

# FACILITY CONDITION ASSESSMENT AND ENERGY AUDIT

## THE CITY OF BURLINGTON

645 Pine Street  
Burlington, Vermont 05401  
Martha Keenan



## FACILITY CONDITION ASSESSMENT AND ENERGY AUDIT

of

## LEDDY PARK AND ARENA

Leddy Park Road  
Burlington, Vermont 05408

**PREPARED BY:**

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**EMG Project #:** 110226.14R-010.294  
**Date of Report:** October 1, 2014  
**On-Site Date:** August 25, 2014 and August 29, 2014



DECISION INTELLIGENCE

**Immediate Repairs Report**  
**Leddy Park Arena**  
**10/1/2014**

EMG

Report Section	Location Description	ID	Cost Description	Quantity	Unit	Unit Cost	Subtotal	Deficiency Repair Estimate *
3.2	Bathrooms - Arena and park building	271524	ADA, Wrap drain pipes below accessible lavatory	6	EA	\$120.00	\$720	<b>\$720</b>
5.3	North west of the ice rink	271527	Civil Engineer Drainage study	1	EA	\$5,500.00	\$5,500	<b>\$5,500</b>
6.2	Tree shop building - east wall	271541	Engineering Study for structural exterior wall	1	Each	\$5,500.00	\$5,500	<b>\$5,500</b>
6.3	Roof over Leddy Arena Emergency Exit Doors	271546	Architectural Design for repairs and improvements	1	EA	\$7,500.00	\$7,500	<b>\$7,500</b>
6.5	Exterior stairs to the beach	271566	Replace wood railing	124	LF	\$14.79	\$1,834	<b>\$1,834</b>
7.1	Leddy ice rink equipment	274677	Civil Engineer Utility Study	1	EA	\$5,500.00	\$5,500	<b>\$5,500</b>
7.1	Mechanical Room	271477	Commercial gas-fired domestic water heater 120-135 MBH input, high efficiency	1	EA	\$8,670.00	\$8,670	<b>\$8,670</b>
7.1	Mechanical Room	271549	Cooling Tower, Packaged Unit, Galvanized Steel, Induced Air - 200 Ton	1	Each	\$250,000.00	\$250,000	<b>\$250,000</b>
7.1	Sidewall Exhaust Fans	271467	Exhaust Fan 2000 CFM	4	EA	\$2,720.00	\$10,880	<b>\$10,880</b>
7.1	Concession Kitchen	271531	New Kitchen Hood and Ansul System, 7' long	1	EA	\$23,909.00	\$23,909	<b>\$23,909</b>
7.1	Mechanical Room	271552	DDC controls for full HVAC Operation, replace	112000	SF	\$0.33	\$36,960	<b>\$36,960</b>
7.2	Mechanical Room	271475	Commercial gas-fired domestic water heater, 140 to 200 MBH input	1	EA	\$10,089.01	\$10,089	<b>\$10,089</b>
7.2	Concession Kitchen	271553	Grease Interceptor, cast iron, 7 GPM, 14 lb fat capacity	1	EA	\$1,855.00	\$1,855	<b>\$1,855</b>
7.4	Main Electrical Room	271559	Electrical Service and Branch Wiring, replace and upgrades	112000	SF	\$1.00	\$112,000	<b>\$112,000</b>
8.2	Concessions area	271941	New Kitchen Hood and Ansul System, 7' long	1	EA	\$23,909.00	\$23,909	<b>\$23,909</b>
<b>Immediate Repairs Total</b>								<b>\$504,826</b>

\* Location Factor (1.0) included in totals.



