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Our File ST-123-10-A
August 30, 2010

Strata Plan BCS 3187
c/o Strataco Management Ltd.
#101 – 4126 Norland Avenue
Burnaby, BC V5G 3S8
(Email: managers@stratacomgmt.com)

Attention: Mr. Carey Grandy

Dear Sir:


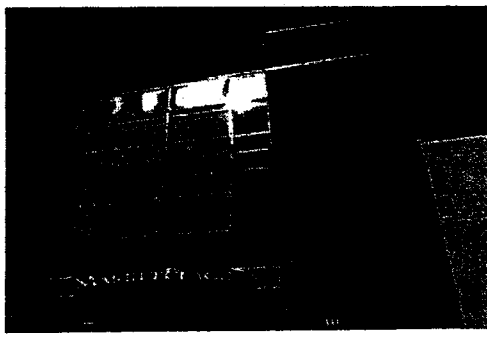
Re: Strata Plan BCS 3187 – Viridian Green
1961 Collingwood Street, Vancouver, BC
- 2-Year Building Envelope Warranty Review

1. INTRODUCTION


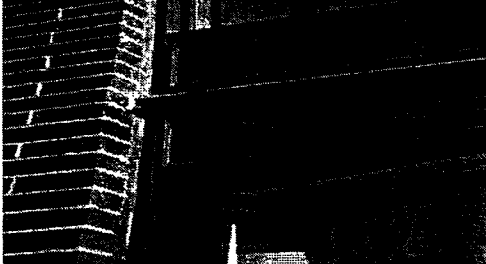
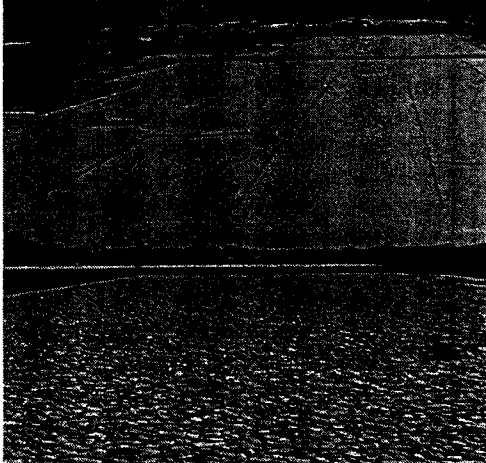
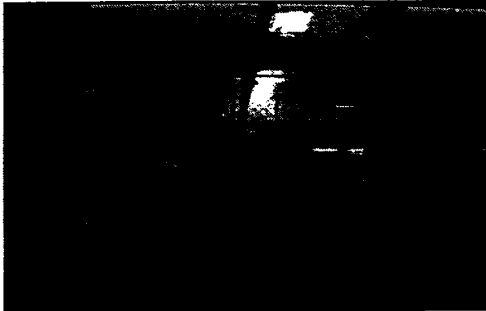
- 1.1 VWV Engineering Ltd. was retained by the Owners of the Strata Plan BCS 3187 – Viridian Green located at 1961 Collingwood Street, Vancouver, BC, to carry out a visual 2-Year Warranty Review of the building envelope components. The review was conducted on August 16 and 20, 2010. Our review was generally conducted from the ground level. The upper wall areas were reviewed with the use of binoculars and from one of the top floor units. The roofs (to which we had access provided) and underground parkade were also reviewed.
- 1.2 Based on the information obtained from the drawings and from the property management company, the Viridian Green complex was designed by W.T. Leung Architects and developed by Lark Developments. The copy of the architectural drawings and details were obtained from the City of Vancouver and were reviewed prior to our site review to obtain general information of the building envelope design features and description of the wall and roof assembly components. No attempt has been made to analyze the design of the buildings or its components and no detailed zoning or Building Code review has been conducted.
- 1.3 It is assumed that the Viridian Green complex was designed and built in accordance with the permits and approvals and in compliance with Codes and By-laws applicable at the time of construction, and that all subsequent maintenance work was performed in an appropriate manner.
- 1.4 A Building Envelope Questionnaire was provided by VWV Engineering Ltd. for the Owners to answer several questions and to list any concerns or deficiencies related to building envelope especially those that can be only observed from inside and/or from their balconies and decks of their units. Out of 22 units, 12 Owners replied and out of these 5 had no problems to report, while others stated that they have the following deficiencies:
 - .1 Six owners reported problems related to windows and exterior doors.
 - .2 Four owners reported problems related to exterior walls (cladding, gutters, vents, etc.).

- .3 Two owners reported problems related to water ponding on balcony, deck or patio.
 - .4 Four owners reported problems related to cold air drafts (around floor, wall, ceiling and windows).
 - .5 One owner reported some problems related to the water ingress from the exterior of the building.
 - .6 Three owners reported problems related to condensation on windows.
 - .7 One owner reported problems related to mould/mildew/fungi.
 - .8 Two owners reported problems underground parkade.
- 1.5 Copies of the questionnaires provided to us are attached to this report under Appendix A.
- 1.6 For clarity of this report, our observations and recommendations are grouped into several categories according to the type of building envelope component (walls, windows and doors, balconies/decks, roof, pavement, concrete curbs and landscaping, underground parkade). Observed deficiencies are illustrated by relevant photographs.

