

Laviolette

building engineering

**Building Condition
Assessments**

**Reserve Fund
Studies**

**Building Envelope
Investigations**

**Roofing
Investigations**

Remedial Design

**Construction
Inspections**

Technical Audits

Energy Audits

Comprehensive Reserve Fund Study

of

**Carleton Condominium
Corporation No. 81**

Final Report Prepared For

**Carleton Condominium Corporation No. 81
% Mr. John Miles**

**Laviolette Building
Engineering Inc.**
28 Concourse Gate - Unit 2
Ottawa (Nepean), Ontario
Canada K2E 7T7

**Tel: (613) 226-4204
Fax: (613) 226-9514
www.lav-eng.ca**

September 22, 2010

Job No. L1730

EXECUTIVE SUMMARY

Overall, the common elements of CCC 81 are in satisfactory condition and are well maintained. However, substantial replacement work will be required over the next several years, due to normal life cycle renewals of aging common elements.

Based on the predicted expenditures listed in the spreadsheet and the current reserve fund finances, the corporation will need to increase reserve fund contributions next year to pay for all foreseeable expenditures over the 30-year horizon of this Study. As such, we recommend that annual contributions be increased from \$196,000 in 2010 to \$215,000 in 2011. After 2011, only annual inflationary increases should be required to pay for all anticipated reserve fund expenditures over the next 30 years and beyond.

The following table lists the major common element renewal work scheduled for completion over the next 30 years, not including minor repairs and allowances for contingencies, elevators, common equipment furnishings, exterior painting and staining.

<u>Item Description</u>	<u>Projected Years of Work</u>
Lobby Refinishing	2011
Corridor Pressurization Fan	2013
Wall Exhaust Fans	2013
Electrical 1 Room Exhaust Fan	2013
Laundry Exhaust Fan	2013
Laundry Exhaust Fan Motor	2013
Fire Alarm Panel & Annunciator	2013
Garage Unit Heaters	2013
Door Entry System	2013
Elevator Modernization	2013
Asphalt Pavement	2014
Swimming Pool Coating	2014
Various Exhaust Fans Motors	2014
Windows	2015 to 2018
Sliding Glass Patio Doors	2015 to 2018
Interior Carpet	2015
Ceramic Tile	2015
Vinyl Tile	2015
Corridor Pressurization Fan Motor	2015
Garage Exhaust Fan Motor	2015
Mechanical Penthouse Exhaust Fan	2015
Chiller Room Exhaust Fan	2015
Elevator Room Exhaust Fan	2015
Chilled Water Circulation Pumps	2015
Fan Coil Unit - Main Lobby	2015
Electrical Distribution	2016
Overhead Garage Doors	2018
Apartment Roof System	2019
Swimming Pool Roof System	2019
Parking Garage Ramp	2020
Visitor Parking Traffic Membrane	2020
Metal Siding	2020
Main Entrance Doors	2020

Swimming Pool Metal Roof System	2020
Jockey Pumps	2020
Garage Exhaust Fan	2020
Chilled Water Circulation Pump Motor	2020
Pool Circulation Pump	2020
Pool Filter	2020
Balcony Waterproofing	2021 to 2022
Exterior Caulking	2021 to 2022
Overhead Garage Doors	2022
Wallpaper	2023
DHW Circulation Pump Motor	2024
DCW Booster Pump Motor	2024
Parking Garage Traffic Membrane	2025
Metal Service Doors	2025
Elevator Sump Pump Motor	2025
DHW Boiler	2025
Barrier-Free Automatic Door Operators	2025
Swimming Pool Coating	2029
Grounds Lighting	2030
Pavers	2030
Parking Garage Roof Membrane	2030
Metal Railings	2030
Unit Entrance Doors	2030
Interior Carpet	2030
Standpipe Booster Pump	2030
Garage Exhaust Fan Motor	2030
Corridor Pressurization Fan Motor	2030
Dehumidifier	2030
Chiller	2032
Cooling Tower	2032
Overhead Garage Doors	2033
DHW Circulation Pump	2034
DCW Booster Pump	2034
Visitor Parking Traffic Membrane	2035
Balcony Waterproofing	2036 to 2037
Balcony Guard Rails	2036 to 2037
Exterior Caulking	2036 to 2037
Overhead Garage Doors	2037
Electrical 2 Room Exhaust Fan	2037
Corridor Pressurization Fan	2038
Fire Alarm Panel & Annunciator	2038
Emergency Power Generator c/w ATS	2038
Garage Unit Heaters	2038
Asphalt Pavement	2039
Parking Garage Traffic Membrane	2040
Elevator Sump Pump	2040
Elevator Sump Pump Motor	2040
Jockey Pumps	2040
Pool Filter	2040
Barrier-Free Automatic Door Operators	2040

All of the above major capital expenditures reflect normal replacement of common elements as they age.

CONTENTS

1.	INTRODUCTION	1
2.	DESCRIPTION OF COMPLEX	1
3.	DESCRIPTION OF WORK ACTIVITIES	2
3.1	Review of Background Information	2
3.2	Condition Assessment and Forecasting of Renewal Work	2
3.3	Calculation of Repair and Replacement Costs	2
3.4	Development of the Spreadsheet	3
3.5	Assumptions and Limitations	4
4.	FINDINGS AND RECOMMENDATIONS	5
4.1	Site Services	5
4.2	Parking Garage	7
4.3	Asphalt Pavement & Exterior Concrete	8
4.4	Landscaped Grounds	9
4.5	Foundation Walls	10
4.6	Balconies & Railings	10
4.7	Exterior Building Cladding	11
4.8	Exterior Painting & Caulking	12
4.9	Windows & Doors	13
4.10	Apartment & Penthouse Roofs	14
4.11	Swimming Pool	15
4.12	Interior Finishes	16
4.13	Mechanical & Electrical Systems	17
4.14	Elevator Systems	19
4.15	Contingencies	19
4.16	Engineering Fees	20
4.17	Reserve Fund Study Updates	20
5.	CONCLUSIONS & SUMMARY COMMENTS	20
	APPENDIX A: SUMMARY OF LIFE EXPECTANCIES AND COSTS	A1
	APPENDIX B: MECHANICAL & ELECTRICAL REPORT	B1
	APPENDIX C: ELEVATOR SYSTEMS REPORT	C1
	APPENDIX D: RESERVE FUND STUDY SPREADSHEET	D1

1. INTRODUCTION

This Reserve Fund Study is a technical and financial assessment of the common elements of the condominium corporation for the purpose of:

- assessing the condition of the common elements
- forecasting and planning for major capital expenditures over the short and long term
- recommending annual reserve fund appropriations.

In this Reserve Fund Study, we outline our findings regarding the current condition and immediate maintenance and repair requirements for all of the common elements. In addition, we outline the repair and replacement work that we expect will be required over the 30-year period that we examine in this report, including all associated costs. Included in the repair/replacement data is an inventory of the quantities of all common elements that will be subject to replacement work over the life of the corporation. Finally, all anticipated expenditures over the next 30 years are outlined in a detailed spreadsheet, and we provide our recommendation for annual reserve fund appropriations. While this report includes our recommendations for the timing of repair/replacement work and for annual reserve fund contributions, these decisions are ultimately made by the Board of Directors of the condominium corporation.

2. DESCRIPTION OF COMPLEX

Carleton Condominium Corporation No. 81 is a 35-year old, 94-unit, 14-storey residential condominium apartment building located at 370 Dominion Avenue, in Ottawa, Ontario. The building structure consists of reinforced concrete slabs, shear walls, foundation walls, columns and footings. The building includes two levels of above grade parking and an indoor swimming pool. The area above the parking garage roof and swimming pool roof is landscaped and protected by a waterproof membrane system. The exterior facades of the building consist of precast concrete panels with steel stud back up walls, aluminum windows and sliding glass patio doors. The residential condominium apartment building and penthouse roofs are protected by inverted waterproof membrane systems. The building also includes concrete balconies with steel guard rails.

The building's services include the typical provisions for electricity, heating and ventilation, communications, and life safety systems. In addition, the building contains two elevators. The building is also equipped with various service, storage and amenity rooms, such as the mechanical and electrical rooms, mail room, storage rooms, garbage/recycling room, laundry room, male and female sauna's, party room, male and female change rooms, swimming pool, and a library. The main entrance vestibule walls are finished with wood slats and the floors are finished with ceramic tile. The ground floor lobby floors are finished with carpet, the ceilings are finished with wood slats, and the walls are finished with wood slats and wallpaper. Typical corridors which provide access to units, are finished with carpet, wallpaper and stipple finish ceilings.

The common property elements also include all site services (such as water supply, electrical supply, sewer systems), landscaped elements such as interlocking paver stone, exposed aggregate stone, precast concrete stone, exposed aggregate stone planters, asphalt pavement, exterior concrete at visitor parking, a pergolla and a brick masonry barbeque.

3. DESCRIPTION OF WORK ACTIVITIES

3.1 Review of Background Information

The first step of a Reserve Fund Study is to become familiar with the complex, and reviewing all available background information about the corporation is a key part of this first step. Before each project begins, we review (as applicable) all drawings and specifications, the current budget, the Auditor's Reports from past years, the past Reserve Fund Study (if one exists), past consultants' reports prepared over the previous several years, the corporation's Declaration and By-laws, warranties for repair and replacement work completed, the repair and maintenance schedule and records, any lists that the Board may have prepared regarding concerns and/or planned repair/replacement work.

3.2 Condition Assessment and Forecasting of Renewal Work

After the background information is reviewed, we carry out visual inspections of readily accessible common elements. The main purpose of the site inspections is to determine the current condition of the common elements. Assessing the current conditions leads directly to determining the maintenance, repair and replacement work that will be required in the near future. In addition, the site assessment of the common elements provides key information regarding when repair and replacement work will be required over the medium to long term. Such information could include the type and quality of materials, the quality of maintenance, the past rate of deterioration, and the expected rate of deterioration in the future. Together, this information enables us to predict approximately when future repair and replacement work will be required. In addition to assessing when work will be required, the site inspections help establish what type of work will be required, what special conditions will affect the work, and how much the work should cost.

3.3 Calculation of Repair and Replacement Costs

After determining the major repair and replacement work to be required over the next 30 years, next we estimate the costs of all projected work. After determining the nature of each work item, the next step is to take an inventory of the common elements. This inventory work is accomplished by measuring the quantities of the common elements using the drawings and, where necessary, by taking site measurements. For each type of renewal work that is forecasted, the total quantity of the common element is determined (such as area of roofing or siding) so that the total value of this element can be determined later. For an Updated Study, the majority of the quantities would have been determined during completion of an earlier Study, so an Updated Study normally will require quantity calculations only for new findings and recommendations.

Once the type and quantities of the renewal work are known, the last step is to calculate the costs of all renewal work. For most items, the total construction costs are determined by multiplying the total quantity of the element by the expected unit price for the work of concern. For example, if the area of flat roofing at the corporation is 200 m² and the typical unit price for flat roof replacement is \$150/m², then the total estimated costs for flat roof replacement will be \$30,000. While this seems simple, the key part of reliable cost estimation is that the unit price must be an accurate reflection of what the costs will be for the particular work of concern and at that particular condominium corporation.

To ensure that the unit prices used in the calculations are appropriate, we compare the work at the complex to a data base listing of unit prices that we have compiled from many projects that we have been involved with over several years of experience. This list was compiled, and is regularly updated, using actual contract prices and job specific cost estimates for all types of work that are typically required at a condominium complex. If there is a unique type of repair work for which costs must be estimated, we determine the general nature of the work and employ the assistance of an experienced contractor to estimate the costs of the work that we have laid out. Often, estimates are obtained from two or three contractors to ensure that the estimate is reliable.