Replacement Reserves Report

Leddy Park Arena  
10/1/2014

Report Section	Location Description	Cond	ID	Cost Description	Lifespan (EUL)	E	A	RUL	Quantity	Unit	Unit Cost	Subtotal	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Deficiency Repair Estimate		
3.2	Bathrooms - Arena and park building		271524	C1031 ADA, Wrap drain pipes below accessible lavatory	0	0	0	6	EA	\$120.00	\$720	\$720																					\$720		
5.2	Drive aisle and tennis court parking lot	Good to Fair	271526	G2022 Replace driveway asphalt paving	25	15	10	90176	SF	\$2.23	\$201,092											\$201,092												\$201,092	
5.2	Leddy main parking	Poor	274679	G2022 Install new base course and asphalt	25	24	1	125000	SF	\$4.43	\$553,750		\$553,750																					\$553,750	
5.3	North west of the ice rink	Poor	271527	_0001 Civil Engineer Drainage study	0	0	0	1	EA	\$5,500.00	\$5,500	\$5,500																						\$5,500	
5.3	Exterior of Leddy Arena	Poor	271528	G2052 Regrade & re-sod flat area adjacent to bldg	25	24	1	22.6	1000 SF	\$2,557.78	\$57,806		\$57,806																					\$57,806	
5.5	Exterior of Leddy Arena	Poor	271535	D5022 Replace wall pack 55 watt low pressure sodium	15	14	1	10	EA	\$454.00	\$4,540		\$4,540																					\$4,540	
6.2	Tree shop building - east wall	Poor	271541	B2010 Engineering Study for structural exterior wall	0	0	0	1	Each	\$5,500.00	\$5,500	\$5,500																						\$5,500	
6.3	Roof over Leddy Arena Emergency Exit Doors	Poor	271546	_0001 Architectural Design for repairs and improvements	0	0	0	1	EA	\$7,500.00	\$7,500	\$7,500																						\$7,500	
6.3	Tree shop building roof	Fair to Poor	271544	B3011 Asphalt shingles, removal and replacement with premium grade	30	28	2	42.4	SQ	\$650.00	\$27,560			\$27,560																				\$27,560	
6.3	Leddy Arena Roof	Good to Fair	271542	B3011C Metal steep roofing, total metal panel replacement	30	15	15	482	SQ	\$841.35	\$405,531																							\$405,531	
6.4	Leddy arena - exterior masonry	Poor	271557	B2011 Pressure wash existing masonry	10	9	1	3214	SF	\$1.74	\$5,592		\$5,592											\$5,592										\$11,185	
6.4	Leddy exterior metal panels	Fair	274675	B2011 Scrape and paint exterior metal	7	6	1	5200	SF	\$1.56	\$8,112		\$8,112								\$8,112													\$24,336	
6.4	The tree shop and park bathroom building	Good to Fair	271562	B2011 General painting cost per SF, minor prep work, single story bldg. (up to 15 feet)	10	8	2	2662	SF	\$2.42	\$6,442				\$6,442										\$6,442									\$12,884	
6.4	Leddy Arena - Exterior caulking	Poor	271560	B2011 Recaulk expansion and control joints up to 1/2" wide	10	9	1	480	LF	\$13.16	\$6,317		\$6,317											\$6,317										\$12,634	
6.4	Leddy Arena - Exterior masonry	Fair to Poor	271554	B2011 Point brick wall first floor	10	9	1	22	CSF	\$948.00	\$20,856		\$20,856											\$20,856										\$41,712	
6.4	Leddy Arena - Metal siding	Fair	271551	C3012 Scrape and paint interior metal	10	9	1	2110	SF	\$1.56	\$3,292													\$3,292										\$6,583	
6.5	Exterior stairs to the beach	Poor	271565	C2011A Replace wood steps	20	19	1	350	SF	\$103.10	\$36,085																							\$36,085	
6.5	Exterior stairs to the beach	Poor	271566	C2014A Replace wood railing	0	0	0	124	LF	\$14.79	\$1,834	\$1,834																						\$1,834	
6.6	Leddy Arena - East Wall	Poor	271568	B2021 Casement window, metal-framed, wire-reinforced glazing, 4' x 2'	30	29	1	10	EA	\$708.00	\$7,080		\$7,080																					\$7,080	
6.6	Tree shop building	Poor	271571	B2034 Replace 12' to 14' x 14' steel sectional overhead door with motor operator	35	34	1	5	EA	\$4,410.00	\$22,050		\$22,050																					\$22,050	
6.6	Leddy Arena - Exterior	Poor	271569	B2039 Replace 3'-0" x 7'-0" metal grated painted door	30	25	5	13	EA	\$2,430.50	\$31,597							\$31,597																\$31,597	
6.8	Throughout the building	Fair to Poor	271939	C3011 Paint interior walls, CMU, including surface prep	7	6	1	36820	SF	\$0.89	\$32,770		\$32,770								\$32,770													\$98,309	
