

BUILDING ENVELOPE EVALUATION
FOR
ROSEDALE GARDEN - 888 HAMILTON ST, VANCOUVER

Prepared for:
The Owners of Strata Plan LMS 740
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EXECUTIVE SUMMARY

Halsall Associates Limited was engaged in 2006 to conduct an exterior building envelope study for the Owners of Strata Plan LMS 740, 888 Hamilton Street, Vancouver, BC. The purpose of the building study was to conduct research about the buildings' envelope integrity and to prepare a report itemizing the deficiencies and maintenance recommendations that if implemented will assist to maximize the useful life of the envelope (walls, roofs, windows, balconies and terraces).

Multiple site visits were conducted during Jul'06 to Jul'07. Inspections were conducted on numerous building components including the high-rise roof and exterior walls, town house exterior walls, windows, balconies, and terraces. In suite interior reviews were also conducted.

It was determined that an active preventative maintenance program would enhance building durability and lifespan of the building envelope at Rosedale Garden. Specific building areas have been identified for maintenance. Maintenance items includes sealing (caulking) exterior walls and window joints, and roof repairs. The Strata has considered resealing all the wall and window areas, rather than just areas where work is presently required, while the contractor is on site in order to extend the period before maintenance work is required next.

An interior humidity control program should also be implemented. This program should be commenced through a test pilot program at three to four select suites to evaluate its effectiveness.

Halsall Associates in cooperation with the Strata Council and the Management Company is planning to initiate a phased maintenance program commencing fall'07. The maintenance initiative will include sealing wall and window joints, and improving interior air circulation. Additional maintenance work consisting of roof repairs and individual suite detail work will form the basis of maintenance work performed during the next twelve (12) month time period. It is expected that the maintenance work will assist to reduce humidity/condensation in indoor spaces. Resident participation will further assist to improve the quality of air circulation. Requests for Resident participation will be sought during the fall'07 time frame.

Table 1 : Repair Schedule

Phase No.	Description	Timing	Opinion of Cost (excluding GST)
1	Exterior sealing repairs at reported leaks	Fall 2007 to Summer 2008	\$120,000
2	Exterior sealing repairs at remaining areas	Fall 2007 to Fall 2009	\$330,000
3	Interior Humidity Control Test Pilot	2008	\$15,000
4	Interior Humidity Control General Program pending the results of Phase No. 3	2009	\$110,000



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1. KEY FINDINGS

1.1 General

- ▶ **General Condition:** *The building envelope is generally secure and sound with no uncommon damage considering the age, size and location.*
- ▶ **Deteriorated Concealed Components:** Condensate forming on the uninsulated window frames is causing damage to exposed components of the exterior walls (Refer to Photo 1). Localized water ingress through open joints in the window frames and joints in window walls may also be contributing to damage at isolated locations (Refer to Photo 2).
- ▶ **Indoor Air Quality:** We noted black staining on the interior drywall at several locations (Refer to Photo 3). We have not confirmed the presence or non-presence of mould as we are not specialists in mould detection. A specialist should be retained to confirm if air quality has been impacted.

1.2 Stucco Cladding

- ▶ **Evidence of Water Ingress:** The moisture content of the exterior gypsum sheathing behind the townhouse stucco walls is elevated as a result of condensation on window frames and possibly leakage through and around the perimeters of windows.

1.3 Granite Tile Cladding

- ▶ **Cracked Mortar Joints:** Mortar joints are cracked at some locations between granite tiles cladding the lower levels of the building and townhouses are cracked at some locations (Refer to Photo 4), potentially allowing water access to concealed moisture sensitive wall components such as steel studs and cement board fasteners. We did not open these wall areas to evaluate the extend of concealed damages, if it exists.

1.4 Acrylic Coated Concrete Cladding

- ▶ **Satisfactory Condition:** The concrete clad walls on the north, south and west elevations of the highrise building appear to be functioning as intended. Minor cracks in the concrete walls and acrylic coating, do not appear to be resulting in water ingress.
- ▶ **Damaged Vent Hoods:** Some vent hoods have impact damage, likely as a result of window washing activities (Refer to Photo 5).



1.5 EIFS Cladding

- ▶ *Satisfactory Condition:* The rainscreened EIFS cladding on the east elevation does not appear to be original to the building. We did not observe any obvious defects in the field of the wall areas.

1.6 Windows

- ▶ *Concealed Condensation:* The window frames are not insulated, allowing widespread condensation to form on the interior sides of the frames during cold weather (Refer to Photo 6). Condensate is allowing mildew to grow on the window frames and sills (Refer to Photo 7 and 8). Condensation that forms on parts of frames that are concealed within the wall is causing moisture damage to interior drywall.
- ▶ *Poor Thermal Performance:* The lack of insulated frames increases the heating and cooling requirements for suites and impacts occupant comfort.
- ▶ *Poor Water Management:* Open joints in window wall metal components and in rubber gaskets between glass and frames are contributing to water damage noted below corners of some windows (Refer to Photo 9 and 10). Water that is entering the window systems through these open joints is leaking into the building interior at some locations.

1.7 Caulking

- ▶ *Deteriorating and Failed Sealants:* Sealants around windows and vents, at EIFS joints, and at interfaces between window walls and concrete walls have aged beyond their effective service life (Refer to Photo 11) or have failed as a result of poor sealant profile or inadequate surface preparation (Refer to Photo 12).

1.8 Balconies

- ▶ *Lack of Membranes:* There are no waterproofing membranes installed on the top surface of the balcony slabs (Refer to Photo 13). Where reviewed, the top surface of balconies are either painted with an exterior grade paint or are covered with tile. Despite the lack of membrane, no leakage has been reported or observed. The lack of damage is likely the result of the shelter provided by balconies above.

1.9 Roofs and Terraces

- ▶ *Leakage Around Mechanical Room Doors:* There is evidence of leakage around the mechanical penthouse doors. The door frames are rusting at unsealed joints between the frames and the walls (Refer to Photo 14). The roofing membrane may also be locally failed near this location.



- ▶ *Poor Drainage at Terraces:* There is ponding at some terrace areas as a result of inadequate slope to drains (Refer to Photo 15).
- ▶ *Localized Debonding of Membrane:* The roof membrane is locally starting to debond from the slab, but general water ingress has not yet been reported and was not observed. The Strata should commence budgeting for replacement. Replacement will likely be required within the next 5-10 years.

1.10 Garage Intermediate Slab Structure

There are normal shrinkage cracks in the slab that do not impact its load carrying capacity. No obvious structural defects were observed.

2. RISK EVALUATION

Our evaluation of the risks associated with water ingress and condensation problems at the building are summarized as follows:

2.1 Steel Stud and Fastener Corrosion

Stucco, EIFS, Granite, window wall and punched window cladding is typically attached to the supporting steel studs by metal screws. Water ingress and condensation behind the cladding can cause studs and fasteners to corrode. The interior wall openings made as part of our review did not indicate that condensate forming at windows or leakage has caused significant fastener corrosion as of yet. Should the Strata at Rosedale Garden implement the proposed program of wall and window maintenance and humidity control, as discussed (refer to Table 1 in Executive Summary), corrosion of steel studs and fasteners should not become a cause for concern.

2.2 Structural Deterioration and Leakage at Balcony Slabs

The lack of waterproofing membrane on the top surface of balcony slabs allows rainwater to come into direct contact with the building structure. Rainwater can enter suites through joints between the balcony slabs and walls and through cracks in the concrete. Rainwater can also gain access to slab reinforcing through cracks in the slabs. This water can cause corrosion of the reinforcing and eventual structural damage to the building. We did not identify any structural damage or leakage related to water collecting on balconies. To maximize the life of the structure, the Strata should consider installing waterproofing membranes over the balconies. As this is not an immediate concern, and deemed a long term building improvement, budgeting for this repair has not been included in this report.



2.3 Ventilation and Humidity Control Management

Ventilation and humidity management is an important environmental consideration affecting indoor air quality and maintaining good condition of the building envelope. Air movement through suites will improve ventilation and reduce the potential for dampness, condensation, and possible mould growth (black wall/ceiling stains).

Condensation on window frames is caused by poorly ventilated living space(s) at Rosedale Garden. Airflow movement into suites through entry doors and, during extreme humidity events, through open windows improves space ventilation. Residents should be instructed to activate the humidistat when condensation forms on window frames. The end result is increased airflow and reduced condensation/dampness, which will assist to reduce condensation problems and the potential for mould growth.

3. REPAIR STRATEGY

A repair strategy for managing condensation and water ingress at the windows is presented here.

3.1 Maintain Wall and Window Seals and Control Suite Relative Humidity

Condensation on window frames, particularly at concealed locations where damage can go undetected, could probably be managed merely by reducing interior humidity. This could be completed by replacing occupant controlled humidistats with an automated system or providing residents with instructions on the use of humidistats. Further dehumidification could be provided by introducing dehumidification units into suites. Kitchen and bathroom fans would also need to be replaced where they are not operating adequately to provide sufficient suite ventilation. The risk of condensate formation could be further reduced by increasing the thermal mass of the window on its interior side. This could be done by installing a metal attachment to the interior side of the window frame. This metal attachment would act as a heat sink, increasing heat flow to the window frame and raising frame temperature above the condensation temperature. Insulating window perimeters may also reduce condensation.

Steps to control interior humidity would need to be coupled with sealing of open joints in the exterior face of the windows to limit the amount of rain water entering the assembly.



