

Green Capital Needs Assessment and Replacement Reserve Analysis

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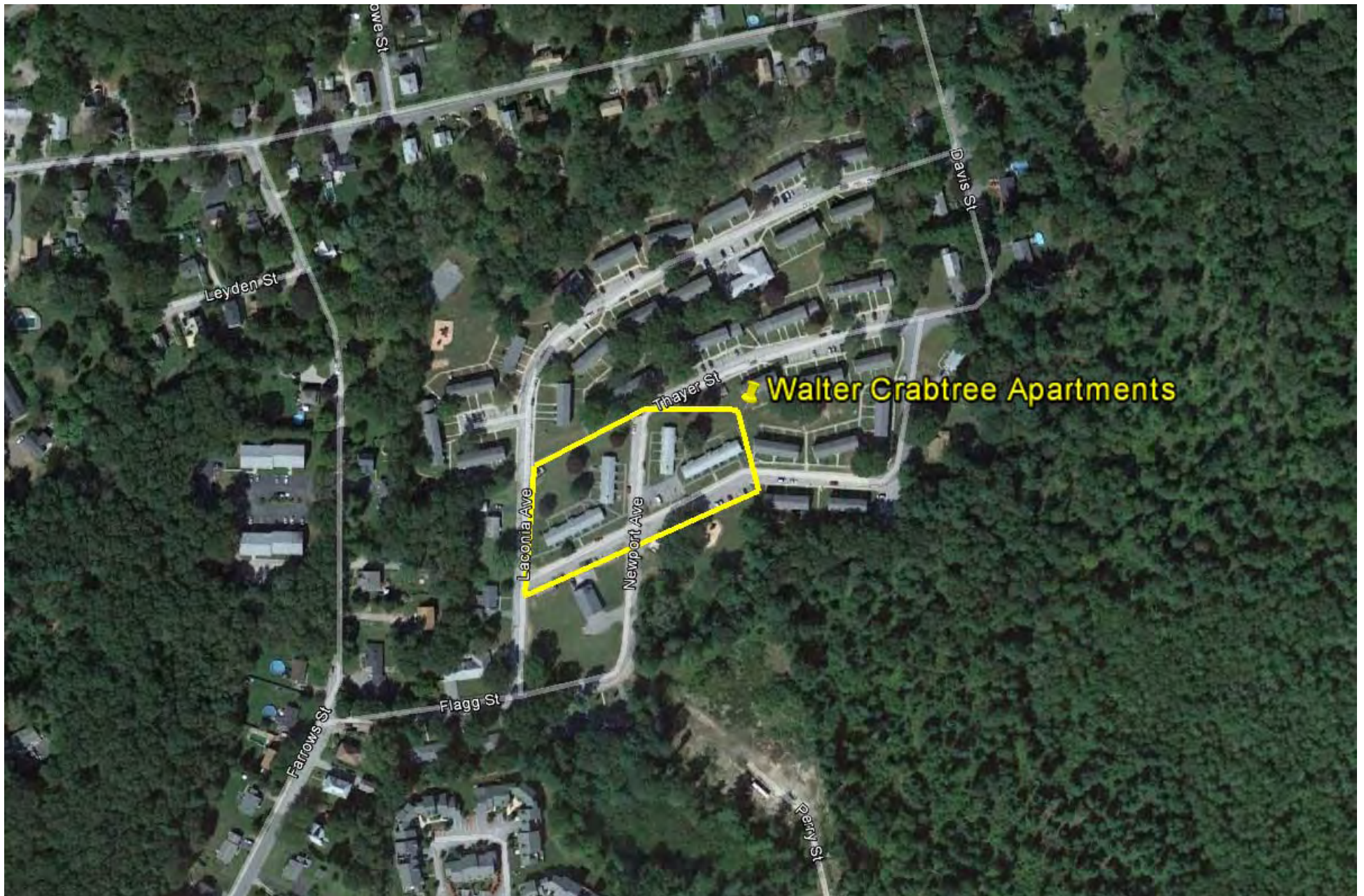
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Walter Crabtree Apartments
CHFA # 85153D
Putnam Housing Authority
Putnam, CT

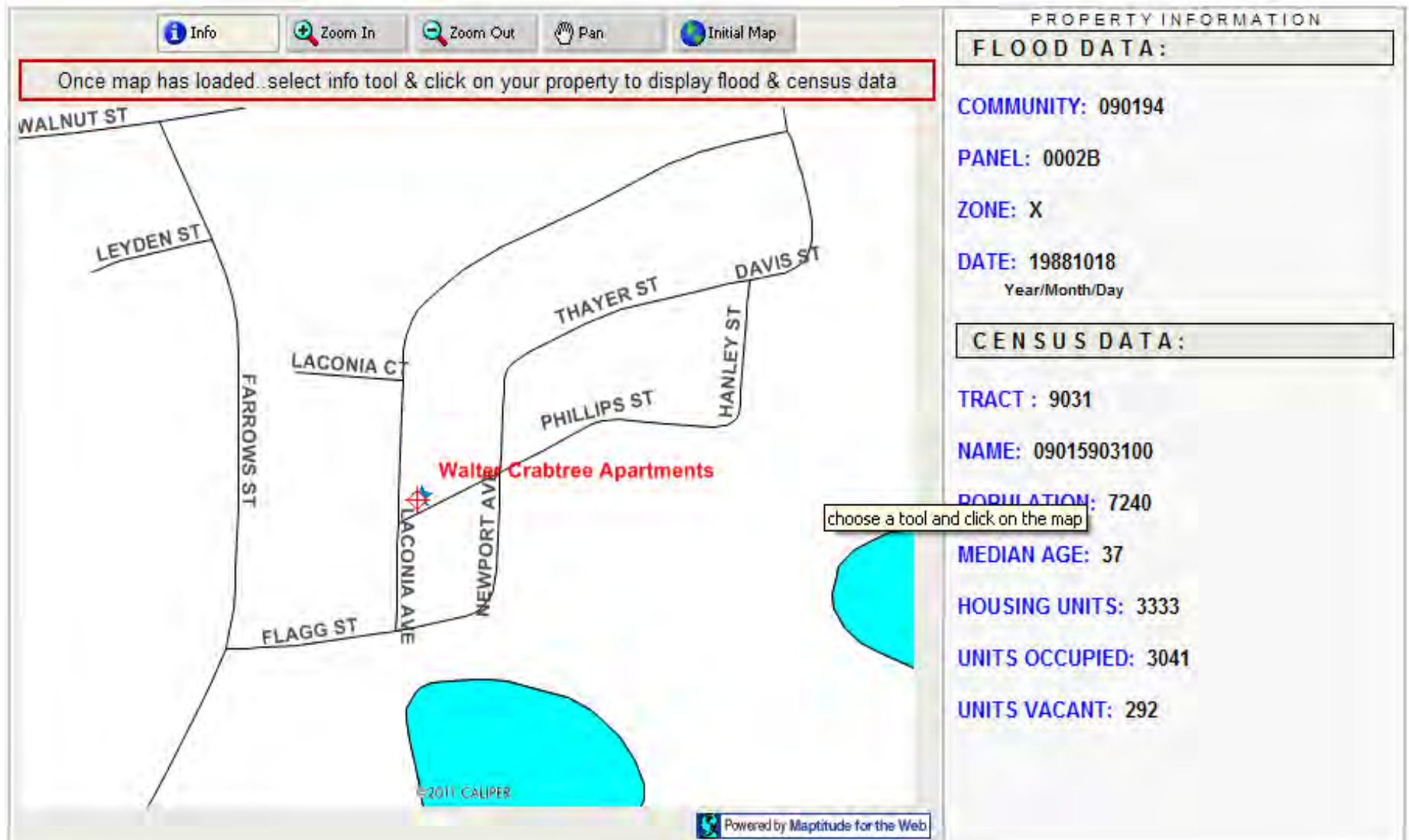
May 20, 2013

Revised Final Report



Walter Crabtree Apartments

6 Phillips Street
Putnam, CT 06260



Walter Crabtree Apartments

6 Philips Street
Putnam, CT 06260

Zone X = Outside the 500-year floodplain and
Outside the 1% and 0.2% annual chance floodplains

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HOW TO READ THIS REPORT

The report is divided into two sections: "Findings and Recommendations" and "Supporting Data".

Findings and Recommendations: The three elements comprising this section constitute the main content of the report. A comprehensive list of the recommended green options and their benefits, and a snapshot of key energy findings, are included in the Executive Summary. Additional detail regarding the property's existing conditions, current and future capital needs, and green recommendations are illustrated in the narrative and photo pages.

Supporting Data: These nine sections contain the support data and calculations used in determining the feasibility of the green recommendations. Hard costs estimates and replacement/repair timing are presented in the capital needs worksheets. The Capital Needs Summaries and Replacement Reserve Analyses highlight the total 20-year capital costs for both the conventional and green scenarios pitted against current funding circumstances. Cost-benefit analyses are included in the Simple Payback and Life Cycle Cost "cut sheets" at the end of the report.

Executive Summary

Overview and Goals

This Green Capital Needs Assessment (GCNA) of the Walter Crabtree Apartments has been undertaken on behalf of the Putnam Housing Authority and Connecticut Housing Finance Authority (CHFA). It is aimed at determining the development's current and prospective physical circumstances, on both a traditional and green basis. A traditional CNA focuses on those capital activities that reasonably can be expected to ensure that a property is viable and in good condition over a twenty-year horizon. In a traditional CNA, it is common for On-Site Insight (OSI) to informally comment on maintenance practices, or suggest discretionary upgrades that might affect operations, marketability, or occupant well being. This GCNA is aimed at more rigorously and more formally identifying green alternatives to conventional replacement of major components and systems. It offers options aimed at helping:

- improve energy and water efficiency,
- reduce operating and capital costs through the use of durable materials and improved maintenance,
- safeguard indoor environmental quality (IEQ) for residents, and
- reduce the property's environmental impact.

Conventional Summary

Future capital actions are based on useful life expectations and assume continued effective maintenance and physical management. The timing of actions by system (including quantities and costs) is also presented in the Capital Needs Worksheet. Costs for the twenty-year plan total \$415,311 in current dollars (\$20,766/unit), or \$531,971 (\$26,599/unit) in inflated dollars.

Current reserves would be outpaced in 15 through 20. However increasing annual contributions in Years 2 and 3 (\$120/unit/year) would fully fund the plan.

Executive Summary

Green Summary

Future capital actions are based on useful life expectations and assume continued effective maintenance and physical management. The timing of actions by system (including quantities and costs) is also presented in the Capital Needs Worksheet. Costs for the twenty-year plan total \$432,906 in current dollars (\$21,645/unit), or \$539,312 (\$26,966/unit) in inflated dollars.

Current reserves would be outpaced in Years 6, 7, and 11 through 20. However adding \$30,000 (cash infusion) in Year 1 coupled with increasing annual contributions in Years 2 and 3 (\$120/unit/year) would fully fund the plan.

We see a number of sensible green opportunities, now and in the future, to replace existing elements with more durable and/or environmentally friendly materials and technology. In both the narrative and detailed capital needs worksheets that follow, conventional and green capital activities are presented in parallel. Capital needs summaries are presented separately for conventional and green models. The green opportunities described in the plan fall into one of two categories: energy and water conservation measures (EWCMS), or green measures (GMS), expanded in detail below:

Energy and Water Conservation Measures (EWCMS):

In the report, 6 energy and water conservation measures (EWCMS) are identified. Energy and water conservation measures are upgrades and improvements to existing mechanical and electrical systems that have a direct impact on energy consumption, and therefore potential utility (electric, gas, oil, water, sewer) savings if implemented appropriately. As part of the inspection process, the property's utility data was analyzed. This information is then used as part of the EWCMS recommendation and calculation process.

Certain EWCMS are interactive. In order to achieve the projected annual energy savings for an interactive group, the EWCMS must be implemented in concert with one another. If any of the interactive EWCMS are deferred or foregone, there may be a significant impact on

Executive Summary

the utility savings outlook. For example, replacement of an inefficient boiler system may not achieve projected utility savings associated with that system if inefficient windows remain in place.

The energy conservation measure specifications (i.e. boiler efficiencies, R-values, U-values) presented in this plan is mostly derived from the International Energy Code and the American Society of Heating, Refrigeration and Air-Conditioning (ASHRAE) Handbook. These measures represent one conceptual option; various alternatives may yield different results. It must be noted that a number of factors may affect the estimated annual energy savings and simple payback periods, and therefore the figures outlined in this report are not guaranteed.

Green Measures (GMs):

The report identifies 4 Green Measures (GMs). Green measures are replacements of existing materials and systems that do not have a direct impact on energy consumption; however, they represent opportunities to reduce capital and operational expenditures in the future due to increased durability, enhanced performance, and increased expected useful life (EUL) potential. Additionally, if implemented properly, GMs can improve indoor environmental quality and can benefit resident and staff health, safety, and well-being.

The life cycle costs for the GMs are calculated in the attached worksheets with the comparative life cycle cost for the conventional replacement alternatives. Other GMs included in the plan do not represent enhanced performance or extended expected useful lives, and therefore the life cycle costs for these GMs are not calculated. Many of the projected savings are based on certain performance and EUL criteria for the respective systems and materials. Several factors may impede upon the expected performance and may skew the estimated savings. In this case, the savings presented in the plan are estimated and cannot be guaranteed.

Executive Summary

Building Modeling Methodology

This report uses an energy model created in TREAT to determine the energy loads (electric and fossil fuel uses including heating, domestic hot water, and non-heating systems) for this property. The TREAT model is based on building-specific construction, HVAC systems, and other building systems (i.e. lighting, appliances, etc.) as identified by the inspection team. The energy model also incorporates 12 months of utility bills, and matches weather data to the utility billing period.

Using the SUNREL™ energy simulation software developed by the National Renewable Energy Laboratory (NREL), TREAT calculates energy uses on an hourly basis (again factoring in weather/climate, existing HVAC systems, and internal gains) for an entire year. The result produces calculated energy use for the property, and proposed energy savings for identified measures. The energy savings are shown both independently and with full interaction of all measures.

Additional measures such as water usage, which is currently not modeled in TREAT, have been presented using OSI's existing utility models. Also, since TREAT evaluates the building as a whole, it is possible that measures reduce electric consumption, could also show an increase in heating requirements (i.e. lighting reduction reduces heat typically produced by the original lighting system and in turn would require an increase to the heating load). The calculated loads (electricity, natural gas) are reconciled against billed utility loads within a 10% margin.

A Note on NPV

Net present value (NPV) is the difference in total life cycle costs between the conventional recommendation and the green recommendation. The EWCs and GMs that carry a negative NPV are viewed as cost-prohibitive, despite potential environmental benefits or additional energy savings. In this report, OSI does not recommend measures that carry a negative NPV.

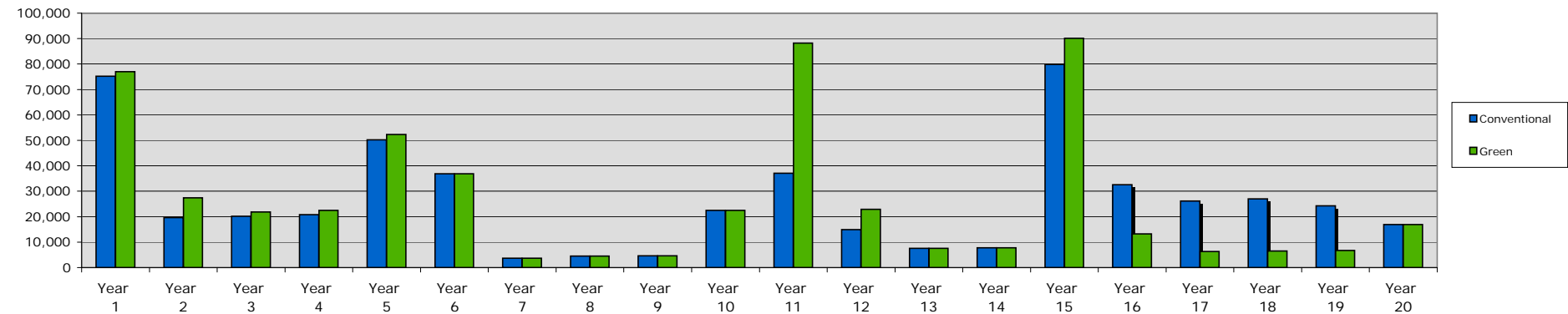
Executive Summary

Dashboard

Property Data

Location:	Putnam, CT
Year Built:	1960
Number of Units:	20
Number of Buildings:	4

Comparison of Capital Needs - Conventional vs. Green



Environmental Impact

(Total Carbon Release Based on Current Annual Energy Usage)

Building Square Footage:	12,650
Resident Population (<i>estimated</i>):	35

	BTUs/yr	Conversion	lbs CO ₂	lbs CO ₂ / Res
Heating	767,344,884	x 0.000161	123,216	3,520
DHW	145,045,130	x 0.000161	23,290	665
Electricity	77,964,200	x 1.582917	36,159	1,033
Total	990,354,214		182,665	5,219

Replacement Reserve Analysis

Conventional

- Plan #1: Capital costs exceed reserves in Years 15-20.
- Plan #2: Increase contribution by \$120 per unit/year in Years 2 and 3.

Green

- Plan #1: Capital costs exceed reserves in Years 6, 7, and 11-20.
- Plan #2: Infusion of \$30K in Yr 1Increase annual contributions by \$120 per unit/yr in Yrs 2 and 3.

Health and Safety

Hazardous Materials

	Identified	Location / Notes
Lead Based Paint (LBP):	none	n/a
Asbestos Containing Materials (ACMs):	none	n/a
Mold:	none	n/a

Indoor Ventilation

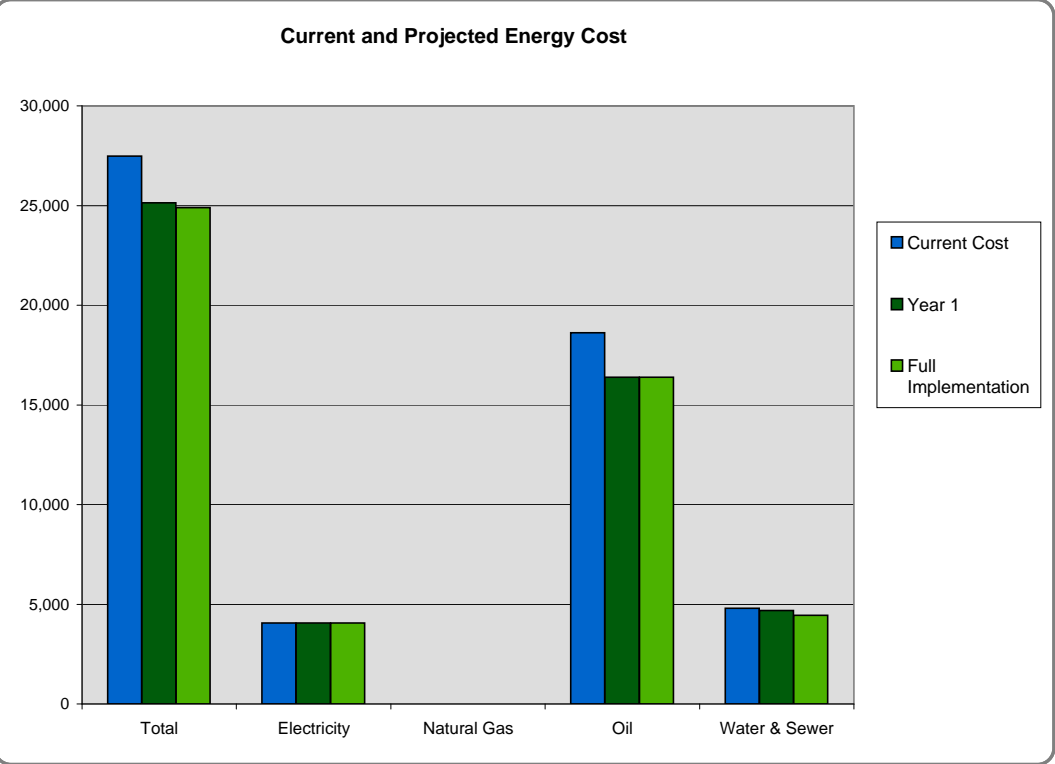
Operable windows, through-wall kitchen exhaust, bathroom ceiling exhaust

Indoor Air Quality (IAQ)

	Design Specification	Actual Read	Notes
Air Flow Rate	400 cfm/apt	not measured	
Thermal Comfort	68-77F	71F	Apt 32
Carbon Monoxide	0 ppm	0 ppm	
Carbon Dioxide	<1,000 ppm	1,669 ppm	Windows closed

Executive Summary

Energy Savings



Energy Intensity / Benchmarking Data

Building Square Footage: 12,650

Heating Degree Days: 5,267

	Amount	Units	BTUs/yr	Energy Intensity (BTUs/(HDDs x SF))
Heating	5,505	gallons	767,344,884	12
Cooling		therms	0	0
DHW	1,040	gallons	145,045,130	2
Electricity	22,850	kWh	77,964,200	1
Total			990,354,214	15

	Gallons/yr	Gallons/sf/yr
Water	288,000	23

Energy Usage Summary

Utility	Current Usage	Current Cost	Projected Usage	Projected Cost	% Savings
Electricity	22,850 kWh	\$4,066	22,850 kWh	\$4,066	0.0%
Natural Gas	0 therms	\$0	0 therms	\$0	n/a
Oil	6,545 gallons	\$18,612	5,763 gallons	\$16,387	12.0%
Water & Sewer	288,000 gallons	\$4,802	266,796 gallons	\$4,449	7.4%
Total		\$27,480		\$24,901	9.4%

Executive Summary

Green Improvement Plan

Measure	Upfront Cost	EUL	Simple SIR ¹	Incremental Cost ²	Green NPV ⁴	Annual Utility Savings									Recommended Timing
						Electric		Gas		Oil		Water & Sewer		Total	
						KWh	\$	Therms	\$	Gallons	\$	Gallons	\$	\$	

Recommended EWCMS (Based on Financial Analysis)

Interactive Group															
EWCM 1 Fiberglass Doors	31,695	35	0.45	2,375	5,346					144	409			409	Immediate
EWCM 6 Program. Thermostats	4,040	20	8.76	1,940	21,460					622	1,769			1,769	Immediate
Interactive Group Total ⁵	35,735			4,315						766	2,178			2,178	
EWCM 4 Washing Machines	1,398	12	1.43	98	1,111	0	0			17	47	7,188	120	167	Immediate
EWCM 5 High Eff Toilets	8,815	30	0.80	615	3,216							14,016	234	234	Year 15
EWCM Subtotal	45,948			5,028		0	0	0	0	782	2,225	21,204	354	2,579	

Recommended GMs (Based on Financial Analysis)

GM 3 Linoleum Flooring	45,506	25		12,411	307	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM Subtotal	45,506			12,411		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Total	91,454			17,439		0	0	0	0	782	2,225	21,204	354	2,579	
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Optional Actions ⁶

EWCM 3 Roof Insulation	16,761	40	1.49	16,761	(5,330)					219	623			623	Immediate
EWCM 2 Windows	29,767	35	2.18	2,077	(17,494)					652	1,854			1,854	Immediate
GM 1 Cement Fiberboard	2,805	45		660	(442)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Year 15
GM 2 Metal Roof	103,920	40		50,284	(29,500)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Year 15
GM 4 Stone Countertops	18,000	30		11,670	(6,858)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Year 12

Notes:

- Simple SIR is calculated as (Total Annual Savings * Estimated Useful Life) / Upfront Cost.
- Incremental Cost is the difference in cost between the green and conventional alternatives.
- Green SIR (Savings to Investment Ratio) is a relative measure that reflects the ratio of total savings to total investment of Green vs. Conventional. Unlike Simple SIR, this calculation takes into account maintenance costs, inflation, discounting, and differences in expected useful life.
- Green NPV is the net present value of installing a green vs. conventional product.
- Interactive group total recognizes full interaction of all measures based on the TREAT model.
- Carried in the plan due to health, safety, environmental, and/or energy benefit, depsite negative NPV.

