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REPORT

Building Envelope Condition Assessment

929 West 16th Street
Vancouver, British Columbia

Presented to:

The Owners, Strata Corporation LMS 2421

c/o Mr. Jim Allison
Property Manager
Assertive Property Management
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PREFACE

Terminology & Glossary

A number of the terms used in this report have specific meaning in the context of this report and are therefore defined below. All of the terms and abbreviations used are standard in the industry. This glossary may be of some aid for those not familiar with construction terms:

Air Barrier refers to a combination of materials and components, including joints, that control the flow of air through an assembly, limiting the potential for heat loss and condensation due to air movement.

Air Leakage refers to the airflow into or out of a space through the wall assembly. The outward leakage of air is known as exfiltration and the inward leakage is known as infiltration. Exfiltration of warm, humid interior air will carry water vapour into the wall assembly which may condense on contact with cold surfaces.

Balcony refers to a horizontal surface exposed to the outdoors, but projected from the building so that it is not located over a living space.

Base Coat refers to the initial wet state material, either factory or field-mixed, used to encapsulate the fibreglass reinforced mesh (in EIFS applications).

Building Envelope refers to those elements of the building that separate inside conditioned space from outside unconditioned space, and includes walls, windows, doors, roofs, balcony decks (over occupied living space) and foundations. Sometimes referred to as "building enclosure" or an "environmental separator" in building codes.

Building Paper refers to a breather-type asphalt sheathing paper which is rated in minutes (15, 30 or 60), based on preventing water flow through it for number of minutes in accordance with a standard test. Also referred to as moisture barrier.

Built-up Roof (BUR) refers to a waterproof system constructed of multiple felt layers mopped down with hot bitumen.

Capillary Break refers to the gap between parallel layers of material sufficient to break the surface tension of water, which is typically a minimum of 10 mm (3/8").

Cladding refers to a material or assembly that forms the exterior skin of the wall. Typical cladding types include; stucco, EIFS, metal panels, brick/stone veneer, wood siding, and vinyl siding.

Concealed Barrier Wall Assembly refers to an exterior wall assembly where moisture is allowed to drain through a series of small interconnected cavities formed between the siding (typically wood or vinyl) and the building paper / moisture barrier. The size and effectiveness of these cavities varies significantly from one type of horizontal siding product to another.

Deck refers to a horizontal surface exposed to the outdoors, located over a living space, and intended for moderate use but not for access to other areas of the building.

Delamination refers to a separation along a plane parallel to the surface.

Dew Point refers to the temperature at which air containing a constant amount of water vapour reaches the saturation point. As the temperature decreases, the air has a lower capacity to contain moisture. Condensation can occur at or below the dew point temperature.

Drained Cavity (also Rainscreen) refers to a design strategy whereby a positive drainage plane is created immediately behind the exterior cladding material and in front of the moisture barrier. The so-formed cavity is sufficient in width to break the surface tension of water, and allows incidental water entering the wall system to drain by gravity with the aid of flashings and membranes.

Drip Edge refers to a projection detailed to direct water run-off away from wall, window, balcony or roofing element.

Efflorescence refers to the dissolved salts in the material (such as concrete or brick) being transported by water, and redeposited on the surface after evaporation.

EIFS refers to *Exterior Insulated Finish System* and generally consists of layers of rigid insulation adhered or fastened to the substrate, and finished with thin coats (lamina) of reinforced cementitious material and a finish coat of acrylic stucco.

EPDM (Ethylene Propylene Diene Monomer) refers to a waterproofing sheet membrane made of vulcanized rubber. These membranes, usually single-ply applications, may be installed fully bonded to the substrate with an adhesive, or may be "loose-laid" with only the laps and terminations of the membranes adhered.

Face-seal refers to a building envelope strategy where the performance of the exterior wall is dependent on the ability of the exterior surface of the cladding, windows and associated sealant to shed water and prevent its infiltration. This system can not accommodate water that penetrates past the exterior face since a positive drainage path and/or additional continuous waterproof barrier are not provided.

