

Green Capital Needs Assessment and Replacement Reserve Analysis

Prepared for:

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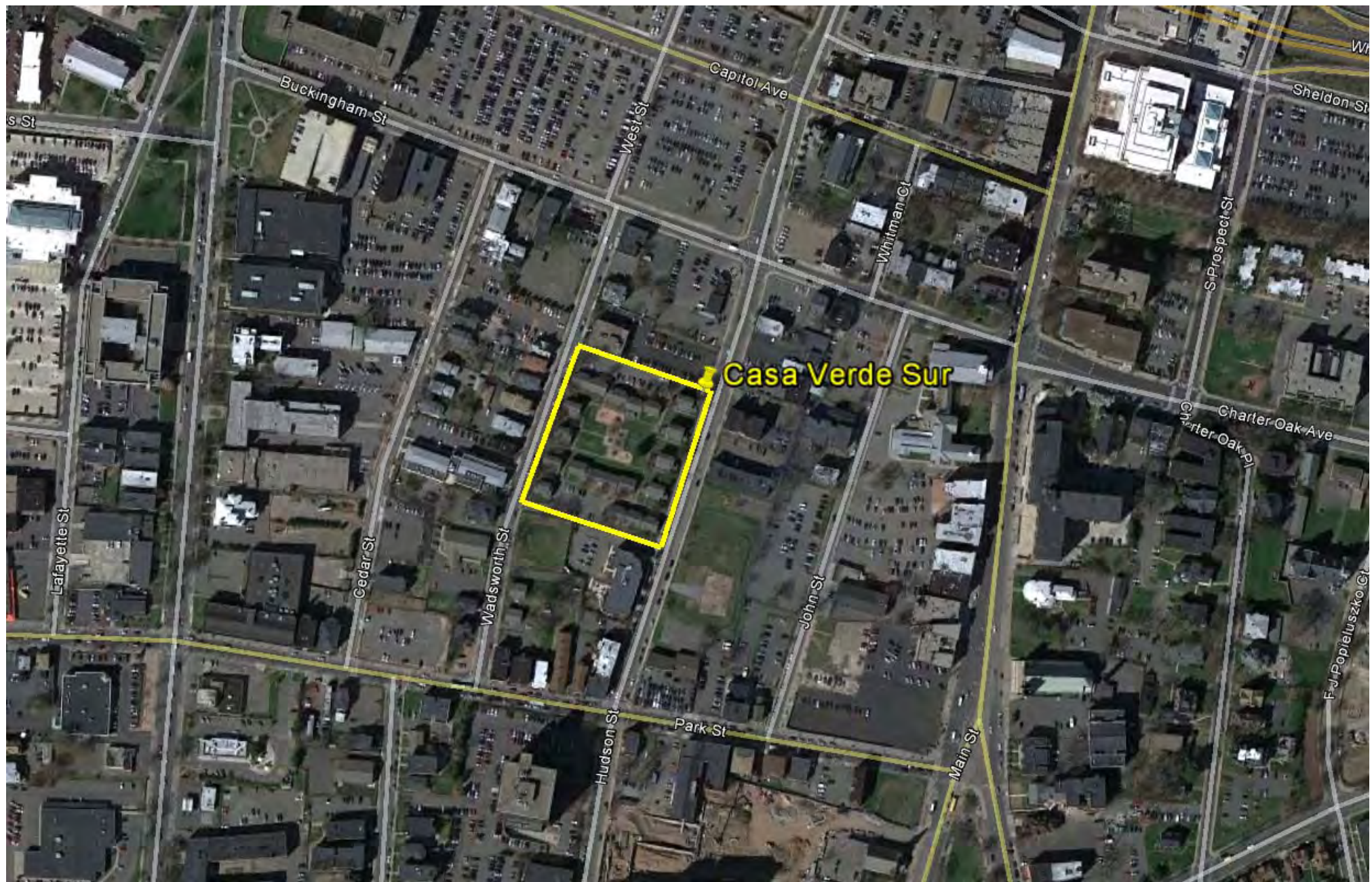
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Casa Verde Sur
CHFA # 85076D
Konover Residential
Hartford, CT

March 22, 2013

Final Report



Casa Verde Sur
60 Wadsworth Street
Hartford, CT 06112

Info Zoom In Zoom Out Pan Initial Map

Once map has loaded, select info tool & click on your property to display flood & census data

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PROPERTY INFORMATION

FLOOD DATA:

COMMUNITY: 095080

PANEL: 0368G

ZONE: X

DATE: 20110916
Year/Month/Day

CENSUS DATA:

TRACT : 5003

NAME: 09003500300

POPULATION: 2343

MEDIAN AGE: 33

HOUSING UNITS: 1102

UNITS OCCUPIED: 968

UNITS VACANT: 134

Casa Verde Sur
60 Wadsworth Street
Hartford, CT 06106

Zone X = Outside 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) has been undertaken on behalf of Konover Residential/North Branford, CT Housing Authority. 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.

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:

Executive Summary

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 \$1,951,717 in current dollars (\$51,361/unit), or \$2,617,696 (\$68,887/unit) in inflated dollars.

The development's capital reserve balance was not available for this report. Using current reserves only, capital reserve funding would be outpaced in each year of the plan. However, a cash infusion of \$1,800,000 in Year 1 would provide a positive reserve balance throughout the twenty year horizon of this report.

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 \$1,726,953 (\$45,446/unit) in current dollars, or \$2,294,142 (\$60,372/unit) in inflated dollars.

The development's capital reserve balance was not available for this report. Using current reserves only, capital reserve funding would be outpaced in each year of the plan. However, a cash infusion of \$1,575,000 in Year 1 would provide a positive reserve balance throughout the twenty year horizon of this report.

Energy and Water Conservation Measures (EWCMs):

In the report, 9 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 EWCM recommendation and calculation process.

Executive Summary

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 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 are 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 6 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.

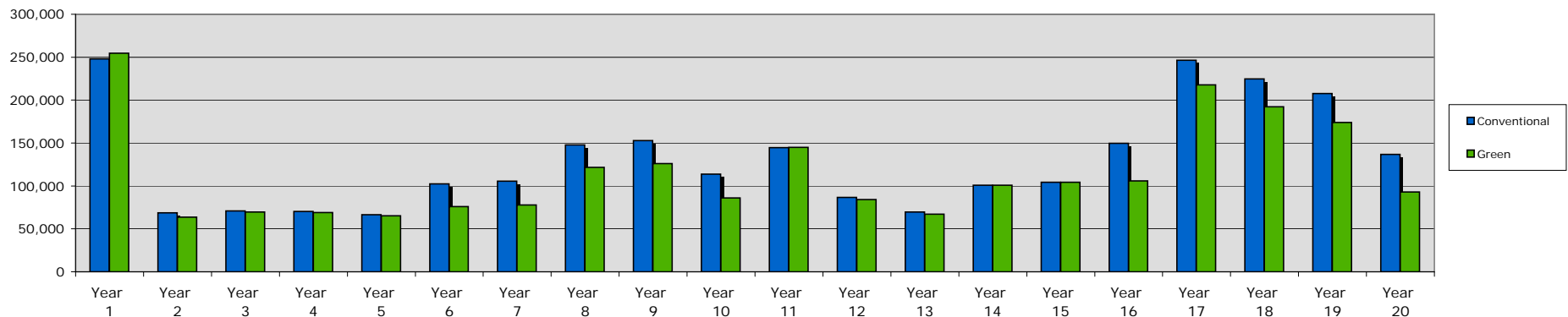
Executive Summary

Dashboard

Property Data

Location:	Hartford, CT
Year Built:	1981
Number of Units:	38
Number of Buildings:	12

Comparison of Capital Needs - Conventional vs. Green



Environmental Impact

(Total Carbon Release Based on Current Annual Energy Usage)

Building Square Footage:	51,600
Resident Population (estimated):	176

	BTUs/yr	Conversion	lbs CO ₂	lbs CO ₂ / Res
Gas	69,469,158	x 11.023100	7,658	44
Oil	5,624,285	x 11.023100	620	4
Electricity	134,787,648	x 1.582917	62,513	355
Total	209,881,091		70,791	402

Replacement Reserve Analysis

Conventional

- Plan #1: Capital costs exceed reserves in all years of the plan.
- Plan #2: Infusion of \$1,800,000 in Year 1.

Green

- Plan #1: Capital costs exceed reserves in all years of the plan.
- Plan #2: Infusion of \$1,575,000 in Year 1.

Health and Safety

Hazardous Materials

	Identified	Location / Notes
Lead Based Paint (LBP):	None	0
Asbestos Containing Materials (ACMs):	None	0
Mold:	None	0

Indoor Ventilation

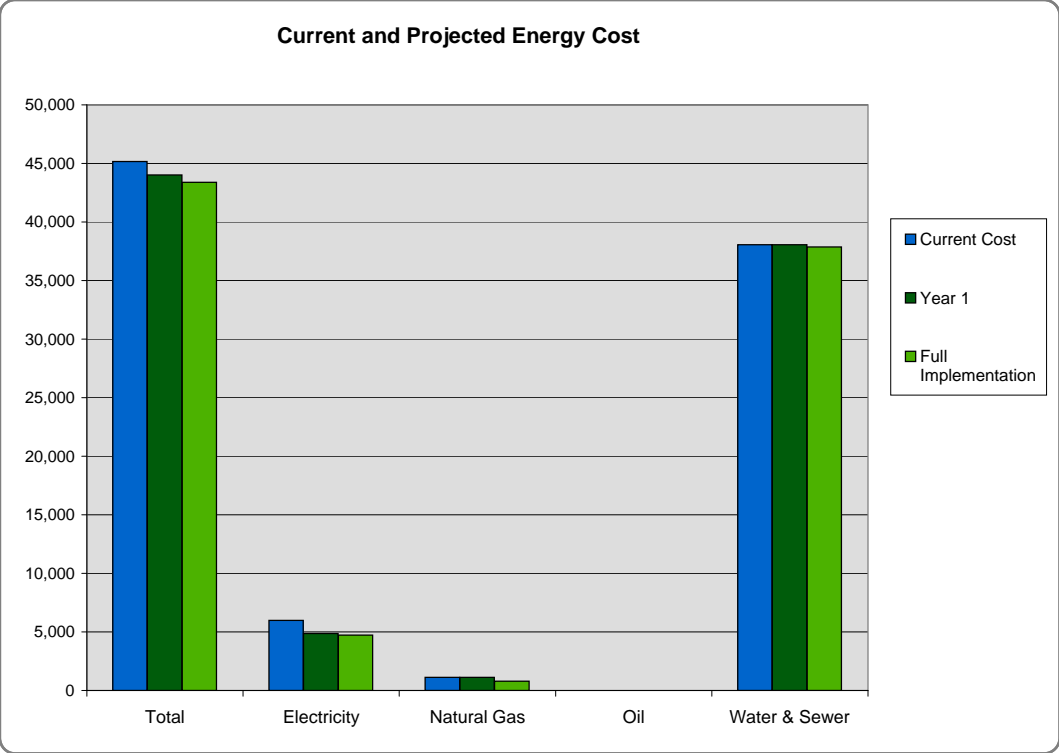
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Indoor Air Quality (IAQ)

	Design Specification	Actual Read	Notes
Air Flow Rate	0	0	Not Tested
Thermal Comfort	68-72	72-78	0
Carbon Monoxide	0	0	Not Tested
Carbon Dioxide	<1000	850-1512	0

Executive Summary

Energy Savings



Energy Intensity / Benchmarking Data

TREAT Modeled Data Normalized For Weather

Building Square Footage: 51,600

Heating Degree Days: 5,122

TREAT Model

	Amount	Units	BTUs/yr	Energy Intensity (BTUs/(HDDs x SF))
Heating	695	therms	69,469,158	0.2628
Cooling	1,648	kWh	5,624,285	0.0213
DHW	272	therms	27,212,669	0.1030
Electricity	38,810	kWh	129,163,363	0.4887
Total			231,469,475	0.8758

	Gallons/yr	Gallons/sf/yr
Water	6,532,721	127

Energy Usage Summary

Billing Data

Utility	Current Usage	Current Cost	Projected Usage	Projected Cost	% Savings
Electricity	39,504 kWh	\$5,980	31,248 kWh	\$4,718	21.1%
Natural Gas	821 therms	\$1,119	586 therms	\$799	28.6%
Oil	0 gallons	\$0	0 gallons	\$0	n/a
Water & Sewer	6,532,721 gallons	\$38,056	6,494,340 gallons	\$37,862	0.5%
Total		\$45,155		\$43,379	3.9%

Executive Summary

Green Improvement Plan

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

Recommended EWCMs (Based on Financial Analysis)

Interactive Group															
EWCM 1 Boiler Com Area	4,078	20	1.04	284	1,901			156	213					213	Year 16
EWCM 2 Heat Circ Pump	626	15	0.90	44	582	249	38							38	Year 6
EWCM 3 Com Area DHW	1,306	10	0.29	91	218			28	38					38	Year 4
EWCM 4 Com Area AC	1,715	10	0.38	120		436	66							66	Year 5
EWCM 5 Com Area Doors	1,113	35	1.93	78	884	45	7	40	54					61	Immediate
EWCM 6 Com Area Windows	3,518	35	1.02	245	1,059	187	28	55	75					103	Year 17
EWCM 8 Int Com Area Lighting	1,911	20	2.60	133	3,632	1,971	298	(36)	(49)					249	Immediate
EWCM 9 Washing Machines	0	10	0.00	0	832	264	40	46	62			33,192	194	296	Immediate
Interactive Group Total ⁵	14,267			994			415		320					735	
EWCM 7 Ext Lighting	5,200	20	3.26	1,480	13,047	5,606	847							847	Immediate
EWCM Subtotal	19,467			2,474		5,606	1,262	0	320	0	0	0	194	1,582	

Recommended GMs (Based on Financial Analysis)

GM 1 Com Area Flooring	4,861	25		346	1,392	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM 2 DU Living Area Flooring	108,311	10		(11,590)	106,190	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM 3 DU Resilient Flooring	33,098	25		2,338	9,483	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Immediate
GM 4 DU Cabinetry	127,044	25		8,864	8,517	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Year 9
GM Subtotal	273,314			(42)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Total	292,781			2,432		5,606	1,262	0	320	0	0	0	194	1,582	

Optional Actions

GM 5 Bath Exhaust Fans	7,562	20	0.00	2,812	(2,812)									0	Immediate
GM 6 Kitchen Countertops	30,400	35	0.00	18,374	(4,526)									0	Immediate

Notes:

1. Simple SIR is calculated as (Total Annual Savings * Estimated Useful Life) / Upfront Cost.
2. Incremental Cost is the difference in cost between the green and conventional alternatives.
3. 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.
4. Green NPV is the net present value of installing a green vs. conventional product.
5. Interactive group total recognizes full interaction of all measures based on the TREAT model.

Narrative

Casa Verde Sur is a development designed for occupancy by families that is comprised of 12 wood framed, walk-up and townhouse buildings. The building contains a total of 38 units, all of which are accessed through direct entry doors. The unit breakdown is as follows: 22 three-bedroom, 8 four-bedroom, and 8 five-bedroom units. The building was originally constructed in 1981.

Due to insufficient unit level utility data an energy analysis for the dwelling units was not possible. Therefore no financial Life Cycle Cost (LCC) analysis on energy consumption (natural gas and electricity) could be undertaken. However, from OSI's experience, the recommendation shown in this report represent options that will provide substantial energy reductions, cost savings, and/or improved expected useful life for the items mentioned.

Site & Handicap Accessibility

Site Surface

Casa Verde Sur is located on a large, slightly sloped parcel of land in a residential neighborhood of Hartford, CT. The site is landscaped with mature lawn areas, plantings, and trees. No capital costs are carried for landscaping improvements, as they are understood to be handled from operations. If, at some future date, management contemplates re-landscaping, OSI recommends attention to sustainable design. Conventional landscaping relies on large lawns, non-native species, extensive irrigation, and heavy use of fertilizers and pesticides. This type of landscaping also tends to be labor-intensive. There are design features that can enhance soil quality, reduce stormwater run-off and pollution, and encourage beneficial insects and wildlife. Such measures can also minimize water usage, maintenance costs, and green waste.

As part of this assessment, the common areas and dwelling units at the development were examined for compliance with the requirements of the Uniform Federal Accessibility Standards (UFAS). The development is partially compliant with UFAS, however, deficiencies were noted at several locations. Costs for handicap accessibility modifications and/or improvements in and on the common areas at these locations are shown in Year 1 unless otherwise noted. Dwelling unit costs are not shown and are expected to be funded as part of future rehab projects or as reasonable accommodation requests.

Narrative

Roadways and Parking Areas

Off-street parking areas are provided for the residents. These areas and a network of walkways through the site are asphalt paved.

Existing conditions	Capital needs	Green alternative
The asphalt paving has exceeded its expected useful life (EUL) and is in fair to poor condition depending on location.	Resurfacing costs for all the asphalt paved surfaces are shown in Year 1.	Repave the existing asphalt with a lighter colored asphalt material. The lighter asphalt material decreases heat retention associated with darker asphalt materials and therefore reduces the heat island effect and allows for a cooler, more comfortable site for the residents and visitors alike. Typically, lighter-colored asphalt paving is not more expensive than dark asphalt materials, and therefore, no premium is carried in the plan for this work.
Asphalt surface maintenance.	Periodic cycles of crack fill and sealcoating are shown in Years 6, 12, and 18.	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

Fencing

Wrought iron fencing encloses the site and several interior site areas.

Existing conditions	Capital needs	Green alternative
The wrought iron fencing s in good condition with only a need for near-term painting	Costs to scrape and paint the fencing are shown in Years 1 and 11 of the report.	Specify low-VOC content paint.

Site Amenities

Modular playground

Existing conditions	Capital needs	Green alternative
Good condition	Future replacement costs shown in Year 20	No Green alternative is suggested.

Accessibility Improvements

Exterior and interior common area deficiencies were observed.

Existing conditions	Capital needs	Green alternative
Site: Much of the walkway system does not meet required width parameters. The playground's wood retaining wall enclosure prevents wheelchair access to the equipment. There is no accessible play component at playground.	Costs to address these deficiencies are shown in Year 1.	No Green alternative is suggested.

Narrative

Existing conditions	Capital needs	Green alternative
Interior Common Areas: The laundry lacks a front load washer. The office restroom lacks toilet area grab bars. Under sink plumbing lacks proper insulation.		
Dwelling Units: Kitchens lack 30-inch work surface with knee space beneath. Ranges are rear control models. Bathrooms have vanities rather than wall hung sinks. Toilet areas lack proper grab bars.	Dwelling unit costs are not shown and are expected to be funded as part of future rehab projects or as reasonable accommodation requests	No Green alternative is suggested.

Narrative

Mechanical Room

Each space (common and residential) is separately heated by a hydronic gas-fired boiler. Domestic hot water is generated similarly by individual gas-fired storage water heaters. This section addresses the equipment serving the office/laundry areas. The residential equipment is addressed in the "Dwelling Unit" section of this report.

Heat is provided by a carrier atmospheric, gas-fired, hydronic boiler rated at 70-MBH. Hydronic heat is circulated by a small ¼-horsepower in-line pump. Domestic hot water (DHW) is generated by an "American" atmospheric gas-fired storage water heater rated at 40-MBH which has a storage capacity of 40-gallons.

Boilers

Carrier atmospheric, gas-fired, hydronic boiler rated at 70-MBH.

Existing conditions	Capital needs	Green alternative
Operating as designed on the day of the assessment.	Replacement costs are shown in Year 16	(EWCM 1) Install a high efficiency ($\geq 96\%$ AFUE) condensing gas-fired boiler to reduce energy usage and utility costs.

Hydronic Circulating Pumps

Small ¼-horsepower standard duty in-line pump

Existing conditions	Capital needs	Green alternative
Operating as designed on the day of the assessment.	Replacement costs are shown in Years 6 and 16.	(EWCM 2) Install high efficiency micro-VFD (variable frequency drive) controlled pumps to reduce energy use and utility costs.

Narrative

Domestic Hot Water

Hydronic Domestic hot water (DHW) is generated by an “American” atmospheric gas-fired storage water heater rated at 40-MBH which has a storage capacity of 40-gallons. Air conditioning of the office area is provided by two thru-wall air conditioners.

Existing conditions	Capital needs	Green alternative
Operating as designed on the day of the assessment.	Replacement costs shown in Years 4 and 14.	(EWCM 3) Install efficient Energy Star rated DHW heater to reduce energy use and utility costs.

Narrative

Building Mechanical and Electrical Systems

The major building systems are limited to distribution piping systems for hydronic heat, domestic hot and cold water, sanitary wastewater, as well as natural gas and electric services. In addition to these systems there are two office air conditioners and local ring fire and smoke detectors. No problems were observed or reported concerning the various distribution systems and no capital expenses are anticipated for them.

Office Air Conditioners

Two small (<12000 BTU) thru-wall type air conditioners are used to cool the office spaces during warm weather periods.

Existing conditions	Capital needs	Green alternative
No problems were observed or reported concerning the air conditioners.	Replacement costs are shown in Years 5 and 15.	(EWCM 4) Replace with higher efficiency models with SEER ratings ≥ 15 to reduce energy use and utility costs.

Narrative

Building Architectural Systems

Building Exterior

Casa Verde Sur consists of twelve wood framed building. The buildings are constructed on a poured concrete foundations, have pitched roofs covered with asphalt and clad in vinyl siding. No issues were observed or reported with regard to the building framing and it should be monitored going forward.

Doors

Common entry doors at the office and laundry room

Existing conditions	Capital needs	Green alternative
No problems were observed or reported concerning the common area entry doors.	Future replacement costs are shown in Year 17.	<p>(EWCM 5) Replace the entry 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><i>The LCC analysis recommends implementation of this option in Year 1 to achieve the greatest possible financial advantage.</i></p>

Narrative

Existing conditions	Capital needs	Green alternative
Exterior Unit Entry Doors: No problems were observed or reported concerning the unit entry doors.	Replacement costs are shown starting in Year 17.	Replace the unit entry doors and sliding glass 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.
Unit sliding glass doors: No problems were observed or reported concerning the unit entry doors. Eighteen of the doors are reported to be original.	Replacement costs are shown starting in Year 1 for the original doors and Year 17 for the newer models.	<i>Due to lack of sufficient utility data no analysis was possible for this option.</i>

Siding

The buildings are clad in simulated clapboard vinyl siding.

Existing conditions	Capital needs	Green alternative
There were no observed or reported problems with the siding.	An allowance to repair approximately 10% of the siding and to paint all is shown Year 1.	No Green alternative is suggested.

Narrative

Existing conditions	Capital needs	Green alternative
Siding maintenance.	Allowances are shown every five years, starting in Year 1, for power washing of the siding.	No Green alternative is suggested.

Windows

Windows are operable double hung, aluminum framed, double glazed models.

Existing conditions	Capital needs	Green alternative
Common Areas: No major problems were observed or reported concerning the windows. Some minor operational and draft complaints were reported.	Costs to replace the windows are shown starting in Year 17, after thirty-five years of service.	(EWCM 6) Replacement of the windows with fiberglass-framed double-glazed models with a low-E (low emissivity) coating, a thermal break, and a gas fill between the glazing layers. The low-e coating will reflect heat from entering the building during the summer, and can reflect radiant infrared energy from escaping the building during the heating months. A thermal break includes an element of low thermal conductivity, such as wood, between the inner and exterior metal frames to reduce thermal transfer. A gas fill (such as argon) between the glazing layers will reduce heat transfer through the glass similar to the low-e coating.

