Engineers

Harbour Cove
Depreciation Report

1450, 1470 & 1490 Pennyfarthing Drive, Vancouver, BC

Prepared for:

Strata Corporation VR 1291
c/o The Wynford Group
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during the field review, we believe that some walking surfaces have been replaced by individual owners in the past or may have been added after original construction.

This report excludes all building components which are for the exclusive use of the Harbour Cove Housing Co-Operative. Section 1 of the 1984 agreement between Harbour Cove Housing Co-Operative, Pennyfarthing Development Corporation and strata corporation VR 1291 designates specific areas for the exclusive use of the co-op. These areas include the recreation room (including adjacent patio, small kitchen and washroom), lobby, elevator (including machine room), bicycle and wheelchair storage room, laundry room, 16 individual storage lockers, bulk storage room, enterphone, and stairways and hallways adjacent to the co-op units. Components which are shared between the co-op and the strata corporation are included in the report. These elements include the building structure, building enclosure, exterior grounds, and many mechanical and electrical systems.

The lounge overlooking the racquet ball court was under renovation at the time of the field review. Consequently, it has been excluded from the report. It was the first time that the lounge has been renovated since original construction and we do not expect that future owners will choose to renovate this area in the next 30 years.

2.3 Maintenance and Renewals

Maintenance, which includes the regular inspections, minor repairs and replacement of assembly components, is required to help many building elements reach their expected service life. The decision to maintain or renew (replace worn out assemblies or materials) is one that the strata corporation needs to consider as various components age. In some instances, as a component ages, its maintenance costs increase to a point where it is more cost-effective to renew the component rather than continue maintaining it. Renewal at approximately this point in time will allow the strata corporation to achieve a low life cycle cost.

It is important to note that maintaining the component beyond its expected service life could increase the risks associated with failure of the component. Consequential damage due to failure of the component can often be more than the cost of replacing the component. In other instances, where failure does not result in significant consequential damage, a run-to-failure approach can be undertaken, where a low-risk component is replaced once it fails.

Other important factors which will have an impact on the timing of renewals include availability of parts or materials, the timing of other related projects, and as mentioned above, the consequences of component failure.

Professional opinions by qualified individuals having significant experience with the component in question would greatly assist the strata corporation in the decision-making process. This type of decision-making process is not part of this depreciation report but is recommended by RJC.

2.4 Expected Service Life and Present Equivalent Age

In the appendices, we provide an opinion on the condition of the building component, its expected service life, present equivalent age and estimated remaining life. The condition assessment is based on a visual review which includes, where applicable and where visually ascertainable, observations related to the maintenance of the building component.

Although we have already phased the window replacement project to occur over several years, the owners could consider advancing, delaying or dividing other projects into phases to reduce the annual value of the special levies. It is important to note that dividing projects into multiple phases results in higher total project costs and requires more time and effort from the strata council to manage the projects. The timing for some of the projects such as replacing the meeting room furniture, painting the guardrails or modernizing the corridor or elevator cab finishes can be adjusted without having to seek professional opinions. Before adjusting the timing for more critical projects, such as the replacement of the windows, parkade waterproofing or brick veneer, the owners should seek professional advice.

Based on our extensive experience with building enclosure projects, several of the projects outlined in the building envelope appendix were grouped together in the draft report. The consolidation of the projects was primarily based on how many years separate related projects, which components are typically replaced by the same contractor or general contractor, which other building enclosure components are impacted by the work and whether other issues (which may precede failure) would be a nuisance to occupants. The main advantages of consolidating projects include (and are not limited to) the ability to reduce overall project costs, facilitate proper transitions between different building components, reduce the workload on the strata council, reduce the inconveniences for owners and achieve a more consistent appearance between similar building components (such as windows and doors). At the request of the strata council, we were asked to separate the projects for this final revision to the report. The main advantage of separating the projects is a reduction in the annual (not total) value of special levies and the possibility of obtaining the maximum service life from each component. Attached as an addendum to this report are the Items Schedule, Expenditure Schedule and three cash flow scenarios provided in the draft report which reflect the recommended consolidation of some building envelope projects.

The depreciation report is a valuable tool in projecting the future financial requirements based on the current condition of the numerous building elements. We encourage the owners of strata corporation VR 1291 to adopt one of the three CRF funding models (or one of their own based on this report) in order to financially prepare themselves for future expenditures in a manner which is fair to current and future owners.

4.1 Items Schedule

Item	Work	Component	Occurrences	Total Budget Over 30 Years[1]
BE		**Building Enclosure**		
BE.1	Replace	Roofing - Inverted Modified Bitumen Membrane	2	$375,000
BE.2	Replace	Skylights - T-Bar System	1	$70,000
BE.3		Skylights - Factory Glazed Unit		$0
BE.4	Replace	Roofing - Conventional Modified Bitumen Membrane	1	$50,000
BE.5	Replace	Roofing - Metal	1	$20,000
BE.6	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	7	$1,925,000
BE.7	Replace	Balconies - Modified Bitumen Membrane Wateproofing	1	$1,500,000
BE.8		Guardrails - Aluminum		$0
BE.9	Assess	Exterior Walls - Rainscreen Brick Veneer	1	$5,000
BE.9	Replace	Exterior Walls - Rainscreen Brick Veneer	1	$5,200,000
BE.10		Exterior Walls - Structural Brick		$0
BE.11	Repair	Privacy Screens - Brick	3	$15,000
BE.12	Replace	Exterior Windows - Aluminum Frame	4	$14,400,000
BE.13	Replace	Glazing - Storefront System	1	$200,000
BE.14		Skylights - Pressure Cap System		$0
BE.15		Glazing - Insulating Glass Units		$0
BE.16	Replace	Exterior Doors - Aluminum Sliding	1	$550,000
BE.17	Replace	Exterior Doors - Aluminum Swing	1	$425,000
BE.18	Replace	Exterior Doors - Entrance	1	$20,000
BE.19		Exterior Doors - Steel Swing		$0
BE.20	Replace	Sealants	5	$625,000
BE.21	Paint	Exterior Coatings	13	$2,444,000
BE.22		Suspended Access System		$0
BI		**Building Interior**		
BI.1	Renew	Entrance Lobby Finishes	2	$750,000
BI.2		Mailboxes		$0
BI.3	Maintain	Corridor Finishes	5	$40,000
BI.3	Renew	Corridor Finishes	1	$2,100,000
BI.4		Interior Doors - Suite Entry		$0

[1] **Expressed in present dollar values**

4.2 Expenditure Schedule

Year	Item	Category	Work	Component	Budget[1]
2016					
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$275,000
	BE.9	4	Assess	Exterior Walls - Rainscreen Brick Veneer	$5,000
	BE.11	4	Repair	Privacy Screens - Brick	$5,000
	BI.3	4	Maintain	Corridor Finishes	$8,000
	ELEC.1	4	Maintain	Unit Substations	$3,000
	ELEC.4	1	Maintain	Emergency Generator	$5,000
	MECH.13	4	Maintain	Piping - Sanitary System Drainage	$15,000
	MECH.21	1	Repair	Fire Suppression - Sprinkler System Piping	$4,000
				Total	**$320,000**
2017					
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$283,000
	BI.20	4	Replace	Hot Tub Tank Finishes	$10,000
	MECH.1	4	Maintain	Air Handling Units - Corridors	$7,000
	MECH.8	4	Replace	Domestic Water Valves and Backflow Preventers	$14,000
	MECH.25	4	Replace	Fire Suppression - Dry Pipe Sprinkler System Air Compressor	$3,000
	PKD.1	2	Replace	Plaza Slab Waterproofing	$386,000
	PKD.4	2	Assess	Traffic Deck Coating	$5,000
				Total	**$708,000**
2018					
	BE.2	4	Replace	Skylights - T-Bar System	$74,000
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$292,000
	BI.1	4	Renew	Entrance Lobby Finishes	$398,000
	EG.8	4	Stain	Enclosures and Fencing - Wood	$10,000
				Total	**$774,000**
2019					
	BE.1	4	Replace	Roofing - Inverted Modified Bitumen Membrane	$191,000
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$300,000
	BE.12	4	Replace	Exterior Windows - Aluminum Frame	$3,934,000
	BI.23	4	Replace	Furniture	$5,000

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
	EG.2	4	Repair	Road - Asphalt Pavement	$5,000
	ELEC.1	4	Maintain	Unit Substations	$3,000
	ELEC.5	1	Replace	Emergency Power Distribution System	$22,000
	MECH.10	4	Replace	Storage Tanks - Domestic Hot Water	$38,000
	MECH.24	4	Replace	Fire Suppression - Dry Pipe Sprinkler System Clapper Valves	$33,000
				Total	**$4,531,000**
2020					
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$310,000
	BE.12	4	Replace	Exterior Windows - Aluminum Frame	$4,052,000
	BI.17	4	Paint	Pool Area Finishes	$10,000
	BI.19	4	Replace	Pool Tank Finishes	$34,000
	EG.3	4	Replace	Walkways - Asphalt Pavement	$17,000
	MECH.18	1	Replace	Hot Tub - Filtration and Sanitization Equipment	$3,000
	MECH.23	1	Repair	Fire Suppression - Standpipe and Fire Hose Cabinets	$23,000
				Total	**$4,449,000**
2021					
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$319,000
	BE.12	4	Replace	Exterior Windows - Aluminum Frame	$4,173,000
	BE.21	4	Paint	Exterior Coatings	$217,000
	BI.3	4	Maintain	Corridor Finishes	$9,000
	ELEC.4	1	Maintain	Emergency Generator	$6,000
	MECH.13	4	Maintain	Piping - Sanitary System Drainage	$17,000
	MECH.21	1	Repair	Fire Suppression - Sprinkler System Piping	$5,000
				Total	**$4,746,000**
2022					
	BE.6	4	Replace	Roof Decks - Modified Bitumen Membrane Waterproofing	$328,000
	BE.12	4	Replace	Exterior Windows - Aluminum Frame	$4,299,000
	BE.21	4	Paint	Exterior Coatings	$224,000
	ELEC.1	4	Maintain	Unit Substations	$4,000
	MECH.1	4	Maintain	Air Handling Units - Corridors	$8,000
	MECH.8	4	Replace	Domestic Water Valves and Backflow Preventers	$17,000