Finish Coat refers to the final wet state material, which provides colour and texture, applied over the reinforced base coat (on stucco or EIFS applications).

Fishmouth refers to a deficiency in the installation of waterproofing membranes (roofing, self-adhering membranes, etc.) which results in a fold in the edge of the membrane, through which water can penetrate.

Flashing refers to sheet metal or other material used in roof or wall construction and designed to shed water (typically sloped outwards, with a drip edge to shed water). Used in conjunction with:

- *Cap* or *Parapet flashing:* top of wall, pier, column or chimney.
- *Saddle flashing:* an upturn, sloping transition piece between a horizontal and vertical plane, eg. balcony cap and wall intersection.
- *Head/sill flashing:* at head or sill of window opening or other penetration.
- *Base flashing:* at bottom edge of wall surface.
- *Cross cavity* or *Through-wall flashing:* a flashing which sheds water from the moisture barrier plane to the exterior, through the cladding.

Gum Lip refers to a method of sealing a flashing to a wall surface whereby the top edge of the flashing is bent outwards to form a caulk-filled cavity (typically at the termination of a waterproofing membrane).

Housewrap refers to a sheet plastic material which is used as a sheathing paper, generally between the wall sheathing material and the exterior cladding. Although recognized as a proprietary term, in this report *housewrap* is used to represent a generic group of materials. One common type of housewrap consists of spun-bonded Polyolefin (SBPO), another is made of perforated polyethylene. Their resistance to liquid water is high, but provides little resistance to water vapour diffusion.

Maintenance refers to a regular process of inspection, cleaning and minor repairs of envelope elements and exterior systems such as roof, walls, windows, gutters, downspouts and drains. Maintenance is performed to ensure proper performance of service life of assemblies or components.

Movement Joint or **Control Joint** refers to a continuous joint in a structure, cladding or other element which allows differential movement of portions of the building structure (expansion joint), or prevents or localizes cracking of brittle materials, such as stucco, where movement needs to be controlled (control joint).

Penetration refers to a hole passing through the building envelope in which ducts, electrical wires, pipe and fasteners are run between inside and outside.

Punch Window refers to the architectural style of the window being expressed as a single "punched" opening surrounded by the cladding material, as opposed to being arranged in vertical or horizontal strips of several window units.

Relative Humidity refers to the ratio (expressed as a percentage) of the amount of moisture within the air to the maximum amount of moisture that the air could possibly contain for a given temperature.

Saddle refers to the transition of small horizontal surfaces, such as the top of a balcony guardrail or parapet wall, with a vertical surface, such as a wall.

Scupper refers to a metal pipe or trough section creating a drainage overflow from a roof or balcony to a downpipe or to a surface below.

Sheathing refers to a material used to provide structural stiffness to the wall framing and to provide structural backing for the cladding and sheathing paper. Typical materials are OSB (oriented strand board), plywood, or gypsum board.

Sheathing Paper (or **moisture barrier**) refers to a material or combination of materials in an exterior wall whose purpose is to retard penetration of incidental water further into the wall structure once past the cladding. Commonly used materials are building paper or housewrap.

Spall refers to a fragment of material, such as concrete or masonry, detached from a larger mass by a physical blow, weather action, internal pressure or efflorescence within the mass (sub-fluorescence).

Strapping refers to the use of wood or metal material, typically 19mm (¾") nominal thickness, to form a drainage cavity and act as a capillary break behind the cladding.

Surfactant refers to an agent (eg., detergent) that, when mixed with water, breaks the surface tension of water drops, thus enabling easier absorption of water through a material. Without surfactants, water would have a greater tendency to remain as drops on the surface of a given material.

Symptoms refers to visual evidence, such as staining or wetting of surfaces, loss of strength, material delamination or cracking, peeling paint, debonded coatings, etc., which suggests a performance problem within the exterior envelope of a building.

Thermal Bridge refers to a material with higher thermal conductivity transferring more heat through an assembly than the surrounding components. For example, a stud in a wall will transfer more heat that the surrounding insulation.

