CAPITAL REPLACEMENT PLANNING

Manual for Co-operative and Non-Profit Housing Providers

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CAPITAL REPLACEMENT PLANNING MANUAL FOR CO-OPERATIVE AND NON-PROFIT HOUSING PROVIDERS

Produced by the Canadian Housing and Renewal Association in collaboration with the Co-operative Housing Federation of Canada and the Ontario Non-Profit Housing Association.

Canada Mortgage and Housing Corporation provided funding for this project and additional input.

This manual will be useful to all providers who are undertaking Capital Replacement Planning. It can be used in conjunction with CMHC's Capital Replacement Planning software and User Guide to provide non-profit and co-operative housing sponsors with an effective tool for planning and budgeting for capital replacement projects associated with their housing portfolios.

CMHC offers a wide rage of housing-related information. For details, call 1 800 668-2642 or visit our home page at www.cmhc.ca

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Introduction

Co-operative and non-profit housing corporations need capital reserve funds to be ready to pay for major replacements and repairs as their buildings age.

This manual provides housing providers with a step-by-step plan and tools to be ready for long-term replacement.

Capital replacement planning means taking a long-term view of the physical and financial needs of your property.

Your non-profit or co-op housing corporation needs two budgets: the annual operating budget and a Capital Replacement Plan.

The annual operating budget concentrates on the **routine maintenance** for the next year.

The Capital Replacement Plan looks at **major repairs and replacements** over a number of years. It is also known as a Replacement Reserve Plan or a Reserve Fund Plan.

The Capital Replacement Plan will help you to budget and set aside enough funds for each year operating your co-op, so that you can pay for large repairs and replacements.

A Capital Replacement Plan allows you to plan, budget or pay for large replacements without large rent increases or emergency financing. This manual will help you reduce and even get rid of some of these risks. It shows you how to create and use a Capital Replacement Plan so that:

- sufficient funds are available when they are needed,
- replacements are made at the right time and are affordable, and
- rents remain stable.

If CMHC directly administers your project, see the CMHC Bulletin, *Replacement Reserve Guide*. It defines capital items, explains how reserve funds work, provides what you need for purchasing, and describes CMHC's approval process.

This manual also contains useful information for all non-profit corporations, whether funded by CMHC or not.

How to use this manual

This manual provides the information that a Board needs to understand and oversee the process of planning capital replacements. It describes how to develop a Capital Replacement Plan and how to keep it up to date.

Each chapter begins with an overview of the material to cover and a step-by-step description of the tasks. Detailed information on technical matters can be found in the appendices.

If you are unfamiliar with capital replacement planning

- review Chapters 1-4 to understand the steps involved.
- use Chapter 1 for help in deciding roles and responsibilities.
- complete the steps in each chapter before moving to the next one.

If you already have a Capital Replacement Plan

- preview the material in Chapters 1-4 to see if there is anything you may want to add to your plan.
- carry out the suggestions for using your plan. You will find them in Chapter 5.

Chapter 1
Creating a Capital Replacement Plan

A Capital Replacement Plan has two parts that help organize information about the physical condition and the financial needs of your property over the long term.

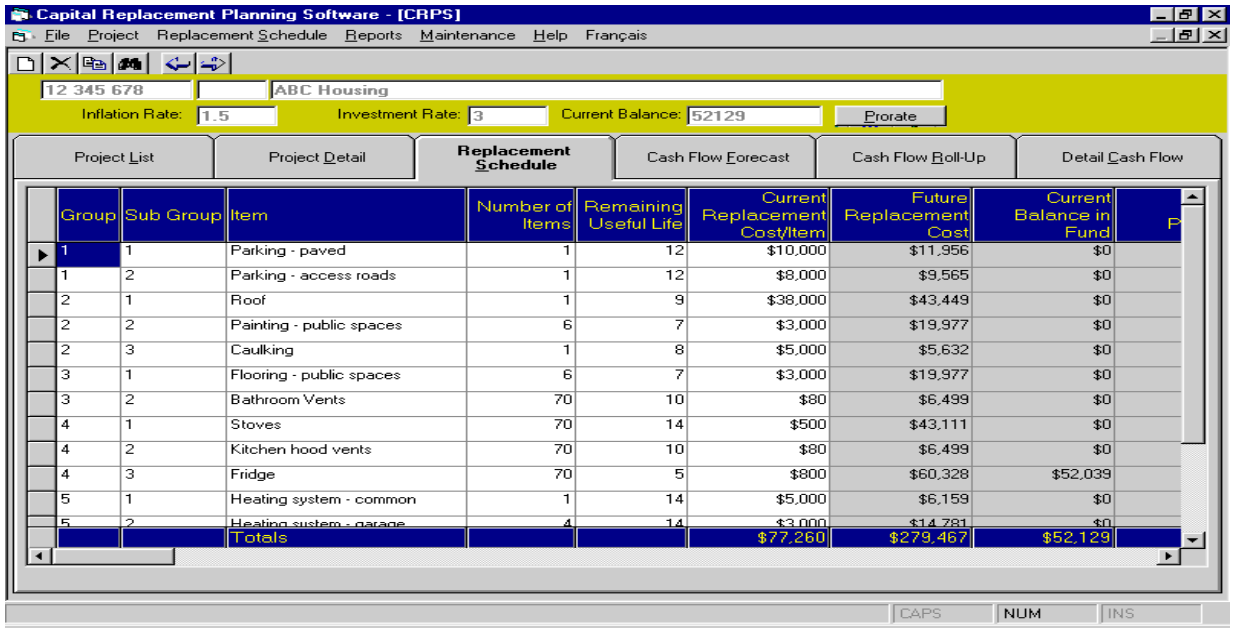
Part 1 - Replacement Schedule

The first part is a Replacement Schedule, which shows future capital replacement needs and how much money you must put aside to carry out the replacements.

Information about the current condition of the building and its equipment is the basis of predicting when you will need replacements. Current replacement costs and assumptions about future inflation are the basis for estimates.

Figure 1 shows a sample from one type of Replacement Schedule. The third column lists the replacement items. The next three columns show information about the current condition and cost of each item. The remaining columns show the results of calculating when you will need replacements. We will describe how to set up a Replacement Schedule later in this manual.

Figure 1: Replacement Schedule

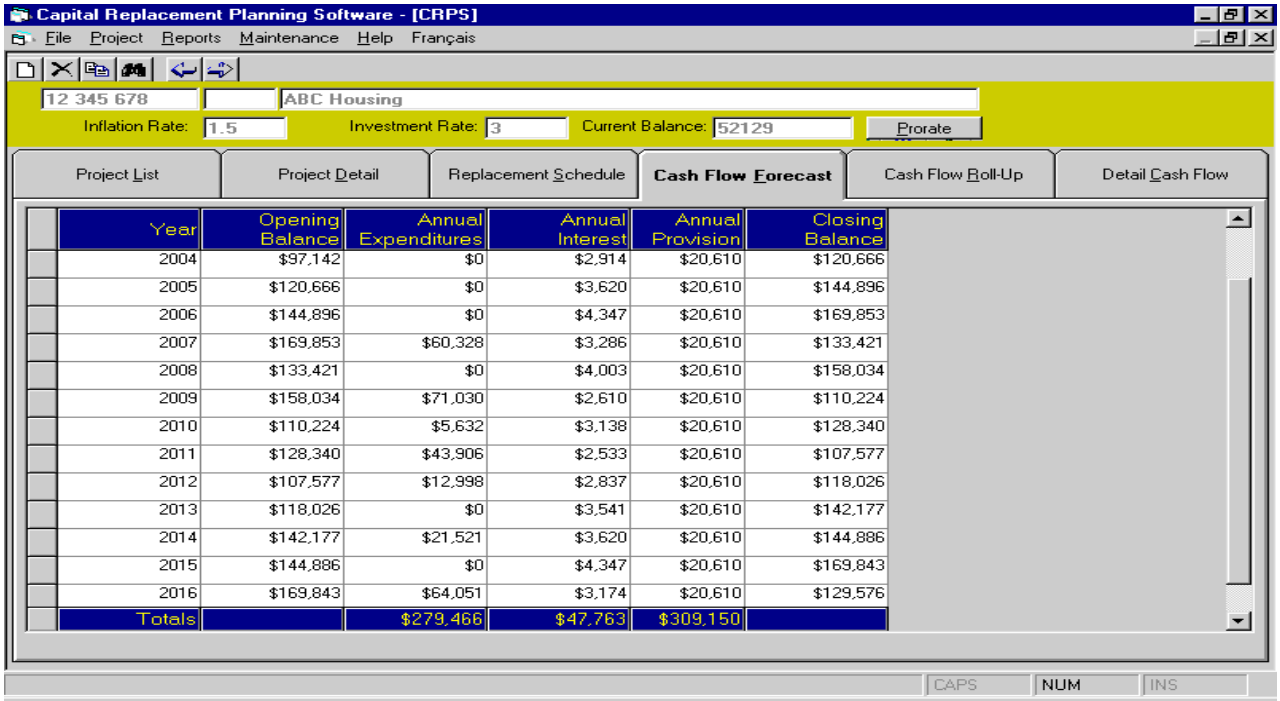


Group	Sub Group	Item	Number of Items	Remaining Useful Life	Current Replacement Cost/Item	Future Replacement Cost	Current Balance in Fund
1	1	Parking - paved	1	12	$10,000	$11,956	$0
1	2	Parking - access roads	1	12	$8,000	$9,565	$0
2	1	Roof	1	9	$38,000	$43,449	$0
2	2	Painting - public spaces	6	7	$3,000	$19,977	$0
2	3	Caulking	1	8	$5,000	$5,632	$0
3	1	Flooring - public spaces	6	7	$3,000	$19,977	$0
3	2	Bathroom Vents	70	10	$80	$6,499	$0
4	1	Stoves	70	14	$500	$43,111	$0
4	2	Kitchen hood vents	70	10	$80	$6,499	$0
4	3	Fridge	70	5	$800	$60,328	$52,039
5	1	Heating system - common	1	14	$5,000	$6,159	$0
5	2	Heating system - garage	4	14	$3,000	$14,781	$0
		Totals			$77,260	$279,467	$52,129

Part 2 - Cash Flow Forecast

The second part is a Cash Flow Forecast as in Figure 2. It describes how much money flows into and out of your Replacement Reserve Fund every year for the period of the plan. There are different approaches to preparing a cash flow forecast. We discuss the details starting on Page 16.

Figure 2: Cash Flow Forecast



Year	Opening Balance	Annual Expenditures	Annual Interest	Annual Provision	Closing Balance
2004	$97,142	$0	$2,914	$20,610	$120,666
2005	$120,666	$0	$3,620	$20,610	$144,896
2006	$144,896	$0	$4,347	$20,610	$169,853
2007	$169,853	$60,328	$3,286	$20,610	$133,421
2008	$133,421	$0	$4,003	$20,610	$158,034
2009	$158,034	$71,030	$2,610	$20,610	$110,224
2010	$110,224	$5,632	$3,138	$20,610	$128,340
2011	$128,340	$43,906	$2,533	$20,610	$107,577
2012	$107,577	$12,998	$2,837	$20,610	$118,026
2013	$118,026	$0	$3,541	$20,610	$142,177
2014	$142,177	$21,521	$3,620	$20,610	$144,886
2015	$144,886	$0	$4,347	$20,610	$169,843
2016	$169,843	$64,051	$3,174	$20,610	$129,576
Totals		$279,466	$47,763	$309,150	

For more information about capital replacement and reserve funds, see the CMHC Bulletin *Replacement Reserve Guide*. It defines capital items, explains how reserve funds work, provides purchasing requirements and describes CMHC's approval process. It contains useful information for all non-profit corporations whether or not they are funded by CMHC.

