COMPREHENSIVE RESERVE FUND STUDY

Ottawa-Carleton Standard Condominium Corporation No. 769
3580 Rivergate Way, Ottawa, ON

Final Report

Submitted to:

Ottawa-Carleton Standard Condominium Corporation No. 769
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1.0 INTRODUCTION

1.1 Terms of Reference

Buchan, Lawton, Parent Ltd. was retained to prepare a comprehensive reserve fund study for the common elements of Ottawa-Carleton Standard Condominium Corporation No. 769. This report, detailing the findings, has been prepared for the Property Manager and Board of Directors of the Condominium.

1.2 Property Description

OCSCC No. 769, commonly known as Rivergate Phase 2, is located at 3580 Rivergate Way in Ottawa, Ontario. The 19 storey, 144-apartment style unit condominium was built in 2006, and is approximately nine years old.

The Condominium consists of one tower, with two levels of underground parking. The site consists of two podium decks. The soft and hard landscaping around the property, including the property around OCSCC 769, are considered to be shared common elements. A separate report has been prepared for the Shared Common Elements.

1.3 Report Description

The findings of the site review are discussed in Section 4.0, Site Review Findings. Each subsection:

- lists the building or site common elements included under that heading;
- discusses the condition of the elements; and,
- includes a table with the normal life cycle, the expected repair/replacement years, and the cost estimates for the elements.

Cost tables developed following the calculation of quantity and current construction costs are presented in Section 5.0, Cost Estimating.

The reserve fund portion of the study is presented in Section 6.0, Reserve Fund Analysis. One scenario is presented for the funding of the reserve fund.

Conclusions are given in Section 7.0 of the report.

The elevator report in its entirety is included in Appendix A. Photographs referenced in the Site Review Findings section are included in Appendix B (Only included in the Final Report). The Form 15 is included in Appendix C (Only included in the Final Report).

2.0 STUDY OBJECTIVES

The purpose of the reserve fund study is to establish recommended funding plans for the major repair or replacement of common elements of the Condominium over the next 30 years.

The steps required to undertake a comprehensive reserve fund study include:

1. Reviewing available documentation such as building drawings and construction specification, descriptions/details of remedial work carried out, reserve fund financial information;
2. Conducting on-site reviews to evaluate the current condition of building and site common elements;
3. Estimating major capital expenditures and timing over the next 30-year period based on quantities, costing data, life cycles and current condition; and,
4. Presenting the reserve fund financial analyses.

2.1 Assumptions and Limitations

The accuracy of the discussions and conclusions contained in the study is limited to the extent of information available at the time of the study. The assessment of the condition of the common elements is based upon visual inspection. No destructive testing or performance monitoring was conducted.

Accordingly, the professional opinions expressed herein are subjective. Projections of building component life expectancy assume that the owners will perform good and timely periodic maintenance. The study does not make allowances for the effects of rare events, such as flooding, lightning, fire, explosions, etc.

It is assumed that the expected standards of performance and appearance correspond with the current norm and that housing industry averages and manufacturers' published data on component life expectancy apply to this property.

3.0 Background Information

3.1 Building Documents

Buchan, Lawton, Parent Ltd was provided with the following information for Ottawa-Carleton Condominium Corporation No. 769.

Drawings

No Drawing reviews were required for this study. Drawings were reviewed during the first reserve fund study BLP conducted.

Audited Financial Statements

Audited financial statements, dated December 31, 2014.
Audited financial statements, dated December 31, 2013.

Previous Reserve Fund Studies

Reserve Fund Study Update Final Report prepared by Buchan, Lawton, Parent Limited, dated November 14, 2012.

Other Reserve Fund Studies

Reserve Fund Study Final Report for Shared Facility for OCSCC 667 & 769, prepared by Buchan, Lawton, Parent Ltd, dated October 29, 2012.

3.2 Site Review

The following Buchan, Lawton, Parent Ltd personnel carried out site reviews on June 10, 2015:

- Mr. Matthew Cogliati, P.Eng.
- Ms. Kathryn Buchan, B.A.Sc.
- Mr. Eli Marshall, M.A.Sc.

The site review entailed the visual observation of the condition of common elements of the building. Additionally, Units 204, 1806, 1804, 1802, 1402, 1101, 1006, 907, 808, 703, 606, 505, 405, and 303 were accessed for inspection on October 5, 2015.

Discussions with the Property Manager provided important information on the building history, the problems encountered, and the remedial measures carried out. The assessment and inclusion of historical items is limited to the information provided to us.

4.0 SITE REVIEW FINDINGS

The following subsections of the report discuss the various building or site common elements. Each subsection:

- lists items included under that heading;
- discusses the current condition of those items;
- includes a table with the normal life cycles of those items; the expected repair/replacement years, and the cost estimates for those items as determined by Buchan, Lawton, Parent Ltd.

If no costing table is provided, the repair or replacement of the component does not fall within the 30-year time frame of this study, or the cost would not typically be expensed against the reserve fund.

4.1 Site Work

4.1.1 Wood Items

Includes: - Cedar Fence
- Wood Trellis

A small wood fence is located at the northeast side of the building, adjacent to the parking garage entrance. The fence is in fair condition, and is showing signs of aging. It is recommended that the fence be refinished to help extend the life of the fence. The metal post brackets and hinges are significantly rusted and should also be painted. Provided preventative maintenance is carried out to the fencing, it should not require replacement for many more years. Preventative maintenance to the cedar fencing should be done using funds from the operating budget.

A gazebo is located at the west corner of the podium deck in the landscaped area. The gazebo is in good condition. It was recently re-stained. A contingency has been included for repairs and a contingency has been included for re-staining.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Replace Cedar Fence	$4,000	25 years	2031
Contingency to Repair/Replace Gazebo Elements	$4,000	15 years	2020, 2035
Contingency to Prepare and Stain Gazebo	$1,000	5 years	2020, 2025, 2030, 2035, 2040

4.2 Structure

4.2.1 Building Structure

Includes - Reinforced Concrete Superstructure
- Exterior and Demising Walls
- Mechanical Penthouse Structure
- Roof Anchors

The building is a reinforced concrete structure, with concrete columns, slabs, walls, shear walls, and parapets on some portions of the main roof and mechanical penthouse. The substructure is discussed in Section 4.2.3.

Exterior walls are comprised of steel stud walls, with exterior and interior drywall and an aluminum curtain wall system. Interior demising walls are comprised of masonry block walls, concrete walls, columns, shear walls, and fire rated steel stud wall assemblies.

The mechanical penthouse is constructed of reinforced concrete slabs and columns, with steel stud and masonry block walls.

The majority of the building structure is concealed with interior finishes such as flooring and drywall, and could not be directly reviewed. However, no problems were reported regarding the building structure.

The normal life cycle of the building structural components is beyond the 30-year time frame of the study.

Galvanized steel roof anchors are installed at various locations on the main roof. Some roof anchors are installed onto the concrete roof slab, while others are installed through the concrete parapet wall of the mechanical penthouse. Roof anchors require regular inspections and testing. Repairs and testing/inspections of the roof anchors should be done using funds from the operating budget.

4.2.2 Balconies

Includes - Reinforced Concrete Balconies
- Pre-cast Guards
- Aluminum Guardrails

Reinforced concrete balconies, which are cantilevered extensions of the concrete floor slab at each level, are provided to each unit. The concrete balconies are generally noted to be in good condition.

The balconies are generally in good condition. No repairs are anticipated in the 30-year time frame of this study. However, a large repair project is

anticipated just beyond the 30-year time frame. This repair project will be included in the next reserve fund study update. In future updates, this project may be moved up, depending on the condition of the aging elements.

During the unit inspections, at Unit 1101, the balcony above (12th floor) had a visible chipped piece. It appears that some repair work was done with an unknown yellow substance injected into the chipped area. The yellow substance has dripped below and onto the balcony at Unit 1101 and was not properly cleaned up. The board noted there may be more units with similar conditions.

Pre-cast concrete guards are installed around the perimeter of all balconies and comprise half of the full guardrail system. The guards are connected to the concrete balconies via steel connections. Drainage holes (openings in the precast guards) allow water to drain from the balcony. The precast guards are in good condition and with occasional repairs when required, should not require replacement during the 30-year time frame of this study.

Pre-finished aluminum guardrails, with glazing panels, are installed around the perimeter of all balconies, and comprise the other portion of the full guardrail system. The pre-finished aluminum guardrails are secured to the precast guards. In general, the guardrails are noted to be in good condition, but may require some corrective work. During the unit inspection, peeling, chipped and/or bubbling paint was observed at Units 204, 1806, 1804, 1101, 1006, 808. The guardrail brackets appear to be in poor condition at Unit 505. Based on the discussion with the board of directors and the property manager, the paint may be repaired under warranty by the manufacturer, though it is unclear if the whole cost (including the cost to remove the guardrails from the building, ship them to the manufacturer, and then re-install them) will be covered under warranty. At this time, no adjustments in the cost to prepare and paint the guardrails have been made. Any changes to this will be captured in the next reserve fund study.

Typically, the manufacturer applied finish should last 20-30 years. A cost to prepare and paint all balcony railings has been included later in the study. This cost may have to be moved up in later studies, depending on the condition. Minor repairs and occasional paint touch ups should be done using funds from the operating budget.

The normal life cycle of the building structural components is beyond the 30-year time frame of the study. Funding has not been directly allocated towards the repair or replacement of structural elements.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Prepare and Paint Balcony Guardrails	$80,000	n/a	2036

4.2.3 Parking Garage Structure

Includes - Parking Garage Structure
- Foundation Waterproofing
- Podium Deck Membrane
- Suspended Slab Traffic Topping Membrane
- Concrete Slab-on-Grade
- Area Wells

The parking garage structure consists of reinforced concrete foundation walls, footings, columns, a suspended slab, and a slab-on-grade. Masonry block walls are also installed throughout the parking garage to separate various rooms. Some portions of the parking garage around the first level are finished with painted drywall and insulation. Some portions of the drywall are damaged from vehicles hitting the walls.

The following is a list of general deficiencies and damages observed in the parking garage:

- Fire door leading to level P1 parking garage is not kept closed as per fire regulation requirements.
- On level P1, unknown item suspended from ceiling.
- Parking garage door entrance rust near the ground.
- Door near the parking garage entrance has hinges that are rusty; metal flashing near the ground is on an angle.
- P1 Spot 33 – drywall damage near the floor.
- P1 Spot 53 – parking wall corner damage.
- P1 Spot 54 – drywall damage, water damage on the ceiling and heavy water staining.
- P1 Near Spot 68 – water leak in overhead insulated pipe.
- P2 Spot 57 – drywall damage.
- On level P2 a fire extinguisher case is damaged.
- On level P2 above an exit door, a penetration through block wall is not adequately sealed.

Vertical cracks were observed in the parking garage at various locations. These cracks appear to be shrinkage cracks, which are normal for concrete structures, however several of the cracks show signs of water leakage. The following issues were observed:

- P1 Spot 17 – vertical hairline cracking on parking garage wall.
- P1 Spot 21 – cracking with possible water penetration.
- P2 Spot 2 – water staining on the wall, strange bubbling near the

ceiling.
- P2 Spot 106 – vertical crack and water penetration through the parking lot wall.

Stains were observed at several locations in the parking garage. The following are the locations where stains were observed:

- P1 Spot 20 – unknown brown staining on a support column and in the parking space as well.
- P1 Spots 23 and 27 – unknown brown staining near the floor of parking spot.
- P1 Spot 33 – rust staining on the ground.
- P2 Spot 12 – rust stain on wall.
- P2 Spot 16 – rust stain on wall, possible water staining as well.
- P2 Spot 25 – rust stain on wall, looks like water leakage.

Additional signs of water leakage were observed at various other locations. The following locations had signs of past and/or current water leakage:

- P2 EF-2, near spot 55 – water damage underneath the fan.
- P1 Near EF-4 water damage and staining on the wall.
- P1 Near EF-5 (near parking spot 53) significant water staining on the ground and drywall damage to the wall possibly from leaks. Additionally, there is damage caused by a vehicle to the corner of the drywall.
- P2 level near the Bicycle Storage room entrance – Under the exhaust fan there appears to be some water damage.

All of the sources of the water leakage (around exhaust fans and along the walls) should be investigated and repaired.

It is assumed that as of spring of 2015, previous deficiencies with regards to foundation waterproofing have been repaired. Contingency to Repair Foundation Waterproofing of $20,000 has been assigned to year 2035.

The garage roof slab outside the building footprint, commonly referred to as the podium deck, is protected with a waterproofing membrane and finished with landscaping, including sod, gardens, walkways, driveways and parking areas. The underside of the concrete podium deck slab is exposed. There is minor hairline cracking in some locations, but no evidence of water leakage through the roof slab. There is a strange crack and fuzzing observed on the concrete slab ceiling at parking spots 132, 130, and 127.