Narrative

Existing conditions	Capital needs	Green alternative
Dwelling Units: No major problems were observed or reported concerning the windows. Some minor operational and draft complaints were reported.	Costs to replace the windows are shown starting in Year 17, after thirty-five years of service.	<p>Replacement of the windows with fiberglass-framed double-glazed models with a low-E (low emissivity) coating, a thermal break, and a gas fill between the glazing layers. The low-e coating will reflect heat from entering the building during the summer, and can reflect radiant infrared energy from escaping the building during the heating months. A thermal break includes an element of low thermal conductivity, such as wood, between the inner and exterior metal frames to reduce thermal transfer. A gas fill (such as argon) between the glazing layers will reduce heat transfer through the glass similar to the low-e coating.</p> <p><i>Due to lack of sufficient utility data no analysis was possible for this option.</i></p>

Narrative

Exterior Stairs

At building L there are three sets of steel framed exterior stairs that provide access to the second floor dwelling units.

Existing conditions	Capital needs	Green alternative
Heavy framed painted metal stair sets. No problems were observed or reported concerning these items during the assessment.	Allowances are shown every five years starting in Year 3.	No Green alternative is suggested.

Unit Patios

Concrete pads are located at each sliding glass door set

Existing conditions	Capital needs	Green alternative
Some minor cracking observed.	Allowances are shown throughout the report for as needed repairs.	No Green alternative is suggested.

Narrative

Building Mounted Lighting

Wall mounted high intensity discharge (HID) fixtures provide site and security lighting throughout the development.

Existing conditions	Capital needs	Green alternative
Fixtures vary in age and condition.	Replacement costs are shown in Year 2 of the report.	<p>(EWCM 7) Install high efficiency, long life, LED lighting fixtures to reduce energy usage as well as utility and operating costs. Low Watt LED fixtures provide the same light output as high wattage HID fixtures. The expected useful life of an LED fixture and lamp array is in the range of 100,000-hours or (at 12-hours a day) 20 years of service without replacement. LED fixtures also do not have ballasts, further reducing replacement and operating costs.</p> <p><i>The LCC analysis recommends implementation of this option in Year 1 to achieve the greatest possible financial advantage.</i></p>

Narrative

Roof

All roofs are wood framed and pitched. Each is covered with asphalt architectural style shingles. Roof drainage is managed by aluminum gutters and downspouts.

Existing conditions	Capital needs	Green alternative
No problems were observed or reported concerning the roof structure, asphalt shingle coverings, or drainage systems during the assessment.	Monitor the roof structure going forward. Costs to replace the asphalt shingle coverings and the drainage systems are shown stating in Year 7.	No Green alternative is suggested. However, it is suggested, to reduce warm weather heat load, to install light colored shingles.

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 storm water 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 includes the common areas are limited to interior building space located in Building L. This includes the management office, public laundry, and a public restroom. 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.

Flooring

All common area flooring is covered with vinyl composite tile (VCT).

Existing conditions	Capital needs	Green alternative
Heavily trafficked, fair to poor condition.	Replacement costs are shown in Years 1 and 16.	<p>(GM 1) Replace the VCT with natural linoleum flooring. Linoleum is a natural product (containing linseed oil, powdered wood or cork, ground limestone, resin binders, natural jute backing), which has been found to be more durable than its vinyl tile counterpart. Linoleum tile hardens over time, and therefore becomes less susceptible to scratching and cracking.</p> <p>Installation of linoleum has a lower annual life cycle cost than vinyl and keeps the vinyl (petroleum based) product out of landfills eliminating the anticipated future recycling costs for these types of materials.</p>

Narrative

Common Area Lighting

The office area, laundry, and restroom are illuminated using T-12 fluorescent tube type fixtures.

Existing conditions	Capital needs	Green alternative
No problems were observed or reported concerning this equipment during the assessment.	Costs to replace the T-12 fixtures with T-5 fixtures are shown in Year 1	(EWCM 8) Replace the fluorescent T-12 tube lamps with low wattage LED replacement tube lamps. These lamps provide a similar lighting level while reducing energy use as well as utility and operating costs. These types of LED lamps are expected to have a ten year useful life and do not require ballasts, further reducing operating costs.

Laundry Equipment

The public laundry features four top-load washers and four electric dryers. This equipment is leased.

Existing conditions	Capital needs	Green alternative
This equipment was operating as designed on the day of the assessment.	Leased equipment, no replacement costs shown.	(EWCM 9) Have the leasing company replace all the washing machines with Energy Star high efficiency front-load type machines to reduce water consumption, energy use, and utility costs.

Narrative

Dwelling Units

During the course of the assessment we inspected 4 units accounting for 10% of the total. These were distributed among all unit types. 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 assessments and additional capital history forms submitted by management.

Dwelling units feature painted gypsum wallboard wall and ceiling and carpeted living areas. Repainting and repair costs are seen as operating expenses and not shown in this report. Kitchens and bathroom floors are covered with vinyl composite tile (VCT). Unit cabinetry (kitchens and bathrooms) has solid wood fronts on laminated particleboard (LPB) casework. Kitchen countertops are plastic laminate on LPB. Appliances include a 30-inch electric range with a recirculating rangehood, frost free refrigerator, and a garbage disposal. Many units have washer and dryer hook-ups. Bathrooms feature one-piece fiberglass tubs and surrounds with anti-scald single hand controls. Toilets have been upgraded to models that have a flush rate on 1.6-gallons. Management reported that the local utility company recently upgraded all in-unit lighting with dedicated CFL fixtures or replacement CFL lamps and installed flow reducing shower heads and aerators of sink faucets.

As previously mentioned, due to insufficient unit level utility data an energy analysis for the dwelling units was not possible. Therefore no financial Life Cycle Cost (LCC) analysis on energy consumption (natural gas and electricity) could be undertaken. However, from OSI's experience, the recommendation shown in this report represent options that will provide substantial energy reductions, cost savings, and/or improved expected useful life for the items mentioned.

Narrative

Flooring

Carpeted living area, vinyl covered kitchen and bathroom floors.

Existing conditions	Capital needs	Green alternative
The carpet varies widely in condition and age.	Replacement cycles for the carpet are shown over five year periods starting in Year 1.	(GM 2) The original flooring (beneath the carpet) is hardwood. It is recommended that this flooring be restored and refinished going forward. This option would reduce the costs associated with repeated carpet replacement cycles and improve indoor air quality. Future refinishing cycles are shown starting in Year 11.
The vinyl flooring in the kitchens and baths is in similar condition as the carpet is.	Replacement costs are shown starting in Years 1 and 16 of the report.	(GM 3) Replace the VCT with natural linoleum flooring. Linoleum is a natural product (containing linseed oil, powdered wood or cork, ground limestone, resin binders, natural jute backing), which has been found to be more durable than its vinyl tile counterpart. Linoleum tile hardens over time, and therefore becomes less susceptible to scratching and cracking. Installation of linoleum has a lower annual life cycle cost than vinyl and keeps the vinyl (petroleum based) product out of landfills eliminating the anticipated future recycling costs for these types of materials.

Narrative

Bathrooms

Bathrooms have LPB vanities with one-piece solid surface sink-tops, tubs and surrounds are one-piece fiberglass units with single-hand anti-scald control valves. Toilets are 1.6-GPF models.

Existing conditions	Capital needs	Green alternative
Vanities are in fair to poor condition.	Replacement costs are shown starting in Year 1.	(GM 4) Replace the vanities with models certified by the Forestry Stewardship Council (FSC) as using wood harvested from sustainable forests. Due to their all wood construction, these types of vanities have a longer EUL than does their LPB counterparts. This extended EUL results in a favorable LCC analysis as well as improving indoor air quality.
The vanity solid surface sink-top combinations are in good to fair condition.	Costs to replace the vanity sinks are shown starting in Year 1.	No Green alternative is suggested.
The tub/shower surround units are approaching the end of their useful service life.	Replacement costs are shown starting in Year 1.	No Green alternative is suggested.
23 of the toilets have been upgraded to 1.6-GPF models. The remainders are original.	Costs to complete the upgrade to 1.6-GPF models are shown Years 1-4.	No Green alternative is suggested.

Narrative

Existing conditions	Capital needs	Green alternative
Bathroom exhaust fans are understood to be original. Many are noisy.	Costs to replace the exhaust fans are shown in Years 1-4	<p>(GM 5) Install humidistat controlled exhaust fans to improve the evacuation of bathroom moisture and reduce the possibility of organic growth.</p> <p><i>Due to a negative net present value (NPV) generated by the Life Cycle Cost analysis (LCC), this option is not recommended.</i></p>

Kitchens

Kitchens feature cabinets with solid wood fronts on laminated particleboard (LPB) casework. Kitchen countertops are plastic laminate on LPB. Appliances include a 30-inch electric range with a recirculating rangehood, frost free refrigerator, and a garbage disposal. Many units have washer and dryer hook-ups.

Existing conditions	Capital needs	Green alternative
Cabinets vary widely in condition.	Costs to replace the cabinets are shown starting in Year 8.	<p>(GM 4) Replace the cabinets with models certified by the Forestry Stewardship Council (FSC) as using wood harvested from sustainable forests. Due to their all wood construction, these types of cabinets have a longer EUL than does their LPB counterparts.</p>

Narrative

Existing conditions	Capital needs	Green alternative
		This extended EUL results in a favorable LCC analysis as well as improving indoor air quality.
Countertops vary in condition.	Replacement casts and cycles are shown starting in Years 1 and 8.	(GM 6) Install solid surface countertops to provide a durable, long lived, hygienic surface. <i>Due to a negative NPV generated by the LCC analysis, this option is not recommended.</i>
30-inch electric ranges. Management reports heavy use and an early high failure rate	Replacement costs are shown starting in Year 1, on an as needed basis.	No Green alternative is suggested.
Frost free, top freezer, Non-Energy Star refrigerators.	Replacement costs are shown, on an annual replacement schedule, throughout the report.	Replace the refrigerators with Energy Star rated models. <i>Due to lack of sufficient utility data no analysis was possible for this option.</i>
Recirculating rangehoods.	Replacement costs are shown concurrent with the cabinet replacements.	No Green alternative is suggested.
Garbage disposals.	Replacement allowances are shown on an as needed basis throughout the report.	No Green alternative is suggested.

Narrative

Unit Mechanical and Electrical

Units are heated individually by Carrier atmospheric, hydronic, boilers. Each boiler is rated at 70-MBH. Domestic hot water is generated by individual gas-fired storage type water heaters. Each is rated at 40-MBH and has a capacity of 40-gallons. Unit electric service is protected by circuit breaker panels and there is a hardwired smoke detector in each living room/hallway.

Existing conditions	Capital needs	Green alternative
Recently replaced boilers: This equipment was operating as designed on the day of the assessment.	Replacement costs are shown starting in Year 14.	Replace the existing boilers with high efficiency, gas-fired, condensing, boilers to reduce energy usage and utility costs.
Original boilers: This equipment was operating as designed on the day of the assessment.	Replacement costs are shown in Year 1.	<i>Due to lack of sufficient utility data no analysis was possible for this option.</i>
Manually operated thermostats. This equipment was operating as designed on the day of the assessment.	Replacement costs are shown in Year 9.	Upgrade to programmable thermostats to reduce energy usage and utility costs. <i>Due to lack of sufficient utility data no analysis was possible for this option.</i>
Baseboard radiation strips. This equipment was operating as designed on the day of the assessment.	Allowances to replace, as needed, are shown throughout the report's scope.	No Green alternative is suggested.

Narrative

Existing conditions	Capital needs	Green alternative
Domestic hot water equipment: This equipment was operating as designed on the day of the assessment.	Allowances to replace the water heaters, as needed, are shown throughout the report.	Install Energy Star rated water heaters to reduce energy usage and utility costs. <i>Due to lack of sufficient utility data no analysis was possible for this option.</i>
Circuit breaker panels: This equipment was operating as designed on the day of the assessment.	Future allowances, to replace the circuit breaker panels, are shown starting in Year 18.	No Green alternative is suggested.
Smoke and fire detection equipment: This equipment was operating as designed on the day of the assessment.	Allowances to repair/replace the devices, as needed, are shown throughout the report.	No Green alternative is suggested.
The National Fire Protection Association (NFPA) has recently upgraded its recommendation for multi-family fire protection coverage in dwelling units to include additional devices in each bedroom.	Costs to upgrade the dwelling unit coverage to this new recommendation are shown in Year 1.	No Green alternative is suggested.

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 ranging from 110°F to 125°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):

This building does not have any mechanically supplied fresh air; instead each occupied space has a series of operable windows to provide fresh air.

Narrative

Temperature, Humidity, Carbon Dioxide (CO₂)

Space temperature and humidity are the key components for comfort level. Temperature and relative humidity was measured in selected conditioned spaces (management office and dwelling unit). The temperature of the conditioned spaces ranged between 72-78°F db, and the humidity ranged from 33-48% rH.

Carbon dioxide levels were measured during the assessment, and are included in Table B below. Carbon Monoxide was also tested during the assessment and is included in Table C below.

Mold and airborne concerns:

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

Reporting:

The tables below describe actual conditions versus design specifications for flow rate and carbon dioxide. The “Notes” column describes a possible reason for a discrepancy between these values where applicable.

Table A. Flow Rate:

Conditioned Space	Actual Read	Design Specification	Notes
Hallways / Stairwells			N/A
Community Room			N/A
Office			Not Tested, Operable windows
Apartment			Not Tested, Operable windows

Narrative

Table B. Carbon Dioxide:

Space	Actual Read	Design Specification	Notes
Hallways / Stairwells		< 1,000 ppm	N/A
Community Room		< 1,000 ppm	N/A
Office	1213-PPM	< 1,000 ppm	Operable windows closed
Apartment	1118-PPM	< 1,000 ppm	Operable windows closed
Apartment	850-PPM	< 1,000 ppm	Operable windows open
Apartment	1324-PPM	< 1,000 ppm	Operable windows closed
Apartment	1095-PPM	< 1,000 ppm	Operable windows closed

Table C. Carbon Monoxide:

Conditioned Space	Actual Read	Design Specification	Notes
Hallways / Stairwells		≈0 ppm	N/A
Community Room		≈0 ppm	N/A
Office		≈0 ppm	Carbon Monoxide level was not measured.
Apartment		≈0 ppm	Carbon Monoxide level was not measured.

Narrative

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 \$1,951,717 in current dollars (\$51,361/unit), or \$2,617,696 (\$68,887/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's replacement reserve balance was not available for this report. Annual contributions are currently \$8750 per year, or \$230 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 all years of the plan.

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 infusion of \$1,800,000 in outside capital in Year 1 to fund through the term capital needs. 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

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 \$1,726,953 (\$45,446/unit) in current dollars, or \$2,294,142 (\$60,372/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's replacement reserve balance was not available for this report. Annual contributions are currently \$8750 per year, or \$230 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 all years of the plan.

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 infusion of \$1,575,000 in outside capital in Year 1 to help fund the green rehabilitation scenario. 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 March 11th, 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 Robert Labadini. Mr. Labadini is a Building Performance Institute (BPI)-certified energy auditor, and LEED Green Associate accredited. Mr. Labadini 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.



Typical parking area



Example of the walkway system



Typical gas-fired boiler



Typical gas-fired storage water heater



Typical entry door



Typical sliding glass door



Typical front elevation



Typical rear elevation



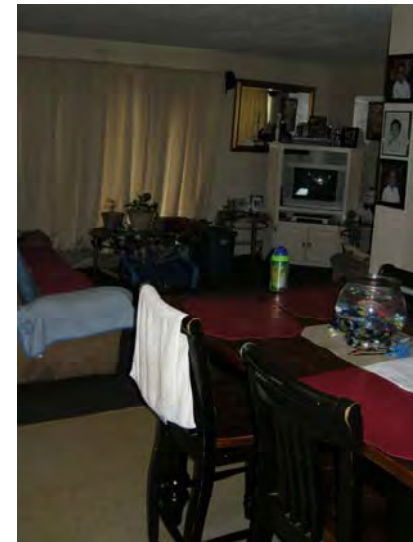
Typical three story townhouse



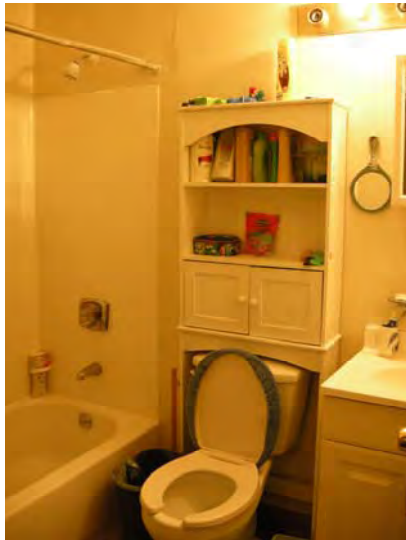
The playground



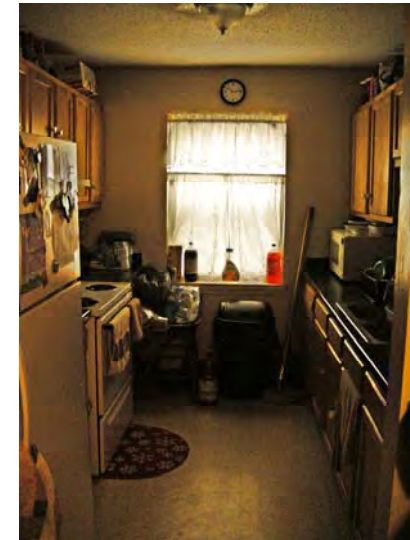
The laundry room



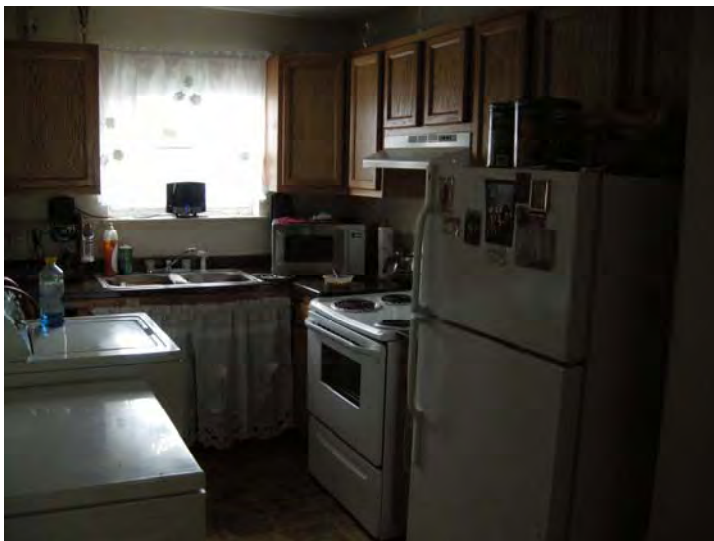
Typical living and dining rooms



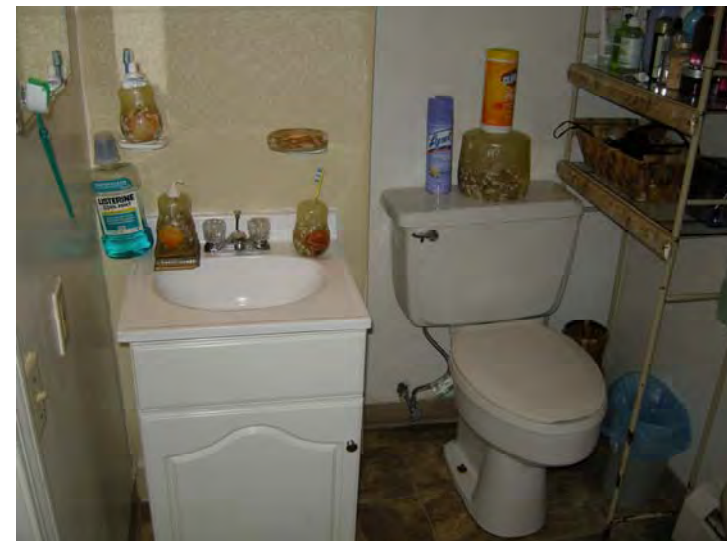
Typical bathroom



Typical kitchen

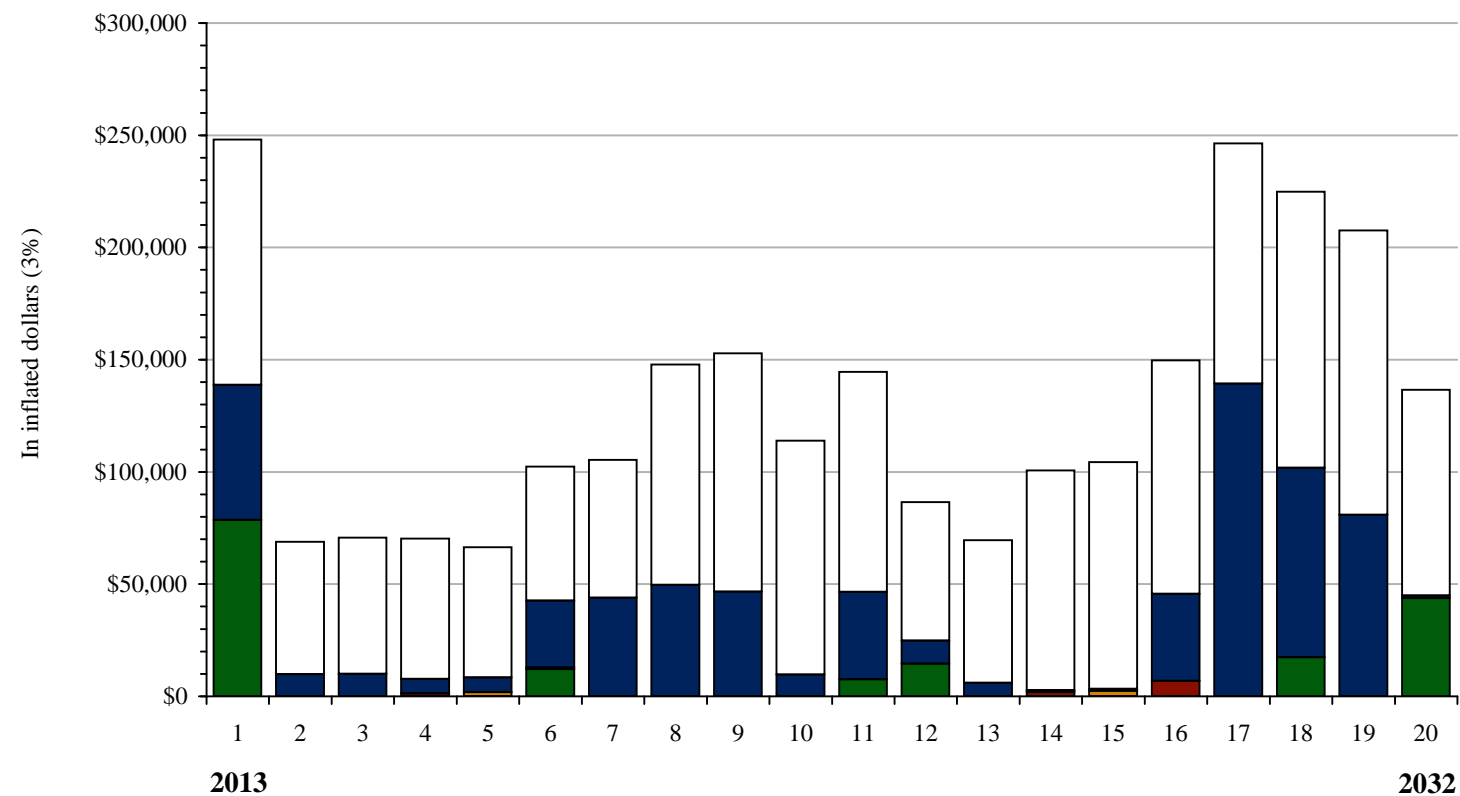


Accessible unit kitchen

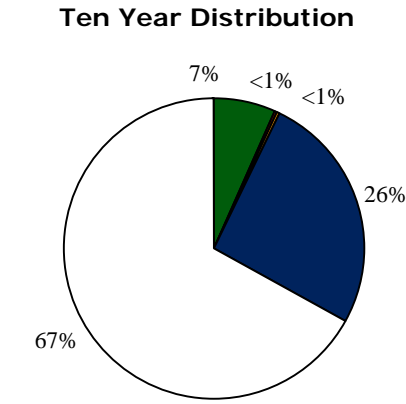
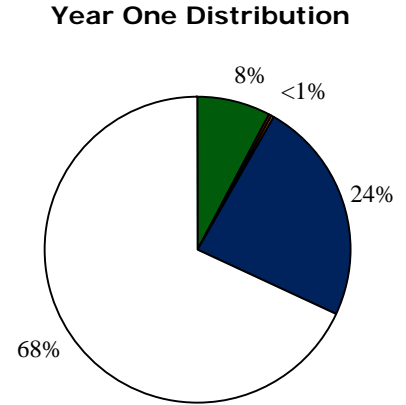
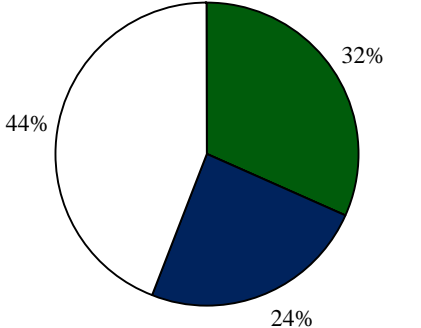


