

CONSTRUCTION  
DIVISION

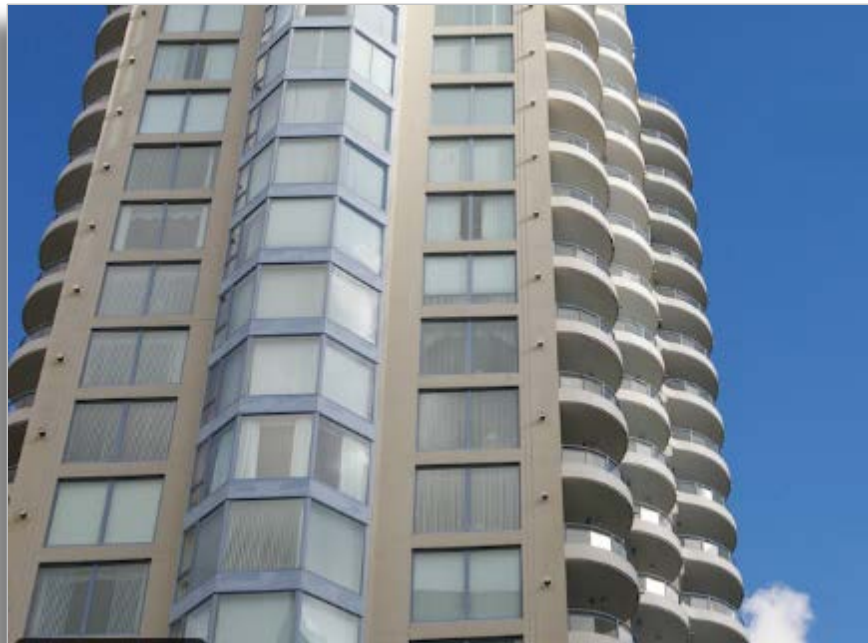
Suite 145  
33771 George Ferguson Way  
Abbotsford, BC V2S 6H1

POINTNEXUS  
CONSULTING

# Building Maintenance Inspection Report

This report was prepared November 7, 2011

**Assessing the Maintenance Requirements  
for a High rise Tower  
in British Columbia**



**Prepared for Property Management Inc.**  
Vancouver, BC

## Contents

---

Contents.....	2
General Description of the Project .....	3
The Building Inspection Defined Scope of Work .....	3
The Building Inspection Report.....	3
General Description of the Property.....	4
Report Summary .....	5
Recommendations .....	7
Maintenance Report Details .....	10
<b>Overall Condition</b> .....	10
<b>Sealant and Caulking Details</b> .....	10
<b>Bay Window Turrets</b> .....	13
<b>Bay Window Assemblies</b> .....	14
<b>Venting</b> .....	15
<b>Balconies and Decks</b> .....	16
<b>Cleaning</b> .....	17
<b>Roof and Gutters</b> .....	18
<b>Garage and Landscaping</b> .....	19
<b>Structural Component Fractures</b> .....	20
Disclaimer.....	21
Addendum – Recommendations Scope of Work.....	22

## General Description of the Project

... a residential, 24 story concrete high-rise located on the West Coast of BC, the east half tower of a two-tower development, completed in 1996 and now 16 years old.

The building has in some suites experienced water ingress problems. One, a penthouse suite, has experienced water problems requiring costly repair.

Pursuant to this, Property Management conducted a building wide resident survey to determine if other suites were also experiencing problems. A number of respondents noted issues, in varying degrees, mostly related to water ingress. In response, the PM, with the strata council made the decision to perform a property-wide non-destructive inspection of the building. The overarching question is: *Assess if the building is at a place in its life-cycle that warrants: 1) suite-specific repairs, 2) general building repairs or 3) perform a more intensive inspection.*