2. GENERAL DESCRIPTION

ITEM	DESCRIPTION	PHOTOGRAPH
2.1	Viridian Green is a mixed use building. The three-storey residential section was constructed partially over the commercial units located on the ground floor. Commercial and residential units are constructed over a concrete parking garage. The complex comprises of three buildings -South building is facing 4 th Avenue, East building is facing Collingwood Street and North building is facing the back lane. There is an interior courtyard walkway between the South and North buildings. The complex has 22 residential units.	
2.2	The exterior walls are a combination of poured concrete walls and steel stud walls clad with brick and/or aluminum or fibre cement panels. Some sections of the building are window walls with spandrel panels. Based on the drawings obtained from the City of Vancouver, the wall assemblies were constructed and detailed as a rainscreen cladding system.	

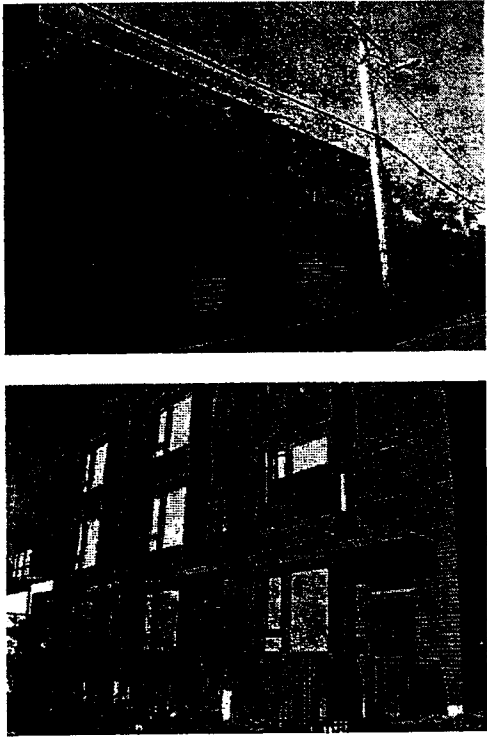
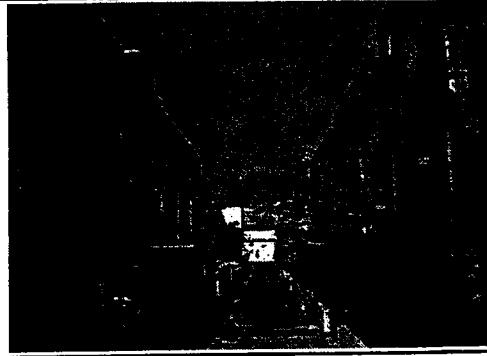


<p>2.3</p>	<p>Most of the units have decks with aluminum and glass guardrails typically secured directly into the face of deck parapet walls. Some of the aluminum and glass guardrails were mounted directly into the cladding. Decks over conditioned space are protected with roof membrane and pavers.</p>	
<p>2.4</p>	<p>The residential windows are aluminum frame, thermally broken, punched windows with double glazed sealed units. Window walls with spandrel panels are present at some wall sections. Prefabricated metal flashing is installed at the sill. At the head, sealant joint was provided at the window and wall interface.</p>	
<p>2.5</p>	<p>Two types of roofing systems are present at the Viridian Green complex. One system is a torch-on membrane applied over the insulation.</p> <p>Other roofs have gravel ballast placed over the insulation and filter fabric. The type of membrane on those roofs was not confirmed.</p> <p>Various building vents are projecting above the roof surface.</p>	
<p>2.6</p>	<p>The complex is constructed over the concrete underground parkade. Sprayed insulation is applied underneath the concrete slab below the occupied areas of the buildings.</p>	

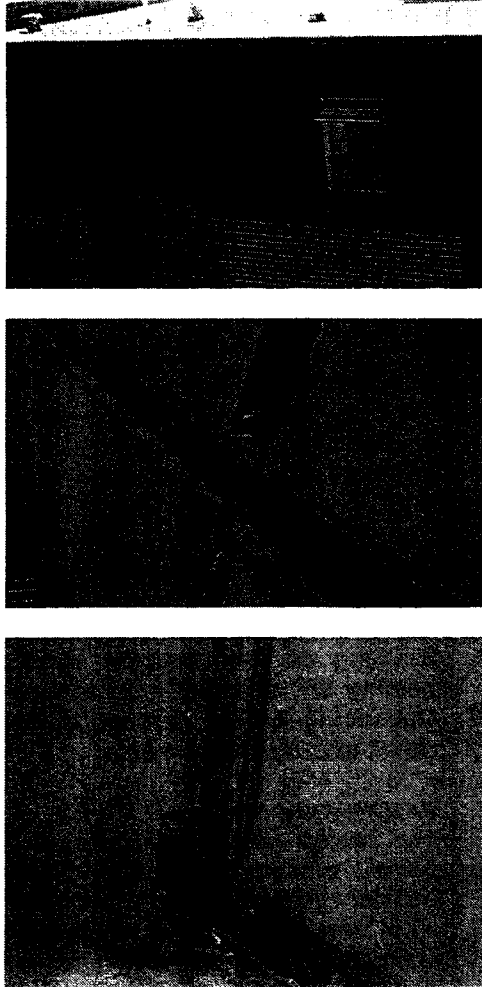
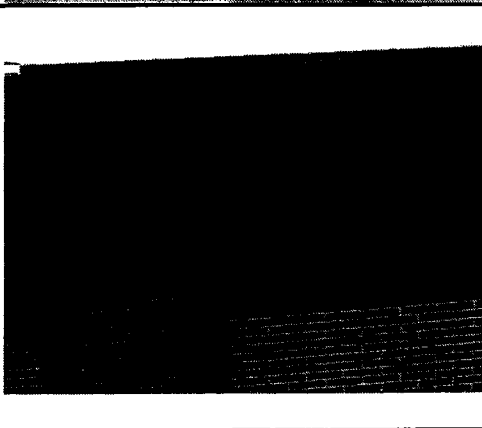


