



REPORT

**Building Envelope Condition
Assessment – The Sonesta**

1989 Dunbar Street
Vancouver, British Columbia

Presented to:

The Owners, Strata Plan LMS 2790
c/o Judi Schuman
Crosby Property Management Ltd.
#600 – 777 Hornby Street
Vancouver, B.C.
V6Z 1S4

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1. INTRODUCTION

1.1 Terms of Reference

Morrison Hershfield (MH) was retained by the owners of The Sonesta (Strata Plan LMS 2790) to undertake an assessment of the current condition of the building envelope systems of their building located at 1989 Dunbar Street in Vancouver. Authorization for the study was provided in writing September 16, 2003, by Judi Schuman of Crosby Property Management Ltd.

The objective of this investigation was to assess the current condition of the building envelope of the property and to provide our recommendations with respect to any required remedial work or further investigations.

1.2 Scope of Work

The scope of our services was outlined in our proposal letter to Judi Schuman of Crosby Property Management Ltd., dated July 24, 2003 and is restated below (in italics) for reference purposes:

- Task 1: Review available 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 facility details before we perform site visits, and afterwards for estimating quantities and budgets. Ideally the documents would include architectural drawings and specifications.*
- Task 2: Review the building envelope evaluation conducted by Omni Engineering (Omni), including their testing results and conclusions. Adjust our field work testing to minimize repeat efforts, although confirm findings.*
- Task 3: As an option, an Occupant Questionnaire Survey can be a useful tool to focus, locate and determine the history of problematic areas. Typically the individual Strata Owner's have been able to provide useful information on the nature and extent of any moisture ingress issues plaguing their unit. 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 our office. We would then tabulate the results and incorporate them 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 4: Undertake a visual examination of the building cladding elements: vinyl, brick, windows, balconies 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 5: Undertake a sample moisture content survey to identify the presence of moisture in the sheathing under the cladding. The test probe locations will be chosen in areas where other visual evidence suggests that water may have penetrated the cladding, at locations where the detailing suggests a potential problem and at select locations previously probed by Omni, to confirm their results. The results of the moisture survey will assist us in determining the extent of the moisture that may exist behind the cladding and the locations for conducting core holes and exploratory openings.*
- Task 6: Based on the results from the visual review and the moisture probe survey, conduct approximately 6 exploratory openings in the vinyl cladding. Sections of the vinyl siding will be removed to review the underlying sheathing and sheathing paper. The vinyl siding will be reinstalled after the openings. The assistance of a contractor will be required to remove and reinstall the vinyl siding.*

To examine the wall areas behind the brick veneer, we will conduct either interior test cut openings in the interior drywall or remove bricks from the exterior (depending on Omni's report and current visual signs). Exterior openings can create an aesthetic problem due to patches, but they can provide more information than interior test cuts, especially when only light staining of sheathing / sheathing paper has occurred.

The interior openings would involve access to the interior of suites, removal of approximately 1 ft² of drywall and the patching of the drywall. A contractor will not be required to remove and reinstall the drywall, but a contractor will be required to permanently patch and paint the drywall holes. The brick veneer openings would require the removal and reinstallation of 4 to 6 bricks. A masonry contractor would be required to conduct this work.

We recommend that the contractors be hired directly by the Strata, under a separate contract and fee. We can assist in finding and evaluating invoices for the contractors, if required.

- Task 7: Develop conceptual remedial work and renewal recommendations with associated budget cost estimates for each major element of the exterior building envelope that is likely to require action over the next few years.*

Task 8: Assess the priority of the various remedial work recommendations and develop an implementation plan. 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 9: Prepare two copies of the final, professionally sealed report. Based on our findings we will propose a conceptual remedial work program, including budget quantity and cost estimates and an implementation plan. We will meet with the Strata Council on one occasion after the report is submitted to discuss our findings, conclusions and recommendations.

During the course of work we varied from the proposed scope of work in the following ways:

- In task 6 we noted that approximately six exploratory openings would be made in the vinyl siding. We felt that it was necessary to make a total of 15 openings. Eight of the 15 were made in the vinyl siding.
- There were no exploratory openings made from either the interior or from the exterior to assess the condition of the wall cladding behind the brick veneer. This decision was made based on the results of our visual review, the level of detail observed at other exploratory openings and based on our review of the design drawings. In addition, there were no reported problems associated with the brick clad wall areas that would indicate a potential problem.

1.3 Limitations

This assessment is based on a review of available documents and visual inspection, selective moisture content measurements and test openings taken at a sample of building envelope elements.

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.

The sheathing moisture content measurements and test openings were done 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.

This report documents the current condition of elements of the building envelope and may identify factors or mechanisms that lead to the current condition. The report is not intended to provide an opinion regarding responsibility of any party in causing or contributing to the found condition.

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.

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 as to the limitations of the documents reviewed, the general visual inspection undertaken and understand that MH cannot be held liable for damages which may be suffered with respect to the purchase, ownership, or use of the subject property.

1.4 Documents Reviewed

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

Document Description	Prepared By	Date
Architectural Drawings: A-1 to A-23, A-23a, A-24 and A-26. Reproductions from city records. <i>MH reviewed</i>	Rostich Hemphill and Associates Architects	Received by the City of Vancouver June 17, 1997. Dates vary on drawings.
Phase 1 Assessment Report and accompanying photocopied appendices (photographs) <i>MH reviewed</i>	Omni Construction Consulting Ltd.	January 14, 2003
Structural Drawings: S1. <i>Not reviewed</i>	Read Jones Christoffersen Ltd.	Received by the City of Vancouver June 17, 1997.
Electrical Drawings: E-1 to E-13. <i>Not reviewed</i>	Fenger Walker International Inc.	February 26, 1996
Mechanical Drawings: M-1 to M-10. <i>Not reviewed</i>	MCW Consultants Ltd.	February 26, 1996
Sprinkler Drawings <i>Not reviewed</i>	M.W. Saunders Engineering Ltd.	June 29, 1997

The Sonesta includes 43 residential units including 3 two-storey townhouse style units. There are six commercial units located on the ground floor (4th Avenue street level). The building is supported by a two-storey below grade concrete parking garage and is approximately seven years old.

The following table provides general information about the buildings. Refer to Photos 1 to 4 for general views of the buildings.

TABLE 1: General Information

Name/Building Address	The Sonesta, 1989 Dunbar, Vancouver, B.C.,
Owner	Strata Plan LMS 2790
Property Manager	Judi Schuman, Crosby Property Management Ltd.
Type of Construction	Concrete parking garage, concrete with steel stud infill at the commercial level, wood frame residential units.
Occupancy	Mixed use, commercial and residential
Date of Construction	Original construction 1996/1997
Applicable Building Code	1995 Vancouver Building Bylaw
Sprinklered?	Yes
Number of Suites	43 residential, six commercial
Number of Storeys	Four
Parking	Two levels of underground parkade
Exterior Cladding	A combination of stone and brick veneer, stucco, vinyl siding, exposed concrete and concrete block. Wood fascia divides floor levels and wood trim is used around windows openings.
Roof	Low slope – Two ply SBS torch-on membrane
Adjoining Properties/ Exposure Condition	North – Back lane and courtyard/patio space South – West 4 th Avenue East – Dunbar Street West – Neighboring building, adjoined

The buildings have architectural features that proved to be important in understanding the significance of our findings. These include:

- Most exterior walls are directly exposed to the elements (wind and rain). Except for recessed balconies, the buildings are not protected by roof or parapet overhangs.
- Many of the balconies are fully protected from overhangs of the balcony/roof above.

- > The ground floor of the building, commercial space and the parkade structure are cast-in-place concrete.
- > Wood trim boards are installed around the perimeter of windows/doors in vinyl clad walls (north elevation).
- > A relatively small amount of stucco exists on the complex adjacent to balconies on the south and east elevation. Acrylic coated polystyrene build-outs are used to create design features such as reveals and keystone details.

The table below provides a chronology of investigation and repair activities related to the building envelope as understood from documents and information provided to MH.

TABLE 2: Previous Investigation

Date	Repair or Investigation Activity	By
October 15, 2002 November 19, 2002 November 22, 2002	Visual review of the complex and site investigation for Building Envelope Assessment, issued January 14, 2003.	Omni Construction Consultants Ltd.
December 1998	A Conciliation Report issued <i>Not provided to MH for review</i>	New Home Warranty
June 1997	Building Envelope Assessment issued <i>Not provided to MH for review</i>	Keystone Engineering Ltd.

Judi Schuman of Crosby Property Management reported two known leaks on the property. They are as follows:

- > A relatively small leak at the hallway leading to the garbage room (Main floor). The leak reportedly occurs only during periods of heavy rain. This may be due to a waterproofing failure in the suspended concrete slab at the courtyard level above (north elevation). See section 3.6 for observations.
- > Leakage was reported by the occupant of unit 210 (north elevation) at her second floor patio door. Refer to Exploratory Opening #13, Appendix B.

1.4.1 Review of Omni Assessment Report

MH was provided with a copy of the assessment report completed by Omni Construction Consultants Ltd., dated January 14, 2003. The report was reviewed prior to our site work to familiarize ourselves with the subject property, the concerns identified, and to ensure that our site work did not duplicate Omni's.

For example, Omni notes the fact that the window head flashings do not extend past the corner of the windows. It is good construction practice to install head flashings past the window. However, Omni did not remove the existing materials to confirm whether damage has resulted from this condition. Therefore, it is unclear if the concern raised is problematic or if repairs are necessary to address the item.

We have the following commentary based on our review of the Omni report and our subsequent field review:

- *Omni Concern: Open joints of the vinyl siding were identified as concerns at balconies, wall penetrations and wall transitions.*

Response: MH conducted several exploratory openings at various locations including critical transitions and found no evidence of failure associated with this concern. Refer to the exploratory openings in Appendix B

- *Omni Concern: Drainage of the cavity behind the brick veneer walls was questioned.*

Response: Weep holes were provided at floor levels and horizontal breaks and appeared to be clear and able to function as intended. We agree that some of the flashing transitions are not ideal and that sealant is relied upon to seal them, however there is no evidence (significant staining or reported leaks) to suggest systemic problems.

- *Omni Concern: High moisture readings were reported in the exterior wood trim boards around windows.*

Response: Wood trim boards are exterior components of the wall assembly that are directly exposed to the weather. They are non-structural components. For the purposes of this assessment and evaluating the condition of the exterior wall assembly moisture probe readings were taken in wood framing elements of the building located behind the exterior moisture barrier (i.e. the exterior sheathing). The condition of the exterior wood trim boards is a concern for overall life expectancy of the trims. Deterioration due to water ingress would necessitate replacement.

- *Omni Concern: Stucco and vinyl wall cladding extends down to the concrete topping at grade level.*

Response: In exploratory openings 4, 7, 10 and 11 we reviewed the existing condition of the base of wall components. A liquid applied waterproofing membrane was confirmed to extend from below the concrete topping and up the base of the wall. We agree with Omni that it is good practice to provide a 4-6 inch break from the base of the wall cladding to grade level. However, the existing details at The Sonesta (with the exception of unit 210) appear to have been successful to date. We also note that the building structure is cast-in-

place concrete around the first floor of the building, which is where the concern was noted by Omni.

- *Omni Concern: Leaks were noted under the steel and glass awning that wraps the southeast corner of the building on the first floor above the restaurant.*

Response: We agree that surface staining has occurred at this location. The staining appears to be concentrated at each of the steel support beams for the awning. The awning slopes back toward the building and directs water to a gutter. We believe that the design of the gutter is such that water is able to run back along the awning beams and then cascade down the face of the cultured stone. We do not feel that this is a significant concern at this time. However, the owners may wish to address this item by installing a drip flashing along the outer edge of the awning to stop the back flow of water and resultant staining. We also note that regular maintenance of the gutter system is critical to avoid back-ups.

- *Omni Concern: A wood cap is used on the balcony partition walls on one area of the north elevation.*

Response: MH removed a portion of the exterior sealant at the second floor between the cladding and the wood cap. Self-adhesive waterproofing membrane was confirmed beneath the wood cap. We feel that this detail will function sufficiently at this location, based on our observations.

- *Omni Concern: No provision for drainage at masonry on the first floor, east elevation.*

Response: It is our understanding that the first floor walls are cast-in-place concrete. Based on our visual review and review of the architectural drawings it appears that the cultured stone and brick cladding is adhered directly to the concrete with no drainage space behind. This is a standard method of attachment and would explain the reason for weep holes not being provided at these locations. We are not concerned with this existing condition.

In summary, we feel that Omni has raised some valid concerns and that the focus of their investigation to typical problem areas was appropriate. However, in our opinion further investigation in the form of exploratory openings is necessary to fully assess the condition of the wall components and assembly as a whole. Through our fieldwork we were able to confirm that many of the concerns raised by Omni, although (for some items) considered contrary to good construction practice, have not resulted in envelope failure.

1.4.2 Review of Architectural Drawings

A review of the architectural drawings was conducted prior to visiting the site. We noted the following items as being significant:

- The exterior sheathing paper was specified as 'tyvek' or 'typar'. Asphalt sheathing paper was confirmed at each exploratory opening (refer to Appendix B for photos and descriptions).
- Several details call for sealing of the polyethylene (poly) vapour barrier. We assume that the design intent is to provide continuity of the poly to meet air barrier requirements. The intent is not specifically referenced in the drawings or general notes.
- A liquid applied deck coating was specified for application on balconies. A vinyl sheet membrane was used on the balconies. This change was likely made prior to, or during construction.
- Two coats of dampproofing were noted for below grade concrete walls. There were no significant problems observed during our review of the exterior walls in the underground parkade.
- Reglets cut into the concrete planter walls and the installation of metal flashing were shown in the details. We did not observe either during our review. Deterioration of the exposed planter waterproofing membrane was observed. Refer to section 3.6 for further discussion.
- The window sill detail does not appear to include an exit path for sub sill drainage. However, waterproof membrane (self-adhesive membrane) is indicated and confirmed at the head, sill and jambs of windows.
- End dams on the head flashing of windows was not indicated or provided. Refer to section 3.3 for discussion.
- We note that the wall framing at the base of wood framed walls (at north elevation, second floor) is level with the exterior patio level. If the exterior waterproofing fails then the wall framing will be exposed to water. It is preferable for the concrete curb (upon which the wall framing sits) to be raised to reduce potential damage. A failure of this detail was detected at unit 210.
- We noted that waterproof membrane was not indicated under the roof parapet caps. However, we confirmed that the roof membrane does extend up and over the roof parapets.

There did not appear to be any significant concerns identified through our review of the architectural drawings. But, several questions were raised and answered during our subsequent fieldwork. We also identified a few items that were changed prior to, or during the original construction. Refer to Section 3 for specific concerns/observations relating to the various building envelope components.

2. ASSESSMENT METHODS

The assessment approach adopted by MH can be considered as a series of sequential steps, which focus the investigation and sample areas addressed.

The initial steps are a review of drawings and occupant input and a visual review of a broad sampling of building elements. From this a focused sample of locations of concern is identified for closer review and moisture measurement. The results of the above steps are then used to identify a limited number of locations for intrusive test openings.