UV refers to ultra-violet radiation (from the sun), which has a degrading effect on many membrane and sealing materials (asphalt based) unless protected by an appropriate shielding layer.

Vapour Retarder refers to a material having a high resistance to water vapour diffusion that is located within the assembly to control the flow of vapour and limit the potential for condensation due to diffusion.

Weephole refers to an opening placed in a wall or window assembly to permit the escape of liquid water from within the assembly. Weepholes can also act as vents.

Window refers to a manufactured assembly of a frame, sash, glazing and necessary hardware, made to fit an opening in a wall.

- *Window sill*: horizontal member at the base of a window.
- *Window head*: horizontal member at the top of a window.
- *Window jamb*: either of the vertical members at the sides of a window.
- *Mullion*: A vertical member between the glazed units.
- *Rail:* A horizontal member between the glazed units.
- *Glazing:* The glass portion of the window.
- *IGU:* Insulated glazing unit. Double or triple panes of glass sealed together to provide insulation value. The still gas between the panes acts as the insulation.
- *Condensation track*: a channel at the interior sill level of the window intended to intercept small amounts of water condensing on the interior surface of the glass.

1. INTRODUCTION

1.1 Terms of Reference

Morrison Hershfield (MH) was retained by the owners of 929 West 16th (Strata Corp. LMS 2421) to undertake an assessment of the current condition of the building envelope systems of their building located in Vancouver. Authorization for the study was provided by Mr. Jim Allison of Assertive Property Management on June 12, 2002.

The objective of this investigation was to assess the overall condition of the building envelope at 929 West 16th and to develop an implementation plan for any required remedial work or further investigations. Deficiencies reported herein are based on visual examination and selective sheathing moisture content measurements taken at typical building details believed to be possible locations of water penetration. They do not represent a total listing of all locations with deficiencies nor do they imply all similar locations or items to be deficient.

1.2 Scope of Work

The scope of our services was outlined in our proposal letter to Mr. Jim Allison of Assertive Property Management Co. dated March 4, 2002, and is restated below for reference purposes:

"The following tasks form our proposed scope of work for the Initial Assessment of the exterior envelope elements:

Task 1: Review available original design documents to become familiar with the designer's intent with respect to the exterior enclosure of the buildings. This will be useful for us to become familiar with the building details before we perform site visits, and afterwards for estimating quantities and budgets. It would also be useful to review documentation and history of previous repairs in order to focus our field investigation and in establishing priorities. Ideally the documents would include architectural drawings and specifications, and previous repair documentation.

Task 1A: As an option, an Occupant Questionnaire Survey can be a useful tool to focus our exterior wall survey as it would provide information on the nature and extent of any moisture ingress issues which Strata Owners may have noted. If this option is desired, we will issue a customized Occupant Questionnaire Survey form to the Strata Council to copy, distribute, collect and return to us. We would then tabulate the results in a computerized database program we have developed for this purpose. The results would be included in the main report.

This is presented as a cost option for your consideration. The Occupant Questionnaire Survey must be conducted at the beginning of the project in order for the information to be integrated into the assessment.

Task 2: *Undertake a visual examination of the building cladding elements; siding, windows, balconies, decks, and roof areas. The purpose of this examination is to identify the current condition of the various components of the building envelope, and to identify probable locations of moisture problems for more in-depth survey and exploratory work.*

Task 3: *Undertake a sample moisture content survey to identify the presence of moisture in the sheathing under the siding. The test probe locations will be chosen in areas where other visual evidence suggests that water may have penetrated the cladding or at locations where the detailing suggests a potential problem. The results of the moisture survey will assist us in determining the extent of the moisture that may exist behind the cladding. The holes required are very small and will be filled with sealant to leave barely noticeable marks.*

Moisture probe surveying is ideally conducted after recent rainfall so that the subject building has had an opportunity to become wetted. If a dry period has preceded the time of the site-work, we may conduct a few additional exploratory openings in lieu of extensive moisture probes.