3. OBSERVATIONS AND RECOMMENDATIONS


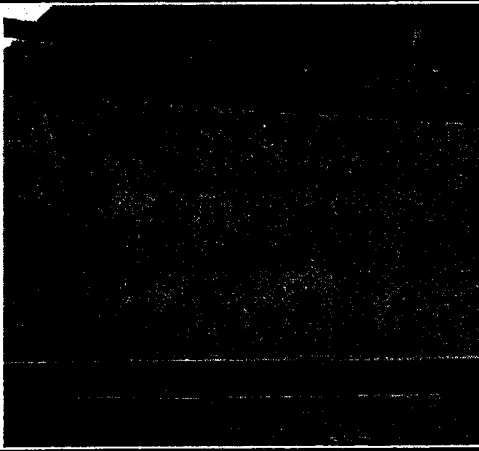
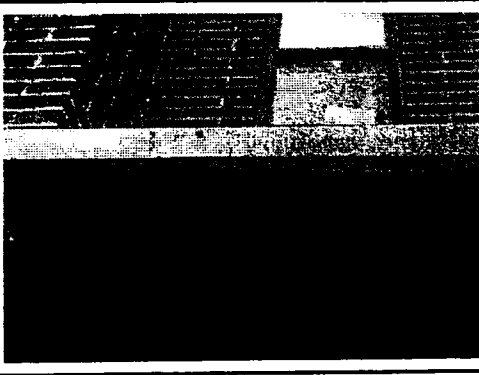
3.1 Walls:

ITEM	DESCRIPTION	PHOTOGRAPH
3.1.1	<p>OBSERVATION The above grade floors consist typically of reinforced concrete slabs and walls. Concrete slab projections were used as a small protective overhang above the entry doors. The upper wall areas and transitions between the claddings are typically terminated without any overhangs. Based on the review of the drawings, the cladding systems at the Viridian Green complex incorporate a cavity behind the cladding for drainage and drying of the accidental moisture that can enter past the cladding surface.</p> <p>RECOMMENDATION Although the above described cladding has some tolerance for the accidental moisture that may enter behind the cladding regular review, maintenance and prevention of water ingress is required for those walls to function as intended. Diligent review and maintenance is particularly required at the penetrations and interfaces of different wall assembly components. (Review/Maintenance)</p>	
3.1.2	<p>OBSERVATION Several deficiencies, including construction deficiencies, were observed and are listed below under relevant sections of this report.</p> <p>RECOMMENDATION Some of the deficiencies may require further investigation and review before the proper solution to rectify and/or eliminate them is implemented. (Review/Maintenance/Warranty)</p>	


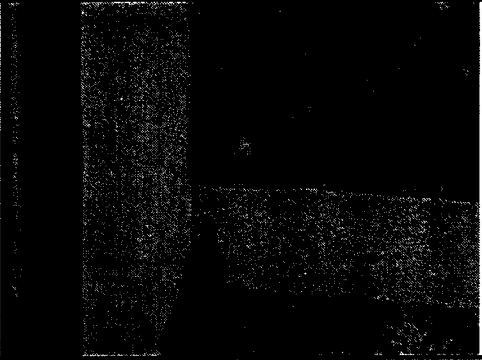

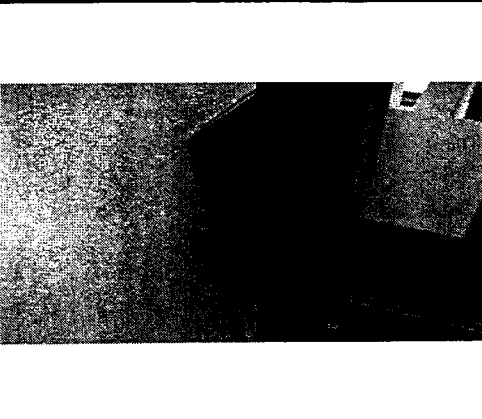


<p>3.1.3</p>	<p>OBSERVATION We observed that several fibre cement panels located at the upper portion of the building, particularly on the north side, have white staining that possibly is an efflorescence staining. The cause of this stain is unknown but may be related to water ingress into the panel. The fibre cement panels were slightly wavy on the edges and their corners were curling. It appears also that those panels were not sufficiently protected with paint. Some of the cut-off edges were not protected with paint and primer. Unsealed gaps were observed at the cladding joints and/or terminations.</p> <p>RECOMMENDATION Further investigation, to access the condition of the deficient panels and the cause of the staining, is recommended. All fibre cement panels including cut-off edges must be protected with primer and paint. All joints in the cladding must be properly detailed and sealed to prevent water ingress behind the cladding. (Review/Warranty)</p>	
<p>3.1.4</p>	<p>OBSERVATION The reverse slope on the metal flashing was observed at transition between brick and fibre cement cladding. The white, possibly efflorescence, staining was visible in the locations at the base and at side of the panels.</p> <p>RECOMMENDATION The flashing deficiencies should be corrected. The panel and their detailing should be reviewed further and, if found deficient, they should be replaced with new properly detailed cladding. (Warranty)</p>	