All major capital expenditures outlined in the spreadsheet are estimated according to the current year's costs. In addition, all budget estimates account for HST at its current rate.

3.4 Development of the Spreadsheet

The main purpose of the spreadsheet is to determine the recommended annual contributions that should be made to the reserve fund. The spreadsheet assists with this recommendation by providing a vehicle for which all important data can be combined into a calculation of all future costs and contributions.

Reserve Fund Data and Calculations:

The first step in preparing the spreadsheet is to enter all startup financial information, such as year reserve fund balance and the current annual contributions. Since the spreadsheet also requires an amount input as the recommended future contributions, we set that amount to equal the current contributions; simply as an initial trial figure.

Next, we input all budgeted expenditures into the spreadsheet, with each figure placed according to the work to be performed and the year the work is expected to be required. To make the spreadsheet easier to follow, all costs included in the spreadsheet are in today's dollars, with inflation accounted for only after the total yearly expenditures are calculated. (The figure below the first double-line is the total yearly expenditures before inflation, while the next figure down is the total after accounting for inflation.)

With the above data entered, the formulae within the spreadsheet automatically calculate the cash flow for the corporation. For each year, the total amount of money remaining in the reserve fund is shown in two ways. The second figure from the bottom is the amount remaining in future dollars - that is, the "actual" amount remaining in that year if all assumptions are correct. To relate all of these figures to today's value of the funds, the bottom figure represents today's equivalent of that future amount, with inflation removed. (The earned interest for each year is calculated in an iterative way by applying the interest rate to the average reserve fund balance over each year.)

As stated previously, the current contributions are first tried as the future contributions. If this funding level results in sufficient funds to cover all anticipated expenditures, then contributions do not need to be increased. Where sufficient funds do not exist using the current contribution level, then the contributions must be increased to a level that does cover all anticipated costs. Sometimes contributions are immediately increased to the required level, while in other cases the increase may be phased in over a few years.

Often a situation occurs where the contribution level is adequate, on average, but there are certain years when there are insufficient funds. In such cases, priorities have to be established that results in some work being delayed until there will be sufficient funds to pay for the work, but without increasing funding levels further. In extreme cases, the corporation may be significantly short of funds and the only way to raise such funds in time is to recommend a special assessment. While a special assessment is a last resort, it is sometimes required. As with phasing in increases in contributions, it is sometimes possible to levy a special assessment that is collected gradually over a few years.

Explanation of Inflation and Interest Rates:

To ensure that the recommendation for annual contributions is as reliable as possible, inflation and earned interest are accounted for in the spreadsheet. While inflation rates over the past generation have been erratic, inflation has remained in the two per cent range for the past decade. This 2% range for inflation is in line with the historically low inflation rates which existed prior to the 1970's, but there is no guarantee that inflation rates will stay at these low levels. (Inflation in Ontario currently is greater than 2%). Because the current inflation rate is fairly low, the rate is expected to stay fairly low for at least a few years, and because historically inflation has been low, we assume an inflation rate of 2.5% for use in the spreadsheet.

Interest is accounted for in the spreadsheet because unused reserve funds are invested, earning interest that is added to the reserve fund. The Condominium Act requires that interest and other income earned by the reserve fund be deposited to the reserve fund. In keeping with the above principal of assuming that current rates will continue for some time, we typically assume an interest rate of 3.0%. This interest rate is based on the assumption that the reserve funds will be kept in secure, easily accessible investments that do not earn high rates of return compared to higher risk investment instruments.

While inflation and interest rates of 2.5% and 3.0% may not apply over the long term, or may not even reflect the exact conditions that exist today, these rates are reasonable average assumptions for this Reserve Fund Study. First of all, this Reserve Fund Study should be updated regularly, so the current rates will likely be close to the actual rates for at least the next few years. Furthermore, the most important rate of concern is the "real interest rate", that is the difference between the interest rate and the inflation rate. For the spreadsheet in this Reserve Fund Study, the real interest rate is 0.5%. As inflation increases, interest rates usually increase by a greater rate (if the higher inflation rate holds for a significant length of time), thereby increasing the real interest rate. Therefore, a real interest rate of 0.5% (based on 2.5% inflation and 3.0% interest) should be conservative over the long term. While the actual rates will inevitably differ from those used in the spreadsheet, these differences should not adversely affect the reserve fund planning.

3.5 Assumptions and Limitations

This report is based only upon visual inspections and a review of the available background information. No quantitative performance testing of any kind has been performed. Therefore, no review has been made regarding the specific performance level of the common elements, or whether individual building elements meet the Ontario Building Code requirements that applied at the time of construction. Furthermore, it is important to note that the review of drawings is not a review of the project design.

Because of the above limitations of this study, the accuracy of the findings, cost estimates, repair forecasts, life expectancy projections, and our recommendations are limited to the information available at the time of preparing this report. In addition, the timing and costs for all expenditures are based on the assumption that all common elements will be well maintained over the life of the corporation and that all elements will perform according to normal standards. If the complex is not well maintained, the corporation is likely to suffer reduced building element performance and life expectancy, thereby increasing and accelerating repair and replacement costs.

4. FINDINGS AND RECOMMENDATIONS

In this section of the report, we outline our findings and recommendations regarding the common elements, with each category of common element discussed within separate subsections. Specifically, each subsection outlines the following information about the common elements:

- findings regarding their current condition
- quantities (as appropriate)
- description of the expected repair and replacement work that will be required
- estimates of when repair and replacement work will be required
- estimates of the costs of repair and replacement work
- advice regarding general repair or replacement procedures that should be followed.

4.1 Site Services

Section Highlights	Items Included: · storm sewers, sanitary sewers, supply of all utilities · grounds lighting and exterior lighting					
	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
Item Description			Year	Costs	Year	Costs
Catch basins, Sewer Covers	Satisfactory	Repairs/adjustments included in costs of related renewal work.				
Sewers & Utilities	Good	No major repairs expected during life of complex.				
Grounds Lighting	Satisfactory	9 light standards (4 at grounds & 5 at podium deck)	as required using annual operating budget		2030	\$4,000
Exterior Lighting	Good	6 wall mounted	as required using annual operating budget			

The major site services contained within the limits of the corporation's property include the supply of all utilities as well as the storm and sanitary sewer systems. These elements should last the life of the complex (i.e. more than 60+ years) without any major repair or replacement work, so no costs are budgeted specifically for these elements during the 30-year period examined in the spreadsheet. However, the sewers should not be ignored based on the assumption that no problems will develop, since minor sewer problems are not completely uncommon. Instead, the sewer system should be inspected periodically using a remote camera to ensure that everything is functioning properly, and to ensure that minor sewer problems that could develop are detected early, so that major problems are averted or at least minimized. Since these inspections are maintenance related, they are commonly paid for with funds from the operating annual budget. Therefore, no special budgeting has been made for inspection costs. If the sewer inspections reveal problems, repairs should be carried out or a program of periodic sewer flushing should be implemented.

The grounds light standards are located throughout the landscaped areas and on top of the parking garage podium deck. The grounds lighting can be maintained using funds from the annual operating budget until full replacement is required in about 20 years. Therefore, we recommend replacing the grounds lighting in 2030, in conjunction with the parking garage podium deck renewal. Associated costs for replacing five of the light standards located on top of the podium deck are included with the podium deck renewal costs. The remaining four light standards throughout the grounds should be replaced at the same time, at a cost of around \$4,000.

The exterior lighting is limited to six wall mounted light fixtures located at the parking garage ramp and above the overhead garage doors. Since exterior lighting is limited, repairs and/or renewal to these elements can occur in an ad-hoc manner, as required, using funds from the annual operating budget.

4.2 Parking Garage

Section Highlights	Items Included: · podium roof deck waterproofing system and landscaping · concrete structure · concrete slab waterproofing · entrance ramp asphalt and membrane · metal guard railings					
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Podium Roof Deck Waterproofing System and Landscaping	Satisfactory	1,560 m²	as required using annual operating budget		2030	\$210,000
Concrete Structure	Satisfactory	N/A	as required using annual contingency allowance		N/A	N/A
Concrete Slab Traffic Waterproof Membrane	Fair to Satisfactory	1,850 m²	2010, 2015 2020, 2030 2035	\$10,000 (each time)	2025 & 2040	\$170,000 (each time)
Entrance Ramp Asphalt & Membrane	Satisfactory	290 m²	as required using annual operating budget		2020	\$30,000
Metal Guard Railings	Satisfactory	280 m	as required using annual operating budget		2030	\$40,000

The garage podium roof deck waterproofing membrane system is assumed to be in generally satisfactory condition since it is only 15 years old. Landscaping elements installed over the parking garage roof are also in good condition. Complete renewal of the parking garage roof waterproofing system and all associated landscaping elements should not be required for another 20 years or so. As such, costs for replacement of the garage roof waterproofing system and associated landscaping are budgeted in 2030, at a total cost of \$210,000.

The parking garage's concrete structure is generally in satisfactory condition and should last the life of the complex. However, localized concrete repairs will be required from time to time. As such, we recommend conducting as required maintenance repairs of the concrete structure using funds from the contingency allowance.

The concrete slab traffic waterproofing membrane was replaced in 2005 but the membrane appears to be worn. In addition, localized areas of delaminated concrete or membrane was detected throughout the suspended slab during our chain drag examination. As such, we recommend repairing the delaminated concrete and/or traffic membrane in 2010 at an estimated cost of \$10,000. Repair costs are again budgeted five years later, in 2020, to extend the service life of the membrane. Full replacement of the traffic membrane should be expected around 2025. As such, we have budgeted \$170,000 for this work. Traffic membranes typically provide a reliable service life of 15 years. Therefore, we have budgeted a second renewal in 2040, at the same cost. Associated costs and timing for repairs is repeated after the

membrane renewal in 2025, to account for repair work that may be required in between membrane renewals.

The garage ramp asphalt is generally in satisfactory condition. According to information provided by the corporation, a portion of the ramp is to be repaired this year by the adjacent property due to a broken water main that runs underneath this ramp. The remaining asphalt should continue to provide adequate service life for another 10 years or so, at which time the waterproofing membrane will likely be due for replacement. As such, we have budgeted \$30,000 in 2020, to replace the ramp membrane and asphalt.

The metal guard railings surrounding the perimeter of the podium roof deck are in satisfactory condition and can be maintained until the podium roof deck is replaced in 2030. At which time, we recommend replacing the metal guard railings in conjunction with the podium roof deck, at an estimated cost of \$40,000.

4.3 Asphalt Pavement & Exterior Concrete

Section Highlights	Items Included: · asphalt pavement · concrete patio · visitor parking concrete					
	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
Item Description			Year	Costs	Year	Costs
Asphalt Pavement	Fair	350 m ²	as required using annual operating budget		2014	\$7,000
Concrete Patio	Satisfactory	4 m ²	as required using annual operating budget			
Visitor Parking Traffic Membrane	Satisfactory	150 m ²	as required using annual operating budget		2020	\$14,000

The asphalt pavement associated with CCC 81's property is limited to a small strip of pavement that provides access to the lower parking garage. This pavement is in fair condition and should be replaced within the next five years. As such, we have budgeted \$7,000 in 2014, to reconstruct the pavement. This pavement should then provide about 25 years of service due to its limited use. Hence no funds have been included in the spreadsheet for a following renewal.