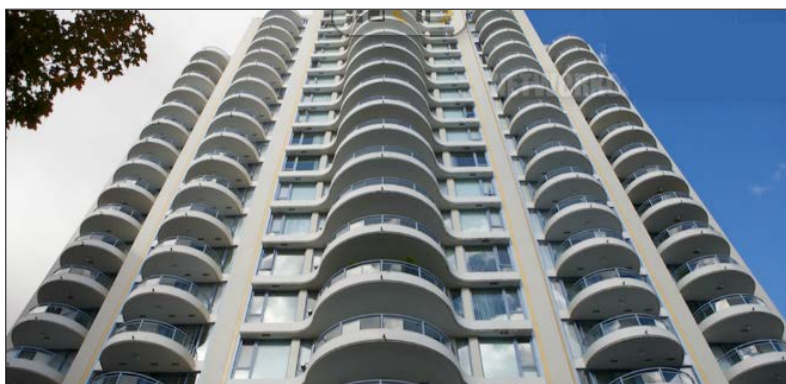


Image 1 - South facing view of

**Point Nexus Consulting Inc.** a consulting company in Vancouver and the Fraser Valley with experience in strata development, renovation work and a specialty with water ingress problems was contracted by Property Managers of Vancouver, BC to perform an initial non-destructive assessment of the building.

## The Building Inspection Defined Scope of Work

The defined Scope of Work was for general non-destructive visual inspections of the entire building for damage or potential damage especially in regard to water ingress, including:

1. Specific inspections of those individual suites whose surveys had indicated problems.
2. Specific inspection of common areas where there had been indication of problems.
3. General exterior building inspections of the roof systems, windows, doors, vents, flashings, cowlings, turrets, bay window units, drainage systems, joint caulking, concrete painted surfaces and cold-joints, decks and patios.

## The Building Inspection Report

The inspection would provide a findings report with recommendations for any required course of actions determined. The report should where possible provide pictures and commentary on both specific issues as well as general conditions including specific and general recommendations for courses of action.

## General Description of the Property



Image 2 –End profile of mirror image West Tower

**A** 24 story cold slab-on-slab concrete residential high-rise located West Coast BC. Built in 1996, the east tower of a two-tower development. The sister tower is an approximately mirror image.

**Management:** The two towers are managed by separate strata councils and property management companies. It is managed by Property Managers, Vancouver BC.

**Foundation:** The basement foundation is multiple levels of parking with a landscaped garden on the North side of the building raised above a portion of the parking lot below.

**Balconies:** The north and south side suites have fashionable half-moon balconies equipped with sliding patio doors and steel bar railings with clear plexiglas sides.

**Exterior Windows and Doors:** All exterior window and door frames are extruded aluminum with flashings applied where required. End suites have a combination of bay windows and fixed pane windows with the uppermost suites the addition of angled glass

turrets topped with crown caps. The crown caps and turrets top the full columns of bay windows below. All suites have sliding patio doors to open balconies. The penthouse suites of the top four floors have larger rectangular decks.

**Building Envelope Seal:** All suite exterior openings appear to have been sealed with an industry standard flexible polyurethane joint sealant. This is the original sealant applied at a bead-width of between  $\frac{1}{2}$  inch and  $\frac{3}{4}$  inch. Commercial sealants are subject to a variety of factors including but not limited to location and exposure to weather, types of weather, joint movement and installation techniques. The concrete exterior is painted.

**Venting:** Suites have venting for gas fireplaces and air-exchange. Fireplace vents are embedded into either the concrete or built into the aluminum curtain frame of the patio doors. Air vents on some of the upper suites have flat vent-covers with no protective cawling.

**Drainage:** Considerable water drainage design was evident for the exterior spaces with scuppers used for the upper penthouse decks and open channel 2" through-holes on the half-moon balconies.

### Inspection Methodology

The requested scope of this inspection was visual only and non-destructive. In our opinion in most situations, this is adequate to assess the condition of the building within the confines of our mandate. In a couple of situations we recommend further, more intensive investigation to determine the extent of the problems.