3.1.5	<p>OBSERVATION The unfinished, deficient detailing at the joints between metal cladding was observed in several locations. This detail appears to be improperly constructed at the time of the original construction. Debonded, deficient sealant joint was observed at the metal cladding and flashing interface.</p> <p>Open, unsealed joints in the cladding and their interfaces will cause water ingress behind the cladding.</p> <p>RECOMMENDATION The deficient cladding detailing and underlying wall assembly components affected by prolong exposure to elements and possible water ingress should be replaced with new properly detailed cladding system ASAP.</p> <p>(Warranty)</p>	
3.1.6	<p>OBSERVATION Staining on the concrete walls and paint peeling off was observed in few locations. Debonding of the sealant at the gum lip detail was also observed.</p> <p>RECOMMENDATION The stains should be cleaned. Debonded paint removed and wall repainted. All deficient sealant joints must be replaced with new joints. After all deficiencies are corrected, regular review and maintenance of all walls and sealant joints is recommended.</p> <p>(Warranty/Maintenance)</p>	
3.1.7	<p>OBSERVATION Staining on the face of the small concrete eyebrows/projections was observed in several locations throughout the project.</p> <p>RECOMMENDATION The stains should be cleaned and the face of the eyebrows/projections repainted, if necessary, to provide durable surface that will not allow for moisture ingress.</p> <p>(Warranty/Maintenance)</p>	

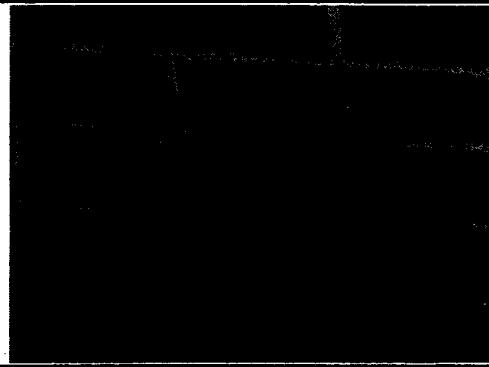


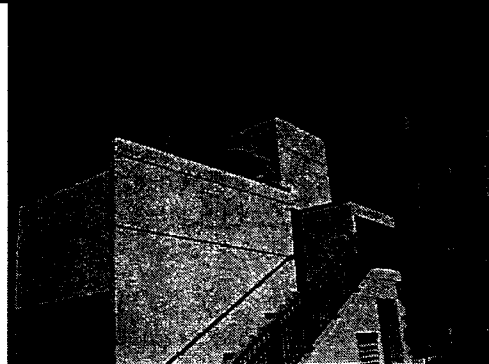


<p>3.1.8</p>	<p>OBSERVATION The joint between the brick cladding and the penetrating pipe appeared improperly sealed in reviewed location.</p> <p>RECOMMENDATION Properly designed sealant joints should be applied at all cladding penetrations including the one shown on the attached photo. (Warranty)</p>	
<p>3.1.9</p>	<p>OBSERVATION Debonding and/or lack of sealant joint at the mortar sealant interface was observed at few locations and was also reported to us by one of the Owners.</p> <p>RECOMMENDATION New sealant joints must be applied at locations where sealant has failed and/or is missing. (Warranty/Maintenance)</p>	
<p>3.1.10</p>	<p>OBSERVATION Staining and water pooling was observed on the exterior stairwell and at the base of the stair wall. It appears that water ingress occurs either at the top of the wall and/or at the gum lip detail.</p> <p>RECOMMENDATION Further investigation of the causes of the staining and pooling water is recommended. Detailing at the top of the wall including saddle detail of wall interfaces should be protected from water ingress. (Warranty/Maintenance)</p>	
<p>3.1.11</p>	<p>OBSERVATION Improperly secured flashing to wall and lack of the sealant joint was observed at the saddle location between concrete walls in several locations. Flashing was improperly secured. Staining on the flashing was observed in several locations indicating that water pools on the flashing. Sharpness of the edges of the flashing was reported to us by one of the Owners.</p>	