There is a small concrete patio located outside of the assistant superintendent's unit, north of the parking garage ramp. The concrete patio is protected with a waterproof membrane which should be replaced every 15 years or so. Funds for membrane renewal and/or miscellaneous concrete repairs should be undertaken from the annual operating budget.

The concrete slab located at the visitor parking area just outside the intermediate level of the parking garage is protected with a waterproofing membrane which was installed in 2007. According to information provided by the corporation, the snow plow has caused damage to the membrane around the catch basin. This damaged membrane should be repaired, as required, using funds from the annual operating budget. After these repairs are performed, the membrane should continue to provide reliable service for another

10 years or so. As such, we have budgeted \$14,000 in 2020, to renew the waterproofing membrane over the visitor parking area.

4.4 Landscaped Grounds

Section Highlights	Items Included: · all landscaped areas of the complex, including drainage patterns, grass and sod areas, unit paver and patio stones, precast planters, wooden park benches and garbage bins, brick masonry barbeque, pergolla and stone ballast					
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Drainage Patterns	Good	No major costs expected during life of complex.				
Grass & Sod Areas	Excellent	N/A	as required using annual operating budget			
Interlocking Unit Pavers	Good	40 m²	as required using annual operating budget		2030	\$4,000
Exposed Aggregate Patio Stone	Good	20 m²	as required using annual operating budget		N/A	N/A
Precast Concrete Patio Stone	Good	260 m²	as required using annual operating budget		N/A	N/A
Precast Planters	Good	3	as required using annual operating budget			
Wooden Park Benches & Garbage Bin	Satisfactory	2 benches 1 bin	as required using annual operating budget			
Brick Masonry Barbeque	Good	1	as required using annual operating budget			
Pergolla	Good	1	included in parking garage podium deck replacement costs.			
Stone Ballast	Good	N/A				
Exposed Aggregate Patio Stone (over parking garage)	Good	5,600 m²				

The landscaped grounds appear to be well maintained and are in generally good condition. Landscape grounds should be maintained regularly using funds from the annual operating budget.

The interlocking pavers located at the main entrance are in good condition and should provide many more years of service before replacement is required. As such, we have budgeted for their replacement in 2030, at an approximate cost of \$4,000.

The exposed aggregate and precast concrete patio stones are in good condition and should last the life of the complex. Associated costs for repairs and/or isolated replacements should be undertaken from the annual operating budget or contingency allowance.

Precast planters, wooden park benches, garbage bins and the brick masonry barbeque are all in good condition and funds for their renewal should be taken from the annual operating budget.

The pergolla, stone ballast and aggregate patio stones located above the parking garage podium deck and will be replaced in conjunction with the parking garage roof membrane renewal. Associated costs for renewing these elements are included with the garage podium roof deck renewal.

4.5 Foundation Walls

Section Highlights		Items Included: · cast-in-place concrete foundation walls				
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Foundation Walls	Satisfactory	N/A	as required using annual operating budget or contingency allowance		N/A	N/A

The building's concrete foundation walls are in generally satisfactory condition. Minor leaks have occurred through some walls but all cracks have been sealed and no active leaks currently exist. Foundation wall repairs should be carried out, as required, using funds from the annual operating budget or contingency allowance.

4.6 Balconies & Railings

Section Highlights		Items Included: · balcony slab waterproofing · guard rails				
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Balcony Slab Waterproofing	Satisfactory	3,000 m ²	as required using annual contingency allowance		2021-2022 2036-2037	\$360,000 (each time)
Guard Rails	Good	1,830 m	as required using annual contingency allowance		2036-2037	\$260,000 (total)

The balcony slabs underwent a major repair program in 2006, that included various concrete repairs and full membrane renewal. With these repairs performed the cast-in-place concrete balconies should continue to provide reliable service for the life of the building. However, localized minor membrane blistering and delaminating was exhibited during our review, and these areas should be repaired using funds from the annual operating budget or contingency allowance. Typically, elastomeric membranes provide about 15 years of reliable service. As such, full membrane renewal is budgeted over two years, in 2021 and 2022, at a total cost of \$360,000. A second membrane renewal is budgeted 15 years later in 2036 and 2037, at the same cost.

A metal balcony guard rail system is present around the outer perimeter of all balconies, installed on top of precast concrete panel cladding. The metal balcony guard rails should last about 50 to 60 years before replacement is required. As such, we recommend conducting the balcony guard rail replacement with the waterproofing replacement in 2036 and 2037. Therefore, \$130,000 is budgeted each year in 2036 and 2037, to replace the balcony guard rail system. In the meantime, these guard rails should be repainted every six years or so, to resist corrosion.

4.7 Exterior Building Cladding

Section Highlights	Items Included: · precast concrete panels · metal siding · louvred vents					
	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
Item Description			Year	Costs	Year	Costs
Precast Concrete Panels	Good	N/A	as required using annual operating budget		N/A	N/A
Metal Siding	Good	290 m ²	as required using annual operating budget		2020	\$40,000
Louvred Vents	Good	24 approx.	as required using annual operating budget			

The precast concrete panels are in good condition and should provide service for many more years. Accordingly, no funds are budgeted in the spreadsheet for significant repairs or precast concrete panel replacement.

Vertical metal siding is present on the exterior elevations of the parking garage and horizontal metal siding is present on the exterior elevation of the rooftop penthouse. The vertical metal siding has been damaged by vehicles at isolated areas, but this minor damage should not decrease its normal service life expectancy of 40 to 50 years. As such, replacement of all metal siding has been budgeted in 2020, at a total cost of \$40,000.

The various louvred mechanical exhaust vents located on the north and south elevations of the building are in good condition and should provide many more years of service before replacement is required. Funds for their renewal can be taken from the annual operating budget.

4.8 Exterior Painting & Caulking

Section Highlights		Items Included: · all exterior painting · all exterior caulking around windows, doors and other elements				
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Exterior Painting	Good	N/A	as required using annual operating budget		2013 & every 6 years	\$35,000 (each time)
Caulking	Satisfactory	4,580 m	2021-2022	\$4,000 (total)	2036-2037	\$56,000 (total)

Exterior painted elements are limited to metal balcony railings, metal garage podium roof deck railings, exterior metal stair systems, exterior concrete, and other minor miscellaneous elements. An allowance of \$35,000 has been budgeted every six years to repaint these elements, starting in 2013.

Most of the exterior caulking is located around windows and doors, and will be renewed in conjunction with the replacement of these elements within the next eight years. The remainder of the caulking should be replaced in conjunction with the balcony waterproofing, in 2021 and 2022, at an estimated cost of \$4,000. Typically, exterior caulking should be replaced every 12 to 15 years or so. As such, we have budgeted \$56,000 for full replacement of all exterior caulking in 2036 and 2037, to coincide with the second balcony waterproofing renewal.

4.9 Windows & Doors

Section Highlights	Items Included: · aluminum framed windows · aluminum framed sliding glass patio doors · aluminum framed storefront entry doors · exterior metal service doors · overhead parking garage doors · unit entrance doors					
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Aluminum Windows	Fair	2,120 m²	as required using annual operating budget		2015-2018	\$1,100,000 (total)
Sliding Glass Patio Doors	Fair	430 m²	as required using annual operating budget		2015-2018	\$220,000 (total)
Aluminum Frame Storefront Entrance Doors	Satisfactory	double set of single doors	as required using annual operating budget		2020	\$15,000
Exterior Metal Service Doors	Good	6 doors	as required using annual operating budget		2025	\$6,000
Overhead Parking Garage Doors	Satisfactory	3 doors	as required using annual operating budget		2018, 2033 2022, 2037	\$15,000 (each time) \$10,000 (each time)
Unit Entrance Doors	Good	94 doors	as required using annual operating budget		2030	\$140,000

All aluminum framed windows are in fair condition and are near the end of their service life. All windows should be replaced within the next eight years, so \$275,000 is budgeted each year from 2015 to 2018, to replace all windows, at a total cost of \$1,100,000.

The sliding glass patio doors are in fair condition and are also near the end of their service life. As such, we have budgeted \$55,000 each year from 2015 to 2018, to replace the patio doors in conjunction with the windows.

The aluminum framed storefront entrance doors are in satisfactory condition and should provide reliable service for another 10 years or so. As such, we have budgeted \$15,000 in 2020, to completely replace the storefront entrance doors.

It is our understanding that the condo has installed new barrier-free entrance door operating systems this year at the main entrance and at the parking garage entrance into the building, and that this work totaled \$16,000. As such, we have included this cost into the spreadsheet.

Metal service doors located throughout the exterior of the building are in good condition and should provide about 50 years of service before replacement is required. As such, we have budgeted \$6,000 for their replacement in 2025.

There are three overhead garage doors that provide access to the parking garage. One large door and one small door were replaced in 2003, and the second large door was replaced in 2007. All doors are operating well and will likely provide a 15-year service life before requiring replacement. As such, we have budgeted \$15,000 in 2018, to replace the large door and small door that were replaced seven years ago, and \$10,000 in 2022, to replace the second large door that was replaced three years ago. The new garage doors will likely provide a service life of 15 to 20 years, after which time replacement of the doors and motors will likely again be required. As such, renewals for these elements are budgeted in 2033 and 2037, at \$15,000 and \$10,000 respectively.

Unit entry doors are solid core wood doors which are in good condition and should provide about 50 years of service before replacement is required. As such, \$140,000 is budgeted for this work in 2030.

4.10 Apartment & Penthouse Roofs

Section Highlights	Items Included: · main roof & penthouse roof systems					
	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
Item Description			Year	Costs	Year	Costs
Main Roof & Penthouse Roof Systems	Satisfactory	1,100 m ²	as required using annual operating budget		2019	\$180,000

The buildings' main roof and penthouse roof systems are comprised of an inverted built-up roof membrane system that is assumed to be in satisfactory condition based on its approximate 16-year age. With continued maintenance, the roof systems should last another ten years or so before replacement is required. Therefore, we have budgeted for replacement of both roof systems in 2019, at an estimated cost of \$180,000.

4.11 Swimming Pool

Section Highlights	Items Included: · swimming pool roof system · swimming pool sloped metal roof system · swimming pool coating					
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Roof System	Satisfactory	150 m²	as required using annual operating budget		2019	\$25,000
Sloped Metal Roof	Satisfactory	50 m²	as required using annual operating budget		2020	\$6,000
Pool Coating	Fair to Satisfactory	120 m²	as required using annual operating budget		2014, 2029	\$50,000 (each time)

The swimming pool roof's system is assumed to be in generally satisfactory condition based on the current age of the system. Landscaping elements installed over the swimming pool roof are in generally good condition. Complete renewal of the swimming pool roof membrane system and all associated landscaping elements will likely be required within the next ten years or so. As such, costs for replacement of the swimming pool waterproofing system and associated landscaping are budgeted in 2019, at a total cost of \$25,000.

The sloped metal roof system above the swimming pool is in satisfactory condition and should last another 10 years or so. As such, we recommend replacing the sloped metal roof in conjunction with the vertical metal siding, in 2020, at an estimated cost of \$6,000.

The swimming pool coating is generally in fair to satisfactory condition and should be replaced within the next five years. As such, we recommend replacing the pool coating in 2014, at an estimated cost of \$50,000. The pool coating should be replaced every 15 years or so, so we have accounted for a second renewal in 2029, at the same cost.