**Resident Surveys** – Point Nexus reviewed the surveys completed by residents to determine which suites needed to be visited and observed for specific issues. Those specific suites that, in our opinion, described situations and issues sounded beyond typical were visited by assessors for an inspection. In most cases, these were similar problems, simply either a more detailed description of the symptom, or a variation in the degree of severity.

**Walkthrough** – Point Nexus walked through all areas of the building reviewing existing or potential issues including halls, common areas, administration offices, garage and storage facilities and well as roof/attic and mechanical and electrical rooms.

**External Drops (Boatswain Chair)** – The project included 16 of drops by an assessor to review the outside condition of the building. Observations included windows and doors, decks and balconies, turrets and bay window frames, drainage, concrete walls and joints. Items and conditions being observed were: infrastructure damage, water ingress, condition of the sealant, application of the sealant, metal framing for doors and windows and flashing details, proper drainage including horizontal planes and positions and installations of flashing, mold and mildew and cleanliness of decks and painted surfaces and concrete surfaces and cold-joint seams.



### Overall Condition

As an overall statement, the building appears to be in good condition. Although there are some problem areas, the condition is as would be expected for the type and age of the building. Concrete buildings have many advantages. If skillfully designed and constructed, there are limited places water can find ingress. Concrete also limits the probability of major structural damage caused by mold, mildew and wood rot that wood framed or stucco clad buildings can experience.

Having said that, there are notable aspects of this building where, as with any building, if not properly maintained, will cause problems. For this building, those are the junctions between



concrete building structure and the metal frames of the installed door, windows and vents where sealing is applied. These junctions are caulked with a sealant that is towards the end of its life-cycle and beginning to show signs of maturing and in some places failure.

## Upper Building

Of special note is the uppermost part of the building. This section has the greater exposure to the most severe weather, including sun, wind and rain, each of which has potential for more extensive wear and tear. In addition, gravity dictates those upper areas have the potential to be the source of damage to a broader range of residents below. Consequently, it is important for the strata as a whole, to ensure those top areas are well maintained and any extra consideration of such areas will pay dividends with the overall well being of the building, which affects all strata property values.

## Caulking and Sealant

Most well built buildings of this type use an industrial grade NP1 Sealant or the commercial equivalent. This high-performance flexible polyurethane can withstand cold and heat, wet and dry and has the ability to withstand up to a 35% movement between the substrates it's adhered. But, such sealants also have a finite life span dependent upon many factors including, but not limited to:

- Quality of the sealant product
- Quality of the initial installation and any subsequent repairs
- Quality of the substrate(s) to which it is applied
- Age since application
- Weather and exposure conditions

We observed the sealant on the building and estimate, on average, it to be at approximately 75% of its expected life-span. Some sealant, in the less exposed areas appears to have fared better, other areas, with direct exposure to harsher climate conditions, are already at a worse percent grade. A number of locations, primarily towards the top of the building are already aged beyond safe usefulness. And, while these problems are more prominent towards the top of the building, no area is immune. Some sealant toward the bottom of the building appears aged more than average as well.

## Recommendations

Concluding our assessment, we recommend the following courses of action: divided into type of issues and building proximity.

**Roof:** The roof components were, with some exceptions, assessed in a good and well maintained condition.

- *Gutters should be cleaned and membranes checked regularly.*
- *The sealant around the flashing detail on the chimney chases should be resealed as there is some leakage occurring in the boiler room.*

**Sealant:** The building's sealant at 16 years age is getting towards the end of its life. Hardening, cracking, shrinking and lifting was noted in many places and while it is difficult to determine exactly where a specific failure may occur, there is appreciably more evidence of wearing toward the upper floors. It is part of good maintenance planning to eliminate probabilities of larger more significant problems when and where appropriate to do so. Because the product is towards the end of its life-cycle, probability and frequency of associated problems will likely increase. Additionally, though a sealant failure problem will have an effect on that area, it also has the potential of affecting associated areas and/or suites down-stream; an eventuality that is difficult to predict in a high-rise.