The success of this option will depend on the amount of humidity created by occupants and the effectiveness of suite fans at ventilating. We recommend that modifications be completed at 3 to 4 test locations first before a general program is adopted. This test program should include a monitoring system so window frame temperatures and interior temperature and relative humidity can be monitored. The test program should be set up on the north elevation where solar heat gain is minimized. Implementation of humidity improvement modifications could be completed one improvement at a time to tune the general control program.

3.2 Other Repairs

In addition to humidity control improvements, maintenance and repair work that should be completed includes:

- ▶ Localized repairs to the main roof near the mechanical room door;
- ▶ Improve slope to drains at terrace areas. This work could be most cost effectively completed when the terrace membrane requires replacement; and
- ▶ Stucco and tile repairs at townhouses.

4. OPINION OF COSTS

Our opinion of costs is contained in Appendix E. The costs are our opinion of value of the remedial work described in this report. They are calculated using quantities obtained during our evaluation and information we have obtained from similar projects. Actual costs will vary depending upon the time of tender, schedule of work and conditions under which the work must be carried out. Halsall has not investigated the presence of pollutants, contaminants and hazardous materials that may be encountered during the work. Depending on the materials present, additional funds may be required for remediation measures.

As every project has its own peculiarities, actual costs can only be established by obtaining bids, preferably on the basis of competitive tenders, from specialized contractors. The costs provided herein should only be used for comparison of options and general budgeting purposes.

5. CONCLUSIONS

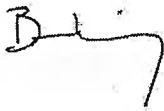
Control of suite humidity and a pro-active wall and window maintenance program are crucial to maximizing the life of the building envelope. A sealant repair program and a relative humidity control test pilot, followed by a general humidity control program should be carried out within the next year.



The Strata should budget for future periodic review and maintenance of wall and window sealants. This should be completed on 5 year intervals. Alternatively, replacement of all seals could be completed along with the sealant work required immediately in order to extend the next required review and reduce the risk of ongoing, unidentified leakage.

We trust this is the information that you require. Please feel free to call us at (604) 924-5575 with any questions.

Respectfully submitted,
HALSALL ASSOCIATES LIMITED



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APPENDIX A - OBSERVATION RECORD

1. SALIENT DATA

1.1 Building Description

GENERAL	
ADDRESS:	888 Hamilton Street, Vancouver
CONSTRUCTION DATE:	1991
GENERAL DESCRIPTION:	25 storey residential high-rise building with 6 two-storey townhouses. Structure is cast in place with post tensioned reinforcing
# OF UNITS:	168 (including townhouses)
WALLS	
CLADDING TYPES:	Granite Tile: main entrance, townhouses (1 st and 2 nd floors) Concrete with Acrylic Coating: North, west and south highrise walls Stucco: South elevations of townhouses Textured Concrete: vertical area running up centre of east Elevation (3 rd -25 th floors) EIFS: East elevation walls beyond textured concrete area apartment floors in between window and aluminum panel areas
TYPICAL GRANITE WALL SECTION (FROM EXTERIOR TO INTERIOR BASED ON ARCHITECTURAL DRAWINGS):	<ul style="list-style-type: none"> ▶ Granite tile ▶ Mortar skim coat ▶ 12mm cement board ▶ 150mm steel studs ▶ Batt insulation in stud space ▶ Polyethylene vapour retarder ▶ 12mm drywall
TYPICAL STUCCO WALL SECTION (FROM EXTERIOR TO INTERIOR BASED ON ARCHITECTURAL DRAWINGS):	<ul style="list-style-type: none"> ▶ Acrylic finish ▶ Stucco ▶ Metal Lath ▶ Building paper ▶ 12mm exterior sheathing ▶ 150mm steel studs ▶ Batt insulation in stud space ▶ Polyethylene vapour retarder ▶ 12mm drywall
DRAINED EIFS WALL SECTION (FROM EXTERIOR TO INTERIOR):	<ul style="list-style-type: none"> ▶ EIFS Lamina (unknown thickness) ▶ Expanded polystyrene insulation (unknown thickness) ▶ Drainage cavity (not confirmed) ▶ Moisture membrane (not confirmed) ▶ Glass fibre reinforced gypsum sheathing ▶ 150mm steel studs ▶ 12mm drywall



WINDOWS, DOORS AND SKYLIGHTS	
WINDOW TYPES:	<ul style="list-style-type: none"> ▶ Punched Windows: fixed and operable (casement style) windows ▶ Window walls: Fixed and Operable
WINDOW GLAZING:	<ul style="list-style-type: none"> ▶ Sealed insulated glazing units (IGU's) with aluminum spacers ▶ IGU's are installed from the exterior, with a rubber gasket seal between the exterior face of the IGU and frame ▶ Original IGU's stamped : IGMAC INFAC, Van, B.C., 1993 and Gmac Marzen Langley 1991
WINDOW FRAMING:	<ul style="list-style-type: none"> ▶ Pre-finished aluminum ▶ 2 drainage holes typical per window ▶ Window wall panes are drained at their base ▶ Punched and window walls have sub sill membrane flashings
ROOFING	
ROOF TYPES:	Protected Membrane
ROOF SECTION (FROM EXTERIOR TO INTERIOR):	<ul style="list-style-type: none"> ▶ Round river washed stone ballast, average depth: approx. 40mm ▶ Scrim Sheet ▶ 75mm extruded polystyrene insulation ▶ Liquid applied membrane ▶ Concrete slab
BALCONIES AND TERRACES	
BALCONY AND TERRACE TYPES:	<ul style="list-style-type: none"> ▶ Conventional reinforced concrete slabs
TYPICAL TERRACE SECTION (FROM TOP TO BOTTOM):	<ul style="list-style-type: none"> ▶ Paving Stones ▶ Filter cloth ▶ 75mm extruded polystyrene insulation ▶ Waterproofing membrane ▶ Concrete slab
BALCONY SECTION (FROM TOP TO BOTTOM):	<ul style="list-style-type: none"> ▶ Ceramic tile and mortar bed (at some locations) ▶ Concrete slab
GUARDRAIL SECTION	<ul style="list-style-type: none"> ▶ Aluminum guardrail with glass infill panels



1.2 Repair History

- ▶ The east elevation wall was replaced with a drained EIFS system in 2000 under the direction of McArthur Vantell Limited.
- ▶ There is evidence of targeted sealant replacement at vents and around windows.
- ▶ Vents modifications were completed in 2002 by Allstar Holdings.
- ▶ South wall caulking completed in 2002 by Allstar Holdings.
- ▶ Cracks in concrete and stucco were completed in 2002 by Allstar Holdings.

1.3 Previous Evaluations

- ▶ "Annual building envelope report, Strata VR1819 - Rosedale Garden - 888 Hamilton St., Vancouver, BC", prepared by Allstar Holdings, in 2002. This report was actually an inspection summary and recommended maintenance document.
- ▶ No evaluations regarding the cladding replacement were available.

1.4 Known Current Problems

The following problems have been reported by Management:

- ▶ On-going leaking at East mechanical penthouse door causing moderate water ponding inside of door.

2. VISUAL REVIEW

COMPONENT	OBSERVATIONS
WALLS	<p>Granite Tile</p> <ul style="list-style-type: none">▶ Generally there are cracks in the mortar between the tile leaving unsealed gaps.▶ Front entrance columns have some cracked and chipped tiles.▶ Sealant between tile and stucco interfaces are generally in good condition. <p>Stucco Walls</p> <ul style="list-style-type: none">▶ Stucco is generally continuous and crack free▶ South Elevation Townhouse wall (Unit 106) is stained from water notably under bay windows, at light fixtures and below roof flashings▶ Window sill flashings do not extend to the vertical face of walls <p>Concrete</p> <ul style="list-style-type: none">▶ Scuppers through balcony guards are typically not sealed to the wall and have moss growing on/in them.▶ The finish on the 6th floor east facing balcony at the north corner appears to have been patch repaired▶ Seals around vents are generally deteriorated there is water staining at the bottom corners of windows▶ There are cracks in acrylic coating at the top of north elevation and along entire height of West elevation



COMPONENT	OBSERVATIONS
	<ul style="list-style-type: none"> ▶ Many vents have been impact damaged ▶ Sealant between concrete and window frames is generally missing and/or deteriorated at South elevation <p>EIFS</p> <ul style="list-style-type: none"> ▶ EIFS is generally crack free ▶ Sealant between EIFS and concrete is dirty in locations, but generally flexible and well bonded ▶ There is a gap in the sealant between the EIFS and window sill flashing interface at most locations. <p>Window Wall Panels</p> <ul style="list-style-type: none"> ▶ East elevation, from 2nd storey terrace level, water staining of aluminum panels noted ▶ There are several open joints in the aluminum panels, particularly at faceted corners of windows sills ▶ Panels finish has faded ▶ Some vent hoods do not adequately cover vent holes in walls
WINDOWS AND DOORS	<p>Townhouses:</p> <ul style="list-style-type: none"> ▶ Water staining below window corners. ▶ Rubber gaskets have shrunk leaving gaps at corners. ▶ Unit 101: missing flashing over decorative concrete ledge. ▶ Unit 103: curved window wall aluminum framing discoloured. ▶ Unit 104: one ground level window and frame replaced and painted to match original. ▶ Unit 106: South windows have small flashing at window base on stucco ledge that does not extend past the ledge. ▶ Sill flashings are backsloped towards the building <p>Common Areas:</p> <ul style="list-style-type: none"> ▶ Flashings at 2nd floor common area windows are backsloped towards the building. ▶ Sheltered windows generally are not caulked. <p>Apartment Units:</p> <ul style="list-style-type: none"> ▶ Large gaps were observed at joints in window frames. ▶ Sills/flashings are generally properly sloped. ▶ Window sealants have a thin profile and are cracking at some locations. ▶ Sealants are generally not applied at window heads. ▶ Sealant dams at window corners are typically thin. ▶ Rubber gaskets have shrunk leaving gaps at window corners. ▶ Concrete walls are stained below punched windows, indicating flashing drips do not sufficiently direct water away from the building.