Task 4: *Based on the results of the moisture survey, identify locations where exploratory openings may be warranted. Typically, these openings involve the removal of siding to observe the conditions under the siding. We may also lift cap flashings.*

We will require the assistance of a contractor to make and close the test openings during our review. They will be patched temporarily to avoid additional damage occurring. Permanent repairs can take place once a remedial work program has been established and authorized to proceed. This contractor will be hired directly by the Strata, under separate contract and fee.

Task 5: *Develop conceptual remedial work and renewal recommendations with associated budget cost estimates for each element of the exterior building envelope which is likely to require action over the next few years.*

Task 6: *Assess the priority of the various remedial work recommendations and develop an implementation plan for the next few years. This will allow you to plan and budget for these activities and hopefully eliminate the surprise of special assessments, as well as the need for less cost-effective short-term solutions. The plan will be discussed with the Strata Council and can be adapted to meet anticipated cash flow realities.*

Task 7: Prepare two copies of the final, professionally sealed report. Based on our findings we will propose a conceptual remedial work program, including quantity and cost estimates and an implementation plan and schedule. We will meet with the Strata Council on one occasion after the report is submitted to discuss our conclusions and recommendations."

1.3 Basic Information

MH was provided with the following background information and documents to assist in our assessment of the condition of the building envelope systems:

- Architectural drawings A-1.0 to A-8.2 (21 drawings in total), prepared by Poon McKenzie Architects, dated between December 19, 1995 and January 8, 1996.
- Report written by First Choice Repairs & Services Ltd. dated October 4, 1999.
- MH Deficiencies Questionnaire Surveys (12 in total), submitted through July, 2002.
- Discussion took place with owners or tenants including Ron Roach, (vice-president of the Strata council), regarding previous leaks and remedial work performed at the complex.

1.4 Limitations

This review was based on visual inspection and a review of available documents. It is a basic assumption that any correspondence, material, data, evaluations and reports furnished by others are free of latent deficiencies or inaccuracies except for apparent variances discovered during the completion of this report.

Unless specifically noted in this report, no testing, detailed analysis or design calculations were completed, nor were they within the scope of this review.

Any comments or conclusions within this report represent our opinion, which is based upon the documents provided to us, our field review of physical conditions, specifically identified testing and our past experience. This review is limited to technical, construction and performance items.

Some of the findings herein are based on a random sampling, while others are based on a visual review of the surface conditions. There are potentially other deficiencies that may exist but were not recorded in this report. Any deficiencies omitted were due to limited visual and physical access to areas of the envelope where cladding was not removed or probed.

In issuing this report, MH does not assume any of the duties or liabilities of the designers, builders or owners of the subject property. Owners, prospective purchasers, tenants or others who use or rely on the contents of this report, do so with the understanding of the limitations of the documents reviewed, the general visual inspection undertaken and that MH cannot be held liable for damages which may be suffered with respect to the purchase, ownership, or use of the subject property.

2. ASSESSMENT METHODS

MH's assessment approach was through a series of steps, which focused the investigation and sample areas addressed.

We initially undertake a visual review of a broad sampling of the building. A focused sample of locations of concern is identified for moisture probing by our visual observations, drawing review and occupant survey results. The findings of the above steps are then used to identify a limited number of locations for exploratory test openings.

2.1 Site Inspection

Four site visits were made in July 2002. During site visits we carried out an exterior visual inspection of the buildings, including walls, roof, balconies, and windows. A review of the parking garage was not included in the scope of work. We visited several suites, including all those that identified moisture-related problems in the questionnaire.

We followed this with a moisture probe survey, focusing on problems areas highlighted in the earlier visual examination. The fieldwork was carried out by Maria Faraone, M.Arch. (Intern Architect) and Brian Simpson (Building Science Technician.) on July 19th, 22nd, 23rd, and 24th. A contractor, B.J. Plastering, was retained to make the exploratory openings on July 23rd and 24th in selected locations based on the results of the previous steps of assessment work. David Kayll, FMA, P.Eng., BEP visited the site on July 23, 2002.