Planning Steps

There are three basic steps in creating a Capital Replacement Plan. Below is a short summary of these steps and the following chapters describe them in detail.

Step 1 – Collect Information

The first step is to collect information on the **current condition** of your property. Most of the information you collect in this stage is about the physical condition of your property. You will also collect some background information about your finances and program needs. Chapter 2 describes five key tasks for completing this step.

Step 2 – Make Predictions

The second step is about the **future needs** of your property. The information you collected in Step 1 will be used to prepare the Replacement Schedule and the Cash Flow Forecast. You will test different possibilities for the future to find how much you need to add to the Replacement Reserve Fund each year and to point to the possible risks. Chapter 3 covers the four key tasks for making predictions.

Step 3 – Get Approvals

The third step is to get approval for the Capital Replacement Plan. You will need to prepare a report for the Board that will sum up the information collected in Step 1 and describe the conclusions reached in Step 2. In some cases, you will also have to obtain approval for the Plan from your funding authorities. Chapter 4 outlines the tasks for getting approvals.

The amount of time you need to complete each step depends on whether you are starting a first Capital Replacement Plan or revising one. Revisions are usually quicker because most of the information you need for revision is already in place.

The first Capital Replacement Plan should be prepared when the building is one to three years old. This allows for enough time to prepare for the first replacements, which are likely to start when a building is seven to eight years old. Once you have a Plan, bring it up to date at least every three years. **If you do not have a Plan, you should start to prepare one now.**

Deciding Who Does What

Some organizations use their own staff or volunteers to do the planning work. Others hire consultants to do some or most of the work in Steps 1 and 2. There are several key issues to consider when deciding who will be responsible for each of the tasks described above. These key issues are:

What is the Size and Complexity of your Property?

A simple property has only a few unit types. Their mechanical and electrical systems are easy to understand.

Large projects and projects with several buildings are usually complex. High-rise buildings are likely to have complex mechanical and electrical systems.

How Much Information do you have Already?

If there are previous technical reports available for your property, you may already have a lot of the information that you will need*. You will need less information to bring an existing Capital Replacement Plan up to date than you needed when you first established the Plan.

If this is your first Capital Replacement Plan, you can get a head start if you locate construction documents such as building plans and specifications.

Who is Available?

You or your property management firm may have a staff person who has detailed knowledge about your property and technical expertise in evaluating building conditions.

1. _____

* In Ontario, some municipalities commission replacement reserve fund studies on behalf of all non-profit providers and co-ops in their area. Early indications are that these studies will provide the information necessary for preparing a Capital Replacement Plan.

Building science consultants and engineers can offer specialized knowledge and expertise in evaluating your property for fees. The fees normally range from $3,000 to $10,000. They can help identify building problems that are only starting to appear and usually have little impact on routine operations.

Many consultants provide pre-programmed reports so you should review their reports carefully to be sure that the details about your property are correct. Many consultants and engineers carry liability insurance to cover any errors or omissions in their reports.

You could try hiring consultants for only the most technical parts of the work, such as inspecting the structure or the mechanical systems [1].

If you hire a consultant, make sure your contract specifies the following:

- the minimum qualifications
- reports will be written in plain language
- provide all data in electronic format, compatible with software of your choice.

See Appendix C for more help with hiring a consultant.

What Can You Afford?

Consultants' fees vary, depending on how much you ask them to do and how complex your property is. With careful scheduling, you may be able to spread the cost of their work across more than one fiscal year.

You may be able to use money from your Replacement Reserve Fund to pay for some or all of the costs of preparing a Capital Replacement Plan. You will need approval from Canada Mortgage and Housing Corporation (CMHC) before using reserve funds for this purpose if your co-op has received funding under a federal program.

1. In Québec, Loi 132—modified on December 5, 2000—requires the use of an architect for projects greater than 4 units, when exterior work is required (for example, roof, windows, and so on).

The most important strategy for keeping fees affordable is a competitive process for choosing the consultant. Other strategies include doing the work in stages. For example, you could do one building at a time or hire consultants for only the most technical parts of the work.

This manual includes suggestions for working with consultants so that you are prepared for setting the terms of reference and managing their work. A similar disciplined approach should also apply when you prepare a plan with staff who will be working on the project.

You do not need to be an engineer or a financial whiz to understand, prepare and use a Capital Replacement Plan. This manual will lead you through each step. It uses illustrations and samples to show you where you are going and provides checklists to keep you organized along the way.

Chapter 2
Collect Information

A Capital Replacement Plan needs accurate and up-to-date information. The effort you spend on collecting information will pay off for many years. You can find the information from a detailed physical inspection of the property and from your management records.

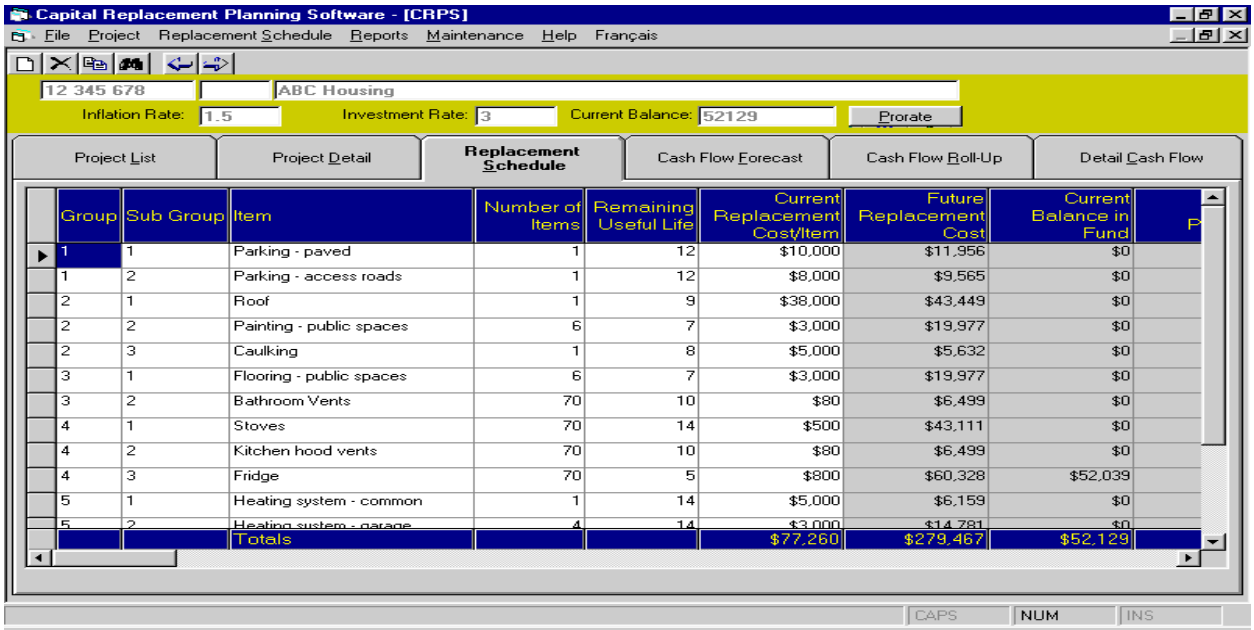
Task 1: Prepare a Building Inventory

Before creating the Replacement Schedule, you or your consultant should prepare a list of all the replacement items in your property.

The Building Inventory should contain a complete list of the systems, components, appliances and equipment that may need major repairs or replacements in the future (see Appendix A for an example of the category list.)

Figure 3 illustrates one suggestion for organizing the information in a Building Inventory. Your consultant or planning software may use a different format to prepare the Building Inventory.

Figure 3: Building Inventory



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		Totals			$77,260	$279,467	$52,129

For detailed information about Creating a Building Inventory with Useful Life Estimates, see Appendix A.

Task 2: Assess Useful Life

Assessing useful life calls for an assessment of when and how often replacements are made. The normal and actual service life of major components are two of the most important pieces of information in a Capital Replacement Plan. For each item, you need to know:

- the remaining useful life – **when** the next replacement will occur, and
- the normal useful life – **how often** future replacements will be necessary.

The normal useful life of each item is based on industry standards (for example, exterior balcony sliding doors 18-24 years, fire hoses 8-16), but there are other factors that can affect the "normal useful life" of your property.

A component's "effective age" is the basis of the remaining useful life. The "effective age" means that the component is better or worse than its age suggests. For example, the normal "age" to replace an appliance may be in the range of 5-10 years. However, with good preventive maintenance and care, the appliance may not need replacement for 10-15 years. The useful life estimates will have a major impact on the necessary annual allocation to the replacement reserve.

Some of the conditions that may result in a reduction in useful life are:

- poor quality construction methods
- poor quality materials
- inadequate maintenance
- microclimate conditions that increase wear, such as salt-water atmosphere, freeze-thaw cycles, local humidity levels, etc.
- higher than normal wear and tear.

Condition Survey

A Condition Survey can help you assess the remaining useful life of building components. The Condition Survey contains information about immediate or possible problems with the condition of your property. A qualified engineer, an inspector or a building science specialist usually prepares the survey, inspects the property and prepares a report with observations and recommendations.

The Condition Survey should include the following information:

- an inventory of all the property's systems, components and equipment
- observations about problems related to building safety, structural integrity, building function and compliance with building codes
- consultant's insights on the cause of each problem and recommendations for follow-up, and
- estimates for normal life and remaining life. Actual conditions in your property are the basis of these estimates.

The assessment provides useful life estimates and develops priorities for future replacements. The survey is especially useful in preparing a Capital Replacement Plan for the first time. This survey could form part of the regular inspection of your project where funding agencies want them.

In addition, you may also ask the consultant or inspector to provide:

- advice on preventive maintenance routines and other steps to prolong the useful life of items
- recommendations for any additional study or testing that is useful
- priority lists for the replacements, especially those needed in the next three to five years.

Do You Need a Technical Audit?

A Technical Audit is a more detailed study than a Condition Survey. It looks for construction and design defects. It involves intensive inspections, sometimes with destructive testing to see construction details hidden in the walls and ceilings.

A Technical Audit is useful before the construction warranty period expires or if you suspect major building problems. It is more expensive than a Condition Survey and is usually not necessary for capital replacement planning.

Task 3: Estimate Replacement Costs

At this stage of planning, you may estimate the cost of making major repairs or replacement. There are three ways to get estimates of replacement costs:

- develop your own estimates by talking to contractors and suppliers,
- use publications in your local library (see suggestions below), or
- hire a consultant.

You are not looking for quotes or firm bids now. You will get formal quotes at the time you make a replacement.