Accessible unit bathroom

Capital Needs Summary - *Conventional*



Casa Verde Sur



Total Costs by Building System (inflated dollars)

	Year 1	Years 1-10	Years 1-20
Site Systems & Accessibility	\$78,519 or \$2,066/unit	\$90,678 or \$2,386/unit	\$173,880 or \$4,576/unit
Mechanical Room		\$2,003 or \$53/unit	\$10,605 or \$279/unit
Building Mech. & Elec.		\$1,795 or \$47/unit	\$4,208 or \$111/unit
Building Architectural	\$60,210 or \$1,584/unit	\$272,524 or \$7,172/unit	\$673,919 or \$17,735/unit
Dwelling Units	\$109,372 or \$2,878/unit	\$779,733 or \$20,519/unit	\$1,755,085 or \$46,186/unit
In inflated dollars:	\$248,101 or \$6,529/unit	\$1,146,733 or \$30,177/unit	\$2,617,696 or \$68,887/unit
In current dollars:	\$248,101 or \$6,529/unit	\$1,009,689 or \$26,571/unit	\$1,951,717 or \$51,361/unit

Capital Needs Summary - *Conventional*

OSI Ref: **13134**
 Property Age: **32 Years**
 Financing: **PHA**

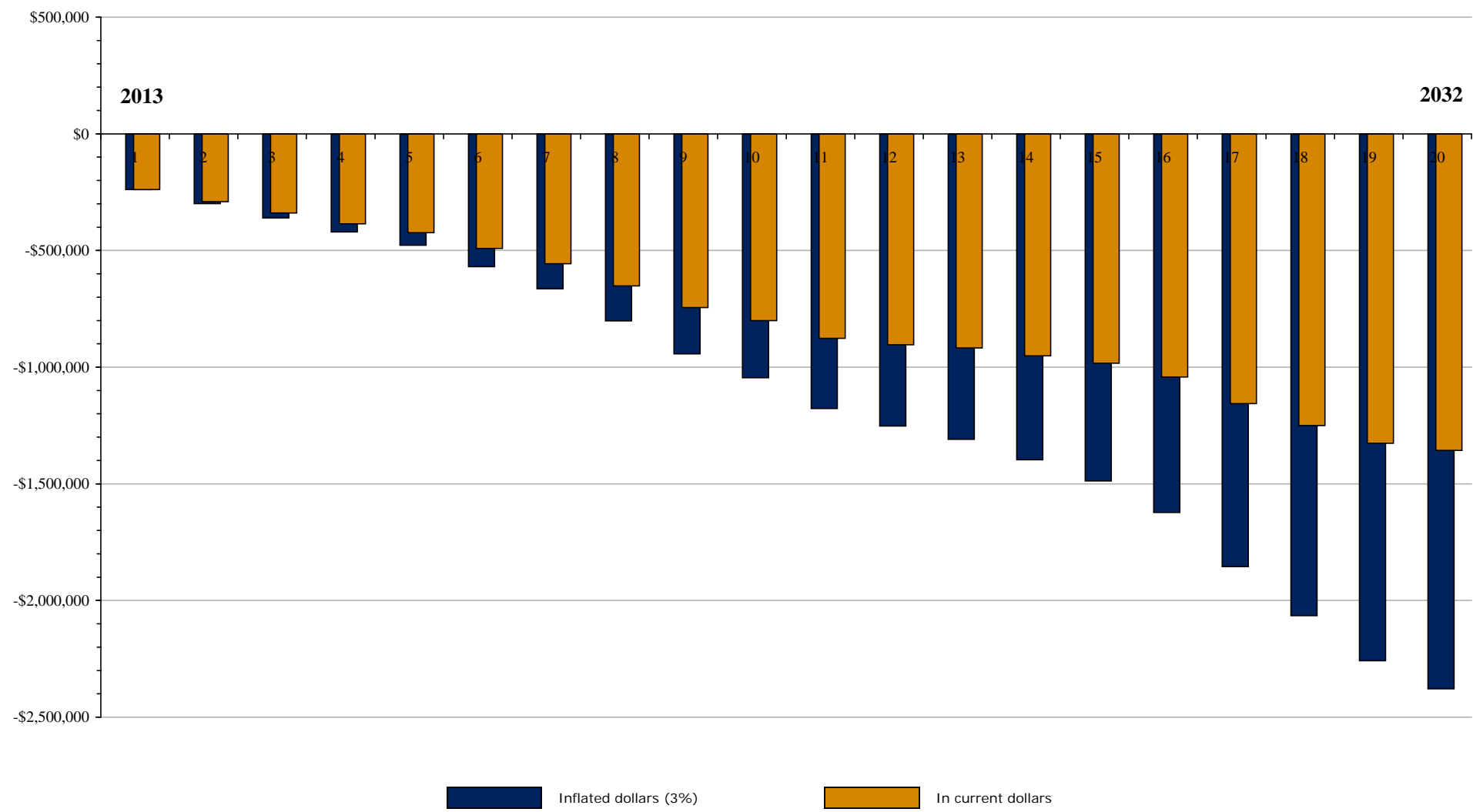
Residential Buildings: **12**
 Total Number of Units: **38**
 Occupancy: **Family**

	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 & Accessibility										
Surface	\$78,519	\$0	\$0	\$0	\$0	\$12,159	\$0	\$0	\$0	\$0
Accessibility	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Sub-Total	\$78,519	\$0	\$0	\$0	\$0	\$12,159	\$0	\$0	\$0	\$0
Mechanical Room										
Boilers	\$0	\$0	\$0	\$0	\$0	\$675	\$0	\$0	\$0	\$0
Boiler Room Systems	\$0	\$0	\$0	\$1,328	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical Sub-Total	\$0	\$0	\$0	\$1,328	\$0	\$675	\$0	\$0	\$0	\$0
Building Mech. & Electrical										
Mechanical	\$0	\$0	\$0	\$0	\$1,795	\$0	\$0	\$0	\$0	\$0
Electrical	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Elevators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical & Electrical Sub-Total	\$0	\$0	\$0	\$0	\$1,795	\$0	\$0	\$0	\$0	\$0
Building Architectural										
Structural and Exterior	\$52,123	\$9,850	\$10,018	\$6,385	\$6,576	\$29,767	\$708	\$5,157	\$751	\$773
Roof Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$43,176	\$44,471	\$45,805	\$8,878
Halls, Stairs, Lobbies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Community Spaces	\$8,087	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Architectural Sub-Total	\$60,210	\$9,850	\$10,018	\$6,385	\$6,576	\$29,767	\$43,883	\$49,627	\$46,556	\$9,651
Dwelling Units										
Living Areas	\$28,648	\$29,507	\$30,392	\$31,304	\$32,243	\$33,211	\$34,207	\$35,233	\$36,290	\$37,379
Bathrooms	\$12,852	\$13,238	\$13,635	\$14,044	\$11,398	\$11,740	\$12,092	\$12,455	\$12,829	\$13,214
Kitchens	\$7,692	\$7,923	\$8,160	\$8,405	\$5,274	\$5,432	\$5,595	\$40,592	\$41,810	\$43,064
Mechanical & Electrical	\$60,180	\$8,332	\$8,582	\$8,839	\$9,104	\$9,377	\$9,659	\$9,948	\$15,301	\$10,554
Dwelling Units Sub-Total	\$109,372	\$58,999	\$60,769	\$62,592	\$58,019	\$59,760	\$61,552	\$98,228	\$106,230	\$104,211
Total Capital Costs	\$248,101	\$68,849	\$70,787	\$70,305	\$66,390	\$102,361	\$105,436	\$147,856	\$152,786	\$113,862

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	
\$7,510	\$14,519	\$0	\$0	\$0	\$0	\$0	\$17,336	\$0	\$43,838	Site Systems & Accessibility
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Surface Accessibility
\$7,510	\$14,519	\$0	\$0	\$0	\$0	\$0	\$17,336	\$0	\$43,838	Site Sub-Total
\$0	\$0	\$0	\$0	\$0	\$6,818	\$0	\$0	\$0	\$0	Mechanical Room
\$0	\$0	\$0	\$1,784	\$0	\$0	\$0	\$0	\$0	\$0	Boilers
										Boiler Room Systems
\$0	\$0	\$0	\$1,784	\$0	\$6,818	\$0	\$0	\$0	\$0	Mechanical Sub-Total
\$0	\$0	\$0	\$0	\$2,413	\$0	\$0	\$0	\$0	\$0	Building Mech. & Electrical
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Mechanical
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Electrical
										Elevators
\$0	\$0	\$0	\$0	\$2,413	\$0	\$0	\$0	\$0	\$0	Mechanical & Electrical Sub-Total
\$27,453	\$821	\$5,978	\$871	\$897	\$31,825	\$139,261	\$84,420	\$80,824	\$1,039	Building Architectural
\$9,144	\$9,419	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Structural and Exterior
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Roof Systems
\$2,409	\$0	\$0	\$0	\$0	\$7,036	\$0	\$0	\$0	\$0	Halls, Stairs, Lobbies
										Community Spaces
\$39,006	\$10,239	\$5,978	\$871	\$897	\$38,861	\$139,261	\$84,420	\$80,824	\$1,039	Building Architectural Sub-Total
\$38,500	\$39,655	\$40,845	\$42,070	\$43,332	\$44,632	\$45,971	\$47,350	\$48,771	\$50,234	Dwelling Units
\$817	\$842	\$867	\$893	\$920	\$947	\$976	\$1,005	\$1,035	\$1,066	Living Areas
\$44,356	\$6,486	\$6,680	\$6,881	\$7,087	\$7,300	\$7,519	\$12,714	\$13,095	\$13,488	Bathrooms
\$14,395	\$14,827	\$15,271	\$48,228	\$49,675	\$51,166	\$52,700	\$61,976	\$63,835	\$26,944	Kitchens
										Mechanical & Electrical
\$98,068	\$61,809	\$63,663	\$98,072	\$101,014	\$104,045	\$107,166	\$123,045	\$126,736	\$91,733	Dwelling Units Sub-Total
\$144,584	\$86,567	\$69,641	\$100,727	\$104,324	\$149,724	\$246,427	\$224,800	\$207,559	\$136,610	Total Capital Costs

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



Current Replacement Reserve Balance: **\$0**
Adjusted Replacement Reserve Balance: **\$0**
Current annual contributions to reserve accounts: **\$8,750**

At the end of Year One, Reserve Balances are projected to be: **(\$239,220)**
At the end of Year 20, Reserve Balances are projected to be: **(\$2,379,054)**
Unmet needs projected in most years of the plan

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

Reserve Funding In Year 1										
Starting Balance:		\$0 or \$00/unit								
Contributions to Reserves:		\$8,750 or \$230/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.								
	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	\$0	(\$239,220)	(\$298,921)	(\$360,286)	(\$420,886)	(\$477,280)	(\$569,346)	(\$664,177)	(\$801,110)	(\$942,645)
(B) Annual Funding										
Contributions Indexed at 3%	\$230	\$237	\$244	\$252	\$259	\$267	\$275	\$283	\$292	\$300
(C) Additional Unit Contributions										
(D) Total Annual Reserve Funding	\$8,750	\$9,013	\$9,283	\$9,561	\$9,848	\$10,144	\$10,448	\$10,761	\$11,084	\$11,417
(E) Interest on Reserves at 3%	\$131	\$135	\$139	\$143	\$148	\$152	\$157	\$161	\$166	\$171
Total Funds Available	\$8,881	(\$230,072)	(\$289,499)	(\$350,581)	(\$410,890)	(\$466,985)	(\$558,741)	(\$653,254)	(\$789,859)	(\$931,057)
(F) Total Capital Cost	\$248,101	\$68,849	\$70,787	\$70,305	\$66,390	\$102,361	\$105,436	\$147,856	\$152,786	\$113,862
(G) Reserve Balances	(\$239,220)	(\$298,921)	(\$360,286)	(\$420,886)	(\$477,280)	(\$569,346)	(\$664,177)	(\$801,110)	(\$942,645)	(\$1,044,919)
Outside Capital:										
Adjusted Reserve Balances	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. The development's replacement reserve balance was not available for this report.
2. Annual contributions are currently \$8750 per year, or \$230 per unit.
3. Under this scenario, the property's needs exceed reserves in all years of the plan.

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

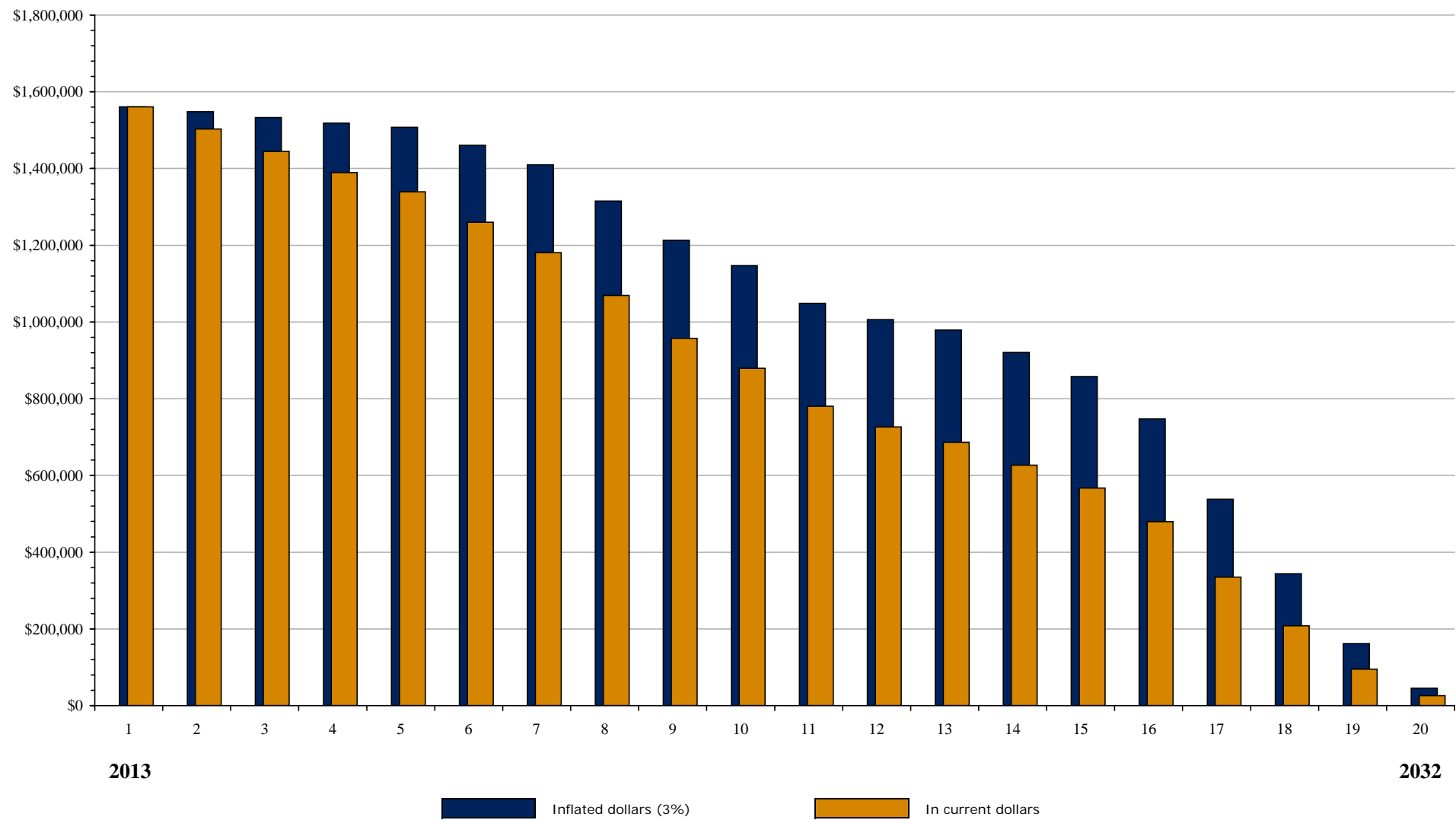
Line C, Additional Contributions allows for material adjustments in annual RR funding that would enable the property to meet all projected needs out of reserves through Year 20.

**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*

Reserve Funding In Year 20									
Projected replacement reserve balance is (\$2,379,054)					This is (\$62,607)per unit in inflated dollars or (\$35,704) per unit in uninflated dollars				
Projected annual funding to reserves is \$15,343					This is \$404 per unit in inflated dollars or \$230 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

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



Current Replacement Reserve Balance: **\$0**
Adjusted Replacement Reserve Balance: **\$0**
Current annual contributions to reserve accounts: **\$8,750**

At the end of Year One, Reserve Balances are projected to be: **\$1,560,780**
At the end of Year 20, Reserve Balances are projected to be: **\$45,429**
All projected capital needs are met throughout the plan

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

		Reserve Funding In Year 1									
		Starting Balance:		\$0 or \$00/unit							
		Contributions to Reserves:		\$8,750 or \$230/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.									
		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		\$0	\$1,560,780	\$1,547,902	\$1,532,974	\$1,518,364	\$1,507,520	\$1,460,681	\$1,409,670	\$1,315,027	\$1,212,942
(B) Annual Funding											
Contributions Indexed at 3%		\$230	\$237	\$244	\$252	\$259	\$267	\$275	\$283	\$292	\$300
(C) Additional Unit Contributions											
(D) Total Annual Reserve Funding		\$8,750	\$9,013	\$9,283	\$9,561	\$9,848	\$10,144	\$10,448	\$10,761	\$11,084	\$11,417
(E) Interest on Reserves at 3%		\$131	\$46,959	\$46,576	\$46,133	\$45,699	\$45,378	\$43,977	\$42,452	\$39,617	\$36,560
Total Funds Available		\$8,881	\$1,616,751	\$1,603,761	\$1,588,668	\$1,573,911	\$1,563,042	\$1,515,106	\$1,462,883	\$1,365,728	\$1,260,919
(F) Total Capital Cost		\$248,101	\$68,849	\$70,787	\$70,305	\$66,390	\$102,361	\$105,436	\$147,856	\$152,786	\$113,862
(G) Reserve Balances		(\$239,220)	\$1,547,902	\$1,532,974	\$1,518,364	\$1,507,520	\$1,460,681	\$1,409,670	\$1,315,027	\$1,212,942	\$1,147,057
Outside Capital:		\$1,800,000									
Adjusted Reserve Balances		\$1,560,780	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

The plan calls for an infusion of \$1,800,000 in outside capital in Year 1 to fund through the term capital needs.

*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 \$45,429					This is \$1,196 per unit in inflated dollars or \$682 per unit in uninflated dollars				
Projected annual funding to reserves is \$15,343					This is \$404 per unit in inflated dollars or \$230 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
\$1,147,057	\$1,048,820	\$1,006,012	\$979,213	\$920,905	\$857,642	\$747,484	\$537,733	\$343,744	\$161,617
\$309	\$319	\$328	\$338	\$348	\$359	\$370	\$381	\$392	\$404
\$11,759	\$12,112	\$12,475	\$12,850	\$13,235	\$13,632	\$14,041	\$14,462	\$14,896	\$15,343
\$34,588	\$31,646	\$30,367	\$29,569	\$27,826	\$25,934	\$22,635	\$16,349	\$10,536	\$5,079
\$1,193,404	\$1,092,578	\$1,048,855	\$1,021,632	\$961,966	\$897,208	\$784,160	\$568,545	\$369,176	\$182,039
\$144,584	\$86,567	\$69,641	\$100,727	\$104,324	\$149,724	\$246,427	\$224,800	\$207,559	\$136,610
\$1,048,820	\$1,006,012	\$979,213	\$920,905	\$857,642	\$747,484	\$537,733	\$343,744	\$161,617	\$45,429
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Reserve Balances (A)

Starting Replacement Reserves

Annual Funding (B)

Contributions Indexed at 3%

Additional Unit Contributions (C)

Total Annual Reserve Funding (D)

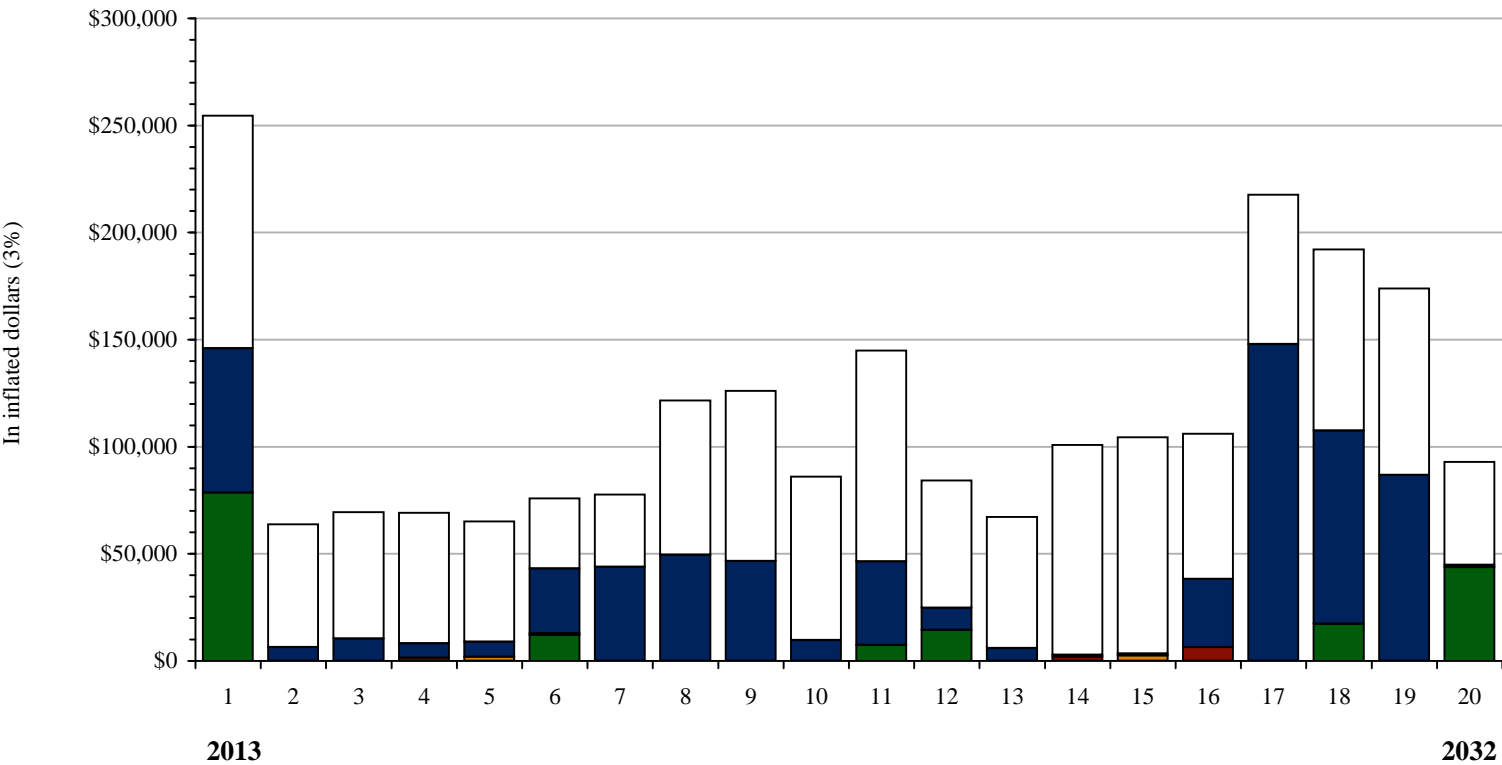
Interest on Reserves at 3% (E)