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
	PKD.4	2	Assess	Traffic Deck Coating	$6,000
				Total	**$4,886,000**
2023					
	BE.20	4	Replace	Sealants	$154,000
	BE.21	4	Paint	Exterior Coatings	$231,000
	EG.8	4	Stain	Enclosures and Fencing - Wood	$6,000
	PKD.4	2	Renew	Traffic Deck Coating	$154,000
	PKD.5	4	Replace	Expansion Joint Seals	$49,000
				Total	**$594,000**
2024					
	BE.5	4	Replace	Roofing - Metal	$25,000
	BE.7	2	Replace	Balconies - Modified Bitumen Membrane Wateproofing	$1,900,000
	BE.16	4	Replace	Exterior Doors - Aluminum Sliding	$697,000
	BE.21	4	Paint	Exterior Coatings	$238,000
	BI.9	4	Renew	Amenity Room Finishes	$101,000
	BI.13	4	Renew	Exercise Room Finishes	$23,000
	BI.23	4	Replace	Furniture	$6,000
	EG.2	4	Repair	Road - Asphalt Pavement	$6,000
	EG.5	4	Replace	Walkways - Tile	$10,000
	ELEC.9	1	Replace	Lighting - Exterior	$13,000
	MECH.2	4	Repair	Swimming Pool Area - Air Handling Unit	$11,000
	MECH.9	4	Replace	Boilers - Domestic Water	$101,000
	MECH.14	4	Maintain	Piping - Stormwater System Drainage	$13,000
	MECH.22	1	Replace	Fire Suppression - Fire Pump	$32,000
	PKD.1	2	Replace	Plaza Slab Waterproofing	$5,954,000
				Total	**$9,130,000**
2025					
	EG.14	4	Replace	Exterior Furniture - Wood	$16,000
	ELEC.1	4	Maintain	Unit Substations	$4,000
	PKD.3	4	Replace	Parkade Gate Operators	$4,000
				Total	**$24,000**
2026					
	BE.11	4	Repair	Privacy Screens - Brick	$7,000

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
	ELEC.4	1	Maintain	Emergency Generator	$7,000
	MECH.13	4	Maintain	Piping - Sanitary System Drainage	$20,000
	MECH.21	1	Repair	Fire Suppression - Sprinkler System Piping	$5,000
				Total	**$39,000**
2027					
	BI.3	4	Renew	Corridor Finishes	$2,907,000
	ELEC.6	4	Replace	Electric Baseboard Heaters	$242,000
	MECH.1	4	Maintain	Air Handling Units - Corridors	$10,000
	MECH.8	4	Replace	Domestic Water Valves and Backflow Preventers	$19,000
	PKD.4	2	Assess	Traffic Deck Coating	$7,000
				Total	**$3,185,000**
2028					
	BE.20	4	Replace	Sealants	$178,000
	EG.8	4	Stain	Enclosures and Fencing - Wood	$7,000
	ELEC.1	4	Maintain	Unit Substations	$4,000
	PKD.4	2	Renew	Traffic Deck Coating	$285,000
				Total	**$474,000**
2029					
	BE.9	4	Replace	Exterior Walls - Rainscreen Brick Veneer	$7,636,000
	BE.18	4	Replace	Exterior Doors - Entrance	$29,000
	BE.21	4	Paint	Exterior Coatings	$275,000
	BI.12	4	Renew	Washroom Finishes	$37,000
	BI.15	4	Renew	Strata Corporation Office Finishes	$29,000
	BI.16	4	Renew	Change Room Finishes	$132,000
	BI.17	4	Replace	Pool Area Finishes	$184,000
	BI.18	4	Replace	Sauna Finishes	$37,000
	BI.23	4	Replace	Furniture	$7,000
	ELEC.2	4	Replace	Transformers	$59,000
	ELEC.4	1	Replace	Emergency Generator	$88,000
				Total	**$8,513,000**
2030					
	BE.21	4	Paint	Exterior Coatings	$284,000
	BI.6	4	Renew	Parkade Elevator Lobby Finishes	$38,000

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
	BI.8	4	Paint	Stairwell Finishes	$38,000
	EG.2	4	Replace	Road - Asphalt Pavement	$68,000
	EG.8	4	Replace	Enclosures and Fencing - Wood	$17,000
	MECH.1	4	Replace	Air Handling Units - Corridors	$68,000
	MECH.23	1	Repair	Fire Suppression - Standpipe and Fire Hose Cabinets	$30,000
	PKD.3	4	Replace	Parkade Gate Operators	$5,000
				Total	**$548,000**
2031					
	BE.21	4	Paint	Exterior Coatings	$292,000
	ELEC.1	4	Maintain	Unit Substations	$5,000
	ELEC.8	1	Replace	Lighting - Interior	$23,000
	ELEC.12	1	Replace	Lighting - Parkade	$195,000
	ELEC.15	4	Replace	Telephone Entry System	$28,000
	MECH.13	4	Maintain	Piping - Sanitary System Drainage	$23,000
	MECH.21	1	Repair	Fire Suppression - Sprinkler System Piping	$6,000
				Total	**$572,000**
2032					
	BE.21	4	Paint	Exterior Coatings	$301,000
	BI.3	4	Maintain	Corridor Finishes	$13,000
	BI.20	4	Replace	Hot Tub Tank Finishes	$16,000
	MECH.1	4	Maintain	Air Handling Units - Corridors	$11,000
	MECH.8	4	Replace	Domestic Water Valves and Backflow Preventers	$22,000
	PKD.4	2	Assess	Traffic Deck Coating	$8,000
				Total	**$371,000**
2033					
	BE.20	4	Replace	Sealants	$207,000
	EG.8	4	Stain	Enclosures and Fencing - Wood	$8,000
	PKD.4	2	Renew	Traffic Deck Coating	$207,000
				Total	**$422,000**
2034					
	BE.4	4	Replace	Roofing - Conventional Modified Bitumen Membrane	$85,000
	BE.17	4	Replace	Exterior Doors - Aluminum Swing	$724,000
	BI.23	4	Replace	Furniture	$9,000

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
	ELEC.1	4	Maintain	Unit Substations	$5,000
	ELEC.1	4	Repair	Unit Substations	$1,021,000
	ELEC.4	1	Maintain	Emergency Generator	$9,000
	MECH.7	4	Replace	Piping - Domestic Water Distribution	$2,270,000
	MECH.10	4	Replace	Storage Tanks - Domestic Hot Water	$60,000
	MECH.14	4	Maintain	Piping - Stormwater System Drainage	$17,000
	MECH.16	4	Replace	Swimming Pool - Water Heater	$68,000
	MECH.17	1	Replace	Swimming Pool - Filtration and Sanitization Equipment	$17,000
				Total	**$4,285,000**
2035					
	BI.21	4	Replace	Squash Court Finishes	$79,000
	EG.3	4	Replace	Walkways - Asphalt Pavement	$26,000
	MECH.7	4	Replace	Piping - Domestic Water Distribution	$2,338,000
	MECH.25	4	Replace	Fire Suppression - Dry Pipe Sprinkler System Air Compressor	$5,000
	PKD.2	4	Replace	Parkade Gates	$9,000
	PKD.3	4	Replace	Parkade Gate Operators	$5,000
				Total	**$2,462,000**
2036					
	BE.11	4	Repair	Privacy Screens - Brick	$9,000
	ELEC.7	4	Replace	Sauna Heaters	$5,000
	MECH.7	4	Replace	Piping - Domestic Water Distribution	$2,408,000
	MECH.13	4	Maintain	Piping - Sanitary System Drainage	$27,000
	MECH.21	1	Repair	Fire Suppression - Sprinkler System Piping	$7,000
				Total	**$2,456,000**
2037					
	BE.21	4	Paint	Exterior Coatings	$349,000
	BI.3	4	Maintain	Corridor Finishes	$15,000
	ELEC.1	4	Maintain	Unit Substations	$6,000
	ELEC.14	1	Replace	Fire Alarm Panel	$372,000
	MECH.1	4	Maintain	Air Handling Units - Corridors	$13,000
	MECH.8	4	Replace	Domestic Water Valves and Backflow Preventers	$26,000
				Total	**$781,000**

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
2038					
	BE.20	4	Replace	Sealants	$240,000
	BE.21	4	Paint	Exterior Coatings	$359,000
	EG.8	4	Stain	Enclosures and Fencing - Wood	$10,000
	PKD.7	4	Paint	Painted Finishes	$383,000
				Total	**$992,000**
2039					
	BE.21	4	Paint	Exterior Coatings	$370,000
	BI.17	4	Paint	Pool Area Finishes	$16,000
	BI.23	4	Replace	Furniture	$10,000
	ELEC.3	4	Replace	Electrical Distribution System	$20,000
	ELEC.4	1	Maintain	Emergency Generator	$10,000
	ELEC.17	4	Replace	Video Surveillance System	$30,000
	ELEV.1	4	Renew	Controllers and Drives	$2,171,000
	ELEV.2	4	Repair	Machines	$543,000
				Total	**$3,170,000**
2040					
	BE.1	4	Replace	Roofing - Inverted Modified Bitumen Membrane	$407,000
	BE.21	4	Paint	Exterior Coatings	$381,000
	BI.19	4	Replace	Pool Tank Finishes	$61,000
	ELEC.1	4	Maintain	Unit Substations	$6,000
	MECH.6	4	Replace	Mechanical Vent Terminations	$203,000
	MECH.18	1	Replace	Hot Tub - Filtration and Sanitization Equipment	$6,000
	MECH.23	1	Repair	Fire Suppression - Standpipe and Fire Hose Cabinets	$41,000
	PKD.2	4	Replace	Parkade Gates	$10,000
	PKD.3	4	Replace	Parkade Gate Operators	$6,000
				Total	**$1,121,000**
2041					
	ELEC.10	1	Replace	Lighting - Walkway	$31,000
	MECH.13	4	Maintain	Piping - Sanitary System Drainage	$31,000
	MECH.21	1	Repair	Fire Suppression - Sprinkler System Piping	$8,000
				Total	**$70,000**

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
2042					
	BI.3	4	Maintain	Corridor Finishes	$17,000
	MECH.1	4	Maintain	Air Handling Units - Corridors	$15,000
	MECH.8	4	Replace	Domestic Water Valves and Backflow Preventers	$30,000
	MECH.25	4	Replace	Fire Suppression - Dry Pipe Sprinkler System Air Compressor	$6,000
	PKD.4	2	Assess	Traffic Deck Coating	$11,000
	PKD.4	2	Assess	Traffic Deck Coating	$11,000
				Total	**$90,000**
2043					
	BE.20	4	Replace	Sealants	$278,000
	BI.1	4	Renew	Entrance Lobby Finishes	$833,000
	EG.8	4	Stain	Enclosures and Fencing - Wood	$11,000
	ELEC.1	4	Maintain	Unit Substations	$7,000
	ELEC.16	4	Replace	Access Control System	$167,000
	PKD.4	2	Renew	Traffic Deck Coating	$278,000
	PKD.4	2	Renew	Traffic Deck Coating	$444,000
				Total	**$2,018,000**
2044					
	BE.13	4	Replace	Glazing - Storefront System	$458,000
	BI.23	4	Replace	Furniture	$11,000
	EG.12	4	Replace	Retaining Walls - Brick	$57,000
	ELEC.3	4	Replace	Electrical Distribution System	$23,000
	ELEC.4	1	Maintain	Emergency Generator	$11,000
	ELEC.11	1	Replace	Lighting - Lamp Post	$194,000
	ELEV.4	4	Renew	Cab Interior Finishes	$343,000
	MECH.14	4	Maintain	Piping - Stormwater System Drainage	$23,000
				Total	**$1,120,000**
2045					
	BE.21	4	Paint	Exterior Coatings	$442,000
	MECH.25	4	Replace	Fire Suppression - Dry Pipe Sprinkler System Air Compressor	$7,000
	PKD.2	4	Replace	Parkade Gates	$12,000

[1] **Adjusted for inflation**

Year	Item	Category	Work	Component	Budget[1]
	PKD.3	4	Replace	Parkade Gate Operators	$7,000
				Total	**$468,000**

[1] **Adjusted for inflation**

BE.12 Exterior Windows - Aluminum Frame

Description

The windows consist of non-thermally broken aluminum frames which hold insulating glass units (IGU). The exterior gaskets consist of an aluminum glazing stop at the 1470 building and a rubber gasket at 1450 and 1490 buildings. The interior glazing seal consists of butyl tape on all three buildings. Sill flashing which extends past the face of the concrete upstand walls is installed below the windows. Head flashing is installed at the 1450 building, but no head flashing was observed over the windows of the 1470 and 1490 buildings. Some windows have been replaced since original construction.