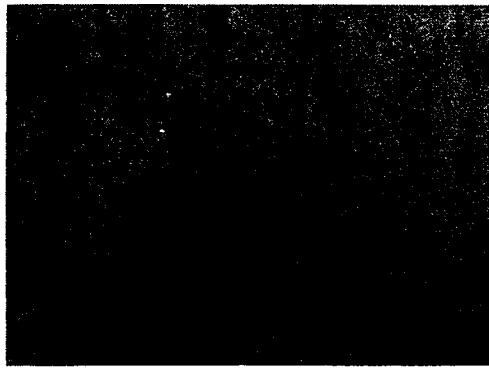


	<p>RECOMMENDATION</p> <p>The flashing should be properly secured and new sealant joints must be applied at the locations where the sealant has failed and/or was missing.</p> <p>The flashing should be adjusted to provide minimum 6% slope as required by BC Building Code.</p> <p>Although our review does not include review of the design and detailing that was specified for the flashing, we recommend that the sharp edges of the flashing are eliminated at all locations.</p> <p>(Warranty/Maintenance)</p>	
3.1.12	<p>OBSERVATION</p> <p>The water staining and softness of the drywall was observed at the base of the wall in the main hallway to the building.</p> <p>RECOMMENDATION</p> <p>Further investigation and water testing is recommended to confirm the cause of the stained, partially damaged drywall. The possible water entry location must be identified and repaired as required to prevent further damage.</p> <p>(Warranty)</p>	

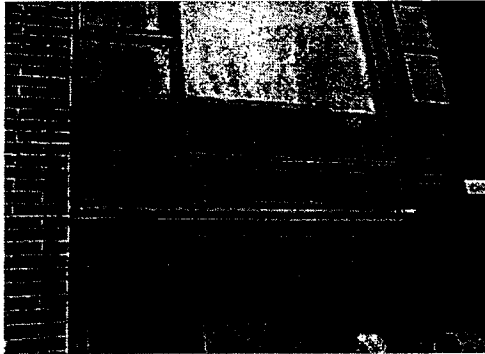
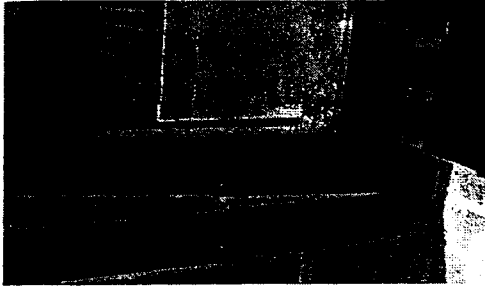


<p>3.1.13</p>	<p>OBSERVATION At a few locations observed, vents were plugged possibly with lint or some other debris.</p> <p>RECOMMENDATION The vent screens should be checked and cleaned regularly to allow for proper moisture discharge to outside. The screens inside the unit must be also cleaned regularly.</p> <p>(Maintenance)</p>	
<p>3.1.14</p>	<p>OBSERVATION Loose, improperly secured bug screen weep holes were observed. In one location, the weep hole was installed on an angle. Unprotected weep holes can allow for insect entry.</p> <p>RECOMMENDATION All weep holes should be protected by properly installed bug screens.</p> <p>(Warranty)</p>	 <p>Unit 214</p>
<p>3.1.15</p>	<p>OBSERVATION The metal and glass canopy were observed at the street elevation above the commercial units. Accumulation of dirt was observed on the glass panels.</p> <p>RECOMMENDATION Sealant application at the canopies attachment locations should be checked and renewed as required. Canopies should be reviewed and cleaned regularly to allow for their function.</p> <p>(Maintenance)</p>	
<p>3.1.16</p>	<p>OBSERVATION A majority of the wall areas was clean at the time of our review. Localized staining and dirt build-up were observed only at some locations.</p> <p>RECOMMENDATION It is recommended that a Building Envelope and Renewal Maintenance Manual, with the instructions on how to maintain and renew building envelope components, be provided by the Developer for the Owners.</p> <p>(Warranty/Maintenance)</p>	

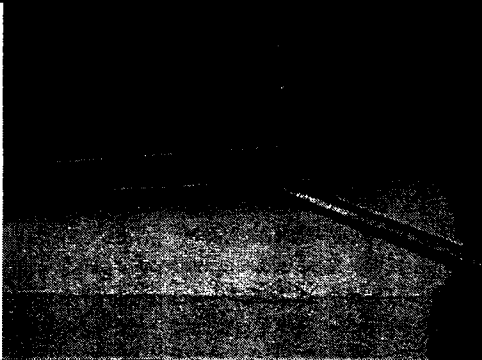
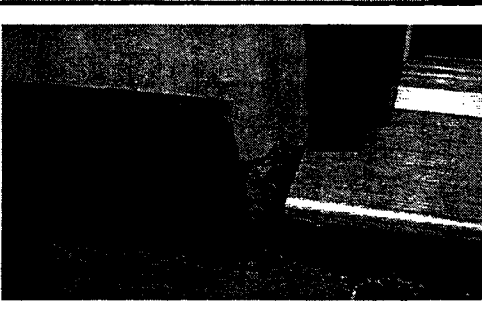
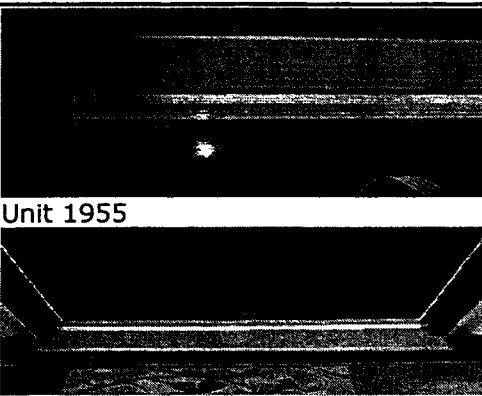