2.1 Site Work

The site work was arranged and carried out by David Deamer of MH. Mathew Pel of MH assisted with the visual review, exploratory openings and moisture probe survey conducted on October 10. Our visual inspection of the building included walls, roof areas, balconies, windows and the parking garage. During the process of our visual review we recorded moisture content readings at areas of concern and at locations where the existing vinyl siding could be removed (exploratory openings). The results of our moisture probe readings are discussed in section 2.2 and are shown on the elevation drawings in Appendix D.

On October 29, MH attended the site with Mar-Will Construction to undertake exploratory openings at targeted locations. Paul Bissky of Mar-Will Construction assisted with removal and replacement of wood trim, wall cladding and sheathing membranes.

We were not provided access to the interior of suites. However, window sills and balcony door sills were reviewed from the exterior where possible. There were no reported leaks on the interior of suites (with the exception of those identified in section 1.4 above) and no indication of specific leaks in the Omni Assessment report.

The weather at the time of the fieldwork on October 10 included scattered clouds and extended periods of sun, with temperatures ranging from 5°C to 12°C. On October 29 the weather conditions included scattered clouds, sunny periods and temperatures ranging from 10°C to 14°C. We note that periods of extreme wet weather preceded 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. Moisture probing is performed by drilling two 4mm diameter holes approximately 20mm apart through the exterior cladding and into the sheathing. At The Sonesta, in many cases we were able to remove the vinyl siding to expose the exterior sheathing, therefore not requiring holes to be drilled. After recording the MC reading of the sheathing, the holes (through the stucco) were cleaned and filled with sealant.

There are limitations to this method that must be considered while interpreting results.

The Delmhorst moisture meter measures the electrical resistance of materials (the presence of water lowers the electrical resistance). There is a fairly well researched relationship between resistance and moisture content of wood but it is not exact. Readings can be affected by several factors including:

- wood species
- temperature
- characteristics of the piece of wood
- preservative treatment

Errors can also be introduced by poor contact of the pins with the material being measured or by contact of the pins with metal flashing or lath.

Furthermore readings are only indicative of moisture present at the probed location at the time of sampling. MC depends on relative humidity and the history of exposure to wetting drying cycles. Since, most of Vancouver's annual rainfall occurs during the winter months, measurements taken in late summer may not identify the average state of the sheathing condition.

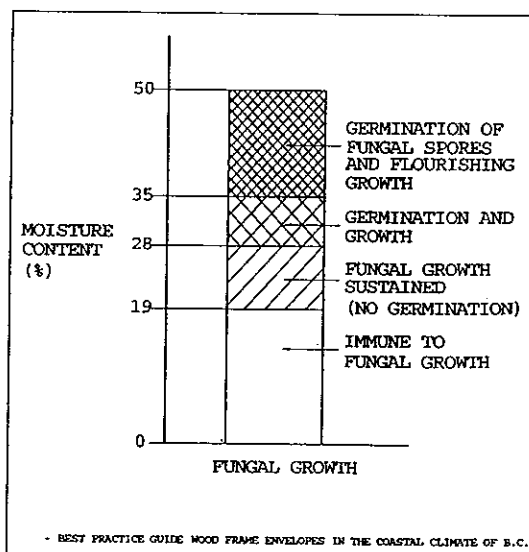
The BD-9 moisture meter has a scale for wood moisture content (with a range from 10% to 50% MC). It also has a reference scale (labeled 0-100 units) generally used for plaster and concrete. In this report MC readings are recorded as read from the meter. Temperature and species correction data is available but have not been applied because the impact is small in relation to other uncertainties.

Interpretation of MC Readings in Wood

The following guidelines were used to interpret MC measurements in wood:

MC less than 20% indicate that the wood has not been recently exposed to liquid water and the MC is below that required for wood decay fungi to propagate.

- MC between 20% to 30% indicate probable exposure to liquid water, and represent a MC at which fungal growth can be sustained. We interpret such readings as a "Caution" where the condition of the wood should be assessed by visual review.



- MC greater than 30% indicate exposure to liquid water and are conditions under which decay fungi can grow. We interpret this as a "Danger" reading which should be verified through visual review using exploratory openings.

2.3 Exploratory Openings

Exploratory 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 were provided with a temporary seal to prevent further entry of water into the wall assembly or were reinstated to match existing.

3. ASSEMENT OF CURRENT CONDITIONS

3.1 Environmental Conditions

To evaluate environmental conditions, we classify buildings under one of the following three categories:

High

Building is located with direct waterfront exposure

Located on a hill above protecting elements

Medium

Low rise building in a rural, moderately treed site

Located with buildings within five building heights

Low

Buildings of similar or greater height located within two building heights in all directions

We would classify the site as having a low exposure to wind driven rain because of its proximity to adjacent buildings.

With respect to indoor environments, and the potential for condensation in the residential units we note that ventilation is provided by bathroom exhaust vents, kitchen range hood vents, dryer vents and fireplace exhaust vents, which are controlled by the occupants. Baseboard heaters are indicated in the electrical drawings while air handling units are shown in the commercial units on the first floor.

3.2 Walls

3.2.1 Assemblies Used

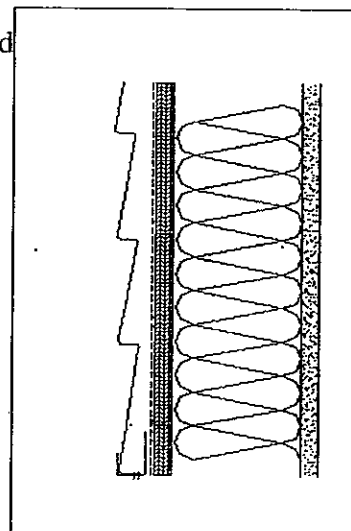
There are fundamentally five different exterior wall assemblies constructed at this project. Variations of these assemblies also exist in terms of the supporting structure, such as wood studs, steel studs, concrete and wall sheathing being plywood or gypsum. In addition, there are two privacy wall assemblies that are not technically part of the envelope, but are addressed in this assessment. All specific wall assemblies are identified and referenced in the architectural drawings. Assembly components listed below shown in italics were not confirmed through exploratory openings, but are taken from the architectural drawings. Also, refer to section 1.4.2 for significant design issues identified through our review of the drawings.

Note: Components shown in italics were not observed, but are taken from the architectural drawings.

Vinyl Walls

The construction called for in the drawings and confirmed at test opening 1 and 2 was:

- Vinyl siding
- Asphalt sheathing paper
- 1/2" plywood sheathing
- *2x4 studs*
- *R12 batt insulation*
- *6 mil poly vapour barrier*
- *5/8" type 'X' gypsum wall board*



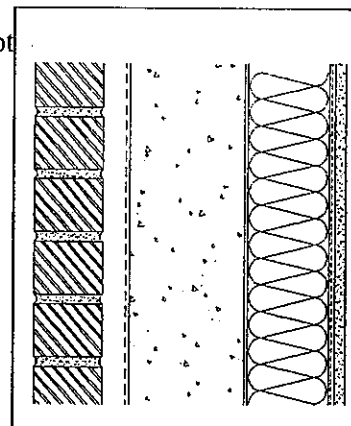
We noted the following deviations from the architectural drawings:

- Tyvek or Typar (Spun Bonded Polyolefin) sheathing paper is indicated in the drawings instead of asphalt sheathing paper.

Brick Veneer Walls

The construction called for in the drawings was not confirmed at an exploratory opening:

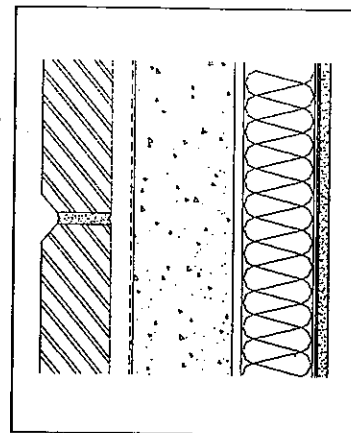
- Brick veneer and mortar
- 'Tyvek' or 'Typar' building wrap
- 1/2" plywood sheathing (or gypsum)
- *2x4 studs (or steel studs)*
- *R12 batt insulation*
- *6 mil poly vapour barrier*
- *5/8" type 'X' gypsum wall board*



Cultured Stone Walls

The construction called for in the drawings was not confirmed at an exploratory opening:

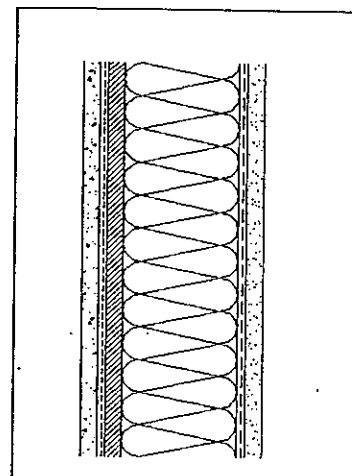
- Cultured stone masonry units and mortar (no air space)
- *Concrete wall*
- *steel stud furring*
- *R20 batt insulation*
- *6 mil poly vapour barrier*
- *5/8" type 'X' gypsum wall board*



Stucco Walls

The construction as confirmed at test opening 12 was:

- 3/4" stucco
- Asphalt sheathing paper
- 1/2" plywood sheathing
- 2x4 studs
- R12 batt insulation
- 6 mil poly vapour barrier
- 5/8" type 'X' gypsum wall board



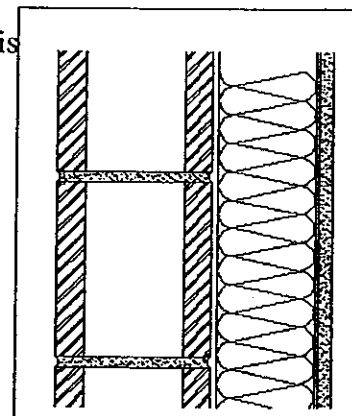
We noted the following deviations from the architectural drawings:

- Tyvek or Typar (Spun Bonded Polyolefin) sheathing paper is indicated in the drawings instead of asphalt sheathing paper.

Concrete Block Walls

There were no exploratory openings made to confirm this assembly:

- Painted or 'split face' Concrete Block
- *Steel stud or wood furring*
- *R20 batt insulation*
- *6 mil poly vapour barrier*
- *5/8" type 'X' gypsum wall board*



3.2.2 Visual Review

The following observations of the exterior walls were made during our visual review of the complex:

- Minor staining was observed on the exterior wall surfaces (vinyl, stucco, brick and stone walls) at various locations throughout the complex. More significant staining (efflorescence) was noted at the areas below the awning on the cultured stone cladding (at the commercial level). Surface staining was also noted at transitions from balcony edges and corners.
- Minor efflorescence was noted on brick veneer walls. Cracking of the brick walls was observed at two locations (one on the east elevation, middle of the second floor and one on the south elevation, third floor at east side of wall).
- Failed sealant joints were noted in a few locations and poorly sealed or unsealed wall penetrations were also observed.
- Loose, detached and buckled sections of vinyl siding were observed at a few locations on the south elevation walls.
- Corrosion was observed on many of the fireplace exhaust vent penetrations.
- The flap for one of the dryer exhaust vents on the north elevation (above opening #9) was stuck open. Maintenance personnel should conduct regular checks to ensure that these are functioning properly.
- Poorly sealed and lapped tie-ins (flashing, sealant, vinyl membrane) between balcony corners and the adjacent walls.
- A design feature exists at the southeast corner of the building at roof level. The wall cladding on the exterior side of the parapet is constructed with sections of acrylic coated polystyrene and wood fascia board. There were no concerns observed, other than the fact that this is a non-typical method of cladding. We note that attention by maintenance staff is required to ensure that all of the joints in this area remain sealed.

We note that many of these items can be easily repaired (i.e., minor expense and ease of access) and should be included as part of your regularly scheduled maintenance. The cause is likely a result of exposure to the elements or aspects of the original construction or design.

3.2.3 Moisture Probe Survey

Probes made in the exterior sheathing to measure the moisture content (MC) were performed at 20 locations. The probe locations and results are shown on the elevation drawings in Figures 1 through 4, Appendix D. Many of the moisture probe readings were taken at exploratory openings.

The results of the moisture probe survey were positive. The majority of the readings fell within the range of 5 to 15%, which are considered low to moderate. Recent

heavy rainfall preceded the site work, indicating that the wood components of the wall assembly, where probed, were sufficiently protected. A pattern of high moisture readings associated with any typical building element was not found.

Moisture readings above 15% were measured at two locations. One was at a parapet wall saddle location (measured at 17%, shown on Figure 2, east elevation). The drill filings were clean and dry and there were no obvious signs of distress at this location. We did not feel that it was necessary to explore further at this location.

The second location was at the base of the wall under the patio sliding door on the north elevation, unit 210. The occupant had reported moisture ingress on the interior of the unit at this location. Moisture readings of 25% and 40% were recorded at this location.

3.2.4 Exploratory Openings

Fifteen exploratory openings were made in the wall assemblies to confirm the construction and condition of the building envelope components. Locations of exploratory openings are indicated on Figures 1 through 4, Appendix D. Detailed observations recorded at each opening are included in Appendix B, complete with an identifying photograph.

Assessment of the brick clad walls was limited to a detailed visual review from the exterior. Investigation through exploratory openings in brick can be destructive and costly. In addition, repairs to sections of brick are likely to become eyesores on the exterior façade (repair areas stand out from unaffected areas).

Another option is to make exploratory openings from the interior of the wall assembly, however this only allows for assessment of the wall framing. It is preferable to review the lapping of exterior sheathing paper and if there is any indication of moisture entry past the face of the brick or sheathing paper. This method of investigation again can be destructive and disruptive to the occupants. The Property Manager indicated that attaining access to the suites can be difficult due to the occupants work schedules. There were no reported problems from the Strata or Property Manager relating to the brick clad areas.

Given this information we felt that exploratory openings to gain access behind the brick were not necessary at this time. However, openings in the brick should be considered during future building envelope assessments.

In general, the wall assemblies reviewed were in good condition. There was only limited indication of moisture penetration past the exterior cladding. Structural deterioration was detected at one location (refer to exploratory opening #13), which is thought to be a localized problem.

A pattern of moisture penetration or resultant damage was not detected from our exploratory openings.

3.2.5 General Discussion - Walls

The stucco walls (found at balcony edges and on the south elevation between brick clad areas) are clad in what is often referred to as *face-sealed stucco*, in which no specific provision is made for the drainage of water that gets past the face of the cladding. In a face-seal system, durability of the wall is dependent on the ability of the exterior surface of the cladding and associated sealant to shed water and to dry out before water penetrated the sheathing membrane (building paper). Water that penetrates past the stucco face, via leakage paths (e.g., cracks, ineffective or deteriorated sealants, or the absorption nature of the stucco), can provide the moisture needed for decay of the sheathing and framing materials.

Recent history has shown that the use of these systems in moderate or high exposure environments incurs a high risk of deterioration due to water entry. A number of contributing factors have been identified as leading to this^{1,2}. Major factors in governing the prevalence of problems are degree of exposure and the number of details prone to water penetration. The performance history of face-sealed stucco systems in the Lower Mainland is such that in 1996, The City of Vancouver amended its Building Bylaws to enforce systems that incorporate a drained cavity behind the stucco. These drained cavity "rainscreen" systems are now considered good practice except in the most sheltered locations³. Most municipalities in the Lower Mainland and warranty providers will not accept the use of face-sealed systems where major repairs are undertaken.