Comments

Some of the exterior rubber gaskets were not properly secured in place or were not continuous. Some latches were missing on the common area windows and several window latches were loose. Leakage to the interior was observed at one window. Sealant was observed on the outside of several windows, presumably to mitigate water ingress.

RJC's 2014 Building Envelope Condition Assessment (BECA) report documented a variety of significant design and/or construction deficiencies, as well as age-related deterioration of the windows, flashing above and below windows, doors, wall assemblies and sealants. Poor water drainage characteristics were also noted. These deficiencies and age-related deterioration are resulting in water entering the wall cavity below some windows and to an increased rate of deterioration of the wall assemblies below the windows where leakage was occurring. Approximately 30% of the 60 interior recesses made by RJC revealed some form of deterioration of the wall assembly which, if not addressed, could worsen with time. The majority of these areas were adjacent to the windows, doors and beneath the solarium skylights. As a result of the findings, three solarium skylights were replaced since the 2014 report.

We believe that some of the windows have reached the end of their service life and the remaining windows will soon be at the end of their service life and require replacement. In the 2014 report, RJC recommended replacement of the windows over a ten year period, beginning in 2014. This depreciation report has reduced the project to four phases and deferred the start of the work, beginning in the 2019/2020 fiscal year. We recommend that the prioritization of the four contiguous areas of work be based on the findings of the 2014 BECA report in combination with observations of leakage from occupants. The estimated remaining service life represents the average service life of the windows. Some have already failed and some will fail after the indicated service life. The budget includes replacement of the original and recently installed windows (by individual owners) with thermally broken aluminum-framed windows, replacement of the brick around the windows (in order to achieve a proper tie-in with the adjacent wall assembly), replacement of the remaining original solarium skylights with thermally broken aluminum-framed skylights, restoration of interior finishes and consulting engineering fees.

16 – Windows overlooking east courtyard

17 – Window leak in Unit 901 - 1470

Service Life Stats

Expected Service Life	35 years
Present Equivalent Age	31 years
Estimated Remaining Life	4 years

Condition Assessment

Very Good	Good	Fair	Poor	Failed

Category

① ② ③ **4**

Work Required

2019	Replace	**$3,600,000**	$3,934,000
2020	Replace	**$3,600,000**	$4,052,000
2021	Replace	**$3,600,000**	$4,173,000
2022	Replace	**$3,600,000**	$4,299,000

Present values (black) are rounded as described in Section 2.5 and future values (blue) are rounded to the nearest $1,000.

BE.15 Glazing - Insulating Glass Units

Description

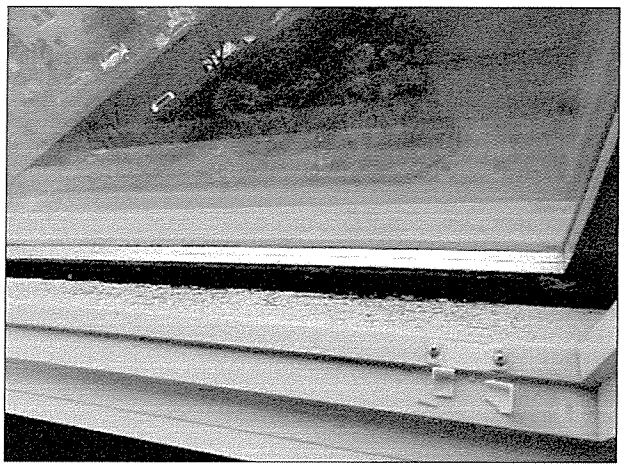
Insulating glass units (IGU) are installed in the windows, storefront glazing, T-bar skylights and glazed exterior doors (except the three sets of main entrance doors). Some of the IGUs date from original construction and others were replaced as recently as last year. The IGUs of the 1470 building are constructed with a composite spacer which is more prone to failure than the metal spacers of the 1450 and 1490 buildings. In an effort to reduce solar heat gain, a window film is installed on the inside face of the IGUs along the west side of the corridors.

Comments

Given that the IGUs have a different service life than the windows, exterior doors and skylights of which they are a part of, the IGUs for the complex are categorized independently in this appendix. The strata corporation meeting minutes indicate that many IGUs have been replaced over the last five years. Several failed IGUs were observed during the field review. Some of the IGUs in the corridors on the west side of the complex were partially delaminated from the metal spacers. This may pose a safety risk and should be addressed as soon as possible.

Although an average service life has been provided, the rate of IGU failure generally follows a bell curve pattern with IGU failures taking place over a 10 to 15-year period. The IGUs of this complex are currently within the bell curve failure period of typical IGUs. Consequently, if not already done, we recommend that the strata council create a separate line item in the operating budget to fund replacement of failed IGUs on an annual basis. Owners can notify the strata council of failed IGUs in their unit and the strata council can, after verifying the claim, replace all failed IGUs once a year to achieve significant economies of scale. We recommend an annual replacement value of approximately $20,000 for this line item in the operating budget. The IGU replacement program should be terminated at least two years before replacement of the windows, exterior doors or skylights. We assume that window washing is undertaken on an annual basis and as such, is funded from the operating budget.

As noted in RJC's 2014 Building Envelope Condition Assessment (BECA), we recommend that all replacement IGUs include a low emissivity (low E) coating to reduce the solar gain in the warmer months of the year.



20 – 1985 IGU in 1490 building

21 – IGU in 1470 building

Service Life Stats

Expected Service Life	25 years
Present Equivalent Age	20 years
Estimated Remaining Life	5 years

Condition Assessment

Very Good | Good | Fair | Poor | Failed

Category

① ② ③ 4

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Read Jones Christoffersen
Consulting Engineers

Harbour Cove
Building Envelope Condition Assessment

1450, 1470, 1490 Pennyfarthing Drive, Vancouver, BC
Vancouver, BC

Prepared for:

The Owners, Strata Plan VR1291
c/o The Wynford Group
#815 - 1200 West 73rd Avenue
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Prepared by:

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February 21, 2014
RJC# VAN.103675.0005

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EXECUTIVE SUMMARY

As requested, Read Jones Christoffersen Ltd. (RJC) has completed an assessment of the building envelope assemblies at Harbour Cove located at 1450, 1470 and 1490 Pennyfarthing Drive in Vancouver, BC.

RJC's assessment included a review of available architectural and structural drawings, discussion of building envelope performance with the building manager, review of questionnaires completed by unit occupants, visual review of building envelope components (walls, windows, doors, balconies, decks, and roofs), and examination of interior and exterior exploratory recesses.

Our condition assessment of Harbour Cove revealed little in the way of significant deterioration and at this point in time, the building appears to be in a condition commensurate with its age. Deterioration which was observed on the building appears to be primarily associated with age-related deterioration of materials. Elements of the building require targeted maintenance and remediation to maintain the intended use of the building and ensure continued operation of building services. If not addressed, these elements are likely to result in continued deterioration of the building components, including the underlying structure. It is our opinion that the existing aluminum windows and doors are nearing the end of their functional service life and should be targeted for replacement over time. The original roof and roof deck membranes are also at the end of their functional service life and should also be planned for replacement. The brick 'rainscreen' wall assemblies are currently in a serviceable condition, however do require maintenance activity to prolong their service life.

One scenario outlining conceptual level recommendations for building envelope remediation and renewal tasks has been provided, including an associated Opinion of Probable Cost to complete the work. It is important to note that there are many phased scenarios available that would allow the Strata to plan these expenditures over different time periods, based on available funding. RJC would be able to assist the Strata should they wish to consider the recommended remediation work below being completed over other time frames. Due to the size and complexity of the buildings, a detailed long-term maintenance and renewals plan and record keeping program should be implemented by the Owners, particularly if they opt for a phased restoration program. This BECA report should be used to inform the basis of any long-term plan.

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condition assessment.

Table 1 - Documents Provided	
"Building Envelope Condition Assessment" Report	Prepared by Morrison Hershfield, dated September 5, 2006
Architectural Drawings	▪ Drawings 60C to 79C for 1450 Pennyfarthing (Bldg C). Prepared by Hamilton Doyle and Associates, dated February 8, 1982. ▪ A-1 to A-55B (includes Details) for 1470 Pennyfarthing (Bldg B). Prepared by Hamilton Doyle and Associates, dated June 6, 1983. ▪ A-2A to A-15A for 1490 Pennyfarthing (Bldg A). Prepared by Hamilton Doyle and Associates, dated June 6, 1983.
Structural Drawings: S-1 to S-18B	Prepared by Read Jones Christoffersen Ltd., dated September 1983.

2.0 SUMMARY OF FIELD DATA

2.1 Questionnaires

The following is a summation of the information presented in Appendix C.

A Building Envelope Questionnaire was circulated to all of the unit occupants. The document requested information on the performance of the balconies/decks, walls, and window/door assemblies.

Responses were received from 159 of the 304 units (52%). A general summary of the questionnaire responses is outlined in Table 2.

Table 2 - Summary of Questionnaire Responses		
Description	**Numbers of Units**	**% of Responding Units**
Water Leaks	20	13%
Area of Black Mildew[1]	25	16%
Cold Air Penetration	37	23%
Window Problems	99	62%
Exterior Door Problems	46	29%
Cracking Inside Suite	37	23%
Balcony and Deck Problems	53	33%
Water Leaks in Parking Stall	20	13%

Items of interest noted by RJC are as follows:

.1 62% of the responding units responding to the questionnaire reported having problems with windows. The responding units indicated that there are condensation issues, failed sealed

insulated glazing units, difficulty in operating the windows and unsealed gaps around the frames. A review of previous reports indicates that window repairs have been conducted at 16 different suites, as a result of moisture-related damage.