- *We recommend the entire building be re-caulked with new NP1 Sealant or its commercial equivalent. Applied properly, this would entail cutting out the old sealant and applying new backer-rod and new sealant.*

**Bay Window Turrets:** Of particular note are the Bay Windows on the East and West ends of the building. These are vulnerable to considerable damage and leakage from seriously compromised caulking and seals. The column of bay windows runs the entire length of 19 floors and is topped with an angled glass turret. The turret is crowned with a small but important cap flashing. The sealant for the turrets and their crown pieces are notably weak and there is leakage occurring now with the potential for significant leakage at any time in the future. Each suite in the length of the entire column of bay windows is vulnerable to water ingress as a consequence.

- *It is recommended these be thoroughly cleaned and, where applicable, the current sealant removed and new sealant properly applied.*

**Bay Windows Assemblies:** In addition to the Turrets, the column of Bay Windows is a complicated assembly of aluminum extruded pieces stacked on top of each other. Because of their exposed position on the building and their complex connective structure, these are vulnerable to leakage.

- *We recommend the Bay Window Assemblies be viewed as a priority for removal of old sealant and new sealant applied.*

**Venting:** There were a number of exterior air vents in the upper floors that had been exposed without proper cowling for protection.

- *It is recommended these be removed and clean or replaced with new sealant and proper cowling be applied to protect them from water and wind.*

**Balconies and Window Eyebrows:** The half-moon balconies are membrane sealed and painted concrete floors with a channel for drainage with a drainage hole to passively release the water. The balconies appeared in good repair with the exception of many with considerable dirt, mold and algae accumulations and in need of power cleaning. With a few balconies in the more exposed areas, it was noted the floor sealant membrane has been compromised exposing the concrete. In our opinion, these need re-sealing. Window eyebrows also tended to be exposed to drainage flow and consequently were accumulating dirt and mold.

- *It is recommended both the balconies and the window eyebrows be cleaned with a pressure washer.*
- *It is recommended in specifically affected suites a new sealing membrane be applied to the floor of affected balconies and decks.*

**Surface Cleaning & Window Cleaning:** Many surfaces have seen the accumulation of dirt, mold and mildew which are not only unsightly, but also pose the potential for erosion of the surface which has the potential to require more extensive work in the future.

- *It is recommended pressure cleaning be done to all affected surfaces*
- *Additionally, with worker's fully scaling the exterior of building, economies of scale would suggest the windows, especially those not easily accessible, be cleaned at the same time.*

**Landscaping and Foundation:** There is a leak at one or more of the drain pipes, as well as various places in the concrete cold-joints of the landscaped terrace foundation, above the underground parking garage. The solution will likely require removal of existing landscape and soil. Remove deteriorated waterproof membrane, repair membrane on structural concrete slab and place new drainage material prior to placing soil and re-landscaping

This problem is perplexing because it is difficult to assess the source and locations of the leak(s). Essentially, the concrete slab of the parking garage is coated with material to provide a water-proof membrane. Often that then covered with a layer of gravel of a spacer-mat that is designed to allow space for water to flow freely. The soil, trees, shrubs and grass are set directly on top of the spacer.

Potential problems can be: 1) a breakdown of the water proof membrane allowing water to drain into the concrete fractures and, 2) the gravel-spacer becomes clogged or matting-spacer (whichever was used) becomes compressed and proper drainage is impeded, creating water backup, pooling and a breakdown of the seal or redirection of water to places not sealed.

There may be some technical equipment available to help locate leakage sources, but now covered with 16 years of plant growth, to fully determine the extent of the problem, will probably require digging up all or a portion of the landscaping to see assess what is really happening.

- *It is recommended there be a further investigation into this garage water ingress problem. We recommend all or a portion of the landscape material be removed to locate and assess the problem and, if possible and/or fiscally feasible, to immediately fix the problem.*




**Structural Component Fractures:** A number of fractures (cracks and fissure openings) in the concrete structure were observed. These varied in size, location and structural function and while none appeared to be critical to the structural integrity of the building's structure, in the cases of



larger cracks, repair to retain structural integrity and prevent development into larger problems in the future is advised.