Total Funds Available

Total Capital Cost (F)

Reserve Balances (G)

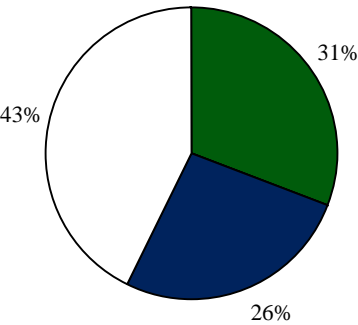
Capital Needs Summary - Green



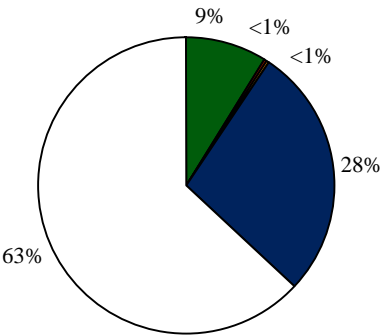
Total Costs by Building System (inflated dollars)

	Year 1	Years 1-10	Years 1-20
Site Systems & Accessibility	\$78,519 or \$2,066/unit	\$90,678 or \$2,386/unit	\$173,880 or \$4,576/unit
Mechanical Room		\$2,153 or \$57/unit	\$10,425 or \$274/unit
Building Mech. & Elec.		\$1,930 or \$51/unit	\$4,523 or \$119/unit
Building Architectural	\$67,387 or \$1,773/unit	\$278,021 or \$7,316/unit	\$692,766 or \$18,231/unit
Dwelling Units	\$108,651 or \$2,859/unit	\$636,906 or \$16,761/unit	\$1,412,548 or \$37,172/unit
In inflated dollars:	\$254,557 or \$6,699/unit	\$1,009,688 or \$26,571/unit	\$2,294,142 or \$60,372/unit
In current dollars:	\$254,557 or \$6,699/unit	\$898,239 or \$23,638/unit	\$1,726,953 or \$45,446/unit

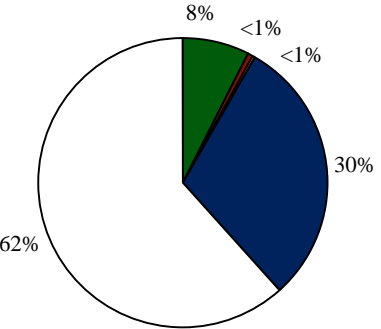
Casa Verde Sur



Year One Distribution



Ten Year Distribution



Twenty Year Distribution

Capital Needs Summary - Green

OSI Ref: **13134**
 Property Age: **32 Years**
 Financing: **PHA**

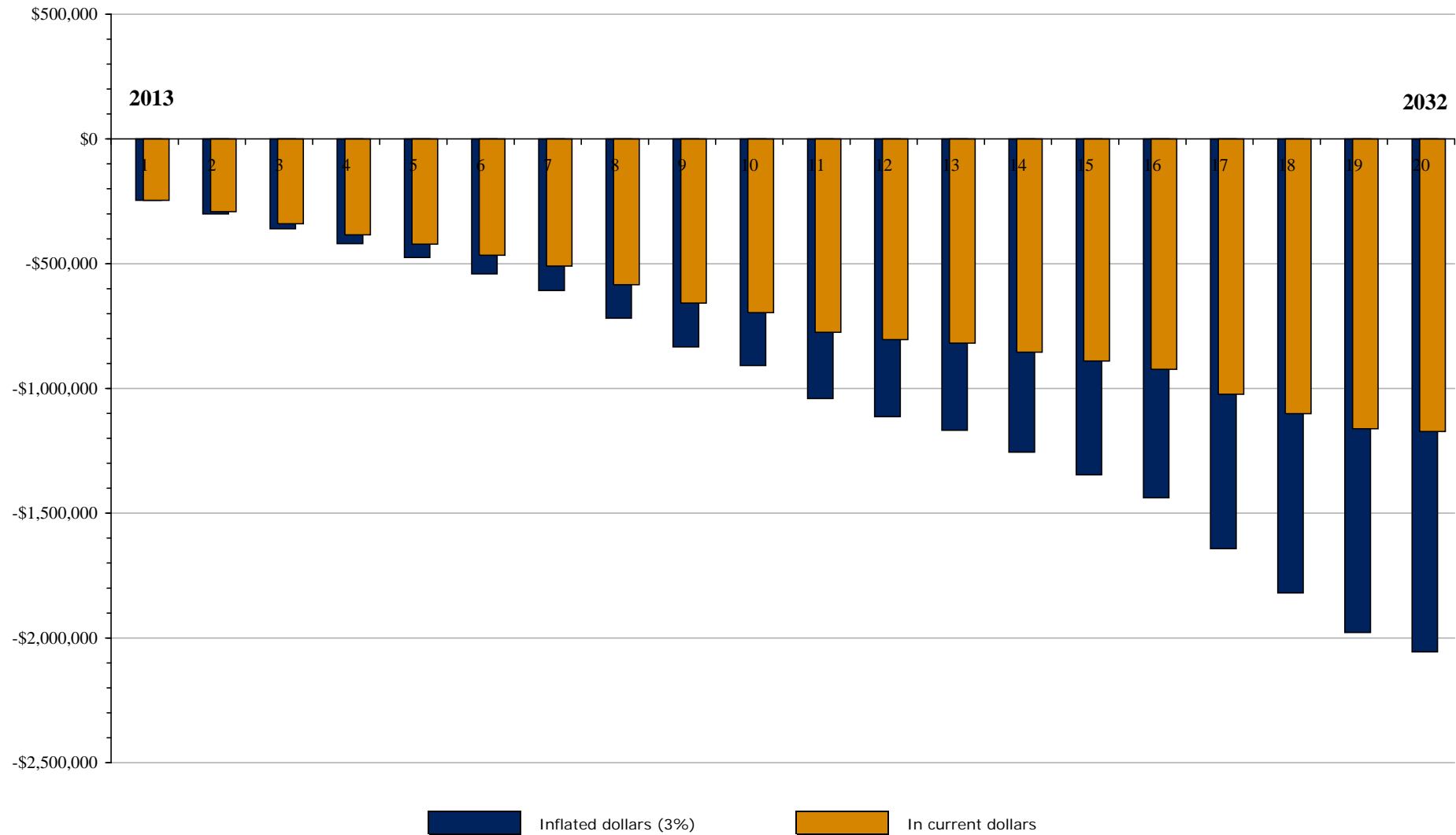
Residential Buildings: **12**
 Total Number of Units: **38**
 Occupancy: **Family**

	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 & Accessibility										
Surface	\$78,519	\$0	\$0	\$0	\$0	\$12,159	\$0	\$0	\$0	\$0
Accessibility	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Site Sub-Total	\$78,519	\$0	\$0	\$0	\$0	\$12,159	\$0	\$0	\$0	\$0
Mechanical Room										
Boilers	\$0	\$0	\$0	\$0	\$0	\$726	\$0	\$0	\$0	\$0
Boiler Room Systems	\$0	\$0	\$0	\$1,427	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical Sub-Total	\$0	\$0	\$0	\$1,427	\$0	\$726	\$0	\$0	\$0	\$0
Building Mech. & Electrical										
Mechanical	\$0	\$0	\$0	\$0	\$1,930	\$0	\$0	\$0	\$0	\$0
Electrical	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Elevators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mechanical & Electrical Sub-Total	\$0	\$0	\$0	\$0	\$1,930	\$0	\$0	\$0	\$0	\$0
Building Architectural										
Structural and Exterior	\$58,830	\$6,424	\$10,436	\$6,815	\$7,019	\$30,223	\$708	\$5,157	\$751	\$773
Roof Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$43,175	\$44,471	\$45,805	\$8,878
Halls, Stairs, Lobbies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Community Spaces	\$8,557	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Architectural Sub-Total	\$67,387	\$6,424	\$10,436	\$6,815	\$7,019	\$30,223	\$43,883	\$49,627	\$46,556	\$9,651
Dwelling Units										
Living Areas	\$26,353	\$27,144	\$27,958	\$28,797	\$29,661	\$5,438	\$5,601	\$5,769	\$5,942	\$6,121
Bathrooms	\$13,014	\$13,405	\$13,807	\$14,221	\$11,581	\$11,928	\$12,286	\$12,655	\$13,034	\$13,425
Kitchens	\$7,904	\$8,141	\$8,385	\$8,637	\$5,512	\$5,677	\$5,847	\$43,218	\$44,515	\$45,850
Mechanical & Electrical	\$61,380	\$8,688	\$8,949	\$9,217	\$9,494	\$9,779	\$10,072	\$10,374	\$16,119	\$11,006
Dwelling Units Sub-Total	\$108,651	\$57,378	\$59,099	\$60,872	\$56,247	\$32,822	\$33,807	\$72,017	\$79,611	\$76,402
Total Capital Costs	\$254,557	\$63,801	\$69,535	\$69,114	\$65,196	\$75,931	\$77,690	\$121,644	\$126,166	\$86,054

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	
\$7,510	\$14,519	\$0	\$0	\$0	\$0	\$0	\$17,336	\$0	\$43,838	Site Systems & Accessibility
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Surface Accessibility
\$7,510	\$14,519	\$0	\$0	\$0	\$0	\$0	\$17,336	\$0	\$43,838	Site Sub-Total
\$0	\$0	\$0	\$0	\$0	\$6,354	\$0	\$0	\$0	\$0	Mechanical Room
\$0	\$0	\$0	\$1,918	\$0	\$0	\$0	\$0	\$0	\$0	Boilers
\$0	\$0	\$0	\$1,918	\$0	\$6,354	\$0	\$0	\$0	\$0	Boiler Room Systems
\$0	\$0	\$0	\$1,918	\$0	\$6,354	\$0	\$0	\$0	\$0	Mechanical Sub-Total
\$0	\$0	\$0	\$0	\$2,594	\$0	\$0	\$0	\$0	\$0	Building Mech. & Electrical
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Mechanical
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Electrical
\$0	\$0	\$0	\$0	\$2,594	\$0	\$0	\$0	\$0	\$0	Elevators
\$0	\$0	\$0	\$0	\$2,594	\$0	\$0	\$0	\$0	\$0	Mechanical & Electrical Sub-Total
\$27,453	\$821	\$5,978	\$871	\$897	\$31,825	\$147,849	\$90,231	\$86,810	\$1,039	Building Architectural
\$9,144	\$9,419	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Structural and Exterior
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Roof Systems
\$2,409	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Halls, Stairs, Lobbies
\$39,006	\$10,239	\$5,978	\$871	\$897	\$31,825	\$147,849	\$90,231	\$86,810	\$1,039	Community Spaces
\$39,006	\$10,239	\$5,978	\$871	\$897	\$31,825	\$147,849	\$90,231	\$86,810	\$1,039	Building Architectural Sub-Total
\$35,416	\$36,479	\$37,573	\$38,700	\$39,861	\$6,778	\$6,981	\$7,191	\$7,407	\$7,629	Dwelling Units
\$878	\$905	\$932	\$960	\$989	\$1,018	\$1,049	\$1,080	\$1,113	\$1,146	Living Areas
\$47,226	\$6,779	\$6,982	\$7,192	\$7,407	\$5,744	\$5,916	\$11,063	\$11,395	\$11,737	Bathrooms
\$14,860	\$15,306	\$15,765	\$51,174	\$52,710	\$54,291	\$55,920	\$65,291	\$67,250	\$27,552	Kitchens
\$98,380	\$59,468	\$61,252	\$98,026	\$100,967	\$67,831	\$69,866	\$84,625	\$87,164	\$48,063	Mechanical & Electrical
\$98,380	\$59,468	\$61,252	\$98,026	\$100,967	\$67,831	\$69,866	\$84,625	\$87,164	\$48,063	Dwelling Units Sub-Total
\$144,896	\$84,226	\$67,230	\$100,815	\$104,457	\$106,010	\$217,714	\$192,192	\$173,973	\$92,940	Total Capital Costs

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



Current Replacement Reserve Balance: **\$0**
Adjusted Replacement Reserve Balance: **\$0**
Current annual contributions to reserve accounts: **\$8,750**

At the end of Year One, Reserve Balances are projected to be: **(\$245,676)**
At the end of Year 20, Reserve Balances are projected to be: **(\$2,055,499)**
Unmet needs projected in most years of the plan

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

		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	\$0	(\$245,676)	(\$300,330)	(\$360,442)	(\$419,851)	(\$475,052)	(\$540,687)	(\$607,772)	(\$718,493)	(\$833,409)	
(B)	Annual Funding											
	Contributions Indexed at 3%	\$230	\$237	\$244	\$252	\$259	\$267	\$275	\$283	\$292	\$300	
(C)	Additional Unit Contributions											
(D)	Total Annual Reserve Funding	\$8,750	\$9,013	\$9,283	\$9,561	\$9,848	\$10,144	\$10,448	\$10,761	\$11,084	\$11,417	
(E)	Interest on Reserves at 3%	\$131	\$135	\$139	\$143	\$148	\$152	\$157	\$161	\$166	\$171	
	Total Funds Available	\$8,881	(\$236,528)	(\$290,908)	(\$350,737)	(\$409,855)	(\$464,756)	(\$530,082)	(\$596,849)	(\$707,243)	(\$821,821)	
(F)	Total Capital Cost	\$254,557	\$63,801	\$69,535	\$69,114	\$65,196	\$75,931	\$77,690	\$121,644	\$126,166	\$86,054	
(G)	Reserve Balances	(\$245,676)	(\$300,330)	(\$360,442)	(\$419,851)	(\$475,052)	(\$540,687)	(\$607,772)	(\$718,493)	(\$833,409)	(\$907,874)	
	Outside Capital:											
	Adjusted Reserve Balances	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Notes:

1. The development's replacement reserve balance was not available for this report.
2. Annual contributions are currently \$8750 per year, or \$230 per unit.
3. Under this scenario, the property's needs exceed reserves in all years of the plan.

*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*

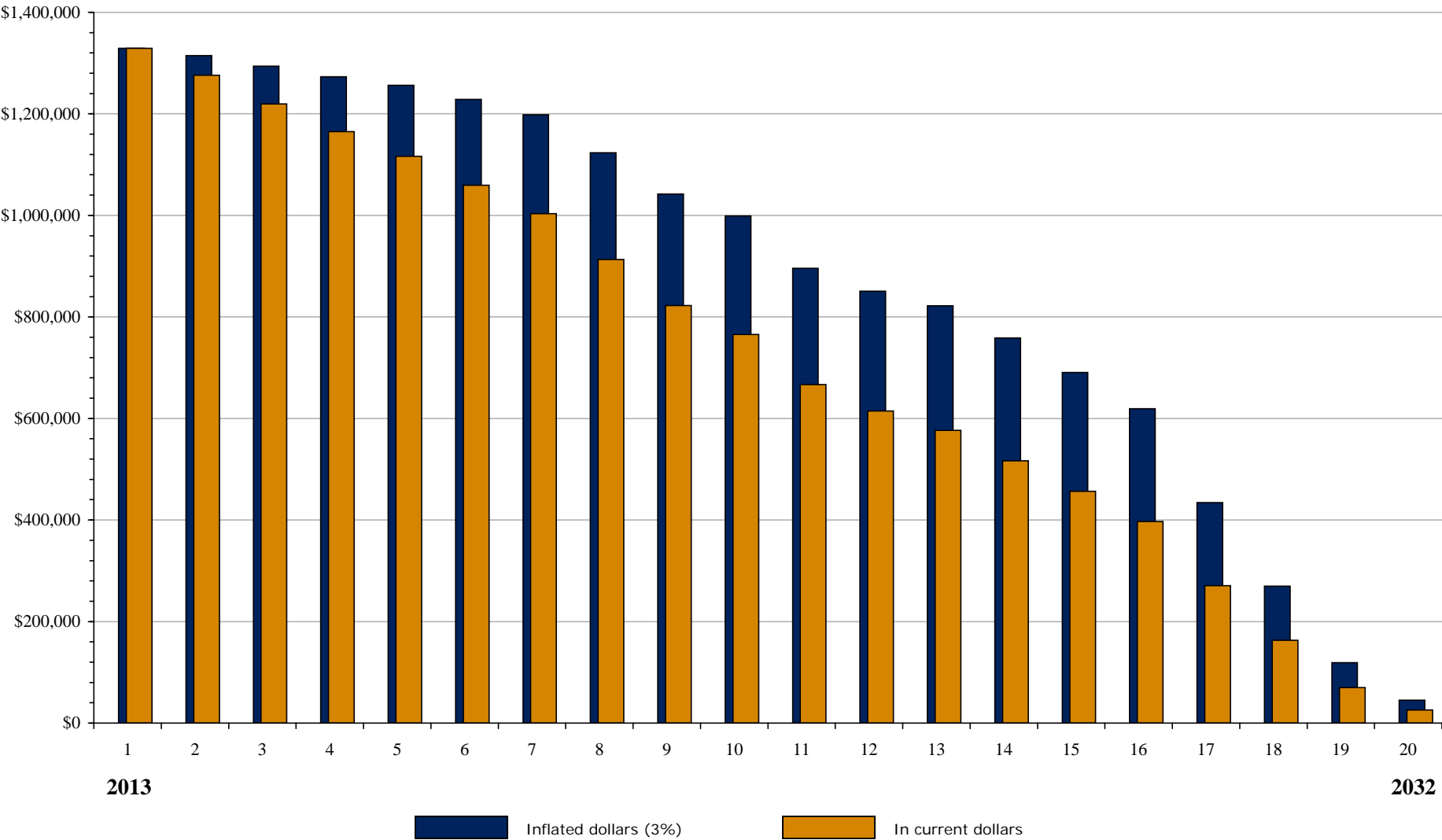
Reserve Funding In Year 20

Projected replacement reserve balance is **(\$2,055,499)** This is (\$54,092) per unit in inflated dollars or (\$30,848) per unit in uninflated dollars

Projected annual funding to reserves is **\$15,343** This is \$404 per unit in inflated dollars or \$230 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)
(\$907,874)	(\$1,040,835)	(\$1,112,767)	(\$1,167,334)	(\$1,255,107)	(\$1,346,130)	(\$1,438,303)	(\$1,641,766)	(\$1,819,279)	(\$1,978,133)	Starting Replacement Reserves
										Annual Funding (B)
\$309	\$319	\$328	\$338	\$348	\$359	\$370	\$381	\$392	\$404	Contributions Indexed at 3%
										Additional Unit Contributions (C)
\$11,759	\$12,112	\$12,475	\$12,850	\$13,235	\$13,632	\$14,041	\$14,462	\$14,896	\$15,343	Total Annual Reserve Funding (D)
\$176	\$182	\$187	\$193	\$199	\$204	\$211	\$217	\$223	\$230	Interest on Reserves at 3% (E)
(\$895,939)	(\$1,028,541)	(\$1,100,104)	(\$1,154,292)	(\$1,241,673)	(\$1,332,293)	(\$1,424,051)	(\$1,627,086)	(\$1,804,159)	(\$1,962,559)	Total Funds Available
\$144,896	\$84,226	\$67,230	\$100,815	\$104,457	\$106,010	\$217,714	\$192,192	\$173,973	\$92,940	Total Capital Cost (F)
(\$1,040,835)	(\$1,112,767)	(\$1,167,334)	(\$1,255,107)	(\$1,346,130)	(\$1,438,303)	(\$1,641,766)	(\$1,819,279)	(\$1,978,133)	(\$2,055,499)	Reserve Balances (G)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

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



Current Replacement Reserve Balance: **\$0**
Adjusted Replacement Reserve Balance: **\$0**
Current annual contributions to reserve accounts: **\$8,750**

At the end of Year One, Reserve Balances are projected to be: **\$1,329,324**
At the end of Year 20, Reserve Balances are projected to be: **\$45,017**
All projected capital needs are met throughout the plan

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

		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:		\$8,750 or \$230/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	\$0	\$1,329,324	\$1,314,550	\$1,293,874	\$1,273,281	\$1,256,279	\$1,228,333	\$1,198,097	\$1,123,319	\$1,042,103	
(B)	Annual Funding											
	Contributions Indexed at 3%	\$230	\$237	\$244	\$252	\$259	\$267	\$275	\$283	\$292	\$300	
(C)	Additional Unit Contributions											
(D)	Total Annual Reserve Funding	\$8,750	\$9,013	\$9,283	\$9,561	\$9,848	\$10,144	\$10,448	\$10,761	\$11,084	\$11,417	
(E)	Interest on Reserves at 3%	\$131	\$40,015	\$39,576	\$38,960	\$38,346	\$37,841	\$37,007	\$36,104	\$33,866	\$31,434	
	Total Funds Available	\$8,881	\$1,378,351	\$1,363,409	\$1,342,395	\$1,321,475	\$1,304,263	\$1,275,787	\$1,244,963	\$1,168,269	\$1,084,954	
(F)	Total Capital Cost	\$254,557	\$63,801	\$69,535	\$69,114	\$65,196	\$75,931	\$77,690	\$121,644	\$126,166	\$86,054	
(G)	Reserve Balances	(\$245,676)	\$1,314,550	\$1,293,874	\$1,273,281	\$1,256,279	\$1,228,333	\$1,198,097	\$1,123,319	\$1,042,103	\$998,900	
	Outside Capital:	\$1,575,000										
	Adjusted Reserve Balances	\$1,329,324	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Notes:

The plan calls for an infusion of \$1,575,000 in outside capital in Year 1 to help fund the green rehabilitation scenario.