.2 33% of the responding units reported having problems with their balconies or decks. These were typically related to pooling of rainwater, efflorescence and staining on surfaces, and peeling of wall and deck finishes. More than one unit recorded that previous membrane repairs have been completed at ground floor patios and roof decks due to previous leaks.

.3 29% of the responding units reported exterior door problems. These were typically related to misalignment, resulting in difficulty in operation and cold air penetration through unsealed gaps. Condensation issues were also reported, related to the exterior doors.

.4 23% of the responding units reported cold exterior air penetrating into their units. These were typically related to the windows and sliding doors. A number of responding units indicated that there is a draft at the windows, particularly at unsealed gaps around the windows. Drafts were also noted at the sliding doors, particularly at unsealed gaps due to misalignment of doors.

.5 To a lesser extent, there were also some units reporting water leaks in other areas of the unit, and areas with black mildew. The water leaks were noted at the interior face of exterior walls, particularly near the base of the wall around patio and balcony doors. Areas with black mildew were primarily reported to be on window sills and frames. Of the 20 units which reported water leaks, 9 units also reported areas of black mildew.

2.2 Interior Reviews and Exploratory Recesses

The following is a summation of the information presented in Appendices D, E and F. The locations of the interior recesses have been shown on the elevation drawings in Appendix K.

A total of 33 units were examined from the interior, which represents approximately 11% of the units in the buildings. The units and common areas reviewed are summarized in Table 3 below:

Table 3 - Summary of Interior Review Locations

1450 Pennyfarthing	1470 Pennyfarthing	1490 Pennyfarthing
104, 109, 304, 312, 407, 510, 610, 702, 811, 812, 901, 910 3rd floor corridor 5th floor corridor 7th floor corridor 9th floor corridor	G03, 104, 302, 405, 505, 601, 806, 903, 1001, 1002 Ground floor corridor 3rd floor corridor 5th floor corridor 6th floor corridor 7th floor corridor 8th floor corridor	G01, 302, 305, 310, 404, 501, 607, 610, 707, 801, 803 1st floor corridor 2nd floor corridor 3rd floor corridor 4th floor corridor 5th floor corridor 7th floor corridor 8th floor corridor East stairwell

During the interior reviews, a visual review of interior finishes was conducted and moisture content readings were taken at the interior face of the exterior concrete or sheathing. A total of 60 exploratory recesses were made from the interior to conduct this review.

The following is a summary of the wall assembly conditions observed:

.1 The condition of each recess was given a value based on a scale of 0 to 5. A value of 0 was given to recesses with no evidence of deterioration or staining and a value of 5 was given to recesses with severely deteriorated materials. It is our opinion that a value of 0 or 1 can be considered normal in the West Coast environment and may not be detrimental to the structure. Values of 2 and 3 may lead to further deterioration if not addressed, while values of 4 and 5 are of immediate concern. The conditions were identified at the time of review and may change with continuing exposure to moisture. Summaries of the values assessed at the interior recesses are listed in Table 4.

Table 4 - Summary of Interior Recess Deterioration Values

Scale Rating	Frequency of Deterioration in 60 Total Recesses	% of Overall Recesses
Deterioration Scale Value of 0	26	43%
Deterioration Scale Value of 1	16	27%
Deterioration Scale Value of 2	10	16%
Deterioration Scale Value of 3	3	5%
Deterioration Scale Value of 4	1	2%
Deterioration Scale Value of 5	4	7%

.2 As shown above, approximately 30% of the recesses had values of 2 or greater. The majority of these areas were adjacent to the windows, doors and beneath the solarium skylights. At these locations deterioration was in the form of either corrosion at the steel framing, deterioration of interior finishes and black organic growth at the paper face of the gypsum wall board, or a combination of the above.

.3 Generally, the interior recesses were located at the inside face of the concrete upstand. An accurate moisture content reading cannot be taken from the concrete, therefore relative readings were taken using dry concrete as a reference. These relative moisture readings are summarized in Appendices D, E, and F, with the interior exploratory recess descriptions. Where wood or gypsum sheathing materials were encountered, moisture readings were taken in these materials. These moisture content readings have also been included in Appendices D, E, and F with the corresponding exploratory recess description.

.4 At a number of the units reviewed, some minor water staining and damage to the interior finishes was also observed. Damage appears to be caused by a combination of leakage and condensation. In particular, moisture damage was observed at painted wood sills and drywall at jambs and beneath the windows. This correlates with survey responses reporting water leakage and heavy condensation at windows.

.5 No vapour retarder was observed at 1450 Pennyfarthing, meaning there is no vapour control within the wall assembly. At 1470 and 1490 Pennyfarthing, the existing vapour retarder was observed to be discontinuous at some locations.

.6 A significant number of failed insulating glass units and replacement units were observed during the interior review. Discussions with the Building Manager indicate that many of the original units have been replaced due to failure.

We expect that the rate of IGU failures within the building will continue to increase exponentially over time as the desiccant within the IGUs increases in moisture content, slowing its ability to absorb further moisture. This will lead to fogging under extreme conditions (whereby the desiccant cannot absorb moisture fast enough to prevent temporary fogging of the IGU) with fogging occurring on a more regular basis as the desiccant absorbs further moisture. Once the desiccant becomes close to its saturation point, permanent fogging is to be expected.

2.3 Exterior Reviews and Exploratory Recesses

The following is a summation of the information presented in Appendices G, H, I and J. The locations of the exterior recesses have been shown on the elevation drawings in Appendix K.

During the exterior reviews, a visual review of the exterior walls, windows, balconies, roofs and decks was conducted. 12 bosun chair drops (4 drops per building) were conducted to review these exterior finishes.

A total of 9 exploratory recesses were examined from the exterior. Bricks were selectively removed at 7 locations to review the condition of the wall assembly behind the brick veneer system. Pavers were lifted at 2 locations at 1490 Pennyfarthing to review the condition of the roof deck membrane where new material ties into existing.

The following is a summary of the exterior assembly conditions observed:

.1 Similar to the interior recesses, the condition of each exterior exploratory recess was given a value based on a scale of 0 to 5. A value of 0 was given to recesses with no evidence of deterioration or staining and a value of 5 was given to recesses with severely deteriorated materials. Values were assigned based on visible condition of the shelf angles, membrane, substrate and adjacent finishes.

.2 Detailing of the masonry veneer system varies from building to building. At 1450 Pennyfarthing, built-out concrete corbels at the slab edges support the veneer walls above. At 1470 and 1490 Pennyfarthing, steel shelf angles are installed at the slab edges, which support the veneer system above. A variety of waterproofing materials have been used as the through-wall flashing membrane. This is described in further detail in Section 3.1.

.3 An exploratory recess was opened adjacent to a window jamb on the West elevation of 1450 Pennyfarthing. No membrane was observed at the jambs, and the plywood window liner was open to the drainage cavity in the adjacent brick veneer system. This means that the

4.0 RECOMMENDATIONS AND OPINIONS OF PROBABLE COST

4.1 Summary of Remediation Recommendations

Table 12 lists all remediation recommendations associated with the building envelope assemblies outlined in Section 3 of this report.

It is recommended that the work be completed in the near future as moisture ingress and related deterioration will continue and restoration costs will increase if delayed.

Table 11 - Recommendations for Remediation

A	Provide maintenance repairs at the brick veneer wall areas at all three buildings. This would include, but is not limited to, targeted mortar repointing, replacement of cracked brick, clearing obstructed weep holes, horizontal sealant replacement at the shelf angle locations. Mortar below corbels and shelf angles should be removed and replaced with backer rod and sealant.
B	Continue with sealant replacements at wall interfaces, including but not limited to, balcony-to-brick interfaces, brick-to-concrete interfaces, wall penetrations, movement joints, etc. Clean and re-apply paint at areas with paint failure.
C	Continue with at-grade base of wall waterproofing at West elevation of 1470 Pennyfarthing, including installation of membrane, drainage medium, drain mat, drain tile and filter cloth. Reduce height of landscaping such that it is not above cold joint.
D	Replace deteriorated gypsum sheathing at vertical strips of brick veneer on steel stud back-up walls at South elevation of 1490 Pennyfarthing. Scope of work expected to include steel framing restoration, new sheathing, new membrane and brick replacement. Recommend pairing this sheathing replacement work with the recommended window replacement scope of work in this area.
E	Replace the existing window and door assemblies. Replacement doors and windows to be thermally broken and meet current building and energy code requirements. Where window assemblies are adjacent to the brick veneer wall assembly, isolated brick veneer removal will be required to allow for proper tie-in detailing. Window replacement work to include installation of proper head and sill flashings. At balconies and patios, install curb at low door sills as part of the window replacement work.
F	Replace the existing pressure plate skylight assemblies with a new, more robust, pressure plate skylight assembly.
G	Based on age of system, plan for replacement of T-bar skylight with new pressure plate type skylight assembly.
H	Provide maintenance repairs at the balconies including, but not limited to, targeted concrete delamination repair at isolated areas of concrete spalling, installation of new scuppers at balcony floor level where current scuppers are too high and cleaning and painting of top-mounted guardrail fasteners to provide protection against further corrosion.
I	Continue with roof membrane replacement at all remaining roof areas with original roof membrane. This would require removal and reinstatement of stone ballast and replacement of insulation. Review sloping requirements to confirm proper drainage. Install cap flashings at parapets and replace base of wall flashings. Replace deck drains and overflow scuppers as required.
J	Continue with roof deck membrane replacement at all remaining roof deck areas. This would require removal and reinstatement of the interlocking pavers and replacement of the rigid insulation. Review sloping requirements to confirm proper flow of drainage. Remove and replace guardrails and raise concrete parapet as required to achieve guardrail connection above the roof deck assembly. Replace deck drains and overflow scuppers as required.