Narrative

Walter Crabtree Apartments consists of four garden-style (single level) buildings (listed as Buildings 1 through 4) designed for elderly residents. There are a total of 20 direct entry units: 8 efficiencies and 12 one-bedrooms. The development was originally constructed in 1960.

Site

Site Surface

Walter Crabtree Apartments is located on a slightly sloped parcel of land in a residential neighborhood of Putnam, CT. The site has asphalt-paved walkways, and a similarly paved parking lot. It is bordered and bisected by municipal streets. There are also lawn areas surrounding the buildings.

Walkways and Parking Areas

Existing conditions	Capital needs	Green alternative
Minor cracks were observed in portions of the walkways and the parking lot. There is no indication of major surface damage, such as depressions that would lead to ponding (drainage problems).	The plan includes the costs for surface repairs (crackfilling, sealcoating, and parking lot re-striping) in Years 1, 6, and 16, and resurfacing in Year 11.	Open pavers are shown as the green alternative for the walkways and the parking lot, to help address the heat island effect (resulting in less retained and reflected heat from a traditional asphalt surface) and to promote adequate drainage. No green alternative is carried for the crack-fill and sealcoat work; however, it is recommended that a low volatile organic compound (VOC) and/or recycled-content paint (content should be at least 50%; VOCs should not exceed 250 grams per liter) is used during the restriping process.

Narrative

Landscaping		
Existing conditions	Capital needs	Green alternative
The site features a well-maintained lawn and garden beds.	The plan includes an allowance for replanting and pruning in Year 12.	The green alternative would be to replace the existing landscaping with a Xeriscape, which employs native and adaptive plantings that require significantly less water and fertilizers than traditional lawns and garden beds.

Narrative

Mechanical Room

There are two central mechanical rooms (located in Buildings 2 and 3), identical in arrangement, with each serving a pair of buildings. Each mechanical room has an oil-fired Crown boiler that produces hydronic heat for space heating and domestic hot water (DHW) generation. The hydronic heat for space heating is circulated to both served buildings via a pair of multi-speed Grundfoss in-line pumps. The hydronic heat for DHW production is distributed to a pair of insulated 80-gallon storage tanks, each with an internal heat exchanger (water-to-water). Each boiler is governed by a Tekmar controller, which uses outside air (OA) and return water temperature inputs to adjust boiler output to meet varying heating loads. Also, fuel oil is stored in two underground storage tanks (USTs); each tank is a double-wall fiberglass vessel ranging between 2,000 and 2,500 gallons capacity.

Boilers and Peripherals

Existing conditions	Capital needs	Green alternative
The boilers appear to be well-maintained and each has a combustion efficiency in the mid-80%. The Tekmar controllers and the circulating pumps also appear to be in good condition.	The boilers are expected to provide reliable performance throughout most of the plan. Their replacement cost is shown in Year 15. The Tekmar controllers are to be replaced every 15 years, beginning in Year 5. The hydronic circulating pumps are shown being replaced concurrent with the boilers.	This boiler plant arrangement is considered to be the green alternative.

Domestic Hot Water

Existing conditions	Capital needs	Green alternative
The DHW storage tanks also appear to be in good condition, with no indication of leaks or damage to the insulation jackets.	These tanks are to be replaced in Year 10 after 20 years of use.	Green alternative is in place.

Narrative

Building Mechanical and Electrical Systems

The major building systems include distribution piping systems for hydronic heat, domestic hot and cold water, sanitary wastewater, electrical, and fire detection. There were no observed or reported problems with most of these systems. There is additional discussion in the Dwelling Units report section addressing some of these systems on the unit level.

Fire Detection		
Existing conditions	Capital needs	Green alternative
Smoke and heat detectors for the common areas are limited to the pair of laundry rooms and mechanical rooms, both located in Buildings 2 and 3.	The plan includes the costs to replace these detectors in Years 5 and 15.	No green alternative shown.

Narrative

Building Architectural Systems

Building Exterior

Walter Crabtree Apartments consists of four garden-style apartment buildings. Each building is constructed on a poured concrete foundation, has brick exterior walls, and a pitched roof covered with asphalt shingles. Also, each building has wood-framed single glazed windows, and each is augmented with a storm window. Exterior doors are wood and all unit entry doors also have a storm door.

Doors		
Existing conditions	Capital needs	Green alternative
Most of the doors appear to be original and in fair-to-good condition.	The door replacement costs are shown in Year 1, including the unit doors which are to be replaced over the first 4 years of the plan. The storm doors are shown being replaced annually, starting in Years 1 and 16.	<p>The green option would be to replace the exterior doors with fiberglass models. Fiberglass doors are more durable to metal or wood doors since they are resistant to rusting, impact-related damage, and deterioration associated with wood or metal options. Not only are they more durable, but they also lower operations costs since they don't require periodic painting, and therefore have a lower life cycle cost than the traditional alternatives.</p> <p>Insulated fiberglass doors often have higher insulating qualities compared to conventional flush wood or metal models, and therefore reduce heat loss. Typically, insulated fiberglass doors can attain R-Values of at least R-5. (See EWCM 1).</p>

Narrative

Siding

Existing conditions	Capital needs	Green alternative
<p>The exterior siding appears to be in good condition, with no signs of mortar loss or deterioration observed on the brickwork.</p> <p>The vinyl wall panels, located at each window, appear to be in good condition.</p>	<p>The plan includes an allowance for anticipated brickwork repairs (repointing) in Year 11. The vinyl panels are to be replaced in Year 15.</p>	<p>Cement fiberboard panels were evaluated as possible replacements of the vinyl panels.</p> <p>The fiberboard panels have a longer useful life and are more resistant to impact damage. This option however was not viewed as being cost-effective. See GM 1.</p>

Windows / Curtain Walls

Existing conditions	Capital needs	Green alternative
<p>The wood-framed single hung windows used throughout this development have surpassed their useful life. The existing storm windows help to reduce energy loss.</p>	<p>Vinyl framed double-glazed windows are shown being installed in Year 1 to replace the existing wood-framed and storm windows.</p>	<p>Replacement of the windows and fixed panels with fiberglass-framed, double-glazed models with a low-E (low emissivity) coating, and a gas fill between the glazing layers (EWCM #2). The low-e coating will reflect heat from entering the building during the summer, and can reflect radiant infrared energy from escaping the building</p>

Narrative

Existing conditions	Capital needs	Green alternative
		during the heating months. A gas fill (such as argon) between the glazing layers will reduce heat transfer through the glass similar to the low-e coating. It is recommended that the windows be monitored and appropriately caulked going forward to keep air infiltration to a minimum. The LCC however indicates that the cost-effective option is to use the conventional (vinyl-framed) windows.

Roof

Existing conditions	Capital needs	Green alternative
Each building has a pitched roof, covered with asphalt shingles and has gutters and downspouts for roof drainage. There were no signs or reports of active roof leaks. The estimated insulation level in the attic is R-15.	Replacement of the existing roof covering is shown in Year 5. The plan also includes the costs to increase the insulation level to R-38.	The cost-effectiveness of the insulation was also evaluated in EWCM 3, resulting in mixed results. The life cycle cost (LCC) analysis yielded a negative NPV, however this same measure has a Savings-to-Investment Ratio (SIR) of over 1.0, which is standard for

Narrative

Existing conditions	Capital needs	Green alternative
		<p>recommended measures. Even though this measure is shown as not being recommended based on OSI's approach, the mixed results warrants further consideration of increasing the insulation. See EWCM 3.</p> <p>A metal roof was evaluated as a green measure in terms of a longer useful life than the architectural shingles. The existing insulation level addresses the energy savings component. However in terms of a longer lasting roof surface, the metal roof option is not considered to be cost-effective. (See GM 2)</p>

Note:

We do not, as yet, recommend a 'green vegetative roof' – the installation of soil and vegetation on a waterproof membrane - as an option. While these may also reduce roof temperatures and cooling loads, and reduce stormwater run-off, they are much more expensive than conventional systems, and we see too many questions about performance and maintenance.

Narrative

Building Interior Common Areas

The building interior is limited to the pair of laundry rooms (Buildings 2 and 3). Wall and ceiling surfaces are painted drywall throughout. Allowances are shown throughout the plan for as-needed repairs and painting. As a green measure, the plan specifies low-VOC or recycled-content paint for painting cycles at no additional premium. The floors are concrete and are to be maintained as operating concerns throughout the plan.

Laundry room

Existing conditions	Capital needs	Green alternative
Each laundry room has a leased top-loading washer and electric dryer.	Replacement of the equipment is considered to be an operating concern.	<p>Replace the standard washing machines with high-efficiency front-loading Energy Star rated models. The high-efficiency washing machines utilize less water (as much as 40% less) than traditional washing machines and the lower demand for hot water also has an energy-savings component.</p> <p>An analysis using a hypothetical equipment cost (for illustration purpose only) is shown to demonstrate the cost-effectiveness of this measure. See EWCM 4.</p>

Narrative

Dwelling Units

During the course of the assessment, OSI inspected 3 units which represented all unit types and conditions. A sample of this size is felt to be sufficient given the age, tenancy, design, and location of the development. Additional information about units and capital replacements was obtained from discussions with residents during inspections and additional capital history forms submitted by management.

Finishes

Existing conditions	Capital needs	Green alternative
Each unit features painted walls and ceilings, hollow core interior and closet doors. Living areas as well bathrooms and kitchens have VCT flooring. Most of these finishes were found to be in good condition, an indication of some of the continuing upgrades that have occurred.	Apartment repainting and any interior or closet door replacement are to be addressed as operating concerns. VCT replacement is shown over a four-year period starting in Years 1 and 16...	The existing VCT is to be replaced with a linoleum product. This product will offer a substantially longer useful life than the carpeting and VCT. Additionally, the linoleum product should help to improve indoor air quality (IAQ) by being easier to clean and maintain, and being significantly more resistant to dust accumulation (see GM 3).

Narrative

Bathrooms

Existing conditions	Capital needs	Green alternative
<p>Bathrooms have an enameled steel bathtub with a ceramic tile tub surround, and an anti-scald mixing valve. Ventilation is provided via an operable window. Low-flow showerheads (2.0 gallons per minute (gpm) or less) are in place, and existing toilets are rated at 1.6 gallons per flush (gpf). Bathrooms also have wall-hung sinks.</p>	<p>Replace of bathroom sinks and general accessories is shown starting in the first year of the plan. An allowance for anticipated bathtub reglazing is shown starting in Year 2. Exhaust fans are shown being replaced in Year 5. The plan also shows toilet replacement starting in Year 15.</p>	<p>The one viable green option for bathrooms is to replace the existing 1.6 gpf toilets with high efficiency 1.28 gpf toilets, shown in Year 11. (See EWCM 9).</p> <p>Bathrooms could also be upgraded with variable speed exhaust fans, designed to react to humidity (moisture) level variations. These fans are controlled by a humidistat and will automatically adjust their fan speed and exhaust rate to match the variations in humidity levels. This item was not included as part of the TREAT energy model, but should be discussed at the client review meeting.</p>

Narrative

Kitchens

Existing conditions	Capital needs	Green alternative
Kitchens have recently-installed wood cabinets, laminated particleboard countertops, frost-free refrigerators, through-wall exhaust fans, and 20-inch electric ranges.	<p>The cabinets are in good condition and are expected to continue to provide reliable performance throughout the plan; cabinet replacement is not expected in this 20-year period. Countertop replacement starts in Year 12. The plan also shows the costs to replace the ranges starting in Year 10. Refrigerator replacements start in Year 7. The exhaust fans are to be replaced annually starting in Year 5.</p>	<p>The refrigerators could also be replaced with comparable Energy Star rated units, which significantly reduce energy consumption. This green opportunity was not included as part of the TREAT energy model because the apartments are individually-metered (no apartment utility bills were available).</p> <p>Replacing the existing cabinets with comparable FSC-certified wood cabinets starting in Year 20 will reduce the existence of formaldehyde gases (from adhesives used with laminated particleboard products), and as well provide a product that has a longer useful life. This opportunity was not included as a green measure because with the exception of the increased cost for the certified wood cabinets, all other key parameters (e.g. useful life) are the same. Stone countertops were considered as the</p>

Narrative

		green alternative to the existing countertops, primarily because of a longer useful life. However this opportunity was not shown to be cost-effective. (See GM 4)
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Unit Mechanical and Electrical

Existing conditions	Capital needs	Green alternative
<p>Hydronic baseboard sections are used throughout the apartments, each controlled by a wall-mounted thermostat (one per apartment).</p> <p>Each apartment has a Federal Pacific (FPE) Stab-Lok circuit breaker panel. These panels have a history of failing to fully react to an electric overload condition, resulting in a partially tripped breaker. This condition creates a life-safety hazard.</p> <p>There are hardwired smoke detectors in the living and sleeping areas of the apartments.</p>	<p>The existing thermostats are to be replaced in the near-term, in Year 5. The plan also includes an allowance, starting in Year 8, to replace baseboard sections.</p> <p>The plan includes the cost to replace the Stab-Lok circuit breaker panels in Year 1.</p> <p>Also, smoke detectors are to be added to all bedrooms and existing apartment smoke detectors replaced in Year 3. Future replacement of all apartment smoke detectors is shown in Year 13.</p>	<p>The green plan includes the cost to upgrade each apartment with a programmable thermostat to govern hydronic baseboard heat. These thermostats, when properly used can control space temperatures to match occupant's preference, including a night setback and time-of-day use.</p> <p>(See EWCM 6).</p>

Narrative

Health and Safety

Resident and Staff Concerns:

As part of the assessment, the property was examined for potential resident and staff health and safety concerns.

Lead-Based Paint and Asbestos:

- OSI did not conduct any testing for asbestos containing material (ACMs) or for lead-based paint (LBP). Therefore, this section should not be interpreted as a comprehensive or conclusive identification of ACMs or LBP. No areas or components containing LPBs or ACMs were identified or reported.

Other Health and Safety Issues:

- Domestic hot water temperatures were recorded at 120°F. DHW temperatures should be in the range of 110°F to 130°F; at temperatures of 140°F, burns (scalding) can occur.

Indoor Air Quality

Ventilation (Common Areas and Apartments):

The buildings do not have any mechanically supplied fresh air; instead each occupied space has a series of operable windows to provide fresh air. There is a series of exhaust fans used to remove stale air from kitchens and bathrooms. The exhaust fans are operated at the unit-level.

Narrative

Temperature, Humidity, Carbon Dioxide (CO₂)

Space temperature and humidity are the key components for comfort level. Temperature and relative humidity was measured in one apartment providing the following readings:

Temperature: 71F

Relative Humidity: 46.3%

Carbon Dioxide: 1,669 ppm

Carbon Monoxide: 0 ppm

Mold and airborne concerns:

No mold was observed on the interior of the apartments, nor in any common spaces at the property.

Capital Needs Summary, Replacement Reserve Analysis - *Conventional*

Future capital actions are based on useful life expectations and assume continued effective maintenance and physical management. The timing of actions by system (including quantities and costs) is also presented in the Capital Needs Worksheet. Costs for the twenty-year plan total \$415,311 in current dollars (\$20,766/unit), or \$531,971 (\$26,599/unit) in inflated dollars.

Two approaches to funding the property's physical needs through replacement reserves are presented in the Replacement Reserve Analysis section of the report, with accompanying graphics.

Plan #1 presents current capital funding circumstances. The development is estimated to have a replacement reserve balance of \$132,879 on December 31, 2013. Annual contributions are currently \$12,490 per year, or \$625 per unit. From OSI's experience, this is seen as an inadequate funding level for a property of this age and complexity. For planning purposes here, these contributions are shown being indexed at 3% for inflation going forward. Under this scenario, the property's needs exceed reserves in Years 15 through 20.

Plan #2, as one alternative, is aimed at fully meeting projected needs through Year 20. It starts with the same annual funding assumptions outlined above. The plan calls for an increase in annual contributions of \$120/unit (\$10/unit/month) in Years 2 and 3. Contributions are then indexed at 3%. This is one hypothetical option, and is included for illustrative purposes only. No assumptions are made about its viability; various alternatives might achieve similar results.

Capital Needs Summary, Replacement Reserve Analysis - *Green*

Future capital actions are based on useful life expectations and assume continued effective maintenance and physical management. The timing of actions by system (including quantities and costs) is also presented in the Capital Needs Worksheet. Costs for the twenty-year plan total \$432,906 in current dollars (\$21,645/unit), or \$539,312 (\$26,966/unit) in inflated dollars.

Two approaches to funding the property's physical needs through replacement reserves are presented in the Replacement Reserve Analysis section of the report, with accompanying graphics.

Plan #1 presents current capital funding circumstances. The development is estimated to have a replacement reserve balance of \$132,879 on December 31, 2013. Annual contributions are currently \$12,490 per year, or \$625 per unit. From OSI's experience, this is seen as an inadequate funding level for a property of this age and complexity. For planning purposes here, these contributions are shown being indexed at 3% for inflation going forward. Under this scenario, the property's needs exceed reserves in Years 6, 7, and 11 through 20.

Plan #2, as one alternative, is aimed at fully meeting projected needs through Year 20. It starts with the same annual funding assumptions outlined above. The plan calls for a cash infusion of \$30,000 in Year 1 and an increase in annual contributions of \$120/unit (\$10/unit/month) in Years 2 and 3. Contributions are then indexed at 3%. This is one hypothetical option, and is included for illustrative purposes only. No assumptions are made about its viability; various alternatives might achieve similar results.

Narrative

Additional Notes:

1. The Physical Assessment of the property was conducted on February 28th, 2013. Members of the management and site staff provided information on the property's current condition, recent repairs, and near-term needs. Additional information was provided by informal interviews with residents during the dwelling unit evaluation portion of the assessment. We would like to thank site staff for their assistance.
2. OSI was represented on this assignment by David Jackson. Mr. Jackson is a Building Performance Institute (BPI)-certified energy auditor, and LEED Green Associate accredited. Mr. Jackson complied with the applicable professional standards for ethics as defined by the BPI Code of Ethics during the assessment process.
3. Regular updates of this plan are recommended to ensure careful monitoring of major building systems and to adjust the program to accommodate unanticipated circumstances surrounding the buildings, operations, and/or occupants.



A view of two buildings from the rear courtyard.



The site also features asphalt walkways.



A view of the parking lot; note the cracks.



Buildings have brick exterior walls with vinyl window panels (arrow).



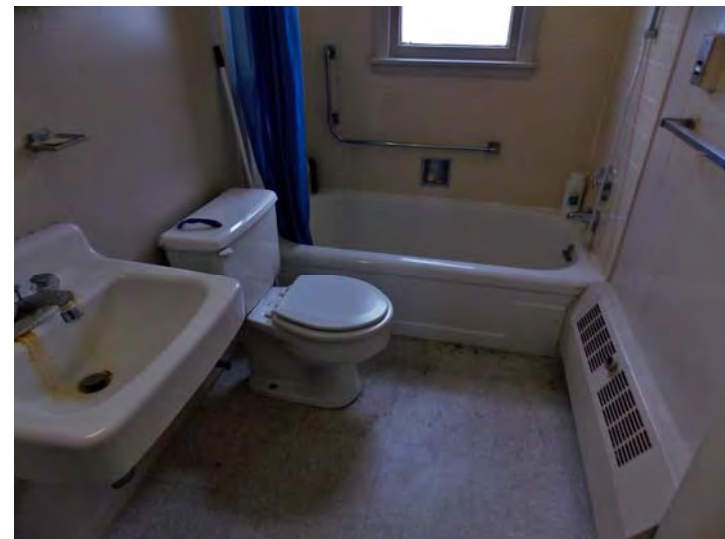
Roofs are pitched and covered with asphalt shingles.



An infra-red image of one of the buildings. The brighter colors indicate warmer surfaces, possible heat loss. Roof surface is heat gain from sunlight.



Kitchens have been upgraded with wood cabinets and new countertops (faux granite).



Bathrooms feature a wall-hung sink, an enameled steel bathtub with a ceramic tile tub surround.



This is one of the FPE Stab-Lok circuit breaker panels, found in each apartment.



One of the oil-fired boilers used to produce hydronic heat and DHW. To the left (arrow) is one of the circulating pumps.