Bring your estimates of replacement costs up to date on a regular basis, usually every three years. Hiring a consultant every time may be expensive. Instead, you may refer to costing guides in your local library. These publications contain cost information with regional cost adjustments. They are often only available for use in the library and not available for checkout. They quote unit prices so it will also be necessary for you to include quantities in your Building Inventory. Bring them up to date every year. Two of the most common publications are:

- *Hanscomb Yardsticks for Costing,* published by Southam Business Publications, and
- *Means Residential Cost Handbook,* published by R.S. Means Co.

Major replacement jobs may involve extra costs for design fees, project manager and tenant-related costs for relocation or miscellaneous expenses.

As well, there may be hidden costs such as extra staff time to co-ordinate the work.

Task 4: Assess Financial Position

This task is simple because it needs only a few documents that should be easy to find. These documents are:

- annual audited financial reports from the last two or three years, and
- a copy of the most recent Capital Replacement Plan.

Usually, your audited annual financial reports will contain statements of what is happening in the reserve fund. Financial statements and the previous Capital Replacement Plan can help you to:

- evaluate reserve fund income in recent years
- identify trends in investment earnings, and
- compare what actually happened with the previous plan.

A general review of the financial reports may also point out financial conditions that could affect the Plan. For example:

- an operating surplus could top-up the Replacement Reserve Fund if necessary;
- the need to overcome an operating deficit could limit the opportunities to increase funding to the Replacement Reserve Fund; and
- changes in mortgage payments or other debt payments may affect the amount of operating revenue that is available for allocations to the Replacement Reserve Fund.

Task 5: Identify Program Requirements

Operating Agreements between your housing organization and federal, provincial or territorial funding agencies may contain rules and regulations that could affect your planning for capital replacement. Your rules depend on which level of government administers your funding and under which program it was developed.

There are several ways that your funding agency may restrict or regulate the management of your capital replacements and reserve funds. Some of the most common regulations include:

- a minimum annual allocation
- a requirement to keep interest earned on investment in the Replacement Reserve Fund

- a target for the amount in the Replacement Reserve Fund
- spending approvals before making any capital replacements, and
- restrictions on the type of investments you can make.

Review your program requirements each time you prepare a Capital Replacement Plan. Funding agencies may issue program directives from time to time that revise previous regulations.

Where to Find Program Requirements

- Operating Agreement
- social housing legislation and regulations
- program guidelines, such as conflict of interest
- program directives

The Capital Replacement Plan must also meet your organization's policies and by-laws. Examples include spending and investment policies.

Chapter 3
Make Predictions

When you have a complete picture of the current condition of your property, you are ready to look ahead. In this step, you will make calculations, prepare forecasts, and identify potential risks.

If you are doing the work yourselves, you have a choice of tools to use. These include constructing the Capital Replacement Plan with a simple spreadsheet program or using a software tool designed for that purpose. CMHC has a computer program that will help you predict future reserve fund needs and test different assumptions about the rate of inflation, investment income and other factors.

Task 1: Construct a Replacement Schedule

The Replacement Schedule is a timeline showing the replacements for each year. It can predict the withdrawals from the fund for each year in the plan. The illustration below shows one approach in setting up a Replacement Schedule using a spreadsheet. To keep it simple, show all components of one type (for example, carpet) as being replaced at the same time rather than staged over several years.

Figure 4: Replacement Schedule

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		REPLACEMENT SCHEDULE											
3			Useful Life		Current	Year							
4		Item	Rem	Norm	Cost	1	2	3	4	5	6	7	
5		METAL HANDRAIL	1	6	7,200	7,200						7,200	
6		DRYERS	1	8	4,800	4,800							
7		WASHERS	1	8	6,400	6,400							
8		WOOD SIDING	2	10	36,000		36,000						
9		ASPHALT SHINGLES	3	15	113,400			113,400					
10		BALCONY RAILINGS	4	10	9,000				9,000				
11		CARPET	5	15	63,400					63,400			
12		EXTERIOR LIGHT FIXTURES	5	15	66,200					66,200			
13		VINYL TILE	5	15	75,600					75,600			
14		BATH VANITIES	5	20	25,900					25,900			
15		SUITE EXHAUST FANS	6	20	47,300						47,300		
16		BALCONY SLIDING DOORS	6	20	100,800						100,800		
17		TOTAL CURRENT COSTS				18,400	36,000	113,400	9,000	231,100	148,100	7,200	
18		FUTURE COSTS	INFLATION		3.00%	19,000	38,200	123,900	10,100	267,900	176,800	8,900	
19													

Figure 4 shows some of the expenditures to the end of year 7. Your schedule should continue for the period of the planned replacement. Note that this excludes recurring replacements.

HOW TO CONSTRUCT THE REPLACEMENT SCHEDULE

Method 1 - Using a generic or other available spreadsheet software.

1. **Put current costs into future replacement years.**

   From the survey assessment made in task 2, use the remaining life to determine the next replacement.

2. **Calculate the total number of replacements to be made and the total costs of making the replacements for each year.**

3. **Calculate the inflation index for each year.**

   Decide the inflation assumption you will use. Then create the index for each year. CMHC recommends that you use the CPI factor (see page 16).

4. **Calculate future costs.**

   For each year, multiply the current cost by the inflation index (CPI).

See Appendix A for detailed information on preparing a Replacement Schedule.

HOW TO CONSTRUCT THE REPLACEMENT SCHEDULE AND DETERMINE THE ANNUAL PROVISION AND CASH FLOW

Method 2 - Using CMHC Capital Replacement Planning Software (CRPS)

1. **Current Balance.**

   Confirm balance in reserve fund.

2. **Inflation Rate.**

   Set the inflation rate you will use for the entire period. Usually you will use the most current CPI factor for the calculations.

3. **Investment Rate.**

   Set the expected investment rate of return. Usually you will use the current 5-year GIC or historical return.

4. **Remaining Useful Life.**

   Set the year of the replacement based on the remaining useful life (using normal life expectancy and current condition).

5. **Current Cost**

   Decide the current replacement cost for the items identified.

6. **Annual Provision**

   Calculate the required annual provision to undertake the replacements in the years planned. CRPS will**:**

   - prorate the existing balance among the replacements
   - calculate the future replacement cost using the annual inflation rate as a basis
   - calculate the annual investment return and remaining balance in the fund, taking the addition of the annual provision and reduction for the future replacements into consideration, and
   - decide the annual provision necessary to meet the planned replacements.

Scenarios

Compare the necessary allocation to the current allocation and the available budget. You may need to do more calculations to arrive at an acceptable future capital plan. You can use CRPS to test various scenarios.

Inflation Rate

The Statistics Canada Consumer Price Index (CPI) is the generally accepted measure for the rate of inflation. Most people accept it and refer to it. An analyst will also take into account current market rent levels to find practical limits to increases in rents. These limits may become important if your co-op needs increases in annual allocations to the Fund.

Investment Rate

Your investment return in previous years is a starting point for the assumption about investment return in future years. For a conservative approach, use the most current 8-year rate available for Guaranteed Investment Certificates (GICs). A Capital Replacement Plan may cover a period from 10-20 years. This allows you to make detailed plans for the next 5-10 years and see what is likely to happen in the following decade. There is not much advantage in making your plan longer. The farther in the future you look, the more uncertain your predictions become.

Task 2: Prepare Cash Flow Forecasts

Cash flow forecasts show the flow of dollars in and out of the Replacement Reserve Fund over the next 20 years. The forecasts include:

- forecasts of **future withdrawals,** based on the Replacement Schedule.
- forecasts of **future income**, using your assumptions about your allocations and investment plans.

Figure 5: Cash Flow Forecast

CASH FLOW FORECAST

Assumptions		Year 1	2	3	4	5	6	7
BALANCE AT START OF YEAR		280,000	321,748	345,556	279,940	331,011	111,903	-19,937
WITHDRAWALS		-18,952	-38,192	-123,915	-10,130	-267,908	-176,839	-8,855
ALLOCATIONS		45,000	45,000	45,000	45,000	45,000	45,000	45,000
INVESTMENT INCOME	RATE 6.00%	15,700	17,000	13,300	16,200	3,800	0	0
BALANCE AT END OF YEAR		321,748	345,556	279,940	331,011	111,903	-19,937	16,208

There are many ways to prepare a cash flow forecast. Figure 5 illustrates a spreadsheet approach. Its focus is the balance in the reserve fund at the end of each year.

HOW TO CONSTRUCT THE CASH FLOW FORECAST

1. **Balance at start of year**

   For Year 1, use the current balance in your Replacement Reserve Fund.

2. **Withdrawals**

   Use the future replacement costs that you calculated in the Replacement Schedule.

3. **Allocations**

   When you first set up the Cash Flow Forecast, use the amount that you are now setting aside each year. This may not be enough, so we describe ways of dealing with shortfalls below.

4. **Investment income**

   Make an estimate of how much you can earn on your investments. Your knowledge about what you earned in previous years is the basis of this forecast.

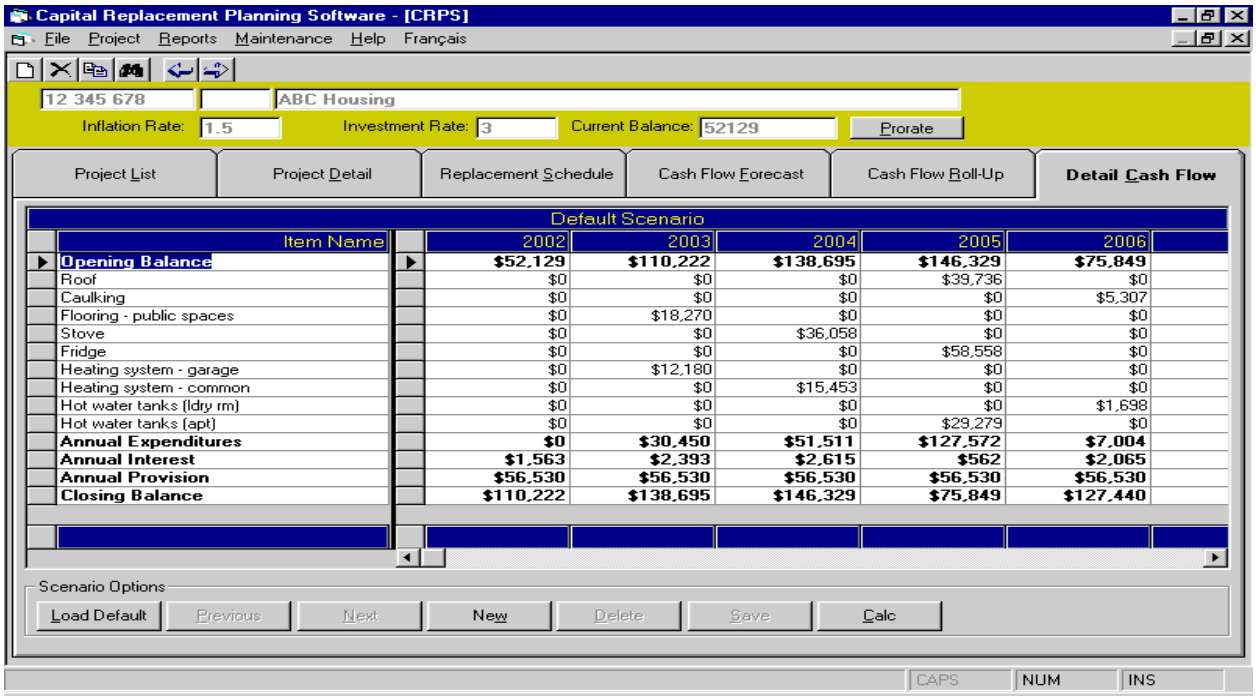
   The example (see 5) calculates investment income on the balance at the start of the year less the expected expenditures.