Table 12 - Opinions of Probable Cost				
No.	Description	Maintenance Forecast Period		
		0-2 Years	2-5 Years	5-10 Years
A	Provide maintenance repairs at the brick veneer wall areas at all three buildings. This would include, but is not limited to, targeted mortar repointing, replacement of cracked brick, clearing obstructed weep holes, horizontal sealant replacement at the shelf angle locations. Mortar below corbels and shelf angles should be removed and replaced with backer rod and sealant.	$128,000.00	$192,000.00	
B	Continue with sealant replacements at wall interfaces, including but not limited to, balcony-to-brick interfaces, brick-to-concrete interfaces, wall penetrations, movement joints, etc. Clean and re-apply paint at areas with paint failure.	$50,000.00		
C	Continue with at-grade base of wall waterproofing at West elevation of 1470 Pennyfarthing, including installation of membrane, drainage medium, drain mat, drain tile and filter cloth. Reduce height of landscaping such that it is not above cold joint.	$20,000.00		
D	Replace deteriorated gypsum sheathing at vertical strips of brick veneer on steel stud back-up walls at South elevation of 1490 Pennyfarthing. Scope of work expected to include steel framing restoration, new sheathing, new membrane and brick replacement. Recommend pairing this sheathing replacement work with the recommended window replacement scope of work in this area.		$561,000.00	
E	Replace the existing window and door assemblies. Replacement doors and windows to be thermally broken and meet current building and energy code requirements. Where window assemblies are adjacent to the brick veneer wall assembly, isolated brick veneer removal will be required to allow for proper tie-in detailing. Window replacement work to include installation of proper head and sill flashings. At balconies and patios, install curb at low door sills as part of the window replacement work.	$250,000.00[1]	$7,500,000.00[2]	$7,500,000.00[2]
F	Replace the existing pressure plate skylight assemblies with a new, more robust, pressure plate skylight assembly. .	$100,000.00[3]		
G	Based on age of system, plan for replacement of T-bar skylight with new pressure plate type skylight assembly.		$65,000.00[4]	
H	Provide maintenance repairs at the balconies including, but not limited to, targeted concrete delamination repair at isolated areas of concrete spalling, installation of new scuppers at balcony floor level where current scuppers are too high and cleaning and painting of top-mounted guardrail fasteners to provide protection against further corrosion.	$61,000.00		
I	Provide maintenance repairs at the brick veneer wall areas at all three buildings. This would include, but is not limited to, targeted mortar repointing, replacement of cracked brick, clearing obstructed weep holes, horizontal sealant replacement at the shelf angle locations. Mortar below corbels and shelf angles should be removed and replaced with backer rod and sealant.		$401,000.00	

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Table 5 - Recommendations for Remediation: Exterior Walls	
A	Provide maintenance repairs at the brick veneer wall areas at all three buildings. This would include, but is not limited to, targeted mortar repointing, replacement of cracked brick, clearing obstructed weep holes, horizontal sealant replacement at the shelf angle locations. Mortar below corbels and shelf angles should be removed and replaced with backer rod and sealant.
B	Continue with sealant replacements at wall interfaces, including but not limited to, balcony-to-brick interfaces, brick-to-concrete interfaces, wall penetrations, movement joints, etc. Clean and re-apply paint at areas with paint failure.
C	Continue with at-grade base of wall waterproofing at West elevation of 1470 Pennyfarthing, including installation of membrane, drainage medium, drain mat, drain tile and filter cloth. Reduce height of landscaping such that it is not above cold joint.
D	Replace deteriorated gypsum sheathing at vertical strips of brick veneer on steel stud back-up walls at South elevation of 1490 Pennyfarthing. Scope of work expected to include steel framing restoration, new sheathing, new membrane and brick replacement. Recommend pairing this sheathing replacement work with the recommended window replacement scope of work in this area.

3.2 Window and Door Assemblies

The following is a summation of the information presented in Appendix M.

The typical windows at Harbour Cove consist of non-thermally broken aluminum frames, supporting double glazed insulating glazing units (IGUs). The exterior gasket consists of a metal glazing stop at 1470 Pennyfarthing and a rubber gasket at 1450 and 1490 Pennyfarthing. The interior glazing seal consists of a wet gasket (butyl tape) at all three buildings. The glazing panes are separated with a desiccant filled metal spacer bar at 1450 and 1490 Pennyfarthing and with a composite spacer at 1470 Pennyfarthing. The service life of both types of IGU is approximately 20 years and their longevity depends on the durability of the glazing components. There are also swing-operable sashes within the windows.

The windows at all three buildings have sill flashings which also extend past the face of the concrete upstand walls below the windows. Head flashings were observed at 1450 Pennyfarthing, however, no head flashings were observed on the windows at 1470 and 1490 Pennyfarthing. Existing architectural details show a small head flashing at these locations, but this may have been encapsulated in a large bead of sealant. Most of the observed flashings were too short and/or backsloped in some areas. Properly installed flashings help divert water from the window and wall assemblies.

Access doors to the balconies and decks are a combination of aluminum frame side hung swing doors and sliding metal patio doors. In both cases, the glazing units are double-glazed IGUs.

Items of interest noted by RJC are as follows:

.1 The windows for the most part are original, with a large number of the original sealed insulating glass units (IGUs) having been replaced. It was noted that replacement of glass units has been ongoing for a number of years, and has been performed as unit owners report failed IGUs. Because of the nature of this replacement with no central standard, there is the

potential for problems to occur. Sealed glass units are a wind load bearing item and as such, require specific engineering to ensure they are capable of transferring wind load reliably to the base building structure. Further, selection of glass thickness and glass types (annealed, heat strengthened and tempered) is critical to providing appropriate load carrying capacity.

.2 There was a significant percentage of failed IGUs as evidenced by condensation or fogging within panes. Failure of the seals on IGUs are a performance and aesthetic issue as it impairs vision and increases glare, and also reduces the insulating performance of the windows. In advanced stages, IGU failure will impair the wind load resistance of the glass as the two panes no longer work together.

IGUs at 1470 Pennyfarthing include a composite spacer, which is more prone to failure than the metal spacers also found at Harbour Cove. This is consistent with the high incidence of failing IGUs at 1470, relative to the other two buildings.

.3 The aluminum window frames are not thermally broken and there was no low-E coating observed. The unthermally broken frames and lack of low-E coating results in the thermal transfer rate between the interior and exterior surfaces being high and increased probability of condensation forming at the windows.

The South-West facing windows of the corridors at 1470 Pennyfarthing are large solar heat gain collectors and would benefit from a properly installed Low-E coating with respect to temperature regulation within these corridors.

.4 Damaged and deteriorated exterior sealant was observed at a number of locations around the window and door assemblies. The sealant joints have failed at several of these locations. The maintenance of sealant joints in mitigation of water ingress at these conditions is critical.

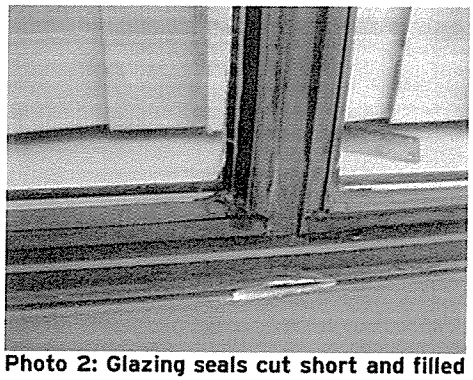

Photo 2: Glazing seals cut short and filled with failed sealant allows water to penetrate the window assembly.

.5 The exterior glazing stops were either warped, damaged, cut short, or not properly secured in place at a number of locations. This is a safety concern for the retention of glass into frames in a high-rise building, as well as being direct openings for water ingress into the glazing rebate.

.6 Unsealed mitre joints were observed in the window assemblies, as well as fastener penetrations through condensation tracks. Both of these items allow water to penetrate the assembly and into interior finishes. No end dams have been provided on the sill extrusion at 1450 and 1490 Pennyfarthing, allowing water in the window assembly to drain to the window corners and damage interior finishes. Sealant has been used as a temporary means of remedying this.

.7 Drainage holes have been installed from the exterior to drain incidental moisture in the glazing rebate. Weep holes were also noted through the frames which may allow water from the glazing rebate into the interior.

.8 No membrane has been installed at window head, jambs or sills. The windows rely on exterior sealant to keep out water. Large unsealed gaps were observed around window and doors, which not only allow water penetration, but also air leakage into the wall assembly. Windows and doors are misaligned in several locations, resulting in an improper seal at operable vents and difficulty in operation.

.9 Aluminum window frames were observed to have a weathered finish, with aluminum corrosion observed in some instances. Aluminum corrosion appears to be most significant on elevations with higher exposures. Painting the window frames may offer a temporary solution to aluminum corrosion, however will require regular maintenance.

.10 The storefront windows and doors at the ground floor consist of single-glaze aluminum frames, with rubber gaskets serving as the interior and exterior glazing seals. No evidence of water ingress was noted during the visual review at these areas. While the performance of these units does not appear to be a problem at this time, the energy performance of these units may not meet current standards.

The storefront windows at the 8th Floor roof decks at 1450 Pennyfarthing, consist of double-glazed aluminum frames, with rubber gaskets serving as the interior and exterior glazing seals.

Missing or discontinuous glazing stops were noted in several locations. The exterior glazing stops are relied upon to hold the glazing unit in place and should all the stops from a particular glazing unit become dislodged, this may pose a life safety issue. The solution is a relatively simple fix which would involve hiring a glazing contractor to replace missing or discontinuous glazing stops.

Based on our review of the interior and exterior of the building, it is our opinion that the windows are nearing the end of their functional service life and should be targeted for replacement over time. Many of the original IGU's have been replaced and Owners can expect sealed unit failures to continue to occur as the units age. Evidence of water ingress was observed at the window assembly detailing, indicating leakage at either the window perimeter or through the window assemblies. Both types of failure are common with this window type and installation. Frequency of leaks and damage to interior finishes can be expected to increase as the window systems remain in place and continue to age.

As the windows are nearing the end of their functional service life, it is recommended that they be replaced. Replacement with new thermally broken window and door assemblies will improve the thermal performance of the windows, occupant comfort, and help reduce radiant heat loss. Targeted leak repairs at windows may be considered, however at some point they will become uneconomical for the short-term benefits they provide.

Window replacements will have to comply with Vancouver Building By-Law, which requires new windows to meet the air and water resistance performance requirements of the North American

Fenestration Standard (NAFS). It is important to note that where the window assemblies are adjacent to the brick veneer wall assemblies, isolated brick veneer removal will be required to allow for proper tie-in detailing. Where the vertical bands of brick veneer are fairly narrow (ie. less than 3 or4 feet in width), the entire vertical band of brick veneer may need to be removed and replaced. These types of transitions were noted at all elevations on all three buildings.

In order to provide continued service life of the building, the following recommendations have been provided for the window and door assemblies.

Table 6 - Recommendations for Remediation: Windows and Doors	
E	Replace the existing window and door assemblies. Replacement doors and windows to be thermally broken and meet current building and energy code requirements. Where window assemblies are adjacent to the brick veneer wall assembly, isolated brick veneer removal will be required to allow for proper tie-in detailing. Window replacement work to include installation of proper head and sill flashings. At balconies and patios, install curbs at low door sills as part of the window replacement work.

3.3 Skylight Assemblies

There are several skylight assemblies at Harbour Cove. At 1470 and 1490 Pennyfarthing, pressure plate skylight assemblies are installed at the 8th, 9th and 10th storey solariums. A pressure plate skylight system is also installed at the penthouse of 1450 Pennyfarthing, however this area was not accessible at the time of our review. T-Bar style skylights and dome skylights were observed on the roofs of 1470 and 1490 Pennyfarthing.

The pressure-plate skylight systems are experiencing failure at the pressure plate seals and at the skylight heads. Damage to interior finishes was observed beneath the pressure plate style skylights in the solariums at various units. Interface detailing at the heads of the windows at the 5th, 8th, 9th and 10th floor solariums may require removal of the existing skylight framing, to facilitate window tie-ins. In the event that the existing skylight assemblies are removed, it is likely that they would not be able to be reinstalled as reconstruction of the structural support would be necessary and the existing system would not meet current building code requirements.