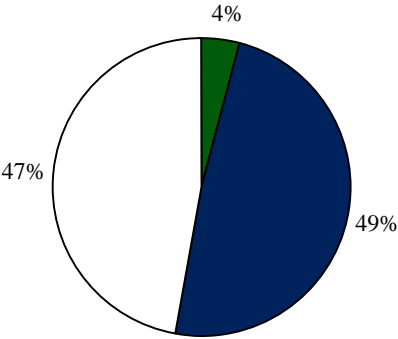
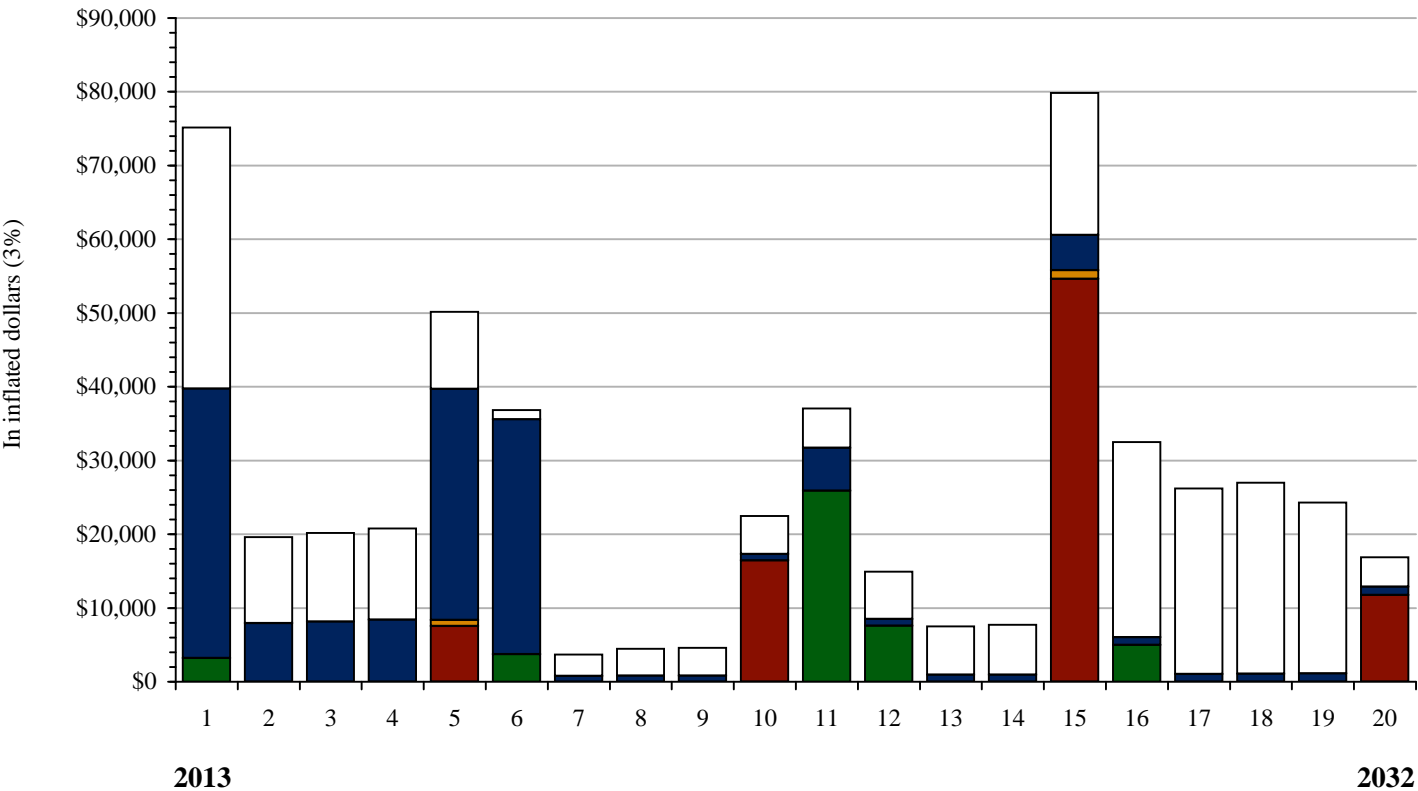
A view of the Tekmar controller (arrow).



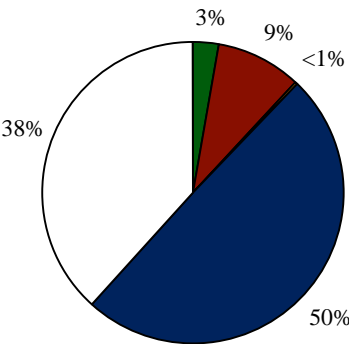
Each boiler room has a pair of insulated DHW storage tanks.

Capital Needs Summary - Conventional

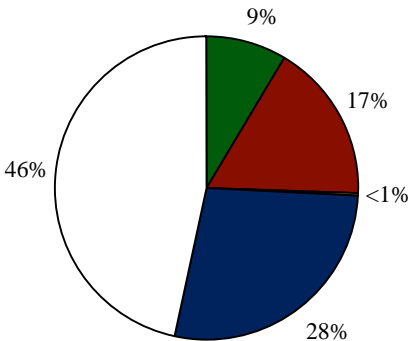
Walter Crabtree Apartments



Year One Distribution



Ten Year Distribution



Twenty Year Distribution

Total Costs by Building System (inflated dollars)

	Year 1	Years 1-10	Years 1-20
Site Systems	\$3,213 or \$161/unit	\$6,938 or \$347/unit	\$45,465 or \$2,273/unit
Mechanical Room		\$23,981 or \$1,199/unit	\$90,378 or \$4,519/unit
Building Mech. & Elec.		\$855 or \$43/unit	\$2,005 or \$100/unit
Building Architectural	\$36,519 or \$1,826/unit	\$127,533 or \$6,377/unit	\$146,378 or \$7,319/unit
Dwelling Units	\$35,446 or \$1,772/unit	\$98,713 or \$4,936/unit	\$247,746 or \$12,387/unit
In inflated dollars:	\$75,178 or \$3,759/unit	\$258,021 or \$12,901/unit	\$531,971 or \$26,599/unit
In current dollars:	\$75,178 or \$3,759/unit	\$236,212 or \$11,811/unit	\$415,311 or \$20,766/unit

Capital Needs Summary - *Conventional*

OSI Ref: 13117
 Property Age: 53 Years
 Financing: CHFA

Residential Buildings: 4
 Total Number of Units: 20
 Occupancy: Elderly

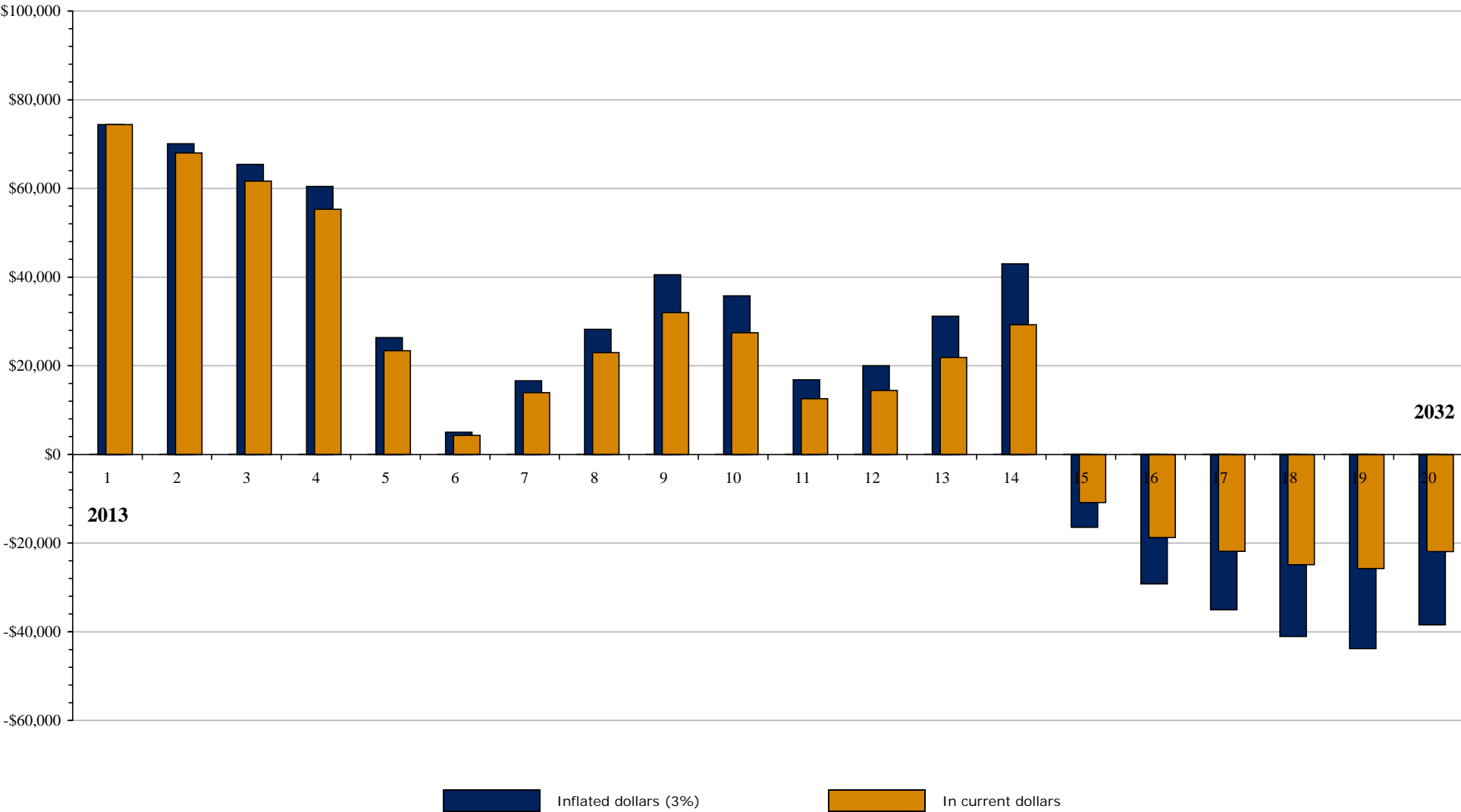
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
Site Systems										
Surface	\$3,213	\$0	\$0	\$0	\$0	\$3,725	\$0	\$0	\$0	\$0
Site Distribution Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Sub-Total	\$3,213	\$0	\$0	\$0	\$0	\$3,725	\$0	\$0	\$0	\$0
Mechanical Room										
Boilers	\$0	\$0	\$0	\$0	\$7,541	\$0	\$0	\$0	\$0	\$0
Boiler Room Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,440
Mechanical Sub-Total	\$0	\$0	\$0	\$0	\$7,541	\$0	\$0	\$0	\$0	\$16,440
Building Mech. & Electrical										
Mechanical	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Electrical	\$0	\$0	\$0	\$0	\$855	\$0	\$0	\$0	\$0	\$0
Elevators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical & Electrical Sub-Total	\$0	\$0	\$0	\$0	\$855	\$0	\$0	\$0	\$0	\$0
Building Architectural										
Structural and Exterior	\$36,519	\$7,940	\$8,178	\$8,423	\$741	\$764	\$786	\$810	\$834	\$859
Roof Systems	\$0	\$0	\$0	\$0	\$30,184	\$31,089	\$0	\$0	\$0	\$0
Halls, Stairs, Lobbies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Community Spaces	\$0	\$0	\$0	\$0	\$405	\$0	\$0	\$0	\$0	\$0
Building Architectural Sub-Total	\$36,519	\$7,940	\$8,178	\$8,423	\$31,330	\$31,853	\$786	\$810	\$834	\$859
Dwelling Units										
Living Areas	\$7,691	\$7,922	\$8,159	\$8,404	\$0	\$0	\$0	\$0	\$0	\$0
Bathrooms	\$1,554	\$1,987	\$2,046	\$2,108	\$1,102	\$1,135	\$1,169	\$1,204	\$1,240	\$1,277
Kitchens	\$1,701	\$1,752	\$1,805	\$1,859	\$124	\$128	\$1,731	\$1,783	\$1,837	\$3,197
Mechanical & Electrical	\$24,500	\$0	\$0	\$0	\$9,207	\$0	\$0	\$676	\$697	\$718
Dwelling Units Sub-Total	\$35,446	\$11,661	\$12,011	\$12,371	\$10,432	\$1,262	\$2,900	\$3,664	\$3,774	\$5,192
Total Capital Costs	\$75,178	\$19,601	\$20,189	\$20,794	\$50,159	\$36,840	\$3,687	\$4,474	\$4,608	\$22,491

Walter Crabtree Apartments

Costs on these pages are aggregated by category from the Capital Needs worksheets which follow. Total capital costs on these pages are carried forward to line F of the Replacement Reserve Analysis(es) that follow.

2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20	
\$25,908	\$7,613	\$0	\$0	\$0	\$5,006	\$0	\$0	\$0	\$0	Site Systems
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Surface
										Site Distribution Systems
\$25,908	\$7,613	\$0	\$0	\$0	\$5,006	\$0	\$0	\$0	\$0	Site Sub-Total
\$0	\$0	\$0	\$0	\$54,648	\$0	\$0	\$0	\$0	\$11,748	Mechanical Room
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Boilers
										Boiler Room Systems
\$0	\$0	\$0	\$0	\$54,648	\$0	\$0	\$0	\$0	\$11,748	Mechanical Sub-Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Building Mech. & Electrical
\$0	\$0	\$0	\$0	\$1,150	\$0	\$0	\$0	\$0	\$0	Mechanical
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Electrical
										Elevators
\$0	\$0	\$0	\$0	\$1,150	\$0	\$0	\$0	\$0	\$0	Mechanical & Electrical Sub-Total
\$5,793	\$912	\$939	\$967	\$4,241	\$1,026	\$1,057	\$1,089	\$1,121	\$1,155	Building Architectural
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Structural and Exterior
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Roof Systems
\$0	\$0	\$0	\$0	\$544	\$0	\$0	\$0	\$0	\$0	Halls, Stairs, Lobbies
										Community Spaces
\$5,793	\$912	\$939	\$967	\$4,785	\$1,026	\$1,057	\$1,089	\$1,121	\$1,155	Building Architectural Sub-Total
\$0	\$0	\$0	\$0	\$0	\$11,982	\$12,342	\$12,712	\$13,093	\$0	Dwelling Units
\$1,316	\$1,355	\$1,396	\$1,438	\$4,582	\$6,199	\$6,385	\$6,577	\$3,284	\$1,717	Living Areas
\$3,293	\$4,268	\$4,396	\$4,527	\$4,663	\$7,454	\$5,527	\$5,693	\$5,864	\$1,303	Bathrooms
\$739	\$761	\$784	\$808	\$10,028	\$857	\$883	\$909	\$936	\$964	Kitchens
										Mechanical & Electrical
\$5,347	\$6,384	\$6,576	\$6,773	\$19,273	\$26,492	\$25,136	\$25,890	\$23,177	\$3,984	Dwelling Units Sub-Total
\$37,049	\$14,909	\$7,515	\$7,740	\$79,856	\$32,524	\$26,193	\$26,979	\$24,299	\$16,887	Total Capital Costs

Replacement Reserve (RR) Analysis: *Plan One - Conventional*



Current Replacement Reserve Balance: **\$132,879**
Adjusted Replacement Reserve Balance: **\$132,879**
Current annual contributions to reserve accounts: **\$12,490**

At the end of Year One, Reserve Balances are projected to be: **\$74,365**
At the end of Year 20, Reserve Balances are projected to be: **(\$38,449)**
Unmet needs projected in most years of the plan

Replacement Reserve (RR) Analysis: *Plan One - Conventional*

		Reserve Funding In Year 1									
		Starting Balance:		Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.							
		Contributions to Reserves:									
		2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances											
Starting Replacement Reserves		\$132,879	\$74,365	\$70,053	\$65,415	\$60,436	\$26,359	\$5,006	\$16,607	\$28,223	\$40,520
(B) Annual Funding											
Contributions Indexed at 3%		\$625	\$643	\$663	\$682	\$703	\$724	\$746	\$768	\$791	\$815
(C) Additional Unit Contributions											
(D) Total Annual Reserve Funding		\$12,490	\$12,865	\$13,251	\$13,648	\$14,058	\$14,479	\$14,914	\$15,361	\$15,822	\$16,297
(E) Interest on Reserves at 3%		\$4,174	\$2,424	\$2,300	\$2,167	\$2,024	\$1,008	\$374	\$729	\$1,084	\$1,460
Total Funds Available		\$149,543	\$89,653	\$85,604	\$81,230	\$76,517	\$41,846	\$20,293	\$32,696	\$45,128	\$58,277
(F) Total Capital Cost		\$75,178	\$19,601	\$20,189	\$20,794	\$50,159	\$36,840	\$3,687	\$4,474	\$4,608	\$22,491
(G) Reserve Balances		\$74,365	\$70,053	\$65,415	\$60,436	\$26,359	\$5,006	\$16,607	\$28,223	\$40,520	\$35,786
Outside Capital:											
Adjusted Reserve Balances		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Starting reserve balance is \$132,879.
2. Starting annual contribution is \$12,490.
3. Capital needs outpace reserves in Years 15 through 20.

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

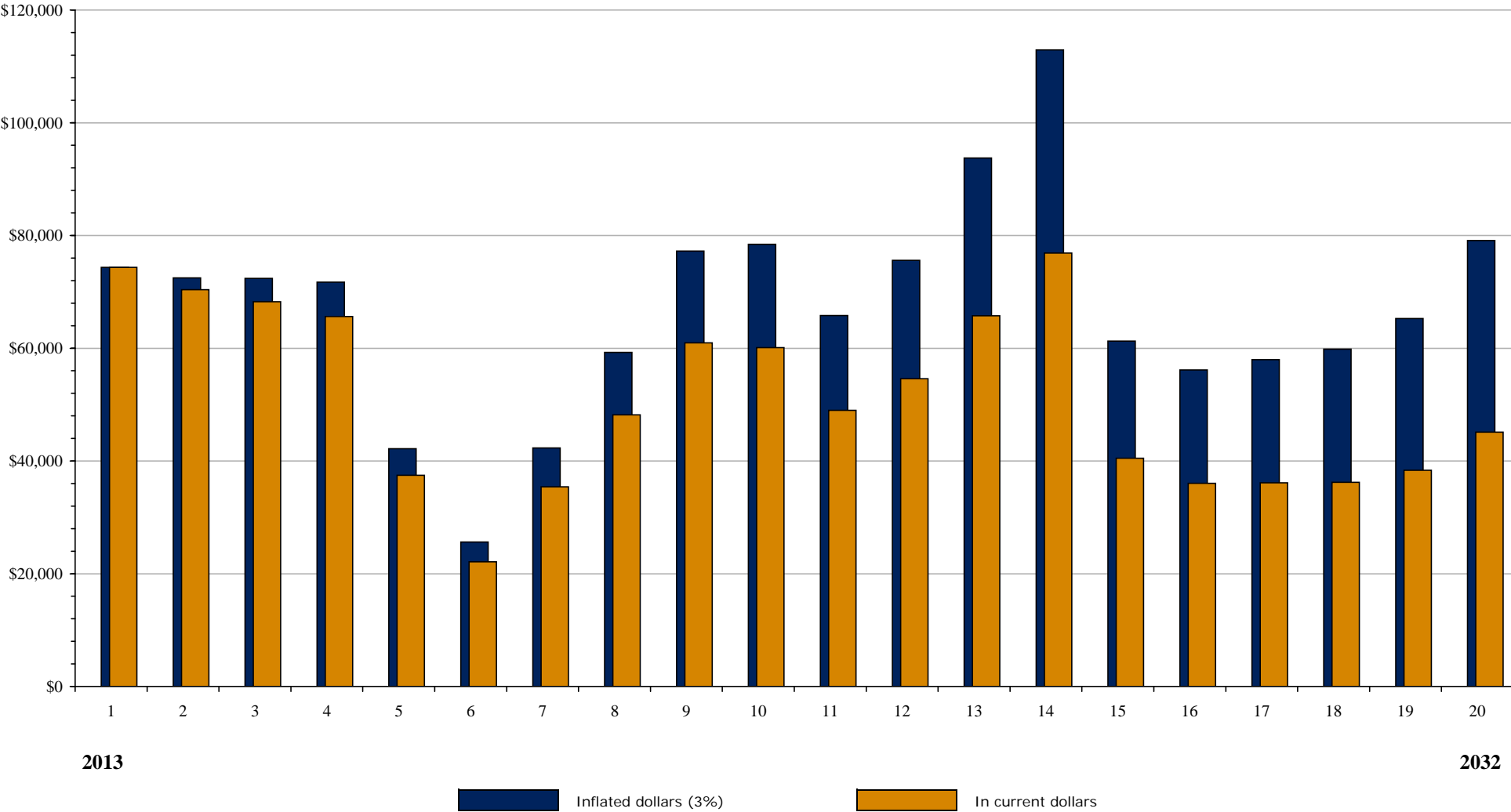
Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan One - Conventional*

[illegible]

Replacement Reserve (RR) Analysis: *Plan Two - Conventional*



Current Replacement Reserve Balance: **\$132,879**
Adjusted Replacement Reserve Balance: **\$132,879**
Current annual contributions to reserve accounts: **\$12,490**

At the end of Year One, Reserve Balances are projected to be: **\$74,365**
At the end of Year 20, Reserve Balances are projected to be: **\$79,108**
All projected capital needs are met throughout the plan

Replacement Reserve (RR) Analysis: *Plan Two - Conventional*

Reserve Funding In Year 1										
Starting Balance:		\$132,879 or \$6,644/unit				Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.				
Contributions to Reserves:		\$12,490 or \$625/unit								
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances										
Starting Replacement Reserves	\$132,879	\$74,365	\$72,489	\$72,404	\$71,712	\$42,172	\$25,619	\$42,292	\$59,267	\$77,223
(B) Annual Funding										
Contributions Indexed at 3%	\$625	\$643	\$763	\$883	\$910	\$937	\$965	\$994	\$1,024	\$1,055
(C) Additional Unit Contributions		\$120	\$120							
(D) Total Annual Reserve Funding	\$12,490	\$15,265	\$17,665	\$17,665	\$18,195	\$18,740	\$19,303	\$19,882	\$20,478	\$21,093
(E) Interest on Reserves at 3%	\$4,174	\$2,460	\$2,440	\$2,437	\$2,424	\$1,546	\$1,058	\$1,567	\$2,085	\$2,633
Total Funds Available	\$149,543	\$92,089	\$92,593	\$92,506	\$92,331	\$62,459	\$45,979	\$63,741	\$81,831	\$100,948
(F) Total Capital Cost	\$75,178	\$19,601	\$20,189	\$20,794	\$50,159	\$36,840	\$3,687	\$4,474	\$4,608	\$22,491
(G) Reserve Balances	\$74,365	\$72,489	\$72,404	\$71,712	\$42,172	\$25,619	\$42,292	\$59,267	\$77,223	\$78,457
Outside Capital:										
Adjusted Reserve Balances	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Same starting reserve balance and annual contribution as shown in Plan 1.
2. Annual contribution increased by \$120 per apartment (\$10/month) in Years 2 and 3.
3. Plan is fully funded.