3.1.17	<p>OBSERVATION Staining and moisture-damaged drywall and baseboard was observed at Unit 1957.</p> <p>RECOMMENDATION Units experiencing condensation problems and elevated RH should be further investigated by Mechanical Consultant to ensure that the ventilation system (kitchen, bathroom fans) is working properly and that there is no accumulation of water in the wall assembly as a result of condensation. The moisture-damaged drywall and baseboards should be repaired. (Warranty)</p>	
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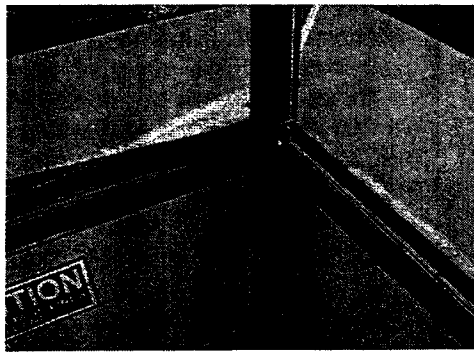
3.2 Windows and Doors:

ITEM	DESCRIPTION	PHOTOGRAPH
3.2.1	<p>OBSERVATION The residential windows are aluminum frame, double glazed sealed units. Problems related to condensation and/or draft around the windows/doors was reported by some Owners.</p> <p>RECOMMENDATION Windows/doors should be reviewed and cleaned regularly to allow for their function. Problems related condensation should be investigated further during the winter months. Review of the ventilation system by a Mechanical Consultant is also recommended. (Maintenance/Review)</p>	
3.2.2	<p>OBSERVATION Prefabricated metal flashing was observed at the sill. At the head, sealant joint was provided at the window and wall interface. The sealant joints and weep holes in the joint at the sill locations were quite large.</p> <p>RECOMMENDATION Regular review and renewal of the sealant joints is required as per manufacturer warranty requirements. (Maintenance)</p>	

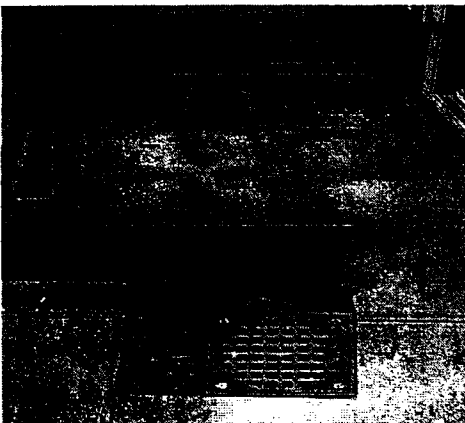



3.2.3	<p>OBSERVATION Large unsealed gaps were observed between the concrete wall and window sill flashing.</p> <p>RECOMMENDATION Confirmation that those gaps will not lead to future water ingress should be obtained from the Design team. (Warranty)</p>	
3.2.4	<p>OBSERVATION An unsealed gap by the entry door was observed at Unit 205.</p> <p>RECOMMENDATION The gap must be sealed to prevent water and air infiltration. (Warranty)</p>	
3.2.5	<p>OBSERVATION The draft around the doors was reported by some of the Owners. Deficiency with weather stripping was observed at some location and also reported by the Owner of Unit 1955.</p> <p>RECOMMENDATION Regular review and adjustment of the doors should be done as per manufacturer's maintenance requirements. Deficient weather stripping should be replaced with new. (Warranty/Maintenance)</p>	 <p>Unit 1955</p>


3.3 Balconies/Decks:

ITEM	DESCRIPTION	PHOTOGRAPH
3.3.1	<p>OBSERVATION The balcony and deck railings are constructed out of aluminum frame with glass panels. They are typically face-mounted on the deck parapet walls. Some of the railings are mounted to the face of the exterior wall.</p> <p>RECOMMENDATION Regular renewal of the sealant joint at the railing attachment bracket and on the top of the screws is recommended. (Maintenance)</p>	






<p>3.3.2</p>	<p>OBSERVATION The decks are waterproofed with the membrane and protected with pavers. The gaps between the pavers and at the building wall were observed to allow for drainage of the surface water at the membrane level. The insulation and filter cloth was observed underneath the pavers.</p> <p>RECOMMENDATION The regular review and clean-up and drains is required for the deck drainage system to function as intended. The gaps between the pavers should be clean at all times to prevent water pooling at the pavers level.</p> <p>(Maintenance)</p>	
<p>3.3.3</p>	<p>OBSERVATION Vegetation growing between the pavers was observed at some locations. It appears that the drainage at the membrane level allows for pooling of the water that allows for vegetation to grow.</p> <p>RECOMMENDATION Regular review and clean-up of the membranes are recommended in order to maximize their performance and prevent growth of unwanted weeds.</p> <p>(Maintenance)</p>	