In general, the T-bar skylight systems have poor interface detailing, which renders them susceptible to air and moisture leakage. Based on the age of the systems, it is recommended that consideration be given to replacement of these skylights. Age is the primary basis for this recommendation, as no significant interior deterioration was noted below the T-Bar skylight assemblies at this time.

No interior damage was observed beneath domed skylights and no significant issues were raised regarding the domed skylights, beyond condensation issues. Replacement of the domed skylights has not been included in our recommendations at this time.

In order to improve the performance and service life of the skylight systems, RJC recommends that the existing pressure-plate and T-bar type skylight assemblies be removed and replaced with new pressure plate skylight assemblies.

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2013 Depreciation Report

Harbour Cove, 1450, 1470 & 1490 Pennyfarthing Drive, Vancouver, BC

SUBMITTED TO The Owners, Strata Plan VR1291
C/O Ms. Bettina Rodenkirchen, Property Manager
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815 - 1200 W 73rd Avenue
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224 West 8th Avenue
Vancouver BC V5Y 1N5

PROJECT # 2738.30

DATE May 31, 2013

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MEMORANDUM

TO: Owners, Strata Plan VR 1291, Harbour Cove

FROM: Strata Council, VR 1291

DATE: June 6, 2013

RE: Depreciation Report

Council has received the final version of the Depreciation Report which includes references to the 2006 Morrison Hershfield Report and the RDH Parkade Condition Assessment of 2012, and makes recommendations for an updated building envelope condition assessment (BECA) to validate the assumptions made in the depreciation report.

In the opinion of Council, the Depreciation Report is unable to provide a sufficiently detailed assessment of the current condition of the brickwork, windows, and roofs, and Council proposes that we conduct an updated assessment of the building envelope so that a more accurate and manageable Capital Plan can be developed for the next few years.

Owners will have to agree to the expenditure for an updated building envelope assessment to be carried out, and subsequently decide on a long term funding plan for repair and maintenance costs.

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Appendices

Below is a bird's eye view of Harbour Cove, indicating the location of the three buildings.

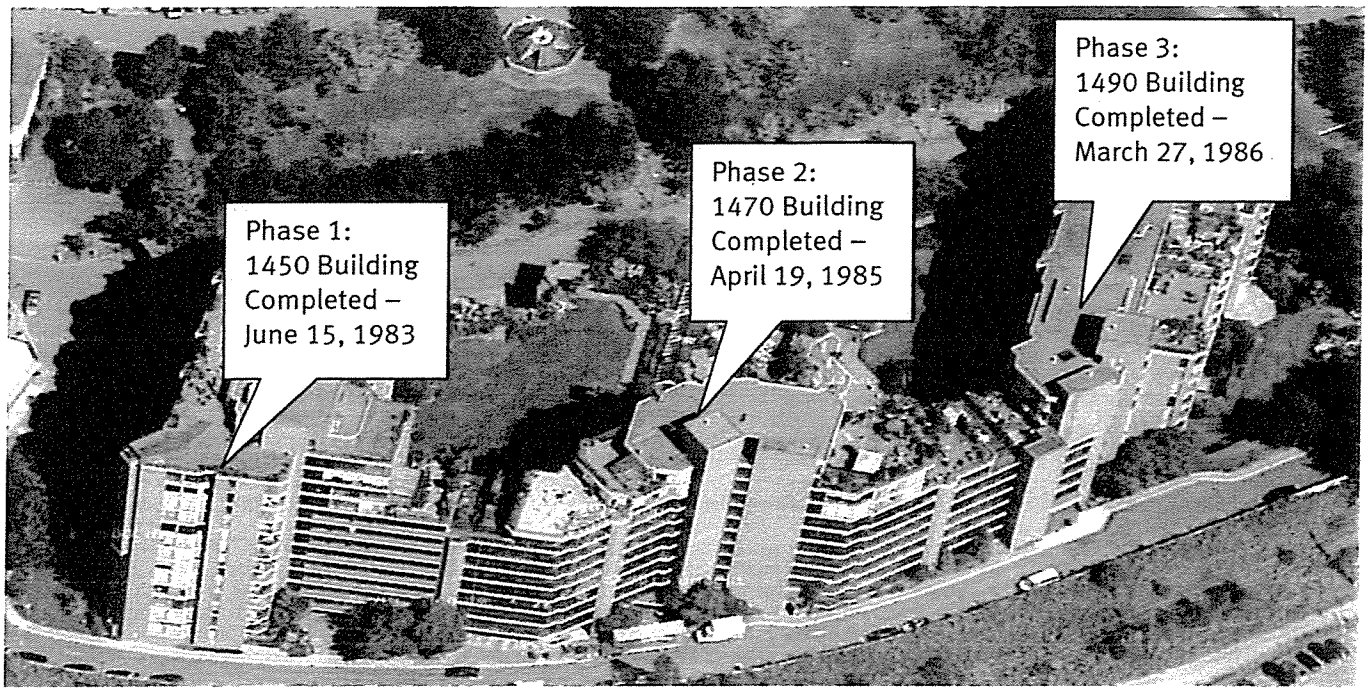

Fig. 2.1.1 Bird's eye view of Harbour Cove

Over time, all assets move through a series of life cycle stages. In this regard, Harbour Cove can be considered an "adolescent" building where the majority of the assets date from original construction, but a number of significant major maintenance activities and renewals projects have occurred. A brief history of activities and projects, as reported to us or as described in the documents reviewed, is listed in Table 2.1.1.

Table 2.1.1 Summary of Completed Projects

Summary of Completed Projects – Listed by System	
Enclosure System	**Electrical System**
⇢ Recoating of exterior concrete wall surfaces (2012)	⇢ Replacement of security surveillance equipment (2010)
⇢ Commissioning of parkade condition assessment (2012)	⇢ Replacement of enterphone panels (2007)
⇢ Replacement of roof above elevator room of building 1490 (2012)	⇢ Upgrading of interior light fixtures (2006)
⇢ Commissioning of building envelope condition assessment (2006)	⇢ Replacement of exterior garden courtyard lights (2006)
⇢ Installation of anchor and fall protection equipment (2007)	⇢ Replacement of proximity access control system (1988)
⇢ Replacement of lobby entrance doors at building 1470 (2006)	⇢ De-energizing and cleaning of electrical distribution equipment

Enclosure System (cont'd)

- Periodic repair/replacement of roof and roof deck waterproofing
- Installation of weep holes in window frames and other localized water shedding improvements
- Installation of caulking at window frame mitre joints and butt joints
- Installation of caulking at metal frames of skylights
- Periodic replacement of caulking at window interface details and at brick veneer cladding
- Periodic caulking of cracks in the concrete and masonry walls
- Localized patching of delaminated concrete on the driving surface of the parkade
- Routing and sealing of cracks of the parkade concrete slab driving surface at isolated locations
- Crack injection at isolated parkade soffit areas
- Periodic replacement of masonry brick ties and installation of expansion joints
- Localized replacement of insulated glazing units
- Localized balcony membrane repairs

Mechanical System

- Re-piping of domestic water distribution system (2005)
- Replacement of sump pumps (2005)
- Replacement of domestic hot water heaters (2005)
- Phased replacement of make-up air units (2005-2009)
- Cyclical overhauling of sump pumps
- Cyclical replacement of overhead gate motors
- Cyclical replacement of domestic hot water storage tanks
- Cyclical replacement of various valves, pumps and fans

Elevator System

- Modernization of elevator systems (2012)

Amenities

- Replacement of commercial grade fitness equipment (2013)
- Resurfacing of pool and spa tanks (2006)
- Replacement of pool and spa heating equipment (2005)
- Cyclical replacement of pool and spa circulation and sanitation equipment
- Replacement of facility office equipment
- Replacement of audio and visual equipment in amenity and fitness rooms of building 1470

Interior Finishes

- Replacement of rubber sports flooring in fitness room of building 1470 (2003)
- Replacement of hallway carpet flooring (1999)
- Replacement of vinyl wallpaper (1999)
- Periodic repainting of interior walls

Fire Safety System

- Replacement of fire alarm panels and associated field devices in buildings 1470 and 1490 (2011-2013)
- Replacement of LED exit signs (2006)
- Cyclical replacement of fire extinguishers

Sitework

- Replacement of exterior tile flooring at lobby entrance of building 1490 (2010)
- Replacement of wood fencing with concrete fencing along Pennyfarthing Drive (2007)
- Repair, repainting, and replacement of wood fencing in courtyard (2006)
- Ongoing garden improvements

3.2. Renewals Plan

It has been estimated that the Strata Corporation and Co-op will collectively need to spend approximately $37.8M in capital expenditures over the next 30 years. The following table indicates the distribution of the projected major maintenance and renewal costs within each system, for both the Strata Corporation and Co-op, over the next 30 years. This will enable the Owners to better understand which asset groups will require the largest investment of the Owners' money over time.

Table 3.2.1 Costs Broken Down by System

System	Sample Assets	Current Dollars			Future Dollars
		Strata Corporation	Co-op	Total	Total
Enclosure	Roofs, windows, doors, etc.	$18,431,000	$970,000	$19,401,000	$22,958,000
Electrical	Lighting, etc.	$1,043,000	$39,000	$1,082,000	$1,437,000
Mechanical	Plumbing, drainage, ventilation, etc.	$3,150,000	$174,000	$3,324,000	$5,105,000
Elevator	Controls, pumps, tanks, finishes, etc.	$1,140,000	$140,000	$1,280,000	$2,061,000
Fire Safety	Detections, suppression, egress, etc.	$561,000	$30,000	$591,000	$823,000
Interior Finishes	Flooring, painting, doors, etc.	$2,301,000	$160,000	$2,461,000	$3,490,000
Amenities	Furnishings, pool equipment etc.	$283,000	$22,000	$305,000	$413,000
Sitework	Landscaping, paving, etc.	$1,015,000	$51,000	$1,066,000	$1,492,000
Total		**$27,924,000**	**$1,586,000**	**$29,510,000**	**$37,779,000**

The figure below summarizes the distribution of the major maintenance and renewal costs for the next 10 years. Of the $37.8M in capital expenditures over the next 30 years, approximately $20.1M is expected over the next 10 years. For Harbour Cove, the majority of these costs are in the enclosure system (See Appendix H).