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

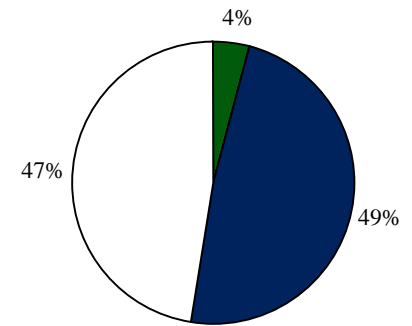
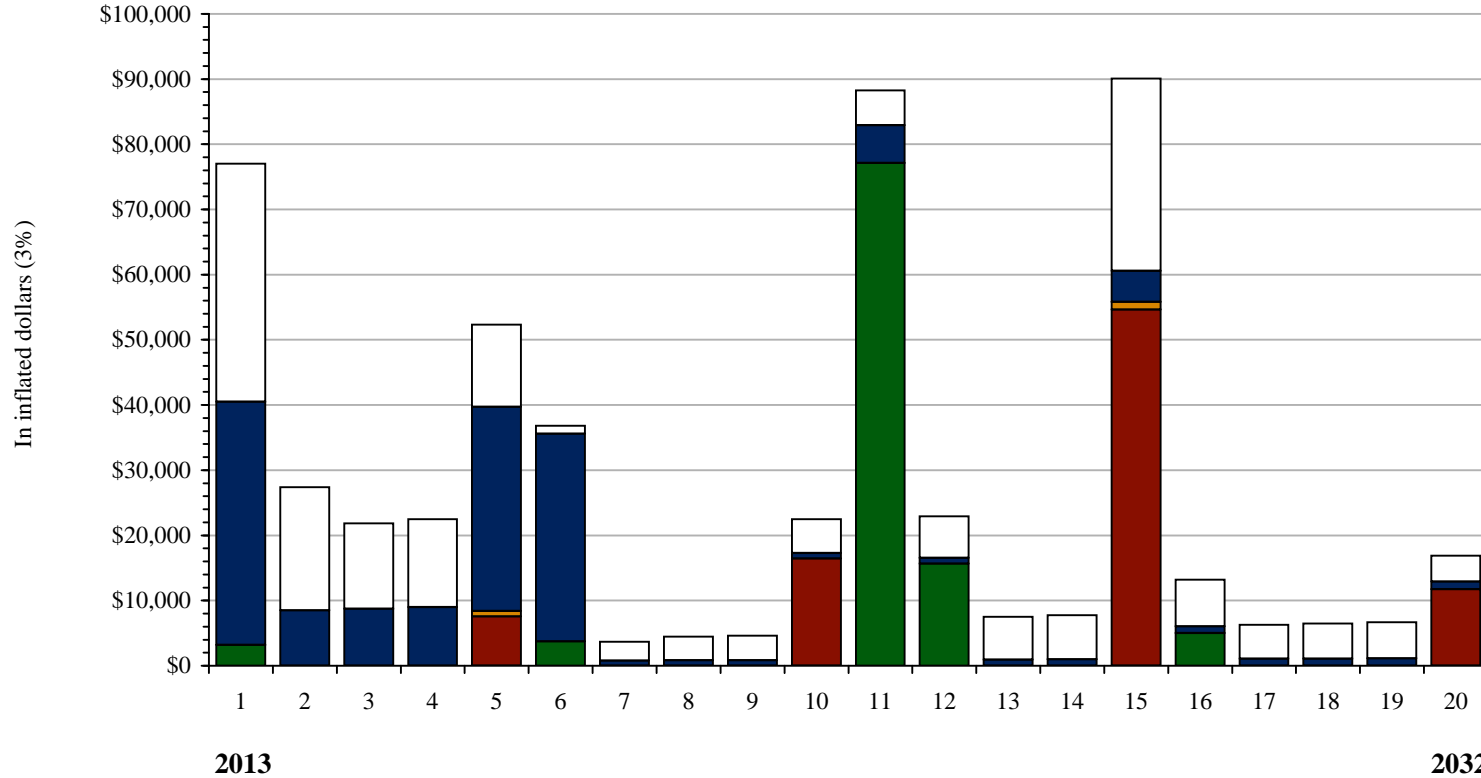
**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan Two - Conventional*

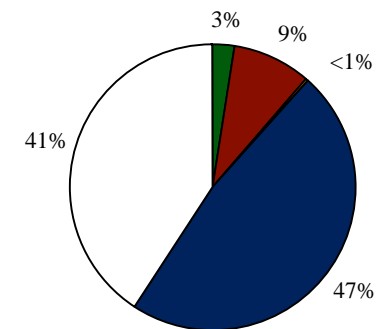
Reserve Funding In Year 20										
Projected replacement reserve balance is \$79,108					This is \$3,955 per unit in inflated dollars or \$2,256 per unit in uninflated dollars					
Projected annual funding to reserves is \$28,347					This is \$1,417 per unit in inflated dollars or \$808 per unit in current dollars					
2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20	
										Reserve Balances (A)
\$78,457	\$65,814	\$75,592	\$93,739	\$112,907	\$61,257	\$56,134	\$57,955	\$59,835	\$65,266	Starting Replacement Reserves
										Annual Funding (B)
\$1,086	\$1,119	\$1,152	\$1,187	\$1,223	\$1,259	\$1,297	\$1,336	\$1,376	\$1,417	Contributions Indexed at 3%
										Additional Unit Contributions (C)
\$21,725	\$22,377	\$23,048	\$23,740	\$24,452	\$25,186	\$25,941	\$26,719	\$27,521	\$28,347	Total Annual Reserve Funding (D)
\$2,680	\$2,310	\$2,613	\$3,168	\$3,754	\$2,215	\$2,073	\$2,139	\$2,208	\$2,383	Interest on Reserves at 3% (E)
\$102,862	\$90,501	\$101,254	\$120,647	\$141,113	\$88,658	\$84,149	\$86,814	\$89,564	\$95,995	Total Funds Available
\$37,049	\$14,909	\$7,515	\$7,740	\$79,856	\$32,524	\$26,193	\$26,979	\$24,299	\$16,887	Total Capital Cost (F)
\$65,814	\$75,592	\$93,739	\$112,907	\$61,257	\$56,134	\$57,955	\$59,835	\$65,266	\$79,108	Reserve Balances (G)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Capital Needs Summary - *Green*

Walter Crabtree Apartments



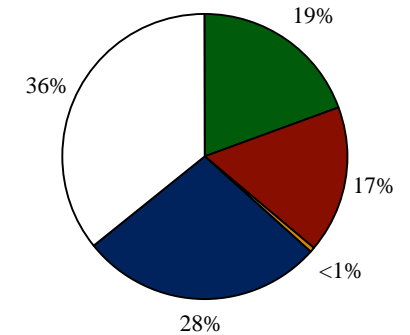
Year One Distribution



Ten Year Distribution

Total Costs by Building System (inflated dollars)

	Year 1	Years 1-10	Years 1-20
Site Systems	\$3,213 or \$161/unit	\$6,938 or \$347/unit	\$104,693 or \$5,235/unit
Mechanical Room		\$23,981 or \$1,199/unit	\$90,378 or \$4,519/unit
Building Mech. & Elec.		\$855 or \$43/unit	\$2,005 or \$100/unit
Building Architectural	\$37,307 or \$1,865/unit	\$130,006 or \$6,500/unit	\$148,850 or \$7,442/unit
Dwelling Units	\$36,480 or \$1,824/unit	\$111,403 or \$5,570/unit	\$193,387 or \$9,669/unit
In inflated dollars:	\$77,001 or \$3,850/unit	\$273,183 or \$13,659/unit	\$539,312 or \$26,966/unit
In current dollars:	\$77,001 or \$3,850/unit	\$250,664 or \$12,533/unit	\$432,906 or \$21,645/unit



Twenty Year Distribution

Capital Needs Summary - Green

OSI Ref: **13117**
 Property Age: **53 Years**
 Financing: **CHFA**

Residential Buildings: **4**
 Total Number of Units: **20**
 Occupancy: **Elderly**

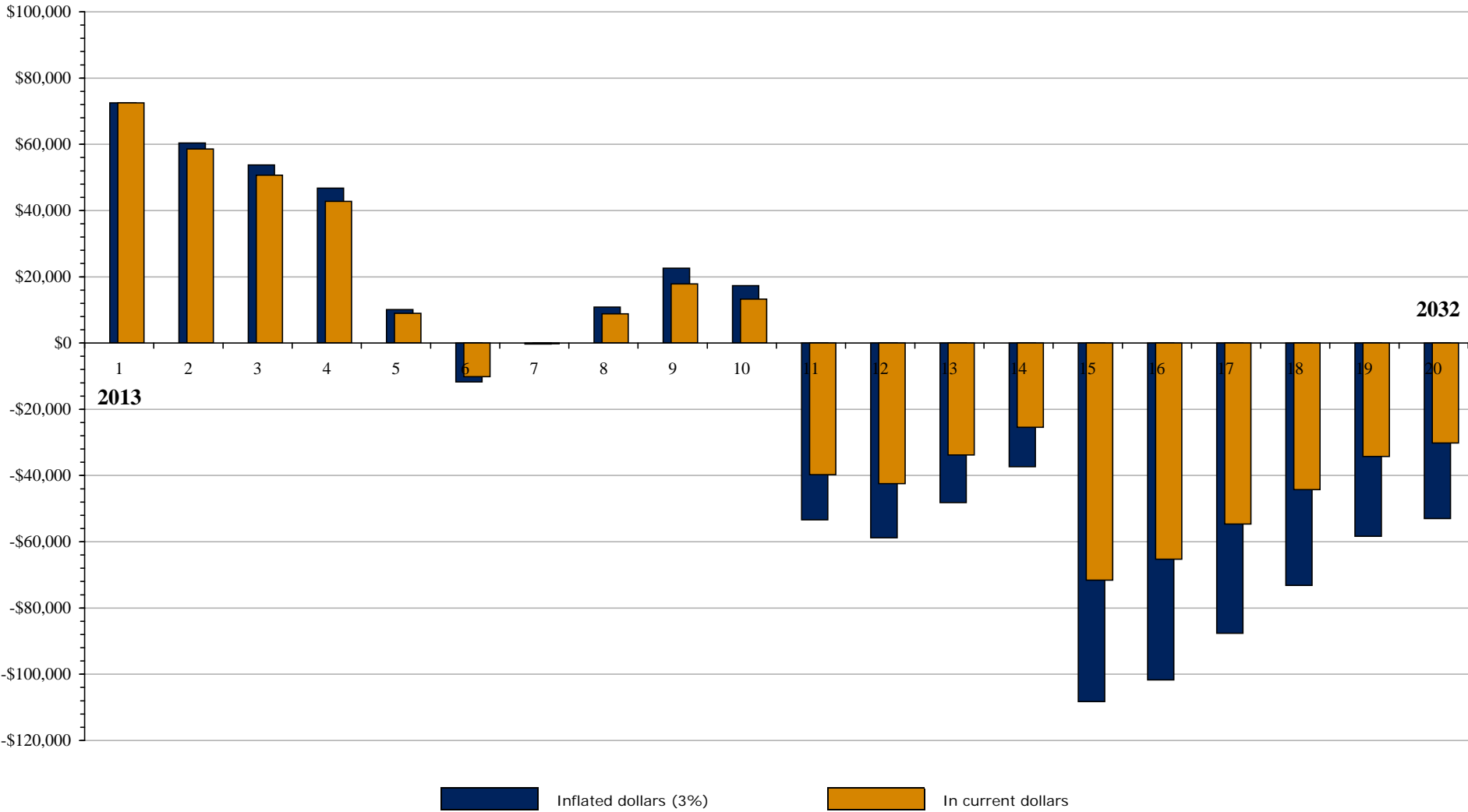
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
Site Systems										
Surface	\$3,213	\$0	\$0	\$0	\$0	\$3,725	\$0	\$0	\$0	\$0
Site Distribution Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Sub-Total	\$3,213	\$0	\$0	\$0	\$0	\$3,725	\$0	\$0	\$0	\$0
Mechanical Room										
Boilers	\$0	\$0	\$0	\$0	\$7,541	\$0	\$0	\$0	\$0	\$0
Boiler Room Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,440
Mechanical Sub-Total	\$0	\$0	\$0	\$0	\$7,541	\$0	\$0	\$0	\$0	\$16,440
Building Mech. & Electrical										
Mechanical	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Electrical	\$0	\$0	\$0	\$0	\$855	\$0	\$0	\$0	\$0	\$0
Elevators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical & Electrical Sub-Total	\$0	\$0	\$0	\$0	\$855	\$0	\$0	\$0	\$0	\$0
Building Architectural										
Structural and Exterior	\$37,307	\$8,485	\$8,739	\$9,001	\$741	\$764	\$786	\$810	\$834	\$859
Roof Systems	\$0	\$0	\$0	\$0	\$30,184	\$31,089	\$0	\$0	\$0	\$0
Halls, Stairs, Lobbies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Community Spaces	\$0	\$0	\$0	\$0	\$405	\$0	\$0	\$0	\$0	\$0
Building Architectural Sub-Total	\$37,307	\$8,485	\$8,739	\$9,001	\$31,330	\$31,853	\$786	\$810	\$834	\$859
Dwelling Units										
Living Areas	\$8,460	\$8,714	\$8,975	\$9,245	\$0	\$0	\$0	\$0	\$0	\$0
Bathrooms	\$1,649	\$8,265	\$2,147	\$2,212	\$1,102	\$1,135	\$1,169	\$1,204	\$1,240	\$1,277
Kitchens	\$1,871	\$1,928	\$1,985	\$2,045	\$124	\$128	\$1,731	\$1,783	\$1,837	\$3,197
Mechanical & Electrical	\$24,500	\$0	\$0	\$0	\$11,390	\$0	\$0	\$676	\$697	\$718
Dwelling Units Sub-Total	\$36,480	\$18,906	\$13,108	\$13,501	\$12,616	\$1,262	\$2,900	\$3,664	\$3,774	\$5,192
Total Capital Costs	\$77,001	\$27,391	\$21,847	\$22,502	\$52,342	\$36,840	\$3,687	\$4,474	\$4,608	\$22,491

Walter Crabtree Apartments

Costs on these pages are aggregated by category from the Capital Needs worksheets which follow. Total capital costs on these pages are carried forward to line F of the Replacement Reserve Analysis(es) that follow.

2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20	
\$77,107	\$15,642	\$0	\$0	\$0	\$5,006	\$0	\$0	\$0	\$0	Site Systems
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Surface Site Distribution Systems
\$77,107	\$15,642	\$0	\$0	\$0	\$5,006	\$0	\$0	\$0	\$0	Site Sub-Total
\$0	\$0	\$0	\$0	\$54,648	\$0	\$0	\$0	\$0	\$11,748	Mechanical Room
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Boilers Boiler Room Systems
\$0	\$0	\$0	\$0	\$54,648	\$0	\$0	\$0	\$0	\$11,748	Mechanical Sub-Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Building Mech. & Electrical
\$0	\$0	\$0	\$0	\$1,150	\$0	\$0	\$0	\$0	\$0	Mechanical
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Electrical
										Elevators
\$0	\$0	\$0	\$0	\$1,150	\$0	\$0	\$0	\$0	\$0	Mechanical & Electrical Sub-Total
\$5,793	\$912	\$939	\$967	\$4,241	\$1,026	\$1,057	\$1,089	\$1,121	\$1,155	Building Architectural
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Structural and Exterior Roof Systems
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Halls, Stairs, Lobbies
\$0	\$0	\$0	\$0	\$544	\$0	\$0	\$0	\$0	\$0	Community Spaces
\$5,793	\$912	\$939	\$967	\$4,785	\$1,026	\$1,057	\$1,089	\$1,121	\$1,155	Building Architectural Sub-Total
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Dwelling Units
\$1,316	\$1,355	\$1,396	\$1,438	\$14,814	\$1,525	\$1,571	\$1,618	\$1,667	\$1,717	Living Areas
\$3,293	\$4,268	\$4,396	\$4,527	\$4,663	\$4,803	\$2,797	\$2,881	\$2,967	\$1,303	Bathrooms
\$739	\$761	\$784	\$808	\$10,028	\$857	\$883	\$909	\$936	\$964	Kitchens
										Mechanical & Electrical
\$5,347	\$6,384	\$6,576	\$6,773	\$29,506	\$7,185	\$5,251	\$5,408	\$5,570	\$3,984	Dwelling Units Sub-Total
\$88,248	\$22,938	\$7,515	\$7,740	\$90,089	\$13,217	\$6,308	\$6,497	\$6,692	\$16,887	Total Capital Costs

Replacement Reserve (RR) Analysis: *Plan One - Green*



Current Replacement Reserve Balance: **\$132,879**

Adjusted Replacement Reserve Balance: **\$132,879**

Current annual contributions to reserve accounts: **\$12,490**

At the end of Year One, Reserve Balances are projected to be: **\$72,542**

At the end of Year 20, Reserve Balances are projected to be: **(\$52,972)**

Unmet needs projected in most years of the plan

Replacement Reserve (RR) Analysis: *Plan One - Green*

Reserve Funding In Year 1										
Starting Balance:		\$132,879 or \$6,644/unit		Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.						
Contributions to Reserves:		\$12,490 or \$625/unit								
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances										
Starting Replacement Reserves	\$132,879	\$72,542	\$60,385	\$53,799	\$46,764	\$10,093	(\$11,748)	(\$297)	\$10,820	\$22,596
(B) Annual Funding										
Contributions Indexed at 3%	\$625	\$643	\$663	\$682	\$703	\$724	\$746	\$768	\$791	\$815
(C) Additional Unit Contributions										
(D) Total Annual Reserve Funding	\$12,490	\$12,865	\$13,251	\$13,648	\$14,058	\$14,479	\$14,914	\$15,361	\$15,822	\$16,297
(E) Interest on Reserves at 3%	\$4,174	\$2,369	\$2,010	\$1,819	\$1,614	\$520	\$224	\$230	\$562	\$922
Total Funds Available	\$149,543	\$87,776	\$75,646	\$69,266	\$62,435	\$25,092	\$3,390	\$15,294	\$27,204	\$39,815
(F) Total Capital Cost	\$77,001	\$27,391	\$21,847	\$22,502	\$52,342	\$36,840	\$3,687	\$4,474	\$4,608	\$22,491
(G) Reserve Balances	\$72,542	\$60,385	\$53,799	\$46,764	\$10,093	(\$11,748)	(\$297)	\$10,820	\$22,596	\$17,324
Outside Capital:										
Adjusted Reserve Balances	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Starting reserve balance is \$132,879.
2. Starting annual contribution is \$12,490.
3. Capital needs outpace reserves in Years 6, 7, and 11 through 20.