At The Sonesta, the majority of the exterior walls are clad with brick and vinyl siding. A relatively small amount of stucco is used, for which there were no significant problems observed through the course of our review. Also, we are not aware of any reported problems (interior or exterior) associated with the stucco walls.

The vinyl siding and brick clad walls (except for the first floor) have a two-stage moisture management strategy. The cladding sheds the majority of water impacting the wall and then there is a secondary moisture barrier (typically asphalt impregnated sheathing paper or sheathing membrane separated from the cladding by a capillary break. The walls also incorporate flashing to manage the moisture that penetrates the cladding and drain it back to the outside at horizontal breaks and weep holes. The brick clad walls also have storage capacity for moisture which enables the system to hold water providing additional drying time.

¹ *Survey of Building Envelope Failures in the Coastal Climate of British Columbia*, Morrison Hershfield Limited for CMHC, 1996

² Preliminary report of Part II of the Barrett Commission of Enquiry into the Quality of Condominium Construction in British Columbia, March, 2000

³ *Best Practice Guide; Wood Frame Envelopes in The Coastal Climate of British Columbia*, Morrison Hershfield Limited in joint venture with another Vancouver Engineering firm published by CMHC, 1999

The success of these systems depends on:

- Controlling the volume of water that penetrates the cladding (typically higher at the edges, corners, wall penetrations and transitions),
- The correct lapping of sheathing membranes and flashing to direct water down and out of the wall assembly, and
- Maintaining clear drainage spaces behind the cladding that allow some drainage, provide a capillary break and enhance drying by air movement. In walls with vinyl siding, furring out the cladding with strapping creates a clear cavity that improves all three effects.

Our experience with vinyl and masonry assemblies in the Lower Mainland³ is that they generally have the ability to manage the moisture load when well detailed and installed. When problems are detected, we often find them to be localized and able to be traced back to specific failures, as opposed to systemic failures requiring full rehabilitation of the wall system.

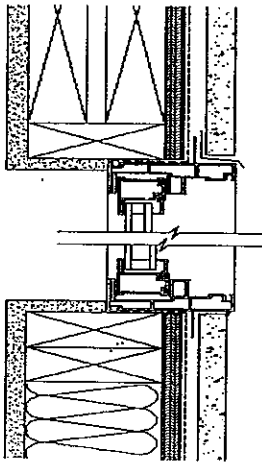
At The Sonesta we found:

- The exterior vinyl wall systems to be in good condition with no indication of stress or staining from moisture penetration. The building envelope components appear to be performing as originally intended.
- Localized damage that can be attributed to a specific failure in the at-grade waterproofing at one location. The extent and specific cause of the problem can only be determined through further removal of existing materials and assessment. However, we feel the problem can most likely be attributed to a membrane failure. (refer to Section 3.6)
- The stucco clad wall areas do not make up a significant amount of wall areas at The Sonesta. We found no evidence of failure or distress relating to the stucco walls in our visual review, moisture probe survey or exploratory openings. The stucco thickness measured at opening 12 was approximately one inch.
- Light efflorescence and staining was noted at a few locations on brick clad walls and some localized cracking was identified.

3.3 Windows, Doors, Skylights and Awnings

3.3.1 Assemblies Used

The following table identifies the primary glazed assemblies used in the project:

Window Type and Use		
Manufacturer	Almetco (no longer exists)	
Frame Material	Vinyl	
Corner construction	Welded	
Mounting method	Flange mount	
Drainage	Drained Glazing Cavity	
Type of Operator	Horizontal Sliders	
Glazing installation	Dry seal ext. / wet seal int.	
Glazing	Double	
IGU seals	Aluminum (Dated 1997 - Almetco)	
Flashing	Head flashing used. No metal sill flashing used	
Perimeter seal and trim	Cladding / trim sealed to frame with sealant	

3.3.2 Visual Review

The following observations were made during our visual review of the windows:

- Test opening at windows (test openings 8, 9, 11, 13 and 15) showed that there is no evidence of failure or moisture penetration.
- The sheathing paper was found to lap over the nailing flange at the sill, resulting in a reverse lap. This means that if the window leaks through the frame or if moisture penetrates past the cladding surface then the wood framing elements below the opening will be exposed to moisture.
- The head flashing was not installed at a few windows and patio sliding doors. These may have been missed during the original construction.
- Windows installed into brick openings are assumed to be installed using similar details to those used at other openings (s.a. membrane and sheathing paper). A visual review of these window openings showed no unusual staining on the exterior or on the interior condensation track where reviewed. We did note that the sealant around some of the windows requires repair/replacement. An allowance for sealant repair has been included in item 4 of Table 4, below.
- A shelf angle is used to support the brick at the window head and also act as a drip flashing. A metal sill flashing is installed at the window sills to deflect moisture away from the windows. Maintenance of the sealant at the ends of the sill flashing is critical and was poorly applied at one location.

- During removal of the existing materials at some window exploratory openings, it appears that a primer or stain has been applied onto the wood surfaces of the rough opening. This may be primer intended for use with the s.a. membrane, however the primer was not on the surfaces in contact with the membrane, where reviewed. Primer for the self-adhesive is often required by the product manufacturers to ensure that the material is fully adhered to the necessary substrate. Primer was not used at the openings reviewed, instead staples were used to secure the membrane. These observations do not appear to be problematic, but are considered to be improper construction practice. (What is the point of this item? Maybe just outline the observed poor installation of the SA membrane). No consequences were noted anyway.
- Wood trim boards are installed around the perimeter of window openings. The sill board is beveled at the bottom edge to provide a drip edge for surface water. The trim boards were found to be back-sealed to the surface of the sheathing paper.
- Sealant is relied upon on the exterior connections of the cladding to the window frame. The caulking is well sealed at most locations, however regular maintenance is required throughout. Failed or missing sealant was noted in a few areas.
- At exploratory openings 8 and 9 we noted that batt insulation was stuffed into the void between the window frame and the window rough opening at the sill. This will provide some thermal advantages. However, based on where it was observed, it may also block drainage of the window sub-sill cavity. There was no moisture detected at these openings.

3.3.3 Discussion

When exposed to wind driven rain, windows can allow leakage to the inside. This can create significant damage and nuisance depending on how often it happens. Of more concern, windows have proven to be a common source of water penetration in to wall systems^{1,2}. Typical leakage points include:

- poorly sealed joints at the window to wall junction
- joints within window frames particularly at bottom corners, or
- joints where sectional windows are coupled together.

In new construction or during major renovation, MH has found it necessary to assume that all windows will eventually leak through the frames. Our standard practice is to incorporate a sub-sill flashing to protect the wall and drain the incidental water out of the wall system. Such waterproofing measures protect the wall but do not improve the performance of the windows themselves. We typically recommend that at locations where major remedial action is necessary, consideration be given to upgrading to improved windows and window detailing.

At The Sonesta, the vinyl-framed windows are constructed with factory-welded corners. There was no indication of weakness or failure based on our review of the window frames. In fact, there was no sign of moisture penetration past the exterior cladding. Only minor corrosion of fasteners was noted at our exploratory openings. At this time, there is no sign of failure that would necessitate removal or major repairs to the existing windows. However, inappropriate window subsill detailing does exist. A future action plan should be developed in conjunction with wall or window repairs.

The most significant issue relating to windows is the fact that the wall sheathing paper is back-lapped at the sill. Meaning that if moisture ingress at the window jambs or sill does occur, it will be diverted back towards the interior framing, as opposed to shed away and out of drainage openings or weep holes. At this time we found no evidence of failure at any of our exploratory openings, but we did confirm the detail to be typical at each window exploratory opening.

This issue can be addressed from the exterior through removal of the trim boards and possibly removal of some vinyl siding to correct the lapping. We have included a budget figure in the cost summary table for reference. At this time there does not appear to be an immediate need to correct this item, however the detail should be monitored regularly to ensure that any leakage or failure does not go undetected. Refer to Section 4 for specific recommendations on this issue.

Head flashings at windows were found to be missing at a few locations. This may have been a construction deficiency that was left undetected. Self-adhesive membrane was used at each of the window openings and provides a membrane flashing behind the exterior cladding, as confirmed through our exploratory openings. MH did not conduct exploratory openings at windows or patio doors where metal flashings were not installed. There was no visual evidence suggesting problems, nor is MH aware of any reported problems resulting from the lack of window head flashings.

3.4 Roofs and Decks

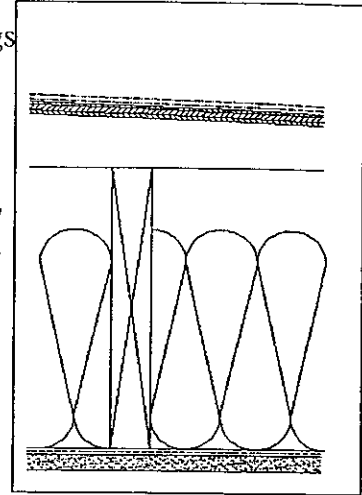
3.4.1 Assemblies Used

Based on our review of the architectural drawings there appears to be fundamentally one roof (over conditioned space) assembly used on the project.

Flat Roof (used for main roof and top floor decks)

The construction as noted in the Architectural drawings was:

- Two ply Modified Bitumen Roof (SBS)
- 5/8" plywood sheathing
- 2x4 cross strapping
- 2x8 strapping perpendicular to roof joists and tapered to min. 2" depth to provide min. 1/4" per foot slope to drain
- R28 insulation
- Poly Air/vapour barrier
- 2 layers of 5/8" type X gypsum wallboard to ceiling



3.4.2 Observations

The following observations were made during our visual review of the roof assemblies:

- Air bubbles were found at three locations, each at the perimeter stripping of the SBS roof membrane. These indicate installation deficiencies, but do not appear to have resulted in damage to the roof assembly.
- Sections of roof wall cladding (asphalt shingle and sheet metal) on the roof top parapet walls and division walls have fallen off. This likely occurred during windstorms. There was no indication of structural damage resulting from the unprotected areas.
- Sealant was found to be missing or failed at various joints in the roof parapet wall transitions (saddles) and at roof penetrations.
- Slope on the roof was generally good, with minor ponding in a few locations. Regular cleaning of roof drains is required.
- MH pulled up the roof parapet cap flashing at a few locations and confirmed that the roof membrane extends up and over the parapet.
- The roof cavity is vented to the exterior via a strip vent in the perimeter of the parapet walls (on the exterior). We noted that some of the strip venting was missing at sections on the north elevation. The roof framing was visible and appeared to be in good condition.
- A waterproof membrane (appears to be self-adhesive membrane) was installed under the metal cap flashing on a portion of the round roof parapet walls at the southeast corner. The membrane has deteriorated where exposed to UV light. This is not a building envelope concern as SBS roofing is present behind.

- The seams of the SBS roofing cap sheet appeared to be well bonded, there were no noted concerns other than the bubbles noted above.

3.4.3 Discussion

In general, the upper flat roof systems at The Sonesta are in good condition. A few minor maintenance items require attention and some small scale repairs are necessary to address specific deficiencies, as follows:

- Repair air bubbles at three locations
- Repair loose or damaged sections of wall cladding on roof areas.
- Apply sealant to unsealed or failed joints in the roof wall cladding (this includes saddles and roof penetrations).

3.5 Balconies

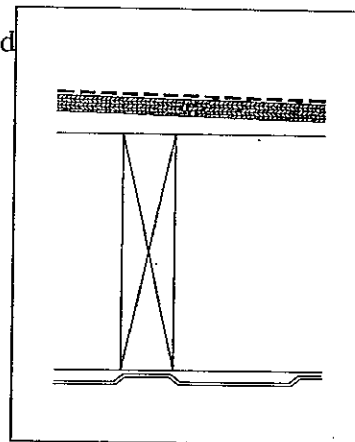
3.5.1 Assemblies Used

Based on our review of the architectural drawings and visual review of the complex there appears to be fundamentally one balcony deck assembly used on the project.

Flat Roof (use for main roof and top floor decks)

The construction as noted in the architectural drawings and as observed during our visual review was:

- PVC vinyl deck membrane (heat welded seams)
- *5/8" T&G plywood to slope away from building (drains over the outside edge of deck)*
- *Perimeter wood cant strip*
- *Joists as per structural requirements*
- *5/8" type X exterior G.W.B. soffit*



3.5.2 Observations

The following observations were made during our visual review of the complex:

- Drainage of water off the surface of the deck is achieved with slope toward the edge. Scupper drains are installed on some balconies at the outside edge. We observed poorly detailed scupper drains where they tie-in with the vinyl membrane. Sealant has been used for this connection to seal the edge of the membrane. This sealant has failed in many cases. Downspouts from the scupper drains are not used; some surface staining on the wall below the balconies does exist.

- Aluminum railings consist of 1 ½" posts and a rounded handrail. The posts are mounted directly through the deck surface and the handrail connections are made into the adjacent wall cladding. The post connections are installed on a rubber (EPDM) pad and the screw connections are sealed with sealant. We confirmed that the handrail connections were made into solid backing (for structural support) at two locations. The wall penetrations were back sealed to the cladding. A review for structural compliance of the existing railings was beyond the scope of this condition assessment.
- Exploratory openings at balconies were not deemed necessary during our visual review. There was neither indication of staining on the perforated aluminum soffit nor any indication of deck membrane failure or weakness.
- Exploratory openings 2, 6 and 14 were all made in close proximity to balconies to review suspect locations. No damage was found.
- The wood corner posts shown in opening 14 were not wrapped in protective sheathing paper (this is not considered good practice). The post was in good condition and the deck membrane was sufficiently lapped up the base of the column.
- Algae growth and surface staining were noted at several locations on the north elevation balconies. It appears that the balcony edge flashing creates a small ridge which somewhat hinders drainage over the edge. This is considered to be mainly an aesthetic concern. We note that it is always preferable to have good slope-to-drain on roofs and balconies. The conditions observed at The Sonesta do not appear to be problematic at this time. The staining was noted by Omni as a concern.
- A wood cap is installed on one of the north elevation balcony partition walls. A section of sealant was removed to assess the condition of the wall under the cap. Self-adhesive membrane was found beneath the wood cap and a moisture probe was taken (10%, dry and solid). We feel that this detail will provide sufficient protection for the wood frame partition wall.
- Many of the balconies are partially protected by the roof or balcony above, therefore not being directly exposed to the weather. A few decks on the fourth floor do not have overhang protection. A visual inspection of the fourth floor soffits was done and no unusual staining was detected.
- In the future, renewal of the balcony membrane will be required (typically a vinyl membrane has a service life of 10-15 years). Prior to renewal, an assessment of the balcony railings should be conducted. Removal of the railings will be necessary to allow for replacement. The railings must be reinstalled to meet current standards for structural attachment and lateral restraint.

3.5.3 Discussion

At this time the balcony systems appear to be functioning as intended with no significant failures or reported problems. The vinyl membrane was found to be in

good condition and the railing systems appear to be adequately secured. A few areas of concern were raised by Omni, and through our site work we feel that some relatively minor improvements are necessary, as follows:

- Check each scupper location and ensure that vinyl membrane is fully sealed to the copper scupper. Assume eight locations (Refer to Photo 14).
- Reseal the connection between second floor balcony membrane and the flashing over the adjacent cultured stone. Assume 16 locations (Refer to Photo 15).

At this time we did not identify any other issues relating to balconies that require immediate attention.