4.12 Interior Finishes

Section Highlights	Items Included: · lobby refinishing, interior painting, acoustical ceiling tile, carpets, tile flooring, wood slats, and wallpaper · amenity room appliances, furnishings and equipment					
Item Description	General Condition	Estimated Quantities	Major Repair		Complete Renewal	
			Year	Costs	Year	Costs
Lobby Refinishing	Satisfactory	N/A	as required using annual operating budget		2011	\$90,000
Interior Painting	Good	N/A	as required using annual operating budget			
Ceiling Tile	Good	100 m ²	as required using annual operating budget			
Interior Carpets	Good	1,200 m ²	as required using annual operating budget		2015, 2030	\$70,000 (each time)
Ceramic Tile	Good	15 m ²	as required using annual operating budget		2015	\$7,000
Mosaic Ceramic Tile	Good	100 m ²	as required using annual operating budget		2015	\$2,000
Vinyl Tile	Good	100 m ²	as required using annual operating budget		2015	\$12,000
Wallpaper	Good	3,660 m ²	as required using annual operating budget		2023	\$90,000 (each time)
Wood Slats	Good	50 m ²	as required using annual operating budget			
Amenity Room Appliances/Furnishing/Equipment	Satisfactory	N/A	2015 & every 10 yrs	\$12,000 (each time)	as required using annual contingency allowance	

The condo has expressed interest in refinishing their lobby within the next two years and have attained an estimate from Suede Contemporary Interiors at a cost of about \$90,000 to perform this work. As such, we have budgeted \$90,000 in 2011, to refinish the lobby.

Interior paint on the walls and ceilings at various amenity rooms is in good condition and funds for repainting can be taken from the annual operating budget.

Acoustical ceiling tile present throughout the party room and ground floor corridor is in good condition. These ceiling tiles should last the life of the building without requiring complete replacement. Isolated broken/stained tiles should be replaced, as required, using funds from the annual operating budget.

The carpets throughout the corridors and amenity rooms are in generally good condition and should provide a service life of 15 years or so. As such, \$70,000 is budgeted in 2015 and 2030 to replace the carpets throughout the corridors and amenity rooms.

Ceramic and mosaic tile, as well as vinyl tile floor exist in limited amenity rooms, and these tiles are in good condition. To minimize replacement costs we recommend replacing all these tiles in conjunction with one another in 2015, at a total combined cost of \$21,000. The ceramic and mosaic tile typically provide a service life of 25 years, so a second renewal is budgeted in 2040, at a total cost of \$9,000. Typically, vinyl tile provides 15 to 20 years of service. However, since this tile does not receive much wear and tear due to its limited use, it should remain satisfactory past its normal service life expectancy. As such, we recommend replacing the vinyl tile in conjunction with the ceramic and mosaic tile in 2040, at a cost of \$12,000.

The interior corridor wallpaper is in good condition and should provide reliable service for another 10 to 15 years. As such, we have budgeted an allowance of \$90,000 in 2023, to replace the existing corridor wall covering with new wallpaper. The new wallpaper should provide 20 years of service before replacement will again be required. This second renewal is expected to occur outside of the 30-year time line of this Study and is not included in the spreadsheet. The interior wallpaper in the swimming pool area is in fair condition and should be replaced sooner using funds from the annual operating budget or contingency allowance.

The wood slats located on the walls and ceiling of the saunas are in good condition and funds for replacing the wood slats can be taken from the annual operating budget.

Various appliances and furnishings, including a refrigerator, stove, couches and chairs, and exercise equipment, including a bicycle and treadmill are present throughout various amenity rooms. An allowance of \$12,000 is included in the spreadsheet every ten years for maintenance and replacement of these appliances, furnishings and equipment.

4.13 Mechanical & Electrical Systems

The building's mechanical and electrical systems were inspected by Levac Robichaud Leclerc and Associates Ltd. and an inventory, condition and replacement costs of all condominium owned mechanical and electrical systems are outlined in Appendix "B", with all costs listed in the reports and included in the spreadsheet. According to the report, all mechanical and electrical systems are in satisfactory condition and no major deficiencies were noted.

As a summary of the costing information included in the mechanical and electrical reports, costs included in the spreadsheet are listed below:

Plumbing & Drainage

- Replacement of elevator sump pump (1 unit) in 2040, at a cost of \$700.
- Replacement of elevator sump pump motor (1 unit) in 2025 and 2040, at a cost of \$300.
- Replacement of DHW boiler (2 units) in 2025, at a cost of \$15,000 each for a total of \$30,000.
- Replacement of DHW circulation pumps (2 units) in 2034, at a cost of \$4,500 each for a total of \$9,000.
- Replacement of DHW circulation pump motor (1 unit) in 2024 and 2039, at a cost of \$500.
- Replacement of DCW booster pump (1 unit) in 2034, at a cost of \$7,500.
- Replacement of DCW booster pump motor (1 unit) in 2024 and 2039, at a cost of \$1,500.

Fire Protection Systems

- Replacement of standpipe booster pump (1 unit) in 2030, at a cost of \$20,000.
- Replacement of jockey pumps (2 units) in 2020 and 2040, at a cost of \$2,500 each for a total of \$5,000.

Ventilation Systems

- Replacement of corridor pressurization fan (1 unit) in 2013 and 2038, at a cost of \$8,000.
- Replacement of corridor pressurization fan motor (1 unit) in 2015 and 2030, at a cost of \$1,500.
- Replacement of garage exhaust fan (1 unit) in 2020, at a cost of \$3,500.
- Replacement of garage exhaust fan motor (1 unit) in 2015 and 2030, at a cost of \$750.
- Replacement of wall exhaust fans (8 units) in 2013, at a cost of \$1,500 each for a total of \$12,000.
- Replacement of mechanical penthouse exhaust fan (1 unit) in 2015, at a cost of \$1,500.
- Replacement of chiller room exhaust fan (1 unit) in 2015, at a cost of \$1,500.
- Replacement of electrical 1 room exhaust fan (1 unit) in 2013, at a cost of \$2,000.
- Replacement of electrical 2 room exhaust fan (1 unit) in 2015, at a cost of \$1,500.
- Replacement of elevator room exhaust fan (1 unit) in 2015, at a cost of \$1,500.
- Replacement of various exhaust fan motors (12 units) in 2014 and 2029, at a cost of \$500 each for a total of \$6,000.
- Replacement of laundry exhaust fan (1 unit) in 2013, at a cost of \$500.
- Replacement of laundry exhaust fan motor (1 unit) in 2013 and 2028, at a cost of \$750.

Heating & Air Conditioning Systems

- Replacement of chiller (1 unit) in 2032, at a cost of \$175,000.
- Replacement of cooling tower (1 unit) in 2032, at a cost of \$45,000.
- Replacement of chilled water circulation pumps (3 units) in 2015, at a cost of \$5,000 each for a total of \$15,000.
- Replacement of chilled water circulation pump motor (1 unit) in 2020 and 2035, at a cost of \$1,000.
- Replacement of fan coil unit - main lobby (1 unit) in 2015, at a cost of \$3,500.

Pool Equipment Systems

- Replacement of pool circulation pump (1 unit) in 2020 and 2035, at a cost of \$1,500.
- Replacement of pool filter (1 unit) in 2020 and 2040, at a cost of \$2,500.
- Replacement of dehumidifier (1 unit) in 2030, at a cost of \$45,000.

Electrical Distributions

- Replacement of electrical distribution equipment in 2016, at a cost of \$60,000.

Fire Alarm Systems

- Replacement of fire alarm and annunciator panel (1 unit) in 2013 and 2038, at a cost of \$15,000.

Emergency Power Systems

- Replacement of emergency power generator c/w ATS (1 unit) in 2038, at a cost of \$35,000.

Electric Heating Systems

- Replacement of garage unit heaters (8 units) in 2013 and 2038, at a cost of \$1,500 each for a total of \$12,000.

Door Entry Systems

- Replacement of door entry system (1 unit) in 2013, at a cost of \$16,000.

Barrier-Free Automatic Door Operators

- Replacement of barrier-free automatic door operators (3 units) in 2025 and 2040, at a cost of \$16,000.

4.14 Elevator Systems

Both elevator systems were inspected by Rooney, Irving and Associates and an assessment of the current condition of the elevator systems are outlined in Appendix "C", with all replacement costs listed in the report and included in the spreadsheet. According to the report, the elevators are in satisfactory condition and no major deficiencies were noted.

A summary of the costing information included in the elevator system report are as follows:

Elevator Systems

- Contingency for mandatory work required by B44 Safety Code in 2015, 2020, 2025, 2030, 2035 and 2040, at a cost of \$2,500 each time.
- Elevator systems modernization and car cab refurbishing in 2013, at a cost of \$340,000.

4.15 Contingencies

Isolated minor repair work (such as thermopane replacements, pavement repairs, electrical repairs, etc.) are difficult to budget for, since these types of expenses are somewhat unpredictable. Costs such as these could total several thousand dollars per year for many corporations, making it difficult to account for these expenses in the annual operating budget. To address this difficulty in budgeting, many corporations include a contingencies allowance in the reserve fund and then use this to pay for isolated major repairs and minor replacement work. We recommend that this approach of having a contingencies allowance be

utilized to cover these types of costs. To reflect this recommendation, we have provided a general contingencies allowance of \$6,000 per year.

4.16 Engineering Fees

Potential costs for engineering fees also are included in the spreadsheet. Engineering fees related to the major repair or replacement of common elements should be paid out of the reserve fund, since such fees are directly related to the common element renewal. To account for such costs, a ballpark cost estimate of such fees is included in the spreadsheet for repair items where the services of an engineer are likely to be used. **It is very important to note that the budgeted amounts are only very rough “guesstimates” of fees, based on what the scope of work might be, but actual scopes of work are likely to vary from that assumed.** Therefore, the Board should not expect quotations for services to match the estimates provided, even for work due within the next few years. The intent of including engineering fees is only to ensure that there is some allowance for such fees, because ignoring engineering fees in budgeting could cause the corporation to be underfunded over the long term.

Budgeted amounts for engineering fees are as follows:

- 2013: \$10,000 for design, specifications, tendering and site review of elevator modernization program.
- 2015: \$15,000 for design, specifications, tendering and site review of window and patio door replacement.
- 2016 to
- 2018: \$12,000/year for site review of window and patio door replacement.
- 2019: \$15,000 for design, specifications, tendering and site review of apartment roof and swimming pool roof system replacement.
- 2020: \$5,000 for design, specifications, tendering and site review of metal siding replacement.
- 2021: \$20,000 for design, specifications, tendering and site review of balcony waterproofing replacement.
- 2022: \$15,000 for site review of balcony waterproofing replacement.
- 2025: \$15,000 for design, specifications, tendering and site review of parking garage traffic membrane replacement.
- 2030: \$20,000 for design, specifications, tendering and site review of parking garage roof membrane replacement.
- 2032: \$10,000 for design, specifications, tendering and site review of chiller and cooling tower replacement.
- 2036: \$20,000 for design, specifications, tendering and site review of balcony waterproofing replacement.
- 2037: \$15,000 for site review of balcony waterproofing replacement.
- 2040: \$15,000 for design, specifications, tendering and site review of parking garage traffic membrane replacement.

4.17 Reserve Fund Study Updates

The new Condominium Act requires full Reserve Fund Study Updates (updates based on inspection) be completed no later than every six years, with a Spreadsheet Update (update without inspection) within three years of completing the Full Study Update. In essence, two types of Reserve Fund Study Updates will be required at maximum six-year intervals, with types of the study required alternating. The estimated \$9,000 costs for a full Study Update are budgeted in the spreadsheet at six-year intervals in 2010, 2016, 2022, 2028, 2034 and 2040. To reflect the need for a Spreadsheet Update within three years of completing a full Study Update, we have budgeted the estimated \$4,500 costs for a Spreadsheet Update every three years after each full Study Update, in 2013, 2019, 2025, 2031 and 2037.