The weather at the time of the fieldwork was warm and sunny, with temperatures ranging from 24°C to 33°C, with an extended period of dry weather preceding the fieldwork.

2.2 Moisture Probe Survey

As part of the scope of work, the moisture content (MC) of wood at selected locations was assessed using a Delmhorst Model BD-9 moisture meter with a range from 10% to 50% MC. Probing was performed by drilling two 4mm diameter holes approximately 20mm apart through the stucco and into the sheathing. A MC reading was then taken and recorded. After the readings, both holes were cleaned and filled with sealant.

2.2.1 Limitations and Sources of Error

The moisture probe survey carried out was intended to assess the extent of moisture ingress and the potential for deterioration of the wood sheathing and

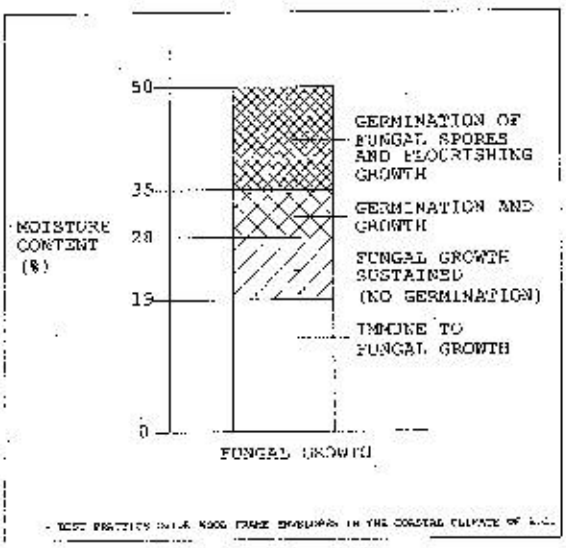
framing at a sampling of the wall areas where moisture damage typically occurs. It was not a comprehensive survey to identify all areas affected by moisture.

The Delmhorst moisture meter measures the electrical resistance of materials between two pins that are set a specific distance apart. The presence of water lowers the electrical resistance of the wood and the manufacturer has determined the relationship between resistance and moisture content. The relationship is not linear and is affected by material characteristics (calibrated for Douglas fir, species correction factors not used in this report) and temperature. The meter is calibrated to take accurate readings at about 20°C. At lower temperatures, actual moisture content will be slightly greater than the measured value. In this report MC readings are reported directly from the meter.

Erroneous readings can be produced if the meter pins probe near or through flashing material or metal lath. Also, slightly higher readings are produced when the probes contact treated wood due to the electrical conductivity created by hydroscopic salts used in wood preservative impregnation.

Moisture content readings taken are only indicative of the amount of moisture present at the location probed and at the time of sampling. MC depends on relative humidity to which the wood is exposed as well as the history of exposure to liquid water and mechanisms that promote drying. This must be considered when interpreting moisture content readings. Typically, only 10% of Vancouver's annual rainfall occurs during the summer months. Measurements taken late in the summer may not be characteristic of the yearly average state of the sheathing.

2.2.2 Interpretation



Generally, wood MC measurements less than 20% are indicative of wood that has not been exposed to liquid water and the MC is below that required for wood decay processes to propagate. It is rare to find moisture-related problems in wood where such readings have been measured.

Moisture contents in the range of 20% to 30% indicate exposure to excessive moisture, and represent a moisture content range at which fungal growth can be sustained. It is interpreted as a "Caution" reading and the condition of the wood should be verified through visual review using exploratory openings. The insertion of the probes gives some information on the structural integrity of the sheathing. Undamaged sheathing should provide solid resistance to the probes, whereas severely moisture-damaged sheathing provides little or no resistance.

Generally, wood moisture content measurements greater than 30% indicate conditions under which fungal spores will germinate and, above 35% indicates flourishing growth in saturated conditions. In this situation the wood either already contains significant amounts of rot or, there is a high potential for rot to occur in the near future. Decay will progress quickly under such conditions unless treatment to prevent decay is initiated. This is interpreted as a "Danger" reading which should be verified through visual review using exploratory openings.