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

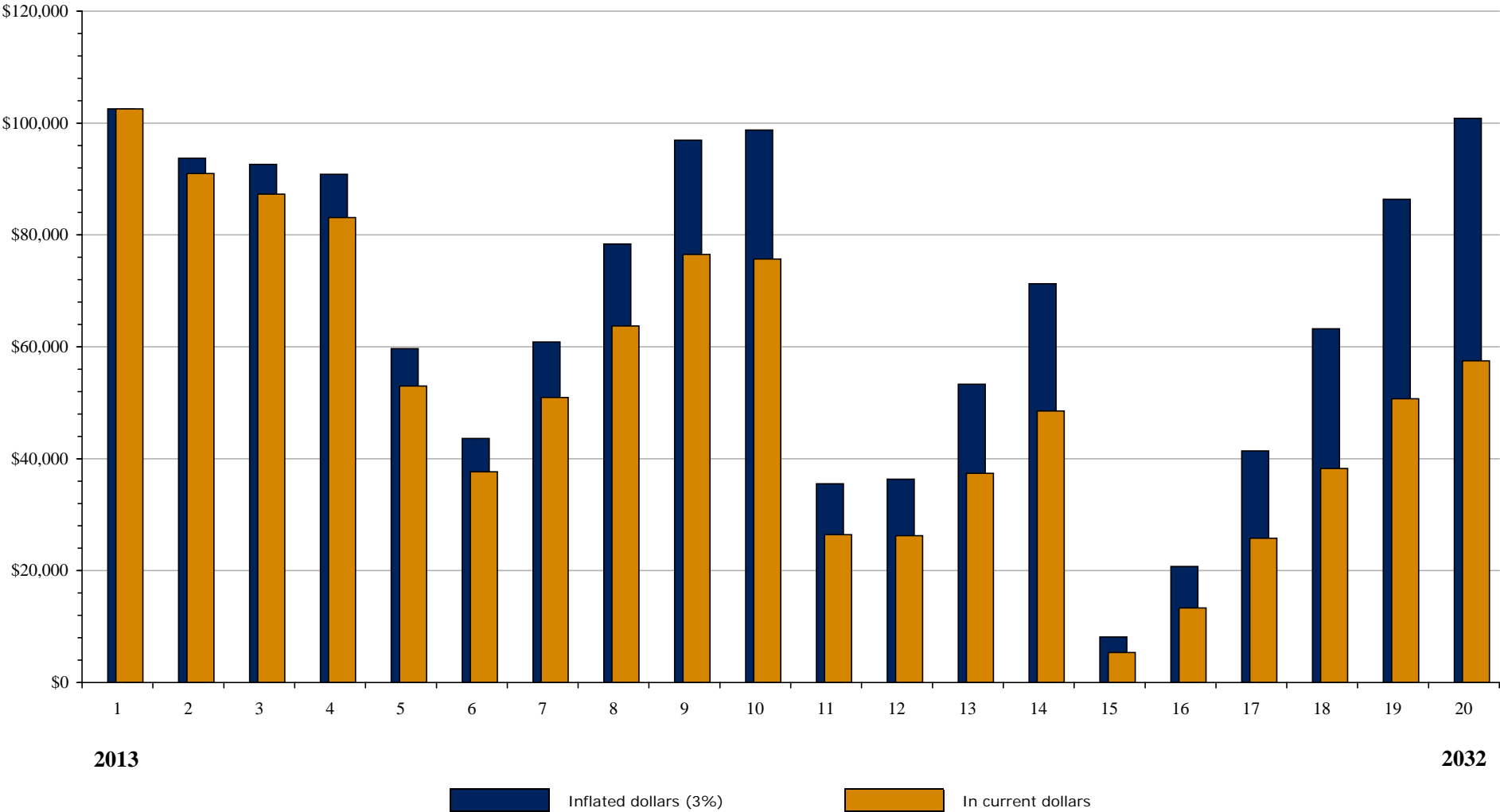
Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan One - Green*

Reserve Funding In Year 20										
Projected replacement reserve balance is (\$52,972)					This is (\$2,649)per unit in inflated dollars or (\$1,510) per unit in uninflated dollars					
Projected annual funding to reserves is \$21,901					This is \$1,095 per unit in inflated dollars or \$625 per unit in current dollars					
2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	
										Reserve Balances (A)
										Annual Funding (B)
										Additional Unit Contributions (C)
										Total Annual Reserve Funding (D)
										Total Funds Available
										Reserve Balances (G)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Replacement Reserve (RR) Analysis: *Plan Two - Green*



Current Replacement Reserve Balance: **\$132,879**

Adjusted Replacement Reserve Balance: **\$132,879**

Current annual contributions to reserve accounts: **\$12,490**

At the end of Year One, Reserve Balances are projected to be: **\$102,542**

At the end of Year 20, Reserve Balances are projected to be: **\$100,860**

All projected capital needs are met throughout the plan

Replacement Reserve (RR) Analysis: *Plan Two - Green*

Reserve Funding In Year 1										
Starting Balance:		\$132,879 or \$6,644/unit		Replacement Reserve (RR) analysis starts here with the starting RR balance reported, or imputed, to have been on hand at the start of Year 1, and current annual RR contributions. The projections below reflect Starting RR Balance (Line A), plus the Total Annual RR Contributions (Line D) and Interest Earnings on RR (Line E), minus Total Annual Capital Costs (Line F), taken from the CNS above. This is expressed arithmetically as (A+D+E)-F=G, Year-End Balances, then carries forward to Line A of the following Year.						
Contributions to Reserves:		\$12,490 or \$625/unit								
	2013 Year 1	2014 Year 2	2015 Year 3	2016 Year 4	2017 Year 5	2018 Year 6	2019 Year 7	2020 Year 8	2021 Year 9	2022 Year 10
(A) Reserve Balances										
Starting Replacement Reserves	\$132,879	\$102,542	\$93,721	\$92,616	\$90,821	\$59,672	\$43,643	\$60,858	\$78,390	\$96,919
(B) Annual Funding										
Contributions Indexed at 3%	\$625	\$643	\$763	\$883	\$910	\$937	\$965	\$994	\$1,024	\$1,055
(C) Additional Unit Contributions		\$120	\$120							
(D) Total Annual Reserve Funding	\$12,490	\$15,265	\$17,665	\$17,665	\$18,195	\$18,740	\$19,303	\$19,882	\$20,478	\$21,093
(E) Interest on Reserves at 3%	\$4,174	\$3,305	\$3,077	\$3,043	\$2,998	\$2,071	\$1,599	\$2,124	\$2,659	\$3,224
Total Funds Available	\$149,543	\$121,112	\$114,463	\$113,324	\$112,014	\$80,483	\$64,545	\$82,863	\$101,527	\$121,235
(F) Total Capital Cost	\$77,001	\$27,391	\$21,847	\$22,502	\$52,342	\$36,840	\$3,687	\$4,474	\$4,608	\$22,491
(G) Reserve Balances	\$72,542	\$93,721	\$92,616	\$90,821	\$59,672	\$43,643	\$60,858	\$78,390	\$96,919	\$98,744
Outside Capital:	\$30,000									
Adjusted Reserve Balances	\$102,542	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Same starting reserve balance and annual contribution as shown in Plan 1.
2. Cash infusion of \$30,000 in Year 1.
3. Annual contribution increased by \$120 per apartment (\$10/month) in Years 2 and 3.
4. Plan is fully funded.

*ANNUAL RR CONTRIBUTIONS are shown being indexed for inflation at the % specified above except when Additional Contributions are called for.

Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**INTEREST EARNINGS ON RESERVES are calculated on 100% of starting balances and on 50% of the total annual contribution for the year at the rate shown

Replacement Reserve (RR) Analysis: *Plan Two - Green*

Reserve Funding In Year 20											
Projected replacement reserve balance is \$100,860					This is \$5,043 per unit in inflated dollars or \$2,876 per unit in uninflated dollars						
Projected annual funding to reserves is \$28,347					This is \$1,417 per unit in inflated dollars or \$808 per unit in current dollars						
2023 Year 11	2024 Year 12	2025 Year 13	2026 Year 14	2027 Year 15	2028 Year 16	2029 Year 17	2030 Year 18	2031 Year 19	2032 Year 20		
										Reserve Balances (A)	
\$98,744	\$35,510	\$36,350	\$53,320	\$71,276	\$8,144	\$20,735	\$41,380	\$63,244	\$86,384	Starting Replacement Reserves	
										Annual Funding (B)	
\$1,086	\$1,119	\$1,152	\$1,187	\$1,223	\$1,259	\$1,297	\$1,336	\$1,376	\$1,417	Contributions Indexed at 3%	
										Additional Unit Contributions (C)	
\$21,725	\$22,377	\$23,048	\$23,740	\$24,452	\$25,186	\$25,941	\$26,719	\$27,521	\$28,347	Total Annual Reserve Funding (D)	
\$3,288	\$1,401	\$1,436	\$1,956	\$2,505	\$622	\$1,011	\$1,642	\$2,310	\$3,017	Interest on Reserves at 3% (E)	
\$123,757	\$59,288	\$60,835	\$79,016	\$98,233	\$33,952	\$47,687	\$69,741	\$93,076	\$117,747	Total Funds Available	
\$88,248	\$22,938	\$7,515	\$7,740	\$90,089	\$13,217	\$6,308	\$6,497	\$6,692	\$16,887	Total Capital Cost (F)	
\$35,510	\$36,350	\$53,320	\$71,276	\$8,144	\$20,735	\$41,380	\$63,244	\$86,384	\$100,860	Reserve Balances (G)	
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		

Projected Capital Needs Over Twenty Years

SITE SYSTEMS

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
SURFACE									
Roadways	_____sf	_____	_____	_____	_____	_____	_____	_____	n/a: Municipal streets
Roadways (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	
Parking	3,200 sf	2.10	\$6,720		≈10	20	11	in 1 Year	Asphalt paved, some cracks observed Resurface in Year 11
Parking (Green)	3,200 sf	6.25	\$20,000	\$13,280	≈10	20	11	in 1 Year	Resurface using open pavers Improved drainage, reduces heat island
Crack-Fill and and and Sealcoat	9,180 sf	0.35	\$3,213		≈10	5	1 /6 /16	in 1 Year	Minor cracks observed. Repair allowance (crackfill, sealcoat, re-stripe)
Pedestrian Paving	5,980 sf	2.10	\$12,558		≈10	20	11	in 1 Year	Asphalt paved, some cracks observed Resurface in Year 11
Pedestrian Paving (Green)	5,980 sf	6.25	\$37,375	\$24,817	≈10	20	11	in 1 Year	Resurface using open pavers Improved drainage, reduces heat island
Fencing - 1	_____lf	_____	_____	_____	_____	_____	_____	_____	
Fencing - 1 (Green)	_____lf	_____	_____	_____	_____	_____	_____	_____	
Fencing - 2	_____lf	_____	_____	_____	_____	_____	_____	_____	
Fencing - 2 (Green)	_____lf	_____	_____	_____	_____	_____	_____	_____	
Retaining Walls	_____lf	_____	_____	_____	_____	_____	_____	_____	
Site Lighting	_____ea	_____	_____	_____	_____	_____	_____	_____	
Site Lighting (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
Landscaping	1 ls	5500.00	\$5,500		Varies	20	12	in 1 Year	Surrounding lawns, flowerbeds, trees Allowance to replant and prune
Landscaping (Green)	1 ls	11300.00	\$11,300	\$5,800	Varies	20	12	in 1 Year	Replace existing w/Xeriscape (local plantings) Minimum maintenance and water use. Discuss
Miscellaneous	_____ea	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous	_____ea	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
Site Distribution Systems	1 ls	_____	_____	_____	53	50	_____	_____	Connected to municipal water and sewer Monitor

SITE SYSTEMS

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
SURFACE																				
Roadways	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roadways (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Parking	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,031	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Parking (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$26,878	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Crack-Fill and and and Sealcoat	\$3,213	\$0	\$0	\$0	\$0	\$3,725	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,006	\$0	\$0	\$0	\$0
Pedestrian Paving	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,877	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pedestrian Paving (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$50,229	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Retaining Walls	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landscaping	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,613	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landscaping (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,642	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Distribution Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

MECHANICAL ROOM

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)	Notes
BOILERS								
Boilers - 1	2 ea	15,215	\$30,429		≈10	25	15	Oil-fired Crown (629 MBH each), w/Beckett burners. 84.5-87% eff
Boilers - 1 (Green)	2 ea				≈10	25		Green option in place
Controls	2 ea	3,350	\$6,700		≈10	15	5 20	Tekmar controllers (one/mech room) w/OA & return water temp input. Replace
Controls (Green)	ea							
Hydronic Circulation Pumps	2 ea	2,850	\$5,700		≈10	25	15	In-line multiple speed Grundfoss pumps Replace
Hydronic Circulation Pumps (Green)	2 ea				≈10	25		Green option in place
Chilled Water Pumps	ea							
Chilled Water Pumps (Green)	ea							
Cooling Water Pumps	ea							
Cooling Water Pumps (Green)	ea							
Heating Water Pumps - 1	ea							
Heating Water Pumps - 1 (Green)	ea							
Combustion Air	1 ls				53	15		Louvered air openings Maintain out of Operating
Combustion Air (Green)	ea							
Flue Exhaust	1 ls				53	20		Metal flues, no missing, loose, or damage section observed. Maintain out of Operating
Flue Exhaust (Green)	ea							
Condensate & Feed Water	ea							
Miscellaneous	ea							
Miscellaneous (Green)	ea							
Miscellaneous	ea							
Miscellaneous (Green)	ea							

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BOILERS																				
Boilers - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$46,027	\$0	\$0	\$0	\$0	\$0
Boilers - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controls	\$0	\$0	\$0	\$0	\$7,541	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,748
Controls (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hydronic Circulation Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,622	\$0	\$0	\$0	\$0	\$0
Hydronic Circulation Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Chilled Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Chilled Water Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cooling Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cooling Water Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Combustion Air	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Combustion Air (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Flue Exhaust	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Flue Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Condensate & Feed Water	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

MECHANICAL ROOM--*continued*

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
BOILER ROOM SYSTEMS									
Boiler Room Piping/Valves	1 ea				53	25			
Boiler Room Piping/Valves (Green)	ea								
3-Way Valve & Controller	ea								
3-Way Valve & Controller (Green)	ea								
Heat Exchanger	ea								
Heat Exchanger (Green)	ea								
DHW Generation - 1	ea								
DHW Generation - 1 (Green)	ea								
DHW Generation - 2	ea								
DHW Generation - 2 (Green)	ea								
DHW Storage - 1	4 ea	3150.00	\$12,600		≈10	20	10	in 1 Year	Insulated storage tanks (≈80 gals each) Replace
DHW Storage - 1 (Green)	ea								
DHW Storage - 2	ea								
DHW Storage - 2 (Green)	ea								
DHW Pumps - 1	ea								
DHW Pumps - 1 (Green)	ea								
DHW Pumps - 2	ea								
DHW Pumps - 2 (Green)	ea								
Miscellaneous	ea								
Miscellaneous (Green)	ea								
Miscellaneous	ea								

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BOILER ROOM SYSTEMS																				
Boiler Room Piping/Valves	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Room Piping/Valves (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3-Way Valve & Controller	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
3-Way Valve & Controller (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heat Exchanger	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heat Exchanger (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$16,440	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Pumps - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING MECHANICAL AND ELECTRICAL

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
BUILDING MECHANICAL									
Compactors	_____ea	_____	_____		_____	_____	_____	_____	
Building Fire Suppression	_____ls	_____	_____		_____	_____	_____	_____	
Building Distribution Systems	_____1 ls	_____	_____		_____53	_____50	_____	_____	
Building HVAC Systems - 1	_____ea	_____	_____		_____	_____	_____	_____	
Building HVAC Systems - 1 (Green)	_____ea	_____	_____		_____	_____	_____	_____	
Building HVAC Systems - 2	_____ea	_____	_____		_____	_____	_____	_____	
Building HVAC Systems - 2 (Green)	_____ea	_____	_____		_____	_____	_____	_____	
Building HVAC Systems - 3	_____ea	_____	_____		_____	_____	_____	_____	
Building HVAC Systems - 3 (Green)	_____ea	_____	_____		_____	_____	_____	_____	
Building Vent. & Exhaust	_____ea	_____	_____		_____	_____	_____	_____	
Building Vent. & Exhaust (Green)	_____ea	_____	_____		_____	_____	_____	_____	
Cold Water Booster Pumps	_____ea	_____	_____		_____	_____	_____	_____	
Cold Water Booster Pumps (Green)	_____ea	_____	_____		_____	_____	_____	_____	
BUILDING ELECTRICAL									
Building Power Wiring	_____1 ls	_____	_____		_____53	_____99	_____	_____	
Emergency Generator	_____ea	_____	_____		_____	_____	_____	_____	
Emergency Lights	_____ea	_____	_____		_____	_____	_____	_____	
Smoke / Fire Detection	_____1 ls	_____760.00	_____ \$760		_____Varies	_____10	_____5 15	_____in 1 Year	Hardwired devices in laundry rooms and mech rooms. Replace in Years 5 and 15
Signaling / Communication	_____ls	_____	_____		_____	_____	_____	_____	
BUILDING ELEVATORS									
Shafts and Doorways	_____ea	_____	_____		_____	_____	_____	_____	n/a: No elevators at property
Cabs	_____ea	_____	_____		_____	_____	_____	_____	
Controller/Dispatcher	_____ea	_____	_____		_____	_____	_____	_____	
Machine Room Equipment	_____ea	_____	_____		_____	_____	_____	_____	

Walter Crabtree Apartments																				
BUILDING MECHANICAL AND ELECTRICAL																				
Costs projected at 3%																				
Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BUILDING MECHANICAL																				
Compactors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Fire Suppression	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Distribution Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems - 3 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Vent. & Exhaust	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Vent. & Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cold Water Booster Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cold Water Booster Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BUILDING ELECTRICAL																				
Building Power Wiring	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Emergency Generator	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Emergency Lights	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Smoke / Fire Detection	\$0	\$0	\$0	\$0	\$855	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,150	\$0	\$0	\$0	\$0	\$0
Signaling / Communication	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Shafts and Doorways	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cabs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controller/Dispatcher	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Machine Room Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
STRUCTURE									
Foundation	1,196 lf				53	50			Concrete slab on grade - Monitor
Framing	ls								
Slab	sf								
Miscellaneous	ea								
BUILDING EXTERIOR									
Exterior Common Doors	2 ea	280.00	\$560		53	35	1	in 1 Year	Solid wood door Replace in Year 1
Exterior Common Doors (Green)	2 ea	345.00	\$690	\$130	53	35	1	in 1 Year	Replace existing with fiberglass door Longevity, energy savings. EWCM 1
Exterior Unit Doors - 2	40 ea	705.00	\$28,200		53	35	1	over 4 Years	Solid wood doors with glass inserts Replace starting in Year 1
Exterior Unit Doors - 2 (Green)	40 ea	757.88	\$30,315	\$2,115	53	35	1	over 4 Years	Replace existing with fiberglass door Longevity, energy savings. EWCM 1
Service Doors	2 ea	280.00	\$560		53	35	1	in 1 Year	Solid wood door Replace in Year 1
Service Doors (Green)	2 ea	345.00	\$690	\$130	53	35	1	in 1 Year	Replace existing with fiberglass door Longevity, energy savings. EWCM 1
Glass Sliding Doors	ea								
Storm Doors	40 ea	247.00	\$9,880		Varies	15	1 16	over 15 Years	On each unit door Replace
Exterior Walls -Brick	10,434 sf				53				No signs of step cracks or mortar loss
Exterior Walls -Brick	522 sf	7.00	\$3,652		53	50	11	in 1 Year	Allowance for repointing in Year 11
Exterior Walls -Brick (Green)	sf								
Exterior Walls - Vinyl Panels	330 sf	6.50	\$2,145		≈20	35	15	in 1 Year	Vinyl window panels, in good condition Replace in Year 15
Exterior Walls - Vinyl Panels (Green)	330 sf	8.50	\$2,805	\$660	≈20	45		Years	Replace existing with cement fiberboard panels Longevity. Not cost-effective. See GM 1.
Exterior Walls - 3	sf								
Trim, Soffit, Fascia	1 lf				53	20			Vinyl Maintain out of Operating
Trim, Soffit, Fascia (Green)	lf								
Exterior Ceilings	sf								
Miscellaneous	ea								
Miscellaneous (Green)	ea								

BUILDING ARCHITECTURE

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
STRUCTURE																				
Foundation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Framing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Slab	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BUILDING EXTERIOR																				
Exterior Common Doors	\$560	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Common Doors (Green)	\$690	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Unit Doors - 2	\$7,050	\$7,262	\$7,479	\$7,704	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Unit Doors - 2 (Green)	\$7,579	\$7,806	\$8,040	\$8,282	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Service Doors	\$560	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Service Doors (Green)	\$690	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Glass Sliding Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Storm Doors	\$659	\$678	\$699	\$720	\$741	\$764	\$786	\$810	\$834	\$859	\$885	\$912	\$939	\$967	\$996	\$1,026	\$1,057	\$1,089	\$1,121	\$1,155
Exterior Walls -Brick	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,908	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls -Brick (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls - Vinyl Panels	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,245	\$0	\$0	\$0	\$0	\$0
Exterior Walls - Vinyl Panels (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls - 3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Trim, Soffit, Fascia	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Trim, Soffit, Fascia (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE--*continued*

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
BUILDING EXTERIORS (cont.)									
Windows - 1	78 ea	355.00	\$27,690		53	35	1	in 1 Year	Wood-framed single glazed w/storm windows Replace w/vinyl double-glazed in Yr 1
Windows - 1 (Green)	78 ea	381.63	\$29,767	\$2,077	53	35		Years	Replace existing w/fiberglass-framed insulated windows in Year 1. Not cost-effective. See EWCM 2
Windows - 2	ea								
Windows - 2 (Green)	ea								
Window Glazing	ea								
Window Glazing (Green)	ea								
Window Lintels	ea								
Unit Balconies	ea								
Unit Balconies (Green)	ea								
Unit Patios	ea								
Unit Patios (Green)	ea								
Building Mounted Lighting	0 ea								Compact fluorescent Maintain out of Operating
Building Mounted Lighting (Green)	1 ls				53	10			Green option in place.
ROOF SYSTEMS									
Structure	13,409 sf				53	50			Wood framed with wood decking Monitor
Roof Covering - 1	13,409 sf	4.00	\$53,636		15	20	5	over 2 Years	Pitched roofing w/asphalt shingles. Replace starting in Year 5, consider architectural shingles
Roof Covering - 1 (Green)	13,409 sf	7.75	\$103,920	\$50,284	15	40		Years	Replace existing w/metal roof (longevity Not cost-effective, see GM 2.
Roof Insulation	13,409 sf				15	40			Maintain out of Operating
Roof Insulation (Green)	13,409 sf	1.25	\$16,761		15	40		Years	Add insulation to attic, increase to R-38 Negative NPV, but a SIR rating of over 1. Discuss
Roof Covering - 3	sf								
Skylights	ea								
Penthouses	ea								

Walter Crabtree Apartments

BUILDING ARCHITECTURE--continued

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
BUILDING EXTERIORS (cont.)																				
Windows - 1	\$27,690	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Windows - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Windows - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Windows - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Window Glazing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Window Glazing (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Window Lintels	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Balconies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Balconies (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Patios	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Patios (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Mounted Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Mounted Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ROOF SYSTEMS																				
Structure	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering - 1	\$0	\$0	\$0	\$0	\$30,184	\$31,089	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Insulation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Insulation (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering - 3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Skylights	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Penthouses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE--*continued*

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
HALLS									
Hallway Walls and Ceilings	_____sf	_____	_____	_____	_____	_____	_____	_____	n/a: No common halls
Hallway Walls and Ceilings (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	
Hallway Floors - 1	_____sf	_____	_____	_____	_____	_____	_____	_____	
Hallway Floors - 1 (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	
Hallway Floors - 2	_____sf	_____	_____	_____	_____	_____	_____	_____	
Hallway Floors - 2 (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	
Hallway Interior Lighting	_____ea	_____	_____	_____	_____	_____	_____	_____	
Hallway Interior Lighting (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
Hallway Heating	_____ea	_____	_____	_____	_____	_____	_____	_____	
Hallway Heating (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
Hallway Doors	_____ea	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous	_____ea	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
STAIRS									
Stair Walls and Ceilings	_____sf	_____	_____	_____	_____	_____	_____	_____	n/a: No common interior stairs
Stair Walls and Ceilings (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	
Stair Floors	_____sf	_____	_____	_____	_____	_____	_____	_____	
Stair Floors (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	
Stair Interior Lighting	_____ea	_____	_____	_____	_____	_____	_____	_____	
Stair Interior Lighting (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	
Stair Doors	_____ea	_____	_____	_____	_____	_____	_____	_____	
Stair Railings	_____ea	_____	_____	_____	_____	_____	_____	_____	