5. CONCLUSIONS & SUMMARY COMMENTS

Overall, the common elements of CCC 81 are in satisfactory condition and are well maintained. However, substantial replacement work will be required over the next several years, due to normal life cycle renewals of aging common elements.

Based on the predicted expenditures listed in the spreadsheet and the current reserve fund finances, the corporation will need to increase reserve fund contributions next year to pay for all foreseeable expenditures over the 30-year horizon of this Study. As such, we recommend that annual contributions be increased from \$196,000 in 2010 to \$215,000 in 2011. After 2011, only annual inflationary increases should be required to pay for all anticipated reserve fund expenditures over the next 30 years and beyond.



Elliott Kiel, Technologist



Steven Laviolette, P. Eng.



APPENDIX A: SUMMARY OF LIFE EXPECTANCIES AND COSTS

Table 1: Summary of Life Expectancies and Costs

Element Description	Approximate Current Age	Normal Life Expectancy	Estimated Life Remaining	Replacement Value
Grounds Lighting	35 years	30 to 40 years	20 years	\$4,000
Garage Podium Roof Deck Waterproofing System and Landscaping	15 years	30 to 35 years	20 years	\$210,000 (total)
Garage Concrete Slab Traffic Waterproofing Membrane	5 years	15 years	15 years	\$170,000
Entrance Ramp Asphalt & Membrane	35 years	30 to 40 years	10 years	\$30,000
Metal Railings	35 years	40 to 50 years	20 years	\$40,000
Asphalt Pavement	35 years	15 to 20 years	4 years	\$7,000
Visitor Parking Waterproofing Membrane	3 years	15 years	10 years	\$14,000
Interlocking Paver Stones	35 years	40 to 50 years	20 years	\$4,000
Balcony Waterproofing Membrane	4 years	15 years	11 to 12 years	\$360,000 (total)
Balcony Guard Rails	35 years	40 to 50 years	26 to 27 years	\$260,000 (total)
Metal Siding	35 years	40 years	10 years	\$40,000
Exterior Painting	3 years	6 years	3 years	\$35,000 (each time)
Exterior Caulking	10 years	12 years	varies	\$56,000 (full)
Aluminum Windows	35 years	35 to 45 years	5 to 8 years	\$1,100,000 (total)
Sliding Glass Patio Doors	35 years	25 to 30 years	5 to 8 years	\$220,000 (total)
Aluminum Frame Storefront Entry Doors	35 years	35 to 40 years	10 years	\$15,000
Metal Service Doors	35 years	40 to 50 years	15 years	\$6,000
Overhead Parking Garage Doors	3 to 7 years	15 years	8 to 12 years	\$25,000 (total)
Unit Entrance Doors	35 years	40 to 50 years	20 years	\$140,000
Main Roof & Penthouse Roof Systems	16 years	25 years	9 years	\$180,000
Swimming Pool Roof System	15 years	30 to 35 years	9 years	\$25,000
Swimming Pool Sloped Metal Roof	35 years	40 to 45 years	10 years	\$6,000

Swimming Pool Coating	unknown	15 years	4 years	\$50,000
Lobby Refinishing	35 years	varies	1 year	\$90,000
Interior Carpets	10 years	12 years	5 years	\$70,000
Ceramic Tile	35 years	25 years	5 years	\$7,000
Mosaic Ceramic Tile	35 years	25 years	5 years	\$2,000
Vinyl Tile	35 years	15 to 20 years	5 years	\$12,000
Interior Wallpaper	10 years	20 years	13 years	\$90,000
Amenity Room Appliances/Furnishings/ Equipment	varies	varies	varies	\$36,000 (total)
<u>Plumbing & Drainage:</u>				
Elevator Sump Pump	0 year	30 years	30 years	\$700
Elevator Sump Pump Motor	0 year	15 years	15 years	\$300
DHW Boiler	10 years	25 years	15 years	\$30,000
DHW Circulation Pump	1 year	25 years	24 years	\$9,000
DHW Circulation Pump Motor	1 year	15 years	14 years	\$500
DCW Booster Pump	1 year	25 years	24 years	\$7,500
DCW Booster Pump Motor	1 year	15 years	14 years	\$1,500
<u>Fire Protection Systems:</u>				
Standpipe Booster Pump	10 years	30 years	20 years	\$20,000
Jockey Pumps	10 years	20 years	10 years	\$5,000
<u>Ventilation Systems:</u>				
Corridor Pressurization Fan	22 years	25 years	3 years	\$8,000
Corridor Pressurization Fan Motor	10 years	15 years	5 years	\$1,500
Garage Exhaust Fan	20 years	30 years	10 years	\$3,500
Garage Exhaust Fan Motor	10 years	15 years	5 years	\$750
Wall Exhaust Fans	27 years	30 years	3 years	\$12,000
Mechanical Penthouse Exhaust Fan	25 years	30 years	5 years	\$1,500
Chiller Room Exhaust Fan	25 years	30 years	5 years	\$1,500
Electrical 1 Room Exhaust Fan	27 years	30 years	3 years	\$2,000
Electrical 2 Room Exhaust Fan	3 years	30 years	27 years	\$2,000
Elevator Room Exhaust Fan	25 years	30 years	5 years	\$1,500
Various Exhaust Fan Motors	11 years	15 years	4 years	\$6,000
Laundry Exhaust Fan	27 years	30 years	3 years	\$500
Laundry Exhaust Fan Motor	12 years	15 years	3 years	\$750
<u>Heating & Air Conditioning Systems:</u>				
Chiller	3 years	25 years	22 years	\$175,000
Cooling Tower	3 years	25 years	22 years	\$45,000
Chilled Water Circulation Pumps	25 years	30 years	5 years	\$15,000
Chilled Water Circulation Pump Motor	5 years	15 years	10 years	\$1,000
Fan Coil Unit - Main Lobby	25 years	30 years	5 years	\$3,500
<u>Pool Equipment Systems:</u>				
Pool Circulation Pump	5 years	15 years	10 years	\$1,500
Pool Filter	10 years	20 years	10 years	\$2,500
Dehumidifier	5 years	25 years	20 years	\$45,000

<u>Electrical Distributions:</u> Electrical Distribution Equipment	35 years	30 to 40 years	6 years	\$60,000
<u>Fire Alarm Systems:</u> Fire Alarm Panel & Annunciator	22 years	25 years	3 years	\$15,000
<u>Emergency Power Systems:</u> Emergency Power Generator c/w ATS	2 years	30 years	28 years	\$35,000
<u>Electric Heating Systems:</u> Garage Unit Heaters	22 years	25 years	3 years	\$12,000
<u>Door Entry Systems:</u> Door Entry System	27 years	30 years	3 years	\$16,000
<u>Barrier-Free Automatic Door Operators:</u> Barrier-Free Automatic Door Operator	0 year	15 years	15 years	\$16,000

APPENDIX B: MECHANICAL & ELECTRICAL REPORT



LEVAC ROBICHAUD LECLERC

Consulting Engineers/Ingénieurs conseils
Rockland • Hawkesbury • Gatineau

RESERVE FUND STUDY

MECHANICAL SYSTEMS

**CCC 81
370 Dominion Avenue
Ottawa, Ontario**

Project No. 10113

**INSPECTION FOR PURPOSE OF THE REPORT PERFORMED ON
March 17, 2010**

RESERVE FUND STUDY MECHANICAL SYSTEMS

1.0 INTRODUCTION

Levac Robichaud Leclerc Associates was retained by Laviolette Building Engineering for the Reserve Fund Study of CCC 81 at 370 Dominion Avenue, Ottawa, Ontario. The building was constructed in 1976 (34 years old).

The following Study is based on a visual inspection of the mechanical systems carried out on March 17, 2010. The survey was based on the field observers' visual observations of representative areas and materials while walking through the subject property. The survey consisted of non-intrusive visual observations, which were readily accessible and easily visible components and systems of the subject property.

The normal life expectancy of the mechanical systems is based on manufacturer's published data and accepted standard in the industry. However, it may vary, depending on preventive maintenance practices and possible partial replacement of the equipment over period of this study. Therefore the life expectancy of this equipment could be extended beyond their normal life expectancy.

2.0 PLUMBING AND DRAINAGE:

2.1 EXISTING SYSTEM DESCRIPTION

- .1 Sanitary drains from building to municipal sanitary sewer by gravity.
- .2 Storm drains from roof are drained to municipal storm sewer by gravity.
- .3 Sanitary drains from the parking garage floor drains are connected to a sand interceptor then drained to municipal sewer by gravity.
- .4 Storm drains from weeping tile drained to municipal storm sewer by gravity.
- .5 Domestic cold water services is connected to the municipal main, metered, and distributed throughout the building with two domestic cold water booster pumps.
- .6 The domestic hot water system includes the following components:
 - a) Two gas fired boilers provide domestic hot water supply to the building.
 - b) Two domestic hot water storage tanks.
 - c) One domestic hot water circulation pump.
- .7 A sump pump is provided for the elevator pit.

2.2 FINDINGS AND RECOMMENDATIONS

In general all the plumbing, hot water boiler and drainage systems appear to be in good working condition and well maintained.

We have noticed surface corrosion on the headers of the domestic hot water boilers. This corrosion should be sanded and repainted with rust inhibitor paint in order to prevent further deterioration. This condition should be monitored closely.

2.3 REPLACEMENT COST

Elevator Sump Pump (1 Unit)	
Estimated replacement cost per unit	\$700.00
Normal life expectancy	30 years
Estimated remaining service life	30 years
Elevator Sump Pump Motor (1 Unit)	
Estimated replacement cost per unit	\$300.00
Normal life expectancy	15 years
Estimated remaining service life	15 years
DHW Boiler (2 Units)	
Estimated replacement cost per unit	\$15,000.00
Normal life expectancy	25 years
Estimated remaining service life	15 years
DHW Circulation Pump (1 Unit)	
Estimated replacement cost per unit	\$4,500.00
Normal life expectancy	25 years
Estimated remaining service life	24 years
DHW Circulation Pump Motor (1 Unit)	
Estimated replacement cost per unit	\$500.00
Normal life expectancy	15 years
Estimated remaining service life	14 years
DCW Booster Pump (1 Unit)	
Estimated replacement cost per unit	\$7,500.00
Normal life expectancy	25 years
Estimated remaining service life	24 years
DCW Booster Pump Motor (1 Unit)	
Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	15 years
Estimated remaining service life	14 years

All other components of the system have a service life over than 40 years. However, preventative maintenance and minor repairs should be covered by the annual operating/maintenance budget.

3.0 FIRE PROTECTION:

3.1 EXISTING SYSTEM DESCRIPTION

- .1 Standpipe fire booster pump and jockey pump located in the garage pump room. Fire hose cabinets and fire extinguishers installed in the typical corridors, including the basement and underground parking.
- .2 Sprinkler heads are provided throughout the lower and upper parking garage, ground floor areas and garbage chute.
- .3 Wet sprinkler system valves and jockey pump are provided in the garage pump room.

3.2 FINDINGS AND RECOMMENDATIONS

In general all the fire protection systems appear to be in good condition. Maintenance in accordance with the manufacturer's recommendations including inspection for the portable fire extinguishers and pumps test run should be performed regularly.

Rust has been observed on the sprinkler test drain located in the pool equipment room. This section of the pipe should be cleaned of rust and painted with rust inhibitor paint in order to prevent deterioration of the pipe.