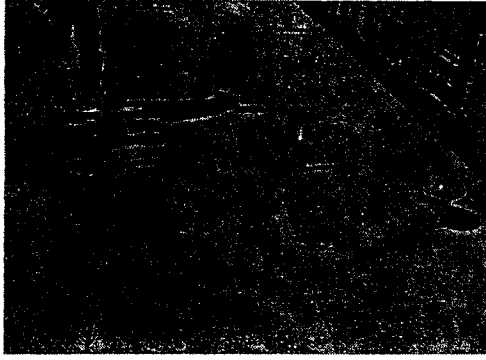
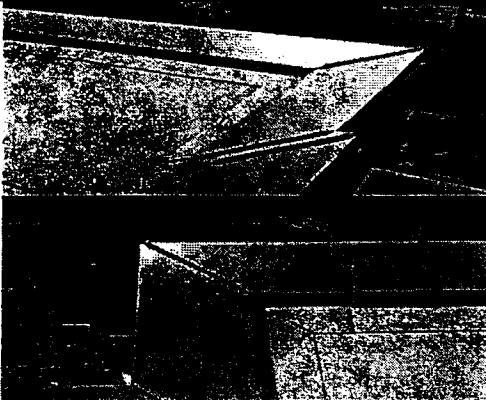
3.4 **Roof:**

ITEM	DESCRIPTION	PHOTOGRAPH
<p>3.4.1</p>	<p>OBSERVATION The roofs on Viridian Green complex are covered as follows:</p> <ul style="list-style-type: none"> • Some roofs are covered with a torch-on membrane (south building and part of north building) which appeared to be applied over the insulation; • Other roofs have gravel ballast placed over the insulation and filter fabric (north-east building and part of north building). The type of membrane on those roofs was not confirmed. <p>We did not observe any water pooling on the roof surface during our review. A problem with the noise from the vents located on the roof was reported by some of the upper unit Owners.</p>	




	<p>RECOMMENDATION Regular review and maintenance are recommended. The vents and duct system should be checked for the solution to the reported problem. (Warranty/Maintenance)</p>	
3.4.2	<p>OBSERVATION Stains on the membrane were observed at some locations.</p> <p>RECOMMENDATION The cause of the staining should be identified. (Maintenance)</p>	
3.4.3	<p>OBSERVATION We observed that some of the drains have no collars to protect the gravel from accumulating at the drains.</p> <p>RECOMMENDATION The proper collar around the drains is recommended. Regular review and clean-up of the membranes are recommended in order to maximize their performance. (Warranty/Maintenance)</p>	

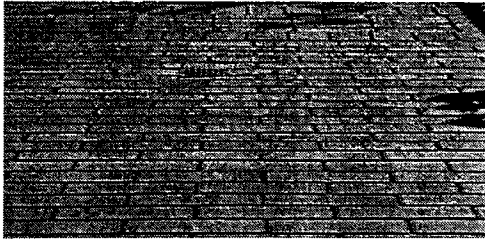
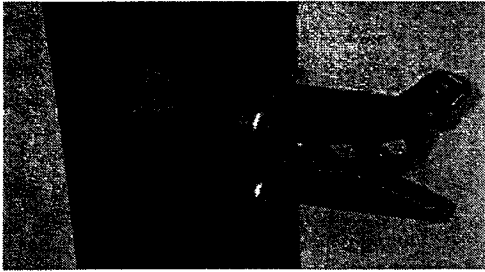



<p>3.4.4</p>	<p>OBSERVATION A roof leak was reported to us at Unit 203. We visually reviewed the area and found no major signs of defects. It appears that roofing cement compound was applied around the membrane seams at the reported leak area. However, the Owner reported that leaks still occur after this patch repair was conducted.</p> <p>RECOMMENDATION A potential water ingress location is under the cap flashing. There is no elevated curb at the roof edge. We recommend water tests and exploratory openings in the ceilings to determine the cause of the leak. (Warranty)</p>	
<p>3.4.5</p>	<p>OBSERVATION The cap flashings were observed to be installed with standing seam at corners and with S-locks.</p> <p>RECOMMENDATION Regular review of the flashing and the sealant bead at the S-lock joints is required in order for the roof system to perform as intended. (Maintenance)</p>	

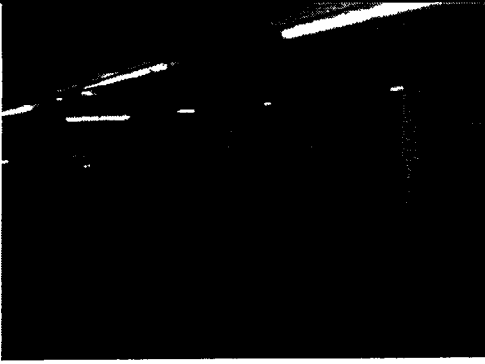
3.5 **Pavement, Concrete Curbs and Landscaping:**

ITEM	DESCRIPTION	PHOTOGRAPH
<p>3.5.1</p>	<p>OBSERVATION Concrete walkways sloping away from the building at the street elevation. Other than some cracking of the concrete walkways, we did not observe any deficiencies at the building perimeter at the time of our review.</p> <p>RECOMMENDATION Regular review and clean-up of the walkways and the wall bases are recommended. (Maintenance)</p>	