Level P1, which is the suspended slab in the parking garage structure, is protected with an elastomeric traffic topping membrane and wearing course. The traffic topping membrane is installed to prevent water from penetrating the concrete slab and causing premature deterioration to the concrete and steel reinforcement. The traffic topping is generally in good condition.

Traffic membrane from garage door to about 1/3 down the ramp leading to P2 appears to have been recently replaced. The membrane in the car washing station also appears to be redone and in good condition.

Minor repairs should continue to be carried out, using funds from the operating budget, until full replacement is necessary. The membrane around each area drain should be reviewed periodically and repaired when required. The membrane around the drains typically deteriorates faster than other areas.

The concrete slab-on-grade installed in level P2 is generally in good condition. The majority of the slab appears to have good drainage towards the area drains. A cost to repair a large portion of the concrete slab on grade has been included at the end of this study.

Caulking is applied around the entire concrete columns-to-concrete slab on grade transitions. The caulking is generally in good condition at this time, but should be reviewed regularly. Caulking was noted to be missing from multiple columns on the P2 level. This caulking helps keep excessive water from draining or pooling directly against the concrete columns. This will help prevent premature deterioration of the concrete columns, which typically occur due to excessive wetting during the winter months. The road salts carried into the garage by the vehicles deteriorates the concrete and steel reinforcement. A cost to replace the caulking is included in this study.

An annual contingency has been carried for general repairs to the parking garage structure for the duration of the study.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Parking Garage Structure	$2,000	n/a	Annually
Contingency to Repair Concrete Slab on Grade	$100,000	35-40 years	2044
Replace Traffic Topping Membrane	$290,000	25 years	2031
Replace Slab on Grade Sealants	$6,000	10-15 years	2016, 2026, 2036
Contingency to Repair Foundation Waterproofing	$20,000	n/a	2035
Contingency to Repair Podium Deck Membrane	$50,000	n/a	2022
Replace Rear Podium Deck Membrane and Site Elements	$500,000	30 years	2037
Replace Front Podium Deck Membrane and Site Elements	$300,000	30 years	2037

Contingency to Repair Parking Garage Finishes	$10,000	n/a	2023, 2033, 2043

4.3 Building Envelope

4.3.1 Cladding System

Includes: - Masonry Veneer
- Exterior Insulated Finishing System (EIFS)
- Metal Siding

The building is primarily clad in brick veneer. A small portion of the parking garage at the southeast corner is clad with EIFS. The mechanical penthouse on the roof is clad with painted metal siding. In general, the cladding throughout the building is in good condition.

The brick veneer is in good condition. There are minor areas of efflorescence. These areas should be reviewed and monitored for worsening. Provided the caulking joints are maintained, the brick veneer should not require major repairs for many years. A cost for a large brick repair project has been included in this study.

During the unit inspections, some brick efflorescence was observed at the balconies of Unit 1804 and two floors below (down to floor 16), as well as Units 1802 and 1402. At Unit 303 on the balcony area, it was observed that the brick mortar was in poor condition, and that the brick was dislodged. This should be repointed and corrected. At Unit 808 it appears that some mortar work was performed on the bricks at the balcony area; however, the mortar cleanup was poor and has stained some of the surrounding brick. The board noted similar conditions might be present in other units.

EIFS is installed around the parking garage overhead and man doors at the northeast corner of the structure. The EIFS is in fair condition. Signs of deterioration were noted along the bottom. Repairs to the base of the wall should be conducted using funds from the operating budget. A cost to replace the EIFS has been included in the short term.

Metal siding is installed around the mechanical penthouse. The painted metal siding is generally in good condition. It was noted in a few locations that the screws were missing in the siding. Repairs and painting of the metal siding should be done using funds from the operating budget.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Brick Veneer	$100,000	n/a	2035
Contingency to Repair EIFS	$5,000	n/a	2021
Replace EIFS	$17,000	30 years	2035

4.3.2 Exterior Doors

Includes: - Main Entrance and Vestibule Doors
- Balcony Sliding Doors
- Garage Exit Stair Door
- Secondary Exit Doors
- Overhead Garage Doors and Openers

The main entrance and vestibule doors are pre-finished aluminum with full glazing, similar to a storefront style. The main entrance doors and window system are original to construction and are in good condition. Glazing replacement should be done as required using the glazing replacement contingency included in Section 4.3.3 Windows. The main entrance and vestibule doors should not require replacement until near the end of this study.

The balcony doors consist of thermally broken pre-finished aluminum sliding patio doors, with full glazing, and white Duracron interior finish. The balcony doors vary in size for some units and are original to construction. In general, the patio doors are noted to be in good condition. It is unclear if the screen doors are a common element. The property manager is reviewing the declaration and unit boundaries. At this time it may be wise to carry a contingency for repairs to be conservative.

The garage exit stair door, located on the west side of the building in the podium deck area, is a pre-finished aluminum door with full glazing. The door is in good condition and should not require replacement until near the end of the study. Glazing replacement should be done using the glazing replacement contingency included in Section 4.3.3 Windows.

Secondary exit doors, such as emergency exit doors, garage exit man doors, and roof access doors, are insulated steel doors in steel frames. The doors are generally in good condition. Repairs and painting of the doors should be done using funds from the operating budget. With proper maintenance, the doors should not require replacement in the 30-year time frame of this study.

The door closer on the door to the roof is non-operative.

One overhead garage door provides vehicular access to the parking garage and the east end of the building. The doors are controlled by garage door openers, which are a part of the fob system. The insulated doors are generally in good condition. Costs to replace the garage doors, tracks, and openers are included in this study.

A general repair contingency has been included in this study to repair exterior common doors, which can be used for secondary exit doors, balcony doors, and screen doors.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Common Exterior Doors	$5,000	n/a	2017, 2027
Replace Main Entrance and Vestibule Doors	$10,000	30 years	2036
Replace Balcony Sliding Doors	$380,000	30 years	2037
Replace Garage Exit Stair Door	$2,000	30 years	2036
Replace Overhead Garage Doors	$6,000	30 years	2036
Replace Overhead Garage Door Openers	$1,000	10 years	2016, 2026, 2036

4.3.3 Windows

Includes: - Punch Windows
- Curtain Wall Windows
- Fixed and Operable Windows
- Aluminum Windowsills and Cap Flashings

The building's window system consists of both punch windows and curtain wall window systems. In those windows there are both fixed glazing and operable windows. The windows date from initial construction. The exterior is a pre-finished aluminum with a Duracron White finish on the inside.

In general, the punch windows are in good condition. The majority of the fixed and operable windows are in good condition. There have also been some glazing units that have been replaced due to premature failure.

The following was observed during unit inspections.

- Some operable windows were found to be difficult, mainly stiff, to operate at Unit 1402 (office window), 1802 (bedroom window), 1006 (living room window), 907 (den window), 505 (both bedroom and dining room), and 303 (living room window and office window as stated by the owner).

- Bedroom window was very difficult to lock at Unit 1006.
- Staining was observed at Unit 1402 (bedroom window), 1101 (bedroom window), 1006 (bedroom window), 703 (living room), 405 (bedroom window, could possibly be due to condensation).
- The casement glass sealant appears to be bleeding out at Unit 1802.
- Bedroom window at Unit 1006 appears to have yellow staining inside the glazing unit.
- Various cracks in drywall near windows were observed at Unit 606 (living room window), 703 (bedroom window, possibly due to condensation), 1804 (bedroom window, minor drywall cracking near the top).
- Watermarks were observed at Unit 907 on the windows above the balcony doors.
- The owner at Unit 703 is reported to have heard water droplet-like sound after rain at their bedroom window.
- The owner at Unit 1101 is reported to have trouble locking their bedroom window during summer.

According to the building manager met on site during the unit inspection, there are a number of windows that are leaking and are scheduled for repair during this year.

A contingency has been included to begin replacing larger quantities of failed glazing units in the short term. The contingency increases later in the study to account for the likelihood of large quantities of glazing replacement as the windows age.

The curtain wall window system consists of pre-finished aluminum mullions with white Duracron interior finish, fixed thermally broken glazing units and operable casement windows, and glass spandrel panels. Behind the glass spandrel panels are air and vapour barrier membrane and semi-rigid insulation. In general, the curtain wall window system appears to be in good condition.

A smaller contingency to repair the curtain wall and punch windows is included in the short term. Repairs to the snap caps and various other elements are scheduled for the short-term. This is repeated alter in the study.

A contingency for a large upgrade and replacement to the curtain wall system, including glazing, operators, weather stripping, spandrel panels, seals, etc., has been included later in the study. Wholesale replacement of the entire curtain system is not anticipated in the 30-year time frame of this study.

Aluminum windowsills are installed along the bottom of all punch windows. As per the window shop drawings reviewed, the aluminum sills are clipped in place into the punch window, and then a sealant is applied between the sill and the punch window frame. Refer to Section 4.3.4 for discussion on the window sealants.

Pre-finished aluminum cap flashing is installed along the top of the curtain wall window systems at the main roof level. The aluminum flashing has lock seams on the top and drip edges around the bottom.

The parking garage exit stair window system is similar to the window system used at the main entrance doors and vestibule. The aluminum frame system is generally in good condition. The windows should not require replacement until the end of this study.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Replace Sealed Glazing Units	$15,000 $25,000	n/a	2021-2030 2031-2035
Contingency to Repair Curtain Wall and Punch Windows	$73,000 $50,000	n/a n/a	2015 2025
Replace Punch Windows	$750,000	35 years	2041
Contingency to Upgrade Curtain Wall System, Glazing, Operators, Weather stripping, etc.	$525,000	30 years	2036
Replace Parking Garage Exit Stair Windows	$13,000	30 years	2036

4.3.4 Caulking

Includes: - Window and Door Perimeters
- Exterior Penetrations
- Cladding Transitions

Exterior caulking is installed at the perimeter of all windows and doors, at all cladding transitions, all brick expansion joints, and at all brick shelf angles. Caulking is also installed at various metal flashing joints throughout the building.

It was noted in a few location around the ground floor windows and doors that caulking was incomplete, or has begun to fail. The caulking transition between the sill flashings and the brick was also incomplete in a few locations.

The following are caulking related observations made during the unit inspections.

- Caulking near the balcony door appeared to be in poor condition at unit No. 1802 (missing, thin, and deteriorating). It appears as though some flashing was used in lieu of caulking, which is generally not recommended.
- At Unit 1402 some caulking has split, and is in poor condition.
- At Unit 1101, the exterior bedroom window caulking is in poor condition. As well, the flashing is sloped back.
- At Unit No. 1006, the dining room window caulking has deteriorated near the bottom of the operable window.
- At Unit No. 907 the caulking near the balcony door is fairly thin.

In general, the caulking is in fair condition and is approaching the end of its typical life expectancy. The few minor deficiencies noted above should be repaired using the operating budget. For large-scale replacements and repairs, the reserve fund should be used.

A cost has been included in the short term to remove and replace all of the caulking throughout the building. The cost to replace the caulking has been included in the window replacement cost in 2036.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Replace Window and Door Sealants	$80,000	10 years	2016, 2017, 2026, 2027
Contingency to Replace Miscellaneous Sealants	$27,000	10 years	2016, 2017, 2026, 2027
	$55,000	10 years	2036

4.3.5 Roofing and Drainage

Includes: - Main Roof
- Mechanical Penthouse Roof
- Parking Garage Exit Stair Roof
- Main Entrance Canopy Roof
- Roof Drains and Scuppers

Main roof and mechanical penthouse roofs are inverted roofing systems, which consist of a concrete slab deck, roof membrane, rigid insulation, filter cloth, and stone ballast. The roof membranes are concealed by these finishes and is not directly available for review. No reports of roof leaks were received. The roof membrane is likely in good condition. A cost to replace the main and mechanical penthouse roofs is included in this study.

The parapet membrane in a few locations was not adequately adhered. A review of the entire parapet should be conducted, and any loose areas should be corrected using funds from the operating budget.

There were numerous areas where the filter cloth was visible through the stone ballast.

As noted in the previous reserve fund study, there was a possible deficiency with respect to the amount of stone ballast installed on the roof. It was calculated (by another engineering firm) that the ballast was insufficient to hold down the rigid roof insulation. It has since been determined that there is an adequate amount of ballast on the roof, it just needed to be evenly raked. The roof ballast should be raked every year using funds from the operating budget.

Pre-finished metal flashing is installed along the top of the parapets around the perimeter of the roof. The metal flashing has drip edges and lock seams at each lap of the flashing. The metal flashing is generally in good condition; however, there are some deficiencies that require repairs to prevent excessive water infiltration, which are as follows:

- The caulking on the joints has cracked and split. The caulking is also drying and hard in some locations, or completely missing in others.
- Caulking and metal flashing in poor condition near the door.
- Missing sealant around conduit penetrations in mechanical enclosure.

Parking garage stair roof is also an inverted roof. The roof appears to be in good condition. A cost to replace the roof is included in this study.