3.3 REPLACEMENT COST

Standpipe Booster Pump (1 Unit)

Estimated replacement cost per unit	\$20,000.00
Normal life expectancy	30 years
Estimated remaining service life	20 years

Jockey Pumps (2 Units)

Estimated replacement cost per unit	\$2,500.00
Normal life expectancy	20 years
Estimated remaining service life	10 years

All other components of the system have a service life of more than 40 years. However, preventative maintenance and minor repairs should be covered by the annual operating/maintenance budget.

4.0 VENTILATION

4.1 EXISTING SYSTEM DESCRIPTION

- .1 A duct in-line fan located in the penthouse mechanical room provides corridor pressurization.
- .2 Exhaust fans with intake grilles are installed in the storage rooms, mechanical and electrical rooms.
- .3 An exhaust fan located on the upper level parking provides ventilation to both garage floors.
- .4 Typical suite washrooms are furnished with a ceiling exhaust fan and ducted to an exterior grille.
- .5 An exhaust fan located on the roof provides exhaust for the laundry machines.
- .6 A Heat Recovery Ventilator (HRV) provides air tempering for the supply air to the corridors using exhausted air from the laundry exhausts.

4.2 FINDINGS AND RECOMMENDATIONS

In general all the ventilation systems appear to be in good working condition.

4.3 REPLACEMENT COST

Corridor Pressurization Fan (1 Unit)

Estimated replacement cost per unit	\$8,000.00
Normal life expectancy	25 years
Estimated remaining service life	3 years

Corridor Pressurization Fan Motor (1 Unit)

Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	15 years
Estimated remaining service life	5 years

Garage Exhaust Fan (1 Unit)

Estimated replacement cost per unit	\$3,500.00
Normal life expectancy	30 years
Estimated remaining service life	10 years

Garage Exhaust Fan Motor (1 Unit)

Estimated replacement cost per unit	\$750.00
Normal life expectancy	15 years
Estimated remaining service life	5 years

Wall Exhaust Fans (8 Units)	
Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	30 years
Estimated remaining service life	3 years
Mechanical Penthouse Exhaust Fan (1 Unit)	
Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	30 years
Estimated remaining service life	5 years
Chiller Room Exhaust Fan (1 Unit)	
Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	30 years
Estimated remaining service life	5 years
Electrical 1 Room Exhaust Fan (1 Unit)	
Estimated replacement cost per unit	\$2,000.00
Normal life expectancy	30 years
Estimated remaining service life	3 years
Electrical 2 Room Exhaust Fan (1 Unit)	
Estimated replacement cost per unit	\$2,000.00
Normal life expectancy	30 years
Estimated remaining service life	27 years
Elevator Room Exhaust Fan (1 Unit)	
Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	30 years
Estimated remaining service life	5 years
Various Exhaust Fans Motors (12 Units)	
Estimated replacement cost per unit	\$500.00
Normal life expectancy	15 years
Estimated remaining service life	4 years
Laundry Exhaust Fan (1 Unit)	
Estimated replacement cost per unit	\$500.00
Normal life expectancy	30 years
Estimated remaining service life	3 years
Laundry Exhaust Fan Motor (1 Unit)	
Estimated replacement cost per unit	\$750.00
Normal life expectancy	15 years
Estimated remaining service life	3 years

Preventative maintenance, minor repairs, air filter and motors replacement should be covered by the annual operating/maintenance budget.

5.0 HEATING & AIR CONDITIONING SYSTEMS

5.1 EXISTING SYSTEM DESCRIPTION

- .1 Common Areas Heating:
Space heating in all common areas, vestibules and locker/utility rooms are furnished with either electric unit heaters or electric baseboard heaters. Refer to Electrical report for details.
- .2 An electric heating coil is provided on the main supply air duct for the corridor pressurization. Refer to Electrical report for details.
- .3 An electric heating coil is provided on the supply air duct of the dehumidifier for the pool area. Refer to Electrical report for details.
- .4 Cooling System:
A central cooling system is provided to supply chilled water to cooling fan coil units installed in typical suites, main lobby & a cooling coil installed on the main duct for the corridor pressurization. The central cooling system consists of the following equipment:
 1. A liquid chiller installed in the mechanical penthouse.
 2. Three chilled water circulation pumps located in the penthouse mechanical room.
 3. Expansion tank.
 4. A cooling tower is provided on the roof.

5.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general all the heating and air conditioning systems appear to be in good working condition.

5.3 REPLACEMENT COST

Chiller (1 Unit)

Estimated replacement cost per unit	\$175,000.00
Normal life expectancy	25 years
Estimated remaining service life	22 years

Cooling Tower (1 Unit)

Estimated replacement cost per unit	\$45,000.00
Normal life expectancy	25 years
Estimated remaining service life	22 years

Chilled Water Circulation Pump (3 Units)

Estimated replacement cost per unit	\$5,000.00
Normal life expectancy	30 years
Estimated remaining service life	5 years

Chilled Water Circulation Pump Motor (1 Unit)

Estimated replacement cost per unit	\$1,000.00
Normal life expectancy	15 years
Estimated remaining service life	10 years

Fan Coil Unit – Main Lobby (1 Unit)

Estimated replacement cost per unit	\$3,500.00
Normal life expectancy	30 years
Estimated remaining service life	5 years

All other components of the system have a longer service life. However, preventative maintenance, minor repairs, air filter and motors replacement should be covered by the annual operating/maintenance budget.

6.0 POOL EQUIPMENT**6.1 EXISTING SYSTEM DESCRIPTION**

- .1 A circulation pump is provided for the pool in the pool equipment room located in the lower garage.
- .2 A filter for the pool is located in the pool equipment room located in the lower garage.
- .3 A “Dectron” dehumidifier unit is provided on the 2nd floor pool ventilation room for the pool area.

6.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general all the pool systems appear to be in good working condition.

6.3 REPLACEMENT COST**Pool Circulation Pump (1 unit)**

Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	15 years
Estimated remaining service life	10 years

Pool Filter (1 unit)

Estimated replacement cost per unit	\$2,500.00
Normal life expectancy	20 years
Estimated remaining service life	10 years

Dehumidifier (1 unit)

Estimated replacement cost per unit

\$45,000.00

Normal life expectancy

25 years

Estimated remaining service life

20 years



LEVAC ROBICHAUD LECLERC

Consulting Engineers/Ingénieurs conseils
Rockland • Hawkesbury • Gatineau

RESERVE FUND STUDY

ELECTRICAL SYSTEMS

**CCC 81
370 Dominion Avenue
Ottawa, Ontario**

Project No. 10113

**INSPECTION FOR PURPOSE OF THE REPORT PERFORMED ON
March 17, 2010**

Levac Robichaud Leclerc Associates Ltd.
1-2884 Chamberland Street • Rockland, Ontario • K4K 1M6
T: (613) 446-7777 • (877) 632-5664 • F: (613) 446-1427
www.lrl.ca

RESERVE FUND STUDY ELECTRICAL SYSTEMS

1.0 INTRODUCTION

Levac Robichaud Leclerc Associates was retained by Laviolette Building Engineering for the Reserve Fund Study of CCC 81 at 370 Dominion Avenue, Ottawa, Ontario. The building was constructed in 1976 (34 years old).

The following Study is based on a visual inspection of the electrical systems carried out on March 17, 2010. The survey was based on the field observers' visual observations of representative areas and materials while walking through the subject property. The survey consisted of non-intrusive visual observations, which were readily accessible and easily visible components and systems of the subject property.

The normal life expectancy of the mechanical systems is based on manufacturer's published data and accepted standard in the industry. However, it may vary, depending on preventive maintenance practices and possible partial replacement of the equipment over period of this study. Therefore the life expectancy of this equipment could be extended beyond their normal life expectancy.

2.0 ELECTRICAL DISTRIBUTIONS

2.1 EXISTING SYSTEM DESCRIPTION

- .1 Incoming secondary electrical powers for the building are rated at 120/208 volts, 3-phase, 4-wire, 3000 amp & 347/600 volts, 3-phase, 4-wire, 1200 amp. The power is fed from a hydro vault located inside the building.
- .2 Electrical panels with circuit breakers and disconnect switches systems (120/208 volt & 347/600 volt) are provided for electrical load distribution system.
- .3 Cable and telephone equipment are located in the ground floor electrical room.
- .4 Receptacles:
An adequate quantity of 120V, 15 Amp duplex receptacles are provided in all common areas, corridors and utility rooms.
- .5 The building electrical wiring system is in EMT conduits and AC-90 (BX cables)

2.2 FINDING AND RECOMMENDATIONS

In general all the electrical distribution systems appear to be in good working condition.

It is recommended that the electrical systems should be maintained regularly. A preventive maintenance should be performed according to the manufacturer's recommendations, to ensure that the systems remain in good working condition at all times.

The electrical distribution in the building is generally original to the building. The main switchgears appear to be in good condition but main switchgears maybe need replacement within the next 10 years. We recommend performing an electrical infra-red inspection of the old electrical distribution equipment (i.e. switchgears, panels and disconnect) by a qualified electrician in order to assess their internal conditions. Even if the condition of this equipment is still in good working order, replacement parts may not be available due to their age of service.

2.3 REPLACEMENT COST

All electrical components have a service life expectancy between 30 to 40 years. They are not necessary to be replaced at the end of the service life expectancy as noted above.

Circuit breakers replacement in the distribution panels, minor repairs and regular maintenance if required should be included in the annual operating/maintenance budget.

Infra-Red Study of Electrical Distribution Equipment :	\$2,500.00
*Replacement of Electrical Distribution Equipment :	\$60,000.00

* Replacement period will depend on infra-red study findings, but should be expected in the next 6 years.

3.0 LIGHTING SYSTEMS:

3.1 EXISTING SYSTEM DESCRIPTION

- .1 The main corridor and lobby area lighting consist of a combination of wall sconces and pot lights.
- .2 Fluorescent light fixtures are installed in the utility rooms, storage rooms, stairwells and parking garage.

3.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general all the lighting systems appear to be in good condition and well maintained.

It is recommend to keep a list of all particular lamps in common areas to be replaced by the maintenance staff. The list can then be utilized to purchase a number of replacement lamps, which can be kept in storage and can be available at any time.

3.3 REPLACEMENT COST

Over the period of this study, a number of lamps installed throughout the building will require replacement. The replacement cost can be estimated based upon the manufacturers' life expectancies of each of the lamps. The cost of lamp replacement could be covered by the annual operating budget.

4.0 FIRE ALARM SYSTEM

4.1 EXISTING SYSTEM DESCRIPTION

The fire alarm system comprises the following elements:

- .1 A fire alarm panel "Simplex 4100" located in the electrical room.
- .2 A fire alarm annunciator panel is provided in the main vestibule.
- .3 Manual pull stations are provided at each exit on each floor.
- .4 A combination of smoke/heat detectors are provided in utility rooms and public areas.

4.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general all fire alarm systems appear to be in good condition and working properly. No major deficiencies were noted.

However, regular preventative maintenance of all the fire alarm components/equipments is recommended to ensure that all of the life safety systems remain active at all times.

4.3 REPLACEMENT COST

Fire Alarm Panel & Annunciator (1 Unit)

Estimated replacement cost per unit	\$15,000.00
Normal life expectancy	25 years
Estimated remaining service life	3 years

All other components of the system have a longer service life. However, preventative maintenance, minor repairs, smoke/heat detector/battery back-up replacement as required and ULC 536 annual test as required by the Code should be covered by the annual operating/maintenance budget.