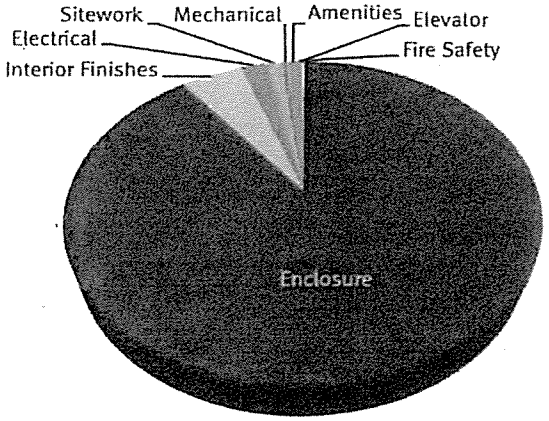

Fig. 3.2.1 Distribution of Major Maintenance and Renewal Costs over the next 10 years (2013 to 2022) for the Strata Corporation and Co-op combined.

The cost implications of these events, together with scheduling considerations, are addressed in the following sections of the Report.

- Replacement of hallway carpets (Strata Corporation responsibility).
- Replacement of hallway vinyl wallpaper covering (Strata Corporation responsibility).
- Replacement of courtyard waterproofing and associated components (Strata Corporation responsibility).Replacement of Creekside Park waterproofing (Strata Corporation responsibility).
- Cyclical replacement of electrical distribution equipment.
- Cyclical replacement of domestic hot water storage tanks.
- Modernization of components of the proximity access control system, as required by technological obsolescence.
- Cyclical replacement of miscellaneous pumps and fans.

Group 3: Asset Renewal Projects
(Primarily Time-Based)

The following projects are considered those that can be reasonably predicted to coincide with the end of the useful service life of certain assets. These projects are non-discretionary and cannot be postponed without significant risk.

- Cyclical replacement of batteries in fire alarm control panel and annunciator panels.

The MH report has been incorporated into this Depreciation Report as it was included in the HC list of reference documents. RDH in the preparation of this report have only read the Morrison Hershfield (MH) report but have not conducted an independent assessment. In our opinion, the MH report does follow a general methodology of assessment that is in keeping with the basic requirements for building enclosure evaluation, however, only a limited amount of destructive testing (actual opening of the building envelope) was performed at that time. Until an updated Condition Assessment is conducted, the conclusions and recommendations from the MH report are the most reliable technical evaluation of the building enclosure. Since 2006 the Owners have annually performed significant targeted building enclosure repairs, that if performed effectively, could extend the expected life cycle for the brick veneer cladding or glazing system. This Depreciation Report also does not take into consideration the actual quantity or effectiveness of any of this targeted building envelope work. The cladding and window renewals shown in 2016, 2017 and 2018 are the MH preliminary forecasts for replacement of these assemblies. The forecast of costs are preliminary "Class D" estimates that can vary +/- 50% due to the limited site information available and are also based primarily on previous investigation work documented in the MH report completed in 2006. Typically, the next step would include an update to the building enclosure condition assessment undertaken in 2006 to evaluate if indeed deterioration is occurring concealed within the wall assembly or surrounding the windows, and if so, the extent and degree of deterioration. The assessment would be used as a basis to develop renewals options for the strata corporation to consider and the results of the assessment could be incorporated into future Depreciation Reports. Remediation alternatives such as phasing the project over a longer period of time, undertaking localized repairs, and mitigating damage can be explored in the next steps of the renewals project planning process. For discussion purposes, RDH have created two additional alternate Tactical Plan scenarios where the glazing/masonry wall renewal work is deferred until 2017 or 2020 start dates as the result of an update assessment that supports these deferred start dates. These alternate plans are provided as a supplement to this report in Appendix I but are not a corroborated recommendation at this time and should not be relied upon for renewal project planning at this time.

Other projects will also require refinement through a normal design process to further define the scope and budget prior to tendering the renewal project. "Class D" estimates have also been provided for these in the Report and a number of general assumptions about the potential scopes of work were made when costs associated with these projects were generated.

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REPORT

Building Envelope Condition Assessment – Harbour Cove

1450, 1470, 1490 Pennyfarthing Drive
Vancouver, British Columbia

Presented to:

The Owners, Strata Corporation VR-1291
c/o Mr. Brian Hale, Facilities Manager
Harbour Cove
1470 Pennyfarthing Drive
Vancouver, BC V6J 4X8

Report No. 5065129.00 September 5, 2006
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roofs and roof decks are inverted roof membrane assemblies, incorporating either a gravel or paver ballast. The courtyard podium is coated with the original waterproofing membrane and covered with a combination of hard and soft landscaping.

1.5 Documents Reviewed

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

Table 1: Documents / Drawings Reviewed

Document Description	Prepared By	Date
Architectural Drawings – Phase I – Building C – 1450 Pennyfarthing Drive	Arnold Nemetz Engineering Ltd. (1980)	May 1981
Architectural Drawings – Phase II – Building B – 1470 Pennyfarthing Drive	Hamilton Doyle and Associates Architects	November 1983
Electrical Drawings – Phase III – Building A – 1490 Pennyfarthing Drive	Hamilton Doyle and Associates Architects	March 1985
Structural Review for 1470 Pennyfarthing Drive Vancouver, BC	CWMM Consulting Engineers Ltd.	March 14, 2002
Brick Veneer Condition Survey, 1450, 1470, 1490 Pennyfarthing Drive (Harbour Cove) and 1515 West 1st Avenue, Vancouver, BC	CWMM Consulting Engineers Ltd.	February 7, 2006
Letter and photos re: 1450, 1470 & 1490 Pennyfarthing Drive	CWMM Consulting Engineers Ltd.	May 24, 2006
Roof/Patio Inspection Report, 1450 Pennyfarthing Drive	LA Hanson & Assoc. Ltd.	November 2000
Executive Summary, Building Envelope Condition – 1450 Pennyfarthing Drive	LA Hanson & Assoc. Ltd.	February 2001
Window leaks/condensation issues in various Suites and roof leaks: Suite 205-1450; Suite 602-1450; Suite 109-1490; Suite 302-1470; 1st Floor, 1470	LA Hanson & Assoc. Ltd.	March 26, 2001
Suite 1002 – 1470 Pennyfarthing Drive	LA Hanson & Assoc. Ltd.	May 14, 2001
Suite 601 – 1470 Pennyfarthing Drive	LA Hanson & Assoc. Ltd.	June 22, 2001
Harbour Cove, Phase 2 (1470 Pennyfarthing) & 3 (1490 Pennyfarthing) – Envelope Evaluation	LA Hanson & Assoc. Ltd.	May 2002
Review at Harbour Cove with Brian Hale	LA Hanson & Assoc. Ltd.	April 4, 2003
Review at Harbour Cove with Brian Hale	LA Hanson & Assoc. Ltd.	April 10, 2003
Review of Mold Issue at Suite G-07, 1450 Harbour Cove with Brian Hale	LA Hanson & Assoc. Ltd.	September 13, 2004
Building Envelope Status Report	LA Hanson & Assoc. Ltd.	June 2005

1.6 Repair History Relevant to Building Envelope Performance

Based on our review and discussions with the facilities manager, the history of renewals and maintenance for this complex have included the following:

- Periodic repair/replacement of roof and roof deck waterproofing in some areas as needed to address water leaks, using a new 2-ply SBS modified membrane
- Installation of weep holes in window frames to provide drainage of the window frames
- Installation of caulking at window frame mitre joints and butt joints to address water leakage
- Installation of caulking at metal frames of skylights to address water leakage
- Periodic replacement of caulking at window interface details and at brick veneer cladding
- Periodic caulking of cracks in the concrete and masonry walls, as needed to address leakage
- Interior repairs to units affected by water ingress, as necessary

The following table provides general information about the buildings. Refer to Photos in *Appendix C: Photographs* for general views of the buildings.

Table 2: Building Data

Building Address/Name	Harbour Cove, 1450, 1470, 1490 Pennyfarthing Drive, Vancouver BC
Owner	Strata Corporation VR-1291
Building Type	High rise
Type of Construction	Noncombustible: concrete frame with steel stud infill
Occupancy	Residential
Applicable Building Code	1987
Sprinklers	Yes
Number of Suites	305 apartment units
Number of Storeys	12-storey high-rise
Parking	Underground
Envelope	Brick veneer cladding on either concrete wall or steel stud backup; Glazing in aluminum frames between painted concrete spandrels.
Courtyard Podium	Grace Bituthene waterproofing on concrete, covered with hard and soft landscaping
Original Flat Roofs & Roof Decks	Inverted Roof Membrane Assembly: Grace Bituthene waterproofing on concrete, covered with rigid insulation and gravel

- Stress cracks and cracks at cold joints in the concrete spandrels (Photos 17, 18, 19). Although stress cracks are common in concrete buildings, they are generally not the source of water ingress in wall assemblies. However, the efflorescence, which accompanies the crack as seen in the photos, is indicative that moisture enters the wall assembly at suspect details, such as windows, parapet saddles or roof assemblies.
- Sealant joints between the brick masonry and adjacent concrete walls are deteriorated or altogether missing (Photo 14).

2.2.1 Exploratory Openings

A total of 8 exploratory openings were made from the interior of the building to confirm the construction and condition of the building envelope components. We performed a detailed investigation of three suites, which were identified to have water ingress problems, with the purpose to ascertain whether the problem is specific to the individual suites or more wide spread.

Locations of exploratory openings and detailed observations are recorded in *Appendix D: Exploratory Openings*, along with identifying photographs. Typically our investigation was focused on the wall assembly beside or below the windows. The most common deficiencies found at exploratory openings are noted in the following table:

Table 4: Exploratory Openings in High-Rise

EO #	Location	Evidence of water ingress	Deteriorated sheathing (or plywood liner)	Framing Corrosion
01	Unit 612, Bldg C – balcony door threshold	mold	yes	moderate
02	Unit 612, Bldg C – window jamb	mold	yes	moderate
03	Unit 612, Bldg C – base of wall at window	water stains	yes	none
04	Unit 310, Bldg C – base of wall at window	water stains	yes	-
05	Unit 310, Bldg C – adjacent to window	mold	yes	-
06	Unit 310, Bldg C – adjacent to window	mold	yes	-
07	Unit 310, Bldg C – window jamb	mold	yes	-
08	Unit 503, Bldg A – base of wall at window	water stains	-	major
8	Total	8 (100%)	7 (88%)	3 (38%)

Of the 8 exploratory openings examined, all 8 locations (100%) showed evidence of water ingress, in more than half of the locations mold was observed. Moderate to major corrosion of steel studs or window fasteners was observed in 3 out of 4 locations (75%). In one of the 8 locations, water ingress has led to deterioration of the hardwood flooring. Although the original drawings specify a vapour barrier beneath the interior gypsum board, in the exploratory openings we have reviewed, the vapour barrier was not continuous into the window returns, and in some areas missing on the walls altogether.