6.8	Concessions area and locker rooms	Fair to Poor	271938	C3021A Recoat epoxy floor	6	5	1	9374	SF	\$16.50	\$154,671		\$154,671							\$154,671					\$154,671									\$618,684	
6.8	Lobby, restrooms, corridor and observation lounge	Fair	271936	C3024 Replace Vinyl tile	18	14	4	902	SY	\$67.75	\$61,111					\$61,111																		\$61,111	
6.8	Office area	Fair to Poor	271937	C3025 Replace carpet, standard commercial, medium traffic	8	6	2	404	SY	\$59.90	\$24,200			\$24,200									\$24,200								\$24,200			\$72,599	
6.8	Throughout the building	Fair to Poor	271940	C3032 Replace acoustical ceiling tiles - partial	9	7	2	182	CSF	\$550.00	\$100,100			\$100,100									\$100,100											\$200,200	
7.1	Leddy ice rink equipment	Poor	274677	_0001 Civil Engineer Utility Study	0	0	0	1	EA	\$5,500.00	\$5,500	\$5,500																						\$5,500	
7.1	Mechanical Room	Good	271474	D2023 Replace hydronic circulating pump, 5 HP	20	10	10	2	EA	\$4,771.00	\$9,542											\$9,542												\$9,542	
7.1	Mechanical Room	Fair	271477	D2023 Commercial gas-fired domestic water heater 120-135 MBH input, high efficiency	15	15	0	1	EA	\$8,670.00	\$8,670	\$8,670																							\$17,340
7.1	Mechanical Room	Fair	271429	D3021 Replace water boiler, gas 1280 to 1500 MBH	30	25	5	2	Each	\$26,135.00	\$52,270							\$52,270																\$52,270	
7.1	Mechanical Room	Poor	271549	D3031 Cooling Tower, Packaged Unit, Galvanized Steel, Induced Air - 200 Ton	20	20	0	1	Each	\$250,000.00	\$250,000	\$250,000																							\$250,000
7.1	High School Locker Room	Fair	271432	D3041 Gas-fired furnace 175 to 200 MBH no AC	25	10	15	1	EA	\$3,540.00	\$3,540																							\$3,540	
7.1	Second Floor Office Area	Fair	271434	D3041 Gas-fired furnace 175 to 200 MBH with AC	25	10	15	1	EA	\$5,476.00	\$5,476																							\$5,476	
7.1	Sidewall Exhaust Fans	Poor	271467	D3042 Exhaust Fan 2000 CFM	10	10	0	4	EA	\$2,720.00	\$10,880	\$10,880										\$10,880												\$21,760	
7.1	Concession Kitchen	Poor	271531	D3042 New Kitchen Hood and Anslu System, 7' long	25	25	0	1	EA	\$23,909.00	\$23,909	\$23,909																							\$23,909
7.1	Mechanical Room	Fair	271479	D3044 Replace Expansion Tank	25	20	5	2	EA	\$2,200.00	\$4,400							\$4,400																\$4,400	
7.1	Northeast Corner of Arena	Good	271550	D3063 Air conditioning Dehumidifying Unit	20	16	4	1	EA	\$50,000.00	\$50,000						\$50,000																	\$50,000	
7.1	Mechanical Room	Poor	271552	D3067 DDC controls for full HVAC Operation, replace	20	20	0	112000	SF	\$0.33	\$36,960	\$36,960																							\$36,960
7.2	Concession Kitchen	Fair	271543	D2023 50-gallon Residential electric hot water heater	12	10	2	1	EA	\$1,335.00	\$1,335			\$1,335													\$1,335							\$2,670	
7.2	Mechanical Room	Fair	271475	D2023 Commercial gas-fired domestic water heater, 140 to 200 MBH input	15	15	0	1	EA	\$10,089.01	\$10,089	\$10,089																							\$20,178
7.2	Mechanical Room	Fair	271478	D2023 Hot water storage tank, glass lined, 140 to 200 gallons	20	14	6	2	EA	\$7,776.00	\$15,552							\$15,552																	\$15,552
7.2	Concession Kitchen	Poor	271553	D2034 Grease Interceptor, cast iron, 7 GPM, 14 lb fat capacity	25	25	0	1	EA	\$1,855.00	\$1,855	\$1,855																							\$1,855
7.4	Main Electrical Room	Poor	271559	D5020 Electrical Service and Branch Wiring, replace and upgrades	40	40	0	112000	SF	\$1.00	\$112,000	\$112,000																							\$112,000
7.6	Main Electrical Room	Good	271545	D5037 Fire alarm panel addressable, with voice	15	5	10	1	EA	\$12,114.90	\$12,115											\$12,115												\$12,115	
8.2	Concessions area	Poor	271941	D3042 New Kitchen Hood and Anslu System, 7' long	25	25	0	1	EA	\$23,909.00	\$23,909	\$23,909																							\$23,909
<b>Totals, Unescalated</b>												\$504,826	\$912,920	\$159,637	\$0	\$111,111	\$88,267	\$15,552	\$154,671	\$40,882	\$0	\$257,829	\$136,157	\$6											