2.3 Exploratory Openings

After the completion of the moisture probe survey, exploratory openings were undertaken to confirm the condition of the wood sheathing and confirm as-built detailing. Exploratory openings consist of cutting roughly 200 x 200mm (8"x8") sections of the stucco cladding to view the condition of the wall components behind. The openings were made at locations where deterioration of the wall components was expected, based on results of visual examination and MC measurements or at locations where construction assemblies were unknown and suspect. After examination, the openings are provided with a temporary seal to prevent further entry of water into the wall assembly.

2.4 Occupant Questionnaire

As part of this report, we initiated an occupant questionnaire survey that provided us with information on specific areas of concern. The owners were asked to indicate which areas of their unit (walls, ceiling, floors, windows, etc.), leaks and other problems were occurring. We utilized the information in the survey to obtain an indication of the history and nature of problems and to focus our site investigations. The results of the survey are discussed in section 3.3.

3. REVIEW OF EXISTING CONDITIONS

3.1 Building Description

The following table provides general information about the building (refer to Photos #1-3 in Appendix B).

Building Address/Name	929 West 16th Avenue, Vancouver, BC
Owner	Strata Corporation LMS 2421
Property Manager	Mr. Jim Allison, Assertive Property Management Ltd.
Building Type	Residential Condominiums
Type of Construction	Woodframe construction
Number of Suites	39
Date of Construction	1996
Applicable Building Code	City of Vancouver Building Bylaw 6134 along with all applicable Bulletins
Number of Storeys	Constructed as a three storey residential building with four levels of condominiums
Parking	Two level below grade, reinforced concrete parkade
Adjoining Properties/ Exposure Condition	North: Back face of building has wood fence screen separating laneway West: Wood fence screen against neighboring residential building with no pedestrian access South: Front face of building facing West 16th Ave. East: Open green space allowing pedestrian access between north and south facades

3.2 Details and History of Building Envelope

The Project is approximately six years old and has shown some signs of water ingress problems. A previous investigation prepared by First Choice Repairs & Services Ltd., dated October 4, 1999 identified areas of the cladding, window penetrations and

decks that were poorly sealed or where sealant has deteriorated. The report also identifies problems with the flashing seams.

A key issue in the previous report was the deterioration of the glulam beams over the parkade ramp (refer to Photo #4 in Appendix B). Repairs have been completed which attempt to address the majority of these issues. Previous repairs included some sealant work around windows.

3.3 Review of Architectural Drawings

The architectural drawings prepared by Poon McKenzie Architects dated December 19, 1995 are labeled "Issued for Construction" and may not reflect "as-built" conditions. It is important to understand that changes that occurred during construction may not be visible during our field investigations. In these situations we assume that the design drawings reflect "as-built" conditions unless we saw deviations from the design under each building envelope element.

The exterior wall cladding consists mainly of stucco with large areas of masonry at the south elevation and at all the ground floor wall areas. Windows are primarily thermally broken units with casement type operating elements. There are some stucco/masonry wall junctions that have a wood trim piece located at the south elevation, fourth level.

The predominant roof system is a flat SBS membrane roofing with a protective ballast cover. The flat roofs slope towards central roof drains. The sloped roof areas have an asphalt shingle cladding.

There are eight decks at the fourth storey level over living spaces. The balconies and decks are waterproofed with a cold, liquid applied, polyurethane membrane.

Detailed descriptions of our field observations follow.

3.4 Walls – Drawings and Field Observations

3.4.1 Original Drawing Review

The architectural drawings show the typical stucco wall assembly as:

Acrylic Stucco System on Wire Mesh
Typar or Tyvek Moisture Barrier
12.7 mm Plywood sheathing
38x89 wood studs
R12 batt insulation

6 mil poly vapor barrier
12.7 mm type 'X' gypsum wallboard

In this wall assembly we have assumed that the Tyvek is intended to act as the moisture barrier. Based on the described assemblies, it would appear that the design intent was to use the sealed polyethylene sheet as both the air barrier and vapour retarder.