*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 **\$45,017**

This is \$1,185 per unit in inflated dollars or \$676 per unit in uninflated dollars

Projected annual funding to reserves is **\$15,343**

This is \$404 per unit in inflated dollars or \$230 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)
\$998,900	\$895,907	\$850,852	\$821,810	\$758,692	\$690,430	\$618,969	\$434,076	\$269,585	\$118,819	Starting Replacement Reserves
										Annual Funding (B)
\$309	\$319	\$328	\$338	\$348	\$359	\$370	\$381	\$392	\$404	Contributions Indexed at 3%
										Additional Unit Contributions (C)
\$11,759	\$12,112	\$12,475	\$12,850	\$13,235	\$13,632	\$14,041	\$14,462	\$14,896	\$15,343	Total Annual Reserve Funding (D)
\$30,143	\$27,059	\$25,713	\$24,847	\$22,959	\$20,917	\$18,780	\$13,239	\$8,311	\$3,795	Interest on Reserves at 3% (E)
\$1,040,803	\$935,078	\$889,040	\$859,507	\$794,887	\$724,979	\$651,790	\$461,777	\$292,792	\$137,957	Total Funds Available
\$144,896	\$84,226	\$67,230	\$100,815	\$104,457	\$106,010	\$217,714	\$192,192	\$173,973	\$92,940	Total Capital Cost (F)
\$895,907	\$850,852	\$821,810	\$758,692	\$690,430	\$618,969	\$434,076	\$269,585	\$118,819	\$45,017	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	1,720 sf	2.10	\$3,611		32	20	1 in 1 Year	Asphalt Paved Costs to resurface
Roadways (Green)								
Parking	12,537 sf	2.10	\$26,327		32	20	1 in 1 Year	Asphalt Paved Costs top resurface
Parking (Green)								
Crack-Fill and Sealcoat	29,967 sf	0.35	\$10,488		32	6	6 /12 /18	Surface maintenance Periodic allowances to crack fill and sealcoat
Pedestrian Paving	15,711 sf	2.10	\$32,993		32	20	1 in 1 Year	Asphalt Paved Costs to resurface
Pedestrian Paving (Green)								
Fencing	1,397 lf	4.00	\$5,588		10	10	1 /11	Wrought iron, painted Periodic allowances to scrape and paint
Fencing (Green)								
Site Lighting								Building mounted fixtures only
Site Lighting (Green)								
Playground	1 ls	25000.00	\$25,000		5	25	20 in 1 Year	Modular play equipment Costs to replace
Landscaping	1 ea				32	20		Open lawn areas and mature plantings Operating
Landscaping (Green)								
ACCESSIBILITY								
Circulation	1 ls	5000.00	\$5,000		32	20	1 in 1 Year	Walkways; add width at repaving cycle. Remove timber edge at playground, add accessible play component.
Circulation (Green)								
Common Areas	1 ls	5000.00	\$5,000		32	20	1 in 1 Year	Install; front load washer, grab bars office RR, insulate office RR plumbing.
Common Areas (Green)								
Dwelling Units	1 ls				Add	20		kit. Work area w/knee space, front cont range Bath, wall sink, toilet grab bars
Dwelling Units (Green)								
Miscellaneous								

Casa Verde Sur 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	\$3,611	\$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	\$26,327	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Parking (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Crack-Fill and Sealcoat	\$0	\$0	\$0	\$0	\$0	\$12,159	\$0	\$0	\$0	\$0	\$0	\$14,519	\$0	\$0	\$0	\$0	\$0	\$17,336	\$0	\$0
Pedestrian Paving	\$32,993	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pedestrian Paving (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing	\$5,588	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,510	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fencing (Green)	\$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
Playground	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$43,838
Landscaping	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Landscaping (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ACCESSIBILITY																				
Circulation	\$5,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Circulation (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Common Areas	\$5,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Common Areas (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dwelling Units	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Dwelling Units (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

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 - Office/Laundry	1 ea	3,794	\$3,794		4	20	16		in 1 Year	Carrier gas-fired atmospheric hydronic 70-MBH
										Costs to replace
Boilers - Office/Laundry (Green)	1 ea	4,078	\$4,078	\$285	4	20	16		in 1 Year	E1 Upgrade Boiler
										High efficiency condensing boiler (AFUE ≥96%)
Boilers	ea									
Boilers (Green)	ea									
Boilers	ea									
Boilers (Green)	ea									
Controls	ea									
Controls (Green)	ea									
Boiler Water Pumps	ea									
Boiler Water Pumps (Green)	ea									
Heating Water Pumps	1 ea	583	\$583		4	10	6 16		in 1 Year	Fractional horsepower in-line
										Costs to replace
Heating Water Pumps (Green)	1 ea	626	\$626	\$44	4	15	6		in 1 Year	E2 Upgrade pump
										Install micro-VFD controlled pump
Heating Water Pumps	ea									
Heating Water Pumps (Green)	ea									
Flue Exhaust	1 ea				4	20				Galvanized metal ductwork flue
										Monitor
Flue Exhaust (Green)	ea									
Condensate & Feed Water	ea									
Miscellaneous	ea									
Miscellaneous (Green)	ea									
Miscellaneous	ea									
Miscellaneous (Green)	ea									

Casa Verde Sur
MECHANICAL ROOM

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 - Office/Laundry	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,911	\$0	\$0	\$0	\$0
Boilers - Office/Laundry (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,354	\$0	\$0	\$0	\$0
Boilers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boilers (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	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Controls (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler 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	\$0	\$0	\$0	\$0	\$0	\$675	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$908	\$0	\$0	\$0	\$0
Heating Water Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$726	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heating Water Pumps (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				4	20				Monitor
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 Gen Office/Laundry	1 ea	1215.00	\$1,215		6	10	4	14	in 1 Year	American gas-fired storage water heater 40-MBH Costs to replace
DHW Gen Office/Laundry (Green)	1 ea	1306.13	\$1,306	\$91	6	10	4	14	in 1 Year E3	Upgrade water heater Install an Energy Star rated model
DHW Generation	ea									
DHW Generation (Green)	ea									
DHW Storage	ea									
DHW Storage (Green)	ea									
DHW Storage	ea									
DHW Storage (Green)	ea									
Domestic Hot Water Pumps	ea									
Domestic Hot Water Pumps (Green)	ea									
Domestic Hot Water Pumps	ea									
Domestic Hot Water Pumps (Green)	ea									
Miscellaneous	ea									
Miscellaneous (Green)	ea									
Miscellaneous	ea									

MECHANICAL ROOM--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
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 Gen Office/Laundry	\$0	\$0	\$0	\$1,328	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,784	\$0	\$0	\$0	\$0	\$0	\$0
DHW Gen Office/Laundry (Green)	\$0	\$0	\$0	\$1,427	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,918	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Generation (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DHW Storage (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Domestic Hot Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Domestic Hot Water Pumps (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Domestic Hot Water Pumps	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Domestic Hot Water Pumps (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	_____	_____	32	50	_____	_____	_____	Hot/cold water, septic, natural-gas Monitor	
Air Conditioner Office	_____	2	ea	797.50	\$1,595	5	10	5	15	in 1 Year	Thru-wall ≈12,000-BTU each Costs to replace	
Air Conditioner Office (Green)	_____	2	ea	857.31	\$1,715	\$120	5	10	5	15	in 1 Year E4	Upgrade air conditioners Install Models that are rated at ≥ SEER 15
Building HVAC Systems	_____	ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Building HVAC Systems (Green)	_____	ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Building HVAC Systems	_____	ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Building HVAC Systems (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	_____	_____	32	55	_____	Standard resident exterior meter box/disconnects Monitor
Emergency Generator	_____	ea	_____	_____	_____	_____	_____	_____	Self-contained battery powered
Emergency Lights Office	_____	3	ea	_____	_____	varies	10	_____	Operating Local ring smoke detectors only
Smoke/Fire Detection Office	_____	1	ls	_____	_____	varies	10	_____	Operating
Signaling / Communication	_____	ls	_____	_____	_____	_____	_____	_____	_____

BUILDING ELEVATORS

Shafts and Doorways	_____	ea	_____	_____	_____	_____	_____	_____	N/A
Cabs	_____	ea	_____	_____	_____	_____	_____	_____	_____
Controller/Dispatcher	_____	ea	_____	_____	_____	_____	_____	_____	_____
Machine Room Equipment	_____	ea	_____	_____	_____	_____	_____	_____	_____

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
Air Conditioner Office	\$0	\$0	\$0	\$0	\$1,795	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,413	\$0	\$0	\$0	\$0	\$0
Air Conditioner Office (Green)	\$0	\$0	\$0	\$0	\$1,930	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,594	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building HVAC Systems (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 Office	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Smoke/Fire Detection Office	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$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	2,657	lf				32	50					Poured concrete Monitor
Framing		ls										
Slab		sf										
Miscellaneous		ea										
BUILDING EXTERIOR												
Exterior Common Doors	3	ea	345.00	\$1,035		18	35	17		in	1 Year	Office and laundry access Flush panel metal, costs to replace
Exterior Common Doors (Green)	3	ea	370.88	\$1,113	\$78	18	35	1		in	1 Year	E5 Install fiberglass, insulated models <i>LCC analysis recommends Yr1 replacement</i>
Exterior Unit Doors	54	ea	345.00	\$18,630		18	35	17		over	3 Years	Flush panel metal Annual allowances to replace as needed
Exterior Unit Doors (Green)	54	ea	370.88	\$20,027	\$1,397	18	35	17		over	3 Years	Upgrade dwelling unit doors Install fiberglass insulated models
	20	ea	1750.00	\$35,000		18	35	17		in	1 Year	Standard size sliding glass doors
GI Sliding Doors Residential	18	ea	1750.00	\$31,500		32	35	1		over	6 Years	Costs to replace
	20	ea	1881.25	\$37,625		18	35	17		in	1 Year	Upgrade sliding glass doors
GI Sliding Doors Residential (Green)	18	ea	1881.25	\$33,863	\$2,363	32	35	1		over	6 Years	Install fiberglass insulated with a low U-value
Service Doors		ea										
Storm Doors		ea										
	66,115	ttl sf										
Exterior Walls	6,612	sf	4.00	\$26,446		18	40	1		in	1 Year	Clapboard profile vinyl siding Allowance to repair ≈10% and paint all
Exterior Walls (Green)		sf										
Exterior Walls	66,115	sf	0.30	\$19,835		18	5	1	6	11	16	Allowances to pressure wash siding
Exterior Walls (Green)		sf										
Exterior Walls		sf										
Trim, Soffit, Fascia	5,313	lf				18	20					Aluminum wrapped Included with siding costs
Trim, Soffit, Fascia (Green)		lf										
Exterior Ceilings		sf										
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
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	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,661	\$0	\$0
Exterior Common Doors (Green)	\$1,113	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Unit Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,965	\$10,264	\$10,572
Exterior Unit Doors (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,713	\$11,034	\$11,365
Gl Sliding Doors Residential	\$5,250	\$5,408	\$5,570	\$5,737	\$5,909	\$6,086	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$56,165	\$0	\$0
Gl Sliding Doors Residential (Green)	\$5,644	\$5,813	\$5,987	\$6,167	\$6,352	\$6,543	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$60,377	\$0	\$0
Service Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Storm Doors	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls	\$26,446	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls	\$19,835	\$0	\$0	\$0	\$0	\$22,994	\$0	\$0	\$0	\$0	\$26,656	\$0	\$0	\$0	\$0	\$30,902	\$0	\$0	\$0	\$0
Exterior Walls (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Exterior Walls	\$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 - Residential	261 ea	467.50	\$122,018		18	35	17	over 3 Years				Aluminum framed, DH, dble glazed Costs to replace
Windows - Residential (Green)	261 ea	502.56	\$131,169	\$9,151	18	35	17	over 3 Years				Upgrade windows Install fiberglass insulated with low U-value
Windows - Common Area	7 ea	467.50	\$3,273		18	35	17	in 1 Year				Aluminum framed, DH, dble glazed Costs to replace
Windows - Common Area (Green)	7 ea	502.56	\$3,518	\$245	18	35	17	in 1 Year				E6 Upgrade windows Install fiberglass insulated with low U-value
Window Glazing	522 ea				varies	10						Dble glazed sashes Operating
Window Glazing (Green)												
Window Lintels												
Exterior Stairs-Bldg L	3 ea	1200.00	\$3,600		12	5	3 8 13 18	in 1 Year				Painted metal stair sets to second floor units Costs to repair, prep, and paint
Exterior Stairs-Bldg L (Green)	3 ea	1200.00	\$3,600	\$0	12	5	3 8 13 18	in 1 Year				Specify low-VOC content paint
Unit Patios Concrete	38 ttl											Concrete pads
Unit Patios Concrete	912 sf	6.50	\$5,928		varies	10	1 11	over 10 Years				Annual allowances for as needed repairs
Unit Patios Concrete (Green)												
Building Mounted Lighting	8 ea	465.00	\$3,720		18	20	2	in 1 Year				250-W HID fixtures Costs to replace
Building Mounted Lighting (Green)	8 ea	650.00	\$5,200	\$1,480	18	20	1	in 1 Year				E7 Install high efficiency/long life LED fixtures LCC recommends Yr 1 replacement
ROOF SYSTEMS												
Structure	27,119 sf				32	50						Wood framed and sheathed Monitor
Roof Covering	27,119 sf	4.00	\$108,476		13	20	7	over 3 Years				Architectural asphalt shingles Costs to replace
Roof Covering (Green)	27,119 sf	4.00	\$108,476	\$0	13	20	7	over 3 Years				Specify light colored (high reflectivity) shingles
Roof Covering												
Roof Covering (Green)												
Roof Drainage	1,775 sf	11.50	\$20,413		10	20	10	over 3 Years				Aluminum gutters and downspouts Costs to replace
Skylights												
Penthouses												

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 - Residential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$65,267	\$67,225	\$69,242	\$0
Windows - Residential (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$70,162	\$72,267	\$74,435	\$0
Windows - Common Area	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,251	\$0	\$0	\$0
Windows - Common Area (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,645	\$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
Exterior Stairs-Bldg L	\$0	\$0	\$3,819	\$0	\$0	\$0	\$0	\$4,428	\$0	\$0	\$0	\$0	\$5,133	\$0	\$0	\$0	\$0	\$5,950	\$0	\$0
Exterior Stairs-Bldg L (Green)	\$0	\$0	\$3,819	\$0	\$0	\$0	\$0	\$4,428	\$0	\$0	\$0	\$0	\$5,133	\$0	\$0	\$0	\$0	\$5,950	\$0	\$0
Unit Patios Concrete	\$593	\$611	\$629	\$648	\$667	\$687	\$708	\$729	\$751	\$773	\$797	\$821	\$845	\$871	\$897	\$924	\$951	\$980	\$1,009	\$1,039
Unit Patios Concrete (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	\$3,832	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Building Mounted Lighting (Green)	\$5,200	\$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	\$0	\$0	\$0	\$0	\$0	\$0	\$43,176	\$44,471	\$45,805	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$43,175	\$44,471	\$45,805	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Covering (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Roof Drainage	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,878	\$9,144	\$9,419	\$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	_____	_____	_____	_____	_____	_____	
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	_____	_____	_____	_____	_____	_____	
Stair Walls and Ceilings (Green)	_____	sf	_____	_____	_____	_____	_____	_____	
Stair Floors	_____0	sf	_____	_____	_____	_____	_____	_____	
Stair Floors (Green)	_____	sf	_____	_____	_____	_____	_____	_____	
Stair Interior Lighting	_____	ea	_____	_____	_____	_____	_____	_____	
Stair Interior Lighting (Green)	_____	ea	_____	_____	_____	_____	_____	_____	
Stair Doors	_____	ea	_____	_____	_____	_____	_____	_____	
Stair Railings	_____	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
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	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Lobby Walls & Ceilings (Green)	_____ sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Lobby Floors	_____ sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Lobby Floors (Green)	_____ sf	_____	_____	_____	_____	_____	_____	_____	_____	_____	
OFFICE											
Walls and Ceilings	2,158 sf	0.62	\$1,338		10	10	1	11	in 1 Year		Painted surfaces Painting cycles
Walls and Ceilings (Green)	2,158 sf	0.62	\$1,338	\$0	10	10	1	11	in 1 Year		Specify low-VOC content paint
Floor Covering	647 sf	5.00	\$3,237		15	15	1	16	in 1 Year		VCT Replacement cycles
Floor Covering (Green)	647 sf	5.38	\$3,478	\$241	15	25	1		in 1 Year	G1	Upgrade resilient flooring Install natural linoleum flooring
Community Kitchen Cabinets	_____ ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	N/A
Community Kitchen Cabinets (Green)	_____ ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Common Area Lighting	14 ea	127.00	\$1,778		varies	20	1		in 1 Year		T-12 fluorescent fixtures Costs to replace with T-5 fixtures
Common Area Lighting (Green)	14 ea	136.53	\$1,911	\$133	varies	20	1		in 1 Year	E8	Upgrade common area lighting Install high efficiency T-5 fluorescent fixtures
PUBLIC LAUNDRY / RESTROOMS											
Walls and Ceilings	733 sf	0.62	\$455		10	10	1	11	in 1 Year		Painted surfaces Painting cycles
Walls and Ceilings (Green)	733 sf	0.62	\$454	\$0	10	10	1	11	in 1 Year		Specify low-VOC content paint
Floor Covering	256 sf	5.00	\$1,279		15	15	1	16	in 1 Year		Vinyl composite tile (VCT) Replacement cycles
Floor Covering (Green)	256 sf	5.38	\$1,376	\$97	15	25	1		in 1 Year	G1	Upgrade resilient flooring Install natural linoleum flooring
Laundry Equipment, (Leased)	4 ea	_____	_____	_____	varies	\$20.00					Top load washers
	4 ea	_____	_____	_____	varies	20					Electric dryers
Laundry Equipment, (Leased) (Green)	4 ea	_____	_____	_____	ADD	20				E9	Replace top load washer w/front load models Standard low-flow (1.6-GPF) toilet and accessories
Restroom Fixtures / Accessories	1 ls	_____	_____	_____	10	20					Operating
Miscellaneous	_____ ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	
Miscellaneous (Green)	_____ ea	_____	_____	_____	_____	_____	_____	_____	_____	_____	

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
OFFICE																				
Walls and Ceilings	\$1,338	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,798	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Walls and Ceilings (Green)	\$1,338	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,798	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering	\$3,237	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,043	\$0	\$0	\$0	\$0
Floor Covering (Green)	\$3,478	\$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
Common Area Lighting	\$1,778	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Common Area Lighting (Green)	\$1,911	\$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	\$455	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$611	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Walls and Ceilings (Green)	\$454	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$611	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Floor Covering	\$1,279	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,993	\$0	\$0	\$0	\$0
Floor Covering (Green)	\$1,376	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Laundry Equipment, (Leased)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Laundry Equipment, (Leased) (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										Hollow-core passage doors	
Unit Interior Doors	236 ea	110.00	\$25,960		varies	25	1		over	25 Years	Annual allowances to replace as needed	
Unit Closet Doors	254 ea	326.00	\$82,804		varies	25	1		over	25 Years	Bi-fold door sets Annual allowances to replace as needed	
Unit Walls and Ceilings	181,866 sf				varies	5					Painted surfaces Operating	
Unit Walls and Ceilings (Green)	181,866 sf				varies	5					Specify low-VOC content paint	
Living Area Floors Carpet	39,967 sf	3.00	\$119,902		varies	5	1	6	11	16	Standard olfin carpet Replacement cycles	
Living Area Floors Restore Wood	39,967 sf	2.71	\$108,311	-\$11,592	0	10	1	11		over	5 Years	G2 Restore original hardwood flooring Refinishing cycles
Living Area Floors VCT	950 sf	5.00	\$4,750		varies	15	1	16		over	15 Years	Entry hall VCT Replacement cycles
Living Area Floors VCT (Green)	950 sf	5.38	\$5,106	\$356	varies	25	1			over	15 Years	G3 Upgrade resilient flooring Install natural linoleum flooring
BATHROOMS												
Bathroom Floors	1,824 sf	5.00	\$9,122		varies	15	1	16		over	15 Years	VCT Replacement cycles
Bathroom Floors (Green)	1,824 sf	5.38	\$9,804	\$682	varies	15	1	16		over	15 Years	G3 Upgrade resilient flooring Install natural linoleum flooring
Bathroom Vanity	38 ea	410.00	\$15,580		varies	20	1			over	10 Years	Bathroom vanities Costs to replace as needed
Bathroom Vanity (Green)	38 ea	440.75	\$16,749	\$1,169	10	25	1			over	10 Years	G4 Upgrade vanities Install FSC certified all wood models
Bathroom Sink	38 ea	375.00	\$14,250		10	20	1			over	10 Years	Solid surface sink/top Costs to replace
Bathroom Sink (Green)	ea											
Bathtub and Shower	38 ea	1720.00	\$65,360		32	35	1			over	10 Years	One-piece fiberglass tubs & surrounds Costs to replace
Bathroom Toilets	23 ea				5	30						New low-flow toilets
Bathroom Toilets (Green)	15 ea	410.00	\$6,150		32	30	1			over	4 Years	Costs to complete replacement cycle
Ventilation & Exhaust	38 ea	125.00	\$4,750		32	20	1			over	4 Years	In-ceiling type exhaust wo/light Costs to replace
Ventilation & Exhaust (Green)	38 ea	199.00	\$7,562	\$2,812	32	20				over	4 Years	G5 Upgrade ceiling fans <i>Neg NPV generated by LCC Not recommended</i>
Accessories	38 ea				varies	10						Standard residential grade accessories Operating