5. **Balance at end of the year**

   This is equal to: [balance at start] – expenditures + allocations + investment income. If the balance at the end of the year is below 0, then you have a shortfall and you need to make some changes.

Note: You perform Tasks 1 and 2 at the same time when you use CRPS, which automatically generates the replacement schedule and the cash flow forecast as you perform Task 1. The cash flow forecast screen will appear as shown in Figure 6.

Figure 6: Cash Flow Forecast-CRPS



Task 3: Acceptable Annual Provision

You may have to adjust the plan if:

- the present allocation is not enough for future replacements, or
- the balance at year end is negative (a shortfall).

There are two types of shortfalls in a Replacement Reserve Fund:

- a short-term deficit that you overcome after one or two years, and
- a continuing deficit that increases each year.

A short-term deficit is often the result of very high expenditures for a one-or two-year period. You can often solve that problem by making adjustments in the Replacement Schedule. For example, you may be able to move some expenditures to a later year or spread the cost across more than one year.

A continuing deficit is the most severe situation and usually needs major changes in all parts of the Plan. Your goal is to reach a positive balance for the Fund.

See Appendix B for detailed information on how to overcome shortfalls.

Note: CMHC's CRPS does not generate a shortfall. The software generates an annual amount that is enough to cover future replacement costs. Housing providers must then decide whether they can fund the Replacement Reserve Fund at this level.

Increase planned allocations

Future planned allocations must increase every year to keep pace with future inflation. Here are some of the methods for setting up such increases.

Index
In this approach, the amount of the contribution (planned allocation) increases by a percentage formula each year. This percentage may be fixed or tied to the inflation rate using the CPI.

Non-profit corporations with a large shortfall may need to use an index that is well above the inflation rate for several years in order to catch up. In some cases, legislation sets the index you must use.

Step
This approach uses a fixed dollar amount for the annual increase.

Try different inflation rates and combinations of the index and step methods. You will find that more than one combination or method will overcome the shortfall. Choose an approach that is best suited to your needs.

Improve investment return

This manual does not offer investment advice. Consult a certified financial adviser to develop the investment plan that suits your needs.

Note: Most federal, provincial and territorial housing programs require housing providers to maintain reserve funds in certain types of secured investments, or they may have explicit investment criteria that apply to investment of reserve funds.

Here are some options to look at in managing your investment strategy.

- Make sure you are taking full advantage of the types of investments available to you. Do not allow funds to sit in low-interest accounts. This does not put your funds to the best possible use.
- Deposit your allocations to the Replacement Reserve Fund as soon as possible. Adding contributions to your investments on a regular basis, rather than waiting until year-end, could increase the earnings of the Fund.
- Match investment durations and maturity to the time of expenditure. Invest appropriate amounts in short and medium-term vehicles to make sure that sufficient funds are available for short and medium-term expenditures.

A final caution about assumptions on investment income is necessary. It may be tempting to solve shortfalls by assuming you can increase your investment return. This may be short-sighted since:

- there is usually a time lag before changes in investment practices will have an effect on your return, and
- there is a danger that the necessary changes in investment practices will not be fully carried out.

If you are too optimistic about investment income, the Capital Replacement Plan will not work.

Make lump-sum payments

Transfer surplus funds from fund-raising efforts, operating surpluses or other sources to the reserve fund. Take into account these reserve funds in preparing the Capital Replacement Plan. The withdrawal of surplus funds to meet other needs, such as operating deficits, is also important.

Task 4: Identify Risks

In calculating and developing the Replacement Reserve Fund forecasts, build into them these three main risk factors:

- economic conditions may be different than you forecast,
- replacements may occur sooner or may cost more than you estimated, and
- investment returns may not live up to your expectations (outcomes fall below expectations).

HOW TO IDENTIFY RISKS

1. **Make a list of the assumptions in your cash flow forecast**

   The most common assumptions are inflation rate (used in the Replacement Schedule) and interest rate for investment income. The forecasts for the remaining life of components is another group of assumptions that you could test.

2. **Find values that will make the Plan fail**

   Manipulate your calculations and create various scenarios with the information you have gathered until a shortfall occurs. For example, if an inflation rate of 3% was used at the beginning in calculations, then try higher values such as 3.5%, 4%, and 4.5%. Make note of the inflation level/rate which will cause the Plan to fail (result in a shortfall). Repeat this test for each of the other assumptions. Another option could be to try lower investment rates or shorter remaining life on the most expensive replacement item.

3. **Decide on how to deal with the risk**

   If only a small change causes the Plan to fail, you should consider revising the Plan. For example, your Plan is too risky if it is based on an investment return of 6% but fails with an investment return of 5.5%. See the previous section on getting rid of shortfalls for suggestions on revising the Plan. Otherwise, use your notes to set up a monitoring system as described in Chapter 5.

You need continuous care to manage these risks after the plan is in place. In fact, risk management begins much earlier. You need a clear picture of which assumptions can cause the most trouble if the predictions are wrong.

There is no way to be certain about future economic condition. However, you can note the variables that have to be monitored. Using the cash flow spreadsheet, you can test a variety of "what-if" scenarios to see how changes in a variable will affect the planned allocations. For example, you may have been too conservative (or optimistic) in forecasting returns on your investments. Some replacements may simply not be feasible (excluding health and safety items).

The purpose of these tests is to make sure that the final plan will be practical and realistic. When you are finished with these steps, you will have a draft Capital Replacement Plan.

The next chapters describe how to get the Plan approved and ready to put into practice.

Chapter 4
Get Approvals

When the Board adopts a Capital Replacement Plan, it has a duty to ensure that the Plan:

- meets government requirements (Non-Profit and Co-operative housing providers funded by CMHC must have their Capital Replacement Plans approved by CMHC and brought up to date at least every three years)
- proposes reasonable and possible goals for building maintenance and investments, and
- reduces the possibility of deficits in the fund over the life of the plan.

To help the Board fulfil its obligations, you must submit the Capital Replacement Plan with a written report and get government approval.

Task 1: Write Recommendations for Board Approval

It is helpful to write each recommendation so that it includes:

- a concise statement of the proposed decision
- a brief statement of what the recommendation achieves, and
- a list of the strengths and weaknesses of any options presented.

HOW TO MAKE RECOMMENDATIONS FOR THE CAPITAL REPLACEMENT PLAN

1. **Replacement Schedule**

   Recommend that the Board adopt the attached Replacement Schedule for forecasting the timing and cost of future capital replacements.

2. **Allocations**

   Recommend that the allocations to the Replacement Reserve Fund follow the pattern used in the Cash Flow Forecast. Describe the pattern in words. For example, the allocations will be set at $45,000 in year one and an increase to $48,000 will be phased in over the next three years. You can make recommendations for future allocations as a single proposal or with alternatives. There is usually more than one way to achieve a workable plan. The benefits of proposing several options include:

   - offers choices for the size and pattern of allocations,
   - requires the Board to follow an active process for decision making, rather than a rubber-stamp decision, and
   - shows the behaviour of the Fund under different conditions.

3. **Investments**

   Recommend that the Board adopt an investment strategy, in accordance with funding agency restrictions, that will reach the investment income put forward in the Cash Flow Forecast. Some non-profit organizations may already have a suitable investment strategy in place. If so, omit this step.

Task 2: Prepare Report for the Board

Your report should include the recommendations and essential background information such as:

- key findings from the technical reports
- statement about the current adequacy of the fund
- potential areas of improvement in management practices that are related to preventive maintenance and investments
- summary of your program requirements, and
- key findings from the cash flow analysis, including a description of possible consequences if you do not adopt the recommendation.

Task 3: Submit the Plan to Funding Authority, if Appropriate

Most funding agencies require you to set up a Replacement Reserve Fund and use it to pay for capital replacement expenditures. Some funding agencies have extra rules, such as pre-approval for each expenditure. The particular rule that applies in your case may depend on:

- which funding agency provides your subsidies, and
- the terms of your operating agreement or the present provincial legislation.

If you have an approved plan, CMHC does not need to approve individual expenditures. However, CMHC's approval is necessary for expenditures that are outside the plan (not of an emergency nature). You must also have an up-to-date Capital Replacement Plan every three years. New technical studies are not necessary for plan updates.

If you do not have an approved plan, CMHC requires pre-approval of all expenditures as set out in the terms of your operating agreements.

Chapter 5
Using a Capital Replacement Plan

Adopting a Capital Replacement Plan is an important step, but it is only the first step in managing future replacements. The real value of the plan depends on how well you use it. A good Capital Replacement Plan should enable you to make good management decisions.

While you are preparing a plan, you will put together useful information about your building and your financial condition. For example, the steps we describe in this manual may:

- alert you to hidden building problems
- help to point out maintenance priorities
- help you decide when to repair or when to replace
- assist in making purchasing decisions (which items, quantity and timing), and
- prompt you to examine your investment decisions.

After the Board approves the Capital Replacement Plan, you need to put it into practice. This includes making sure that:

- replacements are made when needed
- deposits to the Replacement Reserve Fund are properly invested, and
- regular reports show whether the plan is working.

Here are two checklists to help you get your Capital Replacement Plan working and to keep it up to date.

CHECKLIST 1 - **HOW TO IMPLEMENT THE REPLACEMENT SCHEDULE**

Routines to follow every year

- ❑ Inspect building condition.
- ❑ Assess priorities and modify Replacement Schedule if necessary. (See Appendix A for help in setting priorities).
- ❑ Use the Replacement Schedule to prepare a capital budget for next year's replacements.

Routines to follow for each replacement

- ❑ Get competitive bids from several contractors. This process should follow the recommended purchasing requirements (see Appendix E).
- ❑ Make sure that bonding, insurance, permits and warranties are in place and that the non-profit or co-op inspects and monitors contractor's work.
- ❑ Follow legislative requirements for notice to have access to units.
- ❑ Keep tenants informed of work you have planned. Give them estimates of how long it will take and the type of disruption to expect.

The routines listed above will help you:

- control the cost of replacements, and
- maintain quality of life for residents during the replacement process.

CHECKLIST 2 - **HOW TO MONITOR THE CASH FLOW FORECAST**

Every year, or more often

- ❑ Compare Replacement Reserve Fund results with the forecasts in the Capital Replacement Plan.
- ❑ If variances are small, adjust the timing of replacements or investment plans.
- ❑ If variances are large, revise the Capital Replacement Plan.

Add operating surpluses, if any, to the Replacement Reserve Fund within the terms of operating agreements or operating surplus policies.

Every three years

- ❑ Revise the Capital Replacement Plan.

If there is little or no replacement work, annual reports are enough. If you are concerned about possible shortfalls in the near future or if you are in a period of major replacements, quarterly or monthly reports are more useful.