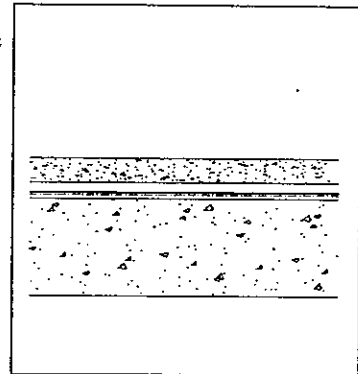
3.6 At Grade Assemblies - Patios, Planters, Parkade

At grade waterproofing assemblies include the suspended concrete slab over the parking garage, the wall/slab connection at the perimeter of the building and the concrete planters around the patio spaces.

Slab Over Parking Garage

The construction as taken from our review of the architectural drawings and exploratory opening 13 was:

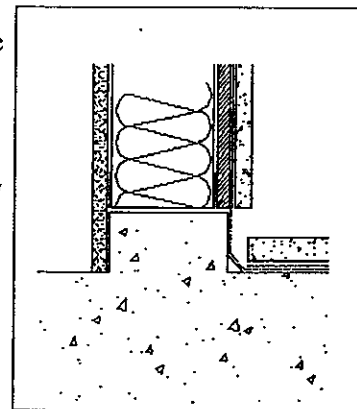
- Concrete topping
- *Filter cloth*
- *Pea gravel*
- *Protection board*
- *Liquid applied urethane membrane*
- *Structural slab*



Wall Slab Connection (Suspended slab)

The construction as taken from our review of the architectural drawings and exploratory opening 13 was:

- *The exterior wall sits upon a concrete curb*
- *The at-grade waterproofing turns up the curb*
- *At the patio door self-adhesive membrane was used and lapped over the at-grade membrane.*
- *Metal flashing, wood trim and concrete topping cover the waterproofing.*



3.6.1 Observations and Discussion

The following observations concerning at-grade waterproofing were made during our visual review of the complex:

- Exploratory openings associated with the at-grade assembly were made at five locations (Refer to Openings 4, 7, 10, 11 and 13).
- The most significant failure identified in this assessment was found at opening 13 (unit 210). We believe that several factors have contributed to what appears to be a localized failure. The concrete patio is back sloped toward the building. The membrane connection between the window rough opening (s.a. membrane) and the at-grade membrane (liquid applied) has failed. Lastly, the base of the wall framing appears to be in line with the top of the concrete patio, therefore if a failure occurs the moisture has a direct route to the interior.
- At the other openings we confirmed the height of the membrane, the thickness and the moisture content of the wood to be sufficient. We are not aware of any other reported problems associated with the base of exterior walls. However, we note that other patio doors with similar configurations to unit 210 are susceptible to the same failure if the problem details are repeated. The concrete topping at the other patio doors on either side of unit 210 have better slope away from the building. Also, the exterior trim boards do not appear to sit in water at the base of the wall.
- The first floor of the building is constructed with cast-in-place concrete. Exploratory openings 10 and 11, confirmed that at-grade membrane was applied onto the concrete exterior wall and at the bottom of the patio door.
- Concrete planters exist on the north elevation of the complex around the second floor patio areas. MH observed a significant amount of waterproof membrane exposed directly to UV light. The membrane used appears to be a liquid applied material and is likely the same material found under the patio concrete topping (at-grade membrane). When exposed to UV, the membrane becomes brittle and deteriorates (Refer to Photo 19). It is recommended that the membrane be repaired and protective metal flashing be installed to cover it around each planter. We note that the architectural drawings indicate the membrane as being covered.

We also noted the following regarding the condition of the parking garage and below grade:

- Staining and efflorescence was observed on the underside of the parkade driveway entrance (refer to Photo 24). This is not unusual in underground parkade structures and if left unrepaired could lead to corrosion of the steel reinforcing inside the concrete (over an extended period of time). Typically, a crack or joint in the suspended concrete slab provides a path for water, and a failure in the waterproofing on top of the slab allows moisture to pass through. Sealing of the crack from the underside may be the easiest and most cost effective repair method, but can redirect water to another location. The best way to address the issue is by repairing the waterproofing membrane above. This can be costly and destructive, as a portion of the concrete patio (or planters) must be broken up and removed to allow for the repair. We do not view this item as being a significant

- concern at this time and are not aware of any associated problems affecting the use or function of the building.
- Overall the parkade structure was relatively free of moisture penetration and staining, with the exception of one location, as noted.
 - A leak was reported in the hallway to the garbage room on the first floor. The area of the leak was dry at the time of the review. It is possible that a leak has occurred in the at-grade membrane on the exterior patio above. Further investigation is required to confirm the location and the source of the leak. We note that this leak does not appear to be affecting interior living space and is relatively far away from the exterior wood frame walls.

4. SUMMARY OF REPAIR ITEMS

Although widespread failure was not detected at The Sonesta, it is important to understand the significance and timing of the relatively minor repairs that are recommended in this assessment report. We note that the majority of building envelope assemblies reviewed are functioning well at this time. As the age of the building progresses it becomes increasingly important to follow through with regular maintenance and renewal of envelope components as required. Failure to keep up with repair work and maintenance can result in costly repairs.

As a general rule, MH recommends that building envelope assessments be completed approximately every five years depending on the age and needs of the specific building. We have not included this item in our summary of budget costs. Specific elements may require more frequent evaluation to ensure that failure does not occur or rapidly progress (e.g., window sills at The Sonesta).

Improper lapping of the wall sheathing paper was found to be typical to the window sills on the north elevation, as confirmed through our exploratory openings. There was no indication of damage at this time, therefore we do not consider this to be an issue that requires immediate action. We recommend that a system of monitoring the sheathing moisture levels at window sills be implemented by the Strata. In the past we have installed moisture pins into the exterior sheathing which can be checked periodically. We recommend that visual evaluation of the wall assembly (exploratory openings) also be made to accompany measuring moisture levels. An allowance has been made in Table 4 for monitoring of the window sill condition and reporting on our findings.

Evidence was found that some maintenance tasks are not being regularly addressed or reviewed. It is critical that the Strata be proactive in terms of keeping up with building envelope maintenance. Without regular maintenance some elements of the building may weaken or fail resulting in costly repairs or replacement, which may have been avoided. We have included an option for providing the Strata with a detailed maintenance manual for The Sonesta to assist with scheduling and budgeting of maintenance tasks (refer to item 9, Table 4).

4.1 Prioritization of Repair Items

To assist with the process of planning for correcting the problems identified in this report, we have assigned a priority reference for each recommended repair item. This serves as a guideline for the strata to ensure that the more critical repairs items are addressed first. The priorities are as follows (Refer to Table 4 below for priority reference to each repair item):

1. **Immediate** (as soon as practical), because of legislative requirements, safety issues, or the risk of loss of function or acceleration in the rate of degradation. These items should be repaired within the next year.

2. **Medium-term** (within 2-5 years) it may be possible to defer repairing these items to a more convenient time without major consequences.
3. **Long-term** (exceeding 5 years).

We note that it is sometimes cost effective to schedule tasks earlier than necessary on technical grounds when there are efficiencies gained by including the task with other scheduled work. We also note that there can sometimes be a cost saving gained by deferring rehabilitation of assemblies with known problems to extend the functional life of the existing components. This may incur a risk of additional damage occurring to the assembly, which could lead to increased repair costs in the future.

4.2 Summary Opinion of Probable Costs

Table 4 presents a summary of MH opinions of probable costs for the recommended remedial work.

It is important to recognize that these are offered as **probable costs**, expressed in 2003 dollars. They are based on quantities estimated from available elevation drawings, prior to development of the design and scope, and unit costs based on our experience with similar projects. We have assumed the use of specific systems and components with which we have had success in the past. Alternatives, which may have either performance or cost implications, should be considered in the design stage, and will affect costing.

Since MH has no control over the costs of construction labour, materials, or equipment, or over the contractor's method of determining prices, or over competitive bidding or market conditions, the opinions of probable cost provided are made solely on the basis of past experience with similar conditions and proposed scopes of work.

The estimates of tasks and probable costs are based on our current knowledge of the condition of the envelope. However, the presence of mold or hazardous materials can impact repair procedures and thus add supplementary costs. To account for this and other unknowns a contingency allowance should be included in the budget figures.

These opinions of probable costs are "orders of magnitude" and are for initial budgeting purposes only. More accurate cost estimates can only be obtained for work of this nature once the design, specifications and detailed tender documents are completed.

Sidebar: Comparative Cost Estimates

It is Morrison Hershfield's practice to provide conservative opinions of probable construction costs, based on the limits of available knowledge. These estimates of construction cost are intended solely for the establishment of parameters for

discussion within the Strata on the future directions for rehabilitation. These are not "quotations for construction".

We caution that these opinions are based upon MH's assumptions of the design and construction elements which would get accomplished as part of an eventual rehabilitation program. Before the final construction cost estimates can be developed with any actual representation of the final work to be accomplished, the Owners must identify the final scope of the work to be completed. This is your building and your money. Therefore, the Owners direct the final extent, and limits, of the work to be done, with professional assistance from MH.

There are always other companies willing to provide lower opinions of cost estimates, either by assuming the use of alternate systems and components, or by using "optimistic" unit cost figures. Nevertheless, the actual real costs are established by the design decisions agreed to by the Owners in consultation with MH, and the subsequent contractor bid prices on the actual design documents. It is important for the Owners to keep in mind that the only cost that ultimately matters is the actual construction cost.

**TABLE 4: Summary of Recommended Remedial Work
Probable Costs (See Notes)**

DESCRIPTION	Budget Cost	Priority (see section 4.1)
1. Wall Repairs		
Repair cracks in brick veneer (2 locations)	\$2,000	2
Install window head flashing in vinyl siding (4 locations)	\$1,500	2
2. Targeted Repairs to unit 210		
Removal of patio door and concrete topping, repairs to decayed framing, replacement of waterproofing, reinstate wall components. We note that this budget figure is based on an assumed scope of work and level of damage to the existing wall components. 20% contingency included.	\$12,000	1
3. Roof Repairs		
Repairs to air bubbles in roof membrane (4 locations, cut and patch). We assume no damage has resulted thus far.	\$1,000	2
Repair and secure loose cladding	\$500	2
Seal roof penetrations and transitions. Allow 200 LF at \$4.5/L.F.	\$1,000	2
4. Sealant Repairs		
Install sealant at unsealed exterior penetrations and replace failed sealant at locations around the complex. (windows, cladding connections, balconies penetrations). Allow 1000LF at \$4.5/L.F.	\$4,500	2
5. At-Grade Planter Repair		
Cover exposed planter membrane (with metal flashing) and seal to planter wall	\$2,500	2
6. Investigation and repair of leak in hallway to garbage room		
Remove concrete topping, fill drain and seal over with like membrane, one location	\$1,000	3
7. Improvements to Awning		
Install flashing to stop back flow of water along outer edge of awning	\$1,500	3
8. Sealing around balcony drains and flashing transitions		
Seal existing vinyl deck membrane to existing copper scupper	\$2,000	1
9. Maintenance and Monitoring Contingency		
Preparation of a maintenance manual for The Sonesta	\$3,500	-

DESCRIPTION	Budget Cost	Priority (see section 4.1)
Investigation, monitoring and reporting on the window sill condition (paper lapping), review every 2 years. <i>(Cost may vary depending on access and scope, Strata to request quote for additional services)</i>	\$2,000	1
Priority 1 – Sub-Total	\$16,000	
Priority 2 – Sub-Total	\$13,000	
Priority 3 – Sub-Total	\$2,500	
Maintenance Manual	\$3,500	
Sub-Total	\$35,000	
GST (7%)	\$2,450	
Grand Total	\$37,500	

Notes:

1. These order of magnitude opinions of probable costs are for initial budgeting purposes only. Estimates are initial figures only.
2. These estimates were developed using assumptions for unit costs and the scope of work for each item. These estimates should not be used to raise Special Assessments without discussing the implications with Morrison Hershfield before hand.
3. The contingency allowances for replacement of rotted and damaged structural members are preliminary estimates (applies to item 2 in the above table only). The final cost of this component cannot be established until the wall sheathing and damaged framing is fully removed.
4. Engineering Fees – A budget figure has not been included with the recommended work. A cost figure can be provided upon the request of the Strata.

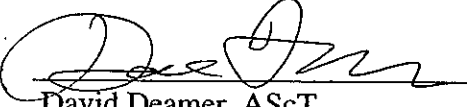
5. SUMMARY

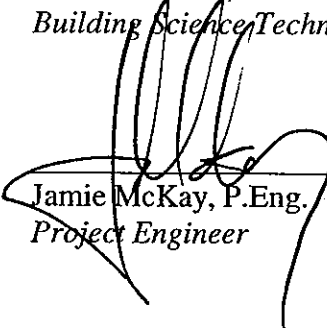
Our review found very little evidence of water penetration at The Sonesta. Localized failure was discovered at one location which has likely resulted from a specific waterproofing failure, as opposed to a widespread systemic problem. Several lesser issues were observed that could be considered maintenance items or improvements. If these items are left unrepaired it is possible that envelope failure and resultant damage could occur.

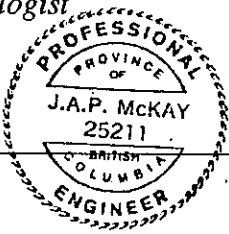
We have assigned priorities to each of the repair items and a recommended time frame during which we feel the item can be addressed without putting the envelope assemblies at risk.

The opinion of probable cost of the recommended repair/maintenance items was estimated at \$37,500. This includes all three priorities.

MORRISON HERSHFIELD LIMITED


David Deamer, AScT
Building Science Technologist


Jamie McKay, P.Eng.
Project Engineer



APPENDIX A: Terminology & Glossary

Appendix A: 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 than 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.

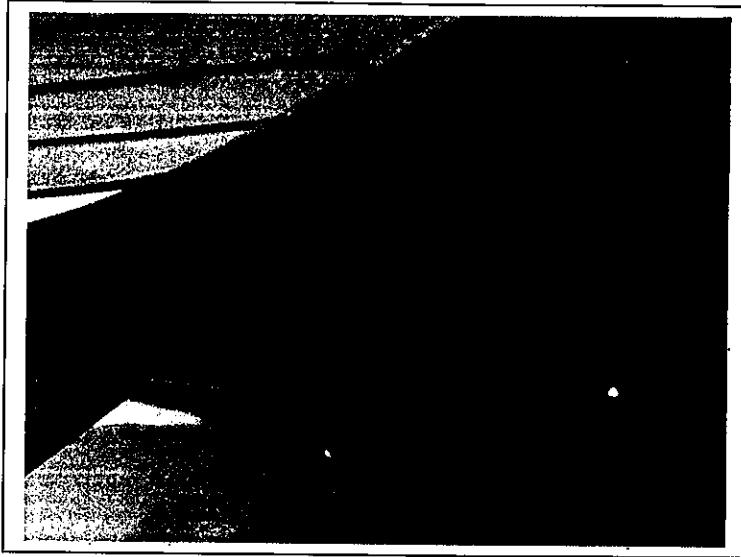
- > **Window sill:** horizontal member at the base of a window.
- > **Window head:** horizontal member at the top of a window.
- > **Window jamb:** either of the vertical members at the sides of a window.
- > **Mullion:** vertical member between the glazed units.
- > **Rail:** horizontal member between 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.