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	\$1,038	\$1,070	\$1,102	\$1,135	\$1,169	\$1,204	\$1,240	\$1,277	\$1,315	\$1,355	\$1,396	\$1,437	\$1,481	\$1,525	\$1,571	\$1,618	\$1,666	\$1,716	\$1,768	\$1,821
Unit Closet Doors	\$3,312	\$3,412	\$3,514	\$3,619	\$3,728	\$3,840	\$3,955	\$4,074	\$4,196	\$4,322	\$4,451	\$4,585	\$4,722	\$4,864	\$5,010	\$5,160	\$5,315	\$5,474	\$5,639	\$5,808
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 Carpet	\$23,980	\$24,700	\$25,441	\$26,204	\$26,990	\$27,800	\$28,634	\$29,493	\$30,378	\$31,289	\$32,228	\$33,195	\$34,190	\$35,216	\$36,273	\$37,361	\$38,482	\$39,636	\$40,825	\$42,050
Living Area Floors Restore Wood	\$21,662	\$22,312	\$22,981	\$23,671	\$24,381	\$0	\$0	\$0	\$0	\$0	\$29,112	\$29,985	\$30,885	\$31,812	\$32,766	\$0	\$0	\$0	\$0	\$0
Living Area Floors VCT	\$317	\$326	\$336	\$346	\$356	\$367	\$378	\$389	\$401	\$413	\$426	\$438	\$451	\$465	\$479	\$493	\$508	\$523	\$539	\$555
Living Area Floors VCT (Green)	\$340	\$351	\$361	\$372	\$383	\$395	\$406	\$419	\$431	\$444	\$457	\$471	\$485	\$500	\$515	\$0	\$0	\$0	\$0	\$0
BATHROOMS																				
Bathroom Floors	\$608	\$626	\$645	\$665	\$684	\$705	\$726	\$748	\$770	\$793	\$817	\$842	\$867	\$893	\$920	\$947	\$976	\$1,005	\$1,035	\$1,066
Bathroom Floors (Green)	\$654	\$673	\$693	\$714	\$736	\$758	\$780	\$804	\$828	\$853	\$878	\$905	\$932	\$960	\$989	\$1,018	\$1,049	\$1,080	\$1,113	\$1,146
Bathroom Vanity	\$1,558	\$1,605	\$1,653	\$1,702	\$1,754	\$1,806	\$1,860	\$1,916	\$1,974	\$2,033	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Vanity (Green)	\$1,675	\$1,725	\$1,777	\$1,830	\$1,885	\$1,942	\$2,000	\$2,060	\$2,122	\$2,185	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Sink	\$1,425	\$1,468	\$1,512	\$1,557	\$1,604	\$1,652	\$1,702	\$1,753	\$1,805	\$1,859	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Sink (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathtub and Shower	\$6,536	\$6,732	\$6,934	\$7,142	\$7,356	\$7,577	\$7,804	\$8,038	\$8,280	\$8,528	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Toilets	\$1,538	\$1,584	\$1,631	\$1,680	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bathroom Toilets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ventilation & Exhaust	\$1,188	\$1,223	\$1,260	\$1,298	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Ventilation & Exhaust (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Accessories	\$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
KITCHENS										
Kitchen Floors	3,378 sf	5.00	\$16,892		varies	15	1	16	over 15 Years	VCT Replacement cycles
Kitchen Floors (Green)	3,378 sf	5.38	\$18,157	\$1,265	varies	25	1		over 15 Years	G3 Upgrade resilient flooring Install natural linoleum flooring
Kitchen Cabinets	38 ea	2700.00	\$102,600		12	20	8		over 4 Years	Wood fronted/LPB casework Costs to replace
Kitchen Cabinets (Green)	38 ea	2902.50	\$110,295	\$7,695	12	35	8		over 4 Years	G4 Upgrade kitchen cabinets Install FSC certified all wood models
Kitchen Cabinets	ea									
Kitchen Cabinets (Green)	ea									
Kitchen Countertops	38 ea	316.48	\$12,026		12	10	1	18	over 4 Years	Plastic laminate on particleboard Iterim replacement cycles
Kitchen Countertops (Green)	38 ea	800.00	\$30,400	\$18,374	12	35			over 4 Years	G6 Install solid surface models Neg NPV generated by LCC Not recommended
Range	38 ea	435.00	\$16,530		12	15	1	16	over 15 Years	Electric 30-inch ranges. Heavy use Costs to replace, as needed
Range (Green)	ea									
Range	ea									
Range (Green)	ea									
Refrigerator	38 ea	670.00	\$25,460		varies	15	1	16	over 15 Years	Frost free non Energy Star models Annual allowances to replace as needed
Refrigerator (Green)	38 ea	720.25	\$27,370	\$1,910	varies	15	1	16	over 15 Years	Upgrade refrigerators Install Energy Star rated models
Refrigerator	ea									
Refrigerator (Green)	ea									
Dishwasher	ea									
Dishwasher (Green)	ea									
Rangehood and Vent	38 ea	281.00	\$10,678		12	20	8		over 4 Years	Recirculating rangehoods Costs to replace
Disposals	38 ea	200.00	\$7,600		12	10	1	11	over 10 Years	Fractional horsepower in-sink models Annual allowances to replace as needed
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	\$1,126	\$1,160	\$1,195	\$1,231	\$1,267	\$1,305	\$1,345	\$1,385	\$1,427	\$1,469	\$1,513	\$1,559	\$1,606	\$1,654	\$1,703	\$1,754	\$1,807	\$1,861	\$1,917	\$1,975
Kitchen Floors (Green)	\$1,210	\$1,247	\$1,284	\$1,323	\$1,362	\$1,403	\$1,445	\$1,489	\$1,533	\$1,579	\$1,627	\$1,676	\$1,726	\$1,778	\$1,831	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$31,546	\$32,493	\$33,467	\$34,471	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Kitchen Cabinets (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$33,912	\$34,930	\$35,977	\$37,057	\$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	\$3,007	\$3,097	\$3,190	\$3,285	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,969	\$5,118	\$5,272
Kitchen Countertops (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Range	\$1,102	\$1,135	\$1,169	\$1,204	\$1,240	\$1,278	\$1,316	\$1,355	\$1,396	\$1,438	\$1,481	\$1,525	\$1,571	\$1,618	\$1,667	\$1,717	\$1,768	\$1,821	\$1,876	\$1,932
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	\$1,697	\$1,748	\$1,801	\$1,855	\$1,910	\$1,968	\$2,027	\$2,088	\$2,150	\$2,215	\$2,281	\$2,350	\$2,420	\$2,493	\$2,567	\$2,644	\$2,724	\$2,805	\$2,890	\$2,976
Refrigerator (Green)	\$1,825	\$1,879	\$1,936	\$1,994	\$2,054	\$2,115	\$2,179	\$2,244	\$2,311	\$2,381	\$2,452	\$2,526	\$2,601	\$2,680	\$2,760	\$2,843	\$2,928	\$3,016	\$3,106	\$3,200
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	\$0	\$0	\$0	\$3,283	\$3,382	\$3,483	\$3,588	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Disposals	\$760	\$783	\$806	\$830	\$855	\$881	\$907	\$935	\$963	\$992	\$1,021	\$1,052	\$1,084	\$1,116	\$1,150	\$1,184	\$1,220	\$1,256	\$1,294	\$1,333
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 Hydronic Boilers	35	ea	3793.75	\$132,781		6	20	14	over 6 Years	Carrier atmospheric gas-fired 70-MBH Costs to replace
Unit Hydronic Boilers (Green)	35	ea	4078.28	\$142,740	\$9,959	6	20	14	over 6 Years	Upgrade heating boilers Install High Eff. condensing (AFUE ≥96%) models
Unit Hydronic Boilers	3	ea	3793.75	\$11,381		32	20	1	in 1 Year	Carrier atmospheric gas-fired 70-MBH Costs to replace
Unit Hydronic Boilers (Green)	3	ea	4078.28	\$12,235	\$854	32	20	1	in 1 Year	Upgrade heating boilers Install High Eff. condensing (AFUE ≥96%) models
Unit Thermostats	38	ea	105.00	\$3,990		6	15	9	in 1 Year	Manually operated Costs to replace
Unit Thermostats (Green)	38	ea	112.88	\$4,289	\$299	6	15	9	in 1 Year	Upgrade thermostats Install programable models
Unit Radiation (Approximate)	2,000	ea	27.50	\$55,000		varies	30	1	over 20 Years	Hydronic baseboard Annual allowances to replace as needed
Unit Radiation (Approximate) (Green)		ea								
Unit Domestic Hot Water	38	ea	1215.00	\$46,170		varies	10	1 11	over 10 Years	Storage water heaters gas-fired 40-MBH/40-gal Annual allowances to replace as needed
Unit Domestic Hot Water (Green)	38	ea	1306.13	\$49,633	\$3,463	varies	10	1 11	over 10 Years	Upgrade DHW heaters Install Energy Star rated models
Miscellaneous		ea								
Miscellaneous (Green)		ea								
IN-UNIT ELECTRICAL										
Unit Electrical Panel	38	ea	1225.00	\$46,550		32	50	18	over 10 Years	Circuit breaker panels Future replacement allowances
Unit Smoke/Fire Detection	38	ea	190.00	\$7,220		10	10	1 11	over 10 Years	Standard smoke detectors Annual allowances to replace as needed
Unit Smoke/Fire Detection	138	ea	295.00	\$40,710		Add	10	1	in 1 Year	NFPA recommends device in each bedroom Costs to add additional devices
Unit Smoke/Fire Detection	138	ea	190.00	\$26,220		1	10	11	over 10 Years	Costs for future replacement of added devices
Unit Lighting	150	ea				varies	10			Hallway/Bathroom fixtures Upgraded w/CFL lamps Operating
Unit Lighting (Green)		lf								
Unit Lighting	38	ea				varies	10			Kitchens; T8 2-tube fixtures Operating
Unit Lighting (Green)		ea								
Miscellaneous		ea								

<div> <div>Casa Verde Sur</div> <div>DWELLING UNITS--continued</div> </div>																				
<div> <div>Costs projected at 3%</div> </div>																				
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
IN-UNIT MECHANICAL																				
Unit Hydronic Boilers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$32,499	\$33,474	\$34,478	\$35,512	\$36,578	\$37,675	\$0
Unit Hydronic Boilers (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$34,936	\$35,984	\$37,064	\$38,176	\$39,321	\$40,501	\$0
Unit Hydronic Boilers	\$11,381	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Hydronic Boilers (Green)	\$12,235	\$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	\$0	\$0	\$0	\$0	\$5,054	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Thermostats (Green)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,433	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unit Radiation (Approximate)	\$2,750	\$2,833	\$2,917	\$3,005	\$3,095	\$3,188	\$3,284	\$3,382	\$3,484	\$3,588	\$3,696	\$3,807	\$3,921	\$4,038	\$4,160	\$4,284	\$4,413	\$4,545	\$4,682	\$4,822
Unit Radiation (Approximate) (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	\$4,617	\$4,756	\$4,898	\$5,045	\$5,196	\$5,352	\$5,513	\$5,678	\$5,849	\$6,024	\$6,205	\$6,391	\$6,583	\$6,780	\$6,984	\$7,193	\$7,409	\$7,631	\$7,860	\$8,096
Unit Domestic Hot Water (Green)	\$4,963	\$5,112	\$5,266	\$5,424	\$5,586	\$5,754	\$5,926	\$6,104	\$6,287	\$6,476	\$6,670	\$6,870	\$7,076	\$7,289	\$7,507	\$7,733	\$7,965	\$8,204	\$8,450	\$8,703
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	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,694	\$7,925	\$8,163
Unit Smoke/Fire Detection	\$722	\$744	\$766	\$789	\$813	\$837	\$862	\$888	\$915	\$942	\$970	\$999	\$1,029	\$1,060	\$1,092	\$1,125	\$1,159	\$1,193	\$1,229	\$1,266
Unit Smoke/Fire Detection	\$40,710	\$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	\$0	\$0	\$0	\$0	\$0	\$0	\$3,524	\$3,629	\$3,738	\$3,850	\$3,966	\$4,085	\$4,208	\$4,334	\$4,464	\$4,598
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

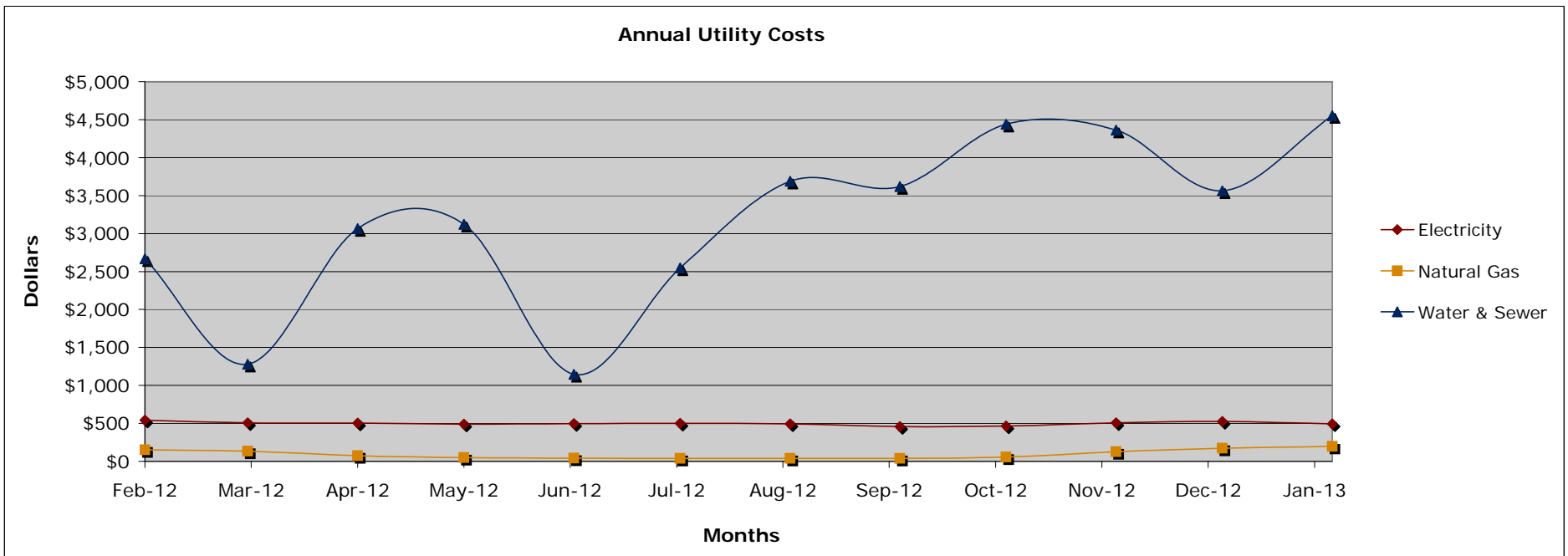
Energy Analysis

Utility Usage

Casa Verde Sur

The energy analysis portion of this Energy Audit examines utility bills for the most recent 12 months to summarize at electricity, natural gas, 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			OIL		TOTAL
	kWh	\$	Therms	\$	Gallons	Water \$	Sewer \$	Total \$	Gallons	\$
Jan-13	3,501	\$494	163	\$198	777,224	\$4,554		\$4,554		\$5,246
Dec-12	3,728	\$524	139	\$173	605,921	\$3,562		\$3,562		\$4,259
Nov-12	3,475	\$506	92	\$125	744,310	\$4,363		\$4,363		\$4,995
Oct-12	3,165	\$465	29	\$56	757,775	\$4,441		\$4,441		\$4,962
Sep-12	2,637	\$457	18	\$40	615,645	\$3,619		\$3,619		\$4,116
Aug-12	3,238	\$494	17	\$38	627,614	\$3,688		\$3,688		\$4,220
Jul-12	3,301	\$499	17	\$38	430,877	\$2,549		\$2,549		\$3,086
Jun-12	3,248	\$497	22	\$44	188,509	\$1,146		\$1,146		\$1,687
May-12	3,152	\$490	27	\$49	529,619	\$3,121		\$3,121		\$3,659
Apr-12	3,260	\$504	46	\$73	519,895	\$3,064		\$3,064		\$3,642
Mar-12	3,285	\$508	116	\$135	211,698	\$1,280		\$1,280		\$1,924
Feb-12	3,514	\$541	135	\$151	523,635	\$2,668		\$2,668		\$3,360
Total	39,504	\$5,980	821	\$1,119	6,532,721	\$38,056		\$38,056		\$45,155
<i>Unit Cost</i>		<i>\$0.151</i>		<i>\$1.3627</i>				<i>\$0.00583</i>		



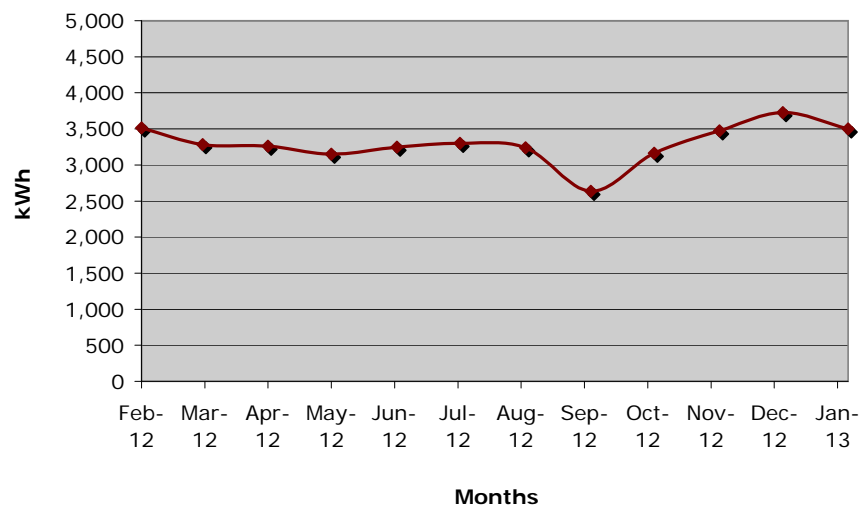
Energy Analysis

Utility Usage, By Type

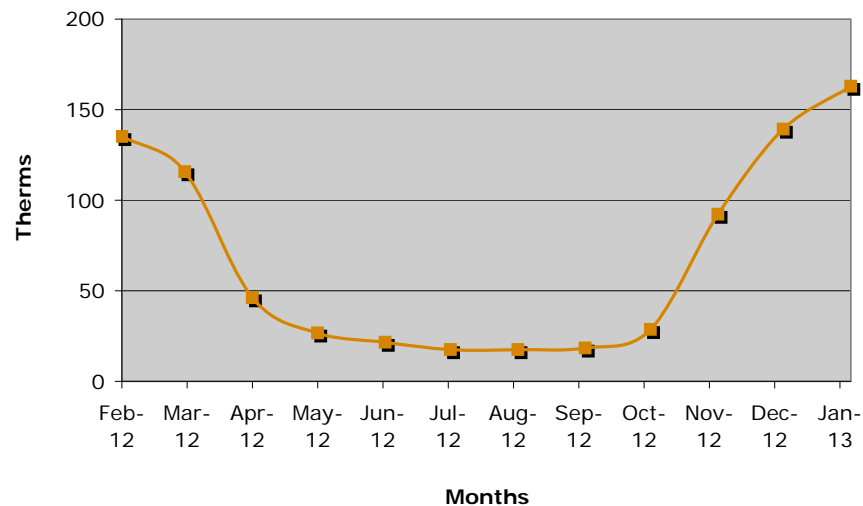
Casa Verde Sur

Below are graphic presentations of annual usage by utility type for the property.

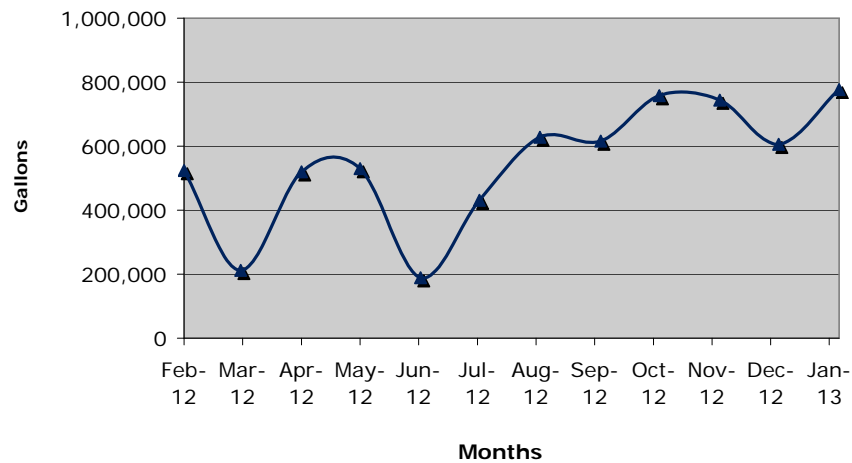
Electricity



Natural Gas



Water & Sewer

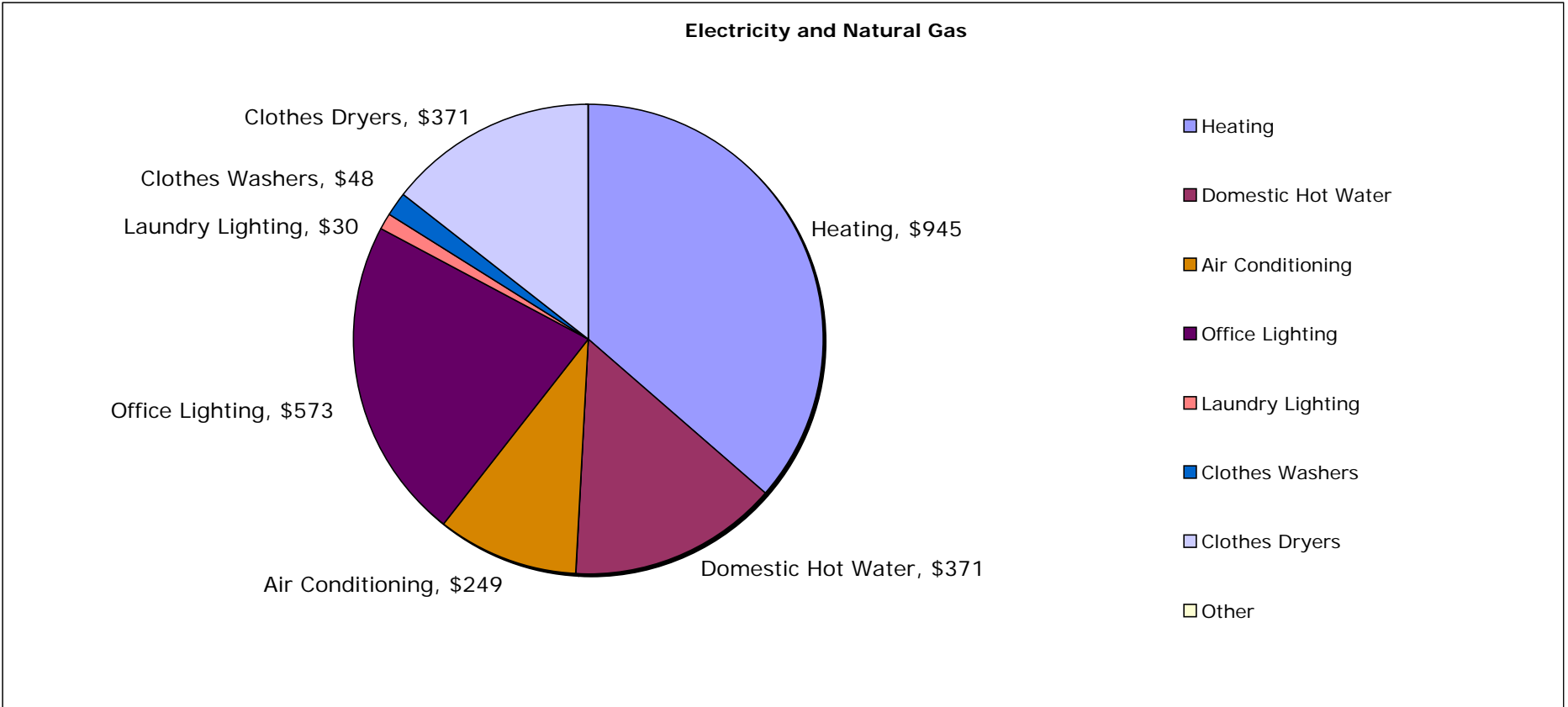


Energy Analysis

Disaggregated End Uses

Casa Verde Sur

Natural gas is used for space heating and domestic hot water generation. Electricity is used for all other services and appliances. 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 (therms)	Annual Usage (btu)
Heating	Natural Gas	\$945		693	69,329,904
Domestic Hot Water	Natural Gas	\$371		272	27,224,745
Air Conditioning	Electricity	\$249	1,644		5,610,202
Office Lighting	Electricity	\$573	3,785		12,915,412
Laundry Lighting	Electricity	\$30	198		676,200
Clothes Washers	Electricity	\$48	317		1,081,919
Clothes Dryers	Electricity	\$371	2,451		8,362,335
Other	Electricity				

Energy Analysis

Notes

Casa Verde Sur

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

General

The property is individually metered for natural gas and electricity, Water and sewer costs are master metered

Natural Gas

Costs shown for office/Laundry area only. Natural gas shows a normal consumption pattern, with spikes during the heating season since the property utilizes natural gas for heating purposes.

Electricity

Costs shown for exterior lighting and office/laundry area only. Electricvity usage is grenerally flat througout the year.

Water and Sewer

Costs shown for whole development. Water and sewer is billed monthly.

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): **Family**
 Resident Population Persons: **178**

Space Types

Units, Common Areas Square Footage: **51,600** Conditioned: **Yes**

Utility Metering

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

Infiltration

Infiltration Condition Tight, Leaky: **Leaky**
 Infiltration Rate ACH: **1**

Architectural

Wall Insulation	Type:	Fiberglass	R-Value:	R-6
Roof Insulation	Type:	Cellulose	R-Value:	R-10
Exterior Doors 1	Type:	Flush Metal	R-Value:	< U-.60
Windows 1	Type:	Aluminum	U-Factor:	1.27

Heating and Cooling

Temperature Control:

Occupied Heating Temp	Degrees F:	72
Occupied Cooling Temp	Degrees F:	N/A

Boilers / DHW Generation:

Boiler 1	Type:	Hydronic	Capacity:	70 MBH	Efficiency:	76%
Domestic Hot Water 1	Type:	Gas-Fired	Capacity:	40 MBH	Efficiency:	79%

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

Water & Sewer

Domestic Hot Water:

DHW Daily Usage	Gallons/Resident:	39
DHW Delivery Temp	Degrees F:	120

Domestic Cold Water:

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

Lighting Loads

Exit Lighting	Type:	CFL	Wattage:	32	Hours per Day:	24
Community / Office	Type:	Fluorescent	Wattage:	26-50	Hours per Day:	4-8
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:	944 kWh
Laundry	Energy Star (Y/N):	No	Usage per Year:	450 kWh

Simple Payback Analysis

EWCM #1 Upgrade Heating Boiler

Carrier atmospheric, gas-fired, hydronic boiler rated at 70-MBH with a measured combustion rating of 76.4%. To be compared to an in-kind replacement model with an anticipated AFUE of 80% and a high efficiency condensing replacement model with an anticipated AFUE of 98%

Replacement Costs		
	Type	Cost
A. Proposed Conventional:	70-MBH atmospheric (AFUE 80%)	\$3,794.00
B. Proposed Green:	70-MBH Condensing (AFUE 98%)	\$4,078.00
C. Incremental Cost Between Proposed Conventional and Proposed Green:		\$284.00

Boiler Efficiencies	
A. Existing Efficiency:	76%
B. Conventional Efficiency:	80%
C. Green Efficiency:	98%

Annual Utility Cost		Existing	Conventional	Green
Utility Cost		69,469,158 btus	65,995,700 btus	53,874,041 btus
		694.69 therms	659.96 therms	538.74 therms
		\$1.36 /therm	\$1.36 /therm	\$1.36 /therm
Heating Cost		\$946.66	\$899.32	\$734.14

Annual Savings: Existing to Conventional				
Savings =	\$946.66	-	\$899.32	= \$47.33 /yr

Annual Savings: Conventional to Green				
Savings =	\$899.32	-	\$734.14	= \$165.18 /yr

Annual Savings: Existing to Green				
Savings =	\$47.33	+	\$165.18	= \$212.51 /yr

Simple Payback: Conventional				
	\$3,794.00	/	\$47.33	= 80.2 yrs
Simple Payback: Green				
	\$4,078.00	/	\$212.51	= 19.2 yrs
Incremental Payback: Conventional to Green				
	\$284.00	/	\$165.18	= 1.7 yrs

Simple Payback Analysis

EWCM #2 Heating Circulation Pumps

Description: This worksheet calculates the annual savings and simple payback of replacing existing pump motors with comparable premium efficient motors.