Walter Crabtree Apartments
BUILDING ARCHITECTURE--continued

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
HALLS																				
Hallway Walls and Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Walls and Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Floors - 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Floors - 1 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Floors - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Floors - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Interior Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Interior Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Heating	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Heating (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Hallway Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
STAIRS																				
Stair Walls and Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Walls and Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Interior Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Interior Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stair Railings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

BUILDING ARCHITECTURE--*continued*

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)				Notes
LOBBIES / MAIL FACILITIES											
Lobby Walls & Ceilings	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	n/a: No common lobbies
Lobby Walls & Ceilings (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Lobby Floors	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Lobby Floors (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
COMMUNITY ROOM / OFFICE											
Walls and Ceilings	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	n/a: No community room at development
Walls and Ceilings (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Floor Covering	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Floor Covering (Green)	_____sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Community Kitchen Cabinets	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Community Kitchen Cabinets (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
PUBLIC LAUNDRY / RESTROOMS											
Walls and Ceilings	580 sf	0.62	\$360		Varies	10	5	15	in	1 Year	Painted walls and ceilings Repaint
Walls and Ceilings (Green)	580 sf	0.62	\$360	\$0	Varies	10	5	15	in	1 Year	Use low VOC paints
Floor Covering	100 sf				53	50					Concrete floor Maintain out of Operating
Floor Covering (Green)	_____sf										
Laundry Equipment	4 ea				Varies	12					Leased: 2 top loading washers and 2 electric dryers Maintain out of Operating
Laundry Equipment (Green)	4 ea				Varies	12					Lease equipment; replace top loading washers with front loading washers (energy & water savings).
Restroom Fixtures / Accessories	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous (Green)	_____ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	

Walter Crabtree Apartments
BUILDING ARCHITECTURE--continued

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
LOBBIES / MAIL FACILITIES																				
Lobby Walls & Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lobby Walls & Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lobby Floors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Lobby Floors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
COMMUNITY ROOM / OFFICE																				
Walls and Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Walls and Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Community Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Community Kitchen Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
PUBLIC LAUNDRY / RESTROOMS																				
Walls and Ceilings	\$0	\$0	\$0	\$0	\$405	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$544	\$0	\$0	\$0	\$0	\$0
Walls and Ceilings (Green)	\$0	\$0	\$0	\$0	\$405	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$544	\$0	\$0	\$0	\$0	\$0
Floor Covering	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Laundry Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Laundry Equipment (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Restroom Fixtures / Accessories	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

DWELLING UNITS

Replacement Items	Quantity	Cost / Unit 2013.00	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)			Notes
LIVING AREA FINISHES										
Unit Hallway Doors	_____ ea	_____	_____		_____	_____	_____	_____	n/a: Direct entry units only (See BA report section)	
Unit Interior Doors	_____ 32 ea	_____	_____		53	25	_____	_____	Hollow core Maintain out of Operating	
Unit Closet Doors	_____ 40 ea	_____	_____		53	25	_____	_____	Hollow core Maintain out of Operating	
Unit Walls and Ceilings	_____ 38,034 sf	_____	_____		53	5	_____	_____	Painted surfaces Maintain out of Operating	
Unit Walls and Ceilings (Green)	_____ sf	_____	_____		_____	_____	_____	_____	Use Low VOC paints	
Living Area Floors - 1	_____ 6,153 sf	5.00	\$30,764		Varies	15	1 16	over 4 Years	VCT, in varying condition Replace starting in Years 1 and 16	
Living Area Floors - 1 (Green)	_____ 6,153 sf	5.50	\$33,840	\$3,076	Varies	25	1	over 4 Years	Replace existing with faux wood linoleum starting in Year 1. See GM 3	
Living Area Floors - 2	_____ sf	_____	_____		_____	_____	_____	_____		
Living Area Floors - 2 (Green)	_____ sf	_____	_____		_____	_____	_____	_____		
BATHROOMS										
Bathroom Floors	_____ 760 sf	5.00	\$3,800		53	15	1 16	over 4 Years	VCT, in varying condition Replace starting in Years 1 and 16	
Bathroom Floors (Green)	_____ 760 sf	5.50	\$4,180	\$380	53	25	1	over 4 Years	Replace existing with faux wood linoleum starting in Year 1. See GM 3	
Bathtub and Shower	_____ 20 ea	375.00	\$7,500		53	20	2	over 20 Years	Enameled steel tubs w/ceramic tile tub surround Bathtub reglazing allowance	
Bathtub and Shower (Green)	_____ ea	_____	_____		_____	_____	_____	_____		
Bathroom Vanity	_____ ea	_____	_____		_____	_____	_____	_____		
Bathroom Vanity (Green)	_____ ea	_____	_____		_____	_____	_____	_____		
Bathroom Sinks	_____ 20 ea	420.00	\$8,400		Varies	30	1	over 20 Years	Wall-hung sinks Replace starting in Year 1	
Bathroom Toilets	_____ 20 ea	410.00	\$8,200		Varies	30	15	over 4 Years	Low flush toilets Replace starting in Year 15	
Bathroom Toilets (Green)	_____ 20 ea	440.75	\$8,815	\$615	Varies	30	15	in 1 Year	Replace existing with high efficiency toilets 1.28 gpf. See EWCM 5	
Ventilation & Exhaust	_____ 20 ea	_____	_____		53	20	_____	_____	Operable windows Maintain out of Operating	
Ventilation & Exhaust (Green)	_____ 20 ea	300.00	\$6,000		53	20	2	in 1 Year	Upgrade with humidistat-controlled variable speed exhaust fan. Discuss	
Accessories	_____ 20 ea	184.00	\$3,680		Varies	20	1	over 20 Years	Towel racks, mirrors, etc. Replacement allowance	

DWELLING UNITS

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
LIVING AREA FINISHES																				
Unit Hallway Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Interior Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Closet Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Walls and Ceilings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Walls and Ceilings (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors - 1	\$7,691	\$7,922	\$8,159	\$8,404	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,982	\$12,342	\$12,712	\$13,093	\$0
Living Area Floors - 1 (Green)	\$8,460	\$8,714	\$8,975	\$9,245	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors - 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Living Area Floors - 2 (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BATHROOMS																				
Bathroom Floors	\$950	\$979	\$1,008	\$1,038	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,480	\$1,524	\$1,570	\$1,617	\$0
Bathroom Floors (Green)	\$1,045	\$1,076	\$1,109	\$1,142	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathtub and Shower	\$0	\$386	\$398	\$410	\$422	\$435	\$448	\$461	\$475	\$489	\$504	\$519	\$535	\$551	\$567	\$584	\$602	\$620	\$638	\$658
Bathtub and Shower (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Vanity	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Vanity (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Sinks	\$420	\$433	\$446	\$459	\$473	\$487	\$502	\$517	\$532	\$548	\$564	\$581	\$599	\$617	\$635	\$654	\$674	\$694	\$715	\$736
Bathroom Toilets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,101	\$3,194	\$3,290	\$3,388	\$0	\$0
Bathroom Toilets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,333	\$0	\$0	\$0	\$0	\$0
Ventilation & Exhaust	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ventilation & Exhaust (Green)	\$0	\$6,180	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Accessories	\$184	\$190	\$195	\$201	\$207	\$213	\$220	\$226	\$233	\$240	\$247	\$255	\$262	\$270	\$278	\$287	\$295	\$304	\$313	\$323

Projected Capital Needs Over Twenty Years

DWELLING UNITS--*continued*

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
KITCHENS									
Kitchen Floors	1,361 sf	5.00	\$6,805		53	15	1	16	VCT, in varying condition Replace starting in Years 1 and 16
Kitchen Floors (Green)	1,361 sf	5.50	\$7,486	\$681	53	25	1	over 4 Years	Replace existing with faux wood linoleum starting in Year 1. See GM 3
Kitchen Cabinets	20 ea				<1	25			Wood cabinets, in good condition Maintain out of Operating
Kitchen Cabinets (Green)	20 ea				<1	20			Replace existing with FSC-certified wood cabinets Beyond time frame of plan
Kitchen Cabinets	ea								
Kitchen Cabinets (Green)	ea								
Kitchen Countertops	20 ea	316.48	\$6,330		<1	12	12	over 10 Years	Laminated particleboard, in good condition Replace starting in Year 12
Kitchen Countertops (Green)	20 ea	900.00	\$18,000	\$11,670	<1	30		Years	Replace existing with solid stone countertops, longer EUL. Not cost-effective. See GM 4.
Range	20 ea	500.00	\$10,000		Varies	25	10	over 10 Years	20-inch electric ranges Replace starting in Year 10
Range (Green)	ea								
Range	ea								
Range (Green)	ea								
Refrigerator	20 ea	670.00	\$13,400		8	15	7	over 10 Years	Frost-free Replace
Refrigerator (Green)	20 ea	720.25	\$14,405	\$1,005	53	15		Years	Consider future replacements with Energy Star refrigerators
Refrigerator	ea								
Refrigerator (Green)	ea								
Dishwasher	ea								
Dishwasher (Green)	ea								
Rangehood and Vent	20 ea	110.00	\$2,200		Varies	20	5	over 20 Years	Through-wall exhaust fans Replacement allowance starting in Year 5
Disposals	ea								
Miscellaneous	ea								
Miscellaneous (Green)	ea								

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
KITCHENS																				
Kitchen Floors	\$1,701	\$1,752	\$1,805	\$1,859	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,650	\$2,730	\$2,812	\$2,896	\$0
Kitchen Floors (Green)	\$1,871	\$1,928	\$1,985	\$2,045	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Countertops	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$876	\$902	\$930	\$957	\$986	\$1,016	\$1,046	\$1,078	\$1,110
Kitchen Countertops (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,305	\$1,344	\$1,384	\$1,426	\$1,469	\$1,513	\$1,558	\$1,605	\$1,653	\$1,702	\$0
Range (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Refrigerator	\$0	\$0	\$0	\$0	\$0	\$0	\$1,600	\$1,648	\$1,697	\$1,748	\$1,801	\$1,855	\$1,911	\$1,968	\$2,027	\$2,088	\$0	\$0	\$0	\$0
Refrigerator (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Refrigerator	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Refrigerator (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dishwasher	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dishwasher (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rangehood and Vent	\$0	\$0	\$0	\$0	\$124	\$128	\$131	\$135	\$139	\$144	\$148	\$152	\$157	\$162	\$166	\$171	\$177	\$182	\$187	\$193
Disposals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Projected Capital Needs Over Twenty Years

DWELLING UNITS--continued

Replacement Items	Quantity	Cost / Unit in 2013 \$	Total Cost in 2013 \$	Total Premium	AGE (Years)	EUL (Years)	Replacement Schedule (Year of action AND duration of project)		Notes
IN-UNIT MECHANICAL									
Unit Warm Air Furnaces	ea								
Unit Warm Air Furnaces (Green)	ea								
Unit Thermostats	20 ea	105.00	\$2,100		Varies	20	5	in 1 Year	Wall-mounted thermostats Replace in Year 5
Unit Thermostats (Green)	20 ea	202.00	\$4,040	\$1,940	Varies	20	5	in 1 Year	Replace existing with programmable thermostats. Discuss
Unit Air Conditioning	lf								
Unit Air Conditioning (Green)	lf								
Unit Radiation	20 ea	550.00	\$11,000		Varies	30	8	over 20 Years	Hydronic baseboard Replacement allowance
Unit Radiation (Green)	ea								
Unit Domestic Hot Water	ea								
Unit Domestic Hot Water (Green)	ea								
Miscellaneous	ea								
Miscellaneous (Green)	ea								
IN-UNIT ELECTRICAL									
Unit Electrical Panel	20 ea	1225.00	\$24,500		53	50	1	in 1 Year	FPE Stab-Lok panel, problematic history Replace
Unit Wiring	20 ea				53	50			Monitor
Unit Security Call System	ea								
Unit Smoke/Fire Detection	20 ea	304.00	\$6,080		5	10	5 15	in 1 Year	Hardwired smoke detectors in living areas and bedrooms. Replace in Yrs 5 and 15
Unit Lighting	lf								
Unit Lighting (Green)	lf								
Unit Lighting	ea								
Unit Lighting (Green)	ea								
Miscellaneous	ea								

Costs projected at 3%

Replacement Items	Year 1 2013	Year 2 2014	Year 3 2015	Year 4 2016	Year 5 2017	Year 6 2018	Year 7 2019	Year 8 2020	Year 9 2021	Year 10 2022	Year 11 2023	Year 12 2024	Year 13 2025	Year 14 2026	Year 15 2027	Year 16 2028	Year 17 2029	Year 18 2030	Year 19 2031	Year 20 2032
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IN-UNIT MECHANICAL

Unit Warm Air Furnaces	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Warm Air Furnaces (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Thermostats	\$0	\$0	\$0	\$0	\$2,364	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Thermostats (Green)	\$0	\$0	\$0	\$0	\$4,547	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Air Conditioning	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Air Conditioning (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Radiation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$676	\$697	\$718	\$739	\$761	\$784	\$808	\$832	\$857	\$883	\$909	\$936	\$964
Unit Radiation (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Domestic Hot Water	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Domestic Hot Water (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

IN-UNIT ELECTRICAL

Unit Electrical Panel	\$24,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Wiring	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Security Call System	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Smoke/Fire Detection	\$0	\$0	\$0	\$0	\$6,843	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,197	\$0	\$0	\$0	\$0	\$0
Unit Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Lighting	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Lighting (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

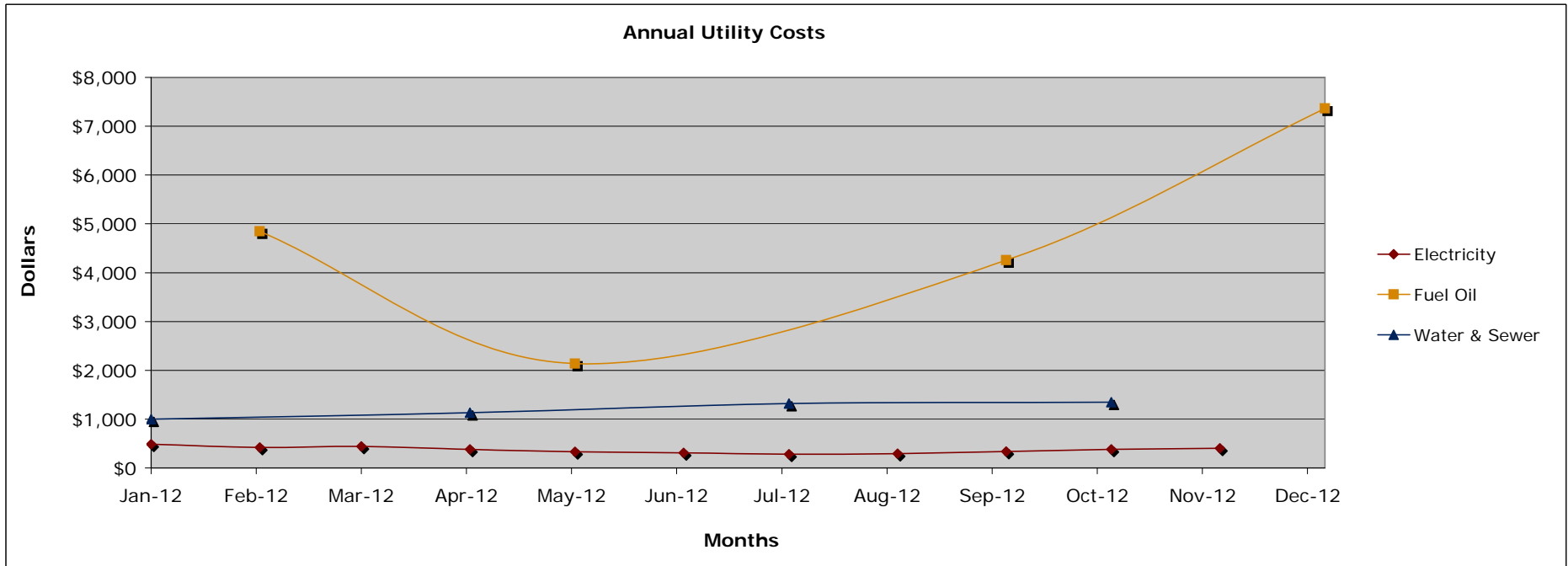
Energy Analysis

Utility Usage

Walter Crabtree Apartments

The energy analysis portion of this GCNA examines utility bills for the most recent 12 months to summarize at electricity, fuel oil, and water/sewer use. The following table and charts show the utility information by utility source, and by monthly and annual consumption.

	ELECTRICITY		NATURAL GAS		WATER / SEWER				FUEL OIL		TOTAL
	kWh	\$	Therms	\$	Gallons	Water \$	Sewer \$	Total \$	Gallons	\$	
Dec-12									2,651	\$7,367	\$7,367
Nov-12	2,408	\$401									\$401
Oct-12	2,261	\$380			64,000	\$1,349		\$1,349			\$1,728
Sep-12	1,805	\$338							1,532	\$4,259	\$4,597
Aug-12	1,214	\$291									\$291
Jul-12	1,432	\$283			64,000	\$1,318		\$1,318			\$1,601
Jun-12	1,707	\$311									\$311
May-12	1,831	\$333							712	\$2,136	\$2,469
Apr-12	2,471	\$383			75,000	\$1,134		\$1,134			\$1,518
Mar-12	2,524	\$440									\$440
Feb-12	2,408	\$422							1,650	\$4,849	\$5,271
Jan-12	2,789	\$484			85,000	\$1,001		\$1,001			\$1,485
Total	22,850	\$4,066			288,000	\$4,802		\$4,802	6,545	\$18,612	\$27,480
Unit Cost		\$0.178						\$0.01667		\$2.84	



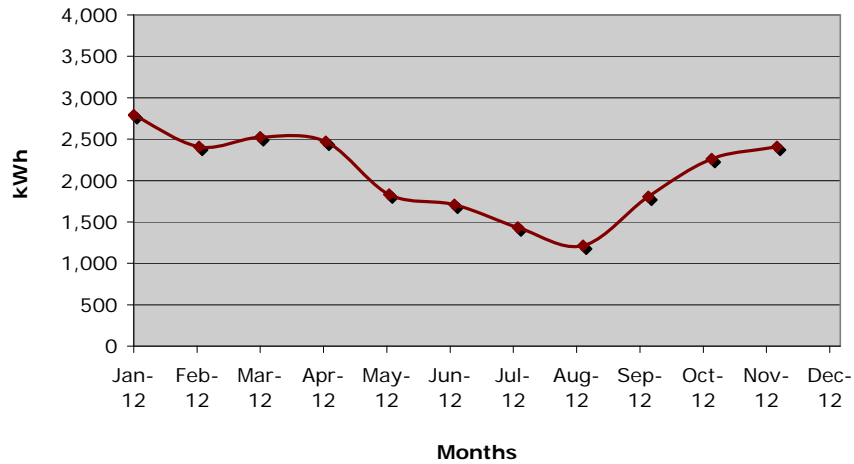
Energy Analysis

Utility Usage, By Type

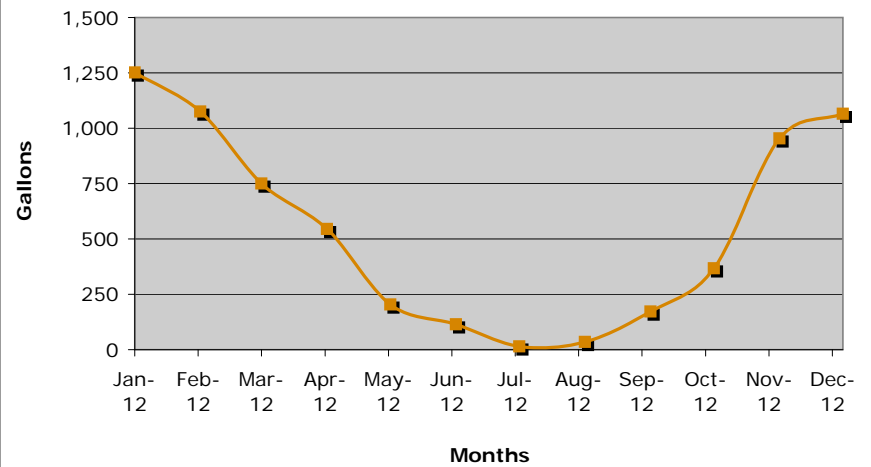
Walter Crabtree Apartments

Below are graphic presentations of annual usage by utility type for the property. Fuel oil usage profile has been adjusted to match the pattern of heating degree days. Water usage corresponds to the average usage between purchase periods.