5.0 EMERGENCY POWER SYSTEM

5.1 EXISTING SYSTEM DESCRIPTION

- .1 A gas fired emergency power generator "Kohler 125" provides emergency power (600V) to the building.
- .2 A transformer provides 600V to 120/208V, 3-ph power to the building.
- .3 An automatic transfer switch (ATS) is provided to provide automatic changer over to emergency power in the event of power failure.

5.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general the emergency power system appears to be in good condition. No major deficiencies were noted.

5.3 REPLACEMENT COST

Emergency Power Generator c/w ATS (1 Unit)

Estimated replacement cost per unit	\$35,000.00
Normal life expectancy	30 years
Estimated remaining service life	28 years

Preventive maintenance including battery replacement & testing should be covered by the annual operating/maintenance budget.

6.0 ELECTRIC HEATING

6.1 EXISTING SYSTEM DESCRIPTION

- .1 Two electric force flow heaters are provided in the main vestibule for heating.
- .2 Electric unit heaters are provided in the lower and upper garages for space heating.

- .3 An electric heating coil is provided on the main ductwork for the corridor pressurization in the mechanical penthouse.
- .4 An electrical heating coil is provided on the ductwork of the dehumidifier for the pool area.
- .5 Electric baseboard heaters are installed in the typical corridors.

6.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general the electric heating systems appear to be in good condition. No major deficiencies were noted.

6.3 REPLACEMENT COST

Garage Unit Heaters (8 Units)

Estimated replacement cost per unit	\$1,500.00
Normal life expectancy	25 years
Estimated remaining service life	3 years

All other components of the system have a longer service life. However, the cost for preventative maintenance and annual testing should be covered by the annual operating/maintenance budget.

7.0 DOOR ENTRY SYSTEM

7.1 EXISTING SYSTEM DESCRIPTION

A video-com system and CCTV door system have been provided for this building entry system.

7.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general the door entry system appears to be in good condition. No major deficiencies were noted.

It is recommended that regular inspections and maintenance is performed according to the manufacturer's recommendations to ensure a proper working system at all times.

7.3 REPLACEMENT COST

Door Entry System (1 Unit)

Estimated replacement cost per unit	\$16,000.00
Normal life expectancy	30 years
Estimated remaining service life	3 years

All other components of the system have a longer service life. However, the cost for preventative maintenance and annual testing should be covered by the annual operating/maintenance budget.

8.0 BARRIER-FREE AUTOMATIC DOOR OPERATORS

8.1 EXISTING SYSTEM DESCRIPTION

Three barrier-free automatic door operators have been provided for this building.

8.2 FINDING AND RECOMMENDATIONS

Based on a visual inspection, in general the barrier-free automatic door operators appear to be in good condition. No major deficiencies were noted.

It is recommended that regular inspections and maintenance is performed according to the manufacturer's recommendations to ensure a proper working system at all times.

8.3 REPLACEMENT COST

Barrier-Free Automatic Door Operator (3 Units)

Actual replacement cost	\$16,000.00
Normal life expectancy	15 years
Estimated remaining service life	15 years

All other components of the system have a longer service life. However, the cost for preventative maintenance and annual testing should be covered by the annual operating/maintenance budget.

APPENDIX C: ELEVATOR SYSTEMS REPORT

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

1.0 PURPOSE AND SUMMARY

In March 4, 2010 a site review of the two passenger elevators located at CCC 81, 370 Dominion, Ottawa was undertaken. This was done in order to determine the condition of the elevator equipment, to identify maintenance deficiencies to be corrected and to assess related capital costs likely to be encountered by the condominium.

2.0 DESCRIPTION OF SYSTEM

The conveying system consists of two (2) variable-voltage drive, geared-overhead machine, traction, passenger elevators. Elevators are grouped as duplex. Technical and nameplate information is as follows:

Elevator Designation:	1	2
Location from lobby:	Left	Right
Installation Numbers:	28928	28930
Class:	Passenger	
Capacity:	2000 lbs	
Speed:	250 fpm	
Floors Served:	G, 2 - 12, PH and Exec	
Car Door Opening:	36" wide x 84" high - single slide	
Car Door Operator:	Otis 7300	
Car Door Re-opening Device:	Mechanical safety edge	
Selector:	Otis "pie-plate" Controller mounted	
Power Supply:	600 volt, 3 phase, 60 cycles	
Hoist Motor:	Otis - DC	
Electrical Controller:	Otis 23 UCL Relay based	
Type of Operation:	Duplex, Down collective	

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

Machine:	Otis, Overhead traction Roped 1:1
Hoist Ropes:	3 x 5/8" Babitt fastenings
Motor-Generator Set:	Otis, 10 HP
Manufacturer:	Otis
Installed:	Circa 1975
Maintenance Contractor:	Otis

3.0 DESCRIPTION OF EXISTING CONDITIONS

The elevator system was manufactured and installed by Otis Elevator circa 1975. Unlike many other installations of the same vintage, older Otis controllers and machines are still supported with regards to parts at this time.

The motor-generator set drive and relay-based controller that is the basis of this elevator system's operation is now considered obsolete. Modern elevator systems typically employ solid-state motor drive systems and micro-processor controller logic. Although modern equipment has advantages in the areas of power consumption and dispatching efficiency, the existing elevator equipment is adequate for present usage.

Although installed in conformance with the prevailing Elevator Code of 1975, many present-day Code requirements are not met. Most notably, the elevators lack overspeed and uncontrolled speed protection for car and counterweight. These devices are normally supplied in the form of Rope Brakes and prevent the elevators from overspeeding in the up direction or moving away from a landing with doors open in certain rare instances.

The elevator cabs lack some of the requirements for conformance with the Elevator Code's Appendix E - Elevator Requirements for Persons with Physical Disabilities. For example, the cabs do not have voice annunciation of floors. The single riser of hall operating buttons also does not meet Appendix E because of the height at which it is mounted.

The elevators were of excellent quality when installed and major components remain in good condition at this time. Major components exhibit some problems in the form of oil leaks at the geared machines and poor commutation in some cases at the DC motor or AC (motor-generator) motor.

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

4.0 MAINTENANCE OBSERVATIONS

The elevators are maintained by Otis Elevator. We assume that maintenance is carried out under the terms of Otis's standard full service maintenance contract.

As major components of the elevator system are covered under the terms of a full maintenance program, generally no major capital expenditures should arise to repair these components. Exceptions to full maintenance coverage detailed in the contract, such as vandalism, should be noted. Problems with typical contractor written documents include the following:

- Most documents employ an "evergreen" clause that will result in the property owner being contractually obligated for subsequent five year terms, should cancellation notice be given less than 90 days in advance of the fifth anniversary of the contract term;
- Response to calls after hours, even emergency trapped-passenger calls, may result in extra charges;
- A liability clause, in which the condominium agrees to "indemnify, defend, and hold harmless" the contractor, is not in the interests of the condominium;
- An obsolescence clause effectively undermines parts coverage due to vague wording including "usual sources". Historically, elevator contractors have been reasonably fair in the application of this clause. However, occasionally elevator contractors have used similar clauses to avoid responsibility for high cost repairs.
- The contract fails to address such fundamental issues as the frequency of preventative maintenance visits, the time to be spent doing preventative maintenance monthly, a description of the preventative maintenance that the contractor will complete and the maximum permissible response time for the contractor to repair an out of service elevator or free a trapped passenger. The maintenance contract also should address the issue of elevator performance as measured by running speed, flight times, door times and noise levels. This information should be quantified now as a benchmark against which the contractor's work can be evaluated. By failing to do so, many property owners find that they have no recourse in the instance of the maintenance contractor's allowing the elevators to gradually deteriorate over the contract's multi-year term.

**MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA**

Listed below are deficiencies that should be corrected by the maintenance contractor under the terms of the full service contract in place:

Deficiencies common to both elevators:

1. Provide a complete record of all malfunctions in the elevator machine room including corrective action taken.
2. Provide guards for the pit light.
3. Provide re-balance per cab upgrades.

Deficiencies particular to Elevator 1:

4. Service noisy generator bearing.
5. Clean and lubricate hoist ropes.
6. Adjust noisy door operation.

Deficiencies particular to Elevator 2:

7. Make the safety edge fully retract when the doors open.

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

5.0 COMPLIANCE TO CAN/CSA-B44-07 SAFETY CODE FOR ELEVATORS

The elevators were installed in compliance with the then-existing CAN/CSA-B44 Safety Code For Elevators. Since the date of installation, there have been numerous revisions to the Code. Listed below are 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 up-overspeed and uncontrolled speed protection.
2. Provide a system to monitor and prevent automatic operation of the elevators with faulty door contact circuits.
3. Provide inspection operation with door open circuitry.
4. Provide counterweight guards and runby signs in the pits.
5. Provide a safety railing on the car tops.
6. Provide emergency lighting with two bulbs in the cabs.
7. Provide Firefighter's emergency operation to Code.
8. Provide elevator emergency power operation.
9. Provide guards for the pit lights.
10. Engrave the installation date on the cross-head data plate.
11. Provide appropriate data plates for crosshead, machine room temperature, machine room humidity, brake setting, door operator, sheave diameter, code issue etc.
12. Provide proper door overlap clearances.
13. Provide restrictors on car door opening.
14. Provide a means for easy manual release of the brake.
15. Identify the elevators at the recall level as "1" and "2".
16. Provide cab telephones.

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

6.0 PERFORMANCE DATA

The performance parameters defined 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- PERFORMANCE DATA

PARAMETER	REQUIRED	MEASURED	
		Car # 1	Car # 2
Car Speed - UP	250 fpm ± 5%	244	248
Car Speed - DOWN	250 fpm ± 5%	231	237
Flight Time - UP	▼ 12.5 sec.	10.7	10.3
Flight Time - DOWN	▼ 12.5 sec.	10.8	11.2
Avg. Acceleration	0.05 g	0.09	0.08
Maximum Jerk Rate	▼ 10 f/s ₃	13	10
Door timeout	20 sec	NA	NA
Door Stall Force	▼ 30 lbs	21	20

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

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.

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

7.0 RECOMMENDATIONS

We recommend that the deficiencies of Section 4 of this report be referred to the maintenance contractor for their corrective action. We would suggest 60 days as a reasonable time frame for them to complete the deficiencies.

Now at an age of approximately 35 years the elevator system likely has reached the end of its normal design lifecycle. Accordingly we recommend that the condominium should consider a major modernization of the equipment in the short term. A Modernization would normally involve the installation of new micro-processor based controllers, the installation of solid-state motor drives, provision of new machine room and hoistway electrical wiring, replacement of the door operators and other renewals of the elevator fixtures. This work would cost approximately \$300,000. The cost includes most work required to have the elevators substantially comply with the latest edition of the CSA Safety Code for Elevators (Section 4.0 of this report).

We noted some signs of minor damage to elevator pit components through infiltration of ground water. Normally, components such as travelling cables, compensation cables, governor cable, governor tension sheaves, buffer stands and rails can be subject to some degree of water without permanent damage. We recommend that these components be monitored in the course of the preventive maintenance work and only repaired or replaced as is subsequently observed to be required.

The relatively unsophisticated relay-based controllers could conceivably be serviced any one of several elevator contractors in the Ottawa-area should competitive pricing be sought by the Condominium at the expiry of the contract term.

Under the terms of a Full Service elevator service contract, the parts and labour required to service almost all of the major components of the existing elevator system are included. Accordingly, there usually are no major capital expenditures required of the Condominium to replace or repair these components within the contract term and within the expected life span of the equipment. Exceptions to consider are vandalism and replacement of obsolete parts.

