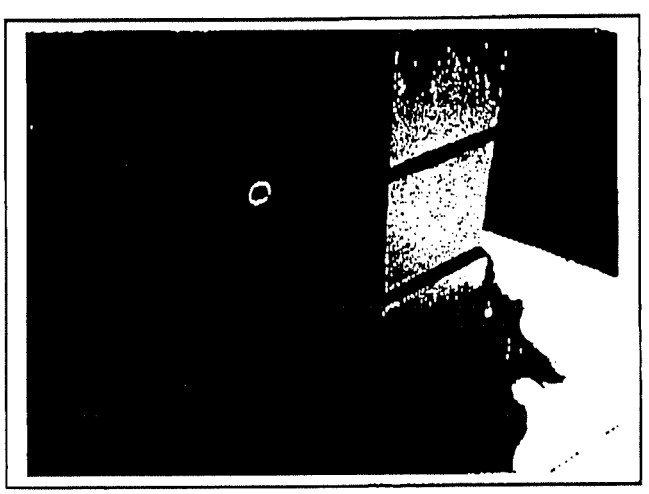

Photo 14
The balcony support columns are clad with an acrylic stucco applied over EPS insulation (EIFS). The framing cavities of the columns have vents installed near the base. Additional vents should be installed near the top of the columns to provide cross-ventilation.

Photo 15
The cavities of the wood frame columns at the balcony decks should also be vented.

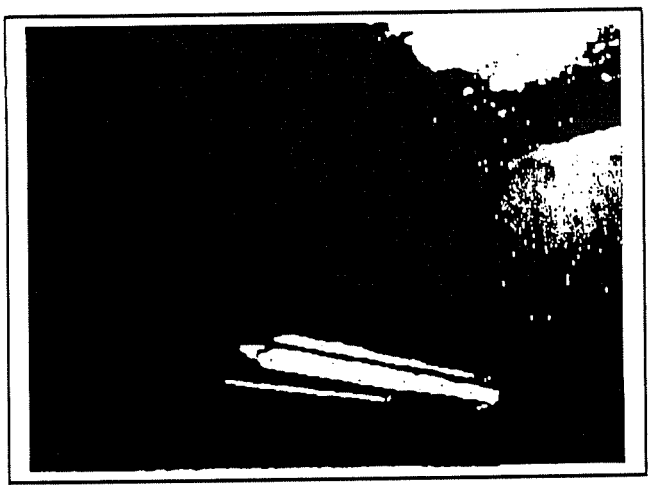

Photo 16
We reviewed the insulated ceiling of the parking garage and there were no indications of moisture ingress through the landscape membrane above.

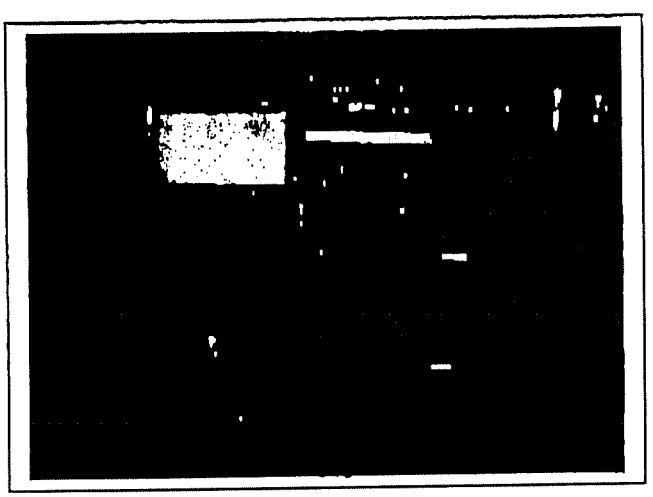

Photo 17
The roof on the project is a two-ply SBS modified bitumen membrane and appears to be properly sloped and vented.
The perimeter curbs have a sloping metal cap flashing with standing seam joints and a back-up membrane.