COMPONENT	OBSERVATIONS
ROOFS	<ul style="list-style-type: none">▸ Parapet and wall counter flashings are fastened with unsealed screws. Sealed with 25mm wide fillet bead of sealant. There are some poorly sealed areas. In general, sealant profile is thin.▸ There are gaps between concrete parapets and scuppers.▸ Drains clear of debris, no ponding, or excessively wet areas noted▸ Parapet walls are generally water stained and supporting algae growth.▸ Mechanical penthouse walls are counter flashed except at doorways.▸ Flashings do not extend above the stone ballast▸ Sealant failed around penthouse and door. Penthouse door frames are rusting.▸ Interior of South mechanical penthouse door show signs of water ingress▸ Flashing under east door step pulled away leaving 25mm gap▸ Fasteners holding the stucco to metal deck at free standing walls are corroding▸ The base of steel posts supporting free standing walls are sealed with a self-adhering membrane to the roof membrane.▸ Concrete block wall with mounted hydrant is not flashed at bottom▸ Area of heavy sealant at corner between concrete block and wall▸ There are areas where the ballast and scrim sheet is wind washed, exposing the roof insulation.
BALCONIES AND TERRACES	<ul style="list-style-type: none">▸ Balcony floors do not have a waterproofing membrane on top of the concrete slab. Individual unit owners have applied different toppings to the slab, including carpet, paint, and tiles. The sealant condition is better at the balconies.▸ Some balcony scuppers have filled with moss



3. INDIVIDUAL SUITE REVIEWS

SUITE NO.	OBSERVATIONS
GENERAL COMMENTS	<ul style="list-style-type: none"> ► Butyl tape has generally been squeezed out of the interior joint between the window frame and IGU. ► Aluminum frame with condensation track (not thermally broken). ► Window frames have been installed with a sub-sill back dam angle. ► Drainage holes are drilled in condensation tracks to allow flow to the outside ► There was considerable condensation on window frames at the time of our visits. ► In general , window sills were moisture damaged.
HIGHRISE SUITE No. 2404	<p>RH = 33 %, TEMPERATURE = 19.2 °C (Occupant recently started using humidistat)</p> <p>Den:</p> <ul style="list-style-type: none"> ► Mildew at base of window frame ► Drywall damage below window ► Drafts at windows <p>Bathroom:</p> <ul style="list-style-type: none"> ► Fan operation weak in bathroom <p>Kitchen and Computer Room:</p> <ul style="list-style-type: none"> ► Water staining below window.
HIGHRISE SUITE No. 2403	<p>RH = 33%, TEMPERATURE = 19 °C (Occupant recently started using humidistat)</p> <p>Living Room:</p> <ul style="list-style-type: none"> ► There was no significant damage at living room walls but some mildew had formed in condensation track ► Operable windows do not have weatherstripping but drafts were not detected during our visit <p>Bedroom:</p> <ul style="list-style-type: none"> ► Mildew at base of window frame <p>Bathroom:</p> <ul style="list-style-type: none"> ► Fan operation weak in bathroom <p>Kitchen:</p> <ul style="list-style-type: none"> ► Fan operation acceptable



HIGHRISE SUITE No. 2305	RH = 31%, TEMPERATURE = 18.1 °C Living Room: <ul style="list-style-type: none">▸ Minor condensation damage at window sill. Large gap in spandrel panel above living room window▸ Open joint at living room spandrel and balcony interface there is moderate damage to window sill below this area.▸ Spandrel base is sloped and drained Bedroom: <ul style="list-style-type: none">▸ Condensation damage at sill of bedroom window▸ Staining on drywall at base of bedroom window jamb Bathroom: <ul style="list-style-type: none">▸ Bathroom fan is not ventilating adequately. Kitchen: <ul style="list-style-type: none">▸ Fan is good▸ Draft between balcony door and window frame
HIGHRISE SUITE No. 2104	RH = 31%, TEMPERATURE = 18.6 °C No damage around windows in den, kitchen, livingroom Bedroom: <ul style="list-style-type: none">▸ Some damage at bedroom window outside corner (minor) Bathroom: <ul style="list-style-type: none">▸ Bathroom fan not working Kitchen: <ul style="list-style-type: none">▸ Kitchen fan operating acceptably



HIGHRISE SUITE No. 1706	RH = 30%, TEMPERATURE = 18.5 °C Living Room: <ul style="list-style-type: none">▶ Hardwood floors buckling beside window wall.▶ Drywall moisture damaged below outside corner of living room window▶ Unsealed joints at sill flashing outside damaged living room area (Metal Spandrel below window) Bedroom: <ul style="list-style-type: none">▶ Minor condensation damage below bedroom window. Mildew in drainage tracks.▶ Bedroom condensation track filled with water. Drainage holes are not provided in condensation track. Bathroom: <ul style="list-style-type: none">▶ Fan operates poorly Kitchen: <ul style="list-style-type: none">▶ Fan operates well
HIGHRISE SUITE No. 1301	RH = 37%, TEMPERATURE = 21°C Living Room: <ul style="list-style-type: none">▶ Ceiling at mid span of window had water damage but was recently painted.▶ The metal spandrel above had no obvious defects.▶ No sill damage noted (was recently painted).▶ 1 cm open gap in gasket at jamb/sill interface. Master Bedroom: <ul style="list-style-type: none">▶ Same as second bedroom▶ Window condensation tracks drain well 2nd Bedroom: <ul style="list-style-type: none">▶ Severe condensation on window frame▶ damage to newly painted drywall and wood sill Bathroom: <ul style="list-style-type: none">▶ Fan operates poorly Kitchen: <ul style="list-style-type: none">▶ Fan operates well



HIGHRISE SUITE No. 1203	RH = 33%, TEMPERATURE = 21.8 °C Living Room: <ul style="list-style-type: none">▸ Condensation damage at base of windows. Mildew on frames.▸ Some drywall damage at outside corner of window wall. Master Bedroom and 2nd Bedroom: <ul style="list-style-type: none">▸ Condensation damage at base of windows. Mildew on frames.▸ Some drywall damage at outside corner of window wall Bathroom: <ul style="list-style-type: none">▸ Fan operates poorly Kitchen: <ul style="list-style-type: none">▸ Fan operates well
HIGHRISE SUITE No. 805	RH = 34%, TEMPERATURE = 23.1°C Living Room: <ul style="list-style-type: none">▸ Condensation tracks cleaned once a week but still some mildew present. There was a considerable amount of condensation on the window. Bedroom: <ul style="list-style-type: none">▸ Condensation track does not have drainage holes and is full of water▸ Owner stated that sill gets very wet when raining Bathroom: <ul style="list-style-type: none">▸ Fan operates poorly Kitchen: <ul style="list-style-type: none">▸ Fan operates well



HIGHRISE SUITE No. 705	RH = 36%, TEMPERATURE = 24.6°C Living Room: <ul style="list-style-type: none">▸ Severe condensation on frame▸ Window sill damaged▸ Owner just showered at time of visit. Condensation on IGU's Bedroom: <ul style="list-style-type: none">▸ Severe condensation on frame▸ Window sill damaged Bathroom: <ul style="list-style-type: none">▸ Fan operates poorly Kitchen: <ul style="list-style-type: none">▸ Fan operates well
HIGHRISE SUITE No. 605	RH = 30%, TEMPERATURE = 24.7 °C Living Room: <ul style="list-style-type: none">▸ Severe mildew growth and condensation in tracks Bedroom: <ul style="list-style-type: none">▸ Severe mildew growth and condensation in tracks Bathroom: <ul style="list-style-type: none">▸ Fan operates poorly Kitchen: <ul style="list-style-type: none">▸ Fan operates well
HIGHRISE SUITE No. 508	RH = 36%, TEMPERATURE = 24.3°C Living Room: <ul style="list-style-type: none">▸ Severe condensation at window sill Bedroom: <ul style="list-style-type: none">▸ Severe condensation at window sill Bathroom: <ul style="list-style-type: none">▸ Fan does not work



HIGHRISE SUITE No. 305	RH = 34%, TEMPERATURE = 24°C Living room: ‣ Severe condensation at sill Bedroom: ‣ Severe condensation at sill Bathroom: ‣ Fan operates poorly Kitchen: ‣ Fan operates well
HIGHRISE SUITE No. 302	RH = 35%, TEMPERATURE = 23°C Living Room: ‣ Severe condensation on sill ‣ Some drywall damage below outside corner of window in living room ‣ Electric heater rusted from condensation dripping from living room window sill Bedroom: ‣ Severe condensation on sill ‣ Bedroom slider has condensation at sill Bathroom: ‣ Fan operates poorly Kitchen: ‣ Fan operates well
HIGHRISE SUITE No. 204	RH = 32%, TEMPERATURE = 21.8°C Bedroom: ‣ Condensation at sill of window Living Room: ‣ Condensation at sill of window ‣ Drywall damage at base of living room wall below corner of window Bathroom: ‣ Fan operates poorly Kitchen: ‣ Fan operates well