Methodology: Energy usage for each motor is calculated by converting the motor's horsepower (hp) rating to kilowatts (kW), and multiplying the kW value by the annual hours of use, and dividing this amount by the motor's efficiency:

$$\{ (\text{hp}) \times (0.746 \text{ kW/hp}) \times (\text{hours}) \} \div (\text{Motor efficiency})$$

Replacement Costs

	Type	Cost
A. Proposed Conventional:	Standard service In-line 1/4-HP Pumps	\$582.50
B. Proposed Green:	Micro-VFD Controlled Pumps	\$626.19
C. Incremental Cost Between Proposed Conventional and Proposed Green:		\$43.69

Utility Cost

Electricity: \$0.15

Existing Conditions

Existing Motor	Quantity	Size: hp	Conversion Factor kW/hp	kW per Motor	Usage hrs/Yr	Load	Existing Efficiency	Total Usage kWh	Operational Cost \$
Heat P1	1	0.25	.746	0.1865	5840	100%	76.0%	1,433	\$216
Heat P2			.746	0.0000		100%		0	\$0
Heat P3			.746	0.0000		100%		0	\$0
Heat P4			.746	0.0000		100%		0	\$0
DHW P1			.746	0.0000		100%		0	\$0
DHW P2			.746	0.0000		100%		0	\$0
DHW P3			.746	0.0000		100%		0	\$0
Totals:								1,433	\$216

Proposed Green Conditions

Existing Motor	Quantity	Size: hp	Conversion Factor kW/hp	kW per Motor	Usage hrs/Yr	Load	Proposed Efficiency	Total Usage kWh	Operational Cost \$
Heat P1	1	0.25	.746	0.1865	5840	100%	92.0%	1,184	\$179
Heat P2			.746	0.0000		100%		0	\$0
Heat P3			.746	0.0000		100%		0	\$0
Heat P4			.746	0.0000		100%		0	\$0
DHW P1			.746	0.0000		100%		0	\$0
DHW P2			.746	0.0000		100%		0	\$0
DHW P3			.746	0.0000		100%		0	\$0
Totals:								1,184	\$179

Annual Savings: Existing to Proposed Green

$$\text{Savings} = \$216.40 - \$178.76 = \$37.63 / \text{yr}$$

Simple Payback: Existing to Proposed Green

$$\$43.69 / \$37.63 = 1.2 \text{ yrs}$$

Simple Payback Analysis

EWCM #3 Upgrade Domestic Hot Water

American gas-fired storage water heater rated at 40-MBH/40-gal. Recommend replacement with a comparable model that is energy star rated.

Replacement Costs		
	Type	Cost
A. Proposed Conventional:	In-kind replacement (AFUE 80%)	\$1,215.00
B. Proposed Green:	Energy Star rated model	\$1,306.13
C. Incremental Cost Between Proposed Conventional and Proposed Green:		\$91.13

DHW Efficiencies		
A. Existing Efficiency:		80%
B. Conventional Efficiency:		80%
C. Green Efficiency:		90%

Annual Utility Cost			
	Existing	Conventional	Green
	27,212,669 btus	27,212,669 btus	24,429,555 btus
	272.13 therms	272.13 therms	244.30 therms
Utility Cost	\$1.36 /therm	\$1.36 /therm	\$1.36 /therm
Heating Cost	\$370.83	\$370.83	\$332.90

Annual Savings: Existing to Conventional				
Savings =	\$370.83	-	\$370.83	= \$0.00 /yr

Annual Savings: Conventional to Green				
Savings =	\$370.83	-	\$332.90	= \$37.93 /yr

Annual Savings: Existing to Green				
Savings =	\$0.00	+	\$37.93	= \$37.93 /yr

Simple Payback: Conventional				
	\$1,215.00	/	\$0.00	= N/A yrs
Simple Payback: Green				
	\$1,306.13	/	\$37.93	= 34.4 yrs
Incremental Payback: Conventional to Green				
	\$91.13	/	\$37.93	= 2.4 yrs

Simple Payback Analysis

EWCM #4 Replace Air Conditioning

Standard efficiency thru-wall air conditioners. Recommend replacement with higher efficiency models rated \geq SEER 15.

Replacement Costs		Type	Cost
A. Proposed Conventional:		In-kind replacement (\approx SEER 9)	\$1,595.00
B. Proposed Green:		Models rated at SEER 15 or higher	\$1,714.62
C. Incremental Cost Between Proposed Conventional and Proposed Green:			\$119.62

Air Conditioning SEER (Seasonal Energy Efficiency Ratio)	
A. Existing SEER:	9.0
B. Conventional SEER:	9.0
C. Green SEER:	15.0

Annual Utility Cost		Existing	Conventional	Green
Utility Cost		5,624,285 btus	5,624,285 btus	4,137,334 btus
		1648.38 kWh	1648.38 kWh	1212.58 kWh
		\$0.15 /kWh	\$0.15 /kWh	\$0.15 /kWh
Heating Cost		\$248.91	\$248.91	\$183.10

Annual Savings: Existing to Conventional				
Savings =	\$248.91	-	\$248.91	= \$0.00 /yr

Annual Savings: Conventional to Green				
Savings =	\$248.91	-	\$183.10	= \$65.81 /yr

Annual Savings: Existing to Green				
Savings =	\$0.00	+	\$65.81	= \$65.81 /yr

Simple Payback: Conventional				
	\$1,595.00	/	\$0.00	= N/A yrs
Simple Payback: Green				
	\$1,714.62	/	\$65.81	= 26.1 yrs
Incremental Payback: Conventional to Green				
	\$119.62	/	\$65.81	= 1.8 yrs

Simple Payback Analysis

EWCM #5 Replace Common Area Exterior Doors

Replacement Costs		
	Type	Cost
A. Proposed Conventional	Existing models with a U value of .60	\$1,035.00
B. Proposed Green	Comparable insulated doors w/thermal break and a U value of .20	\$1,112.64
C. Incremental Cost Between Proposed Conventional and Proposed Green		\$77.64

Utility Costs		A. Cost of electricity:	\$0.15	(\$/kWh)
		B. Cost of natural gas:	\$1.36	(\$/therm)

U-Values ¹		A. Existing:	0.60
		B. Conventional:	0.60
		C. Green:	0.20

Annual Savings: Existing to Conventional					
					0 BTUs
					0.00 kWh
Electric Savings =	\$0.15	x	0.00	=	\$0.00 /yr
					0 BTUs
					0.00 therms
Natural Gas Savings =	\$1.36	x	0.00	=	\$0.00 /yr
Net Savings =					\$0.00 /yr

Annual Savings: Conventional to Green					
					153,540 BTUs
					45.00 kWh
Electric Savings =	\$0.15	x	45.00	=	\$6.80 /yr
					3,500,000 BTUs
					35.00 therms
Natural Gas Savings =	\$1.36	x	35.00	=	\$47.69 /yr
Net Savings =					\$54.49 /yr

Annual Savings: Existing to Green					
	\$0.00	+	\$54.49	=	\$54.49 /yr

Simple Payback: Conventional					
	\$1,035.00	/	\$0.00	=	N/A yrs
Simple Payback: Green					
	\$1,112.64	/	\$54.49	=	20.4 yrs
Incremental Payback: Conventional to Green					
	\$77.64	/	\$54.49	=	1.4 yrs

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

Simple Payback Analysis

EWCM #6 Replace Common Area Windows

Replacement Costs		Type	Cost
A. Proposed Conventional	Al framed, Dble Glazed, No Thermal Break		\$3,273.00
B. Proposed Green	Fiberglass, Dble Glaze, low-E, Argon with Thermal Break		\$3,518.00
C. Incremental Cost Between Proposed Conventional and Proposed Green			\$245.00

Utility Costs			
A. Cost of electricity:		\$0.15	(\$/kWh)
B. Cost of natural gas:		\$1.36	(\$/therm)

U-Factor ¹			
A. Existing:		0.81	
B. Conventional:		0.81	
C. Green:		0.38	

Annual Savings: Existing to Conventional					
Electric Savings =		\$0.15	x	0.00	=
					0 BTUs
					0.00 kWh
					\$0.00 /yr
Natural Gas Savings =		\$1.36	x	0.00	=
					0 BTUs
					0.00 therms
					\$0.00 /yr
Net Savings =					\$0.00 /yr

Annual Savings: Conventional to Green					
Electric Savings =		\$0.15	x	187.00	=
					638,044 BTUs
					187.00 kWh
					\$28.24 /yr
Natural Gas Savings =		\$1.36	x	34.00	=
					3,400,000 BTUs
					34.00 therms
					\$46.33 /yr
Net Savings =					\$74.57 /yr

Annual Savings: Existing to Green					
		\$0.00	+	\$74.57	=
					\$74.57 /yr

Simple Payback: Conventional					
	\$3,273.00	/	\$0.00	=	N/A yrs
Simple Payback: Green					
	\$3,518.00	/	\$74.57	=	47.2 yrs
Incremental Payback: Conventional to Green					
	\$245.00	/	\$74.57	=	3.3 yrs

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

Simple Payback Analysis

EWCM #7 Upgrade Exterior Building Mounted Lighting

Replacement Costs

A. Total cost to replace the exterior HID fixtures w/high efficiency LED fixtures: \$5,200.00

Utility Cost

Electricity: \$0.15
Natural Gas: \$1.36

Existing Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	240-W HID Fixtures	240	8	12	365	8,410	\$1,269.85
Type 2:						0	\$0.00
Type 3:						0	\$0.00
Type 4:						0	\$0.00
Type 5:						0	\$0.00
Total:						8,410	\$1,269.85

Proposed Green Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	80-W LED Fixtures	80	8	12	365	2,803	\$423.28
Type 2:						0	\$0.00
Type 3:						0	\$0.00
Type 4:						0	\$0.00
Type 5:						0	\$0.00
Total:						2,803	\$423.28

Annual Electric Savings

19,129,037 BTUs
5,606.40 kWh

Savings = 5,606.40 x \$0.15 = \$846.57/yr

Annual Natural Gas Savings¹

0 BTUs
0.00 therms

Savings = 0.00 x \$1.36 = \$0.00/yr

Annual Net Cost Savings

\$846.57 + \$0.00 = \$846.57

5. Simple Payback

\$5,200.00 / \$846.57 = 6.14 yrs

Additional Notes/Comments:

Simple Payback Analysis

EWCM #8 Upgrade Interior Common Area Lighting

Replacement Costs

A. Total cost to upgrade T-12 fluorescent fixtures with LED tube replacement lamps: \$1,911.00

Utility Cost

Electricity: \$0.15
Natural Gas: \$1.36

Existing Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	T-12 4-ft/4-lamp 32-W	172	6	12	365	4,520	\$682.54
Type 2:	T-12 4-ft/2-lamp 34-W	60	3	12	365	788	\$119.05
Type 3:						0	\$0.00
Type 4:						0	\$0.00
Type 5:						0	\$0.00
Total:						5,309	\$801.59

Proposed Green Types / Usage

	Description	Wattage per Fixture	Number of Fixtures	Lighting Hours/Day	Usage Days/Year	Usage kWh/Year	Usage \$/Year
Type 1:	LED repl. Tubes Lamps	102	6	12	365	2,681	\$404.76
Type 2:	LED repl. Tubes Lamps	50	3	12	365	657	\$99.21
Type 3:						0	\$0.00
Type 4:						0	\$0.00
Type 5:						0	\$0.00
Total:						3,338	\$503.97

Annual Electric Savings

6,725,052 BTUs
1,971.00 kWh
Savings = 1,971.00 x \$0.15 = \$297.62/yr

Annual Natural Gas Savings¹

-3,600,000 BTUs
-36.00 therms
Savings = -36.00 x \$1.36 = -\$49.06/yr

Annual Net Cost Savings

\$297.62 + -\$49.06 = \$248.56

5. Simple Payback

\$1,911.00 / \$248.56 = 7.69 yrs

Additional Notes/Comments:

¹Negative natural gas savings attributed to decrease in heating gain from the reduced lighting load (wattage); therefore, additional natural gas required for space heating in these areas.

Simple Payback Analysis

EWCM #9 Upgrade Washing Machines - Common Area

1. Replacement Costs

A. Proposed Conventional	Leased Equipment No Costs Shown	\$0.00
B. Proposed Green		\$0.00
C. Incremental Cost Between Proposed Conventional and Proposed Green		\$0.00

2. Existing Conditions

A. Total number of inefficient washing machines	4
B. Estimated number of total annual cycles/washer ¹	1660

3. Annual Energy and Water Use Existing Models

	Annual energy use ²		Utility cost		Total annual cost
Gas (therms):	68.80	x	\$1.36	=	\$93.75
Electric (kWh):	400	x	\$0.15	=	\$60.40
Water/Sewer (gal):	57,540.00	x	\$0.0058	=	\$335.46
					3
					\$489.61

4. Annual Energy and Water Use Proposed Conventional Models

	Annual energy use ²		Utility cost		Total annual cost
Gas (therms):	68.80	x	\$1.36	=	\$93.75
Electric (kWh):	400	x	\$0.15	=	\$60.40
Water/Sewer (gal):	57,540.00	x	\$0.0058	=	\$335.46
					4
					\$489.61

5. Annual Energy and Water Use Proposed Green Models

	Annual energy use ²		Utility cost		Total annual cost
Gas (therms):	23.20	x	\$1.36	=	\$31.61
Electric (kWh):	136.00	x	\$0.15	=	\$20.54
Water/Sewer (gal):	24,348.00	x	\$0.0058	=	\$141.95
					5
					\$194.10

6. Annual Savings: Existing to Proposed Conventional

3	4	6
\$489.61	\$489.61	\$0.00
		/yr

7. Annual Savings: Proposed Conventional to Proposed Green

4	5	7
\$489.61	\$194.10	\$295.51
		/yr

8. Simple Payback: Existing to Proposed Green

\$0.00	/	(\$0.00 + \$295.51)	=	N/A	yrs
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Incremental Payback: Proposed Conventional to Proposed Green

\$0.00	/	\$295.51	=	N/A	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)

Costs are not carried for washing machine replacement, since the laundry equipment is maintained under the terms of a leasing agreement; the efficacy of this measure depends on the availability of Energy Star rated equipment from the lessor.

Life Cycle Cost Analysis

Energy and Water Conservation Measure (EWCM): # 1

Upgrade Common Area Heating Boiler

Atmospheric Gas-fired Hydronic Boiler

vs.

Condensing Gas-fired Hydronic Boiler

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 20

Conventional Product: Atmospheric Gas-fired Hydronic Boiler

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Conventional Boiler	1	ea	\$3,794.00	\$3,794	20	1	1.0	\$3,794	\$3,794
Utility Cost	Natural Gas	660	Therms	\$1.36	\$899	1	1	20.0	\$24,165	\$11,898

Total Life Cycle Cost \$27,959 \$15,692

Energy Savings

Net Life Cycle Cost after Energy Savings									\$27,959	\$15,692

Green Product: Condensing Gas-fired Hydronic Boiler

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Condensing Boiler	1	ea	\$4,078.00	\$4,078	20	1	1.0	\$4,078	\$4,078
Utility Cost	Natural Gas	539	Therms	\$1.36	\$734	1	1	20.0	\$19,727	\$9,713

Total Life Cycle Cost \$23,805 \$13,791

Energy Savings

Net Life Cycle Cost after Energy Savings									\$23,805	\$13,791

ECONOMIC RETURN ANALYSIS

Green NPV	\$1,901
Green IRR	146.2%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Condensing Gas-fired Hydronic Boiler

Override with Green Product? No

Final Product Choice

Green Product: Condensing Gas-fired Hydronic Boiler

Energy and Water Conservation Measure (EWCM): # 1

Upgrade Common Area Heating Boiler

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

15
16

Final Product Choice

Green Product: Condensing Gas-fired Hydronic Boiler

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	Condensing Boiler	1	ea	\$4,078.00	\$4,078	20	1	1.0	\$4,078	\$4,078
Utility Cost	Natural Gas	539	Therms	\$1.36	\$734	1	1	20.0	\$19,727	\$9,713
Total Life Cycle Cost									\$23,805	\$13,791

Energy Savings

Net Life Cycle Cost after Energy Savings									\$23,805	\$13,791

Replacement at End of Remaining Useful Life

Year

16

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Condensing Boiler	1	ea	\$4,078.00	\$4,078	20	16	0.3	\$990	\$760
Utility Cost	Natural Gas	539	Therms	\$1.36	\$734	1	16	5.0	\$6,072	\$1,643

Expenses for Current Product Through Useful Life

Utility Cost	Natural Gas	695	Therms	\$1.36	\$947	1	1	15.0	\$17,615	\$10,410
Total Life Cycle Cost									\$24,677	\$12,813

Energy Savings

Net Life Cycle Cost after Energy Savings									\$24,677	\$12,813

ECONOMIC RETURN ANALYSIS

Timing NPV (\$977)
Timing IRR 3.55%

TIMING RECOMMENDATION

Replacement Year: 16

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

Upgrade Heating Water Circulation Pumps

Standard Duty In-line 1/4-HP Pumps

vs.

Premium Duty, Micro-VFD Controlled Pumps

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 15

Conventional Product: Standard Duty In-line 1/4-HP Pumps

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Standard duty pumps	1	ea	\$582.50	\$583	10	1	1.5	\$925	\$795
Utility Cost	Electricity	1,433	kWh	\$0.15	\$216	1	1	15.0	\$4,024	\$2,378

Total Life Cycle Cost \$4,949 \$3,173

Energy Savings

Net Life Cycle Cost after Energy Savings									\$4,949	\$3,173

Green Product: Premium Duty, Micro-VFD Controlled Pumps

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Micro-VFD Pumps	1	ea	\$626.19	\$626	15	1	1.0	\$626	\$626
Utility Cost	Electricity	1,184	kWh	\$0.15	\$179	1	1	15.0	\$3,325	\$1,965

Total Life Cycle Cost \$3,951 \$2,591

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,951	\$2,591

ECONOMIC RETURN ANALYSIS

Green NPV	\$582
Green IRR	638.8%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Premium Duty, Micro-VFD Controlled Pumps

Override with Green Product? No

Final Product Choice

Green Product: Premium Duty, Micro-VFD Controlled Pumps

Energy and Water Conservation Measure (EWCM): # 2

Upgrade Heating Water Circulation Pumps

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

5

6

Final Product Choice

Green Product: Premium Duty, Micro-VFD Controlled Pumps

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	Micro-VFD Pumps	1	ea	\$626.19	\$626	15	1	1.0	\$626	\$626
Utility Cost	Electricity	1,184	kWh	\$0.15	\$179	1	1	15.0	\$3,325	\$1,965
Total Life Cycle Cost									\$3,951	\$2,591

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,951	\$2,591

Replacement at End of Remaining Useful Life

Year

6

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Micro-VFD Pumps	1	ea	\$626.19	\$626	15	6	0.7	\$410	\$387
Utility Cost	Electricity	1,184	kWh	\$0.15	\$179	1	6	10.0	\$2,376	\$1,150

Expenses for Current Product Through Useful Life

Utility Cost	Electricity	1,433	kWh	\$0.15	\$216	1	1	5.0	\$1,149	\$986
Total Life Cycle Cost									\$3,935	\$2,523

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,935	\$2,523

ECONOMIC RETURN ANALYSIS

Timing NPV (\$68)
Timing IRR n/a

TIMING RECOMMENDATION

Replacement Year: 6

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

Upgrade Common Area DHW

Atmospheric Gas-fired, Storage Water Heater

vs.

Comparable Energy Star Rated Water Heater

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 10

Conventional Product: Atmospheric Gas-fired, Storage Water Heater

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Standard Water Heater	1	ea	\$1,215.00	\$1,215	10	1	1.0	\$1,215	\$1,215
Utility Cost	Natural Gas	272	kWh	\$1.36	\$371	1	1	10.0	\$4,251	\$3,024

Total Life Cycle Cost \$5,466 \$4,239

Energy Savings

Net Life Cycle Cost after Energy Savings									\$5,466	\$4,239

Green Product: Comparable Energy Star Rated Water Heater

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Energy Star Rated Model	1	ea	\$1,306.13	\$1,306	10	1	1.0	\$1,306	\$1,306
Utility Cost	Natural Gas	244	Therms	\$1.36	\$333	1	1	10.0	\$3,816	\$2,715

Total Life Cycle Cost \$5,123 \$4,021

Energy Savings

Net Life Cycle Cost after Energy Savings									\$5,123	\$4,021

ECONOMIC RETURN ANALYSIS

Green NPV	\$218
Green IRR	75.8%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Comparable Energy Star Rated Water Heater

Override with Green Product? No

Final Product Choice

Green Product: Comparable Energy Star Rated Water Heater

Energy and Water Conservation Measure (EWCM): # 3

Upgrade Common Area DHW

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

3

4

Final Product Choice

Green Product:

Comparable Energy Star Rated Water Heater

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	Energy Star Rated Model	1	ea	\$1,306.13	\$1,306	10	1	1.0	\$1,306	\$1,306
Utility Cost	Natural Gas	244	Therms	\$1.36	\$333	1	1	10.0	\$3,816	\$2,715
Total Life Cycle Cost									\$5,123	\$4,021

Energy Savings

Net Life Cycle Cost after Energy Savings									\$5,123	\$4,021

Replacement at End of Remaining Useful Life

Year

4

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Energy Star Rated Model	1	ea	\$1,306.13	\$1,306	10	4	0.7	\$916	\$877
Utility Cost	Natural Gas	244	Therms	\$1.36	\$333	1	4	7.0	\$2,787	\$1,761

Expenses for Current Product Through Useful Life

Utility Cost	Natural Gas	272	Therms	\$1.36	\$371	1	1	3.0	\$1,146	\$1,061
Total Life Cycle Cost									\$4,849	\$3,700

Energy Savings

Net Life Cycle Cost after Energy Savings									\$4,849	\$3,700

ECONOMIC RETURN ANALYSIS

Timing NPV (\$321)
Timing IRR n/a

TIMING RECOMMENDATION

Replacement Year:

4

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

Upgrade Common Area Air Conditioners

Standard Duty Thru-Wall Air Conditioner

vs.