The main entrance canopy roof consists of sloped aluminum framed windows, supported by a steel structure. Pre-finished aluminum flashing clads the majority of the steel structure. Drainage is provided by metal scuppers on both sides of the sloped roof and at both ends. In general, the main entrance roof canopy is in good condition.

Drainage for the main roof is provided by several roof drains, which are connected to the building's storm water drainage system. The roof drains are covered with a screen and dome to prevent debris and stone ballast from entering the drain. The roof drains are generally in good condition; however, some have vegetative growth around them and should be cleaned to keep the drainage path clear.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Replace Main Flat Roofs	$470,000	25 years	2031
Replace Parking Garage Exit Stair Roof	$8,000	25 years	2031
Replace Main Entrance Canopy Roof	$55,000	35 years	2040

4.4 Mechanical Systems

4.4.1 Site Services

Includes - Water Mains
- Storm and Sanitary Drainage Sewers
- Catch Basins and Trench Drains
- Manholes

The building is on the City of Ottawa municipal water system and sewer system. The water entry room is located in the lower level of parking and is distributed to the building and mechanical penthouse. The water mains below grade are not available for review, though there are no reported issues with the service.

Storm and sanitary drainage sewers are installed below the ground in the parking area. They are gravity fed and discharged to the City of Ottawa systems.

Drainage to the asphalt parking lot and roadways is provided by catch basins. The drains are connected to the storm water sewers. Catch basins are included in the shared facility.

Manholes are installed to provide access to the below-grade site services. Occasional re-setting of the manholes will be required to account for settling/compaction of the roadways. Repairs should be done using funds from the operating budget.

Contingency for occasional repairs are carried for repairs to the site services beginning later in the study.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Site Services	$10,000	n/a	2036

4.4.2 Building and Garage Drainage Systems

Includes - Sanitary and Storm Drainage Piping
- Piping, Vents, and Stacks
- Area, Floor, and Trench Drains
- Sump Pumps and Controls
- Sump Pits

The building is connected to the City of Ottawa storm and sanitary sewer system. Sanitary drainage from the suites, common rooms, and various other

drains within the building is gravity fed and connected to the sanitary sewers outside the building, which discharge into the City of Ottawa sewer system.

Storm water drainage from the roof drains, a trench drain in front of the garage doors, and catch basins around the exterior of the building, are also gravity fed to the storm sewers outside the building, which discharge into the City of Ottawa Sewer system.

Drainage piping, backwater valves, vents, and stacks are mostly concealed behind interior finishes and below slabs, and are not available for review. The drainage piping visible in the parking garage appears to be in good condition.

In the mechanical penthouse there is staining on the metal wall, around a roof drainpipe. This was observed on south and north side exterior walls. The staining should be cleaned and monitored over time for re-occurrence.

Minor repairs and replacement of the garage and building drainage systems should be done using funds from the operating budget.

Area drains cast in the suspended slab and slab-on-grade provide drainage in the parking garage. The area drains are in good condition and should not require replacement during the 30-year time frame of this study.

Sump pits and pump provide drainage from below the parking garage level up to the building's sewer systems. The pits appear to be in good condition. The sump pumps typically have a life expectancy of 5-10 years, but often fail prematurely. A few sump pumps have been replaced over the last few years. Cost to replace the sump pumps is included in this study. A contingency to repair the sump pits and controls is included later in the study.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair/Replace Area Drains and Floor Drains	$5,000	n/a	2021, 2036
Contingency to Replace Sump Pumps	$1,500	5 years	2018, 2023, 2028, 2033, 2038, 2043
Contingency to Repair Sump Pits and Replace Sump Controls	$2,000	n/a	2016, 2026, 2036

4.4.3 Domestic Water Systems

Includes - Domestic Water Piping/Valves
- Domestic Hot Water Circulation and Recirculation Pumps
- Domestic Cold Water Circulation Pumps
- Pump Motors
- DHW Storage Tank
- Gas Fired Water Heaters
- Hose Bibs

The building is equipped with domestic cold water, which is pumped from the parking garage up to the rest of the building in the water entry room. Domestic water piping and valves are mostly concealed within walls and are not available for review. A contingency for occasional repairs to the piping and valves has been included in this study.

The building is also equipped with hot water from two indirect hot water heaters. The hot water is stored in the domestic hot water storage tank. Circulation and recirculation pumps are installed in the mechanical penthouse. Costs to replace the pumps and motors are included in this study.

Boiler 1 (HW BOILER #1) - staining on the valve and floor under valve (repaired gas leak). The staining should be cleaned and monitored for re-occurrence. The staining may have been from the soap water test done to the fittings after the valve was replaced.

Exhaust stack from HW BOILER #1 appears to have leaks near the roof. The leak should be reviewed and repaired.

The building is served by a six-inch water main. The main piping distribution system, booster pumps, domestic hot water boilers, and storage tanks are considered a common element. The water distribution system throughout the building is concealed and could not be visually reviewed.

The parking garage is equipped with a car wash bay. Hose bibs are installed to provide cold water. The hose bibs were in good condition. Repair or replacement of the hose bibs should be done using funds from the operating budget.

Minor repairs or upgrades to the domestic water systems should be performed, as needed, using funds from the operating budget.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Domestic Water Systems	$15,000	n/a	2026, 2036
Replace Domestic Hot Water	$7,500	25 years	2031

Recirculation Pumps			
Replace Domestic Hot Water Circulation Pumps	$5,500	25 years	2031
Replace Water Storage Tank	$10,000	25 years	2031
Replace Gas Fired Water Heaters	$17,000	25 years	2031
Replace Domestic Cold Water Booster Pumps	$37,000	25 years	2031
Contingency to Replace Pump Motors	$17,000	15 years	2021

4.4.4 Heating and Cooling Systems

Includes - Boilers
- Circulation Pumps
- Heat Pumps
- Heat Exchanger
- Unit Heaters
- Forced Flow Heaters
- Cooling Tower
- Condenser Pumps
- Chemical Treatment System
- Steam Room Boiler

The heating and cooling system for the majority of the building consists of a water loop system, where heat pumps inside each unit and various common rooms draw or return heat into the water loop. The temperature of the loop is controlled by the boilers and cooling tower located in the mechanical penthouse. Other heating and cooling systems for the building consist of unit heaters, forced flow heaters, air heated/cooled make-up air units, and ventilation.

There are six gas-fired boilers in the mechanical penthouse. All Lochinvar boilers are original to construction. Armstrong circulation pumps are installed and are original to construction.

The boiler chimneys penetrate through the mechanical penthouse roof. The chimneys had some corrosion on the metal flue. A contingency is carried for occasional repairs to the heating and cooling systems. Costs to replace the boilers are included in this study.

There is a booster boiler and pump installed on the 7th and 13th floors, west side locker corridor. The Rheem Ruud booster boiler units have been failing often. There have been three replacements since construction. The insulation around the piping for the booster units is also poorly done and requires

repairs. A contingency to replace the pumps and boilers has been included in this study.

Heat pumps (known as fan coil units) provide ventilation, heating and cooling to the units and various common rooms. The heat pumps in the units vary from 800-1200 cfm. All units have one heat pump, except for the two double units, which have two heat pumps. The common area heat pumps vary from 250 cfm to 2000 cfm, depending on the size of the room. The heat pumps are generally in fair condition. A cost to begin replacing a large amount of heat pumps has been included starting later in the study. Multiple heat pumps have been replaced in the past few years. At the request of the board, an annual contingency to replace the heat pump units is being carried in the study. Inspections of the heat pumps is done out of the operating budget.

The filters in the heat pumps are being replaced using funds from the operating budget.

A glycol heat exchanger is installed in the mechanical penthouse to heat the make-up air unit air. The heat exchanger provides heat from the main water loop, and heats the glycol in the small loop connected to the make-up air unit. Glycol is used for this item as water could freeze in some situations when the outside air is extremely cold. A cost to replace the heat exchanger is included in this study.

Ceiling hung unit heaters are installed in many locations, including the mechanical penthouse, elevator machine room, and in the parking garage. The unit heaters are connected to the water loop and are supplied with hot water. The unit heaters appear to be generally in good condition; however, they were not operational at the time of the site review due to the time of year. A cost to begin replacement of the unit heaters has been included starting later in the study. Occasional repairs and replacement of some units should be done as required using funds from the general repairs contingency for the heating and cooling systems.

Supplemental heat is provided to some areas of the mechanical penthouse, and the main entrance vestibule, by forced flow heaters. Other electric baseboard heaters are installed at various locations and rooms. The heaters were not functioning at the time of the review due to the time of year. A replacement cost has been included in this study.

A cooling tower is installed in the mechanical penthouse. The chiller provides cooling to the water loop of the building heating system. The rooftop chiller and condenser pump are original to construction. No problems were observed or reported with the common element equipment.

The top of the chiller projects beyond the mechanical roof, where an automated damper opens and closes, allowing fresh air into the unit. The top of the chiller is clad with insulation and a reflective membrane. The penetrations and transitions of the reflective membrane are sealed with caulking; however, there are several locations where the caulking is deteriorated. The membrane is also deteriorating in some sections, allowing water to penetrate. Signs of water leakage were also observed inside the mechanical penthouse around the chiller penetration through the roof.

The caulking of the metal flashing near the chiller is missing and deteriorated. The caulking of the reflective membrane around the chiller is disconnected/deteriorated. The reflective membrane is poorly attached to the chiller top metal flashing. In general, the reflective membrane is poorly attached to the insulation in some areas of the chiller. A contingency to repair the cooling tower elements has been included in the short-term.

A chemical treatment system is installed in the mechanical penthouse to treat the water in the heating and cooling loop. A cost to replace the chemical treatment system has been included in this study. Minor repairs should be done using funds from the operating budget.

A contingency has also been included to repair or replace the various pumps for the heating and cooling systems in the mechanical penthouse. The pumps typically have a life expectancy of 15-20 years, but are sometimes unpredictable.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Heating and Cooling Systems	$20,000	n/a	2016, 2026, 2036
Replacing Heating Boilers	$280,000	25 years	2031
Replace Chimney Flue Vents	$18,000	25 years	2031
Replace Heating Circulation Pumps	$40,000	30 years	2036
Contingency to Replace Heat Pumps	$15,000	Annually	Until 2025
Replace Unit Heat Pumps	$15,000 $270,000	20-25 years 20-25 years	Annually from 2015 to 2025 2026, 2031, 2036
Replace Common Area Heat Pumps	$60,000	20-25 years	2031
Replace Glycol Heat Exchanger	$13,000	25 years	2031
Contingency to Replace Mechanical Penthouse Unit Heaters	$3,000	25 years	2031, 2036, 2041
Contingency to Replace Parking Garage Unit Heaters	$26,000	25 years	2031, 2036, 2041
Replace Supplementary Heaters	$5,000	Varies	2026
Contingency to Repair Cooling Tower Elements	$6,000	n/a	2015, 2025
Replace Cooling Tower	$40,000	25 years	2031
Replace Cooling Circulation Pumps	$17,000	30 years	2036
Replace Condenser Pumps	$10,000	30 years	2036
Replace Chemical Treatment System	$3,000	25 years	2031
Replace Steam Room Boiler	$13,000	15 years	2025, 2040
Contingency to Replace Booster Boilers and Pumps	$1,500		2018, 2023, 2028, 2033, 2038, 2043

4.4.5 Ventilation Systems

Includes - Make-up Air Unit
- Parking Garage Ventilation
- Carbon Monoxide Detection System
- Miscellaneous Booster, Transfer, and Exhaust Fans
- Dryer Exhaust Fans
- Dampers and Louvers

Ventilation is provided to the common area hallways by a gas-fired make-up air unit (MAU) located on the roof of the mechanical penthouse. The unit also provides heating and cooling to the common corridors to the common corridors. No issues were reported with the MAU. A cost to replace the unit is included later in the study.

Ventilation to the parking garage is provided by area wells with high capacity exhaust fans, intake dampers, and high capacity supply fans. The ventilation system is controlled by the carbon monoxide detection system, which automatically opens the dampers and turns on the exhaust fans and supply fans. No issues were reported with the ventilation systems in the parking garage. It was not operational at the time of the site visit (C.O. detection system was not triggered due to the time of day with little vehicular traffic). Costs to replace the various parking garage ventilation systems have been included in this study.

Multiple carbon monoxide detectors were found to be out of calibration and required recalibration as of May 2015. The recalibration should be carried out using funds from the operating budget.

Various booster, transfer and exhaust fans are installed throughout the building. The life expectancy of the fans varies depending on the amount of usage. A contingency has been included to replace the miscellaneous fans as required.

The dryer exhaust fans are vented to the roof. The fans appear to be in good condition. A contingency has been included for replacement of the fans.