4. EXPLORATORY OPENINGS**4.1 Exterior Roof Openings**

LOCATION	CONSTRUCTION (EXTERIOR TO INTERIOR)	OBSERVATIONS
ROOF, EAST SIDE OF MECHANICAL PENTHOUSE AT DOOR.	<ul style="list-style-type: none"> ▶ round river washed stone ballast, average depth: approx. 40mm ▶ scrim sheet ▶ 75mm polystyrene insulation ▶ liquid applied membrane ▶ concrete slab 	<ul style="list-style-type: none"> ▶ Some pooling water at membrane ▶ No visible cracks or punctures in membrane
ROOF, WEST SIDE OF MECHANICAL PENTHOUSE AT POST.	<ul style="list-style-type: none"> ▶ round river washed stone ballast, average depth: approx. 40mm ▶ scrim sheet ▶ 75mm polystyrene insulation ▶ liquid applied membrane ▶ concrete slab 	<ul style="list-style-type: none"> ▶ Waterproofing membrane poorly bonded, bubbled areas ▶ Some pooling over membrane ▶ No visible cracks or punctures in membrane

4.2 Wall Openings

LOCATION	CONSTRUCTION (EXTERIOR TO INTERIOR)	OBSERVATIONS
HIGHRISE SUITE 1201 - BELOW BOTTOM CORNER OF SECOND BEDROOM WINDOW, EAST ELEVATION	<ul style="list-style-type: none"> ▶ drained EIFS cladding ▶ glass fibre backed gypsum sheathing ▶ light gauge metal studs with glass fibre batt insulation ▶ polyethylene vapour barrier ▶ painted interior drywall 	<ul style="list-style-type: none"> ▶ Severe condensation on window ▶ Drywall damage and mould at base of wall and at sill ▶ There is a sub-sill pan flashing below punched window ▶ There was condensation on concealed metal components at sill of window. ▶ No stud corrosion or exterior sheathing damage



LOCATION	CONSTRUCTION (EXTERIOR TO INTERIOR)	OBSERVATIONS
HIGHRISE SUITE 1201 - BELOW BOTTOM CORNER OF MASTER BEDROOM, EAST ELEVATION	<ul style="list-style-type: none"> ▶ drained EIFS cladding ▶ glass fibre backed gypsum sheathing ▶ light gauge metal studs with glass fibre batt insulation ▶ polyethylene vapour barrier ▶ painted interior drywall 	<ul style="list-style-type: none"> ▶ Severe condensation on window frames ▶ Drywall damage and mould at base of wall and at sill ▶ Peel and stick membrane below window (window wall) ▶ No stud corrosion or exterior sheathing damage
HIGHRISE SUITE 704 - BELOW BOTTOM CORNER OF MASTER BEDROOM WINDOW, WEST ELEVATION	<ul style="list-style-type: none"> ▶ acrylic coating ▶ concrete wall ▶ light gauge metal studs with glass fibre batt insulation ▶ polyethylene vapour barrier ▶ painted interior drywall 	<ul style="list-style-type: none"> ▶ Some condensation on window frames with finish cracking at sill corners ▶ No stud corrosion or cracks in concrete
HIGHRISE SUITE 1604 - BELOW BOTTOM CORNER OF KITCHEN WINDOW, NORTH ELEVATION	<ul style="list-style-type: none"> ▶ acrylic coating ▶ concrete wall ▶ light gauge metal studs with glass fibre batt insulation ▶ polyethylene vapour barrier ▶ painted interior drywall 	<ul style="list-style-type: none"> ▶ No stud corrosion or cracks in concrete
HIGHRISE SUITE 1604 - BELOW BOTTOM CORNER OF LIVING ROOM WINDOW, WEST ELEVATION	<ul style="list-style-type: none"> ▶ acrylic coating ▶ concrete wall ▶ light gauge metal studs with glass fibre batt insulation ▶ polyethylene vapour barrier ▶ painted interior drywall 	<ul style="list-style-type: none"> ▶ Some finish cracking at sill corner ▶ No stud corrosion or cracks in concrete
SUITE 106 (TOWNHOUSE) - BELOW BOTTOM CORNER OF DINING ROOM BAY WINDOW, SOUTH ELEVATION	<ul style="list-style-type: none"> ▶ stucco cladding ▶ spunbonded polyolefin sheet ▶ glass fibre backed gypsum sheathing ▶ light gauge metal studs with glass fibre batt insulation ▶ polyethylene vapour barrier ▶ painted interior drywall 	<ul style="list-style-type: none"> ▶ No stud corrosion ▶ No structurally significant corrosion noted on stucco fasteners ▶ Exterior gypsum was moist with a crumbling, saturated consistency




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ENGINEERS • CONSULTANTS

BUILDING ENVELOPE EVALUATION - RESIDENT QUESTIONNAIRE SUMMARY
Project: Rosedale Garden
Project No.: 207vR007A
Client: Century 21

Date: April 23/07
Returned questionnaires: 92
Total Number of Suites: 168

Question:	Suites Reporting Yes			Number of Suites			% of Total		
	Living Room	Bedroom	Other	Living Room	Bedroom	Other	Living Room	Bedroom	Other
1. Do you have any problems with leakage that only appears during or following rain storms?	204, 302, 705, 805, 807, 1004, 1006, 1301, 1706, 2305, 2406	302, 705, 805, 908, 1004, 1301, 1706, 2104, 2405, 2406	1301	11	10	1	12%	11%	1%
1.1 On Floor Beneath Window	204, 705, 805, 807, 1301, 1706	705, 1301, 1706, 2104		6	4	0	7%	4%	0%
1.2 On Floor Remote From Window	1301, 1706	1301, 1706		2	2	0	2%	2%	0%
1.3 At Ceiling/top of Window	807, 1301, 2305	1301, 908		3	2	0	3%	2%	0%
1.4 At Side of Window	805, 807, 1004, 1006, 1301, 1706, 2406	805, 1004, 1201, 1301, 1706, 2406		7	6	0	8%	7%	0%
1.5 Other location?	805, 205, 302	805, 302, 2405	1301	3	3	1	3%	3%	1%

2. Do you have leakage or condensation problems that only appear in the winter time? Identify the specific locations where this is a problem below:	204, 302, 305, 505, 507, 508, 605, 606, 703, 705, 802, 805, 807, 907, 1001, 1004, 1006, 1008, 1108, 1201, 1203, 1206, 1301, 1302, 1706, 2006, 2106, 2305	204, 302, 305, 306, 505, 508, 605, 703, 705, 805, 904, 1004, 1006, 1008, 1108, 1201, 1203, 1206, 1301, 1302, 1304, 1706, 2006, 2104	204, 306, 508, 606, 703, 1008, 1304, 2003, 2006	28	24	9	30%	26%	10%
2.1 Beside Window	508, 605, 606, 705, 805, 807, 907, 1301, 1706	508, 605, 705, 805, 904, 1301, 1706	508, 606	9	7	2	10%	8%	2%
2.2 At Ceiling	507, 508, 705, 1301, 2305	508, 705, 1301	508	5	3	1	5%	3%	1%
2.3 At window Sill	302, 305, 504, 505, 508, 605, 606, 703, 705, 802, 805, 807, 1001, 1004, 1006, 1008, 1108, 1201, 1203, 1206,	302, 305, 306, 504, 505, 508, 605, 606, 608, 703, 705, 805, 1004, 1006, 1008, 1108, 1201, 1203, 1206, 1301, 1302, 1304, 1706, 2006, 2104	306, 508, 606, 703, 1008, 1304, 2003, 2006	25	25	8	27%	27%	9%
3. Do you have any severe finish damage at windows? (Blistering, Deteriorated Paint, Drywall or Wallpaper)	204, 302, 505, 507, 508, 605, 606, 705, 805, 908, 1008, 1203, 1301, 1302, 1602, 2006, 2305	302, 505, 508, 605, 606, 705, 708, 805, 904, 1008, 1301, 1602, 2006, 2106	203, 204, 606, 1008, 1201, 1506	16	14	6	17%	15%	7%

3.1 Beside Window	204, 508, 605, 606, 705, 805, 1203, 1301, 2305	508, 605, 606, 705, 805, 904, 1301	204, 606, 1201	9	7	3	10%	8%	3%
3.2 At Ceiling	507, 705, 1301, 1302, 2305	705	1301	5	1	1	5%	1%	1%
3.3 At window Sill	204, 302, 505, 508, 605, 606, 705, 805, 908, 1008, 1301, 1602, 2006	302, 505, 508, 605, 606, 705, 708, 805, 1008, 1301, 1602, 2006, 2106	203, 204, 606, 1008, 1201	13	13	5	14%	14%	5%
4. Failed Sealed Window Units:	705	106, 705		1	2	0	1%	2%	0%
4.1 Do you have any fixed, sealed double glazed window units with moisture trapped between the panes of glass?	204, 605, 705, 1001	605, 705	204	4	2	1	4%	2%	1%
4.2 Do you have any significant difficulties opening sliding windows?	306, 605, 1203, 1903, 2202, 2303	103, 106, 605, 801, 2202	306, 1204, 1903, 2202	6	5	4	7%	5%	4%
4.3 Are there any sliding windows that cannot be removed for cleaning?	n/a	n/a	n/a	0	0	0	0%	0%	0%

COMMENTS:

Question 1: Suite 204: 1.1 - Current. 1.5 - Every time it rains, the carpet gets very wet beneath the left window in the living room; Suite 206: 1.5 - Guest bedroom has condensation in the window frame; Suite 302: 1.5 - Bottom of windows Jan 2007; Suite 608: 1.5 - Kitchen; Suite 805: Ongoing, every time it rains and thereafter. 1.5 - Along window sill and within window frame; Suite 908: Now; Suite 1201: 1.4 - Dec 2006; Suite 1301: Current. 1.1 - Current. 1.2 - Current. 1.3 - Current. 1.4 - Current. 1.5 - Balcony ceiling, current; Suite 1706: November 2006. 1.1 - Rain storm last October 2006 and November 2006. 1.4 - Rainy day Oct 2006. 1.5 - Balcony door; Suite 1804: Approx 2003; Suite 2305: Ongoing; Suite 2405: We only moved in on December 30th; Suite 2406: 1.4 - January 2007.