- *It is recommended the fissures be ground out and a weld can be applied.*

# Maintenance Report Details

Overall Condition	
<p>As an overall statement, the building appears to be in good condition. There are some typical issues related to (and normal for) the seasonally variable and often wet weather conditions experienced in SW British Columbia.</p>	
Sealant and Caulking Details	
<p>We observed the 16-year old sealant is in fair condition and to be, on average, at approximately 75% of its full live-span.</p> <p>Sealant bead-lines for concrete to flashing joints, as shown here, are typically <math>\frac{3}{4}</math>" in wide and holding relatively well.</p>	
<p>These images indicate significant signs of sealant aging. They show a hardening and cracking of the sealant causing a separation of the sealant from the concrete to metal frame or metal frame to metal frame.</p> <p>These conditions are occurring in numerous places and indicate the sealant is nearing the end of its useful life. In many cases, as shown here, repair work is already required.</p> <p>It would be best if the building sealant in its entirety is dealt with, so situations as shown here do not occur elsewhere. There is significant indication that such occurrences will be happening more frequently in the near future.</p> <p>The only way to repair this properly is to cut out the existing sealant and spacer backing and replace it with new material.</p>	

There are many examples of seam separation in the bay window units. These metal framing units are subject to a significant amount of expansion and contraction from heating and cooling which puts stress on the sealant.



Moisture lodged within the separations freezes and expands creating further expansion.



Additionally, mould and mildew can get into the spaces, colonize and further separate the spaces. Consequently, once the initial separation takes place, further expansion and separation, quickly follows.



There are many indications of known problem areas that have had temporary repairs.

These repairs do not appear they were performed by a professional. Silicone chalking was placed over old caulking which generally is not expected to hold well as in this case.

This indicates an instance of a repair that is creating another issue - hidden buildup of mold and grime beneath the repair. This could cause larger problems in the future.



## Bay Window Turrets



Another place where significant problems were observed is the Turret window assemblies that top the Bay Window columns. These are complicated assemblies of triangular shaped windows with multiple joints in the metal assembly and each junction needing careful sealing.

A crown cap which is attached to the concrete, tops the turrets. This point is one of the most vulnerable on the building with potential to cause problems below. It appears there has been at least one or more past attempts to properly seal the caps.

One of the crown caps was almost completely without sealant and there were significant moisture issues below.

These crown caps and turrets are assessed to be high priority because they have potential for problems that could cause extensive problems in the column of windows below.





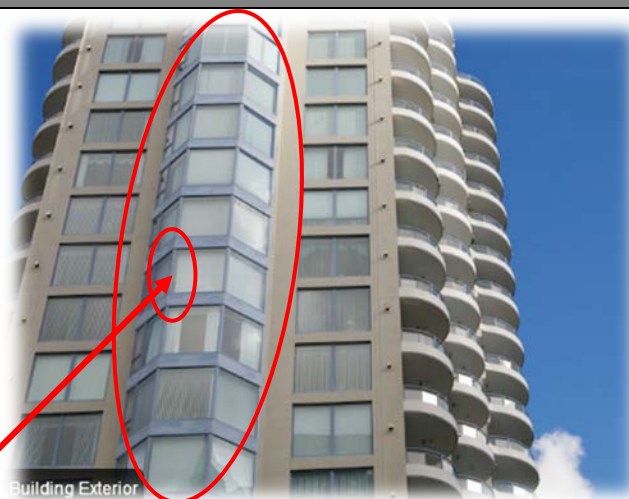
## Bay Window Assemblies

Immediately below the Turrets and Crown caps on the ends of the buildings is the column of Bay Windows and their metal assemblies. These run the entire vertical length of the building and as a whole displayed some persistent problems.