The bathrooms and kitchen ranges in each suite are ventilated and ducted to a common wall exhaust. The individual suite fans are not common elements, and are therefore not considered in this study.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Ventilation Systems	$15,000	n/a	2022, 2037
Replace Make-up Air Unit	$50,000	30 years	2037
Replace Make-up Air Unit Motor	$2,000	15 years	2021
Replace High Capacity Garage Supply Fans	$25,000	15 years	2031
Replace High Capacity Garage Exhaust Fans	$15,000	15 years	2031
Contingency to Replace Garage Supply and Exhaust Fan Motors	$15,000	15 years	2021
Replace C.O. Detections System	$10,000	10 years	2024, 2034, 2044

Contingency to Replace Miscellaneous Common Booster, Transfer, Pressurization, Supply, and Exhaust Fans and Motors	$5,000	Varies	2016, 2021, 2026, 2031, 2036, 2041
Replace Dryer Exhaust Fans	$15,000	30 years	2037
Contingency to Repair Dampers and Louvers	$3,000	Varies	2026, 2036

4.4.6 Waste Disposal Systems

Includes: - Refuse Chute
- Refuse Bins

The building is equipped with two garbage chutes, one located at each end of the locker corridors. Interior finishes conceal the garbage chutes, though no issues were reported. The chute doors appear to be in good condition. Occasional repairs and replacement of the garbage chute elements should be done using funds from the operating budget.

The refuse bins in the parking garage are rented and no costs have been associated with these items.

4.5 Elevator Systems

4.5.1 Elevator

Includes: - Passenger Elevator and Components

Rooney, Irving & Associates Ltd. performed a site review of the passenger elevators in August 2015. The inspection report is attached to this document as Appendix A.

As noted in the Rooney, Irving & Associates Ltd.'s report, the monthly maintenance logs have not been completed since March 2014. The Phase 1 and 2 Fire Service are required to have been completed in July 2015.

Rooney, Irving & Associates Ltd.'s recommendation is for monthly maintenance at a minimum.

The costs included in the report do not include HST. HST has been added in this study.

The deficiencies should be forwarded to the elevator maintenance contractor to be rectified.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Code Required Elevator Upgrades	$5,400	n/a	2018, 2023, 2033, 2038, 2043
Complete Elevator Modernization	$769,000	20-25 years	2028
Cab Refurbishment	$64,000	20-25 years	2028

4.6 Electrical Systems

4.6.1 Building and Site Electrical Service System

Includes: - Primary Switchgear
- Secondary Switchgear
- Transformers and Distribution Panels
- Unit Electrical Panels
- Cable Television, Telephone, Wiring, Receptacles, and Switches
- Site Services

The incoming secondary electrical power for the building is rated at 347/575V, 3-phase, 2000A. Various transformers and electrical panels with circuit breakers and disconnect switches are installed in the hydro vault and main electrical room in the parking garage. Additional electrical panels and switches are installed in the mechanical penthouse.

Electrical panels are installed inside the units. These panels are not considered to be common elements and therefore no costs have been allocated in this study.

Cable television, telephone, and wiring are installed throughout the building and are mostly concealed behind the interior finishes. Receptacles and switches are also installed in all common rooms and corridors. Telephone and cable wiring for units are not considered to be common elements.

No deficiencies were noted or reported with the electrical service system. The electrical system should not require replacement during the time span considered in this report. However, it is wise to carry a repair contingency, which is started later in the study.

Electrical services from the main electrical grid to the hydro vault, and from the hydro vault to the main electrical room, are hung off the ceiling in the parking garage, and from the main electrical room, to the exterior light standards and gate house all buried below grade. No issues were reported with the electrical site services. Repairs to the electrical site services should

be done using the contingency included in this section. Water leak stains were observed in the hydro room and should be investigated.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Site Services	$15,000	n/a	2037
Contingency to Repair/Replace Exterior Light Standards and Fixtures	$5,000	10-20 years	2031, 2036, 2041
Contingency to Repair/Replace Main Electrical Distribution Systems	$20,000	n/a	2037
Contingency to Replace Panels, Switchgears, and Wiring	$20,000	n/a	2037

4.6.2 Lighting Fixtures

Includes: - Common Area Interior Light Fixtures
- Exterior Fixtures

Common interior light fixtures installed in the corridors, common rooms, utility rooms, stairwells, and parking garage consist of a combination of incandescent fixtures, ballast lights, wall and recessed mounted lights, and fluorescent valance lights.

The interior light fixtures are in good condition and full replacement is not anticipated in the 30-year time frame of this study. A contingency for occasional replacement of interior light fixtures has been included starting later in the study.

Exterior light fixtures include some soffit-mounted lights, wall mounted lights, and several light standards around the parking lot and roadway. The light fixtures were generally in good condition. Occasional repairs/replacement of the light fixtures should be done using funds from the operating budget. A contingency to replace larger amounts of light fixtures has been included, starting later in the study.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Replace Common Corridor Light Fixtures	$20,000	30 years	2036, 2041
Contingency to Replace Ground Floor, Lobby, and Amenity Room Light Fixtures	$50,000	30 years	2037
Contingency to Replace Parking Garage and Stairwell Light Fixtures	$24,000	30 years	2036, 2041

4.6.3 Auxiliary Electrical System

Includes: - Front Door Entry System
- CCTV System
- Fob Entry System

Entry to the building is controlled by an intercom remote control door release system located in the front vestibule and connected through to the suites. The entry system panel is original to the building. The panel is in good condition and should not require replacement for many years. Minor repairs to the system should be done using funds from the operating budget.

A CCTV security camera system is installed in the building. Cameras are installed in various locations. The system is original to construction and should not require replacement for many years. Minor repairs or item replacement should be done using funds from the operating budget.

The current fob Win-pak system in the building is original to construction. The property manger noted that the system is in poor condition and will require replacement in the short term. The cost included in the study is based on a quote received to complete the replacement. It should be noted that due to the configuration of the existing system, the fob entry system will have to be upgraded in both Phase 1 and Phase 2 simultaneously.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Replace Main Intercom System	$32,000	20-25 years	2026
Replace CCTV System	$18,000	20-25 years	2016, 2036
Replace FOB Win-pak System	$19,000	20-25 years	2016, 2036

4.7 Life Safety Systems

4.7.1 Fire Detection Systems

Includes: - Fire Control Panel and Remote Annunciator
- Smoke Detectors and Heat Sensors
- Signaling Devices
- Manual Fire Alarm Initiating Devices and Communication Hand Sets

The fire alarm system consists of a zoned, electrically supervised alarm system. Key peripheral components include heat and smoke detectors, pull stations, communication handsets, and signaling devices. The Siemens fire control panel is original to construction and is located in the CACF room near the main entrance. The remote annunciator panel is located in the main entrance vestibule. The current fire alarm panel is being phased out by the

manufacturer and will require replacement in the short term. The cost included in the study is intended to allow for the replacement of the panel and devices by the same manufacturer or a different manufacturer.

All components of the fire detection system should be tested on a regular basis to ensure they are functioning properly. A cost to replace the fire control panel and remote annunciator has been included later in the study. A contingency has been carried to replace the peripheral devices. Many devices have a five to ten year life and require replacement.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Replace Fire Control Panel and Remote Annunciator	$136,000	25 years	2017, 2042
Contingency to Replace Fire Detection Peripheral Devices	$10,000	5-10 years	2017, 2027, 2037

4.7.2 Fire Protection Systems

Includes: - Fire and Booster Pumps
- Wet Pipe Sprinkler System
- Fire Hose Cabinets
- Standpipe Connection

The parking garage of the building is equipped with a wet pipe sprinkler system. A fire pump provides pressure to the system. A booster pump connected to the standpipe serves the fire hose cabinets on each floor and other common areas. An exterior standpipe connection provides fire-fighting capabilities outside the building. In the fire hose cabinets are also fire extinguishers.

The equipment is original to construction of the building. Apart from the booster pump, no major replacement of the fire protection systems is anticipated in the time period for this study. A contingency is included over the life of the building for any major repairs or unexpected item replacement.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair Fire Suppression Systems	$5,000	n/a	2026, 2036
Replace Standpipe Booster Pump	$24,000	30 years	2036

4.7.3 Emergency Systems

Includes: - Emergency Generator
- Exit and Emergency Lights

A Kohler diesel powered emergency generator is located in the parking garage next to the main hydro room. The generator appears to be in good working condition. Regular inspections and maintenance will help to extend the life of the generator. A cost to overhaul the generator is included in this study, which should help extend the overall life. Wholesale replacement of the generator is not anticipated in the 30-year time frame of this study.

The emergency lighting provided to the corridors, stairwells, and utility rooms includes battery packs, remote head units and exit signs. No problems were observed with the operation of the emergency lighting. Repairs and replacement of select items should be done as required using funds from the operating budget.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Overhaul Emergency Generator	$12,000	n/a	2021, 2036

4.8 Interior Finishes

4.8.1 Flooring

Includes - Marble Tiles
- Carpeting
- Ceramic Tile
- Painted Concrete Floors

Marble tile is installed through the majority of the building. Marble tile is installed in the main entrance and lobby area, the ground floor corridors, and all common corridors outside the elevators. The marble tile is original to construction and is in good condition. To maintain the condition of the marble, it is recommended that the marble be polished and sealed. Polishing and sealing the marble should be completed using funds from the operating budget.

The marble tiles in the elevators are polished and sealed every 1 to 2 years, using funds from the operating budget.

Carpeting is installed in several of the common rooms on the ground floor. The carpeting is original to construction and is in fair condition. A cost to

replace the carpeting has been included in this study. Minor repairs should be done using funds from the operating budget.

Ceramic tile is installed at the locker room corridor doors on each floor, in the basement level corridors, and in various amenity rooms. The ceramic tile is in good condition and should not require replacement for many years. Minor repairs should be done using funds from the operating budget. Complete replacement of the ceramic tile is included at the end of this study.

The locker room corridor floors are painted concrete. The painting is in good condition and should only require repainting when required. Painting of the concrete floors should be done as required using funds from the operating budget.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Replace Carpeting	$30,000	10-15 years	2018, 2030, 2042
Replace Ceramic Tile Flooring	$60,000	35-40 years	2043

4.8.2 Wall and Ceiling Finishes

Includes - Hallway Walls and Ceilings
- Stairwells
- Marble Tile Trim
- Acoustical Ceiling Tiles
- Parking Garage Walls, Ceilings, and Column Surfaces

The typical corridor walls and ceilings are painted gypsum board. The walls on the ground floor lobby area are a combination of gypsum board and wood trim and wainscoting. The common area walls and ceilings are in good condition. A cost to prepare and paint the walls and ceilings has been included in this study.

The stairwells are painted concrete treads and risers and steel railings. The walls and ceilings are also painted concrete. The stairwell painting is in good condition. A cost to prepare and paint the stairwells has been included in this study.

Marble tile trim is installed around the perimeter of the walls as baseboards, and around the perimeter of the elevator doorframes. The marble tile is in good condition and should not require replacement in the 30-year time frame of this study. The marble tile trim may require polishing, sealing, and

occasional repairs, which should be done using funds from the operating budget.

Acoustical tile ceilings are installed in various amenity rooms. The tile is in good condition and should not require replacement during the 30-year time frame of this study. Small stains were noted on the ceiling tiles in a few locations. Minor repairs and selective tile replacement should be done using funds from the operating budget.

The parking garage walls, ceilings, and columns, are painted concrete. The paint is in good condition. A cost to paint the parking garage elements has been included in this study.

The mechanical room has painted concrete walls. The walls will likely not require repainting in the 30-year duration of this study.

There is missing fire-stop caulking around a conduit between the mechanical and electrical room. This breach in the fire separation between the two rooms should be repaired using funds from the operating budget.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Repair/Prepare and Paint Corridor Walls and Ceilings	$50,000	15 years	2021, 2036
Contingency to Repair/Prepare and Paint Stairwells	$50,000	20 years	2026
Prepare and Paint Parking Garage Walls, Columns, and Ceilings	$180,000	15 years	2020, 2035

4.8.3 Interior Doors

Includes: - Suite Entrance Doors
- Common and Utility Room Steel Doors
- Common Room Wood Doors

The suite entrance doors are double solid wood doors. The majority of the doors are original to construction and appear to be in good condition. A few doors have been replaced over the last few years. The doors should not require replacement during the 30-year time frame of this study. Minor repairs and re-finishing of the doors should be done as required using funds from the operating budget. A contingency has been included to begin replacing doors as required.

The metal doors in the stairwell, garbage chute rooms, garbage room, electrical/mechanical room, basement vestibule, and various other utility room doors are original to construction.

No major problems were noted with the doors and wholesale replacement is not anticipated in the 30-year time frame of this study. Minor repairs, painting, or selective replacement should be done using funds from the operating budget.

Other common room doors, such as the amenity rooms and office, are solid wood doors. The doors are similar to the suite entrance doors (except the size), and are in good condition. Minor repairs and re-finishing of the doors should be done as required using funds from the operating budget. Selective door replacement should also be done using funds from the operating budget.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Replace Suite Entrance Doors	$7,000	n/a	2015

4.8.4 Specialties

Includes - Mailboxes

The mailboxes are pre-fabricated steel mailboxes. The mailboxes are in good condition and should not require replacement during the 30-year time frame of this study. Minor repairs should be done using funds from the operating budget.