Question 2: Suite 203: 3.3 - Near sliding glass door in kitchen on the window sill; Suite 204: 2.1 - This is a problem year round; Suite 302: 2.3 - January 2007; Suite 305: 2.3 - January 18th; Suite 306: January 2007; Suite 505: Every winter.; Suite 508: 2.1 - Daily, bad problem. 2.2 - Daily, bad problem. 2.3 - Daily, bad problem; Suite 606: 2.1 - During winter '07. 2.3 - During winter '07; Suite 703: 2.1 - Down windows. 2.2 - Down windows. 2.3 - Whole window Dec/Jan 2006/2007; Suite 705: Occurring every year.; Suite 805: Ongoing every time it rains and thereafter; Suite 907: All the time.; Suite 1001: One window has, inside the glass panes, about 1/2 inch of water that has built up from condensation; Suite 1008: 2.3 - This month; Suite 1108: All winter long and quite a lot. 2.3 - All winter long; Suite 1201: Winter; Suite 1301: Current. 2.1 - Current. 2.2 - Current. 2.3 - Current; Suite 1304: Bathroom (Shower) Kitchen, often when cooking. 2.3 - Bathroom (Shower) Kitchen, often when cooking; Suite 1706: Rainy day and windstorm rainy day. 2.1 - October 2006. 2.3 - October 2006; Suite 1804: Approximately 2003; Suite 2003: November/December 2006 and January 2007. 2.3 - 2nd bedroom Has condensation on window frames and in window sill; Suite 2006: Kitchen (less frequent). When it is cold outside. 2.3 - on surrounding metal frames; Suite 2305: Ongoing.

Question 3: Suite 203: Near sliding glass door in kitchen.; Suite 302: Minor finish damage in window sill in bedroom.; Suite 505: Minor cracking of paint on window sills.; Suite 508: 3.1 - Daily. 3.2 - Daily. 3.3 - Daily; Suite 1301: Current. 3.1 - Current. 3.2 - Current. 3.3 - Current.

Question 4: Suite 103: Sliding door off bedroom very difficult.; Suite 106: Patio door. Suite 403: 4.1 - There is a funny pattern that shows in what appears to be the space between the panes. No water though. Solarium window closes frame but one handle to close is completely missing; Suite 504: Constant draft, difficult to keep heat steady in apartment; Suite 1201: 4.2 - Balcony door.

Additional Comments: Suite 106: There is a crack in stucco on upstairs patio; Suite 203: Hardwood floor buckles and is damp in places after the flood (burst pipe on the sixth floor); Suite 204: Water not draining outside of the window on small balcony when it rains and water is rising in this area; Suite 305: The only problem for me is condensation that forms on the metal window frames and that ends up pooling along the window still. It's possible there could be a leakage along the bottom of the window but it's hard to tell if it's an actual leak or just condensation; Suite 306: Cracked window in living room before move in, check lease; Suite 508: Condensation collects and stains wooden floors; Suite 605: The main window in the living room and bedrooms are both very drafty and cold. Both windows don't shut properly; Suite 606: Broken handgrips on windows in bedroom, kitchen and living room. Mould spots growing on bathroom ceiling. Lots of condensation/water gathers in the window sills, literally drips; Suite 608: Moisture on surface of window frame; Suite 703: Cold, a cold breeze comes in from all the windows; Suite 805: I have been very concerned about finding what appears to be mould spores in and along my window sills (and metal tracks). Also, I have to keep everything and anything from coming in to contact with my window ledges and sills or else they become immediately soaked with water; Suite 807: No big window leaks; Suite 808: Had problem prior to 2000, not since restoration of East wall; Suite 908: Window handles; Suite 1201: We have mould around the bedroom windows, as well as the living room; Suite 1202: One of the windows in the bedroom has a handle missing; Suite 1302: Marks on ceiling in the living room near the large window.; Suite 1506: Seal leaked out between the steel window frame and the window glass (inside glass) in some areas of living room and bedroom windows. Deteriorated paint on window sill caused from the leakage; Suite 1706: Condensation, musty odors; Suite 1802: When the dryer is running water drips out of the exhaust fan on the patio; Suite 2006: Yes. When it is cold outside, water condenses in our dryer vent and runs through the 2nd bedroom windows and down the metal frame. We advised Rada of the problem and he arranged to have the vents cleaned a second time. This fixed the problem temporarily but when it snowed in Vancouver (and while it was very cold) the problem returned and we avoided using our dryer. We are looking into whether adding a booster or changing the dryer would solve the problem permanently; Suite 2101: Some windows and door to balcony let in draft when really windy; Suite 2304: Handles for window closure are broken. Ceiling stucco is cracked in 3 places, 2 in master bedroom and 1 in the dining/living room area; Suite 2305: Only one problem, I have one leak. I have only 6 feet of East wall and that is where the problem is.

APPENDIX C - MOISTURE PROBE TEST RESULTS

MOISTURE TESTER INFORMATION	
<i>Manufacturer:</i>	Delmhorst
<i>Model:</i>	BD-2100 (Digital)
<i>Material Tested:</i>	Gypsum Sheathing
<i>Scale Used:</i>	Gypsum

1. Categorizing Reading Locations

When completing a moisture probe survey, it is important to consider the condition and exposure of the cladding at the test locations. In order to properly evaluate the performance of a wall assembly, readings should be taken both at and away from defects, and in both sheltered and exposed areas.

To allow for meaningful comparison of test results, the moisture probe locations have been categorized as follows:

CATEGORY	APPARENT CLADDING CONDITION		CLADDING EXPOSURE	
	AWAY FROM VISIBLE DEFECTS	AT OR ADJACENT VISIBLE DEFECT	SHELTERED	EXPOSED
A	✓		✓	
B	✓			✓
C		✓	✓	
D		✓		✓

Sheltered areas are defined as those areas where elements (such as roofs or canopies) overhang the cladding so as to protect it from wetting during non-wind driven rainfalls.

Exposed areas are defined as those areas where the cladding is either unprotected or relies on small drip edges such that wetting occurs more frequently.

2. Interpreting Moisture Readings

Moisture probe readings are used to identify instantaneous moisture contents in building materials. These provide an indication of the exterior cladding performance at the time of testing. Moisture contents can change with variations in the interior and exterior environmental conditions to which the cladding is exposed.

Moisture contents in gypsum sheathing are interpreted as follows:



MOISTURE CONTENT	CLASSIFICATION	COMMENTS
0% to 0.5%	Dry	Unlikely to support deterioration.
0.5% to 1.0%	Borderline	Result not certain. Increasing risk that deterioration may be supported.
Greater than 1.0%	Wet	Deterioration of the paper facing, softening of the gypsum core and/or mould/fungal growth is expected to occur.

Moisture contents in wood sheathing are interpreted as follows:

MOISTURE CONTENT	CLASSIFICATION	COMMENTS
Less than 19%	Dry	Unlikely to support deterioration. Wood considered immune to fungal growth
19 to 28%	Borderline	Result not certain. Increasing risk that deterioration may be supported. Fungal growth sustained, but not germination.
29 to 50%	Wet	Enough moisture to initiate wood decay and mould growth. Decay fungi will germinate and flourish.
Greater than 50%	Saturated	High risk that deterioration of the wood has or is about to occur.

3. Environmental Conditions

The conditions at the time of testing were as follows:

ENVIRONMENTAL CONDITIONS	
<i>Date of Testing:</i>	November 23, 2006
<i>Weather During Testing:</i>	Cloudy and Rain
<i>Temperature:</i>	5°C
<i>Last Rainfall:</i>	Rain was last experienced on November 22, 2006 (moderate severity)

In the Lower Mainland, moisture probe surveys are typically best performed between November and April when there is ample wetting and limited drying cycles. Surveys performed outside this period can be misleading with respect to the amount of concealed wetting that is occurring.