APPENDIX B: Exploratory Openings

Opening No. 1

Location	North elevation, at roof parapet above courtyard
Detail Addressed	Parapet saddle connection and roof wall
Reason location selected	To evaluate condition of roof saddle connection

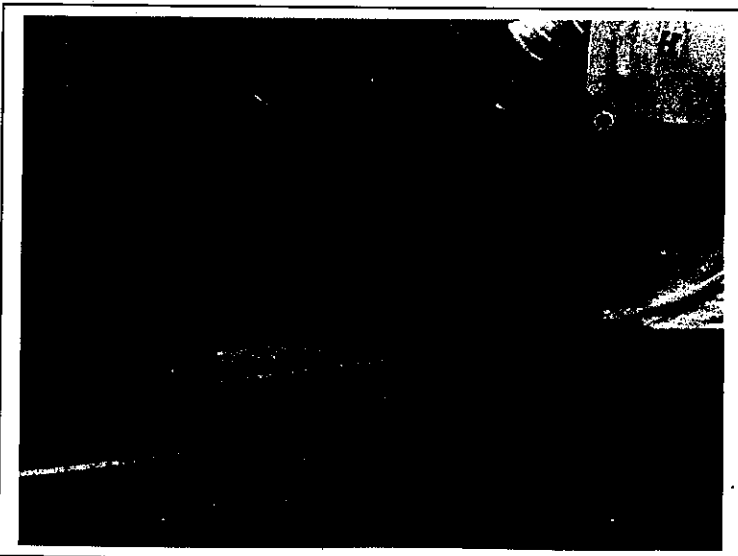


Vinyl siding removed from above the saddle connection. We confirmed that sheathing was in good condition and roof membrane and sheathing paper were well lapped.

MC - 9%

Opening No. 2

Location	North elevation, facing west at curved balcony, next to second floor patios
Detail Addressed	Base of wall adjacent to balcony saddle
Reason location selected	To assess critical wall intersections

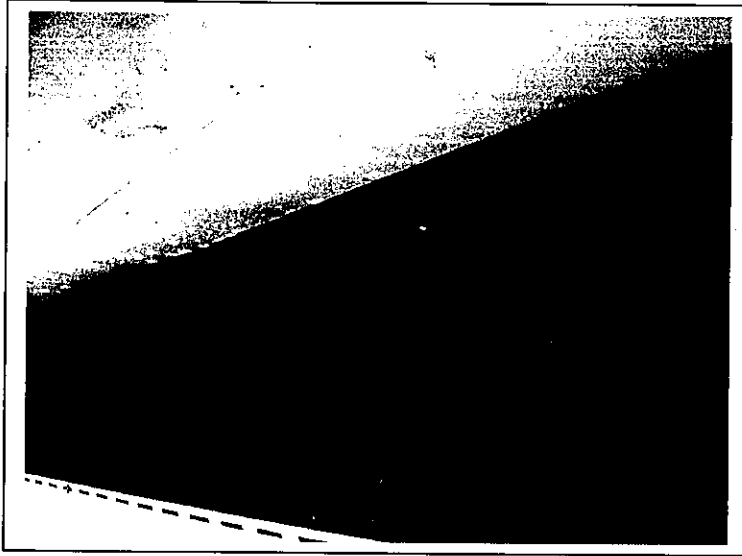


The vinyl siding was removed and the existing sheathing paper was pulled back to review the condition of the wall framing. There were no observed problems

MC - 10%

Opening No. 3

Location	Third floor fireplace vent, north elevation in courtyard
Detail Addressed	Existing detailing at exterior wall penetration
Reason location selected	Accessibility and to assess a typical wall element

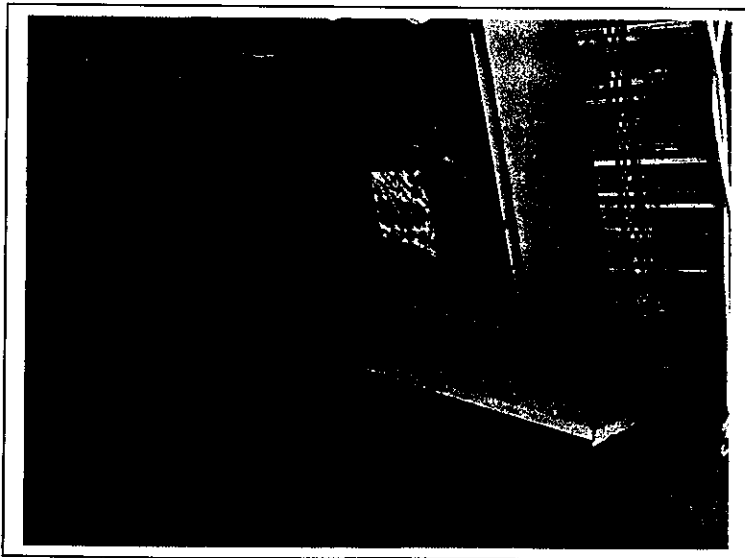


Self-adhesive (s.a.) waterproof membrane is installed under the vent penetration, as shown here. Photo shows vinyl siding pulled up the membrane installed with staples. There was no indication of primer used on the sheathing paper. There was no indication of moisture ingress.

MC - 12%

Opening No. 4

Location	North elevation, courtyard elevation
Detail Addressed	Typical base of wall detailing, at-grade membrane
Reason location selected	Easy access to this location

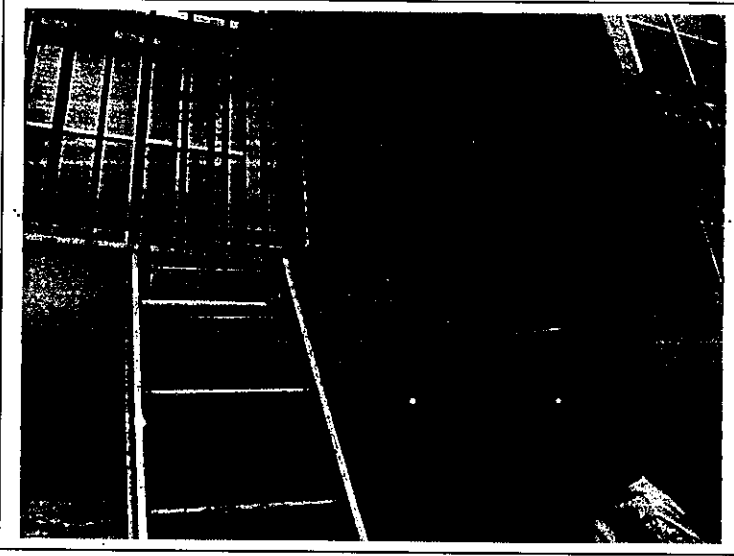


The at-grade membrane was applied sufficiently up the wall (approx 12" above the top of the concrete). The wall materials were properly lapped at this location.

MC - 12%

Opening No. 5

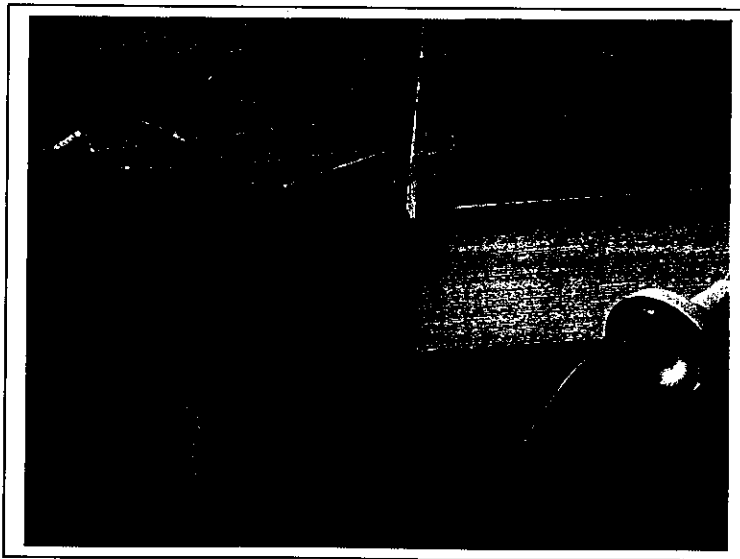
Location	North elevation, third floor sliding door
Detail Addressed	Removal of vinyl siding under window corner
Reason location selected	To assess typical detailing at a critical location



The existing siding was removed to review the lapping of paper and condition of wall framing. Plywood sheathing was clean and dry, no moisture probe required.

Opening No. 6

Location	Balcony connection to wall, north elevation second floor
Detail Addressed	Transition from balcony deck to adjacent wall
Reason location selected	Vulnerable transition, accessible

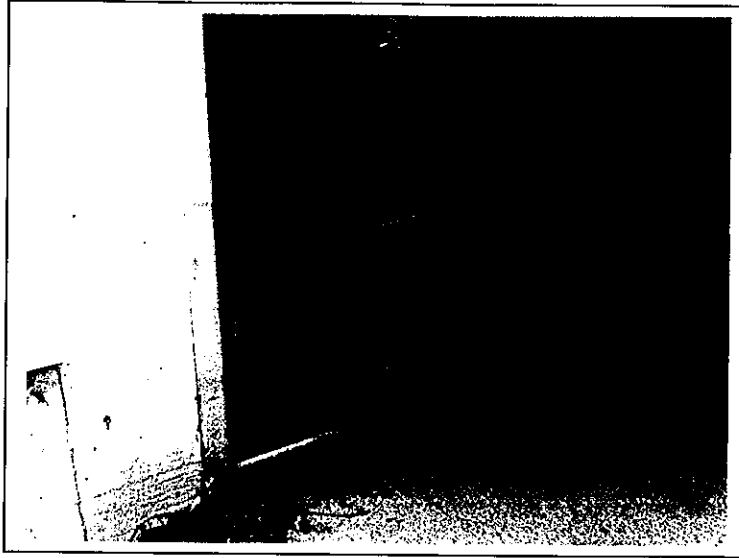


This section of vinyl siding was removed to expose the condition of the existing framing. The sheathing paper was well lapped and the framing was clean and dry, there were no noted problems. The vinyl was not removed at the balcony corner to confirm the tie-in of the deck membrane to the wall.

MC - 11%

Opening No. 7

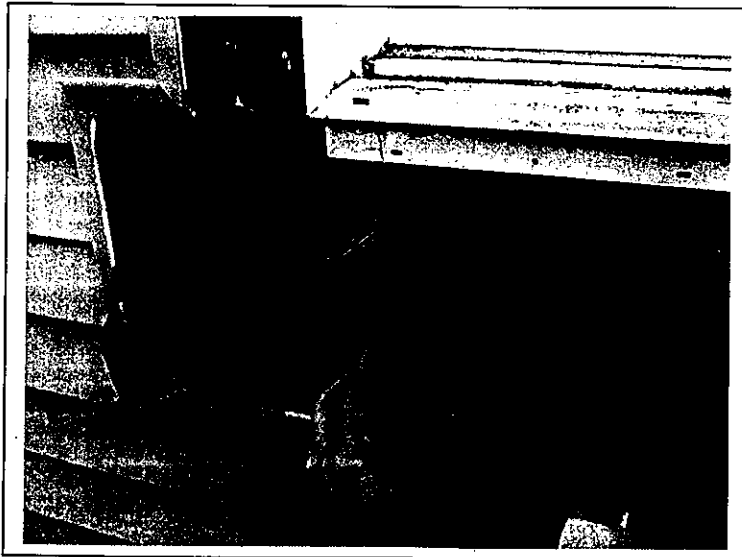
Location	North elevation, ground floor patio,
Detail Addressed	Base of wall next to patio slider
Reason location selected	Wall cladding extends down to the concrete patio, confirm existing conditions



The vinyl siding was removed at the base of the wall next to the patio slider. Concrete footing was observed at the base of the wall. Self-adhesive membrane was applied onto the concrete and wood strapping was installed at this location. There was no sign of waterproof membrane turning up the concrete at this location. No moisture reading taken.

Opening No. 8

Location	North elevation, second floor
Detail Addressed	Window sill, wood trim removed
Reason location selected	To evaluate existing window detailing



The wood trim was removed around the perimeter of the window to expose lapping of the sheathing paper and self-adhesive membrane. S.a. membrane is used at the head, jambs and sill of the window. However, the sheathing paper at the window sill is back-lapped at the window sill. In the event that moisture enters behind the cladding, it will be diverted against the wall sheathing (plywood). There was no damage observed at this location.

MC – 15% (sill)
MC – 14% (head)
MC – 13% (jamb)

Opening No. 9

Location	North elevation, third floor
Detail Addressed	Window sill, window trim removed
Reason location selected	To confirm typical detailing and lapping of sheathing paper at windows

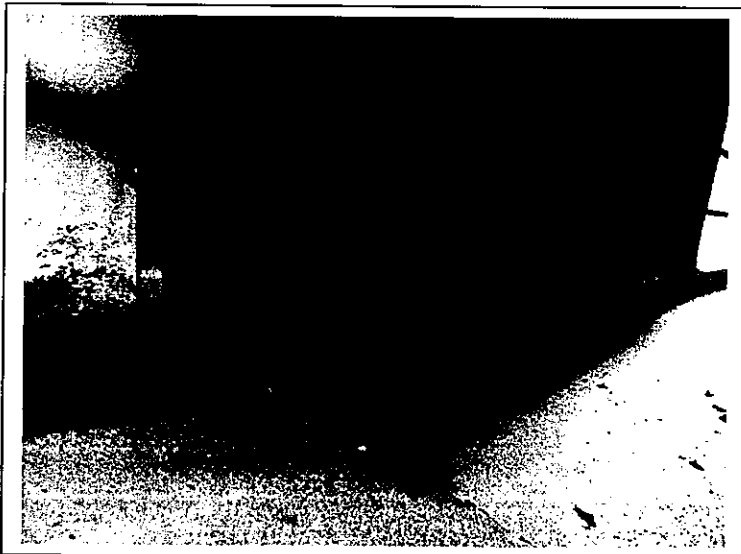


Notice the reverse lap of the sheathing paper at the window sill. This appears to be a typical condition at all windows, however there is no resultant damage observed. Batt insulation was installed between the window frame and the rough opening at the sill. We assume that this is installed to provide resistance to air leakage.

MC - 8%

Opening No. 10

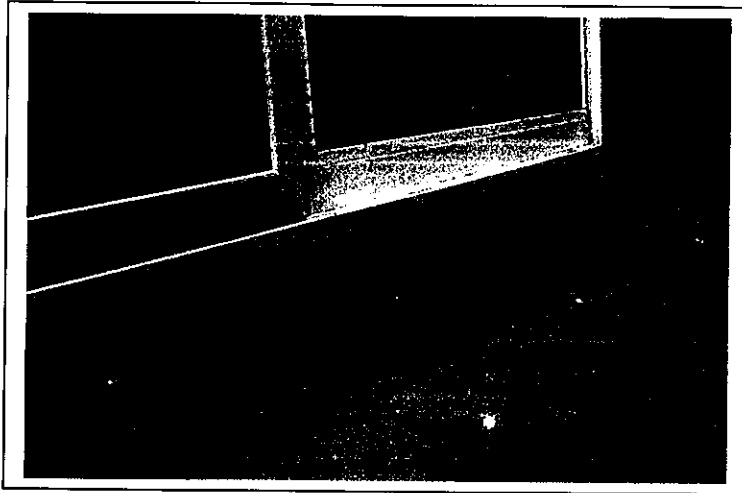
Location	Courtyard, west elevation, north side of building
Detail Addressed	Base of wall at second floor patio
Reason location selected	To confirm existing conditions.