4.8.5 Lobby and Amenity Rooms

Includes - Main Lobby
- Recreation and Other Rooms
- Office
- Guest / Superintendent Suite
- Appliances and Furniture

The main lobby and ground floor corridors are finished with marble tile floor, painted gypsum board walls, wood trim and paneling, wall and ceiling light fixtures, art work, drapery, and furniture. A concierge desk is also located at the main entrance doors. The main lobby area is generally in good condition. Several of the items in the main lobby are updated on a regular basis and other items will require occasional repairs. Contingencies for the main lobby interior finishes have been included. The marble tiles are polished and sealed every 1 to 2 years, using funds from the operating budget.

Recreation and common rooms are located on the ground floor. The condominium manager office is located near the main entrance doors. A guest/superintendent suite is also provided for the building and is a common element. The finishes in these common rooms will require updates and repairs. Contingences have been included in this study.

Minor paint touch-ups are required throughout the common room. These repairs should be conducted using funds from the operating budget.

Appliances and furniture are also supplied to the various common areas on the ground floor, and in the office, meeting, and recreation rooms. A contingency has been included to replace elements as required.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Contingency to Refurbish Main Lobby Interior Finishes	$12,500	n/a	2020, 2025, 2030, 2035, 2040
Contingency to Refurbish Recreation Facilities Interior Finishes	$15,000	n/a	2021, 2028, 2035, 2042
Contingency to Refurbish Management Office Interior Finishes	$6,000	n/a	2021, 2036
Contingency to Refurbish Guest/Superintendent Suite Finishes	$9,000	n/a	2021, 2036
Contingency to Replace Amenity Room Appliance and Furniture	$5,000	n/a	2018, 2023, 2028, 2033, 2038, 2043

4.9 Engineering Fees

Includes - Reserve Fund Study Fees
- Major Repair / Replacement Projects

Under the new Condominium Act, reserve fund study updates must be conducted every three years. At a minimum, every second update must be a comprehensive update (with a site review). Costs to carry out the reserve fund study updates have been included in this study.

For major item repair or replacement projects (such as the parking garage traffic topping, parking garage podium deck membrane, main roof, curtain walls, etc.), it is recommended to engage an engineering firm to carry out the design, tendering, and project management. Costs have already been

included in some of the larger item replacement costs in their individual sections.

Task	*Estimated Costs*	*Life Expectancy*	*Assigned Years*
Comprehensive Reserve Fund Study Update	$8,500	n/a	2015, 2021, 2027, 2033, 2039
Reserve Fund Study Update	$4,100	n/a	2018, 2024, 2030, 2036, 2042

5.0 COST ESTIMATING

Estimates of the costs for reserve fund items in the following tables are based on current 2015-dollars for the project elements outlined. The costs represent values for labour, material, and the Harmonized Sales Tax (HST). The tables are linked to the reserve fund analysis spreadsheets presented in Section 6.0.

It has been assumed that materials used in the construction of the building will be replaced with materials of equivalent quality unless stated otherwise.

The life spans and estimated repair/replacement costs of particular materials in the project are estimated based primarily on Buchan, Lawton, Parent Ltd.'s experience and judgement, which has been developed through many years in the field of building science. In addition, the firm routinely monitors the Quantity Survey Costing for the industry published regularly by Means in their *Building Construction Costs Data* series and by Hanscomb in their *Yardsticks for Costing* and works closely with contractors.

5.1 Estimated Costs, First Ten Years

	Estimated Costs $2015									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ITEM	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10
SITE WORK										
Wood items										
Contingency to Repair/Replace Gazebo Elements	0	0	0	0	0	4000	0	0	0	0
Contingency to Prepare and Stain Gazebo Elements	0	0	0	0	0	1000	0	0	0	0
STRUCTURE										
Parking Garage										
Contingency to Repair Parking Garage Structure	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Contingency Replace Slab on Grade Sealants	0	6000	0	0	0	0	0	0	0	0
Contingency to Repair Podium Deck Membrane	0	0	0	0	0	0	0	50000	0	0
Contingency to Repair Parking Garage Finishes	0	0	0	0	0	0	0	0	10000	0
BUILDING ENVELOPE										
Cladding										
Contingency to Repair EIFS	0	0	0	0	0	0	5000	0	0	0
Exterior Doors										
Contingency to Repair Common Exterior Doors	0	0	5000	0	0	0	0	0	0	0
Replace Overhead Garage Door Opener	0	1000	0	0	0	0	0	0	0	0
Windows										
Contingency to Replace Sealed Glazing Units	0	0	0	0	0	0	15000	15000	15000	15000
Contingency to Repair Curtain Wall and Punch Windows	73000	0	0	0	0	0	0	0	0	0
Sealants										
Replace Window and Door Sealants	0	80000	80000	0	0	0	0	0	0	0
Contingency to Replace Miscellaneous Sealants	0	27000	27000	0	0	0	0	0	0	0
MECHANICAL										
Garage and Building Drainage System										
Contingency to Repair/Replace Area Drains amd Floor Drains	0	0	0	0	0	0	5000	0	0	0
Contingency to Replace Sump Pumps	0	0	0	1500	0	0	0	0	1500	0
Contingency to Repair Sump Pits and Replace Sump Controls	0	2000	0	0	0	0	0	0	0	0
Domestic Water and Sanitary Systems										
Contingency to Replace Pump Motors	0	0	0	0	0	0	17000	0	0	0
Heating and Cooling Systems										
Contingency to Repair Heating and Cooling Systems	0	20000	0	0	0	0	0	0	0	0
Contingency to Repair/Replace Unit Heat Pumps	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000
Contingency to Repair Cooling Tower Elements	6000	0	0	0	0	0	0	0	0	0
Contingency to Replace Booster Boilers and Pumps	0	0	0	1500	0	0	0	0	1500	0
Ventilation Systems										
Contingency to Repair Ventilation Systems	0	0	0	0	0	0	0	15000	0	0
Replace Make-up Air Unit Motor	0	0	0	0	0	0	2000	0	0	0
Contingency to Replace Garage Supply and Exhaust Fan Motors	0	0	0	0	0	0	15000	0	0	0
Replace C.O. Detection System	0	0	0	0	0	0	0	0	0	10000
Contingency to Replace Miscellaneous Common Booster, Transfer, Pressuirzation, Supply and Exhaust fans	0	5000	0	0	0	0	5000	0	0	0

5.1 Estimated Costs, First Ten Years, cont'd

	Estimated Costs $2015									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
ITEM	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10
ELEVATOR										
Code Required Elevator Upgrades	0	0	0	5400	0	0	0	0	5400	0
ELECTRICAL										
Auxiliary Electric Systems										
Replace CCTV Systems	0	18000	0	0	0	0	0	0	0	0
Replace Fob Winpak System	0	19000	0	0	0	0	0	0	0	0
FIRE/LIFE SAFETY SYSTEMS										
Fire Detection										
Replace Fire Control Panels and Remote Annunciator	0	0	136000	0	0	0	0	0	0	0
Contingency to Replace Fire Detection Peripheral Devices	0	0	10000	0	0	0	0	0	0	0
Emergency Systems										
Overhaul Emergency Generator	0	0	0	0	0	0	12000	0	0	0
INTERIORS										
Floors										
Replace Carpeting	0	0	0	30000	0	0	0	0	0	0
Walls & Ceilings										
Contingency to Repair/Prepare and Paint Corridor Walls and Ceilings	0	0	0	0	0	0	50000	0	0	0
Prepare and Paint Parking Garage Walls, Columns, and Ceilings	0	0	0	0	0	180000	0	0	0	0
Interior Doors										
Contingency to Replace Suite Entrance Doors	7000	0	0	0	0	0	0	0	0	0
Lobby and Amenity Rooms										
Contingency to Refurbish Main Lobby Interior Finishes	0	0	0	0	0	12500	0	0	0	0
Contingency to Refurbish Recreation Facilities Interior Finishes	0	0	0	0	0	0	15000	0	0	0
Contingency to Refurbish Management Office Interior Finishes	0	0	0	0	0	0	6000	0	0	0
Contingency to Refurbish Guest/Superindendent Suites Finishes	0	0	0	0	0	0	9000	0	0	0
Contingency to Replace Amenity Room Appliances and Furniture	0	0	0	5000	0	0	0	0	5000	0
RESERVE FUND STUDIES										
Reserve Fund Study Update	0	0	0	4100	0	0	0	0	0	4100
Comprehensive Reserve Fund Study	8500	0	0	0	0	0	8500	0	0	0
TOTALS	**$111,500**	**$195,000**	**$275,000**	**$64,500**	**$17,000**	**$214,500**	**$181,500**	**$97,000**	**$55,400**	**$46,100**

5.2 Estimated Costs, 30 Years

	Estimated Costs $2015					
	2015-2019	2020-2024	2025-2029	2030-2034	2035-2039	2040-2044
ITEM	years 1-5	years 6-10	years 11-15	years 16-20	years 21-25	years 26-30
SITE WORK						
Wood items						
Replace Cedar Fencing	0	0	0	4000	0	0
Contingency to Repair/Replace Gazebo Elements	0	4000	0	0	4000	0
Contingency to Prepare and Stain Gazebo Elements	0	1000	1000	1000	1000	1000
STRUCTURE						
Balconies						
Prepare and Paint Balcony Guardrails	0	0	0	0	80000	0
Parking Garage						
Contingency to Repair Parking Garage Structure	10000	10000	10000	10000	10000	10000
Contingency to Repair Concrete Slab on Grade	0	0	0	0	0	100000
Replace Traffic Topping Membrane	0	0	0	290000	0	0
Contingency Replace Slab on Grade Sealants	6000	0	6000	0	6000	0
Contingency to Repair Foundation Waterproofing	0	0	0	0	20000	0
Contingency to Repair Podium Deck Membrane	0	50000	0	0	0	0
Replace Rear Podium Deck Membrane and Site Elements	0	0	0	0	500000	0
Replace Front Podium Deck Membrane and Site Elements	0	0	0	0	300000	0
Contingency to Repair Parking Garage Finishes	0	10000	0	10000	0	10000
BUILDING ENVELOPE						
Cladding						
Contingency to Repair Brick	0	0	0	0	100000	0
Contingency to Repair EIFS	0	5000	0	0	0	0
Replace EIFS	0	0	0	0	17000	0
Exterior Doors						
Contingency to Repair Common Exterior Doors	5000	0	5000	0	0	0
Replace Main Entrance and Vestibule Doors	0	0	0	0	10000	0
Replace Balcony Sliding Doors	0	0	0	0	380000	0
Replace Garage Exit Stair Door	0	0	0	0	2000	0
Replace Overhead Garage Door	0	0	0	0	6000	0
Replace Overhead Garage Door Opener	1000	0	1000	0	1000	0
Windows						
Contingency to Replace Sealed Glazing Units	0	60000	75000	115000	25000	0
Contingency to Repair Curtain Wall and Punch Windows	73000	0	50000	0	0	0
Replace Punch Windows	0	0	0	0	0	750000
Contingency to Upgrade Curtain Wall Glazing, Operators, Weatherstipping, etc.	0	0	0	0	525000	0
Replace Parking Garage Exit Stair Windows	0	0	0	0	13000	0
Sealants						
Replace Window and Door Sealants	160000	0	160000	0	0	0
Contingency to Replace Miscellaneous Sealants	54000	0	54000	0	55000	0
Roofing						
Replace Main Flat Roofs	0	0	0	470000	0	0
Replace Parking Garage Exit Stair Roof	0	0	0	8000	0	0
Replace Main Entrance Canopy Roof	0	0	0	0	0	55000