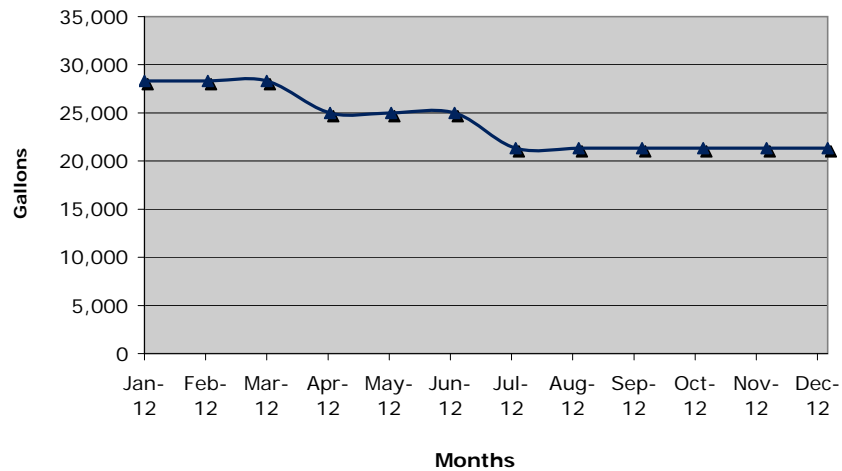
Electricity



Fuel Oil



Water & Sewer

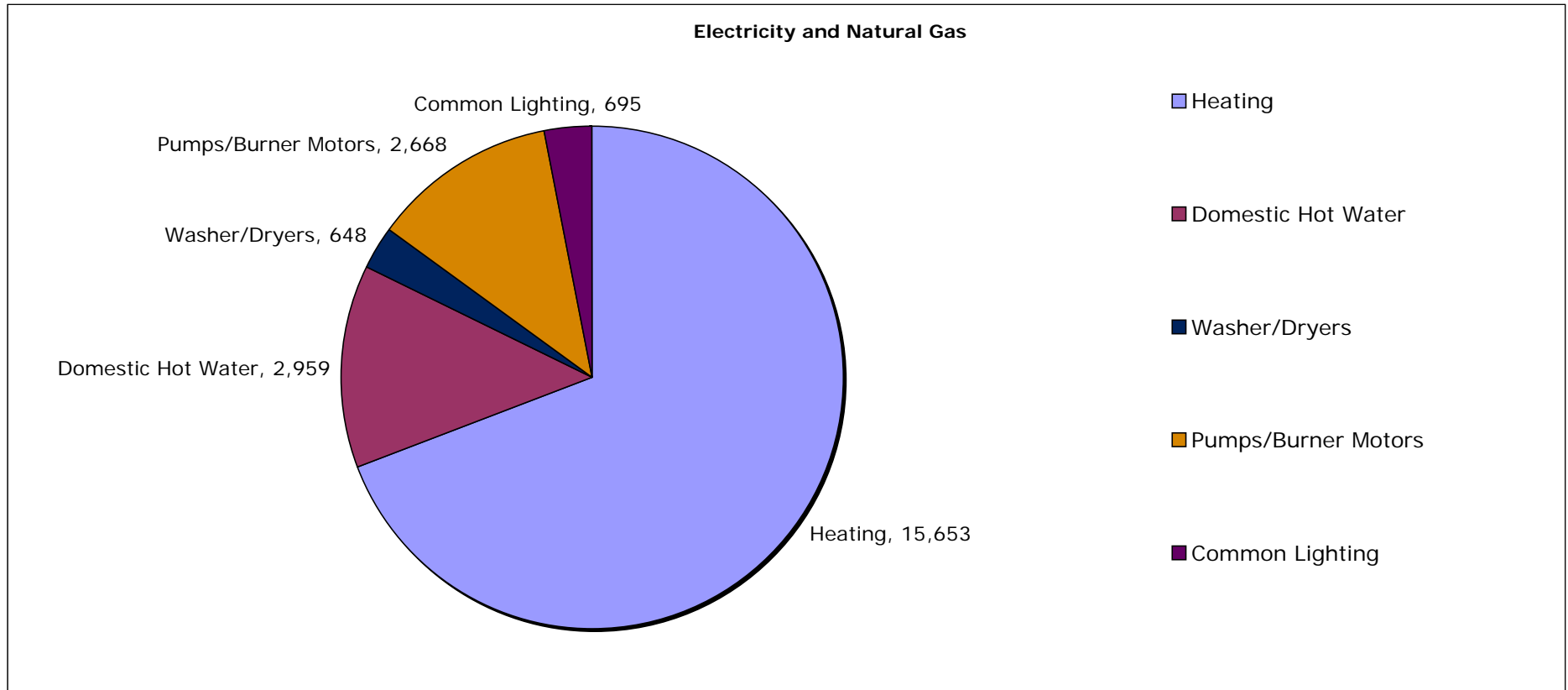


Energy Analysis

Disaggregated End Uses

Walter Crabtree Apartments

Fuel oil is used for space heating and domestic hot water generation. Electricity is used for all common services (lighting, pumps, etc). The following chart illustrates the disaggregated costs based on the end uses. Please note: the estimated end uses are based on the calculated loads and not the billed loads.



End Use	Utility	Annual Cost	Annual Usage (kWh)	Annual Usage (gallons)	Annual Usage (btu)
Heating	Fuel Oil	\$15,653		5,505	767,344,884
Domestic Hot Water	Fuel Oil	\$2,959		1,041	145,056,763
Washer/Dryers	Electricity	\$648	3,642		12,425,888
Pumps/Burner Motors	Electricity	\$2,668	14,994		51,160,908
Common Lighting	Electricity	\$695	3,906		13,327,148

Energy Analysis

Notes

Walter Crabtree Apartments

Below are notes regarding the property metering schedule, general billing information, and specific usage details by utility type.

General

The property is master metered for fuel oil, water and sewer, and common area electricity. The dwelling units are individually metered for electricity consumption.

Fuel

Fuel oil shows a normal consumption pattern, with spikes during the heating season since the property utilizes fuel oil for heating purposes.

Electricity

Electricity is generally higher in the winter months, presumably to a higher demand for lighting caused by daylight savings time. A few of the summer months, particularly June, are showing high usage for electricity. It is assumed that these summer spikes in usage may be ascribed to air conditioning use by the residents. July shows the lowest electricity usage of the 12-month period, so overall air conditioning demand may not be very high at this property.

Water and Sewer

Water and sewer is billed quarterly. Usage pattern is based on the average use within quarters.

Energy Assumptions Table

Below are the energy assumptions by category that were used as inputs for the TREAT model for the property.

These energy assumptions are based on the following:

1. The physical inspection of the property
2. Diagnostic testing conducted during the inspection
3. The historic utility billing information
4. The building blueprints/plans
5. Information provided by site management and maintenance staff

General

Property Type (Family, Elderly, Commercial): **Elderly**
Resident Population Persons: **35**

Space Types

Units, Common Areas	Square Footage:	12,650	Conditioned:	Yes
Basement	Square Footage:	n/a	Conditioned:	No
Basement	Square Footage:	n/a	Conditioned:	Yes

Utility Metering

Common Spaces	Utility Type:	Electricity	Individual, Master:	Master
Whole Building	Utility Type:	Fuel Oil	Individual, Master:	Master
Whole Building	Utility Type:	Water/Sewer	Individual, Master:	Master
Dwelling Units	Utility Type:	Electricity	Individual, Master:	Individual

Infiltration

Infiltration Condition	Tight, Leaky:	Average
Infiltration Rate	ACH:	0.6

Architectural

Wall Insulation	Type:	None	R-Value:	R-6
Roof Insulation	Type:	Cellulose	R-Value:	R-15
Exterior Doors 1	Type:	Flush Metal	R-Value:	< R-3
Exterior Doors 2	Type:	Wood/Glass	R-Value:	< R-3
Windows 1	Type:	Aluminum	U-Factor:	1
Windows 2	Type:	Wood	U-Factor:	1

Heating and Cooling

Temperature Control:

Occupied Heating Temp	Degrees F:	73
Occupied Cooling Temp	Degrees F:	N/A
Unoccupied ¹ Heating Temp	Degrees F:	68
Unoccupied ¹ Heating Time	Hours / Day:	8

Boilers / DHW Generation:

Boiler 1	Type:	Oil-Fired	Capacity:	629 MBH	Efficiency:	86%
Domestic Hot Water 1	Type:	Storage Tanks	Capacity:	80 gals ea	Efficiency:	

¹Unoccupied temps/times based on opportunity for savings based on programmable thermostats

Water & Sewer

Domestic Hot Water:

DHW Daily Usage	Gallons/Resident:	17
DHW Delivery Temp	Degrees F:	120

Domestic Cold Water:

Showerheads	Gallons / Minute:	2
Toilets	Gallons / Flush:	1.6
Irrigation	Gallons / Year:	None

Lighting Loads

Mechanical Room	Type:	Fluorescent	Wattage:	60	Hours per Day:	1
Storage	Type:	T8	Wattage:	32	Hours per Day:	1
Common Laundry	Type:	T8	Wattage:	60	Hours per Day:	8
Exit Lighting	Type:	Incandescent	Wattage:	32	Hours per Day:	24
Community / Office	Type:	Fluorescent	Wattage:		Hours per Day:	
Exterior	Type:	Metal Halide	Wattage:	100	Hours per Day:	12

Appliances, Miscellaneous Loads

Range	Energy Star (Y/N):	No	Usage per Year:	150 therms
Refrigerator	Energy Star (Y/N):	No	Usage per Year:	600 kWh
Laundry	Energy Star (Y/N):	No	Usage per Year:	156 kWh
Miscellaneous Load			Usage per Year:	6920 kWh

Simple Payback Analysis

EWCM #1 Replace Exterior Doors

Replacement Costs		
	Type	Cost
A. Proposed Conventional	Wood Doors	\$29,320.00
B. Proposed Green	Insulated Metal Doors	\$31,695.00
C. Incremental Cost Between Proposed Conventional and Proposed Green		\$2,375.00

Existing Conditions

General: Existing doors are flush metal models. Insulating quality of existing doors estimated at no greater than R-5.

A. Door Type:

B. Total Area of Doors: sf

C. Utility Cost: Oil \$2.84 /gallon

R-Value

A. Existing: 3

B. Conventional: 3

C. Green: 5

Annual Savings: Existing to Conventional

0 BTUs

gallons

Savings = \$2.84 x 0.00 = \$0.00 /yr

Annual Savings: Conventional to Green

20,073,600 BTUs

144.00 gallons

Savings = \$2.84 x 144.00 = \$409.48 /yr

Annual Savings: Existing to Green

20,073,600 BTUs

144.00 gallons

Savings = \$0.00 + \$409.48 = \$409.48 /yr

Simple Payback: Conventional

\$29,320.00 / \$0.00 = n/a yrs

Simple Payback: Green

\$31,695.00 / \$409.48 = 77.4 yrs

Incremental Payback: Conventional to Green

\$2,375.00 / \$409.48 = 5.8 yrs

Additional Notes:

Simple Payback Analysis

EWCM #2 Replace Windows

Replacement Costs		Type	Cost
A. Proposed Conventional:		Vinyl Framed Double Glazed	\$27,690
B. Proposed Green:		Fiberglass Framed Dbl Glazed Argon Filled	\$29,767
C. Incremental Cost Between Proposed Conventional and Proposed Green:			\$2,076.75

Existing Conditions	
General: Slider models have poor fit and allow for appreciable air infiltration. Remaining models in fair condition with limited air infiltration.	
A. Window Type:	Single Glazed w/Storms
B. Total Area of Windows:	
C. Utility Cost:	Oil \$2.84 /gallon

U-Factor ¹	
A. Existing:	1.00
B. Conventional:	0.45
C. Green:	0.33

Annual Savings: Existing to Conventional	
	67,051,400 BTUs
	481.00 gallons
Savings =	\$2.84 x 481.00 = \$1,367.78 /yr

Annual Savings: Conventional to Green	
	23,837,400 BTUs
	171.00 gallons
Savings =	\$2.84 x 171.00 = \$486.26 /yr

Annual Savings: Existing to Green	
	90,888,800 BTUs
	652.00 gallons
Savings =	\$1,367.78 + \$486.26 = \$1,854.03 /yr

Simple Payback: Conventional				
\$27,690.00	/	\$1,367.78	=	20.2 yrs
Simple Payback: Green				
\$29,766.75	/	\$1,854.03	=	16.1 yrs
Incremental Payback: Conventional to Green				
\$2,076.75	/	\$486.26	=	4.3 yrs

Additional Notes:
1 The U-factors were derived from the 2001 ASHRAE Fundamentals Handbook, based on the specifications in the plan

Simple Payback Analysis

EWCM #3 Add Roof Insulation

Replacement Costs		Type	Cost
A. Proposed Conventional:		Maintain estimated level (R15)	\$ -
B. Proposed Green:		Increase to R38	\$16,761
C. Incremental Cost Between Proposed Conventional and Proposed Green:			\$ 16,761.25

Existing Conditions	
A. Roof area:	
B. Type of existing roof structure:	
C. Utility Cost:	Oil \$2.84 /gallon
D. Existing Heating Efficiency:	

R-Value	
A. Existing:	15.00
B. Conventional:	15
C. Proposed Green:	38

Annual Savings: Existing to Conventional	
	0 BTUs
	0.00 gallons
Savings =	\$2.84 x 0.00 = \$0.00 /yr

Annual Savings: Conventional to Green	
	30,528,600 BTUs
	219.00 gallons
Savings =	\$2.84 x 219.00 = \$622.75 /yr

Annual Savings: Existing to Green	
	30,528,600 BTUs
	219.00 gallons
Savings =	\$0.00 x \$622.75 = \$622.75 /yr

Simple Payback: Conventional				
	\$0.00	/	\$0.00	= n/a yrs
Simple Payback: Green				
	\$16,761.25	/	\$622.75	= 26.9 yrs
Incremental Payback: Conventional to Green				
	\$16,761.25	/	\$622.75	= 26.9 yrs

Additional Notes:

Simple Payback Analysis

EWCM #4 Replace Washing Machines - Common Area

1. Replacement Costs

A. Proposed Conventional	\$1,300.00
B. Proposed Green	\$1,397.50
C. Incremental Cost Between Proposed Conventional and Proposed Green	\$97.50

2. Existing Conditions

A. Total number of inefficient washing machines	2
B. Estimated number of total annual cycles/washer ¹	

3. Annual Energy and Water Use Existing Models

	Annual energy use ²		Utility cost		Total annual cost
Oil (gallons):	19.72	x	\$2.84	=	\$56.07
Electric (kWh):	312	x	\$0.18	=	\$55.52
Water/Sewer (gal):	14,372.00	x	\$0.0167	=	\$239.65
					3
					\$351.24

4. Annual Energy and Water Use Proposed Conventional Models

	Annual energy use ²		Utility cost		Total annual cost
Oil (gallons):	19.72	x	\$2.84	=	\$56.07
Electric (kWh):	312	x	\$0.18	=	\$55.52
Water/Sewer (gal):	14,372.00	x	\$0.0167	=	\$239.65
					4
					\$351.24

5. Annual Energy and Water Use Proposed Green Models

	Annual energy use ²		Utility cost		Total annual cost
Oil (gallons):	16.50	x	\$2.84	=	\$46.92
Electric (kWh):	312.00	x	\$0.18	=	\$55.52
Water/Sewer (gal):	7,188.00	x	\$0.0167	=	\$119.86
					5
					\$222.29

6. Annual Savings: Existing to Proposed Conventional

3		4		6	
\$351.24	-	\$351.24	=	\$0.00	/yr

7. Annual Savings: Proposed Conventional to Proposed Green

4		5		7	
\$351.24	-	\$222.29	=	\$128.94	/yr

8. Annual Fuel Oil Savings²

Cost/gallon		gallons			
\$2.84	x	3.22	=	\$9.15	/yr

9. Simple Payback: Existing to Proposed Green

\$1,397.50	/	(\$0.00 + \$138.10)	=	10.12	yrs
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Incremental Payback: Proposed Conventional to Proposed Green

\$97.50	/	\$138.10	=	0.71	yrs
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Additional Notes/Comments:

¹ This worksheet assumes that on average, residents use the washing machines 1-2 times per week (≈2,000 loads per year, or 1,000 loads per machine)

² Negative natural gas savings attributed to decrease in heating gain from the reduced washing machine energy use; therefore, additional natural gas required for space heating in these areas.

Costs shown are only for illustration; laundry equipment is under a lease agreement.

Simple Payback Analysis

EWCM #5 Replace Toilets - Dwelling Units

Replacement Costs

A. Proposed Conventional	\$8,200.00
B. Proposed Green	\$8,815.00
C. Incremental Cost Between Proposed Conventional and Proposed Green	\$615.00

Existing Conditions

A. Total number of existing toilets	20	
B. Average gallons per flush:	1.6	
C. Estimated total number of flushes per day:	6.0	
D. Estimated total daily usage per toilet:	10	gal/day
E. Estimated number of days per year facility in use:	365	
F. Cost of water and sewer:	\$0.0167	(\$/gal)

Proposed Conditions: Conventional Models

A. Total number of toilets	20	
B. Average gallons per flush:	1.6	
C. Estimated total number of flushes per day	6.0	
D. Estimated total daily usage per toilet:	10	gal/day
E. Estimated number of days per year facility in use:	365	
F. Cost of water and sewer:	\$0.0167	(\$/gal)

Proposed Conditions: Green Models

A. Total number of toilets	20	
B. Average gallons per flush:	1.28	
C. Estimated total number of flushes per day	6.0	
D. Estimated total daily usage per toilet:	8	gal/day
E. Estimated number of days per year facility in use:	365	
F. Cost of water and sewer:	\$0.0167	(\$/gal)

Annual Water Use: Existing Models

$$20 \times 10 \times 365 = 70,080 \text{ gal/yr}$$

Annual Water Use: Proposed Conventional Models

$$20 \times 10 \times 365 = 70,080 \text{ gal/yr}$$

Annual Water Use: Proposed Green Models

$$20 \times 8 \times 365 = 56,064 \text{ gal/yr}$$

Annual Savings: Existing to Proposed Conventional Models

$$70,080 - 70,080 \times \$0.02 = \$0.00 \text{ \$/yr}$$

Annual Savings: Proposed Conventional to Proposed Green Models

$$70,080 - 56,064 \times \$0.02 = \$233.71 \text{ \$/yr}$$

Annual Savings: Existing to Proposed Green Models

$$\$0.00 + \$233.71 = \$233.71 \text{ \$/yr}$$

Simple Payback: Conventional

$$\frac{\$8,200.00}{\$0.00} = \text{n/a} \text{ yrs}$$

Simple Payback: Green

$$\frac{\$8,815.00}{\$233.71} = 37.72 \text{ yrs}$$

Incremental Payback: Proposed Conventional to Proposed Green Models

$$\frac{\$615.00}{\$233.71} = 2.63 \text{ yrs}$$

Additional Notes/Comments:

Simple Payback Analysis

EWCM #6 Install Programmable Thermostats - Dwelling Units

Installation Costs		
A. Proposed Conventional	Manual thermostats	\$2,100.00
B. Proposed Green	Programmable Thermostats	\$4,040.00
C. Incremental Cost Between Proposed Conventional and Proposed Green		\$1,940.00

Utility Costs	
Fuel Oil:	\$2.84

Existing Conditions	
A. Occupied heating temperature	73°F
B. Unoccupied (setback) heating temperature	73°F
C. Unoccupied (setback) time	0 hrs / day

Proposed Conventional Conditions	
A. Occupied heating temperature	73°F
B. Unoccupied (setback) heating temperature	73°F
C. Unoccupied (setback) time	0 hrs / day

Proposed Green Condition	
A. Occupied heating temperature	73°F
B. Unoccupied (setback) heating temperature	68°F
C. Unoccupied (setback) time	8 hrs / day

Annual Savings: Existing to Proposed Conventio	
	0 btus
	0.00 gallons
Savings =	\$2.84 x 0.00 = \$0.00 /yr

Annual Savings: Conventional to Proposed Gree	
	86,706,800 btus
	622.00 gallons
Savings =	\$2.84 x 622.00 = \$1,768.72 /yr

Annual Net Cost Savings	
	\$0.00 + \$1,768.72 = \$1,768.72

Simple Payback: Conventional				
\$2,100.00	/	\$0.00	=	n/a yrs
Simple Payback: Green				
\$4,040.00	/	\$1,768.72	=	2.28 yrs
Incremental Payback: Proposed Conventional to Proposed Green Models				
\$1,940.00	/	\$1,768.72	=	1.10 yrs

Additional Notes/Comments:	
1. The worksheet estimates that the facility is in use 365 days/year	
2. Unoccupied (setback) temperatures and times are subject to proper resident usage.	

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 1

Insulated Metal Doors

Wood Doors

vs.

Fiberglass Doors

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

35

Conventional Product:

Wood Doors

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Common Doors	2	ea	\$280.00	\$560	35	1	1.0	\$560	\$560
Install/Replace	Unit Doors	40	ea	\$705.00	\$28,200	35	1	1.0	\$28,200	\$28,200
Install/Replace	Service Doors	2	ea	\$560.00	\$1,120	35	1	1.0	\$1,120	\$1,120

Total Life Cycle Cost

\$29,880

\$29,880

Energy Savings

Net Life Cycle Cost after Energy Savings									\$29,880	\$29,880

Green Product:

Fiberglass Doors

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
--------	-------------	----------	------	-----------	------------	-----	------------	--------	----------	------------

Life Cycle Costs

Install/Replace	Common Doors	2	ea	\$345.00	\$690	35	1	1.0	\$690	\$690
Install/Replace	Unit Doors	40	ea	\$757.88	\$30,315	35	1	1.0	\$30,315	\$30,315
Install/Replace	Service Doors	2	ea	\$345.00	\$690	35	1	1.0	\$690	\$690

Total Life Cycle Cost

\$31,695

\$31,695

Energy Savings

Utility Cost	Fuel Oil Saved	144	gallons	\$2.84	(\$409)	1	1	35.0	(\$24,758)	(\$7,161)
Net Life Cycle Cost after Energy Savings									\$6,937	\$24,534

ECONOMIC RETURN ANALYSIS

Green NPV	\$5,346
Green IRR	33.0%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Fiberglass Doors

Override with Green Product? No

Final Product Choice

Green Product: Fiberglass Doors

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 1

Insulated Metal Doors

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

Final Product Choice

Green Product:

Fiberglass Doors

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Common Doors	2	ea	\$345.00	\$690	35	1	1.0	\$690	\$690
Install/Replace	Unit Doors	40	ea	\$757.88	\$30,315	35	1	1.0	\$30,315	\$30,315
Install/Replace	Service Doors	2	ea	\$345.00	\$690	35	1	1.0	\$690	\$690
Total Life Cycle Cost									\$31,695	\$31,695
Energy Savings										
Utility Cost	Fuel Oil Saved	144	gallons	\$2.84	(\$409)	1	1	35.0	(\$24,758)	(\$7,161)
Net Life Cycle Cost after Energy Savings									\$6,937	\$24,534

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	1
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 2

Fiberglass-Framed Windows

Vinyl Double Glazed Windows

vs.