A wood nailing strip was installed to provide backing to secure the vinyl siding. Staining on the wood was observed. Deterioration of the wood strip is expected over time. It is preferable to use treated wood, installed vertically to allow drainage at this location. A concrete curb was confirmed behind, therefore no moisture probe reading was taken.

Opening No. 11

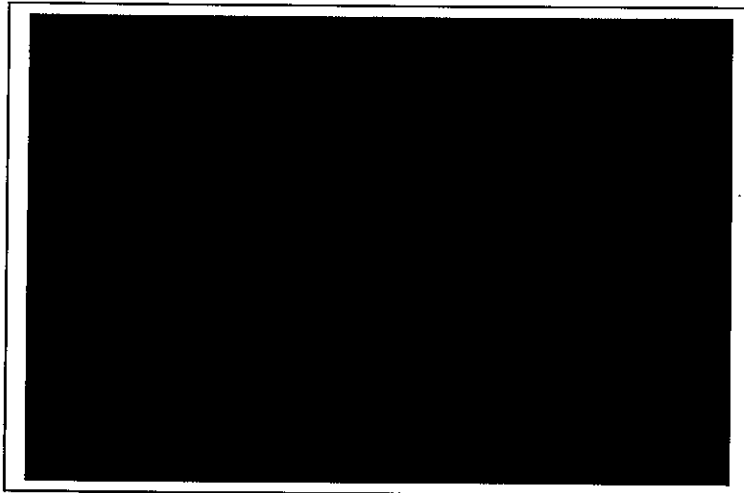
Location	North elevation, ground floor patio (next to exploratory opening #7)
Detail Addressed	Detail at base of patio door
Reason location selected	To confirm waterproofing under patio slider



Several strips of untreated wood are used as backing to secure the wood trim under the patio door. See comments in Opening #10. Liquid membrane was used as the at-grade membrane and was confirmed to lap up the concrete curb. S.a. membrane was applied under the patio door and was poorly lapped over the at-grade membrane. There was no damage observed. There was no moisture probe reading taken.

Opening No. 12

Location	South Facade/Second Floor
Detail Addressed	Column between balconies
Reason location selected	Suspect location and to confirm wall assembly / condition

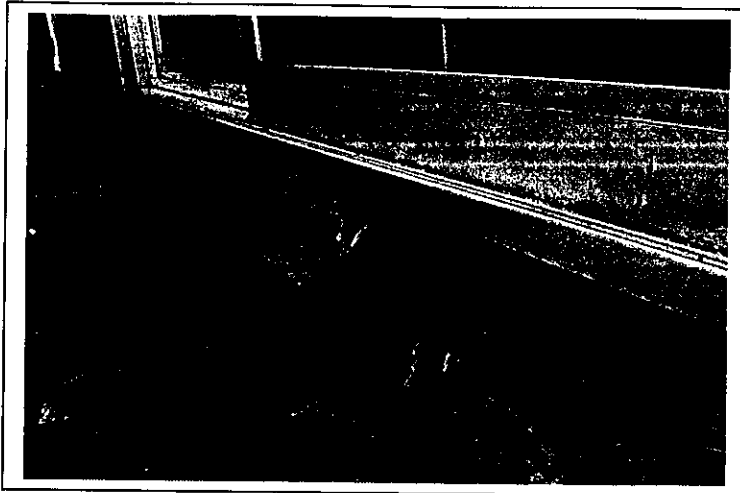


Polystyrene board was installed over top of a stucco base to form these architectural build-outs. The opening was made through the build-out. The wall sheathing was in good condition and there was no evidence of moisture ingress.

MC – 10%

Opening No. 13

Location	North elevation, patio level, second floor – unit 210
Detail Addressed	Base of wall under patio slider
Reason location selected	Reported leakage on the interior

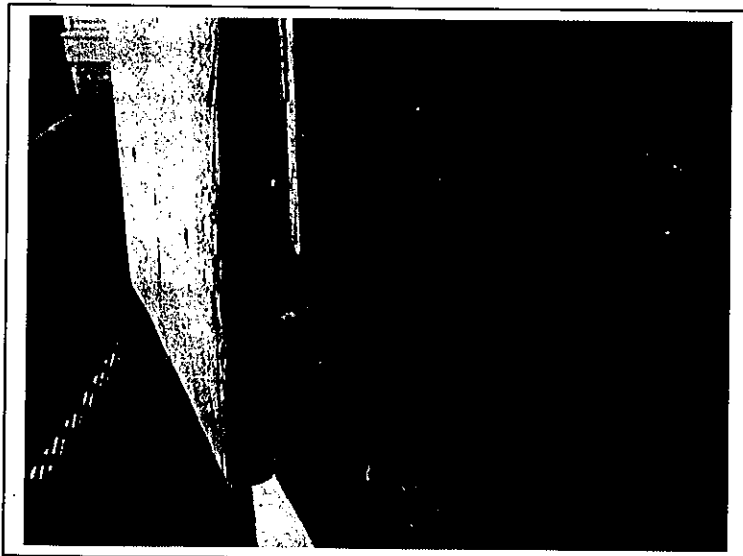


The wood trim board was removed from the exterior at the sill and on a portion of the jamb. The trim board was rotten. S.a. membrane was visible lapping from the bottom of the door down and behind the concrete topping. The framing of the door sill was decayed. Repairs are necessary.

MC – 25% at base of jamb
MC – 40% at center of door sill

Opening No. 14

Location	North elevation, third floor balcony
Detail Addressed	Wood column at outside corner of balcony
Reason location selected	Exposure and to confirm existing conditions

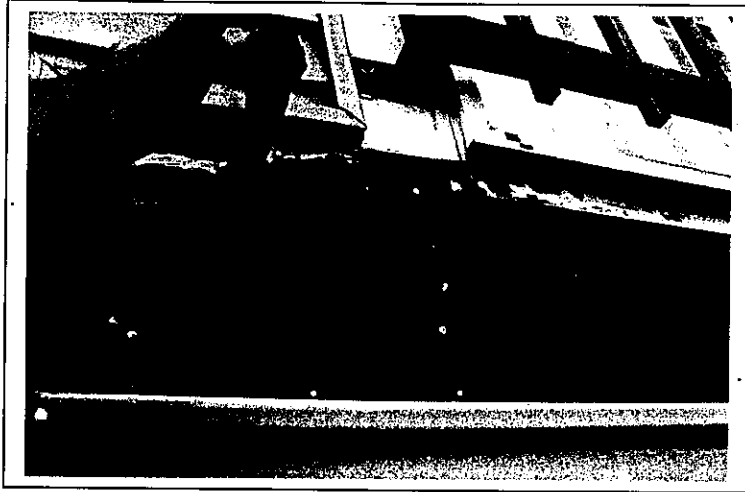


The wood column is clad with wood trim and the joints were sealed with caulking. The trim was pulled away. The vinyl balcony membrane extended up the wood post approximately 4 1/2". There was no sheathing paper or protective membrane used between the wood trim and the wood post. There was no evidence of damage due to this condition. This is considered poor construction practice.

MC – 10%

Opening No. 15

Location	North elevation, third floor
Detail Addressed	Patio slider at sill – trim board removed
Reason location selected	To assess as-built conditions



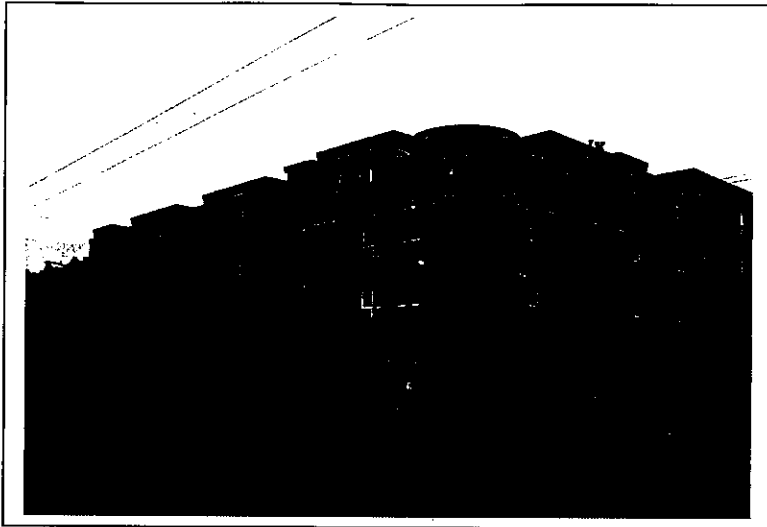
Self-adhesive membrane was used at the door sill as shown (typical) lapping over a starter strip of wall sheathing paper. The field of sheathing paper below laps over top of the s.a. membrane and the starter strip, creating a back-lap. There was no evidence of damage or significant moisture penetration onto the sheathing membrane. It was noted that the release paper was left on the back side of the s.a. membrane

MC – 15%

APPENDIX C: Photographs

Photo 1

Location	South east corner of the building (Dunbar and 4 th Avenue)
Building Element	General building configuration



Description: The south and east consist mainly of brick. Commercial units are located on the ground floor with residential above.

Photo 2

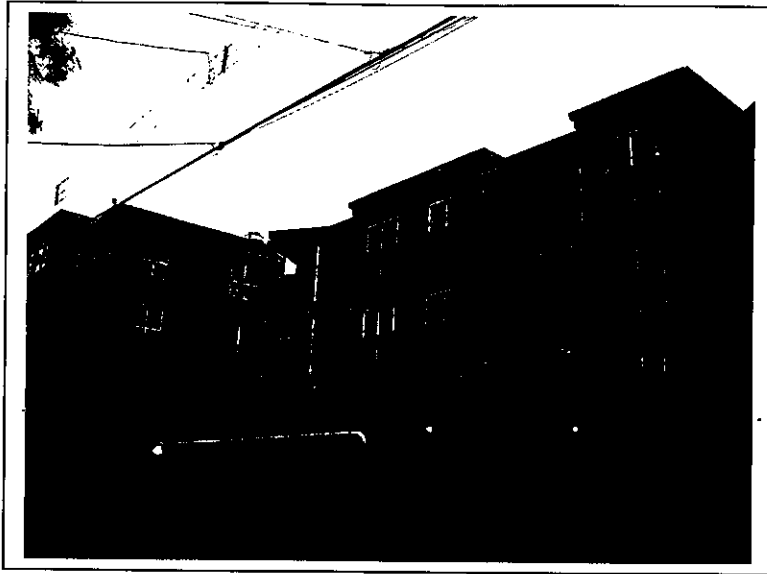
Location	East elevation (Dunbar)
Building Element	General building configuration



Description: Commercial unit and residential entrance at ground floor and residential units on above floors. The exterior walls are not protected by roof overhang, except for the ground floor commercial units.

Photo 3

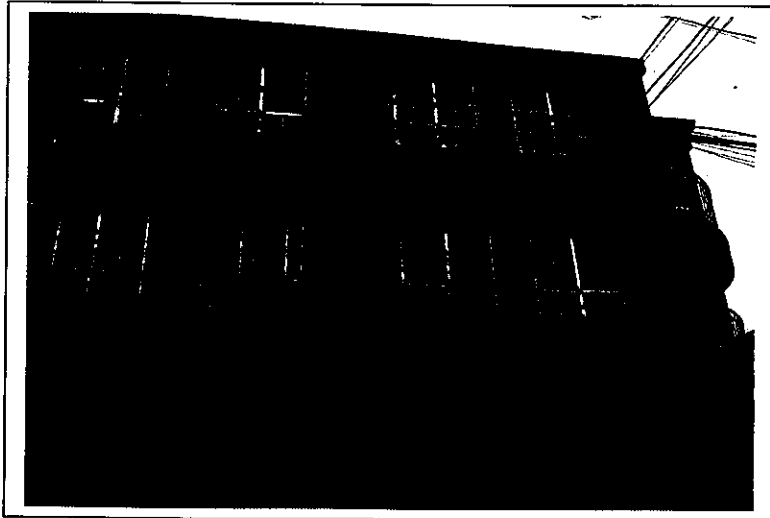
Location	North elevation (lane way at entrance to underground parkade)
Building Element	General view of exterior walls



Description: North elevation and courtyard walls are clad mainly with vinyl siding.

Photo 4

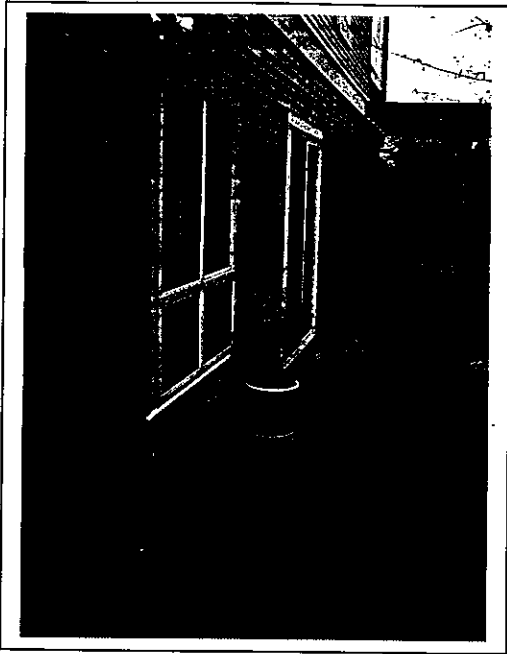
Location	North elevation, next to northeast corner of the building
Building Element	General view of window penetrations in vinyl siding



Description: Note that wood trim surrounds the windows set in vinyl siding. There is no overhang above.

Photo 5

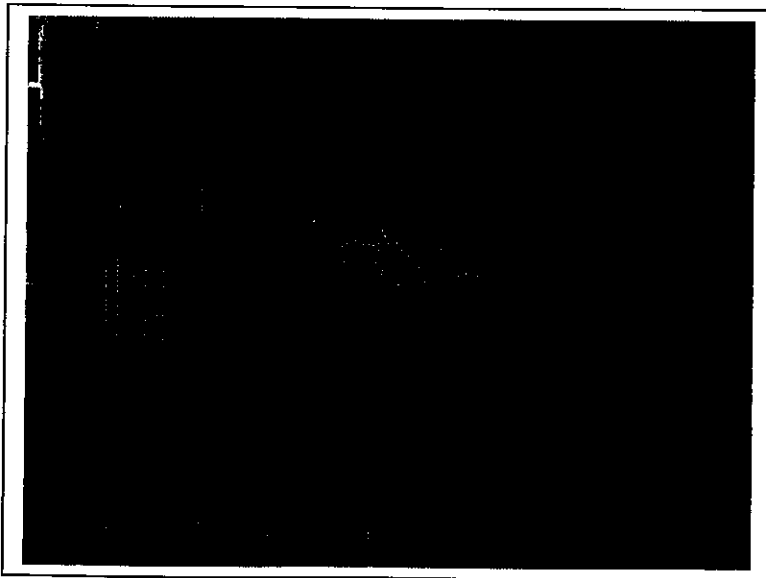
Location	North elevation at ground floor patio
Building Element	Window and patio door set in vinyl siding



Description: The wall cladding extends down to grade level. Concrete slopes to patio drains. Test opening #_ revealed this wall to be solid concrete, as the wood frame appears to terminate above.