5.2 Estimated Costs, 30 Years, cont'd

	Estimated Costs $2015					
	2015-2019	2020-2024	2025-2029	2030-2034	2035-2039	2040-2044
ITEM	years 1-5	years 6-10	years 11-15	years 16-20	years 21-25	years 26-30
MECHANICAL						
Site Services						
Contingency to Repair Water Mains and Sewer Lines	0	0	0	0	10000	0
Garage and Building Drainage System						
Contingency to Repair/Replace Area Drains amd Floor Drains	0	5000	0	0	5000	0
Contingency to Replace Sump Pumps	1500	1500	1500	1500	1500	1500
Contingency to Repair Sump Pits and Replace Sump Controls	2000	0	2000	0	2000	0
Domestic Water and Sanitary Systems						
Contingency to Repair Domestic Water Systems	0	0	15000	0	15000	0
Replace Domestic Hot Water Recirculation Pumps	0	0	0	7500	0	0
Replace Domesitc Hot Water Circulation Pumps	0	0	0	5500	0	0
Replace Water Storage Tank	0	0	0	10000	0	0
Replace Gas Fired Water Heaters	0	0	0	17000	0	0
Replace Domestic Cold Water Booster Pumps	0	0	0	37000	0	0
Contingency to Replace Pump Motors	0	17000	0	0	0	0
Heating and Cooling Systems						
Contingency to Repair Heating and Cooling Systems	20000	0	20000	0	20000	0
Replace Heating Boilers	0	0	0	280000	0	0
Replace Chimney Flue Vents	0	0	0	18000	0	0
Replace Heating Circulation Pumps	0	0	0	0	40000	0
Contingency to Repair/Replace Unit Heat Pumps	75000	75000	15000	0	0	0
Replace Unit Heat Pumps	0	0	270000	270000	270000	0
Replace Common Area Heat Pumps	0	0	0	60000	0	0
Replace Glycol Heat Exchanger	0	0	0	13000	0	0
Contingency to Replace Mechanical Penthouse Unit Heaters	0	0	0	3000	3000	3000
Contingency to Replace Parking Garage Unit Heaters	0	0	0	26000	26000	26000
Replace Supplementary Heaters	0	0	5000	0	0	0
Contingency to Repair Cooling Tower Elements	6000	0	6000	0	0	0
Replace Cooling Tower	0	0	0	40000	0	0
Replace Cooling Circulation Pumps	0	0	0	0	17000	0
Replace Condensor Pumps	0	0	0	0	10000	0
Replace Chemical Treatment System	0	0	0	3000	0	0
Replace Steam Room Boiler	0	0	13000	0	0	13000
Contingency to Replace Booster Boilers and Pumps	1500	1500	1500	1500	1500	1500
Ventilation Systems						
Contingency to Repair Ventilation Systems	0	15000	0	0	15000	0
Replace Make-up Air Unit	0	0	0	0	50000	0
Replace Make-up Air Unit Motor	0	2000	0	0	0	0
Replace High Capacity Garage Supply Fans	0	0	0	25000	0	0
Replace High Capacity Garage Exhaust Fans	0	0	0	15000	0	0
Contingency to Replace Garage Supply and Exhaust Fan Motors	0	15000	0	0	0	0
Replace C.O. Detection System	0	10000	0	10000	0	10000
Contingency to Replace Miscellaneous Common Booster, Transfer, Pressuirzation, Supply and Exhaust fans	5000	5000	5000	5000	5000	5000
Replace Roof Dryer Exhaust Fans	0	0	0	0	15000	0
Contingency to Repair Dampers and Louvres	0	0	3000	0	3000	0
ELEVATOR						
Code Required Elevator Upgrades	5400	5400	0	5400	5400	5400
Complete Elevator Modernization	0	0	769000	0	0	0
Cab Refurbishment	0	0	64000	0	0	0

5.2 Estimated Costs, 30 Years, cont'd

	Estimated Costs $2015					
	2015-2019	2020-2024	2025-2029	2030-2034	2035-2039	2040-2044
ITEM	years 1-5	years 6-10	years 11-15	years 16-20	years 21-25	years 26-30
ELECTRICAL						
Site and Building						
Contingency to Repair Site Services	0	0	0	0	15000	0
Contingency to Repair/Replace Exterior Light Standards and Fixtures	0	0	0	5000	5000	5000
Contingency to Repair/Replace Main Electrical Distrubtion Systems	0	0	0	0	20000	0
Contingency to Replace Panels, Switchgears, And Wiring	0	0	0	0	20000	0
Lighting						
Contingency to Replace Common Corridor Light Fixtures	0	0	0	0	20000	20000
Contingency to Replace Ground Floor, Lobby and Amenity Room Light Fixtures	0	0	0	0	50000	0
Contingency to Replace Parking Garage and Stairwell Light Fixtures	0	0	0	0	24000	24000
Auxiliary Electric Systems						
Replace Main Intercom System	0	0	32000	0	0	0
Replace CCTV Systems	18000	0	0	0	18000	0
Replace Fob Winpak System	19000	0	0	0	19000	0
FIRE/LIFE SAFETY SYSTEMS						
Fire Detection						
Replace Fire Control Panels and Remote Annunciator	136000	0	0	0	0	136000
Contingency to Replace Fire Detection Peripheral Devices	10000	0	10000	0	10000	0
Fire Suppression System						
Contingency to Repair Fire Suppression Systems	0	0	5000	0	5000	0
Replace Booster Pump	0	0	0	0	24000	0
Emergency Systems						
Overhaul Emergency Generator	0	12000	0	0	12000	0
INTERIORS						
Floors						
Contingency to Repair/Reseal Corridor Marble Tile Flooring	0	0	0	0	0	0
Replace Carpeting	30000	0	0	30000	0	30000
Repalce Ceramic Tile Flooring	0	0	0	0	0	60000
Walls & Ceilings						
Contingency to Repair/Prepare and Paint Corridor Walls and Ceilings	0	50000	0	0	50000	0
Contingency to Repair/Prepare and Paint Stairwells	0	0	50000	0	0	0
Prepare and Paint Parking Garage Walls, Columns, and Ceilings	0	180000	0	0	180000	0
Interior Doors						
Contingency to Replace Suite Entrance Doors	7000	0	0	0	0	0
Lobby and Amenity Rooms						
Contingency to Refurbish Main Lobby Interior Finishes	0	12500	12500	12500	12500	12500
Contingency to Refurbish Recreation Facilities Interior Finishes	0	15000	15000	0	15000	15000
Contingency to Refurbish Management Office Interior Finishes	0	6000	0	0	6000	0
Contingency to Refurbish Guest/Superindendent Suites Finishes	0	9000	0	0	9000	0
Contingency to Replace Amenity Room Appliances and Furniture	5000	5000	5000	5000	5000	5000
RESERVE FUND STUDIES						
Reserve Fund Study Update	4100	4100	0	4100	4100	4100
Comprehensive Reserve Fund Study	8500	8500	8500	8500	8500	0
TOTALS	**$663,000**	**$594,500**	**$1,690,000**	**$1,826,500**	**$3,101,500**	**$1,303,000**

6.0 RESERVE FUND ANALYSIS

The reserve fund balance calculations are presented in this section. The total costs identified from the cost estimating sheets in Section 5.0 have been allocated to each year over a 30 year time horizon. In each individual year, the 2015 dollar costs are inflated to an assumed inflation rate. The calculated fund balance each year is the previous year's balance plus the contribution shown in that year, minus the replacement costs shown in that year, plus or minus any interest on the previous fund value.

The reserve fund spreadsheet includes a discounted fund value. This amount represents the fund value in 2015 dollars.

Scenario 1, shown in Section 6.1a, is intended to reflect the long-term performance of the fund assuming the current funding plan is followed. The following assumptions were made to develop this scenario:

- March 31, 2015 reserve fund balance: $1,183,000
- Remaining Year 1 reserve fund contribution: $182,108
  (Total year 1 contribution: $273,163)
- Year 2 reserve fund contribution: $279,992
- Annual contribution increase rate, Years 2-30: 2.5%
- Interest on monies retained in the reserve fund: 2.5%
- Interest on borrowed money (if necessary): 7.0%
- Inflation index: 2.5%

Using these assumptions, the fund's projected balance remains above a deficit for the 30-year duration of the study.

6.1a Scenario 1, Reserve Fund Cash Flow, Table

FISCAL YEAR	**31-Mar-15**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Year	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
CONTRIBUTION		182,108	279,992	286,992	294,167	301,521	309,059	316,785
TOTAL ITEM COSTS $2015		111,500	195,000	275,000	64,500	17,000	214,500	181,500
INFLATED COSTS		111,500	199,875	288,922	69,459	18,765	242,687	210,484
INTEREST ON FUND		29,575	32,080	34,884	35,708	42,219	50,343	53,261
FUND VALUE (fiscal year end)	**1,183,000**	**1,283,183**	**1,395,380**	**1,428,334**	**1,688,750**	**2,013,724**	**2,130,439**	**2,290,001**
DISCOUNTED FUND VALUE	**1,183,000**	**1,283,183**	**1,361,346**	**1,359,509**	**1,568,172**	**1,824,335**	**1,882,998**	**1,974,661**

FISCAL YEAR	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Year	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
CONTRIBUTION	324,705	332,823	341,143	349,672	358,414	367,374	376,558	385,972
TOTAL ITEM COSTS $2015	97,000	55,400	46,100	338,000	338,000	338,000	338,000	338,000
INFLATED COSTS	115,303	67,500	57,573	432,669	443,485	454,572	465,937	477,585
INTEREST ON FUND	57,250	63,916	72,147	81,040	80,991	80,889	80,732	80,515
FUND VALUE (fiscal year end)	**2,556,654**	**2,885,893**	**3,241,611**	**3,239,655**	**3,235,574**	**3,229,265**	**3,220,618**	**3,209,521**
DISCOUNTED FUND VALUE	**2,150,824**	**2,368,587**	**2,595,650**	**2,530,813**	**2,465,976**	**2,401,139**	**2,336,302**	**2,271,465**

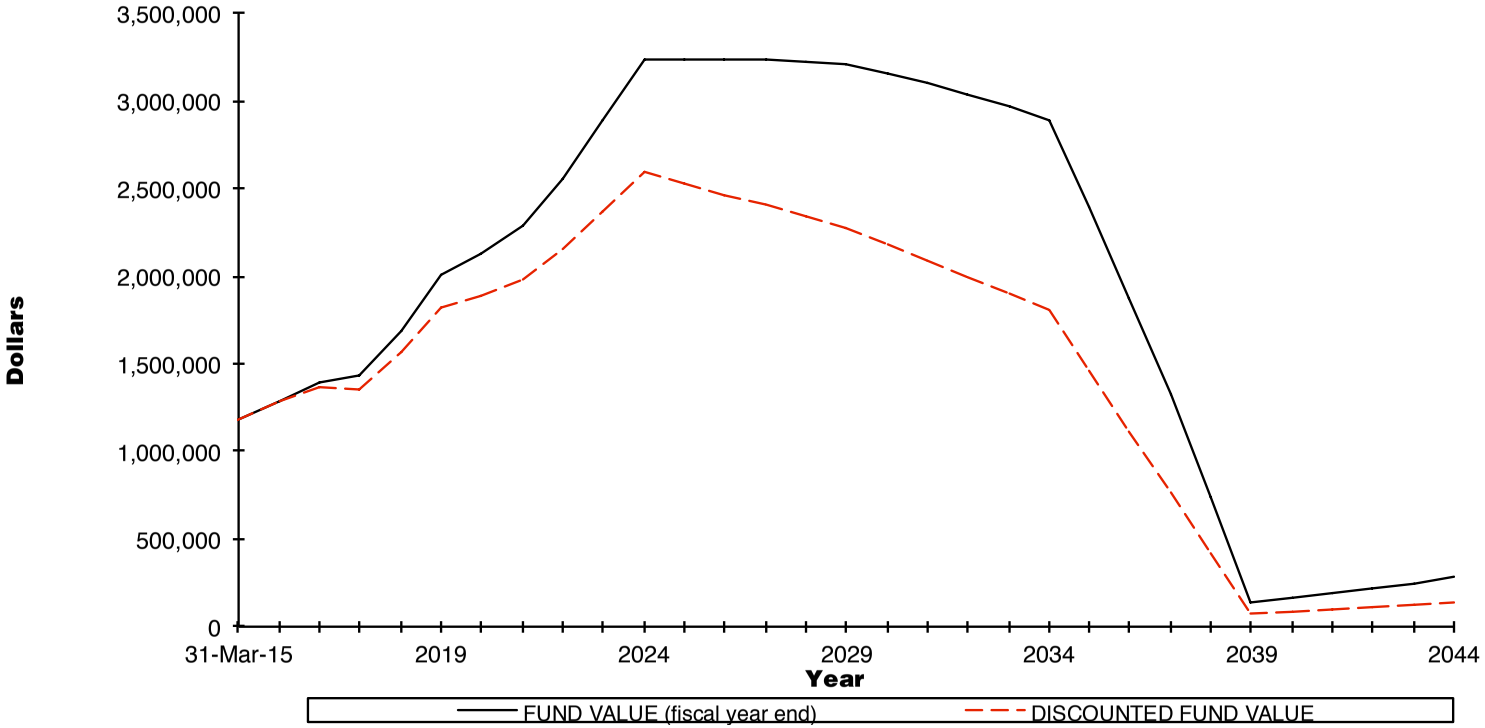
FISCAL YEAR	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
Year	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*
CONTRIBUTION	395,621	405,512	415,650	426,041	436,692	447,609	458,800	470,270
TOTAL ITEM COSTS $2015	365,300	365,300	365,300	365,300	365,300	620,300	620,300	620,300
INFLATED COSTS	529,063	542,290	555,847	569,743	583,987	1,016,434	1,041,845	1,067,891
INTEREST ON FUND	80,238	78,908	77,461	75,893	74,198	72,370	59,959	46,882
FUND VALUE (fiscal year end)	**3,156,317**	**3,098,447**	**3,035,711**	**2,967,901**	**2,894,804**	**2,398,349**	**1,875,263**	**1,324,524**
DISCOUNTED FUND VALUE	**2,179,328**	**2,087,191**	**1,995,054**	**1,902,917**	**1,810,780**	**1,463,643**	**1,116,506**	**769,369**

FISCAL YEAR	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**
Year	*24*	*25*	*26*	*27*	*28*	*29*	*30*
CONTRIBUTION	482,026	494,077	506,429	519,090	532,067	545,369	559,003
TOTAL ITEM COSTS $2015	620,300	620,300	260,600	260,600	260,600	260,600	260,600
INFLATED COSTS	1,094,588	1,121,953	483,138	495,216	507,597	520,287	533,294
INTEREST ON FUND	33,113	18,627	3,396	4,063	4,761	5,492	6,256
FUND VALUE (fiscal year end)	**745,075**	**135,826**	**162,513**	**190,449**	**219,681**	**250,255**	**282,220**
DISCOUNTED FUND VALUE	**422,232**	**75,095**	**87,658**	**100,221**	**112,784**	**125,347**	**137,910**

ASSUMPTIONS:	
Opening Fund Balance	$1,183,000
Remaining Year 1 Contr.	$182,108
Total Year 1 Contr.	$273,163
Year 2 Contribution	$279,992
Avg Yr 1 $/Unit/Month	$158.08
Avg Yr 2 $/Unit/Month	$162.03

	year 1	year 5-20	year 21-30
Fund Interest -	2.5%	2.5%	2.5%
Cost Inflation Index -	2.5%	2.5%	2.5%
Borrowing Cost Interest -	7.0%	7.0%	7.0%
Contribution Increase -	2.5%	2.5%	2.5%

6.1b Scenario 1, Reserve Fund Cash Flow, Graph



7.0 CONCLUSIONS AND RECOMMENDATIONS

Common element items requiring major repair or replacement in the short term are tabulated in the First Ten Years cost worksheet (Section 5.1).