Periodically the Technical Standards and Safety Authority, the TSSA, requires remedial work to be carried out on certain makes or types of elevators. The Condominium would be required to pay the costs to meet the requirements. We recommend allowing \$2,500 every five years to fund this work.

MAINTENANCE AUDIT
CCC NO. 81 - ELEVATOR SYSTEM
370 DOMINION, OTTAWA

PROJECTED CAPITAL COST TABLE

Predicted Work - Year:	0-5	5-10	10-15	15-20	20-25	25-30
Future Mandatory Work Required By B44 Safety Code	\$ 2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Complete Modernization Of Existing Elevator Including B44 Code Upgrades	\$300,000					
Elevator Cab Refurbishing	Included in above					

Notes of Costs:- HST not included;
- Based on year 2010 dollars;
- Work not the responsibility of the elevator trade not included.

- end of report -

APPENDIX D: RESERVE FUND STUDY SPREADSHEET

CCC 81: RESERVE FUND SPREADSHEET

SPREADSHEET ESSENTIALS:

- THE END OF THE FISCAL YEAR IS DECEMBER 31 OF EACH YEAR
- ESTIMATED RESERVE FUND BALANCE AS AT DECEMBER 31, 2009 WAS: \$470,895
- FOR 2010, RESERVE FUND CONTRIBUTIONS ARE: \$196,000
- FOR 2011, WE RECOMMEND RESERVE FUND CONTRIBUTIONS OF: \$216,000
- FROM 2012 TO 2026, CONTRIBUTIONS ARE ASSUMED TO INCREASE BY INFLATION.
- AFTER 2026, RESERVE FUND CONTRIBUTIONS ARE FROZEN AT 2026 LEVELS INDEFINITELY.

SPREADSHEET ASSUMPTIONS:

- 2.5% IS THE ASSUMED INFLATION RATE FOR EXPENDITURES & CONTRIBUTIONS
- 3.0% IS THE ASSUMED RATE OF INTEREST EARNINGS FOR RESERVE FUND INVESTMENTS BASED ON THE AVERAGE BALANCE FOR EACH YEAR
- INFLATION AND INTEREST RATES ARE ASSUMED TO BE CONSTANT OVER THE 30-YEAR PERIOD EXAMINED IN THIS SPREADSHEET

AGE OF COMPLEX (start of fiscal year)	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
WORK DESCRIPTION	CALENDAR YEAR																
Grounds Lighting																	
Pavers																	
Parking Garage Roof Membrane																	
Parking Garage Traffic Membrane	\$10,000					\$10,000					\$10,000					\$170,000	
Parking Garage Ramp											\$30,000						
Visitor Parking Traffic Membrane											\$14,000						
Asphalt Pavement					\$7,000												
Metal Railings												\$180,000					
Balcony Waterproofing												\$180,000					
Balcony Guard Rails											\$40,000						
Metal Siding																	
Exterior Painting & Staining																	
Exterior Caulking				\$35,000						\$35,000							
Windows												\$2,000	\$2,000			\$35,000	
Sliding Glass Patio Doors						\$275,000	\$275,000	\$275,000	\$275,000								
Overhead Garage Doors						\$55,000	\$55,000	\$55,000	\$55,000								
Metal Service Doors									\$15,000				\$10,000			\$6,000	
Main Entrance Doors																	
Unit Entrance Doors																	
Apartment Roof System										\$180,000							
Swimming Pool Roof System										\$25,000							
Swimming Pool Metal Roof System											\$6,000						
Swimming Pool Coating					\$50,000												
Lobby Refinishing																	
Interior Carpet						\$70,000											
Ceramic Tile						\$7,000											
Mosaic Tile						\$2,000											
Vinyl Tile						\$12,000											
Wallpaper						\$12,000								\$90,000		\$12,000	
Common Equipment Furnishings																	
Plumbing & Drainage																\$2,000	\$30,500
Fire Protection																	
Ventilation Systems				\$23,250	\$6,000	\$6,750					\$5,000						
Heating and Air Conditioning						\$18,500					\$3,500						
Pool Equipment											\$1,000						
Electrical Distribution							\$60,000				\$4,000						
Fire Alarm System				\$15,000													
Emergency Power System																	
Door Entry System				\$16,000												\$16,000	
Barrier-Free Automatic Door Operators																	
Electric Heating	\$16,000																
Elevators				\$12,000													
Contingencies Allowance	\$6,000	\$6,000	\$6,000	\$340,000	\$6,000	\$2,500	\$6,000	\$6,000	\$6,000	\$6,000	\$2,500	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000
Engineering Fees				\$10,000		\$15,000	\$12,000	\$12,000	\$12,000	\$15,000	\$6,000	\$20,000	\$15,000			\$15,000	
Reserve Fund Study Updates	\$9,000			\$4,500			\$9,000	\$348,000	\$363,000	\$4,500			\$9,000			\$4,500	
EXPENDITURES, BEFORE INFLATION	\$41,000	\$96,000	\$6,000	\$461,750	\$69,000	\$491,750	\$417,000	\$348,000	\$363,000	\$265,500	\$142,000	\$208,000	\$222,000	\$96,000	\$8,000	\$287,300	\$6,000
EXPENDITURES, AFTER INFLATION	\$41,000	\$98,400	\$6,304	\$467,254	\$76,163	\$556,370	\$483,592	\$413,663	\$442,280	\$331,573	\$181,772	\$272,914	\$298,565	\$132,337	\$11,304	\$430,579	\$9,907
ANNUAL CONTRIBUTIONS	\$196,000	\$215,000	\$220,375	\$225,684	\$231,531	\$237,320	\$243,253	\$249,334	\$255,567	\$261,957	\$268,506	\$275,218	\$282,099	\$289,151	\$296,380	\$303,789	\$303,789
EARNED INTEREST	\$16,705	\$21,350	\$27,036	\$26,987	\$26,042	\$24,343	\$16,566	\$10,908	\$5,894	\$2,170	\$2,497	\$3,929	\$3,833	\$5,067	\$13,002	\$15,808	\$18,849
REMAINING FUND: FUTURE DOLLARS	\$642,700	\$780,651	\$1,021,758	\$771,375	\$958,766	\$964,079	\$440,305	\$286,884	\$106,066	\$36,620	\$127,850	\$134,083	\$121,450	\$284,351	\$582,429	\$471,447	\$765,179
REMAINING FUND: 2010 DOLLARS	\$642,700	\$761,610	\$972,524	\$721,870	\$868,613	\$986,949	\$379,674	\$241,346	\$87,053	\$30,924	\$99,876	\$102,191	\$90,305	\$206,274	\$412,201	\$325,518	\$528,916

OTHER SPREADSHEET INFORMATION:

- ALL COSTS LISTED IN THE ROWS BESIDE WORK DESCRIPTIONS (I.E. ABOVE THE FIRST DOUBLE-LINE) ARE THE ACTUAL COST ESTIMATES OUTLINED IN THE MAIN BODY OF THE REPORT
- INFLATION IS ACCOUNTED FOR ONLY AFTER YEARLY EXPENDITURES ARE TOTALLED
- ALL COSTS ARE ESTIMATED IN 2010 DOLLARS

	52	53	54	55	56	57	58	59	60	61	62	63	64	65	TOTALS	WORK DESCRIPTION	
	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
				\$4,000											\$4,000	Grounds Lighting	
				\$4,000											\$4,000	Pavers	
				\$210,000										\$170,000	\$210,000	Parking Garage Roof Membrane	
				\$10,000					\$10,000						\$390,000	Parking Garage Traffic Membrane	
									\$14,000						\$30,000	Parking Garage Ramp	
													\$7,000		\$28,000	Visitor Parking Traffic Membrane	
				\$40,000							\$180,000				\$40,000	Asphalt Pavement	
										\$180,000	\$180,000				\$40,000	Metal Railings	
										\$130,000	\$130,000				\$720,000	Balcony Waterproofing	
															\$260,000	Balcony Guard Rails	
															\$40,000	Metal Siding	
					\$35,000						\$35,000				\$175,000	Exterior Painting & Staining	
										\$28,000	\$28,000				\$60,000	Exterior Caulking	
															\$1,100,000	Windows	
															\$220,000	Sliding Glass Patio Doors	
							\$15,000				\$10,000				\$50,000	Overhead Garage Doors	
															\$6,000	Metal Service Doors	
															\$15,000	Main Entrance Doors	
				\$140,000											\$140,000	Unit Entrance Doors	
															\$180,000	Apartment Roof System	
															\$25,000	Swimming Pool Roof System	
															\$6,000	Swimming Pool Metal Roof System	
			\$50,000												\$100,000	Swimming Pool Coating	
															\$90,000	Lobby Refinishing	
															\$140,000	Interior Carpet	
				\$70,000										\$7,000	\$14,000	Ceramic Tile	
														\$2,000	\$4,000	Mosaic Tile	
														\$12,000	\$24,000	Vinyl Tile	
															\$90,000	Wallpaper	
									\$12,000						\$36,000	Common Equipment Furnishings	
				\$20,000				\$16,500					\$500	\$1,000	\$50,300	Plumbing & Drainage	
				\$2,250										\$5,000	\$30,000	Fire Protection	
											\$2,000	\$8,000			\$51,750	Ventilation Systems	
				\$45,000					\$1,000					\$2,500	\$240,500	Heating and Air Conditioning	
									\$1,500						\$53,000	Pool Equipment	
															\$60,000	Electrical Distribution	
												\$15,000			\$30,000	Fire Alarm System	
												\$35,000			\$35,000	Emergency Power System	
															\$16,000	Door Entry System	
														\$16,000	\$48,000	Barrier-Free Automatic Door Operators	
															\$24,000	Electric Heating	
				\$2,500										\$2,500	\$355,000	Elevators	
	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$186,000	Contingencies Allowance	
				\$20,000		\$10,000				\$20,000	\$15,000			\$15,000	\$211,000	Engineering Fees	
		\$9,000			\$4,500						\$4,500			\$9,000	\$76,500	Reserve Fund Study Updates	
															\$5,682,050	EXPENDITURES, BEFORE INFLATION	
		\$15,000	\$56,000	\$573,750	\$45,500	\$236,000	\$21,000	\$31,500	\$47,000	\$364,000	\$410,500	\$76,000	\$13,500	\$248,000	N/A	EXPENDITURES, AFTER INFLATION	
	\$9,130	\$23,395	\$89,524	\$940,156	\$76,421	\$406,291	\$37,057	\$56,975	\$87,135	\$691,707	\$799,572	\$151,734	\$27,626	\$520,197	N/A	ANNUAL CONTRIBUTIONS	
	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	\$303,789	N/A	EARNED INTEREST
	\$28,401	\$38,023	\$46,714	\$41,709	\$38,751	\$39,772	\$43,484	\$52,629	\$61,290	\$60,549	\$48,935	\$45,191	\$53,088	\$55,616	N/A	REMAINING FUND: FUTURE DOLLARS	
	\$1,108,240	\$1,426,658	\$1,687,637	\$1,092,979	\$1,357,099	\$1,254,370	\$1,604,596	\$1,904,030	\$2,181,974	\$1,884,606	\$1,407,759	\$1,605,006	\$1,934,298	\$1,773,466	\$1,773,466	REMAINING FUND: 2010 DOLLARS	
	\$728,330	\$914,724	\$1,055,664	\$667,014	\$807,998	\$751,854	\$908,315	\$1,052,691	\$1,176,936	\$975,958	\$722,743	\$803,912	\$945,197	\$945,487	\$845,487		