4. Moisture Probe Test Results

The exterior cladding was drilled at a total of 5 locations to allow the moisture content of the sheathing to be checked. The results were as follows:

READING #	BUILDING ELEVATION	LOCATION	CATEGORY	READING	COMMENTS
MP1	South Elevation, Main Floor Patio	Approximately 0.2 m below West Bay Window Facing South-West	B	0.6%	Minimally protected by window sill above, in area of moderate water run-off
MP2	South Elevation, Main Floor Patio	Approximately 0.2 m below West Bay Window Facing South	B	1.2%	Fully Protected by Entrance Canopy.
MP3	South Elevation, Main Floor Patio	East Bay Window, facing South - West, Approximately 0.5 m Below Sill	B	0.8%	Window sill and caulking in poor condition around
MP4	South Elevation, Main Floor Patio	Approximately 0.5 m East of kitchen window	B	1.3%	In area of moderate staining
MP 5	South Elevation, East of Curved Window Wall	Approximately 1.2 m above the main floor patio	B	3.1%	Completely exposed

*NB: At time of moisture probes, heavy rain conditions persisted. While appropriate actions were taken to ensure the moisture probe readings were accurate, it is possible that the wet weather has skewed the recorded results.



5. Summary of Test Results

CATEGORY	# OF READINGS	AVERAGE READING	MOISTURE CONTENT					
			0% TO 0.5%		0.5% TO 1%		> 1%	
			#	%	#	%	#	%
A	5	1.4%	0	0%	2	40%	3	60%
B	0	0%	0	0%	0	0%	0	0%
C	0	0%	0	0%	0	0%	0	0%
D	0	0%	0	0%	0	0%	0	0%
TOTALS/ AVERAGES	5	1.4%	0	0%	2	40%	3	60%



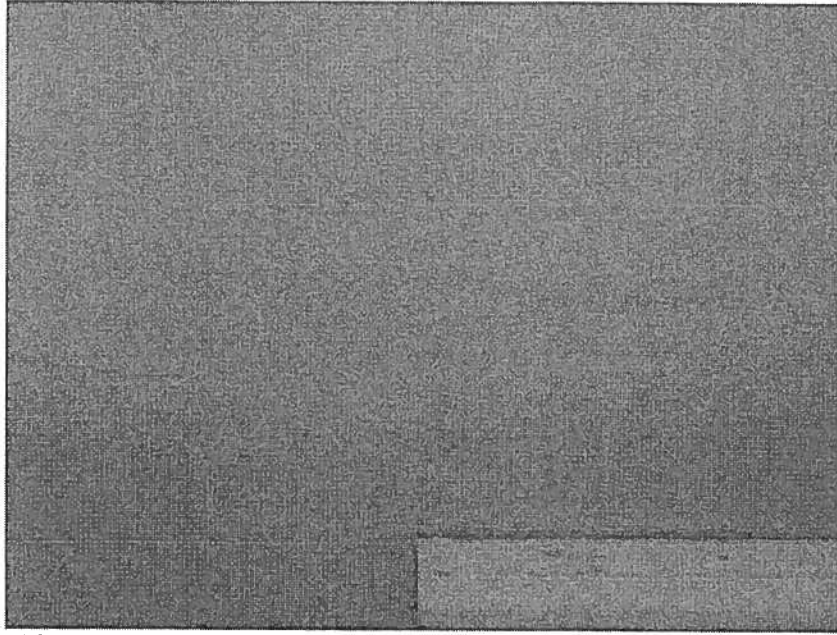


Photo 1: Suite 2404: Bubbling of interior paint below a windowsill, indicative of moisture damage to interior gypsum drywall.

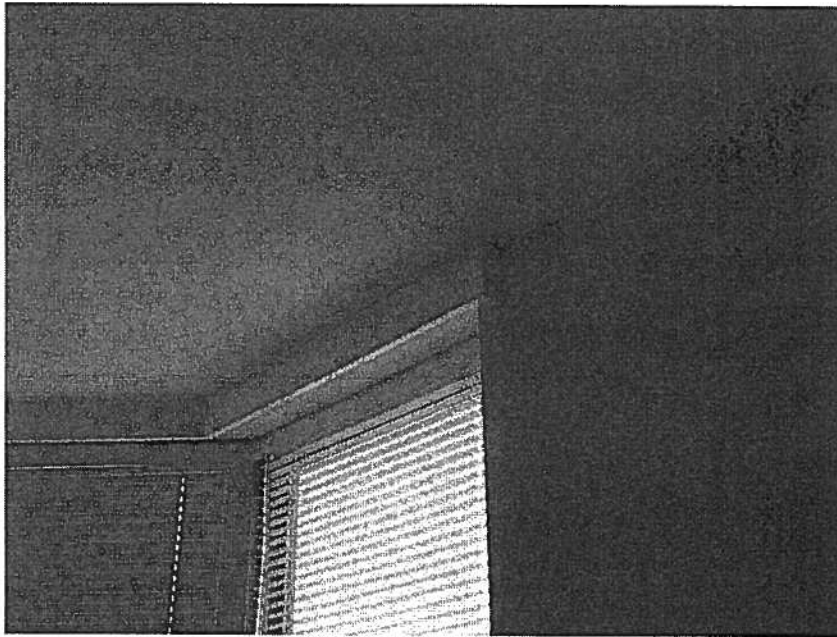


Photo 2: Ceiling water staining at Suite 2305. There is an open joint in the exterior of the window wall above this location allowing water ingress.



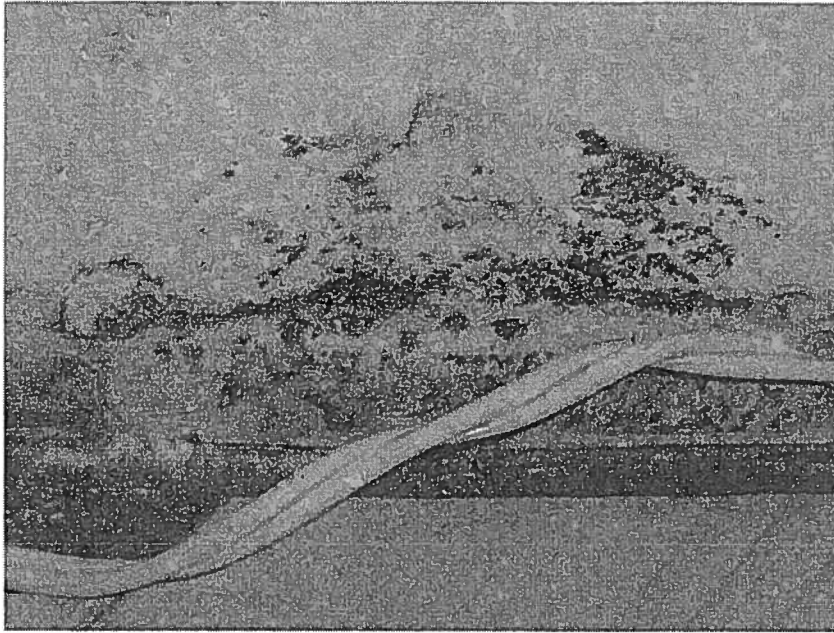


Photo 3: Suite 1201: Black mould like staining on interior drywall below a window.





Photo 4: Typical cracked mortar joint in tile clad walls at townhouses.

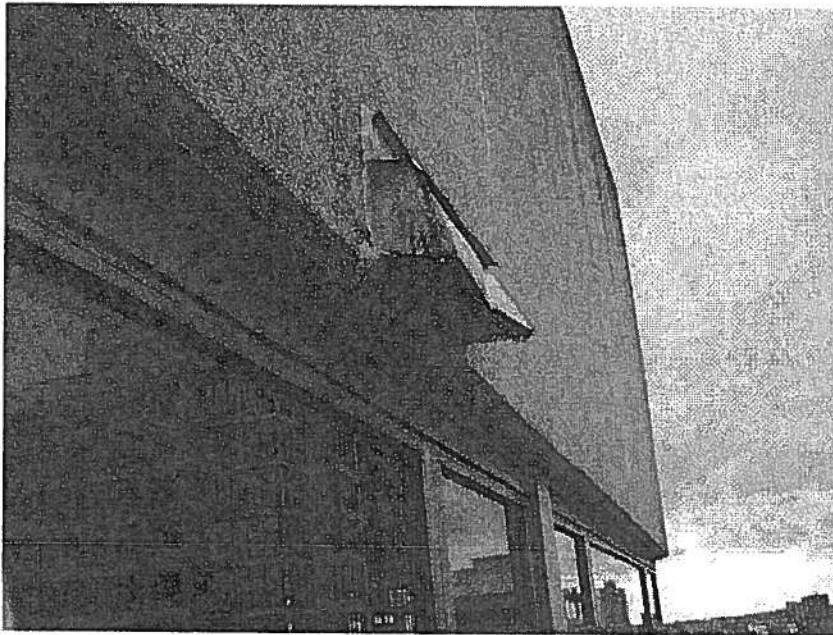


Photo 5: Impact damage to some vent hoods.