If you are careful to keep up with your plans and processes, you can make sure that:

- you are following the replacement practices
- the investment plan is getting good results, and
- the financial results are as you expected.

Appendix A:
Technical Help for Collecting Information

This appendix includes extra information for readers who want detailed guidance in collecting the information in the Planning Manual. Its focus is on the technical building information that you or a consultant have put together during the first part of the planning process.

Creating a Building Inventory with Useful Life Estimates

A Building Inventory contains a complete list of all the building's components and systems.

See Appendix D, CMHC Capital Items Form, for a sample list of building components.

The list enumerates the most common building components for apartment buildings over five storeys. It shows useful life estimates based on different service levels. The items are grouped using standard construction headings.
This is a useful approach because it simplifies estimating costs, contracting replacements and sharing information with other providers. You may want to re-order the list so that it is more convenient during actual building inspection.

The information in the table in Appendix F is only a guide. The actual useful life of any building element can vary quite a lot. This variation depends on the quality of design, installation, and materials. Use and actual maintenance levels will also affect actual useful life. The table does not replace informed decision-making.

Note: The data in Appendix F comes from *Service Life of Multi-Unit Residential Building Elements and Equipment,* published by CMHC May 2000, in the Housing Technology Series. The report is the result of a survey of experienced building professionals across Canada, which provided real-life, non-theoretical estimates of service life for more than 230 building components.

Setting Priorities in the Replacement Schedule

Replacement priorities can help you make choices when you cannot afford to do all the capital replacements at the scheduled time. Some replacements cannot wait no matter how much they cost, because not making repairs may result in serious injury or damage.

A common approach is to assign a priority rating based on the following categories:

1. Life safety
2. Structural integrity
3. Legal requirements
4. End of useful life
5. Cost-effective initiatives.

The following example shows a more detailed and technical approach to defining priorities. An engineering firm that provides technical services to building owners developed this rating system for their own use. Buchan, Lawton, Parent Ltd. applies these standards when it inspects buildings for condition surveys and other technical studies. This example may contain more detail than you need, but it shows a way to rank priorities.

Example of Replacement Priorities

BUILDING CONDITION SURVEY INSPECTION – RATING SYSTEM

Sample provided courtesy of Buchan, Lawton, Parent Ltd.

1. Very poor	**Immediate major attention – life safety issues** Major work or complete replacement is required immediately; danger to the public or building occupants exists and cannot be ignored. Restricted access, hoarding or building evacuation may be warranted.
2. Very poor	**Immediate major attention – performance issues** Major work or complete replacement is required immediately; building element is no loner performing its intended function. Left unattended, a dangerous condition could develop or damage to other building elements could result.
3. Very poor	**Near end of service life** Major work or complete replacement is required in the near future, usually within one year. Building element is still performing its intended function, however, serious problems can be expected.
4. Poor	**Needs significant attention** Major remedial work is required in the near future. If action is not taken in the near future, further deterioration will likely result in complete failure of the system or building element.
5. Fair	**Sound but has signs of significant distress** The system or building element is performing its intended function and will continue to do so. Remedial work is required in the near future.

BUILDING CONDITION SURVEY INSPECTION – RATING SYSTEM

Sample provided courtesy of Buchan, Lawton, Parent Ltd.

6. Fair	**Basically sound, has some deficiencies** The system or building element is performing its intended function and will continue to do so. Some remedial work is warranted within the next two to three years.
7. Good	**Some deterioration or deficiencies** The system or building element is performing its intended function and is in good condition. A few minor repairs are required in addition to ongoing maintenance work.
8. Very good	**Some minor deterioration or deficiencies** The system or building element is performing its intended function and is in very good condition. Ongoing maintenance work is all that is required.
9. New condition	**Minor deficiencies** The system or building element is performing its intended function and is in new condition. Some work is required to repair minor deficiencies.
10. New condition	**No deficiencies** The system or building element is in new condition and does not have any deficiencies. No deficiencies observed.
X	**Element not visible and therefore, not inspected.**
*	**Building Code or safety issues**

Reviewing Consultants' Draft Condition Surveys

If you have engaged the services of a consultant, it is important to ensure that you are satisfied that the information is complete, accurate and presented in plain language. You do not need to be an expert to review the report, but it helps to include a person knowledgeable about the property in the review. You want to make sure that the report:

- includes all replacement items for your building

  It is easy to overlook equipments acquired after construction of the building because they will not appear in the construction documents.

- excludes items that do not exist in your building

  For example, a technical consultant may assume that all units have the same floor finishes. It is possible some units have ceramic tile on the bathroom floors and others have vinyl tile.

- states the correct quantity for each item

  Sometimes single items are easily overlooked, such as a refrigerator or stove in the community centre. This does not mean that you have to measure and count every item yourself. However, you should review it to make sure that the quantity appears to be in the ballpark.

- makes reasonable assumptions about future maintenance standards, and

  Preventive maintenance routine can extend the useful life of many replacement items. If you have a good preventive maintenance program, then ask your technical consultant to reflect that in the estimates of useful life. However, a Capital Replacement Plan will not be accurate if you are not realistic and assume a higher level of maintenance than the level that is likely.

- makes appropriate assumptions about the quality of the replacement components and equipment

  Sometimes the replacement will be a higher quality than the original installation. For example, higher quality carpets may last longer. There are usually many different factors that go into the calculation of "which is better — higher quality with less frequent replacement or lower cost with more frequent replacement." These types of calculation are called "life cycle costing." You may want the consultant to perform some additional work and help you make these calculations for selected major items.

It is important to review the cost estimates closely. A simple slip on the keyboard can turn an item that should be $3,225 into $322,500 (or the reverse). To narrow your search for potential errors, review the unit prices, especially those with very large or very small dollar amounts.

Organizing Key Documents

Several important documents contain useful information about your building. The following documents can help you prepare your Building Inventory because they contain information about installation techniques and materials, quantities and current condition. If you retain consultants to prepare a Condition Survey or other building reports, they may ask for access to some of these documents.

Construction drawings and specifications

The construction documents are important tools in reserve fund planning. They help technical consultants become familiar with the building and the construction techniques and materials used. They are used to measure important quantities, such as the number of square metres of carpeting that will be replaced in the future.

The construction drawings and specifications should have been handed over to the housing provider after the construction was complete. There may be separate sets for use by the general contractor, the mechanical contractor and electrical contractor. The specifications contain the detailed description of all construction procedures and materials. In some cases, the provider will have received "as-built" documents that clearly identify changes made during the course of construction. These could include revised drawings, a book of change orders, or both.

Technical consultants will want to review these documents before inspecting your property. Consultants will appreciate knowing in advance that you have put all of these documents together. It will make their job easier.

Renovation drawings / specifications

Renovation documents are not as detailed as original construction documents. The type of information contained in renovation documents will be similar to construction documents. However, they will contain drawings and specifications for only the parts of the building that were changed.

Previous replacements

Information about previous replacements should be readily available for both management and technical consultants.

Preventive maintenance records for building components and systems

Good preventive maintenance routines would extend the life expectancy of most building systems and components. The building's history of preventive maintenance will help technical consultants predict future maintenance expectations and estimate the remaining useful life of replacement items.

Previous inspection reports

Information from residents and staff can point to particular areas of concern and document the beginning of problems. Previous technical studies reduce the need to recalculate quantities and can provide useful insights for the current condition survey

Appendix B:
Technical Help for Making Predictions

This appendix contains additional information that you may use in making predictions about future capital replacement jobs. This information is more technical than the main part of this manual. It is intended mainly for the person or group responsible for developing the Replacement Schedule and the Cash Flow Forecast.

Adjusting the Replacement Schedule

Adjusting the Replacement Schedule is one technique for reducing annual provision where this is not possible within the current budget. Here are some of the adjustments you can make.

Reduce expenditures

You will not create enough impact on the cash flow forecasts by tinkering with low-cost items. Instead, you should focus on these types of expenditures:

- large expenditures early in the replacement schedule,
- replacements which can be phased in, and
- items with usually high average annual costs may be due to computer errors.

Once you have identified these items, you may be able to use some combination of the following options for adjusting the schedule:

- extend useful life with remediation
- extend useful life by increasing preventive maintenance routines for these items, and
- spread replacement of an item over several years.

You can reduce the demand on your Replacement Reserve Fund by spreading certain replacements over a period of years.

For example, you could decide to replace 20 per cent of the appliances each year for five years, instead of all at once.

Replacement items in suites are good for staged replacements. This is because their remaining life can vary greatly, depending on the wear and tear caused by individual residents. These include appliances, cabinets, flooring and other finishes.

Advantages of staging replacements across several years:

- Only items that are at the end of their useful life are replaced
- Withdrawals from the Replacement Reserve Fund are spread across several years

Disadvantages of this approach:

- Potentially higher per item costs (because of lower volume)
- Less efficient use of staff time

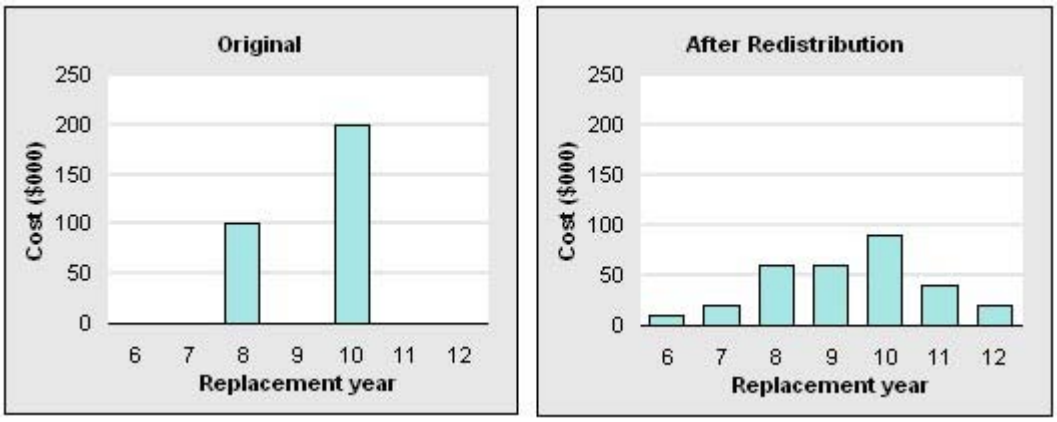
Redistribute annual expenditures

Replacement Schedules frequently contain important peak years, especially in years that are multiples of four and five. This is because calculation of book values for useful life is the basis of these multiples. For example, you will rarely find an item with a textbook useful life of 13 years. Instead, you will more commonly see 10, 12, or 15 years.

The peaks in the Replacement Schedule can result in large expenditures from the Fund in some years and smaller or zero expenditures in following years. A redistribution of annual expenditures will smooth out these peaks. Statistical analysis methods would also achieve the same result. Figure 7 illustrates the impacts of statistical redistribution. The benefits of this technique include:

- lower artificial peaks in the project expenditures
- more realistic view of the long-term demand on the Fund, and
- reduce the numbers or size of short-term Fund deficits.

Figure 7: Impact of Statistical Redistribution



Evaluating the Replacement Reserve Fund

Examine recent fund activity

A brief look at the Replacement Reserve Fund's recent activity will answer questions about:

- how your financial performance compares to what you planned
- what investment income is possible and realistic in the future, and
- what improvements could and will be made to your financial strategy.