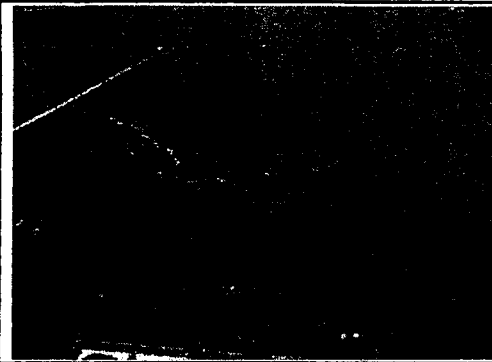




<p>3.5.2</p>	<p>OBSERVATION Settlement of some of the pavers was observed on the walkways by the main entrance to the high-rise building.</p> <p>RECOMMENDATION The uneven pavers should be removed and re-installed to eliminate tripping hazard. (Warranty/Maintenance)</p>	
<p>3.5.3</p>	<p>OBSERVATION Rust on the hinges installed on the concrete walls was observed in several locations. This deficiency was also reported by one of the Owners.</p> <p>RECOMMENDATION The corroded hinges should be replaced with a stainless steel one or any other corrosion resistant. (Warranty)</p>	
<p>3.5.4</p>	<p>OBSERVATION Vegetation was observed in the planters located close to the building.</p> <p>RECOMMENDATION Regular trimming and maintenance of the vegetation are recommended. (Warranty/Maintenance)</p>	

3.6 **Underground Parkade:**

ITEM	DESCRIPTION	PHOTOGRAPH
<p>3.6.1</p>	<p>OBSERVATION We did not observe any active leaks at the slab level at the time of our review. Spray-applied insulation was observed under liveable section of the building. Active water ingress was reported by some of the Owners.</p> <p>RECOMMENDATION Regular review for any problems at the parkade level is recommended. (Review/Maintenance)</p>	



3.6.2	<p>OBSERVATION Cracks and efflorescence staining were observed at around the pipes penetrating the underside of the parkade slab in several locations.</p> <p>RECOMMENDATION The efflorescence staining should be cleaned and cracks monitored for recurrence of the staining or active leaks. Regular review for any problems at the slab level is recommended.</p> <p>(Warranty/Maintenance)</p>	
3.6.3	<p>OBSERVATION Cracks in the concrete slab were observed in several locations. The cracks appeared to be sealed with caulking.</p> <p>RECOMMENDATION Regular review of the slab, particularly at the cracks and high traffic locations, is recommended.</p> <p>(Warranty/Maintenance)</p>	
3.6.4	<p>OBSERVATION Cracks and efflorescence staining was observed at several locations. Active water ingress was reported by some of the Owners.</p> <p>RECOMMENDATION The efflorescence staining should be cleaned and cracks monitored for recurrence of the staining or active leaks. Regular review for any problems at the slab level is recommended.</p> <p>Warranty/Maintenance)</p>	

4. CONCLUSIONS

Based on our review, we provide the following conclusions and recommendations:

- 4.1 The most serious problem is related to the water ingress. Water ingress at the bathroom ceiling was reported by the Owners of Unit 203. This deficiency requires further investigation and needs to be rectified to prevent further damage. The other location of possible water ingress is at the wall base in the main hallway which also needs to be further investigated and repaired as required. The detailed review and testing to identify causes of all suspect water ingress locations are recommended to be done ASAP.
- 4.2 Second important item is related to the unfinished cladding detailing and all other cladding deficiencies that should be further reviewed and repair as required.



- 4.3 The problem with condensation on windows and in bathrooms was reported by several Owners. One unit was visited where we observed moisture-damaged drywall and the baseboard in the bathroom. We were informed that this damage occurred as a result of high humidity in the bathroom, despite of the use of the bathroom fan during and after showering and bathing. **The units experiencing condensation problems and elevated RH should be further investigated by Mechanical Consultant to ensure that the ventilation system (kitchen, bathroom fans) is working properly and that there is no accumulation of water in the wall assembly as a result of condensation.**
- 4.4 There were also other miscellaneous deficiencies related to building envelope reported by the Owners or observed by VVV Engineering Ltd. For more specific information regarding observed deficiencies and required action, please see previous Section 2 "Observations and Recommendations" and Appendix A – problems reported by the Owners. Since not all of the Owners participated in the survey, we cannot guarantee that all defects were identified at this point of time. We recommend that the Owner/Occupant questionnaire be distributed once a year.
- 4.5 **It is recommended that Building Envelope Maintenance Manual with maintenance instructions be provided to the Strata and individual Owners.**

5. LIMITS OF LIABILITY

- 5.1 The building envelope 2-Year Warranty review undertaken by VVV Engineering Ltd. was based on rather limited and superficial visual observations.
- 5.2 Only two site visits were made, with no attempt to review every element or portion of the building to ascertain the quality or sufficiency of any particular aspect of the building. As such, our opinion cannot be extended to elements and portions of the building not reviewed, or situations reasonably beyond the control of VVV Engineering Ltd.
- 5.3 The building envelope 2-Year Warranty review undertaken was a visual unobtrusive review to identify areas of obvious deterioration and maintenance items and actions required. We cannot guarantee that all defects were identified, but every reasonable effort was made to identify potential problems within the scope of the review. As such, our opinion cannot be extended to elements and portions of the buildings not reviewed, or situations reasonably beyond the control of VVV Engineering Ltd. During the visual building condition review, no attempt has been made by VVV Engineering Ltd. to analyze the design of the building and its components and no detailed zoning or Building Code review has been conducted.
- 5.4 Our comments are not a guarantee or warranty of any aspect of the condition of the buildings whatsoever. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. VVV Engineering Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.



If you have any questions regarding the contents of this report, please do not hesitate to contact us.

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APPENDIX A

OWNER AND/OR OCCUPANT QUESTIONNAIRES