Fiberglass-Framed Insulated Windows

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 35

Conventional Product:

Vinyl Double Glazed Windows

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
--------	-------------	----------	------	-----------	------------	-----	------------	--------	----------	------------

Life Cycle Costs

Install/Replace	Vinyl Windows	78	ea	\$355.00	\$27,690	35	1	1.0	\$27,690	\$27,690

Total Life Cycle Cost \$27,690 \$27,690

Energy Savings

Utility Cost	Fuel Oil Savings	481	gallons	\$2.84	(\$1,368)	1	1	35.0	(\$82,699)	(\$23,921)
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Net Life Cycle Cost after Energy Savings (\$55,009) \$3,769

Green Product:

Fiberglass-Framed Insulated Windows

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
--------	-------------	----------	------	-----------	------------	-----	------------	--------	----------	------------

Life Cycle Costs

Install/Replace	Fiberglass Windows	78	ea	381.63	\$29,767	35	1	1.0	\$29,767	\$29,767

Total Life Cycle Cost \$29,767 \$29,767

Energy Savings

Utility Cost	Fuel Oil Savings	171	gallons	\$2.84	(\$486)	1	1	35.0	(\$29,400)	(\$8,504)
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Net Life Cycle Cost after Energy Savings \$367 \$21,262

ECONOMIC RETURN ANALYSIS

Green NPV	(\$17,494)
Green IRR	n/a

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Vinyl Double Glazed Windows

Override with Green Product? No

Final Product Choice

Conventional Product: Vinyl Double Glazed Windows

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 2

Fiberglass-Framed Windows

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

Final Product Choice

Conventional Product: Vinyl Double Glazed Windows

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Vinyl Windows	78	ea	\$355.00	\$27,690	35	1	1.0	\$27,690	\$27,690
Total Life Cycle Cost									\$27,690	\$27,690
Energy Savings										
Utility Cost	Fuel Oil Savings	481	gallons	\$2.84	(\$1,368)	1	1	35.0	(\$82,699)	(\$23,921)
Net Life Cycle Cost after Energy Savings									(\$55,009)	\$3,769

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 3

Increase Attic Insulation

Existing Insulation ≈R-15

vs.

Increased Insulation R-38

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 40

Conventional Product:

Existing Insulation ≈R-15

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Maintain	Batt Insulation	13,409	sf	\$0.00		40	1	1.0		
Total Life Cycle Cost									\$0	\$0

Energy Savings

Net Life Cycle Cost after Energy Savings									\$0	\$0

Green Product:

Increased Insulation R-38

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Add Insulation	13,409	ea	\$1.25	\$16,761	40	1	1.0	\$16,761	\$16,761
Total Life Cycle Cost									\$16,761	\$16,761

Energy Savings

Utility Cost	Fuel Oil Savings	219	gallons	\$2.84	(\$623)	1	1	40.0	(\$46,956)	(\$11,432)
Net Life Cycle Cost after Energy Savings									(\$30,195)	\$5,330

ECONOMIC RETURN ANALYSIS

Green NPV	(\$5,330)
Green IRR	5.3%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Existing Insulation ≈R-15

Override with Green Product? No

Final Product Choice

Conventional Product: Existing Insulation ≈R-15

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 3

Increase Attic Insulation

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

4
5

Final Product Choice

Conventional Product: Existing Insulation ≈R-15

Immediate Replacement

Year

1

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Maintain	Batt Insulation	13,409	sf			40	1	1.0		
Total Life Cycle Cost									\$0	\$0

Energy Savings

Net Life Cycle Cost after Energy Savings									\$0	\$0

Replacement at End of Remaining Useful Life

Year

5

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Maintain	Batt Insulation	13,409	sf			40		1.0		

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$0	\$0

Energy Savings

Net Life Cycle Cost after Energy Savings									\$0	\$0

ECONOMIC RETURN ANALYSIS

Timing NPV	\$0
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year: 1

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 4

Energy Star Washing Machines

Top Loading Washers

vs.

Front Loading (Energy Star) Washers

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

12

Conventional Product:

Top Loading Washers

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Top Loading Washers	2	ea	\$650.00	\$1,300	12	1	1.0	\$1,300	\$1,300
Utility Cost	Electricity	312	kWh	\$0.18	\$56	1	1	12.0	\$788	\$520
Utility Cost	Fuel Oil	19.72	gallons	\$2.84	\$56	1	1	12.0	\$796	\$525
Utility Cost	Water/Sewer	14,372	gallons	\$0.0167	\$240	1	1	12.0	\$3,401	\$2,246
Total Life Cycle Cost									\$6,285	\$4,591

Energy Savings

Net Life Cycle Cost after Energy Savings									\$6,285	\$4,591
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Green Product:

Front Loading (Energy Star) Washers

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
--------	-------------	----------	------	-----------	------------	-----	------------	--------	----------	------------

Life Cycle Costs

Install/Replace	Front Loading Washers	2	ea	\$698.75	\$1,398	12	1	1.0	\$1,398	\$1,398
Utility Cost	Electricity	312	kWh	\$0.18	\$56	1	1	12.0	\$788	\$520
Utility Cost	Fuel Oil	17	gallons	\$2.84	\$47	1	1	12.0	\$666	\$440
Utility Cost	Water/Sewer	7,188	gallons	\$0.02	\$120	1	1	12.0	\$1,701	\$1,123
Total Life Cycle Cost									\$4,552	\$3,480

Energy Savings

Net Life Cycle Cost after Energy Savings									\$4,552	\$3,480
--	--	--	--	--	--	--	--	--	---------	---------

ECONOMIC RETURN ANALYSIS

Green NPV	\$1,111
Green IRR	n/a

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Front Loading (Energy Star) Washers

Override with Green Product? No

Final Product Choice

Green Product: Front Loading (Energy Star) Washers

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 4

Energy Star Washing Machines

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

Final Product Choice

Green Product:

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Front Loading Washers	2	ea	\$698.75	\$1,398	12	1	1.0	\$1,398	\$1,398
Utility Cost	Electricity	312	kWh	\$0.18	\$56	1	1	12.0	\$788	\$520
Utility Cost	Fuel Oil	17	gallons	\$2.84	\$47	1	1	12.0	\$666	\$440
Utility Cost	Water/Sewer	7,188	gallons	\$0.02	\$120	1	1	12.0	\$1,701	\$1,123
Total Life Cycle Cost									\$4,552	\$3,480
Energy Savings										
Net Life Cycle Cost after Energy Savings									\$4,552	\$3,480

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 5

High Efficiency Toilets

Low Flush Toilets (1.6 gpf)

vs.

High Efficiency Toilets (1.28 gpf)

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

30

Conventional Product:

Low Flush Toilets (1.6 gpf)

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Low Flush Toilets	20	ea	\$410.00	\$8,200	30	1	1.0	\$8,200	\$8,200
Utility Cost	Water/Sewer Usage	70,080	gallons	\$0.0167	\$1,169	1	1	30.0	\$55,595	\$19,153
Total Life Cycle Cost									\$63,795	\$27,353

Energy Savings

Net Life Cycle Cost after Energy Savings									\$63,795	\$27,353

Green Product:

High Efficiency Toilets (1.28 gpf)

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	High Eff Toilets	20	ea	\$440.75	\$8,815	30	1	1.0	\$8,815	\$8,815
Utility Cost	Water/Sewer Usage	56,064	gallons	\$0.0167	\$935	1	1	30.0	\$44,476	\$15,322
Total Life Cycle Cost									\$53,291	\$24,137

Energy Savings

Net Life Cycle Cost after Energy Savings									\$53,291	\$24,137

ECONOMIC RETURN ANALYSIS

Green NPV	\$3,216
Green IRR	66.1%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: High Efficiency Toilets (1.28 gpf)

Override with Green Product? No

Final Product Choice

Green Product: High Efficiency Toilets (1.28 gpf)

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 5

High Efficiency Toilets

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product	14
Replacement Year	15

Final Product Choice	
Green Product:	High Efficiency Toilets (1.28 gpf)

Immediate Replacement				Year	1						Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted		
Install/Replace	High Eff Toilets	20	ea	\$440.75	\$8,815	30	1	1.0	\$8,815	\$8,815		
Utility Cost	Water/Sewer Usage	56,064	gallons	\$0.02	\$935	1	1	30.0	\$44,476	\$15,322		
Total Life Cycle Cost										\$53,291	\$24,137	
<i>Energy Savings</i>												
Net Life Cycle Cost after Energy Savings										\$53,291	\$24,137	

Replacement at End of Remaining Useful Life				Year	15							
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted		
Install/Replace	High Eff Toilets	20	ea	\$440.75	\$8,815	30	15	0.5	\$3,639	\$3,499		
Utility Cost	Water/Sewer Usage	56,064	gallons	\$0.02	\$935	1	15	16.0	\$28,503	\$5,528		

<i>Expenses for Current Product Through Useful Life</i>												
Utility Cost	Current Water Usage	70,080	gallons	\$0.02	\$1,169	1	1	14.0	\$19,967	\$12,243		
Total Life Cycle Cost										\$52,109	\$21,270	
<i>Energy Savings</i>												
Net Life Cycle Cost after Energy Savings										\$52,109	\$21,270	

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$2,867)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	15
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 6

Programmable Thermostats

Manual Thermostats

vs.

Programmable Thermostats

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 20

Conventional Product:

Manual Thermostats

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Manual Thermostats	20	ea	\$105.00	\$2,100	20	1	1.0	\$2,100	\$2,100
Total Life Cycle Cost									\$2,100	\$2,100

Energy Savings

Net Life Cycle Cost after Energy Savings									\$2,100	\$2,100

Green Product:

Programmable Thermostats

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Programmable T-Stats	20	ea	\$202.00	\$4,040	20	1	1.0	\$4,040	\$4,040
Total Life Cycle Cost									\$4,040	\$4,040

Energy Savings

Utility Cost	Fuel Oil Savings	622	gallons	\$2.84	(\$1,769)	1	1	20.0	(\$47,526)	(\$23,400)
Net Life Cycle Cost after Energy Savings									(\$43,486)	(\$19,360)

ECONOMIC RETURN ANALYSIS

Green NPV	\$21,460
Green IRR	1066.7%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Programmable Thermostats

Override with Green Product? No

Final Product Choice

Green Product: Programmable Thermostats

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Energy and Water Conservation Measure (EWCM): # 6

Programmable Thermostats

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

4
5

Final Product Choice

Green Product: Programmable Thermostats

Immediate Replacement

Year

1

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Programmable T-Stats	20	ea	\$202.00	\$4,040	20	1	1.0	\$4,040	\$4,040
Total Life Cycle Cost									\$4,040	\$4,040

Energy Savings

Utility Cost	Fuel Oil Savings	622	gallons	\$2.84	(\$1,769)	1	1	20.0	(\$47,526)	(\$23,400)
Net Life Cycle Cost after Energy Savings									(\$43,486)	(\$19,360)

Replacement at End of Remaining Useful Life

Year

5

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Programmable T-Stats	20	ea	\$202.00	\$4,040	20	5	0.8	\$3,130	\$3,014

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$3,130	\$3,014

Energy Savings

Utility Cost	Fuel Oil Savings	622	gallons	\$2.84	(\$1,769)	1	5	16.0	(\$40,127)	(\$16,802)
Net Life Cycle Cost after Energy Savings									(\$36,996)	(\$13,788)

ECONOMIC RETURN ANALYSIS

Timing NPV	\$5,572
Timing IRR	83.21%

TIMING RECOMMENDATION

Replacement Year:	1
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

1

Cement Fiberboard Window Panels

Vinyl Panels

vs.

Cement Fiberboard Panels

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

45

Conventional Product:

Vinyl Panels

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Vinyl Window Panels	330	sf	\$6.50	\$2,145	35	1	1.3	\$2,556	\$2,363
Total Life Cycle Cost									\$2,556	\$2,363

Energy Savings

Net Life Cycle Cost after Energy Savings									\$2,556	\$2,363

Green Product:

Cement Fiberboard Panels

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Cement Fiberbd Panels	330	sf	\$8.50	\$2,805	45	1	1.0	\$2,805	\$2,805
Total Life Cycle Cost									\$2,805	\$2,805

Energy Savings

Net Life Cycle Cost after Energy Savings									\$2,805	\$2,805

ECONOMIC RETURN ANALYSIS

Green NPV	(\$442)
Green IRR	1.4%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Vinyl Panels

Override with Green Product? No

Final Product Choice

Conventional Product: Vinyl Panels

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM):

1

Cement Fiberboard Window Panels

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

14
15

Final Product Choice

Conventional Product:

Vinyl Panels

Immediate Replacement

Year

1

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Vinyl Window Panels	330	sf	\$6.50	\$2,145	35	1	1.3	\$2,556	\$2,363
Total Life Cycle Cost									\$2,556	\$2,363

Energy Savings

Net Life Cycle Cost after Energy Savings									\$2,556	\$2,363

Replacement at End of Remaining Useful Life

Year

15

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Vinyl Window Panels	330	sf	\$6.50	\$2,145	35	15	0.9	\$2,344	\$1,074

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$2,344	\$1,074

Energy Savings

Net Life Cycle Cost after Energy Savings									\$2,344	\$1,074

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$1,289)
Timing IRR	(0.44%)

TIMING RECOMMENDATION

Replacement Year:	15
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

2

Install Metal Roof

Architectural Asphalt Shingles

vs.

Metal Roof

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

40

Conventional Product:

Architectural Asphalt Shingles

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Arch Asphalt Shingles	13,409	sf	\$4.00	\$53,636	20	1	2.0	\$150,509	\$74,420

Total Life Cycle Cost

\$150,509 \$74,420

Energy Savings

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Net Life Cycle Cost after Energy Savings

\$150,509 \$74,420

Green Product:

Metal Roof

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Metal Roof	13,409	sf	\$7.75	\$103,920	40	1	1.0	\$103,920	\$103,920

Total Life Cycle Cost

\$103,920 \$103,920

Energy Savings

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Net Life Cycle Cost after Energy Savings

\$103,920 \$103,920

ECONOMIC RETURN ANALYSIS

Green NPV	(\$29,500)
Green IRR	3.3%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Architectural Asphalt Shingles

Override with Green Product? No

Final Product Choice

Conventional Product: Architectural Asphalt Shingles

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM):

2

Install Metal Roof

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

14
15

Final Product Choice

Conventional Product: Architectural Asphalt Shingles

Immediate Replacement

Year

1

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Arch Asphalt Shingles	13,409	sf	\$4.00	\$53,636	20	1	2.0	\$150,509	\$74,420
Total Life Cycle Cost									\$150,509	\$74,420

Energy Savings

Net Life Cycle Cost after Energy Savings									\$150,509	\$74,420

Replacement at End of Remaining Useful Life

Year

15

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Arch Asphalt Shingles	13,409	sf	\$4.00	\$53,636	20	15	1.3	\$108,751	\$32,413

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$108,751	\$32,413

Energy Savings

Net Life Cycle Cost after Energy Savings									\$108,751	\$32,413

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$42,007)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	15
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

3

Linoleum Flooring in Apartments

Vinyl Composite Tile (VCT) Flooring

vs.

Linoleum Flooring Product

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

25

Conventional Product:

Vinyl Composite Tile (VCT) Flooring

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	VCT-Living Areas	6,153	sf	\$4.00	\$24,611	15	1	1.7	\$46,278	\$34,069
Install/Replace	VCT-Kitchen	1,361	sf	\$4.00	\$5,444	15	1	1.7	\$10,237	\$7,536
Install/Replace	VC-Bathroom	760	sf	\$4.00	\$3,040	15	1	1.7	\$5,716	\$4,208

Total Life Cycle Cost

\$62,231

\$45,813

Energy Savings

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Net Life Cycle Cost after Energy Savings

\$62,231

\$45,813

Green Product:

Linoleum Flooring Product

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Linoleum-Living Areas	6,153	sf	\$5.50	\$33,840	25	1	1.0	\$33,840	\$33,840
Install/Replace	Linoleum-Kitchen	1,361	sf	\$5.50	\$7,486	25	1	1.0	\$7,486	\$7,486
Install/Replace	Linoleum-Bathroom	760	sf	\$5.50	\$4,180	25	1	1.0	\$4,180	\$4,180

Total Life Cycle Cost

\$45,506

\$45,506

Energy Savings

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Net Life Cycle Cost after Energy Savings

\$45,506

\$45,506

ECONOMIC RETURN ANALYSIS

Green NPV	\$307
Green IRR	8.2%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Linoleum Flooring Product

Override with Green Product? No

Final Product Choice

Green Product: Linoleum Flooring Product

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM):

3

Linoleum Flooring in Apartments

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product:

Linoleum Flooring Product

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Linoleum-Living Areas	6,153	sf	\$5.50	\$33,840	25	1	1.0	\$33,840	\$33,840
Install/Replace	Linoleum-Kitchen	1,361	sf	\$5.50	\$7,486	25	1	1.0	\$7,486	\$7,486
Install/Replace	Linoleum-Bathroom	760	sf	\$5.50	\$4,180	25	1	1.0	\$4,180	\$4,180
Total Life Cycle Cost									\$45,506	\$45,506
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$45,506	\$45,506

ECONOMIC RETURN ANALYSIS

Timing NPV	n/a
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	1
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Life Cycle Cost Analysis

Green Measure (GM):

4

Stone Countertops

Laminated Particleboard Countertops

vs.

Stone Countertops

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term

30

Conventional Product:

Laminated Particleboard Countertops

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	LPB Countertops	20	ea	\$316.48	\$6,330	12	1	2.5	\$20,763	\$11,142

Total Life Cycle Cost

\$20,763

\$11,142

Energy Savings

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Net Life Cycle Cost after Energy Savings

\$20,763

\$11,142

Green Product:

Stone Countertops

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
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Life Cycle Costs

Install/Replace	Stone Countertops	20	ea	\$900.00	\$18,000	30	1	1.0	\$18,000	\$18,000

Total Life Cycle Cost

\$18,000

\$18,000

Energy Savings

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Net Life Cycle Cost after Energy Savings

\$18,000

\$18,000

ECONOMIC RETURN ANALYSIS

Green NPV	(\$6,858)
Green IRR	1.5%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Laminated Particleboard Countertops

Override with Green Product?

No

Final Product Choice

Conventional Product: Laminated Particleboard Countertops

Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

Green Measure (GM):

4

Stone Countertops

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

11
12

Final Product Choice

Conventional Product: Laminated Particleboard Countertops

Immediate Replacement

Year

1

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	LPB Countertops	20	ea	\$316.48	\$6,330	12	1	2.5	\$20,763	\$11,142
Total Life Cycle Cost									\$20,763	\$11,142

Energy Savings

Net Life Cycle Cost after Energy Savings									\$20,763	\$11,142

Replacement at End of Remaining Useful Life

Year

12

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	LPB Countertops	20	ea	\$316.48	\$6,330	12	12	1.6	\$15,039	\$5,218

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$15,039	\$5,218

Energy Savings

Net Life Cycle Cost after Energy Savings									\$15,039	\$5,218

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$5,924)
Timing IRR	(12.92%)

TIMING RECOMMENDATION

Replacement Year:	12
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Notes:

1. Analysis performed using a discount rate of 8.00% and an inflation rate of 3.00% for both expenses and energy costs.
2. Timing NPV and Timing IRR are relative measures comparing Immediate Replacement vs. Replacement at End of Remaining Useful Life.

Statement of Delivery

ON-SITE INSIGHT, Inc. (and/or its representatives) hereby certifies that, this Green Capital Needs Assessment (the “GCNA” or the “Report”) is delivered subject to the following terms and conditions:

1. This report and analysis are based upon observations for the visible and apparent condition of the building and its major components on the date of the fieldwork. Although care has been taken in the performance of this assessment, ON-SITE INSIGHT, Inc (and/or its representatives) makes no representations regarding latent or concealed defects that may exist and no warranty or guarantee is expressed or implied. This report is made only in the best exercise of our ability and judgment.
2. We have undertaken no formal evaluations of environmental concerns, including but not limited to asbestos containing materials (ACMs), lead based paint, chlorofluorocarbons (CFCs), polychlorinated biphenyls (PCBs), and mildew/mold.
3. Conclusions in this report are based on estimates of the age and normal working life of various items of equipment and/or statistical comparisons. Actual conditions can alter the useful life of any item. When an item needs immediate replacement depends on many factors, including previous use/misuse, irregularity of servicing, faulty manufacturer, unfavorable conditions, Acts of God and unforeseen circumstances. Certain components that may be working when we made our inspection might deteriorate or break in the future without notice.
4. To prepare this report, we used historic data on capital activities and costs, blueprints (when available), and current prices for capital actions. We have not independently verified this information, have assumed that it is reliable, but assume no responsibility for its accuracy.
5. Unless otherwise noted in the report, we assume that all building components meet code requirements in force when the property was built.
6. If accessibility issues are referenced in the report, the site elements, common areas, and dwelling units at the development were examined for compliance with the requirements of the Uniform Federal Accessibility Standards (UFAS), and for Massachusetts properties, the Massachusetts Architectural Accessibility Board (AAB). The methodology employed in undertaking this examination is adapted from a Technical Assistance Guide (TAG-88-11) titled “Supplemental Information About the Section 504 Transition Plan Requirements” published by the Coordination and Review section of the U.S. Department of Justice Civil Rights Division, and the AAB Rules and Regulations, 521 CMR effective July 10, 1987. The Guide also incorporates the requirements of UFAS, published, April 1, 1988 by the General Services Administration, the Department of Defense, the Department of Housing and Urban Development, and the U.S. Postal Service. Changes in legislation and/or regulations may make some observations moot.

7. Response Actions and estimated costs of responses were developed by ON-SITE INSIGHT, Inc. If additional structural work is necessary, costs for some Response Actions may exceed estimates. Whenever the Response Action is to remove, reposition, or modify walls, a competent structural engineer should be retained before any work is done, because such investigation may disclose that a Response Action is either more costly than estimated, or is not possible.
8. Conclusions reached in this report assume current and continuing responsible ownership and competent property management.
9. Regular updates of this plan are recommended to ensure careful monitoring of major building systems and to adjust the program to accommodate unanticipated circumstances surrounding the buildings, operations, and/or occupants.

Signed,



Signature

David Jackson

Name

Senior Associate/Mechanical Specialist

Title

January 28, 2011

Date