The following template lists the calculations that are included in an evaluation of recent activity. It also suggests questions for you or the analyst to consider.

Replacement Reserve Fund Performance - Template

Replacement Reserve Fund Performance		
Data	**Calculation**	**Evaluation**
Information from financial report (previous 3-5 years)		
Allocation to fund	Average annual allocation over last three years	Are allocations keeping pace with inflation?
	Average change in allocation, if any	Did allocations conform to the Reserve Fund Estimates in the previous Capital Plan?
Investment income	Average annual return on investments over last three years	How did the rate of return compare with inflation?
Information from financial report (previous 3-5 years)		
Expenditures	Variance between planned withdrawals and actual withdrawals	Were expenditures higher or lower than planned? Were unit prices different than predicted? Were items replaced earlier or later than expected?
Investment income	Variance between expected income from investment and actual income	Were investments higher or lower than planned? Did you manage the investments effectively?
General	Variance between assumptions and actual inflation	Did the economy perform differently than expected?

Calculate current adequacy

Measuring the current adequacy of the Replacement Reserve Fund should indicate whether the current balance is sufficient to cover the cost of wear and tear that has already taken place. Figure 8 illustrates an approach for calculating fund adequacy with a spreadsheet. It uses information from the Replacement Schedule to find out if there is a shortfall in the Fund. Your consultant or planning software may use a different approach.

Figure 8: Sample Calculation - Fund Adequacy

	A	B	C	D	E	F	G	H
1								
2		Calculating Fund Adequacy						
3			Current	Useful Life			Annual	Req'd Fund
4			Cost	Norm.	Rem.	Age	Cost	Balance
5			*A*	*B*	*C*	*D*	*E*	*F*
6						*= B - C*	*= A / B*	*= D x E*
7		Refrigerators	63,000	10	5	5	6,300	31,500
8		Asphalt shingles	90,000	15	10	5	6,000	30,000
9		Balcony sliding doors	110,000	20	12	8	5,500	44,000
10							Required balance	105,500
11							Actual balance	92,000
12							Surplus / (shortfall)	-13,500
13								

You can also use these calculations to learn more about the predicted replacements. The items with the highest average annual cost will place the biggest demand on your Fund over time. They may not be the most expensive items. The Fund Adequacy calculation shows that cost and useful life are equally important in finding out which items will make the most demands on your Replacement Reserve Fund.

Developing Assumptions for Cash Flow Forecasting

The cash flow forecasts use several assumptions about the future. Usually, an analyst selects the assumptions based on information in the technical reports and management records so that they reflect the actual circumstances for your organization.

Economic conditions

The future inflation rate is one of the most important assumptions in the cash flow forecast. It affects all the elements of the Plan by:

- increasing future costs,
- decreasing the value of future allocations, and
- influencing return on investment.

The Consumer Price Index (CPI) is the generally accepted reference for the rate of inflation. An analyst will also take into account current market rent levels to see practical limits to increases in rents. These limits may become important if large increases in annual allocations to the Fund are necessary.

Investment income

Your investment return in previous years is a starting point for the assumption about investment return in future years. For a conservative approach, use the most current five-year rate available for the Guaranteed Investment Certificates (GICs).

Economic conditions will also have a direct or indirect impact on your investment return. Therefore, the cash flow forecasts should make sure that there is a realistic link between the assumptions for inflation and investment return.

For example, assume that the investment return will be 5 per cent when inflation is 2 per cent. You may decide to test what happens when inflation rises to 4 per cent, then the assumption about investment return should also increase. This is because the interest rate on the GIC or other investment that you purchase in ten years would be affected by the inflation rate at that time.

Allocations

There are two types of allocations to the Replacement Reserve Fund:

- planned amounts as set out in your operating budget, and
- unplanned contributions.

Planned allocations include the amount required by your funding agency and any other increases that you make. Planned allocations are an annual amount in the operating budget, but the actual investment can occur in smaller amounts during the year.

Your Replacement Reserve Fund Plan might include a single contribution if there are surplus funds to top up the Fund. In future years, your operations may occasionally produce surpluses. Your Reserve Fund Estimates could include a provision that such surpluses will automatically roll over into the Replacement Reserve Fund. However, these are **unplanned contributions** because it is not possible to predict when they might occur or their amounts.

Appendix C:
Hiring Technical Consultants

Collecting information and making predictions for a Capital Replacement Plan often involves working with consultants including:

- building specialists (engineers, architects, inspectors) who evaluate the building and prepare technical reports, and
- reserve fund analysts who prepare and evaluate cash flow projections.

Some groups might want to get written estimates of the service life and current replacement cost from, among others:

- certified roofing contractors
- elevator service companies
- mechanical service companies
- building envelope engineers or architects.

Role of Consultants in Capital Replacement Planning

Building Specialists

The role of the building specialist is to produce the technical reports needed for capital replacement planning. To carry out this responsibility, the building specialist will:

- review management records and previous technical reports to become familiar with the property
- inspect the common areas and selected units to produce an inventory of replacement items and record their current condition
- estimate the useful life and current replacement costs for all replacement items
- recommend replacement priorities and further investigation if necessary

- review key findings with the provider
- produce technical reports documenting their findings
- provide advice on alternative replacement scheduling (if necessary), and
- produce a remediation report if you ask for it.

You should expect the consultant to produce information that is:

- written in plain language
- provided in printed and electronic formats, and
- compatible with your software.

The cost of the building specialist's work would depend on:

- level of local competition for the consulting work
- size and complexity of the property, and
- availability of previous technical reports for the property.

Ballpark estimates of fees would range from $5,000 to $10,000* for a medium project of about 100 units.

Reserve Fund Analyst

The reserve fund analyst is responsible for preparing cash flow forecasts of your reserve fund. Typical duties of the reserve fund analyst include:

- developing a series of cash flow forecasts that show possible future results for different sets of assumptions
- giving advice on appropriate economic assumptions to consider
- explaining key assumptions that a monitoring system should track, and
- producing printouts and graphics that illustrate the cash flow forecasts.

The printouts and graphics should include information about:

- impact on the Replacement Reserve Fund if no changes are made to the fund's income
- future values, taking inflation into account, and

* Based on July 2002 price quotes in Greater Toronto Area (GTA) and neighbouring cities.

- potential risks in predicting future economic conditions.

Your non profit or co-op, or a member of the building specialist's team, or an independent consultant may do the reserve fund analysis. The qualifications for a reserve fund analyst include:

- a designation from REIC - (Real Estate Institute of Canada), technical college, engineer or an architect.
  Note: REIC - certified reserve planner designation has a body that disciplines its members. It also requires that the analyst carry insurance for errors and omissions.
- previous experience in forecasting needs of Replacement Reserve Funds
- a good understanding of non-profit financial management practices
- technical skills and experience in preparing spreadsheet models
- knowledge of economic conditions and how they affect cash flow forecasting, and
- ability to explain the results in non-technical terms.

Ballpark estimates of fees would range from $3,000 to $8,000* for a medium project of about 100 units.

Simple cash flow predictions are relatively easy to construct. However, Replacement Reserve Fund planning often makes extra demands on the spreadsheet model and the analyst. This is especially true if your Replacement Reserve Fund has been under-funded for some time and requires a lot of consultation between you and the analyst to develop realistic forecasts.

Selecting Consultants

The most common approach to selecting consultants is to begin a competitive proposal call. In this approach, your organization issues a written Request for Proposals (RFP) to a list of potential consultants. The consultants respond with a document that describes:

- how they will carry out the work you are asking for
- their qualifications for doing this work
- a proposed fee, and

* Based on July 2002 price quotes in Greater Toronto Area (GTA) and neighbouring cities.

- conditions, such as time limits, that affect the proposal.

The RFP approach:

- prompts the provider to make a clear written statement of what it expects
- encourages competitive bids, which may result in lower fees, and
- provides an opportunity to preview each consultant's work style.

Consultants want to know the questions you want answered and how you will use the information. The following sample offers suggestions for a general description of the consultant's work.

Sample Definitions of Consultants' Work

Definition of Consultants' Work
Building Specialist Sample The building specialist will conduct a thorough inspection of the Client's buildings and site to answer the following questions. ▪ What is the present condition of the property and its replacement items? ▪ Are there any problems that require immediate attention or further analysis? What steps are recommended? The consultant's report will include data necessary for a detailed reserve fund plan. It will include an inventory of replacement items with life expectancies, quantities and costs. The consultant will provide written documentation in plain language and replacement data in the electronic format as prescribed by the client. The work included consultations with the Client to review key findings and to find alternative plans for replacement strategies, if required.
Reserve Fund Analyst Sample The reserve fund analyst will prepare cash flow forecasts for the Client's reserve fund to help the Client determine: ▪ What is the impact of proposed changes to the annual contributions? ▪ What is the impact of proposed changes to the investment strategy? The consultant will develop alternative forecasts to illustrate options for annual contribution recommendations and their impact on annual housing budgets and housing charges (rents). The consultant's report includes a risk analysis that identifies key assumptions to track in a monitoring system. The work includes consultations with the Client to review results.

Managing Consultants

A good working relationship with your consultants requires regular communications and responding to requests for information in a timely manner. You should also

- Review the draft Replacement Inventory as soon as possible.

  It is especially important to identify differences in the Replacement Inventory as soon as possible. The inventory needs to be correct so that the estimates about future replacement costs are correct.

  It is also an important step in managing the consultant's work. Major errors at this stage of the work may signal the need for close monitoring.

- Check other draft reports when they become available.

  Check that they are complete and accurate to the best of your knowledge. Ensure that they are written in plain language.

Good consultants are willing to change inaccurate information or incorrect assumptions. However, it is not reasonable to ask them to change their expert opinion. If you do not agree with a report's recommendations, you can work with the consultant to find other solutions or you can seek a second opinion.