One scenarios are presented in this study. Based on the findings and assumptions herein, the Condominium's current plan does provide sufficient funds to meet the projected capital costs over the next 30 years. Scenario 1, with a Year 2 annual contribution of $279,992 does provide sufficient funds to meet the projected capital costs over the next 30 years.

There were several new contingencies included in this study, including heat pump replacement, unit entry door replacement, and booster pumps and boiler replacement. There were also several unplanned expenditures such as the window repair project that is currently planned for 2015.

The reserve fund study must be updated every three (3) years as per the Condominium Act, in order to update it based on how the elements are aging, actual costs incurred since the previous study and to account for current raw materials and construction industry costs.

APPENDIX A

ELEVATOR REPORT

SITE REVIEW AND RESERVE FUND STUDY - ELEVATORS
3580 RIVERGATE WAY, OTTAWA

1.0 PURPOSE

In August 2015, a site review of the elevator system at 3580 Rivergate Way, Ottawa was performed by Rob McGregor. The purpose of the review and of this report was to assess the technical aspects of the elevator system, determine the capital costs likely to be encountered by the Condominium, assess the operation of the system, note upgrades required to meet current Code[1] and to itemize deficiencies to be corrected. The review undertaken was predominantly visual and system components were not disassembled under the scope of our work.

2.0 DESCRIPTION OF ELEVATOR SYSTEM

The elevator system consists of four (4) ThyssenKrupp passenger elevators, installed by ThyssenKrupp Elevator in 2006. They are geared, passenger elevators arranged as two-in-a-line per tower.

2.1 TECHNICAL DATA

A description of technical and nameplate data is as follows:

Elevator Designation:	1 2 3 4
Government Numbers:	83978- 83979 - 83980 - 83981
Class:	Passenger
Capacity:	2500 pounds
Speed:	500 fpm
Floors Served:	P, G, 2 - 19
Car Door Opening:	42” wide x 84" high Single speed - side opening
Car Door Re-opening Device:	Solid State Multi beam Detector
Power Supply:	600 Volt (nominal), 3 Phase, 60 Hz

[1] CAN/CSA-B44-10 *Safety Code for Elevators*

Machine:	ThyssenKrupp *Model GD1* Geared overhead
Hoist Motor:	ThyssenKrupp *AC* *Frame 286TCZ* 1765 rpm, 30 HP 230/460 volts / 3 phase / 60 Hz
Drive:	*VVVF*
Control:	ThyssenKrupp *Model TAC 50* 40 HP, FLA 36 600 volts / 3 phase / 60 Hz
Roping:	1:1 6 x 5/8" diameter
Door Operator:	ThyssenKrupp Closed loop
Elevator Manufacturer:	ThyssenKrupp *Elevator*
Date Installed:	Circa 2006
Maint. Contractor:	ThyssenKrupp *Elevator*

2.2 EXISTING CONDITIONS

The elevators were manufactured and installed by the ThyssenKrupp Elevator Company circa 2006. The components used in the elevator controllers and the method of position control is similar to numerous elevators installed across North America in operation today. Accordingly, finding a source of replacement parts and qualified service personnel should not be a problem in the immediate future.

The electrical controllers that govern the movement of the elevators are micro-processor based. The main advantage of microprocessor based controllers is their ability to more efficiently dispatch grouped elevators. The existing control system is non-proprietary meaning other contractors, other than the original installer, are able to maintain these elevators.

The elevators are fitted with up overspeed and uncontrolled low speed protection, features which prevent the elevators from overspeeding in the up direction or moving away from a landing with doors open in certain rare instances.

The car door re-opening devices are solid state multi beam detectors. Physical contact with the door re-opening device is not required to initiate the re-opening cycle.

The elevator cabs consist of ceramic tile flooring, raised wood panelling on the sides and back, a stainless steel front return, steel kick plates and reveals, and stainless steel ceilings with recessed lighting. The cabs may be considered to be in excellent condition.

The elevator system is equipped with automatic emergency recall, in-car emergency service operation and emergency power operation. Note these features were not tested in the course of our on site study.

In general, the elevators were found to be installed in conformance to applicable codes and to generally accepted industry practice

3.0 MAINTENANCE

The elevators are maintained by ThyssenKrupp Elevator. Although we were not provided with a copy of the maintenance contract, we assume work is completed under the terms of ThyssenKrupp's standard full-service preventive maintenance contract.

Standard Maintenance Control Program (MCP) logs are being utilized by ThyssenKrupp Elevator (TKE) as opposed to elevator specified logs. This is acceptable only if all non-applicable tasks are clearly blanked or crossed out throughout the entire log. It appears that some applicable tasks have been marked as N/A in the MCP logs. TKE should thoroughly review each line item to ensure all required tasks are being performed.

The maintenance contractor's completion of the machine-room safety-work logs is complete and current. The logs are used in the Province of Ontario in order to document safety work completed on elevator installations. The applicable legislation puts the onus of completion of the logs on the property.

Monthly Maintenance: 2014 Missed: April, May, June, August, September, October, December.

2015 Missed: January, March, April, May, July.

Annual Maintenance: Completed in July 2015 & November 2014

Fire Emergency: Performed July 2014, now overdue.

60 Month Maintenance: Completed November 2011

3.1 Maintenance Deficiencies

The deficiencies noted below should be corrected by the maintenance contractor under the terms of a standard full maintenance contract, at no additional cost.

1. Verify completion of Phase I and Phase II Fire Service operation and record in log book.

2. Provide monthly maintenance as a minimum.

3. Complete entries in call back log as required by Provincial Regulations.

4. Complete entries of preventive maintenance undertaken beyond basic safety tasks (i.e. oil changes, rope tensioning, etc.)

Maintenance deficiencies contd:

5. Clean the bottom of the controllers.

6. Monitor governor rope #1 for loss of diameter due to rouging.

7. Provide replacement dates for the batteries in the controllers.

8. Adjust controller to reduce change in acceleration measured as jerk and shown in the table enclosed for car #2.

4.0 COMPLIANCE TO CAN/CSA-B44-10 SAFETY CODE FOR ELEVATORS

The elevators were installed in compliance with the then-existing Safety Code For Elevators. Since the date of installation, there have been some revisions to the Code. Listed below are some readily-identifiable variances relating to the current code for newly installed and modernized elevators. The Code is not retroactive, unless mandated by Director's Ruling, therefore compliance with these items is not mandatory. However, they are listed here as an option to improve the safety of the existing elevators.

1. Provide GFIC protected power outlets in machine room, pits, car top station and under car work station.

2. Provide cab key functions including keyed stop switch and lighted alarm button grouped per Code.

3. Provide guarded, florescent lighting, 100Lux in pit and 200Lux in machine room.

5.0 PERFORMANCE DATA

The performance parameters defined on the following page below were measured. Any found not to reasonably fall within the normal range of values are listed as deficiencies in Section 3 of this report.

Table 1 - ELEVATOR PERFORMANCE DATA

PARAMETER	REQUIRED	ELEV. 1	ELEV. 2	ELEV. 3	ELEV. 4
Car speed UP:	500 fpm ±5%	494	496	494	497
Car speed DOWN:	500 fpm ±5%	495	495	494	503
Flight time UP:	≤11.5 sec	13.1	13.3	12.6	12.8
Flight time DOWN:	≤11.5 sec	13.4	12.9	12.6	13.3
Average Accel. UP:	0.06 g	0.06	0.06	0.07	0.07
Maximum Jerk:	≤8 f/s_3	6.8	17.3	6.3	9.0
Door time out:	20 sec	20	21	20	21
Door stall force:	≤ 30 lbs	26	24	23	24

Table Definitions

Car Speed:
The normal maximum running speed of the elevator, measured in both the up and down directions. The measured value is compared to the design speed of the elevator system.

Flight Time:
The time elapsed for an elevator to serve two consecutive floors, in either the up or down direction, measured from the time the elevator doors begin to close until they are 3/4 open at the next floor. The flight time measurement is compared to a maximum suggested value which is determined by parameters such as car speed, elevator door type and building floor heights.

Average Acceleration:
The average acceleration experienced in the car when approaching top speed. The acceleration measurement is compared to a suggested value which is dependent on the type of elevator system - hydraulic, geared or gearless.

Maximum Jerk:
The maximum change in acceleration experienced in the car over the ride including start, acceleration, deceleration and stop. The Jerk measurement is compared to a suggested value which is dependent on the type of elevator system - hydraulic, geared or gearless.

Door time-out:
The time elapsed from the initiation of a door re-open cycle until the time any light activated door protection device times itself out. The door time-out setting should be 20 seconds.

Door Stall Force:
The force exerted by the elevator car door, during a door close cycle but after the door has been manually brought to a stop. The force is measured while the door is approximately 1/3 closed. The measured force is compared to the maximum force allowed by The CSA Safety Code For Elevators.

6.0 COST DISCUSSION AND RECOMMENDATIONS

Short Term

The deficiencies noted in section 4 of this report be forwarded to the maintenance contractor for their corrective action.

Now at an age of 9 years, the existing motor control equipment is current technology and well within the engineered life expectancy of this type of equipment. Based on their vintage and method of control, other than correcting maintenance deficiencies outlined in the report, we would not recommend any major upgrades in the short term.

Equipment Guarding
The Ministry of Labour (MOL) in Ontario has increased its roster of field inspectors resulting in increased attention on elevator machine rooms. Reliance upon a locked elevator machine room door or restricted access policy is no longer considered sufficient safeguard against the hazards presented by unguarded elevator machinery.

Regardless of a building's age or function the elevator machine room equipment requires guarding to OHSA standards, in the view of MOL. This standard exceeds the usual guarding provided on even new projects by the elevator industry and as accepted by the elevator safety authority - The TSSA. There is no specific deadline for conformance and appears to be little active enforcement of the standard, however we would caution building owners that non-conformance represents increased liability in case of an injury sustained in the elevator machine room. Guarding of elevator machine room hazards to OHSA / MOL standards and including the required TSSA paperwork is likely to cost $7,500 per elevator.

Long Term

As almost all of the major components of the existing elevator system are covered under typical full parts and labour maintenance program, there should be no major capital expenditures to replace or repair these components assuming such a contract exists. Notable exceptions are vandalism and replacement of obsolete parts. Another common source of extra costs occurs when one maintenance contractor's services are terminated by the property owner (or the contractor themselves terminate their contract). This can lead to the new contractor requiring extras to the monthly maintenance fee to cover major components left in poor condition by the outgoing contractor. Vigilant ongoing policing of the performance of the maintenance contractor is an effective method of avoiding this source of extra costs.

If these elevators are properly maintained under the terms of full maintenance contract, they should continue to operate in a safe and acceptable manner for approximately another thirteen to fifteen years. At such time the existing drive control system, machines and controllers may require replacement.

A full modernization would cost approximately $ 170,000 per elevator (total $680,000). We recommend that any handicapped accessibility upgrading and complying with the previously noted B44 Code upgrades be carried out in conjunction with a complete modernization of these elevators to eliminate redundancy and minimize the elevator "down time".

Upon completion of a major modernization, the elevator system should provide reliable elevator service for an additional twenty to twenty five years.