Photo 6

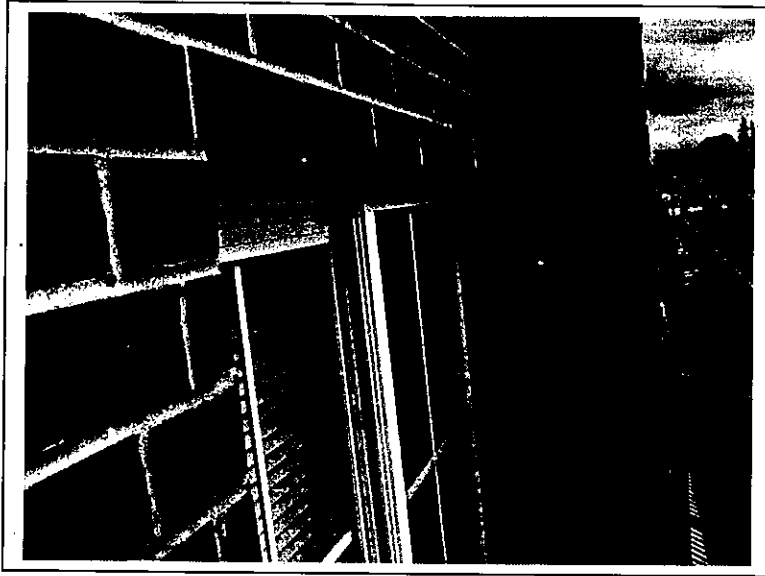
Location	North elevation, level three next to adjacent building
Building Element	Window head



Description: Note that the window head flashing was not installed at this location. At other locations the head flashing was installed but does not extend past the edge of the window jamb.

Photo 7

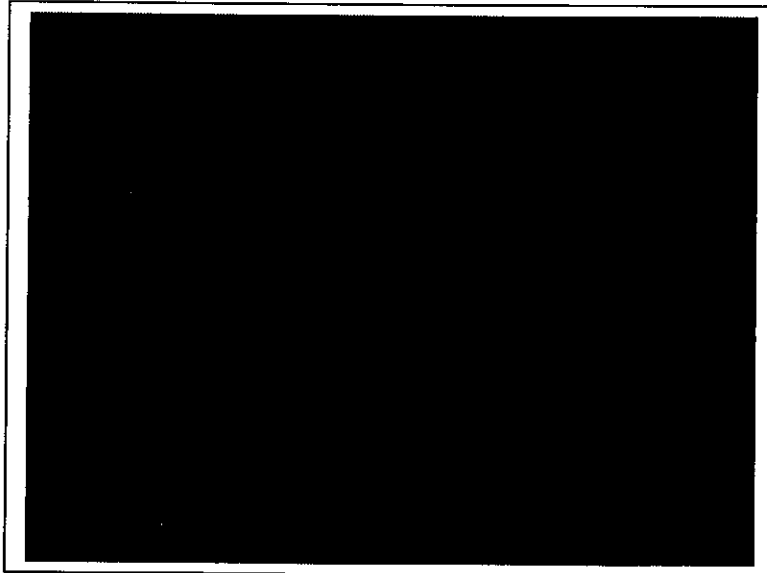
Location	South elevation, level three
Building Element	Typical window installed in brick clad opening



Description: A shelf angle is used to support the brick over the opening and weep holes are provided for drainage. A head flashing is installed at the window head under the shelf angle.

Photo 8

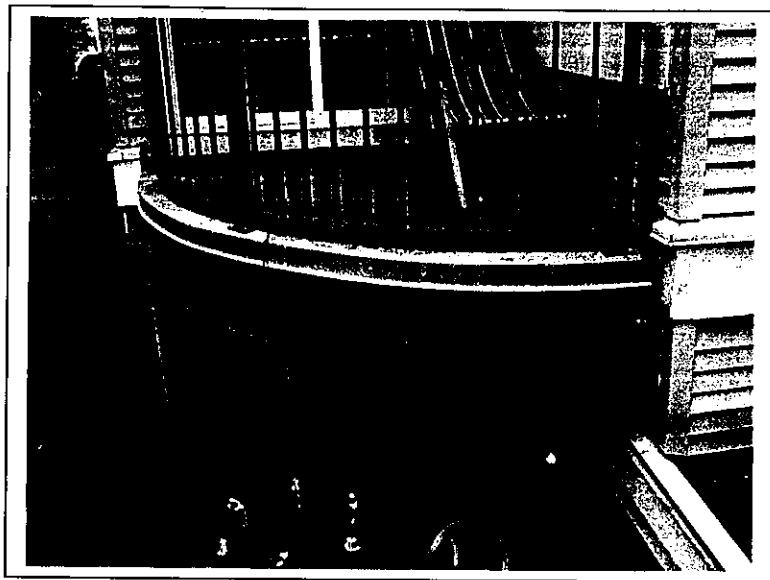
Location	Fourth floor balcony, west facing, north side of building
Building Element	Balcony patio door, top floor, no overhang



Description: window head flashing missing at this location. There is no overhang above.

Photo 9

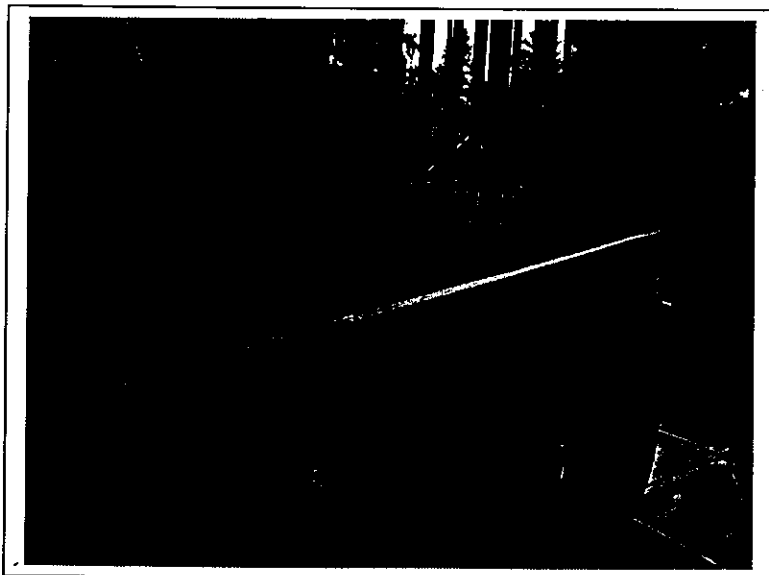
Location	North elevation, second floor balcony, facing west
Building Element	Curved balcony configuration



Description: Typical curved balcony. Note railing attachment and vinyl membrane lapping over balcony edge.

Photo 10

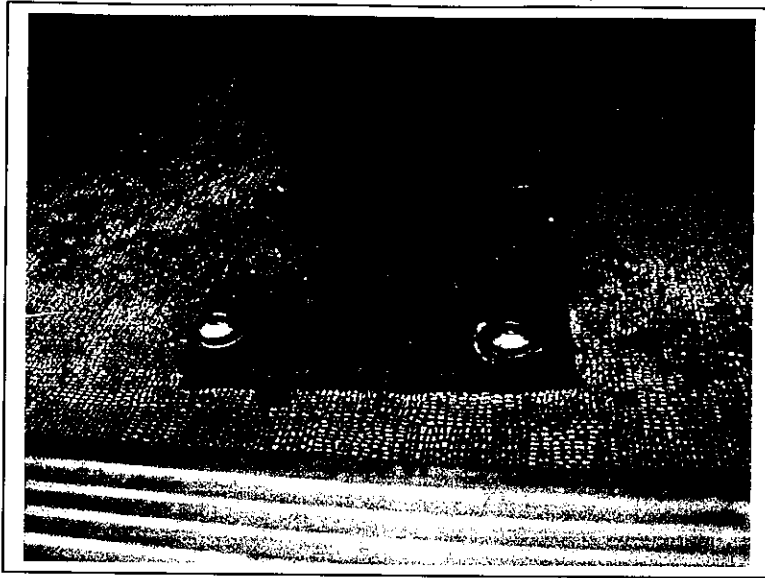
Location	North elevation, courtyard balcony
Building Element	Balcony edge, railing post connection through balcony and wood corner post.



Description: Typical balcony edge detail. Drainage of balcony decks occurs over the edge.

Photo 11

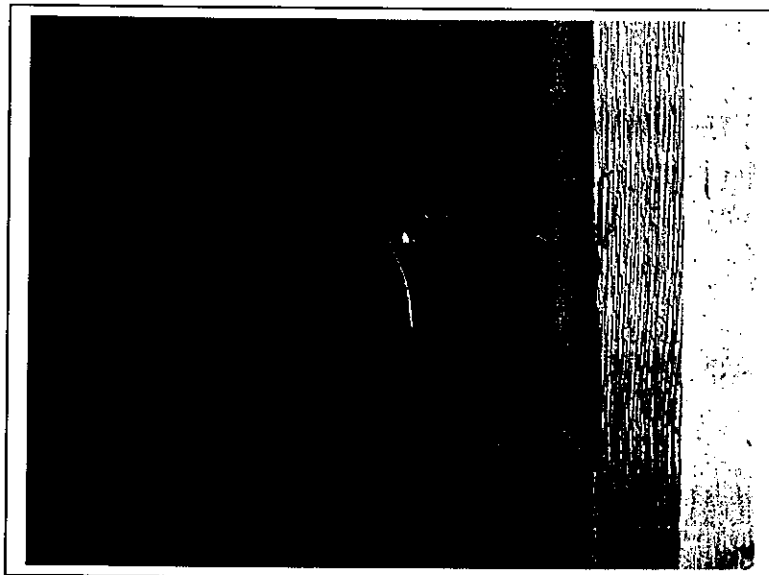
Location	Balcony, north elevation
Building Element	Typical railing post connection through vinyl membrane



Description: Algae growth was observed on this balcony, which is common on the north elevation of buildings. An accumulation was noted near the outside edge of the deck, due to poor slope. The railing post shown was installed through a neoprene pad to seal the screw penetrations.

Photo 12

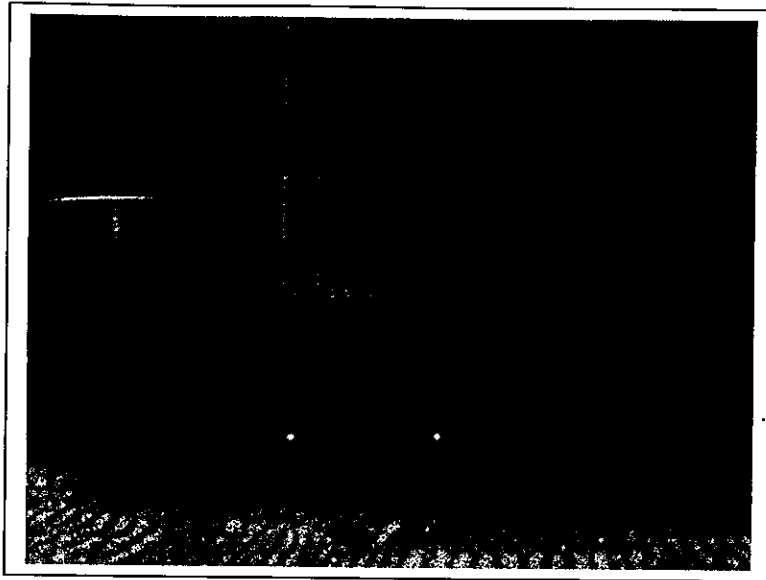
Location	North elevation balcony
Building Element	Railing connection to partition wall



Description: The railing post connection was sealed to the vinyl siding with sealant. Some protection was provided by the overhang above.

Photo 13

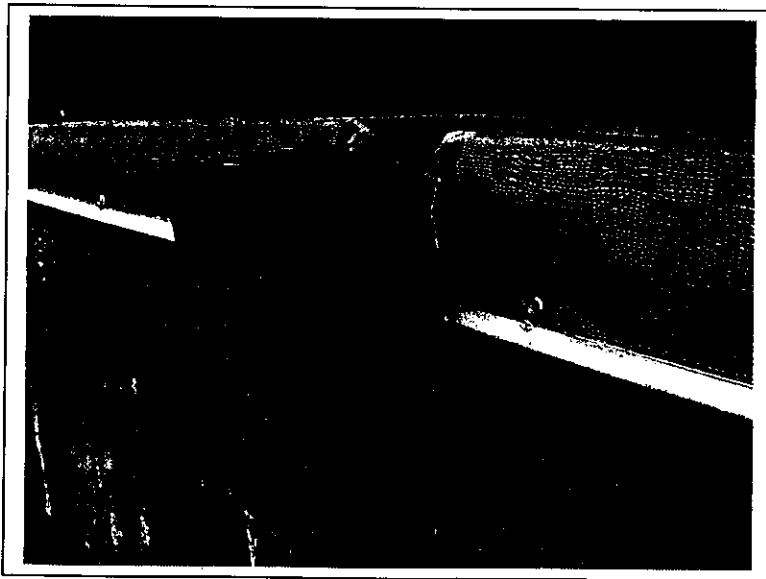
Location	East elevation second floor balcony
Building Element	Balcony door sill at vinyl membrane



Description: The vinyl membrane laps up the edge of the balcony under the door threshold. Note that this balcony is protected by the overhang of a balcony above.

Photo 14

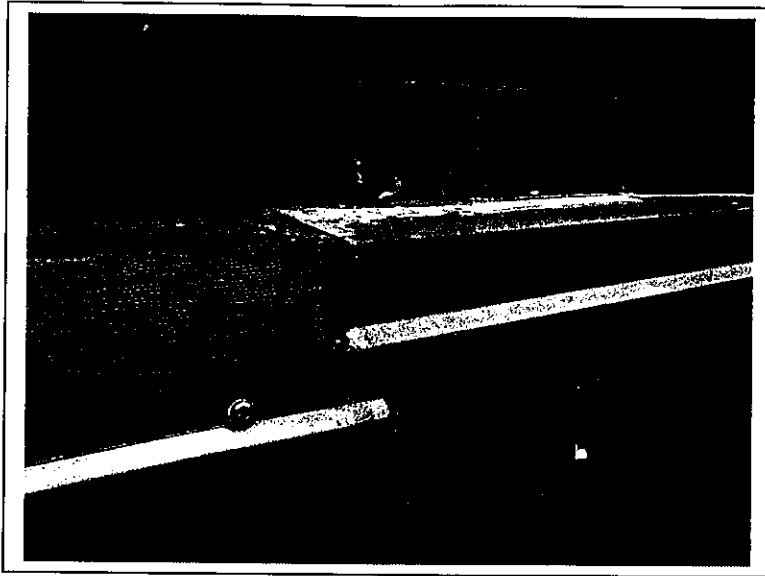
Location	East elevation, level two balcony
Building Element	Scupper drain through balcony edge curb



Description: Notice that the vinyl membrane around the scupper is not fully sealed. Sealant is used at the edges.