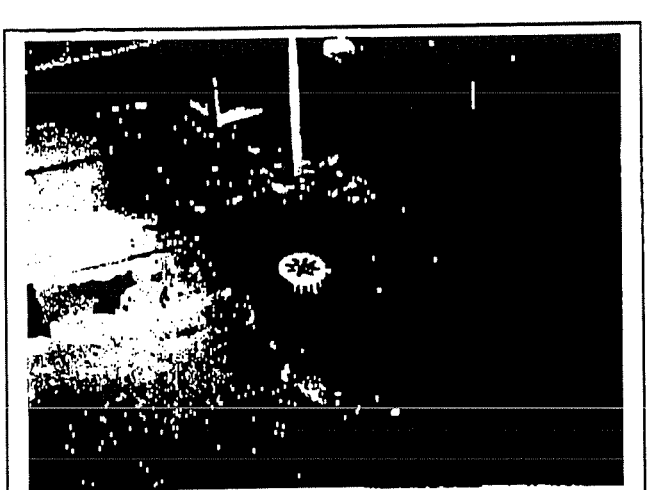

Photo 18
The roof drains are recessed as shown here. The drains are not being maintained as required. Debris should be removed from the roof and drains on a regular basis, monthly if required.

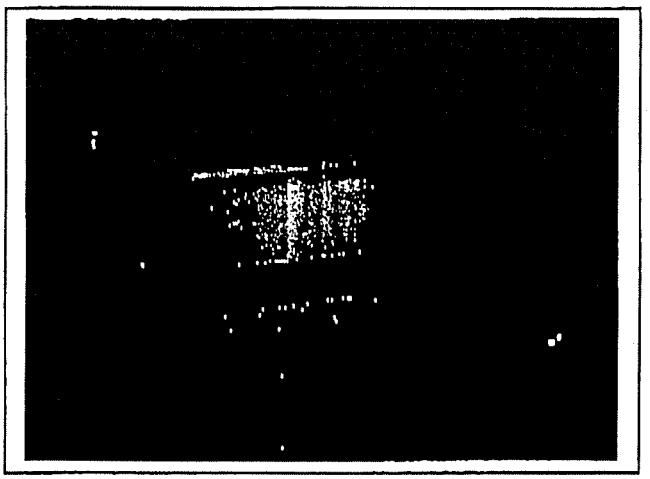

Photo 19
The acrylic skylight assemblies are in good condition and are mounted on eight-inch curbs as required.
The skylights should be monitored for moisture. Moisture forming between the layers of glass indicates a failed unit and requires replacement. Moisture forming on the suite side of the glass indicated excessive in-suite humidity.

Photo 20
The elevator roof drain spills directly onto the wall and the roof below (arrow). The drain should be piped down to the lower roof and spilled onto a splash pad.

End of photos.

7 APPENDIX B: Terminology

ACE AQUA-COAST ENGINEERING LTD.

Balcony An above ground walkway or platform connected to the outside of a building.

Board and batten siding A method of wood cladding in which siding boards are installed vertically, and the joint is covered with a narrower vertical board called a batten.

Breezeway An exterior passageway, usually a covered common area, between different areas or suites in the same building.

Building Code Published regulations controlling design, construction, quality of materials, use and occupancy, and location of structures within the area for which the code has been legally adopted.

Building envelope The entire assembly of the exterior skin of a building including cladding, sheathing papers, windows and doors, joint sealants, and roof, balcony, parking roof, and deck membranes.

Building paper A general term used to describe a heavy paper, usually asphalt impregnated for water resistance, and used under exterior cladding. Product performance is measured in minutes of resistance to moisture penetration, as in 30 minute or 60 minute ratings.

Built-up roofing A roofing system "built-up" with layers of sheet felts and asphalt. The asphalt provides the waterproofing and the felts act as the reinforcement.

Capillary action The tendency of water to rise in a network of small spaces, caused by the surface tension of the water. In a rain-screen assembly, a gap is provided between the parallel layers of material to break the surface tension of water and promote rapid passage of water to the exterior via through-wall flashings.

Cladding The material used on an exterior wall to protect the structure and interior spaces from environmental forces. Types of cladding include stucco, vinyl siding, brick and concrete, stone veneer, wood siding, and EIFS.

Concealed barrier A cladding assembly such as vinyl siding that relies on the building papers or house-wrap to provide the primary defence against moisture and air infiltration.

Deck An exterior area similar to a balcony, but uaually located over an occupied part of the building.

Efflorescence A white powder-like deposit appearing on the surface of concrete, stucco, or brick. It is generally caused by soluble salts within the material being carried to the surface by moisture and deposited as a residue when the water evaporates.