Periodically the Technical Standards and Safety Authority dictates remedial work that must be carried out on various types of elevator. As these rulings become enforced, the cost to ensure the elevator comply with the rulings is the responsibility of the Co-operative. A contingency fund of $ 5,000.00 every five years should be established to cover the cost of any future mandatory work.

Our past experience dictates that consideration should be given to having a long term preventative maintenance program specified and included in the elevator modernization tender document. This will ensure a competitive maintenance price at the front end of the project in lieu of the installation contractor requesting a premium at the end of the warranty period due to the proprietary nature of the equipment (ie. no other contractors are able to successfully maintain the installed control equipment).

7.0 PROJECTED CAPITAL COST TABLE

Year / Predicted Work	1-5	6-10	11-15	16-20	21-25	26-30
Future mandatory work required by B44 Safety Code	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Complete modernization of existing elevators including B44 Code upgrades and cab interiors			$680,000			
Upgrade of cab interior finishes (discretionary)			$ 56,000			

Notes of Costs: HST not included;
Based on year 2015 dollars;
Work not the responsibility of the elevator trade not included.

- end of report -

APPENDIX B

PHOTOGRAPHIC RECORD

Photo 1

General view of the OCSCC 769.

Photo 2

Example of bubbling paint on a pre-finished aluminum guardrail.

Photo 3

Example of balcony guardrail missing paint due to corrosion.

Photo 4

Balcony guardrail example showing peeling paint, corrosion and a cracked member.

Photo 5

The guardrail bracket appears to be corroded and cracked, at Unit 505.

Photo 6

Example of water damage on the ceiling on level P1, Spot 54.

Photo 7

Water leak in overhead insulated pipe on level P1, near Spot 68.

Photo 8

Example of cracking with possible water penetration on P1 level, Spot 21.

Photo 9

Example of a vertical crack and water penetration through the parking
lot wall on level P2, at Spot 106.

Photo 10

Example of unknown brown staining on a parking garage column, P1 level Spot 20.

Photo 11

On level P1, under fan EF-4 some water damage is visible.

Photo 12

On P1 level, under fan EF-5 some water damage is visible.

Photo 13

Example of missing caulking around the bottom of parking garage columns.

Photo 14

Example of brick efflorescence that was observed at the balcony of Unit 1804.

Photo 15

Caulking missing from penetrations at mechanical penthouse walls.

Photo 16

Example of water staining, observed at Unit 1402.

Photo 17

Example of deteriorated caulking outside of the subject property.

Photo 18

At Unit 1802, caulking deteriorating underneath a balcony door.

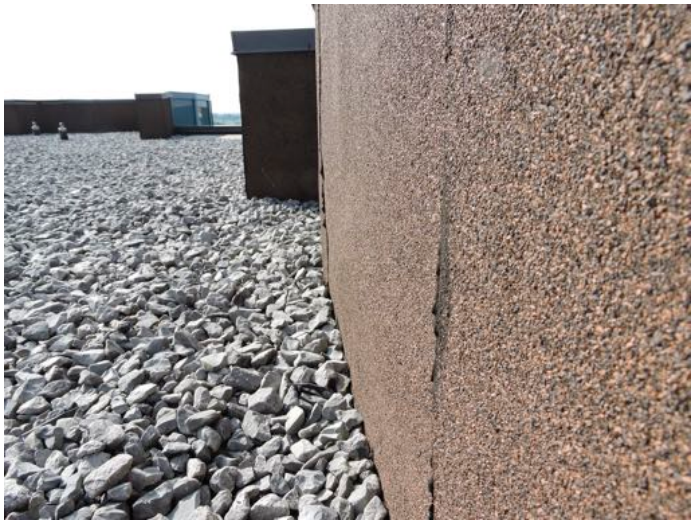


Photo 19

Parapet membrane is not adequately adhered.

Photo 20

Example of staining on the mechanical penthouse metal walls.

Photo 21

Another example of staining on the metal walls of the mechanical penthouse.

Photo 22

Exhaust stack from HW BOILER #1 appears to have leaks near the roof.

Photo 23

Reflective membrane on roof top chiller is poorly attached.

APPENDIX C

NOTICE OF FUTURE FUNDING TO THE RESERVE FUND

NOTICE OF FUTURE FUNDING OF THE RESERVE FUND
(under subsection 94(9) of the *Condominium Act, 1998*)

Condominium Act, 1998

TO: All owners in Ottawa Carleton Standard Condominium Corporation NO. 769

The board has received and reviewed a Reserve Fund Study dated January 18, 2016 prepared by Buchan, Lawton, Parent Ltd and has proposed a plan for the future funding of the reserve fund that the board has determined will ensure that, in accordance with the regulations made under the *Condominium Act, 1998,* the reserve fund will be adequate for the major repair and replacement of the common elements and assets of the corporation.

This notice contains:

1. A summary of the Reserve Fund Study.
2. A summary of the proposed funding plan.
3. A statement indicating the areas, if any, in which the proposed funding plan differs from the reserve fund study.

At the present time the average contribution per unit per month to the reserve fund is $158.08. Based on the proposed funding plan, total average contribution per unit per month for the first three years will be $162.03, $166.08, and $170.24 (which is an average increase in contribution per unit per month of $0.00, $3.95, and $4.05 for the first three years).

The proposed funding plan will be implemented beginning on _____.

Dated this _____ day of _____.

Ottawa Carleton Standard Condominium Corporation NO. 769

.....
(signature)

.....
(print name)

.....
(signature)

.....
(print name)

(Affix corporate seal or add a statement that the persons signing have the authority to bind the corporation).

SUMMARY OF RESERVE FUND STUDY

The following is a summary of the Reserve Fund Study dated January 18, 2016, prepared by Buchan, Lawton, Parent Ltd for Ottawa Carleton Standard Condominium Corporation NO. 769 (known as the Reserve Fund Study).

Subsection 94(1) of the *Condominium Act, 1998*, requires the corporation to conduct periodic studies to determine whether the amount of money in the reserve fund and the amount of contributions collected by the corporation are adequate to provide for the expected costs of major repair and replacement of the common elements and assets of the corporation. As a result, the corporation has obtained the Reserve Fund Study.

The estimated expenditures from the reserve fund for the next thirty (30) years are set out in the CASH FLOW TABLE. In this summary, the term "annual contribution" means the total amount to be contributed each year to the reserve fund, exclusive of interest earned on the reserve fund. The recommended annual contribution for first year is $273,163, based on the estimated expenditures and the following:

Estimated Reserve Fund Opening Balance (June 30, 2012)	$1,183,000.00
Minimum Reserve Fund Balance (as indicated in this table):	$135,826.28
Assumed Annual Inflation Rate for Reserve Fund Expenditures:	2.5%
Assumed Annual Interest Rate for interest earned on the Reserve Fund:	2.5%

The Reserve Fund Study can be examined upon written notice to the corporation's property manager at:

Management Office
3580 Rivergate Way
Ottawa, Ontario
K1V 1V6

Upon receipt of written notice, reasonable arrangements will be made for the examination of the Reserve Fund Study and/or provision of a copy of the study (at the cost of the recipient).

CASH FLOW TABLE
(Future Dollars)

Year	Opening Balance (Future Dollars)	Recommended Annual Contribution	Annual Contribution Already Allocated as of June 30, 2012	Estimated Inflation Adjusted Expenditures	Estimated Interest Earned	Percentage Increase in Recommended Annual Contribution	Closing Balance (Future Dollars)
2015	$1,183,000	$273,163	-$182,108	$111,500	$29,575	2.5%	$1,283,183
2016	$1,283,183	$279,992	- -	$199,875	$32,080	2.5%	$1,395,380
2017	$1,395,380	$286,992	- -	$288,922	$34,884	2.5%	$1,428,334
2018	$1,428,334	$294,167	- -	$69,459	$35,708	2.5%	$1,688,750
2019	$1,688,750	$301,521	- -	$18,765	$42,219	2.5%	$2,013,724
2020	$2,013,724	$309,059	- -	$242,687	$50,343	2.5%	$2,130,439
2021	$2,130,439	$316,785	- -	$210,484	$53,261	2.5%	$2,290,001
2022	$2,290,001	$324,705	- -	$115,303	$57,250	2.5%	$2,556,654
2023	$2,556,654	$332,823	- -	$67,500	$63,916	2.5%	$2,885,893
2024	$2,885,893	$341,143	- -	$57,573	$72,147	2.5%	$3,241,611
2025	$3,241,611	$349,672	- -	$432,669	$81,040	2.5%	$3,239,655
2026	$3,239,655	$358,414	- -	$443,485	$80,991	2.5%	$3,235,574
2027	$3,235,574	$367,374	- -	$454,572	$80,889	2.5%	$3,229,265
2028	$3,229,265	$376,558	- -	$465,937	$80,732	2.5%	$3,220,618
2029	$3,220,618	$385,972	- -	$477,585	$80,515	2.5%	$3,209,521
2030	$3,209,521	$395,621	- -	$529,063	$80,238	2.5%	$3,156,317
2031	$3,156,317	$405,512	- -	$542,290	$78,908	2.5%	$3,098,447
2032	$3,098,447	$415,650	- -	$555,847	$77,461	2.5%	$3,035,711
2033	$3,035,711	$426,041	- -	$569,743	$75,893	2.5%	$2,967,901
2034	$2,967,901	$436,692	- -	$583,987	$74,198	2.5%	$2,894,804
2035	$2,894,804	$447,609	- -	$1,016,434	$72,370	2.5%	$2,398,349
2036	$2,398,349	$458,800	- -	$1,041,845	$59,959	2.5%	$1,875,263
2037	$1,875,263	$470,270	- -	$1,067,891	$46,882	2.5%	$1,324,524
2038	$1,324,524	$482,026	- -	$1,094,588	$33,113	2.5%	$745,075
2039	$745,075	$494,077	- -	$1,121,953	$18,627	2.5%	$135,826
2040	$135,826	$506,429	- -	$483,138	$3,396	2.5%	$162,513
2041	$162,513	$519,090	- -	$495,216	$4,063	2.5%	$190,449
2042	$190,449	$532,067	- -	$507,597	$4,761	2.5%	$219,681
2043	$219,681	$545,369	- -	$520,287	$5,492	2.5%	$250,255
2044	$250,255	$559,003	- -	$533,294	$6,256	2.5%	$282,220

SUMMARY OF PROPOSED PLAN FOR
FUTURE FUNDING OF THE RESERVE FUND

The following is a summary of the board's proposed plan for the future funding of the reserve fund.

The Board of Ottawa Carleton Standard Condominium Corporation NO. 769 has reviewed the Reserve Fund Study dated January 18, 2016, prepared by Buchan, Lawton, Parent Ltd for the corporation (known as the "Reserve Fund Study") and has proposed a plan for the future funding of the reserve fund that the board has determined will ensure that, in accordance with the regulations made under the *Condominium Act, 1998,* the reserve fund will be adequate for the major repair and replacement of the common elements and assets of the corporation.

The Board has adopted the funding recommendations of the Reserve Fund Study and will implement them as set out in the Contribution Table.

The total annual contribution recommended under the proposed funding plan for the current fiscal year is $273,163, which is the same amount that has already been budgeted.

CONTRIBUTION TABLE

*the term “annual contribution” means the amount to be contributed each year to the reserve fund from the monthly common expenses.

Year	A Annual Contribution *	% Increase Over Previous Year	B Other Contribution (e.g. special assessment, loan)	A + B Total Contribution Each Year to Reserve Fund
2015	$273,163	2.5%		$273,163
2016	$279,992	2.5%		$279,992
2017	$286,992	2.5%		$286,992
2018	$294,167	2.5%		$294,167
2019	$301,521	2.5%		$301,521
2020	$309,059	2.5%		$309,059
2021	$316,785	2.5%		$316,785
2022	$324,705	2.5%		$324,705
2023	$332,823	2.5%		$332,823
2024	$341,143	2.5%		$341,143
2025	$349,672	2.5%		$349,672
2026	$358,414	2.5%		$358,414
2027	$367,374	2.5%		$367,374
2028	$376,558	2.5%		$376,558
2029	$385,972	2.5%		$385,972
2030	$395,621	2.5%		$395,621
2031	$405,512	2.5%		$405,512
2032	$415,650	2.5%		$415,650
2033	$426,041	2.5%		$426,041
2034	$436,692	2.5%		$436,692
2035	$447,609	2.5%		$447,609
2036	$458,800	2.5%		$458,800
2037	$470,270	2.5%		$470,270
2038	$482,026	2.5%		$482,026
2039	$494,077	2.5%		$494,077
2040	$506,429	2.5%		$506,429
2041	$519,090	2.5%		$519,090
2042	$532,067	2.5%		$532,067
2043	$545,369	2.5%		$545,369
2044	$559,003	2.5%		$559,003

DIFFERENCES BETWEEN THE RESERVE FUND STUDY AND THE PROPOSED PLAN FOR FUTURE FUNDING OF THE RESERVE FUND

The Plan for Future Funding of the Reserve Fund proposed by the Board differs from the Reserve Fund Study in the following respects:

- No differences