Appendix D: Capital Items Form

Date of data collection	
Project name	
Project number	
Phase (if applicable)	
This form was completed by:	

Site – Group 1

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
1	1	Driveways, parking lots, walkways, curbs				
1	2	Fencing				
1	3	Retaining walls				
1	4	Storage/service buildings				

Building Exterior/Structure – Group 2

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
2	1	Roof surfaces, flashing				
2	2	Eavestroughs, downspouts				
2	3	Fascia, soffits				
2	4	Attic ventilation				
2	5	Chimneys, related components				
2	6	Exterior structure, cladding				
2	7	Balconies				
2	8	Foundation walls, grade beam, columns				

2	9	Wall, floor and roof framing				
2	10	Drain tile				
2	11	Exterior finishes includes painting and stucco				
2	12	Exterior doors, windows, screens				
2	13	Stairs, landings, ramps, porches, decks				
2	14	Caulking (major only)				
2	15	Waterproofing/vapour barriers – above ground				

Building Interior – Group 3

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
3	1	Flooring				
3	2	Ceiling and wall finishes (major renovations)				
3	3	Counter tops, cabinets				
3	4	Kitchen sinks, plumbing fixtures				
3	5	Interior doors, hardware				
3	6	Toilets				
3	7	Bathroom sinks, plumbing fixtures, vanities				
3	8	Tubs, tub surrounds, plumbing fixtures				

Appliances/Special Facilities and Equipment – Group 4

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
4	1	Stoves				
4	2	Stove hood fans				

4	3	Refrigerators				
4	4	Washers				
4	5	Dryers				
4	6	Elevators				
4	7	Intercom/security system				
4	8	Firefighting/prevention equipment				
4	9	Garbage disposal systems (multiple unit buildings)				
4	10	Storage lockers				
4	11	Energy retrofit (exception approval)				

Systems/Heating and Ventilation – Group 5

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
5	1	Forced-air furnaces				
5	2	Boilers – hot water or steam				
5	3	Radiant heat components, radiators				
5	4	Solid fuel burning systems				
5	5	Ductwork, grills, registers				
5	6	Electric baseboards				
5	7	Required air handling systems, HVAC systems				

Systems/Electrical – Group 6

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
6	1	Electrical panel & distribution				
6	2	Fixtures, switches, receptables				

6	3	Hardwired smoke alarms				
6	4	Heat detectors linked to central alarm				
6	5	Emergency lighting				
6	6	Project transformers, emergency generators				

Systems/Plumbing, Water, Sewer – Group 7

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
7	1	Well, or water supply and water distribution system				
7	2	Hot water tanks				
7	3	Storm water and sanitary removal system				
7	4	Booster and circulating pumps (multiple unit buildings)				
7	5	Sump pumps				
7	6	Septic tanks and tile bed				
7	7	Water softeners (where required only)				

Parking Structures – Group 8

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments
8	1	Enclosed parking garage				
8	2	Underground parking garage				

Additional items – all groups

Group	Subgroup	Item name	Number of items	Remaining useful life (years)	Current replacement cost	Comments

Appendix E:
Purchasing Requirements

We recommend that the following purchasing criteria be met for replacement costs of more than $5,000:

For costs above $5,000 and under $30,000:	Competitive prices from three sources through quotations, tenders or proposals.
For costs above $30,000 and under $100,000:	Competitive prices from three sources through quotations, tenders or proposals. For construction work (see note c below), public or invitational tender from at least three contractors/trades.
For costs of $100,000 or more:	Public tender for construction work in all cases or competitive bids from at least six sources.

Notes

a) Purchasing requirements may be met through bulk purchasing. Where bulk-purchasing agreements are entered into:

- the purchasing group should demonstrate that its program is cost-effective in terms of pricing and product servicing,
- the purchasing agreement should not include a user fee on the part of the purchasing group, and
- the purchasing agreement should not exceed three years.

b) Generally accepted public and invitational tendering practices should be followed and documented on file.

c) In the context of replacing a capital item, "construction work" means work where the complexity of the work and the need for modifications to existing building components or structures would normally require specialized trades. In these circumstances, a tender package with specifications and detailed descriptions of the work involved would be necessary to ensure trades tender bids on the same basis.

d) It is recognized that in some regions there may not be enough suppliers/contractors to secure competitive bids from six sources. Where this is the case, a minimum of three bids would be acceptable.

Appendix F: Life Expectancy Guidelines

The data in Appendix F comes from ***Service Life of Multi-unit Residential Building Elements and Equipment*** published by Canada Mortgage and Housing Corporation in May 2000. It is based on a survey of experienced building professionals across Canada from information dated February 29, 1996. This provided real life, non-theoretical estimates of service life (useful life) for over 230 building components.

Ref. No.	Building Element	Material or Equipment Type	Service Life Low End Average (Yrs.)	Service Life High End Average (Yrs.)	Median Service Life (L+H)/2 (Yrs.)	Ontario Housing Corporation Life Expectancy* (Yrs.)
BUILDING STRUCTURE						
1.1	**Foundation Walls**	Damp-proofing	**23**	**32**	**28**	**n/a**
1.2		Structural Concrete Failure	**28**	**38**	**33**	**n/a**
BUILDING EXTERIOR						
2.1	**Exterior Walls**	Precast Concrete Panels	**34**	**49**	**42**	**n/a**
2.2		Brick Veneer	**27**	**42**	**35**	**20**
2.3		Curtain Wall	**26**	**44**	**35**	**25**
2.4		Stucco	**17**	**25**	**21**	**20**
2.5	**Balcony Decks**	Concrete	**21**	**29**	**25**	**n/a**
2.6		Concrete Topping/Waterproofing	**12**	**20**	**16**	**n/a**
2.7	**Balcony Railings**	Painted Iron Railings	**11**	**18**	**15**	**15**
2.8		Aluminum Railings	**20**	**30**	**25**	**15**
2.9		Precast Concrete	**23**	**32**	**28**	**n/a**
2.10		Glass Panels with Steel/Metal	**19**	**27**	**23**	**n/a**
2.11	**Windows**	Metal Casement	**19**	**28**	**24**	**15 (general)**
2.12		Metal Double-Hung	**18**	**26**	**22**	**15 (general)**
2.13		Vinyl Casement	**15**	**23**	**19**	**15 (general)**
2.14		Vinyl Double-Hung	**13**	**22**	**18**	**15 (general)**
2.15		Metal Sliding	**18**	**27**	**23**	**15 (general)**
2.16	**Doors (Exterior/Balcony)**	Sliding Metal/Glass	**18**	**24**	**21**	**20**
2.17		Solid Wood/Composite	**14**	**20**	**17**	**20**
2.18			**8**	**13**	**11**	**10**
2.19	**Exposed Flashing**	Sheet Metal	**18**	**29**	**24**	**10 to 25**
2.20		Non-Metallic	**13**	**22**	**18**	**15 to 25**

* The information below is dated February 29, 1996. It is accompanied by this note: "The following life expectancy information is intended to be used as a guide only and is considered to be representative of the average useful life of building elements under normal operating conditions. It is not a substitute for informed decision making based on element specific information; the actual life span of any building element may vary considerably depending on the service conditions it is subjected to, the design, the quality of materials used, the quality of installation, the environment and the level of applied maintenance".

Ref. No.	Building Element	Material or Equipment Type	Service Life Low End Average (Yrs.)	Service Life High End Average (Yrs.)	Median Service Life (L+H)/2 (Yrs.)	Ontario Housing Corporation Life Expectancy* (Yrs.)
BUILDING INTERIOR						
3.1	**Ceilings: Common Area**	Painted Concrete	**23**	**36**	**30**	**n/a**
3.2		Plastered Concrete	**19**	**30**	**25**	**n/a**
3.3		Drywall	**18**	**27**	**23**	**20**
3.4	**Ceilings: Service Area**	Painted Concrete	**23**	**37**	**30**	**n/a**
3.5		Plastered Concrete	**20**	**31**	**26**	**n/a**
3.6		Drywall	**19**	**27**	**23**	**20**
3.7	**Walls: Common Area**	Concrete Block Glazed	**29**	**44**	**37**	**n/a**
3.8		Concrete Block Painted	**24**	**36**	**30**	**n/a**
3.9		Drywall	**18**	**29**	**24**	**15**
3.10		Ceramic Tiles	**16**	**27**	**22**	**n/a**
3.11		Stone Veneer	**25**	**41**	**33**	**n/a**
3.12	**Walls: Service Area**	Concrete Block Glazed	**29**	**43**	**36**	**n/a**
3.13		Concrete Block Painted	**24**	**37**	**31**	**n/a**
3.14		Drywall	**16**	**25**	**21**	**15**
BUILDING INTERIOR						
3.15	**Floors: Common Area**	Ceramic Tiles	**17**	**29**	**23**	**20**
3.16		Carpeting	**7**	**12**	**10**	**10**
3.17		Terrazzo	**28**	**47**	**38**	**n/a**
3.18		Vinyl Tiles	**10**	**16**	**13**	**10**
3.19	**Floors: Service Area**	Concrete	**25**	**38**	**32**	**n/a**
3.20		Vinyl Tile/Linoleum	**10**	**17**	**14**	**10**
3.21	**Stairway Treads**	Concrete	**25**	**38**	**32**	**n/a**
3.22		Metal Pans with Poured Concrete	**22**	**33**	**28**	**n/a**
3.23	**Stairway Handrails**	Painted Iron	**18**	**26**	**22**	**n/a**
3.24	**Doors: Common Area**	Hollow Metal/Metal Clad	**16**	**26**	**21**	**15**
3.25		Wood/Wood Composite	**12**	**20**	**16**	**15**
3.26	**Doors: Service Area**	Hollow Metal/Metal Clad	**15**	**25**	**20**	**15**
3.27	**Doors: Units**	Wood/Wood Composite	**14**	**23**	**19**	**15**
3.28	**Plumbing Fixtures**	Common Laundry Facilities	**12**	**19**	**16**	**10 to 20**
3.29		Janitor's Room(s)	**16**	**24**	**20**	**10 to 20**
3.30	**Panic Hardware**		**11**	**18**	**15**	**15**

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Ref. No.	Building Element	Material or Equipment Type	Service Life Low End Average (Yrs.)	Service Life High End Average (Yrs.)	Median Service Life (L+H)/2 (Yrs.)	Ontario Housing Corporation Life Expectancy* (Yrs.)
ELEVATORS						
4.1	**Elevator**	Hoisting Equipment	**19**	**30**	**25**	**20**
4.2		Motor	**15**	**23**	**19**	**20**
4.3		Electrical Controls/Equipment	**16**	**24**	**20**	**15**
4.4		Cab Structure	**19**	**30**	**25**	**n/a**
4.5		Interior Finishes of Cab	**10**	**18**	**14**	**15**
ROOFING						
5.1	**Roofs (Conventional)**	Modified Bitumen	**17**	**27**	**22**	**15**
5.2		Built-up Roofing (BUR)	**16**	**24**	**20**	**15**
5.3		Single-Ply	**14**	**23**	**19**	**20**
5.4	**Roofs (Inverted)**	Modified Bitumen	**18**	**26**	**22**	**20**
5.5		Built-up Roofing (BUR)	**18**	**27**	**23**	**15 to 20**
5.6		Single-Ply	**16**	**24**	**20**	**20**
5.7	**Parapets**	Concrete	**21**	**33**	**27**	**n/a**
5.8	**Base & Cap Flashing**	Sheet Metal	**15**	**24**	**20**	**25**
5.9		Non-Metallic	**14**	**21**	**18**	**15 to 25**
5.10	**Landscaped Terrace**	Wood Deck	**12**	**18**	**15**	**10**
5.11		Concrete on Raised Floor	**19**	**28**	**24**	**15**
PARKING GARAGE						
ATTACHED / OPEN Parking Garage						
6.1	**Deck/Roof**	Waterproofing	**13**	**20**	**17**	**15**
6.2	**Walls**	Structural Failure	**26**	**39**	**33**	**n/a**
6.3	**Columns**	Structural Failure	**29**	**40**	**35**	**n/a**
6.4	**Drainage System**		**21**	**32**	**27**	**25**
6.5	**Ramps**	Structural Failure	**21**	**32**	**27**	**10 (repairs)**
6.6		Snow Melting Electrical Cables	**12**	**18**	**15**	**10**
6.7		Glycol Ramp Heating System	**12**	**17**	**15**	**n/a**
6.8	**Lighting Fixtures ***	Fluorescent	**10**	**20**	**15**	**15**
6.9		Incandescent	**10**	**21**	**16**	**15**
6.10	**Overhead Doors**	Aluminum	**9**	**14**	**12**	**10**
6.11		Steel	**10**	**18**	**14**	**10**
6.12		Hoist System / Controls	**7**	**14**	**11**	**10**
6.13	**Exterior Doors**	Metal/Metal Clad	**13**	**23**	**18**	**20**
UNDERGROUND Parking Garage						
6.14	**Walls**	Waterproofing	**17**	**30**	**24**	**15**
6.15		Structural Failure	**30**	**44**	**37**	**n/a**
6.16	**Columns**	Structural Failure	**28**	**45**	**37**	**n/a**