EIFS Exterior Insulation and Finishing System (EIFS) is a composite cladding system which consists of insulation board fastened to an exterior grade gypsum board or glass-mat surfaced gypsum board or other suitable substrate. A polymer-based adhesive/base coat (primus) is applied to the insulation complete with a fiber mesh reinforcement. A water based acrylic primer and polymer-based finish coat is installed on the insulation. The cladding is a "face-sealed" assembly, and depends on the acrylic coating and the caulked joints at interfaces to prevent moisture ingress. By its very nature this cladding system requires constant monitoring and immediate repair should deficiencies become apparent.

EPDM A single-ply elastomeric sheet roofing and waterproofing membrane composed of ethylene/propylene/diene monomer (EPDM). EPDM is suitable for exposed and protected installations and may be applied as a loose laid, partially adhered, or fully adhered depending on the manufacturers installation criteria.

EPS An insulation board comprised of Expanded Polystyrene (EPS) made by expanding polystyrene beads into large blocks that are cut into sheets.

Face-seal A building envelope strategy which depends on the cladding and windows and associated sealants to shed water. No ancillary method of positive drainage is provided behind the face sealed exterior. This system is prone to failure.

Fascia is the exposed vertical edge of a roof or balcony deck.

Flashing Sheet metal weather protection utilized at details that are subject to movement, or details having membranes that require protection from mechanical or environmental damage. Common flashing types and usage include:

- Cap flashing: on parapet walls, columns or chimney enclosures
- Head or sill flashing: above or below a wall opening to effect the transition between dissimilar materials or assemblies
- Saddle flashing: A three dimensional flashing, usually welded, and installed in a location where 3 or more planes intersect, for example

at the interface of a parapet wall cap flashing with the main building wall.

- Through-wall flashing: A flashing that extends from behind the sheathing paper material, across the cladding, and extends outside and slightly down over the cladding, and is shaped to redirect incidental moisture to the exterior side of the cladding.

House-wrap A sheet polyethylene material used as a sheathing paper between the wall sheathing material and the exterior cladding. One common type of house-wrap consists of Spun-Bonded Poly-Olefin, another is made of perforated polyethylene. Their resistance to liquid water is high, but resistance to water vapour is lower than many common "vapour barrier" materials. These products are used primarily as air barriers in buildings.

Insulating glass Glazing units consisting of two pieces of glass spaced apart, usually ½ inch, and hermetically sealed leaving air or inert gas in the space to provide improved thermal efficiency.

Maintenance Regular inspection of the building envelope and systems including roof, walls, windows, gutters, downspouts and drains, followed by the cleaning and repair of those items as required.

Moisture content The amount of water contained in a sample of wood expressed as a percentage.

Movement Joint A joint intentionally introduced into the building envelope to permit differential movement between portions of the building structure (expansion joint), or to control and localize cracking of materials such as stucco (control joint).

Oriented Strand Board A panel material commonly used for exterior sheathing in wood frame construction. The material consist of chips of softwood pressure bonded with adhesives into panels. This product is somewhat more susceptible to moisture damage than wood or plywood.

Parapet wall A partial height wall surrounding a balcony, roof deck, or roofing area.

Penetration An opening in the building envelope through which ducts, electrical wires, pipes and fasteners pass.

Plywood A sheathing product made by gluing several thin layers of wood together in a perpendicular direction.

Rain-screen (also drained cavity) A building envelope strategy using a positive drainage plane created immediately behind the exterior cladding material. Incidental water entering this system is allowed to drain to the exterior by way of flashings and membranes.

SBS (Styrene Butadiene Styrene) Modified Bitumens: Sheet membranes consisting of a bitumen base modified with SBS to provide improved flexibility, elasticity, and aging characteristics. Commonly used as roofing or deck membranes.

Scupper drain A type of drain passing through the vertical portion of roof curbs or balcony parapet walls.

Sheathing (See also Oriented Strand Board and plywood) Panel material used to provide structural stiffness to wall framing and to provide structural backing for the cladding and sheathing paper. Also includes exterior grades of gypsum board, and some rigid insulations.

Sheathing paper See **building paper** or **house-wrap**.

Strapping or furring The use of wood or metal strips to form a drainage cavity and to introduce a capillary break behind the cladding material.

UV Ultra-violet radiation that has a degrading effect on some membrane materials unless protected by an appropriate shielding layer such as flashings or gravels.