Photo 15

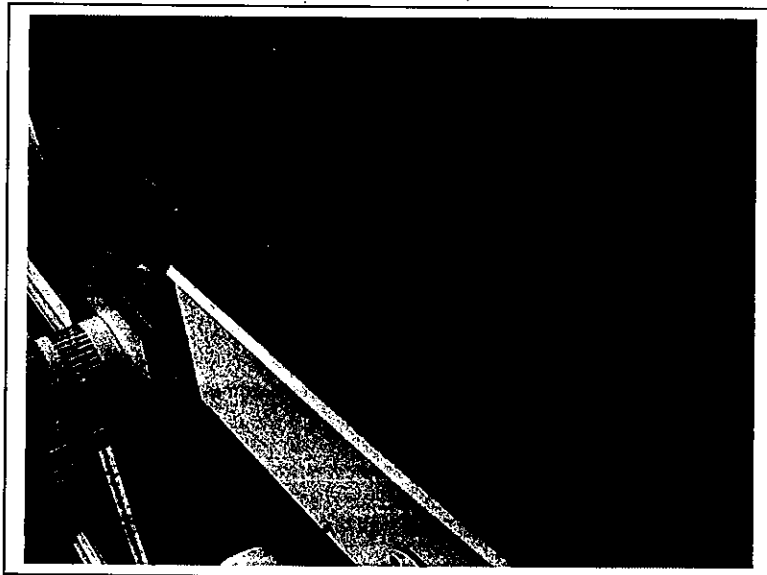
Location	East elevation of building, level two balcony edge
Building Element	Intersection of balcony edge with cultured stone and brick veneer



Description: Sealant was used to seal the edge of the flashing to the vinyl deck membrane.

Photo 16

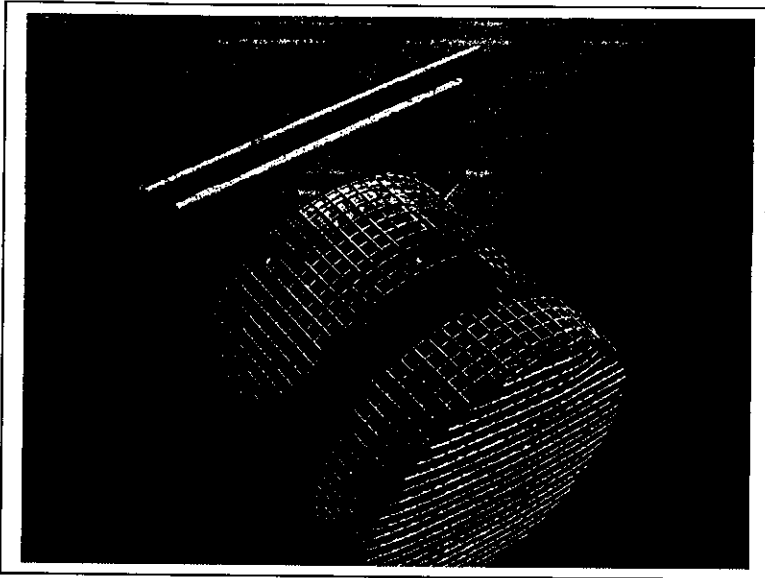
Location	North elevation, level three balcony
Building Element	Balcony edge configuration



Description: Algae growth was observed as a result of ponding water close to the outer edge of the balcony. An exploratory opening was made in the adjacent vinyl siding and no problems were observed. This is a maintenance issue.

Photo 17

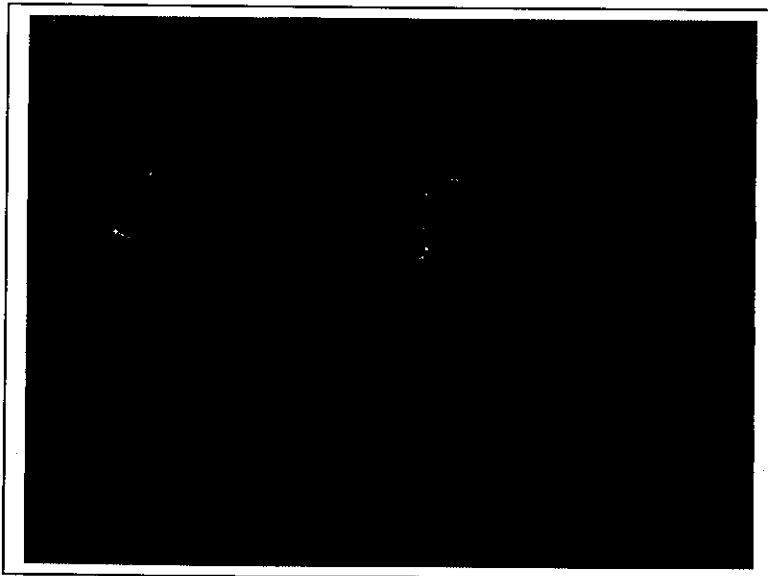
Location	North elevation, courtyard, second floor level
Building Element	Exterior fireplace vent penetration



Description: Corrosion of the vent hood is visible. The penetration through the cladding was sealed.

Photo 18

Location	North elevation, courtyard patio
Building Element	Hose bib, exterior wall penetration



Description: Sealant was used around the hose bib to seal the penetration.

Photo 19

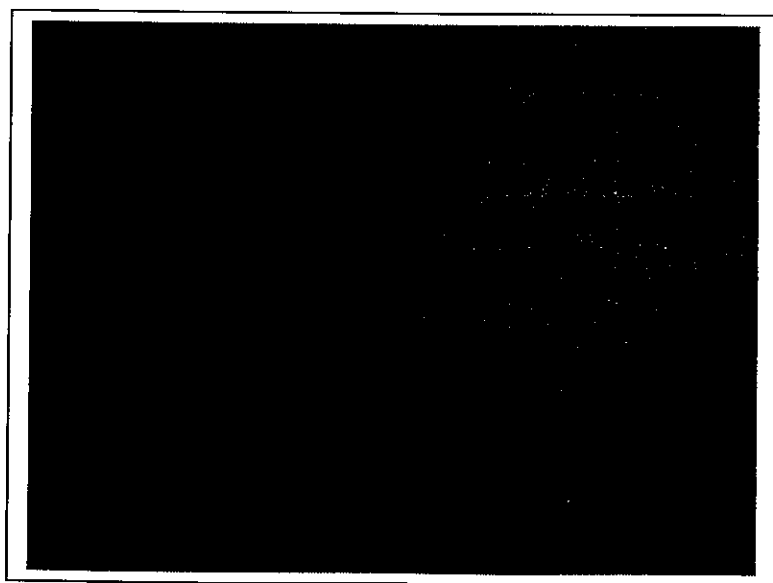
Location	North elevation courtyard, second level
Building Element	Planters at ground floor patios



Description: View of the courtyard planter. Notice that the planter waterproof membrane is exposed. This type of membrane will deteriorate when exposed to UV light.

Photo 20

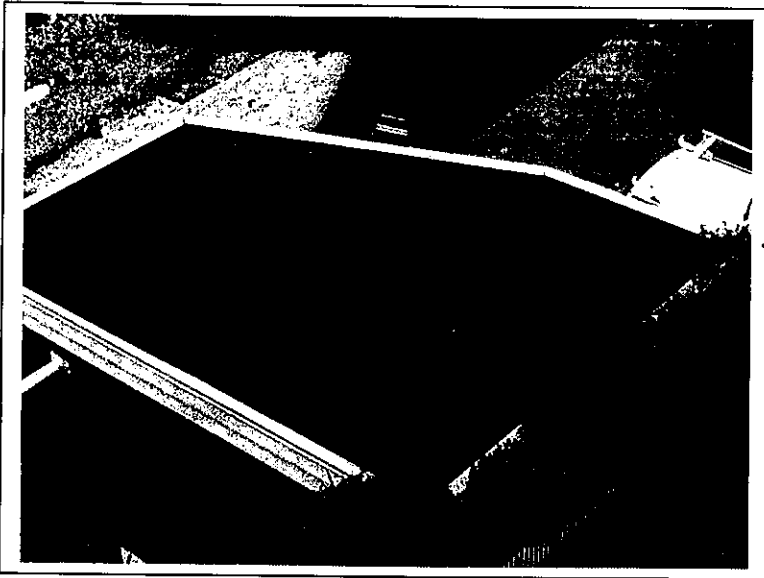
Location	Upper roof, near wall upturn at parapet
Building Element	SBS roofing membrane at wall upturn



Description: Large air bubble observed in roof membrane stripping. Membrane not fully adhered. Repairs are necessary.

Photo 21

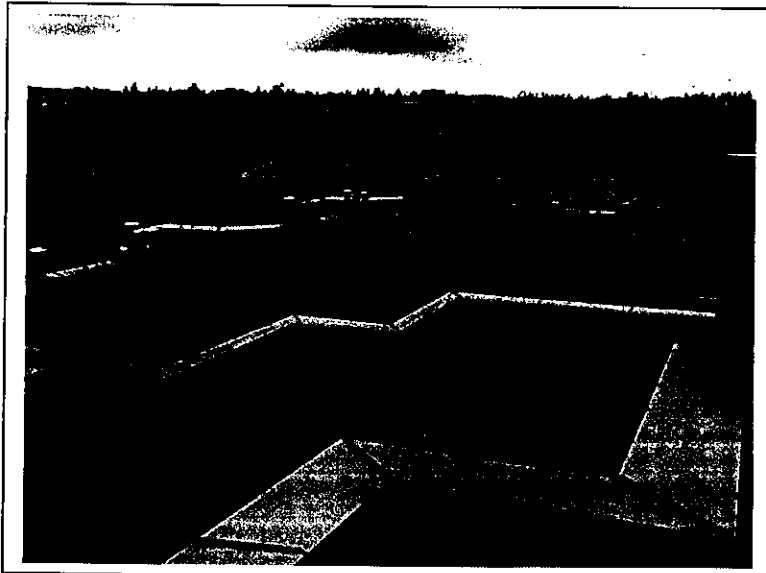
Location	North elevation, flat roof over parkade entrance door next to loading bay
Building Element	Flat roof



Description: Ponding was observed on the flat roof area due to blockage of a drain. Regular maintenance is required to ensure clear drainage.

Photo 22

Location	Upper flat roof
Building Element	Configuration of upper roof and vent hoods



Description: Good slope was noted on the flat roof areas, drainage appeared to be generally good. Roof hood vents penetrate the parapet cap flashing at some locations (left side of photo).

Photo 23

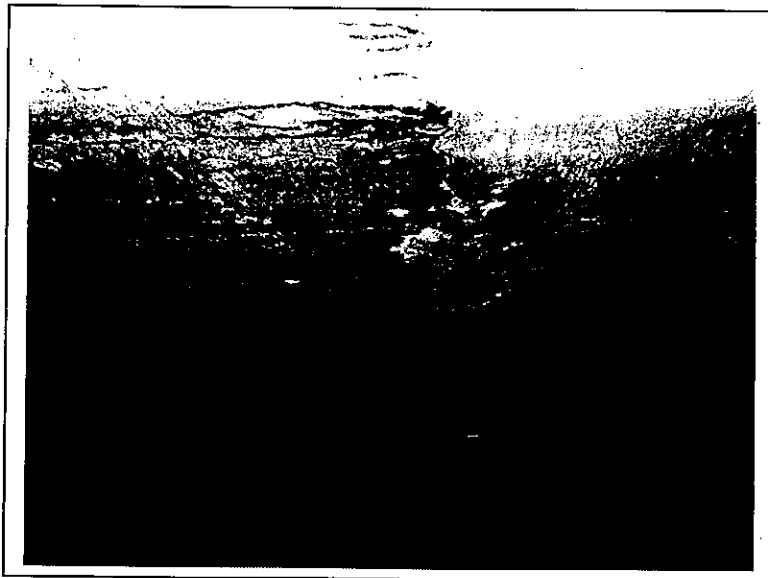
Location	Upper roof, wall shingles at step in roof (middle)
Building Element	Cladding on roof wall area



Description: The laps of the shingles have come apart at this location. The sheathing paper was intact and there was no damage apparent. Regular monitoring of the roof areas should be done as part of the maintenance plan.

Photo 24

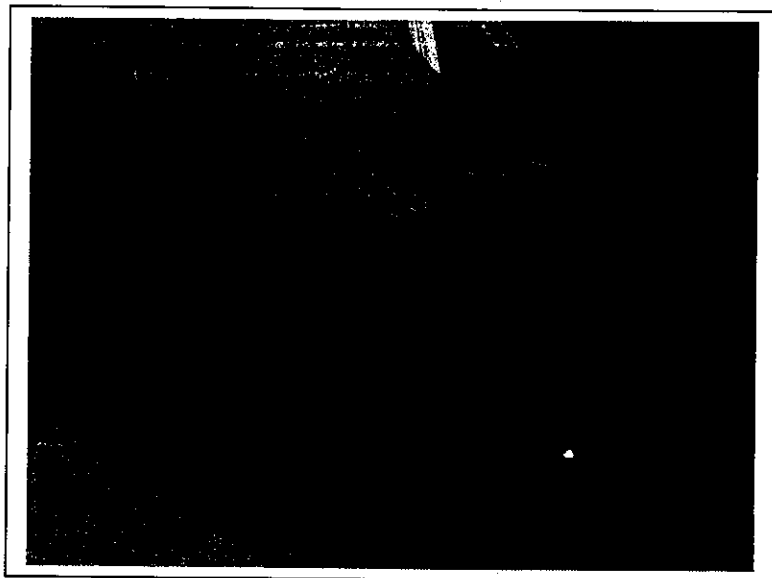
Location	Parkade, level P1 at ramp, north west corner of parkade
Building Element	Staining on underside of suspended concrete slab (ground floor patios above).



Description: Efflorescence resulting from moisture penetration through a crack in the suspended concrete slab. Staining has resulted.

Photo 25

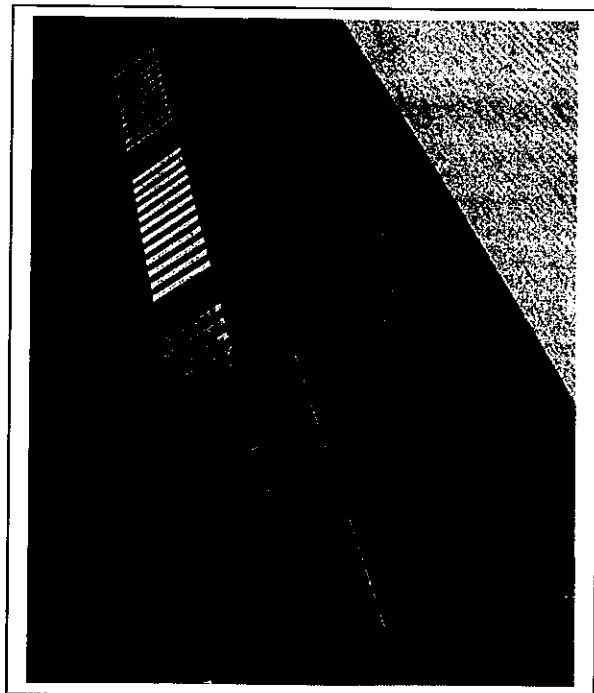
Location	Awning at 4 th floor balcony, south east corner of the building
Building Element	Glass awning connection to building



Description: The t-bar awning has been sealed to the adjacent window with sealant. This could result in early failure of the window upon which the awning is adhered. There was no indication of damage visible from the exterior.

Photo 26

Location	South elevation, 4 th floor, middle
Building Element	EIFS build-out between balconies



Description: EIFS build-outs were used on the south elevation between balconies. There were no noted concerns.