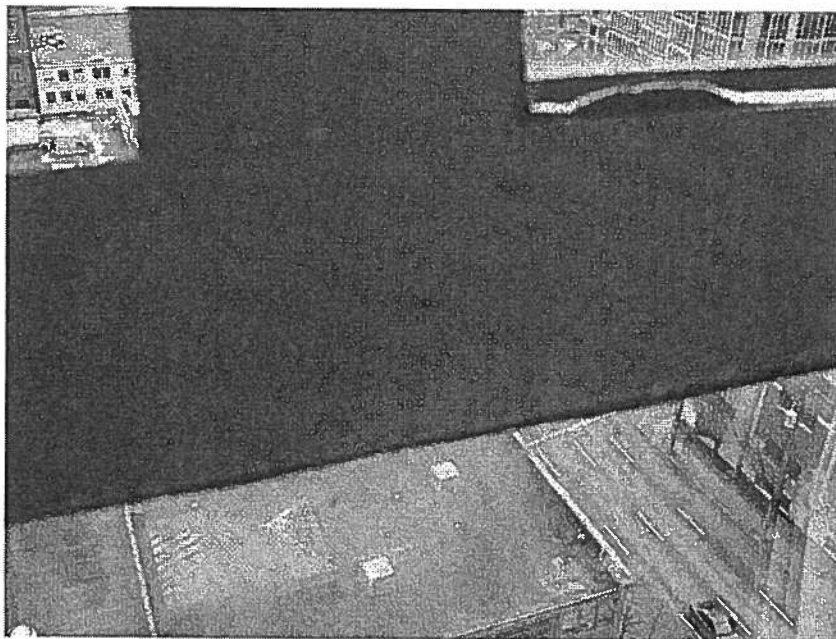


Photo 6: Most windows have condensation on frames.

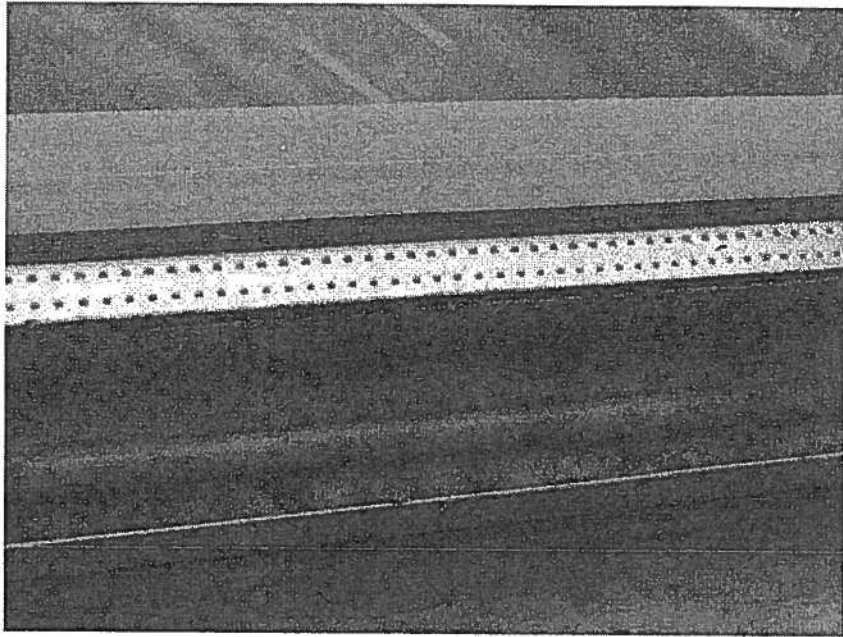


Photo 7: Typical mildew growth in the condensation track of most windows reviewed.



Photo 8: Black staining and water damage common at many windowsills.





Photo 9: Open joints in the window wall allow excessive amounts of water into the system.

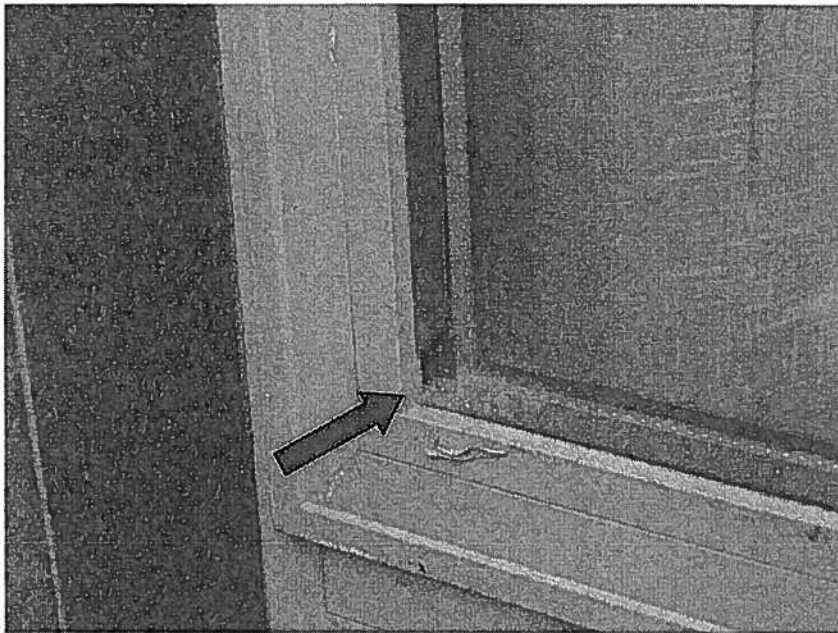


Photo 10: Typical open joint in rubber gasket allows excessive water into window assembly.



Photo 11: Sealant has typically aged beyond its effective service life. Sealant is split, potentially allowing water ingress.



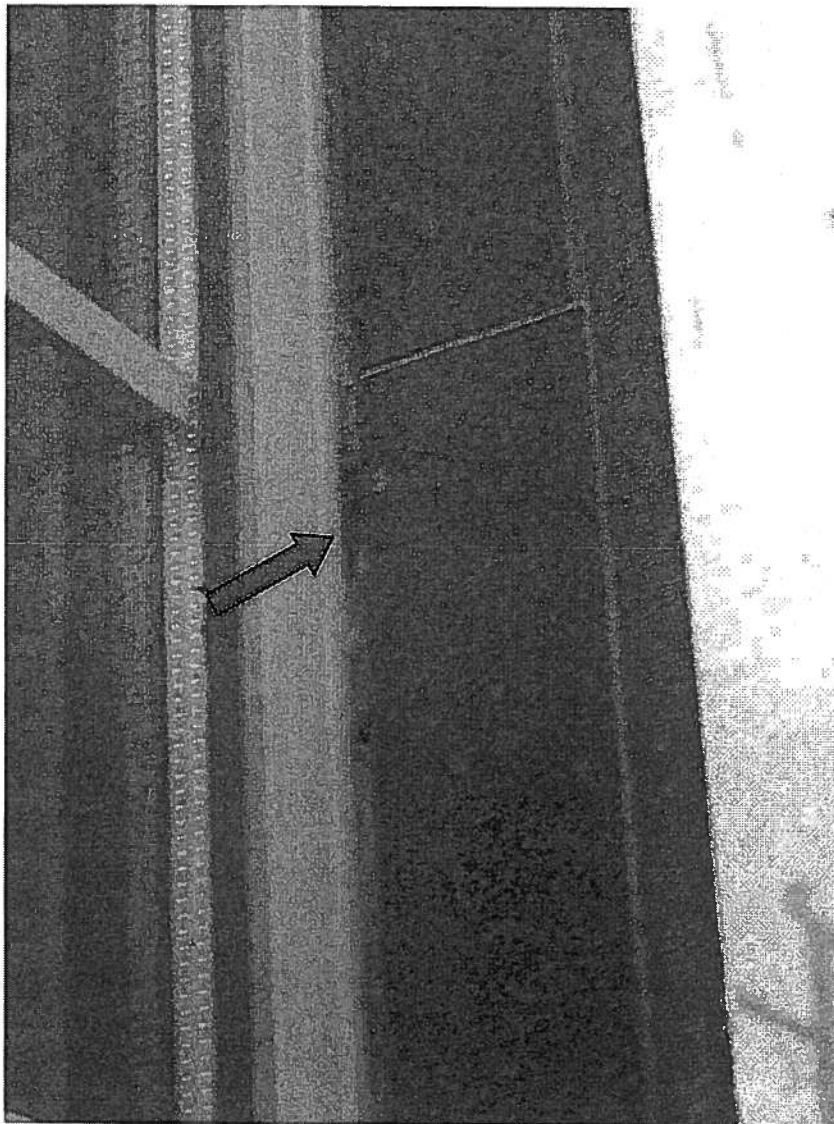


Photo 12: Sealant profile is typically too thin causing joint failure.



Photo 13: The top surfaces of balconies are typically not protected with a waterproofing membrane to protect slab reinforcing from moisture. Balconies are covered with an exterior paint.