Comparable Model With A SEER Rating of ≥15

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 10

Conventional Product: Standard Duty Thru-Wall Air Conditioner

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Standard Duty Models	2	ea	\$797.50	\$1,595	10	1	1.0	\$1,595	\$1,595
Utility Cost	Electricity	1,648	kWh	\$0.15	\$249	1	1	10.0	\$2,853	\$2,030

Total Life Cycle Cost \$4,448 \$3,625

Energy Savings

Net Life Cycle Cost after Energy Savings									\$4,448	\$3,625

Green Product: Comparable Model With A SEER Rating of ≥15

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Higher SEER Rated Models	2	ea	\$857.30	\$1,715	10	1	1.0	\$1,715	\$1,715
Utility Cost	Electricity	1,213	kWh	\$0.15	\$183	1		11.0	\$2,099	\$1,493

Total Life Cycle Cost \$3,814 \$3,208

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,814	\$3,208

ECONOMIC RETURN ANALYSIS

Green NPV	\$417
Green IRR	128.9%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Comparable Model With A SEER Rating of ≥15

Override with Green Product? No

Final Product Choice

Green Product: Comparable Model With A SEER Rating of ≥15

Energy and Water Conservation Measure (EWCM): # 4

Upgrade Common Area Air Conditioners

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

4
5

Final Product Choice

Green Product: Comparable Model With A SEER Rating of ≥15

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	Higher SEER Rated Models	2	ea	\$857.30	\$1,715	10	1	1.0	\$1,715	\$1,715
Utility Cost	Electricity	1,213	kWh	\$0.15	\$183	1		11.0	\$2,099	\$1,493
Total Life Cycle Cost									\$3,814	\$3,208

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,814	\$3,208

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	Higher SEER Rated Models	2	ea	\$857.30	\$1,715	10	5	0.6	\$1,035	\$971
Utility Cost	Electricity	1,213	kWh	\$0.15	\$183	1	4	7.0	\$1,533	\$969

Expenses for Current Product Through Useful Life

Utility Cost	Electricity	1,648	kWh	\$0.15	\$249	1	1	4.0	\$1,041	\$928
Total Life Cycle Cost									\$3,609	\$2,868

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,609	\$2,868

ECONOMIC RETURN ANALYSIS

Timing NPV	(\$340)
Timing IRR	n/a

TIMING RECOMMENDATION

Replacement Year:	5
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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): # 5

Upgrade Common Area Doors

Metal Doors \approx U Value .60

vs.

Fiberglass Insulated Doors U Value .20

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 35

Conventional Product: Metal Doors \approx U Value .60

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Metal Doors	3	ea	\$345.00	\$1,035	35	1	1.0	\$1,035	\$1,035

Total Life Cycle Cost \$1,035 \$1,035

Energy Savings

Net Life Cycle Cost after Energy Savings									\$1,035	\$1,035

Green Product: Fiberglass Insulated Doors U Value .20

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 Doors	3	ea	\$370.88	\$1,113	35	1	1.0	\$1,113	\$1,113

Total Life Cycle Cost \$1,113 \$1,113

Energy Savings

Utility Cost	Nat Gas/Elect	1	ls	\$54.99	(\$55)	1	1	35.0	(\$3,325)	(\$962)
Net Life Cycle Cost after Energy Savings									(\$2,212)	\$151

ECONOMIC RETURN ANALYSIS

Green NPV	\$884
Green IRR	253.1%

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. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Fiberglass Insulated Doors U Value .20

Override with Green Product? No

Final Product Choice

Green Product: Fiberglass Insulated Doors U Value .20

Energy and Water Conservation Measure (EWCM): # 5

Upgrade Common Area Doors

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

16

17

Final Product Choice

Green Product:

Fiberglass Insulated Doors U Value .20

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	Fiberglass Doors	3	ea	\$370.88	\$1,113	35	1	1.0	\$1,113	\$1,113
Total Life Cycle Cost									\$1,113	\$1,113

Energy Savings

Utility Cost	Nat Gas/Elect	1	ls	\$54.99	(\$55)	1	1	35.0	(\$3,325)	(\$962)
Net Life Cycle Cost after Energy Savings									(\$2,212)	\$151

Replacement at End of Remaining Useful Life

Year

17

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Fiberglass Doors	3	ea	\$370.88	\$1,113	35	17	0.5	\$396	\$420

Expenses for Current Product Through Useful Life

Utility Cost	Nat Gas/Elect	1	ls	\$54.99	\$55	1	1	16.0	\$1,108	\$631
Total Life Cycle Cost									\$1,504	\$1,051

Energy Savings

Utility Cost	Nat Gas/Elect	1	ls	\$54.99	(\$55)	1	17	19.0	(\$2,216)	(\$330)
Net Life Cycle Cost after Energy Savings									(\$712)	\$721

ECONOMIC RETURN ANALYSIS

Timing NPV	\$570
Timing IRR	14.08%

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): # 6

Upgrade Common Area Windows

Aluminum Framed, Dble Glazed, No Thermal Break

vs.

Fiberglass Framed, Dble Glazed, low-E, Argon Filled, with Thermal Break

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 35

Conventional Product: Aluminum Framed, Dble Glazed, No Thermal Break

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	In-kind replacement	7	ea	\$467.50	\$3,273	35	1	1.0	\$3,273	\$3,273

Total Life Cycle Cost \$3,273 \$3,273

Energy Savings

Net Life Cycle Cost after Energy Savings									\$3,273	\$3,273

Green Product: Fiberglass Framed, Dble Glazed, low-E, Argon Filled, with Thermal Break

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 Framed	7	ea	\$502.56	\$3,518	35	1	1.0	\$3,518	\$3,518

Total Life Cycle Cost \$3,518 \$3,518

Energy Savings

Utility Cost	Nat Gas/Elect	1	ls	\$74.57	(\$75)	1	1	35.0	(\$4,509)	(\$1,304)
Net Life Cycle Cost after Energy Savings									(\$991)	\$2,214

ECONOMIC RETURN ANALYSIS

Green NPV	\$1,059
Green IRR	48.0%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Fiberglass Framed, Dble Glazed, low-E, Argon Filled, with Thermal Break

Override with Green Product? No

Final Product Choice

Green Product: Fiberglass Framed, Dble Glazed, low-E, Argon Filled, with Thermal Break

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

Upgrade Common Area Windows

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

16

17

Final Product Choice

Green Produdass Framed, Dble Glazed, low-E, Argon Filled, with Thermal Break

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	Fiberglass Framed	7	ea	\$502.56	\$3,518	35	1	1.0	\$3,518	\$3,518
Total Life Cycle Cost									\$3,518	\$3,518

Energy Savings

Utility Cost	Nat Gas/Elect	1	ls	\$74.57	(\$75)	1	1	35.0	(\$4,509)	(\$1,304)
Net Life Cycle Cost after Energy Savings									(\$991)	\$2,214

Replacement at End of Remaining Useful Life

Year

17

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Fiberglass Framed	7	ea	\$502.56	\$3,518	35	17	0.5	\$1,252	\$1,327

Expenses for Current Product Through Useful Life

Total Life Cycle Cost									\$1,252	\$1,327

Energy Savings

Utility Cost	Nat Gas/Elect	1	ls	\$74.57	(\$75)	1	17	19.0	(\$3,006)	(\$448)
Net Life Cycle Cost after Energy Savings									(\$1,754)	\$879

ECONOMIC RETURN ANALYSIS

Timing NPV (\$1,335)
Timing IRR n/a

TIMING RECOMMENDATION

Replacement Year: 17

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): # 7

Upgrade Exterior Building Mounted Lighting

High Intensity Discharge (HID) 240-W Fixtures

vs.

High Efficiency, Long Life LED 80-W Fixtures

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 20

Conventional Product:

High Intensity Discharge (HID) 240-W Fixtures

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	HID Fixtures	8	ea	\$465.00	\$3,720	20	1	1.0	\$3,720	\$3,720
Utility Cost	Electricity	8,410	kWh	\$0.15	\$1,270	1	1	20.0	\$34,123	\$16,801
Maintain	Bulb/Balast Replacement	8	ea	\$150.00	\$1,200	4	4	4.3	\$6,844	\$3,326
Total Life Cycle Cost									\$44,687	\$23,847

Energy Savings

Net Life Cycle Cost after Energy Savings									\$44,687	\$23,847

Green Product:

High Efficiency, Long Life LED 80-W Fixtures

Cost over Life Cycle (EUL)

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Life Cycle Costs										
Install/Replace	LED Fixtures	8	ea	\$650.00	\$5,200	20	1	1.0	\$5,200	\$5,200
Utility Cost	Electricity	2,803	kWh	\$0.15	\$423	1	1	20.0	\$11,373	\$5,600
Maintain	N/A									
Total Life Cycle Cost									\$16,573	\$10,800

Energy Savings

Net Life Cycle Cost after Energy Savings									\$16,573	\$10,800

ECONOMIC RETURN ANALYSIS

Green NPV	\$13,047
Green IRR	159.7%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: High Efficiency, Long Life LED 80-W Fixtures

Override with Green Product? No

Final Product Choice

Green Product: High Efficiency, Long Life LED 80-W Fixtures

Energy and Water Conservation Measure (EWCM): # 7

Upgrade Exterior Building Mounted Lighting

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product
Replacement Year

1
2

Final Product Choice

Green Product: High Efficiency, Long Life LED 80-W Fixtures

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	LED Fixtures	8	ea	\$650.00	\$5,200	20	1	1.0	\$5,200	\$5,200
Utility Cost	Electricity	2,803	kWh	\$0.15	\$423	1	1	20.0	\$11,373	\$5,600
Maintain	N/A									
Total Life Cycle Cost									\$16,573	\$10,800

Energy Savings

Net Life Cycle Cost after Energy Savings									\$16,573	\$10,800

Replacement at End of Remaining Useful Life

Year

2

Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	LED Fixtures	8	ea	\$650.00	\$5,200	20	2	1.0	\$4,900	\$4,854
Utility Cost	Electricity	2,803	kWh	\$0.15	\$423	1	2	19.0	\$10,950	\$5,176
Maintain	N/A									

Expenses for Current Product Through Useful Life

Utility Cost	Electricity	8,410	kWh	\$0.15	\$1,270	1	1	1.0	\$1,270	\$1,270
Total Life Cycle Cost									\$17,120	\$11,300

Energy Savings

Net Life Cycle Cost after Energy Savings									\$17,120	\$11,300

ECONOMIC RETURN ANALYSIS

Timing NPV	\$500
Timing IRR	22.77%

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): # 8

Upgrade Common Area Interior Lighting

4' T12 Fluorescent Fixtures (2 and 4 Bulb)

vs.

Upgrading to LED Replacement Tubes

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 20

Conventional Product: 4' T12 Fluorescent Fixtures (2 and 4 Bulb)

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	Existing Fixtures	9	ea	\$127.00	\$1,143	20	1	1.0	\$1,143	\$1,143
Utility Cost	Electricity	5,309	kWh	\$0.15	\$802	1	1	20.0	\$21,541	\$10,606
Maintain	Bulb/Balast Replacements	14	ea	\$25.00	\$350	4	4	4.3	\$1,996	\$970

Total Life Cycle Cost \$24,680 \$12,719

Energy Savings

Net Life Cycle Cost after Energy Savings									\$24,680	\$12,719

Green Product: Upgrading to LED Replacement Tubes

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	LED Repl Tubes	9	ea	\$136.53	\$1,229	20	1	1.0	\$1,229	\$1,229
Utility Cost	Electricity	3,338	kWh	\$0.15	\$504	1	1	20.0	\$13,544	\$6,668
Maintain	Bulb Replacement	14	ea	\$136.53	\$1,911	10	11	1.0	\$2,569	\$1,190

Total Life Cycle Cost \$17,341 \$9,087

Energy Savings

Net Life Cycle Cost after Energy Savings									\$17,341	\$9,087

ECONOMIC RETURN ANALYSIS

Green NPV	\$3,632
Green IRR	n/a

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Upgrading to LED Replacement Tubes

Override with Green Product? No

Final Product Choice

Green Product: Upgrading to LED Replacement Tubes

Energy and Water Conservation Measure (EWCM): # 8

Upgrade Common Area Interior Lighting

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product:

Upgrading to LED Replacement Tubes

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	LED Repl Tubes	9	ea	\$136.53	\$1,229	20	1	1.0	\$1,229	\$1,229
Utility Cost	Electricity	3,338	kWh	\$0.15	\$504	1	1	20.0	\$13,544	\$6,668
Maintain	Bulb Replacement	14	ea	\$136.53	\$1,911	10	11	1.0	\$2,569	\$1,190
Total Life Cycle Cost									\$17,341	\$9,087
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$17,341	\$9,087

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): # 9

Upgrade Public Washing Mashines

Top Load Non Energy Star Models

vs.

Front Load Energy Star Models

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 10

Conventional Product: Top Load Non Energy Star Models

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Leased (No Costs)					10	1	1.0		
Utility Cost	Electricity	400	kWh	\$0.15	\$60	1	1	10.0	\$692	\$493
Utility Cost	Natural Gas	69	Therms	\$1.36	\$94	1	1	10.0	\$1,075	\$764

Total Life Cycle Cost \$1,767 \$1,257

Energy Savings

Net Life Cycle Cost after Energy Savings									\$1,767	\$1,257

Green Product: Front Load Energy Star Models

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Leased (No Costs)					10	1	1.0		
Utility Cost	Electricity	136	kWh	\$0.15	\$21	1	1	10.0	\$235	\$167
Utility Cost	Natural Gas	23	Therms	\$1.36	\$32	1	1	10.0	\$362	\$258

Total Life Cycle Cost \$598 \$425

Energy Savings

Net Life Cycle Cost after Energy Savings									\$598	\$425

ECONOMIC RETURN ANALYSIS

Green NPV	\$832
Green IRR	n/a

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Front Load Energy Star Models

Override with Green Product? No

Final Product Choice

Green Product: Front Load Energy Star Models

Energy and Water Conservation Measure (EWCM): # 9

Upgrade Public Washing Mashines

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product:

Front Load Energy Star Models

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Leased (No Costs)					10	1	1.0		
Utility Cost	Electricity	136	kWh	\$0.15	\$21	1	1	10.0	\$235	\$167
Utility Cost	Natural Gas	23	Therms	\$1.36	\$32	1	1	10.0	\$362	\$258
Total Life Cycle Cost									\$598	\$425
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$598	\$425

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):

1

Common Area Flooring

Vinyl Composite Tile (VCT)

vs.

Natural Linoleum

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 25

Conventional Product: Vinyl Composite Tile (VCT)

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Office VCT	647	sf	\$5.00	\$3,235	15	1	1.7	\$6,083	\$4,478
Install/Replace	Laundry/Restroom	256	sf	\$5.00	\$1,280	15	1	1.7	\$2,407	\$1,772

Total Life Cycle Cost \$8,490 \$6,250

Energy Savings

Net Life Cycle Cost after Energy Savings									\$8,490	\$6,250

Green Product: Natural Linoleum

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Office Natural Linoleum	647	sf	\$5.38	\$3,481	25	1	1.0	\$3,481	\$3,481
Install/Replace	Laundry/RR Linoleum	256	sf	\$5.38	\$1,377	25	1	1.0	\$1,377	\$1,377

Total Life Cycle Cost \$4,858 \$4,858

Energy Savings

Net Life Cycle Cost after Energy Savings									\$4,858	\$4,858

ECONOMIC RETURN ANALYSIS

Green NPV	\$1,392
Green IRR	21.7%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Natural Linoleum

Override with Green Product? No

Final Product Choice

Green Product: Natural Linoleum

Green Measure (GM):

1

Common Area Flooring

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product:

Natural Linoleum

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Office Natural Linoleum	647	sf	\$5.38	\$3,481	25	1	1.0	\$3,481	\$3,481
Install/Replace	Laundry/RR Linoleum	256	sf	\$5.38	\$1,377	25	1	1.0	\$1,377	\$1,377
Total Life Cycle Cost									\$4,858	\$4,858
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$4,858	\$4,858

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):

2

Dwelling Unit Living Area Flooring

Standard Olefin (Petroleum Based) Carpet

vs.

Restore/Refinish Hardwood Flooring

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 10

Conventional Product: Standard Olefin (Petroleum Based) Carpet

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Standard Carpet	39,967	sf	\$3.00	\$119,901	5	1	2.0	\$258,899	\$214,501

Total Life Cycle Cost \$258,899 \$214,501

Energy Savings

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Net Life Cycle Cost after Energy Savings \$258,899 \$214,501

Green Product: Restore/Refinish Hardwood Flooring

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Restore/Refinish Wood	39,967	sf	\$2.71	\$108,311	10	1	1.0	\$108,311	\$108,311

Total Life Cycle Cost \$108,311 \$108,311

Energy Savings

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Net Life Cycle Cost after Energy Savings \$108,311 \$108,311

ECONOMIC RETURN ANALYSIS

Green NPV	\$106,190
Green IRR	n/a

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Restore/Refinish Hardwood Flooring

Override with Green Product? No

Final Product Choice

Green Product: Restore/Refinish Hardwood Flooring

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

Dwelling Unit Living Area Flooring

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product:

Restore/Refinish Hardwood Flooring

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Restore/Refinish Wood	39,967	sf	\$2.71	\$108,311	10	1	1.0	\$108,311	\$108,311
Total Life Cycle Cost									\$108,311	\$108,311
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$108,311	\$108,311

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): # 3

DU VCT (Entry, Dining Area, Kitchen, and Bath)

VCT

(Conventional Product)

vs.

Natural Linoleum

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 25

Conventional Product:

VCT

Cost over Life Cycle (EUL)

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

Life Cycle Costs

Install/Replace	Hall/Dining VCT	950	sf	\$5.00	\$4,750	15	1	1.7	\$8,932	\$6,575
Install/Replace	Bathroom VCT	1,824	sf	\$5.00	\$9,120	15	1	1.7	\$17,149	\$12,625
Install/Replace	Kitchen VCT	3,378	sf	\$5.00	\$16,890	15	1	1.7	\$31,759	\$23,380

Total Life Cycle Cost \$57,840 \$42,580

Energy Savings

Net Life Cycle Cost after Energy Savings									\$57,840	\$42,580

Green Product:

Natural Linoleum

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	Entry, Dining	950	sf	\$5.38	\$5,111	25	1	1.0	\$5,111	\$5,111
Install/Replace	Bathroom	1,824	sf	\$5.38	\$9,813	25	1	1.0	\$9,813	\$9,813
Install/Replace	Kitchen	3,378	sf	\$5.38	\$18,174	25	1	1.0	\$18,174	\$18,174

Total Life Cycle Cost \$33,098 \$33,098

Energy Savings

Net Life Cycle Cost after Energy Savings									\$33,098	\$33,098

ECONOMIC RETURN ANALYSIS

Green NPV	\$9,483
Green IRR	21.7%

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product: Natural Linoleum

Override with Green Product? No

Final Product Choice

Green Product: Natural Linoleum

Energy and Water Conservation Measure (EWCM): # 3

DU VCT (Entry, Dining Area, Kitchen, and Bath)

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product:

Natural Linoleum

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Entry, Dining	950	sf	\$5.38	\$5,111	25	1	1.0	\$5,111	\$5,111
Install/Replace	Bathroom	1,824	sf	\$5.38	\$9,813	25	1	1.0	\$9,813	\$9,813
Install/Replace	Kitchen	3,378	sf	\$5.38	\$18,174	25	1	1.0	\$18,174	\$18,174
Total Life Cycle Cost									\$33,098	\$33,098
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$33,098	\$33,098

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

Upgrade DU Cabinetry (Kitchen, Bath)

Wood Fronted, LPB Casework

vs.

Forestry Stewardship Council (FSC) Certified All Wood Cabinetry

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 25

Conventional Product: Wood Fronted, LPB Casework

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	Bathroom Wood/LPB	38	ea	\$410.00	\$15,580	20	1	1.3	\$19,966	\$17,871
Install/Replace	Kitchen Wood/LPB	38	ea	\$2,700.00	\$102,600	20	1	1.3	\$131,484	\$117,689

Total Life Cycle Cost \$151,450 \$135,561

Energy Savings

Net Life Cycle Cost after Energy Savings									\$151,450	\$135,561

Green Product: Forestry Stewardship Council (FSC) Certified All Wood Cabinetry

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	Bath FSC	38	ea	\$440.75	\$16,749	25	1	1.0	\$16,749	\$16,749
Install/Replace	Kitchen FSC	38	ea	\$2,902.50	\$110,295	25	1	1.0	\$110,295	\$110,295

Total Life Cycle Cost \$127,044 \$127,044

Energy Savings

Net Life Cycle Cost after Energy Savings									\$127,044	\$127,044

ECONOMIC RETURN ANALYSIS

Green NPV	\$8,517
Green IRR	13.1%

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Green Product Forestry Stewardship Council (FSC) Certified All Wood Cabinetry

Override with Green Product? No

Final Product Choice

Green Product Forestry Stewardship Council (FSC) Certified All Wood Cabinetry

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

Upgrade DU Cabinetry (Kitchen, Bath)

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Green Product Forestry Stewardship Council (FSC) Certified All Wood Cabinetry

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Bath FSC	38	ea	\$440.75	\$16,749	25	1	1.0	\$16,749	\$16,749
Install/Replace	Kitchen FSC	38	ea	\$2,902.50	\$110,295	25	1	1.0	\$110,295	\$110,295
Total Life Cycle Cost									\$127,044	\$127,044
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$127,044	\$127,044

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):

5

Upgrade Bathroom Exhaust Fans

Manually Operated Models

vs.

Humidistat Controlled Models

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 20

Conventional Product:

Manually Operated Models

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 Models	38	ea	\$125.00	\$4,750	20	1	1.0	\$4,750	\$4,750

Total Life Cycle Cost \$4,750 \$4,750

Energy Savings

Net Life Cycle Cost after Energy Savings									\$4,750	\$4,750

Green Product:

Humidistat Controlled Models

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	Humidistat Models	38	ea	\$199.00	\$7,562	20	1	1.0	\$7,562	\$7,562

Total Life Cycle Cost \$7,562 \$7,562

Energy Savings

Net Life Cycle Cost after Energy Savings									\$7,562	\$7,562

ECONOMIC RETURN ANALYSIS

Green NPV	(\$2,812)
Green IRR	n/a

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.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Manually Operated Models

Override with Green Product? No

Final Product Choice

Conventional Product: Manually Operated Models

Green Measure (GM):

5

Upgrade Bathroom Exhaust Fans

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

Final Product Choice

Conventional Product:

Manually Operated Models

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Manual Models	38	ea	\$125.00	\$4,750	20	1	1.0	\$4,750	\$4,750
Total Life Cycle Cost									\$4,750	\$4,750
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$4,750	\$4,750

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):

6

Upgrade Kitchen Countertops

Plastic Laminate on Laminated Particleboard

vs.

Solid Surface Material

(Conventional Product)

(Green Product)

STEP ONE: PRODUCT COMPARISON

Calculated Life Cycle Term 35

Conventional Product: Plastic Laminate on Laminated Particleboard

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	Plastic Laminate	38	ea	\$316.48	\$12,026	10	1	3.5	\$62,673	\$25,874

Total Life Cycle Cost \$62,673 \$25,874

Energy Savings

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Net Life Cycle Cost after Energy Savings \$62,673 \$25,874

Green Product: Solid Surface Material

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	Solid Surface Material	38	ea	\$800.00	\$30,400	35	1	1.0	\$30,400	\$30,400

Total Life Cycle Cost \$30,400 \$30,400

Energy Savings

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Net Life Cycle Cost after Energy Savings \$30,400 \$30,400

ECONOMIC RETURN ANALYSIS

Green NPV	(\$4,526)
Green IRR	6.1%

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. Green NPV and Green IRR are relative measures comparing Green vs. Conventional implementation.

PRODUCT RECOMMENDATION

Recommendation based on Economic Return Analysis

Conventional Product: Plastic Laminate on Laminated Particleboard

Override with Green Product? No

Final Product Choice

Conventional Product: Plastic Laminate on Laminated Particleboard

Green Measure (GM):

6

Upgrade Kitchen Countertops

STEP TWO: REPLACEMENT TIMING

Remaining Useful Life of Existing Product

0

Final Product Choice

Conventional Product:

Plastic Laminate on Laminated Particleboard

Immediate Replacement

									Cost over Life Cycle (EUL)	
Action	Description	Quantity	Unit	Unit Cost	Total Cost	EUL	First Year	Cycles	Inflated	Discounted
Install/Replace	Plastic Laminate	38	ea	\$316.48	\$12,026	10	1	3.5	\$62,673	\$25,874
Total Life Cycle Cost									\$62,673	\$25,874
<i>Energy Savings</i>										
Net Life Cycle Cost after Energy Savings									\$62,673	\$25,874

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.


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

Bob Labadini

Name

Senior Associate/Mechanical Specialist

Title

January 28, 2011

Date