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Ref. No.	Building Element	Material or Equipment Type	Service Life Low End Average (Yrs.)	Service Life High End Average (Yrs.)	Median Service Life (L+H)/2 (Yrs.)	Ontario Housing Corporation Life Expectancy* (Yrs.)
6.17	**Drainage System**		20	35	28	25
6.18	**Ramps**	Structural Failure	23	37	30	10 (repairs)
6.19	**Lighting Fixtures** *	Fluorescent	10	19	15	15
6.20		Incandescent	10	18	14	15
6.21	**Overhead Doors**	Aluminum	10	16	13	10
6.22		Steel	12	20	16	10
6.23		Hoist System / Controls	8	14	11	10
6.24	**Exterior Doors**	Metal/Metal Clad	12	23	18	20
6.25	**Ventilation/ Exhaust Fan(s)**		12	21	17	n/a
6.26	**Heating System**		14	25	20	n/a
6.27	**CO Control System**		10	15	13	n/a
6.27	**Sprinklers**	Dry	17	30	24	n/a
6.29		Wet	18	30	24	n/a
6.30	**Fire Extinguishers**		7	17	12	n/a
6.31	**Fire Hoses**		8	16	12	n/a
ELECTRICAL SYSTEMS						
7.1	**Transformer Vault**		25	39	32	n/a
7.2	**Main Panel**	Circuit Breaker	20	31	26	15 (general)
7.3		Fused Switch	19	29	24	15 (general)
7.4	**Intermediate Panel**	Circuit Breaker	19	29	24	15 (general)
7.5		Fused Switch	18	28	23	15 (general)
7.6	**Transformers**	Delta Configuration	20	27	24	25
7.7		"Y" Configuration	20	27	24	25
7.8	**Suite Panel**	Plug Fuse	17	28	23	15 (general)
7.9		Circuit Breaker	18	30	24	15 (general)
7.10	**Metering**	Bulk	25	56	41	n/a
7.11		Individual	24	37	31	n/a
7.12	**Distribution**	Bus Duct	27	41	34	15 (general)
7.13		Cable	27	42	35	15 (general)
7.14	**Wiring**	Copper	24	39	32	25
7.15		Aluminum	19	41	30	25
7.16	**Fire Alarm (Updated)**	Control/Annunciator Panel	15	23	19	15
7.17		Pull Stations	16	27	22	15
7.18		Alarm Devices (Bells, Horns, Speakers)	15	26	21	15
7.19	**Smoke Detector**	Battery Powered	6	11	9	15
7.20		Hard Wired	10	18	14	15
7.21	**Heat Detector**		11	19	15	15
7.22	**Emergency Power**	Battery	6	10	8	15
7.23		Generator - Diesel	21	32	27	25

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Ref. No.	Building Element	Material or Equipment Type	Service Life Low End Average (Yrs.)	Service Life High End Average (Yrs.)	Median Service Life (L+H)/2 (Yrs.)	Ontario Housing Corporation Life Expectancy* (Yrs.)
7.24		Generator - Gas	19	28	24	25
7.25	**Building Entry System**	Intercom System	13	21	17	15
7.26		Panel Connected to Telephone System	16	31	24	n/a
7.28	**Entry Security System**	Card Reader System	10	17	14	15
7.29		Closed Circuit Camera System	9	15	12	15
7.30	**Television**	Master Antenna	14	19	17	15
7.31		Cable	17	24	21	n/a
7.32		Satellite Dish	9	17	13	n/a
7.33	**Lighting Fixtures**		14	22	18	10
7.34	**Common Area**	24-Hr. Oper.: Fluorescent	10	16	13	10
7.35		24-Hr. Oper:. Incandescent	11	16	14	10
7.36		Non-24 Hr. Oper.: Fluorescent	10	16	13	10
7.37		Non-24 Hr. Oper.: Incandescent	11	16	14	10
7.38	**Service Area**	24-Hr. Oper.: Fluorescent	10	16	13	10
7.39		24-Hr. Oper:. Incandescent	12	17	15	10
7.40		Non-24 Hr. Oper.: Fluorescent	11	17	14	10
7.41		Non-24 Hr. Oper.: Incandescent	11	16	14	10
7.42	**Exterior**	Fluorescent	7	11	9	15
7.43		Incandescent	7	11	9	15
7.44		High Intensity Discharge (HID)	12	18	15	15
MECHANICAL SYSTEMS						
8.1	**Heating System Using:**	Oil	18	26	22	20
8.2		Gas	17	26	22	20
8.3		Electric	20	29	25	20
8.4	**Central System**	Hot Water	20	30	25	25
8.5		Water Heat Pump	11	18	15	15
8.6		Steam	21	32	27	20
8.7		Central Chiller	19	28	24	n/a
8.8	**Heating in Suite**	Radiation - Electric	18	28	23	20
8.9		Radiation - Hydronic	22	32	27	25
8.10		Fan Coil - Electric	14	21	18	20
8.11		Fan Coil - Hydronic	15	25	20	25
8.12		Air-to-Air Heat Pump	11	17	14	15
8.13		Incremental Unit	11	18	15	n/a
8.14		Individual Controls	11	19	15	15
8.15	**Cooling**	Centrifugal Chiller	19	27	23	15 to 20 (general)
8.16		Absorption Chiller	16	19	18	15 to 20 (general)
8.17		Open Loop Cooling Tower	20	28	24	15 to 20 (general)
8.18		Closed Loop Cooling Tower	20	28	24	15 to 20 (general)
8.19		Roof Mounted Air Cooled Water Chiller	15	20	18	15 to 20 (general)

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8.20	**Pipe Distribution**	Pumps	8	17	13	25
8.21	**(Heating/Cooling Syst.)**	Chemical Treatment	8	14	11	15
8.22		Controls	11	19	15	15
8.23		Valves	11	19	15	20
8.24		Pipes	19	32	26	20
8.25		Insulation	18	30	24	20
8.26	**Corridor Air Make Up**	Fan Only	9	18	14	15 (general)
8.27		Built-Up Unit (BUU)- Heated: Gas-Fired Unit	14	22	18	15 (general)
8.28		BUU - Heated: Glycol Coil	15	22	19	15 (general)
8.29		BUU - Heated: Hot Water Coil	16	23	20	15 (general)
8.30		BUU - Cooled: Direct Expansion System	15	23	19	15 (general)
8.31		BUU - Cooled: Chilled Water Coil	15	22	19	15 (general)
8.32		BUU - Cooled: Other	16	23	20	15 (general)
8.33		Roof Top Combined Unit Heated:Gas-Fired Unit	15	22	19	15 (general)
8.34		RTCU - Heated: Glycol Coil	14	21	18	15 (general)
8.35		RTCU - Heated: Hot Water Coil	14	20	17	15 (general)
8.36		RTCU - Cooled: Direct Expansion System	14	20	17	15 (general)
8.37		RTCU - Cooled: Chilled Water Coil	14	21	18	15 (general)
8.38		RTCU - Cooled: Other	14	19	17	15 (general)
8.39	**Roof Top Exhaust Fans**	Central Duct System	16	24	20	20
8.40		In-Suite Bathroom Fan(s)	11	19	15	15
8.41		In-Suite Kitchen Fan(s)	11	18	15	15
8.42	**Domestic Cold Water**	Booster Pump	12	19	16	20
8.43		Meter	17	28	23	20
8.44		Copper Pipes	25	38	32	25
8.45		Galvanized Pipes	19	29	24	15
8.46		PVC Pipes	21	33	27	n/a
8.47		Suite Shut-Off	14	23	19	15
8.48		Riser Shut-Off	14	25	20	15
8.49	**Domestic Hot Water**	Central Oil	12	18	15	12 (general)
8.50		Central Gas	13	21	17	12 (general)
8.51		Central Electric	15	23	19	12 (general)
8.52		In-Suite Oil	10	15	13	12 (general)
8.53		In-Suite Gas	12	19	16	12 (general)
8.54		In-Suite Electric	10	15	13	12 (general)
8.55		Central Tank Lining	12	21	17	12 (general)
8.56		Central Tank Sterilization	5	9	7	n/a

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Ref. No.	Building Element	Material or Equipment Type	Service Life Low End Average (Yrs.)	Service Life High End Average (Yrs.)	Median Service Life (L+H)/2 (Yrs.)	Ontario Housing Corporation Life Expectancy* (Yrs.)
8.57		Suite Shut-Off	14	22	18	20
8.58		Riser Shut-Off	14	22	18	20
8.59		Recirculating System	14	21	18	20
8.60	**Sprinkler**	Pumps	16	24	20	25 (general)
8.61		Dry Valves	18	32	25	25 (general)
8.62		Wet Valves	19	32	26	25 (general)
8.63		Valve Control Devices	14	21	18	25 (general)
8.64		Sprinkler Heads	20	34	27	25 (general)
8.65		Pipes	19	32	26	25 (general)
8.66	**Fire Hose Cabinets**	Access Doors	22	32	27	n/a
8.67		Hose	10	18	14	10
8.68		Fire Extinguishers	8	17	13	10
8.69		Valves/Hoses' Nozzles	13	22	18	n/a
8.70	**Sanitary Sewer**	Cast Iron	27	42	35	25 (general)
8.71		Copper	26	40	33	25 (general)
8.72		Aluminum	27	38	33	25 (general)
8.73		PVC	21	35	28	25 (general)
8.74	**Storm Sewer**	Concrete Transite Pipe	24	37	31	25 (general)
8.75		Cast Iron Pipe	28	45	37	25 (general)
8.76		Area/Roof Drains - Full Flow	24	36	30	25 (general)
8.77		Area/Roof Drains - Control Flow	24	35	30	25 (general)
8.78		Catch Basins	22	37	30	25 (general)
8.79	**Garbage Chute**	Aluminum	20	27	24	n/a
8.80	**(UL Rated)**	Stainless Steel	21	32	27	n/a
8.81		Welded	26	38	32	n/a
8.82		Riveted	19	48	34	n/a
8.83		Self Latching Doors	8	16	12	n/a
8.84		Self Closing Doors	8	15	12	n/a
8.85		Fire Rated Doors	12	20	16	n/a
8.86	**Compactor**		14	22	18	15
SWIMMING POOLS						
9.1	**Swimming Pools**	Filtration System	10	16	13	15
9.2		Pool Deterioration due to Moisture	8	12	10	15 to 20
9.3		Major Cracking/Leakage	11	16	14	15 to 20
9.4		Water Supply/Drainage System	14	22	18	15

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