We noted through-wall flashings were used between storeys at the stucco wall cladding. This through-wall flashing acts as a horizontal expansion joint in the stucco. The stucco terminates at the top of the masonry wall with a metal angle where the top edge of the angle is bent outwards to form a caulk joint or a "gum-lip" detail.

There are black stains on the surface of the cladding particularly above the masonry wall or next to lower roof projections. There were also stains below window weephole openings where water from the window units drained onto the face of the cladding. (Refer to Photos # 5-7 in Appendix B).

The architectural drawings show the typical masonry (brick) wall assembly as:

90 mm Standard Brick
25 mm Air Space
Typar or Tyvek Moisture Barrier
12.7 mm Plywood Sheathing
38x89 Wood Studs
R12 Batt Insulation
6mil Poly Vapor Barrier
12.7 mm Type "X" Gypsum Wallboard

We have assumed the Tyvek is intended to act as the moisture barrier. Based on the described assemblies, it would appear that the design intent was to use the sealed polyethylene sheet as both the air barrier and vapour retarder.

It appears from our investigation that the typical masonry wall description closely describes the as-built condition. In some locations building paper was used instead of Typar or Tyvek. This was noted at previously repaired areas at the glulam beams (refer to explorative opening, "EO" # 5). This building paper may have been installed during the previous repairs.

There are several areas of efflorescence staining on the masonry. This includes areas at the west, north and east elevations. There are signs of efflorescence where gutters appeared to have leaked onto the top course of the masonry. The top course of masonry has cracked mortar joints particularly

where the masonry wall meets the balcony. (Refer to Photos #8-10 in Appendix B).

There are expansion joints in the masonry wall at the north elevation that are filled with sealant. They appear to have been recently resealed and are in good condition.

There is one area with a mortar joint crack between the first and third storey at the south elevation. This may be a result of building settlement. Other signs of building settlement were noted at the building interior in the fourth level hallway.

3.4.2 Field Review Observations

3.4.2.1 Stucco

The stucco walls encompass part of the second third and fourth levels. The system used is often referred to as a "concealed barrier" wall, where the through-wall flashings are intended to divert moisture from the Tyvek moisture barrier to the outside. In general the stucco appears to be in fair condition except for localized areas of staining and cracking.

Typical staining on stucco walls includes areas below window weep holes and window mullions. There are black stains at the base of second level wall areas, above the masonry walls, which is due to back splashing water from the back-sloped masonry flashing. There are many areas of efflorescence staining on the stucco which include next to vents and above masonry walls. There are mold stains at the face of the eaves indicating that rainwater overflows when the eaves are full of debris. There are some small sections of incomplete stucco application under the through wall flashing. (Refer to Photos #11-14 in Appendix B).

There are glulam beams over the parkade ramp access. Previous repair areas noted were at the glulam beams and at locations where previous moisture probe tests were patched. The repair work to the beams included removing a portion of the beams that had become water damaged and installing a steel beam and column support system. The glulam beams were reclad with a stucco system which included untreated furring strips without a drainage outlet at the base of the beam cladding. It was noted that at one location reviewed that the repaired stucco cladding at the glulam beams incorporated building paper.

Stucco cladding is also used on the balcony columns. The stucco appears stained in areas under the metal cap flashing and at the base of the columns. The metal flashing at the base of the wall just above the glulam beams is warped and backsloped in most locations of the north east corner of the building. (Refer to Photo #15 in Appendix B).

3.4.2.2 Brick Veneer

Masonry cladding is a full width veneer with a cavity wall. The masonry is in place at the ground floor of the entire building and full height in areas at the north and south elevations.

There are mortar joint cracks that extend up two storeys on the west face of a projected wall on the south elevation. There is another mortar joint crack at an exterior sprinkler head over the ground floor window below the building overhang at the south elevation. The mortar joints appeared to be in fair condition in the locations reviewed. The mortar joints are hard and do not show signs of deterioration in the areas reviewed.