Small but long fault lines in the caulking between the bay's assembled metal pieces were often observed.

If unattended to, these have the potential to expand becoming more significant spaces and causing water to ingress and run into cavities and spaces below. This also has the potential for damage beyond the immediate local.

This was a persistent characteristic and a symptom of some of one of the problems with the bay window units. It is likely in part due to metal's characteristic large range of expansion and contraction. It may also be in part because the amount of sealant applied is relatively thin, not enough to hold as the metal moves.



## Venting

We observed a problem with approximately 16 unprotected air vents on the 21 and 22 floors. These had flat wall mounted covers unprotected by cowling hoods that would shield them from wind and water.

Consequently, most were loose with little to hold them to the wall. Some, as the one pictured on the right, were almost completely loose, easily pryed off the wall with a fingernail. This was likely the cause of water-staining on the ceiling of the room behind it.

It is recommended, cowling hoods be installed around the covers. If required, new flat vent covers should replace those in poor condition.

The furnace chimneys appeared in good condition. They are mounted directly into the concrete functioning as expected with what appeared to be little chance of water ingress.



## Balconies and Decks

For the most part, the decks and balconies appeared to be in good condition. There were some issues with paint/seal surfaces and with mould, mildew and moss that needed cleaning.



In a few instances, it was noted the sealant surface was wearing off the deck/balcony floors.



A well sealed deck surface helps keep fissures from occurring in the concrete. Fissures that get moisture in can expand due to freezing and other conditions creating larger fissures. A good seal keeps moisture from leaching in and causing the rebar to rust.

A well sealed deck also helps is easier to keep clean and resists mold and mildew from cultivating and damaging the surface of the concrete.

It is recommended decks and balconies be pressure washed and those with compromised surfaces be re-sealed.



## Cleaning

There is considerable dirt, mold and mildew building up on some of the surfaces of the building.

It is recommended these be pressure washed periodically to preserve the integrity of the surfaces and the overall property building values.

To enable economies-of-scale, it is recommended the windows, especially the fixed frame windows and the bay unit windows at the east and west ends be cleaned at the same time as the other work is being performed.





# Roof and Gutters

The roof appeared to be in good repair.

The chimney flashing needs to be re-caulked on the upper-side of the flashing to seal it and prevent it from leaking into the boiler room below.



The gutters are performing as expected and the gutter membrane still in good condition. These need periodic cleaning.

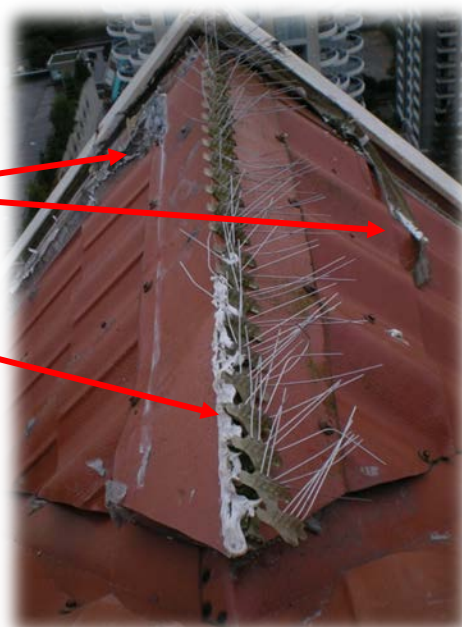


There was one roof location above one of the Penthouse Suites that had experienced considerable damage.

Previous repairs had been attempted using duct tape. As would be expected, these have not held up well.

The roof cap flashing had been badly damaged. This is currently being professionally repaired.

This was a known issue but is added to this report as an example of why a quality maintenance program is recommended to keep the building in good condition and free from unnecessary problems.





## Garage and Landscaping

The landscaped area above the underground parking garage is experiencing water ingress problems. There is indication of significant amounts of water leaking through the concrete, and into the garage. There is a considerable amount of rust staining on the concrete on the garage ceiling indicating the water is getting into the rebar and causing rust and indicating deterioration of the rebar.