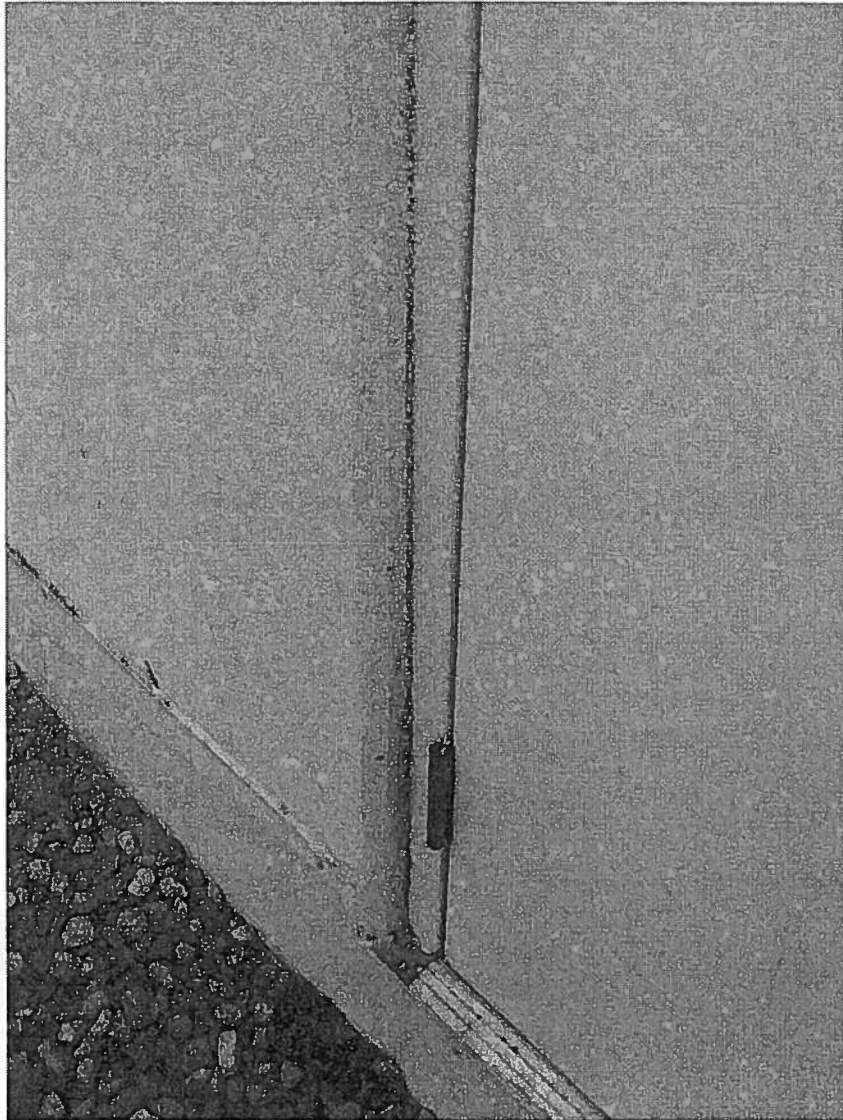


Photo 14: Rusting around roof access doorframe. There is also evidence of water ingress at the building interior at these locations.





Photo 15: Ponding and vegetation growth at terrace resulting from lack of slope to drains.

APPENDIX E OPINION OF COSTS

The following costs are our opinion of value of the remedial work described in this report. They are calculated using quantities obtained during our evaluation and information we have obtained from similar projects. Actual costs will vary depending upon the time of tender, schedule of work and conditions under which the work must be carried out. Halsall has not investigated the presence of pollutants, contaminants and hazardous materials that may be encountered during the work. Depending on the materials present, additional funds may be required for remediation measures.

As every project has its own peculiarities, actual costs can only be established by obtaining bids, preferably on the basis of competitive tenders, from specialized contractors. The costs provided herein should only be used for comparison of options and general budgeting purposes.

No.	Description	Opinion of Cost
1	Phase 1 - Exterior Sealing Repairs at Reported Leaks	
1.1	Access and Site Protection	
a)	Swing Stage	\$ 15,000
b)	Grade Level Protection	\$ 5,000
1.2	Window Sealing	\$ 40,000
1.3	Townhouse Stucco/Tile Maintenance	\$ 25,000
1.4	Localized Roof Repairs	\$ 5,000
1.5	Engineering for Specifications and Tendering for Window Sealing and Roof Repairs	\$ 6,000
1.6	Allowance for Construction Review and Contract Administration	\$ 9,000
1.7	Contingency (10%)	\$ 11,000
Phase 1 Sub-Total - Estimated Construction Cost		\$ 116,000
2	Phase 2 - Exterior Sealing Repairs at Remaining Areas	
2.1	Refer to Executive Summary, Table 1	\$ 330,000
Phase 2 Sub-Total - Estimated Construction Cost		\$ 330,000
3	Phase 3 - Interior Humidity Control Test Pilot	
3.1	Test Pilot Project Equipment and Contractor Costs	\$ 6,000
3.2	Engineering for Test Pilot Program	\$ 6,000
3.3	Contingency (10%)	\$ 1,500
Phase 3 Sub-Total - Estimated Construction Cost		\$ 13,500
4	Phase 4 - Interior Humidity Control General Program (pending results of Phase 3)	
4.1	Fan Repairs	\$ 51,000
4.2	Thermal Massing Improvements	\$ 26,000
4.3	Engineering for Specifications and Tendering for Humidity Control Program	\$ 10,000
4.4	Allowance for Construction Review and Contract Administration	\$ 10,000
4.5	Contingency (10%)	\$ 10,000
Phase 4 Sub-Total - Estimated Construction Cost		\$ 107,000
5	GST (rounded)	\$ 34,000
Total Estimated Project Budget (Current Dollar Value)		\$ 600,500

207vR007A

August 24, 2007

The Owners of Strata Plan LMS 740
% Century 21 Prudential Estates (RMD) Ltd.
7320 Westminster Highway
Richmond, B.C.
V6X 1A1

Attn: Mr. David Distelmeyer - Property Manager

Fax: dave_century21@shaw.ca

Dear David,

**Re: 888 Hamilton Street, Vancouver
Preliminary Structural Review of Garage Intermediate Slab**

We completed our cursory review of the parking garage, at this building on July 25th, 2006 as requested by Century 21. The objective of this survey was to assess the existing construction of the garage and determine if there are any obvious structural concerns.

1. BACKGROUND

The four-level underground parking garage services the 25-storey residential tower and six townhouses above with 231 parking stalls. The conventionally reinforced concrete slabs are supported by reinforced concrete columns and foundation walls. The intermediate suspended slabs are sloped to drains. There is no waterproofing membrane on the intermediate suspended slabs. The roof slab, where it projects beyond the footprint of the buildings, is covered with landscaping and a waterproofing membrane. The lowest level is slab-on-grade construction. The garage was constructed in 1992.

2. PRELIMINARY REVIEW

The slab cracks observed during our preliminary review are normal shrinkage cracks and do not impact the suspended slab's ability to carry load. Also, no signs of structural distress in the slabs was found during our visit. Note that an analysis of the garage design was beyond the scope of our review.

Based on our review, there is no reason to believe there are significant structural defects.



Halsall Associates Limited

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3. RECOMMENDATIONS

We recommend implementation of a routine maintenance and repair program to maximize the life of the garage. This program should include:

- ☐ Monitoring the slab for reinforcing steel corrosion and associated concrete damage. Review should be completed at 5 year intervals.
- ☐ If damage to the slab is detected, complete concrete repairs including coating reinforcing steel with a corrosion inhibiting coating and replacing the concrete.
- ☐ The Strata should also consider installing a waterproofing membrane over the slab to minimize the rate of damage.

We expect this meets your immediate needs. If you have questions, please call us at (604) 924-5575.

Yours very truly,
HALSALL ASSOCIATES LIMITED



Brennan Vollering, P.Eng., LEED AP
Project Manager



Ted Denniston, ASCT
Project Principal

Attachments : Limitations



APPENDIX G - TERMS OF REFERENCE

1. AUTHORIZATION

This report was prepared at the request of Ms. Julie Landicho of Century 21 Prudential Estates in accordance with our proposal dated September 26, 2006.

2. PURPOSE

Halsall was engaged to evaluate the condition of the exterior walls, windows, doors, balconies, terraces and roofs, and offer an opinion on repair options and associated budgets.

3. METHODOLOGY

Work completed for this evaluation included:

- ▶ visual review of exterior walls, windows, doors, balconies, terraces and roofs
- ▶ review of interior environmental conditions
- ▶ review of windows and doors
- ▶ reporting

During the course of our review, we also completed some sheathing moisture content readings at townhouse walls and interior drywall openings at suite 1201.

4. AVAILABLE INFORMATION

The original architectural drawings and a evaluation report by All-Star Holdings (Date unknown) were provided for our review.



APPENDIX H - LIMITATIONS

- ▶ This work is intended solely for the Client(s) named. The scope of work and related responsibilities are defined in the Conditions of Assignment. Any use which a third party makes of this work, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Decisions made or actions taken as a result of our work shall be the responsibility of the parties directly involved in the decisions or actions. Any third party user of this report specifically denies any right to any claims, whether in contract, tort and/or any other cause of action in law, against the Consultant (including Sub-Consultants, their officers, agents and employees).
- ▶ The work reflects the Consultant's best judgement in light of the information reviewed by them at the time of preparation. Unless otherwise agreed in writing by Halsall, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. This is not a certification of compliance with past or present regulations. No portion of this report may be used as a separate entity; it is written to be read in its entirety.
- ▶ This work does not wholly eliminate uncertainty regarding the potential for existing or future costs, hazards or losses in connection with a property. No physical or destructive testing and no design calculations have been performed unless specifically recorded. Conditions existing but not recorded were not apparent given the level of study undertaken. Only conditions actually seen during examination of representative samples can be said to have been appraised and comments on the balance of the conditions are assumptions based upon extrapolation. We can perform further investigation on items of concern if so required.
- ▶ Only the specific information identified has been reviewed. The Consultant is not obligated to identify mistakes or insufficiencies in the information obtained from the various sources or to verify the accuracy of the information.
- ▶ Halsall is not investigating or providing advice about pollutants, contaminants or hazardous materials.
- ▶ Budget figures are our opinion of a probable current dollar value of the work and are provided for approximate budget purposes only. Accurate figures can only be obtained by establishing a scope of work and receiving quotes from suitable contractors.
- ▶ Time frames given for undertaking work represent our opinion of when to budget for the work. Failure of the item, or the optimum repair/replacement process, may vary from our estimate.
- ▶ Any user of this report specifically denies any right to any claim which may arise out of mould or infiltration of precipitation into a building envelope.