There are weep holes provided at regular intervals at the base of the building. They appear to be clear of mortar but were often plugged with debris. There are significant areas of efflorescence staining on the masonry. These areas include next to eaves and downspouts and below the masonry top rowlock course.

There are exposed ledges on the veneer top rowlock course where there is a warped / lifting partial cap flashing. In general the top of the masonry wall is poorly protected and deflects water back up against the stucco wall due to the lack of positive slope. (Refer to Photo #16 in Appendix B). This is also the case at the window sill trim brick which is only partially protected by metal flashing. This results in water absorption and efflorescence staining at the face of the brick below window areas. The mortar joints in these areas reviewed were in fair condition.

The masonry construction includes steel lintel angles above window openings that are of galvanized steel. (Refer to Photo #17 in Appendix B).

In general it appears that at least two-thirds of the brick width bear on the steel support, as is required by Code. There are vertical expansion joints in projected portions of the building that have undergone recent resealing.

The transition between stucco and masonry cladding is completed with a wood trim board at the top level and a sealant / masonry joint at other levels. In the areas reviewed the trim board was in fair condition.

3.4.2.3 Wood

The balcony columns are clad with stucco at the lower half and wood trim board at the upper half. The painted wood trim boards are slightly weathered in some locations, with shrinkage cracks and warping. (Refer to Photo #18 in Appendix B).

Painted wood trim board is also used at the stucco / masonry transitions. They are nailed in place. Where removed, the trim boards were in fair condition. These single continuous trim boards are butt-jointed to the masonry.

The balcony fascia boards are painted wood trim. In general those fascia boards reviewed are in fair condition. At a top level corner balcony at the north elevation, the fascia board is located over top of an exhaust vent penetration. At this location slits were cut into the fascia board to provide the vent opening. Black mold staining was noted around the slit openings at this wood fascia board.

3.4.2.4 Flashing

Metal flashing was reviewed in locations at the balcony columns, at the perimeter of the balcony edge, at the through-wall flashing, at the base-of-wall flashing, and at the roof perimeter. Membrane was not installed under the balcony column cap flashing. The balcony metal cap flashing was lap seamed at flashing ends and corners. The through-wall flashing was also only lap-seamed.

There is a projected base-of-wall flashing at the masonry wall. The flashing ends are jointed with standing seams, which have a sharp exposed edge making them vulnerable at these publicly accessible ground floor locations. (Refer to Photos #19-20 in Appendix B).

The balcony waterproofing system terminates at the perimeter edge flashing. At many balconies reviewed, the perimeter flashing was black stained with moss build-up. The slope on the balconies appears to be insufficient in some areas where there is evidence of water ponding. (Refer to Photos #21-22 in Appendix B).

The balcony edge flashing at the fourth floor, south elevation is also stained. The column cap flashing has become dislodged. (Refer to Photo #23 in Appendix B).

Flashing located at the roof perimeter was in fair condition. There was membrane noted under flashing in the areas reviewed. The perimeter roof flashing at the elevator shaft projection was loose in some locations and not sealed at the corners. Membrane was not noted under the perimeter flashing at the elevator projection. The corner seams appeared to have been poorly constructed and there is evidence of water ingress and staining at the southwest corner of the elevator shaft roof projection. (Refer to Photo #24 in Appendix B).

3.4.2.5 Sealant

Sealant in general is in fair to good condition. Many areas reviewed appeared to have undergone recent sealant repair work. There were some areas with deteriorated sealant; including at the balcony columns between wood trim and cap flashing and at window interior corner locations. (Refer to Photo #25 in Appendix B). Continued rigorous maintenance is essential.

3.4.2.6 Glulam Beams

There are glulam beams that separate the building from the steel post and beam system over the parkade ramp. These glulam beams have experienced varying degrees of mold growth and rot which should not be allowed to continue.

3.4.3 Moisture Probe Survey

Probes through the stucco to measure the sheathing moisture content (MC) were performed at 31 locations. The probe locations and results are shown on the elevation drawings in Figure 1 through 3, Appendix C.

The Table on the following page summarizes by elevation, the results of the moisture probe survey.