The ground is saturated and pooling in certain areas such as here.



This is not a healthy situation and it is recommended further investigation of the landscaped area above the garage be undertaken to try to determine the locations and causes of the leaks.

Because all the leakage is taking place below the ground level and there is no certain way to determine where the break in the membrane(s) is, it is suggested the only adequate way of finding these and determining the best remedy is to displace some or all of the landscape material and dig down to the concrete surface beneath.



## Structural Component Fractures

The building appeared to be in good condition from a concrete structural perspective. The garage roof and landscaping issue being the notable exception.

There were a few small issues noted where the structure had seen some minor fissures in the concrete. It is recommended these be assessed on a case-by-case bases and where it is deemed applicable make an appropriate repair.

A cold-joint separation at a fixed frame window opening.

A cold-joint separation at a floor seam. This is open to the rebar as indicated by the rust stain below the fissure.

A vertical fracture line starting at the corner of a window frame.

In the majority of cases, it is recommended these be ground and filled with an appropriate sealing compound.



## Disclaimer

---

This report is the result of a non-destructive examination of the building as requested by the client Property Management Inc. and falls entirely within the agreed scope of work contracted therein. This report indicates visually observable conditions of the building and states opinion(s) regarding those observations accordingly.

It is opinions of the report's authors that performance of the suggested recommendations provides reasonable actions towards maintaining a healthy and comfortable environment for property owners and forms part of a proactive building maintenance program.

It is entirely up to the parties affected to act upon the stated recommendations. Neither warranties nor representations are made in whole or in part for the final outcomes of any actions taken or not taken by the affected parties.

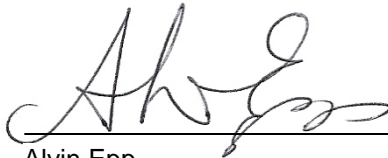
---

This assessment report is presented for the purpose of enabling Property Managers in cooperation with the Tower Strata Council and Property Owners to make informed decisions regarding maintenance and repairs to the building subject to this report.

Duly signed and authorized November 7, 2011 by,



Richard Shatto  
*Senior Partner*  
Point Nexus Consulting Inc.



Alvin Epp  
*Senior Partner*  
Point Nexus Consulting Inc.

## Addendum – Recommendations Scope of Work

---

### Roof

- *Gutters should be cleaned and membranes checked regularly.*
- *The sealant around the flashing detail on the chimney chases should be resealed as there is some leakage occurring in the boiler room.*

### Sealant

- *We recommend the entire building be re-caulked with new NP1 Sealant or its commercial equivalent. Applied properly, this would entail cutting out the old sealant and applying new backer-rod and new sealant.*

### Bay Window Turrets

- *It is recommended these be thoroughly cleaned and, where applicable, the current sealant removed and new sealant properly applied.*

### Bay Windows Assemblies

- *It is recommended the Bay Window Assemblies be viewed as a priority for removal of old sealant and new sealant applied.*

### Venting

- *It is recommended these be removed and clean or replaced with new sealant and proper cowling be applied to protect them from water and wind.*

### Balconies and Window Eyebrows

- *It is recommended both the balconies and the window eyebrows be cleaned with a pressure washer.*
- *It is recommended in specifically affected suites a new sealing membrane be applied to the floor of affected balconies and decks.*

### Surface Cleaning & Window Cleaning

- *It is recommended pressure cleaning be done to all affected surfaces*
- *Additionally, with worker's fully scaling the exterior of building, economies of scale would suggest the windows, especially those not easily accessible, be cleaned at the same time.*

### Landscaping and Foundation

- *It is recommended there be a further investigation into this garage water ingress problem. We recommend all or a portion of the landscape material be removed to locate and assess the problem and, if possible and/or fiscally feasible, to immediately fix the problem.*

### Structural Component Fractures

- *It is recommended the fissures be ground out and a weld applied.*