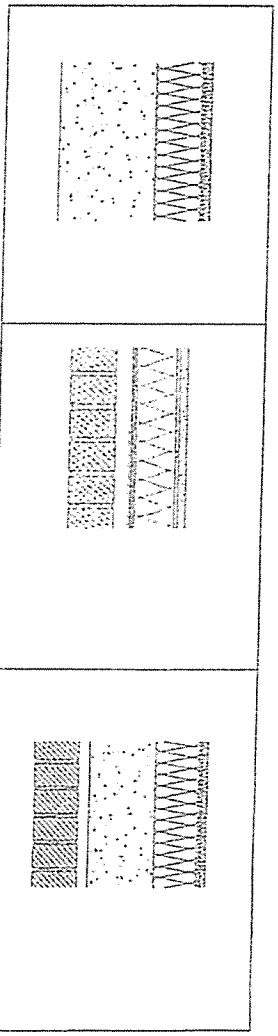
2.2.2 Wall Assemblies

Three types of exterior wall assemblies are used at HC, as described below:

Painted Concrete Spandrels:

- *Paint finish*
- *5 ½" concrete spandrel*
- *3 5/8" steel studs*
- *Batt insulation**
- *Polyethylene vapour barrier*
- *½" gypsum wallboard*

** rigid insulation in 1 ½" steel studs has been used in some locations*



Brick Veneer on Steel Stud Back-up:

- *Brick veneer*
- *1" air space*
- *Building paper*
- *½" gypsum sheathing*
- *3 5/8" steel studs*
- *Batt insulation (rigid insulation in some locations)*
- *Polyethylene vapour barrier*
- *½" gypsum wallboard w/paint finish*

Brick Veneer on Concrete Wall Back-up:

- *Brick veneer*
- *1" air space*
- *5 ½" concrete wall*
- *3 5/8" steel studs*
- *Batt insulation**
- *Polyethylene vapour barrier*
- *½" gypsum wallboard w/paint finish*

** rigid insulation in 1 ½" steel studs has been used in some locations*

In general, the exposed concrete and masonry walls are in good condition with some localized cracks and minor spalling at the concrete spandrels, and minor efflorescence.

One of our exploratory openings, at unit 612, was taken at a sample location of the brick veneer on steel stud back up exterior wall, however, indicated significant deterioration of the gypsum sheathing. The brick veneer area is a narrow strip along the full height of the building with windows adjoining at both sides at each floor level. There are two identifiable sources of moisture, which have contributed to this deterioration.

The first is rainwater ingress from the exterior: the sealant joint between the glazing frame and brick cladding has failed in many locations, resulting in water ingress. Second is interior load: the vapour barrier is discontinuous or altogether missing in some areas allowing interior moisture to condense on the inside surface of the gypsum sheathing. Please refer to *Appendix H: Considering the Use of Polyethylene Vapour Barriers in Temperate Climates*, which describes the effectiveness of vapour barriers in our climate.

In order to replace the deteriorated gypsum sheathing, and to ascertain that the existing steel studs are structurally sound and adequate to carry the load of the brick veneer cladding, the existing brick veneer cladding must be removed and replaced. Please note that the replacement of the exterior gypsum sheathing can only be performed from the exterior by removing the brick veneer.

MH recommends complete rehabilitation of the brick veneer on steel stud backup walls. We also recommend that the interior surface of all exterior walls be coated with a low permeance paint to mitigate vapour diffusion and interstitial condensation. This work is recommended to be performed at the same time as the window rehabilitation.

MH recommends targeted repairs to the exterior exposed concrete walls, by replacing existing caulking and applying new caulking to all cracks, reveals and cladding transitions, as well as applying a new elastomeric coating to the exterior surface to prevent further water penetration. MH also recommends the installation of parapet cap flashings, either metal or waterproof coating, to all balcony and roof parapets to mitigate staining and to reduce the potential for water migration at cracks, which may lead to efflorescence or ingress to the interior.

2.3 Windows, Doors & Skylights

The existing windows, and balcony doors are double glazed IGU's in aluminum frames, which are not thermally broken. Generally, the windows at HC, including the frames, seals, and IGU', are between 21 and 25 years old, and approaching their expected service life.

Based on our visual review and exploratory openings, we have identified some of the more common widespread deficiencies, including: inadequate provision for drainage at the sill and glazing pockets, evidence of leakage at the mitered corners, inadequate head flashing and sill flashing, dislodged glazing seals, and poorly installed sealant, as described below:

- Generally, the windows have a weathered finish as well as deteriorated and cracked sealants. New sealant has been installed in isolated locations as leakage remedy measures at flashing splices, fasteners, window mitre joints and window frame/wall joints; the caulking is generally deteriorated (Photos 7, 8, 11, 12, 13, 21-30).
- Some of the head flashings have had sealant applied at the top side between the flashing and the concrete spandrel above (Photos 7, 22). The sill flashing are poorly sealed and have inadequate transitions to the walls and windows.
- The windows do not incorporate an interior gutter to catch and drain condensation, causing premature deterioration of the interior wood stool, subsill components, and flooring (Photos 31, 32 & EO #02, EO #08).
- The window frames have open, unsealed mitre corners thereby allowing for water penetration.
- The window glazing seals are deteriorated and in some cases dislodged from the window frame (Photo 20).
- The original windows do not incorporate a drain beneath the glazing seals; new drain holes have been drilled in some of the windows (Photos 25, 26, 29).

The majority of the damage at HC was found on the interior of the suites around the windows and balcony doors. The interior finishes, including hardwood flooring, gypsum board and plywood liner show water stains, cracks and mold growth near or below the window frame consistent with what would be expected by condensation. The exploratory openings performed near the windows and balcony doors showed mold growth and water staining, in all locations, and corrosion of steel framing in some locations.

Copy Note only

Due to the robust nature of the construction materials there appears to be limited structural damage at present, however, continued exposure to water ingress will result in accelerated deterioration of building envelope components and interior finishes, if rehabilitation is deferred, thereby leading to greater costs of repairs.

In an attempt to minimize the extent and cost of rehabilitation, we have explored the option of reusing the existing windows. Several significant factors, however, preclude this method as a viable option. First, it is very unlikely that the existing glazing assemblies will pass the required air and water infiltration tests. Second, it is not possible to accommodate adequate sub-sill drainage, without reducing the sizes of the windows - which would be a costly modification. The net potential savings of reusing existing materials is not significant in relation to the large overall expense of

rehabilitation, and would result in poor value for the required effort. Given that the cost of labour bears a considerable component of the overall cost of the work, the value of increased performance, durability and appearance far outweighs the nominal additional expense of using new materials. As such, MH does not recommend re-use of existing windows in the scope of rehabilitation.

2.3.1 Skylights

The skylights are pressure plate assemblies, which are adjoining with the window wall assemblies.

The following observations were made during our visual review and discussions with the facilities manager:

- The original skylights, although pressure plate type, have failed at the pressure plate seals and leak; sealant has been applied to address water ingress at the glazing frames of some of the skylights (Photo 34).

MH recommends that all windows, balcony and roof deck doors and skylights be replaced with new thermally broken pressure-plate assemblies, and with improved penetration details.

In view of the large overall expense of this rehabilitation, and low risk of imminent structural damage, however, it is possible to phase this work, elevation-by-elevation, giving priority to areas, which are most problematic based on occupant reports.

2.4 Balconies

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

- Water stains at the tile flooring are evidence of inadequate slope of the floor surface (Photo 40, 42). There are localized cracks, stains and efflorescence at the slab and at the parapet walls, and on the tile flooring.
- The balcony floor level is higher than the interior finished floor level (Photo 37, EO #01).
- In some areas sealant has been applied at the balcony floor/brick veneer cladding juncture to prevent water ingress due to back sloping of the balcony floor, (Photo 41).

The existing balconies are finished with ceramic tiles on 2-3" drypack, for slope, on waterproof membrane on cantilevered concrete slabs. Drainage is provided by a scupper pipe through the concrete spandrel parapet, at or just above the finished balcony floor level, which, in turn, is above the interior floor level. This condition is highly vulnerable to water ingress, particularly at the doorway threshold.

MH recommends that the balconies be rehabilitated by: (1) removing the existing tile finish, drypack and waterproofing, (2) installing new liquid applied waterproofing

requiring continued maintenance and repair. Please note that hard landscaping cover, over the existing soft landscaping, would not protect the slab from water ingress, as water can migrate horizontally. The only way to properly repair the leakage is to replace the courtyard podium waterproofing membrane itself, which consequently entails the large associated cost of removal and reinstallation of the landscape materials.

The existing Grace Bituthene waterproofing material used is repairable with similar products to patch targeted areas. Please note, however, that this form of target repair always entails a degree of risk and will not be covered by the contractor's or manufacturer's warranty, unless the new waterproofing membrane terminates at a natural transition, such as a vertical upturn. As it would not be considered good value to incur the large associated cost of landscaping, without ensuring that the work can be warranted, MH recommends replacement of the courtyard waterproofing in the areas where leakage is currently occurring, over entire sections of waterproofing, such that the new waterproofing could be terminated at natural transitions.

2.7 Remedial Plan

Based on the recommendation categories set out in the introduction, the rehabilitation recommendations for Harbour Cove fall into two priority categories, as described below.

1. First Priority – areas requiring structural upgrades are recommended in order to mitigate the risk to life safety. Items identified as Priority 1 are recommended to be done without delay.

2. Second Priority – rehabilitation and renewals pertaining to the building envelope of the three buildings are recommended in the second priority, in order to reduce the risk of future damage and ongoing maintenance and repair costs. Owing to the robust nature of the construction materials of the HC buildings, present structural damage appears to be limited. As such, the owners of HC have some flexibility with respect to the timeline of rehabilitation, at the expense of continued and increasing maintenance and repairs. If rehabilitation and renewals are deferred, however, the ongoing exposure to water ingress observed at HC will result in accelerated deterioration of the building envelope components and interior finishes, thereby leading to increased scope and overall cost of rehabilitation.

   Although the extent of water ingress related problems may vary from building to building, for the purposes of establishing a rehabilitation timeline, the need for rehabilitation is considered equal for all three. As such, rehabilitation of all three buildings, including the walls, windows, doors and skylights is recommended to be done within 2-10 years. In view of the large overall scope of rehabilitation, however, the rehabilitation work may be carried out in phases corresponding with the three phases of original construction, or by

elevation, are as may be determined suitable for the HC owner's. Performing the work in phases, however, may increase the overall cost of work, as this may duplicate some of the soft and hard costs, including scaffolding, mobilization, etc.

3. **Third Priority** - rehabilitation of the courtyard podium is considered a low priority item, as the condition represents a low risk of increased damage, thus immediate action is not required - owner discretion is appropriate. The courtyard podium rehabilitation can be deferred to more than 10 years.

Please note that based on the age of the building, the recommended rehabilitation will fall outside of the current HPO regulations, which require mandatory Third Party Warranty on building envelope rehabilitation projects. Optional Third Party Warranty can be obtained for the proposed remediation project, however, if the Strata chooses to do so. MH can provide assistance in obtaining Third Party Warranty with any of the available providers for either the 5-year or 10 year duration. As such, the recommended rehabilitation, particularly as it relates to the replacement of the windows, is considered to be a renewals measure.