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## CERTIFICATION

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The City of Burlington, VT retained EMG to perform this Facility Condition Assessment and Level I Energy Audit in connection with its Leddy Park and Arena, Leddy Park Road, Burlington, Vermont, the "Property". It is our understanding that the primary interest of The City of Burlington, VT is to locate and evaluate materials and building system defects that might significantly affect the value of the property and to determine if the present Property has conditions that will have a significant impact on its continued operations.

The conclusions and recommendations presented in this report are based on the brief review of the plans and records made available to our Project Manager(s) during the site visit, interviews of available property management personnel and maintenance contractors familiar with the Property, appropriate inquiry of municipal authorities, our Project Manager's walk-through observations during the site visit, and our experience with similar properties.

No testing, exploratory probing, dismantling or operating of equipment or in depth studies were performed unless specifically required under Section 2 of this report. This assessment did not include engineering calculations to determine the adequacy of the Property's original design or existing systems. Although walk-through observations were performed, not all areas were observed (See Section 4.2 for areas observed). There may be defects in the Property, which were in areas not observed or readily accessible, may not have been visible, or were not disclosed by management personnel when questioned. The report describes property conditions at the time that the observations and research were conducted.

Any reuse or distribution of this report without such consent shall be at The City of Burlington, VT and the recipient's sole risk, without liability to EMG.

**Prepared by:** Cheyenne Irby, AIA assoc., Project Manager  
Scott Lattimer, PE, Project Manager

**Reviewed by:**



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## 1. EXECUTIVE SUMMARY

### 1.1. PROPERTY INFORMATION AND GENERAL PHYSICAL CONDITION

The property information is summarized in the table below. More detailed descriptions may be found in the various sections of the report and in the Appendices.

Property Information	
Address:	Leddy Park Road, Burlington, Chittenden County, Vermont 05408
Year constructed:	1973 Partial Renovation 1977 (Office spaces) Partial Renovation 2013 (ADA renovations to locker and restrooms, Concession area interior windows) Partial Renovation 2014 (Pro shop and locker room)
Current owner of property:	City of Burlington, Vermont
Management Point of Contact:	City of Burlington, Martha Keenan, Capital Improvement Program Manager 802.540.0701 phone
Property type:	Public building, sporting complex
Site area:	75 Acres
Gross floor area:	112454 Square Feet
Number of buildings:	3
Number of stories:	2
Parking type and number of spaces:	Main Parking at Leddy Arena 267 spaces in open lot Park Parking 52 spaces in an open lot
Building construction:	Steel frame with concrete-topped metal decks. Concrete masonry unit block walls
Bay Column Spacing:	Approximately 20 Feet
Interior vertical clearance:	Approximately 24 Feet
Roof construction:	Skillion and Lean-to roof TPO membrane and standing metal seamed roofing finish
Exterior Finishes:	Concrete masonry units (CMU) and Aluminum siding
Heating and/or Air Conditioning:	Central system with boiler, condenser, and cooling tower.
Fire and Life/Safety:	Hydrants, smoke detectors, alarms, extinguishers,
Dates of visit:	August 25, 2014 and August 29, 2014
Point of Contact (POC):	Melissa Cate

Property Information	
Assessment and Report Prepared by:	Cheyenne Irby and Scott Lattimer
Reviewed by:	George Luce gluce@emgcorp.com

Generally, the property appears to have been constructed within industry standards in force at the time of construction. The property appears to have been maintained since it was first occupied and is in fair to poor overall condition.

According to property management personnel, the property has had a limited capital improvement expenditure program over the past three years, primarily consisting of new windows and flooring finish in the concessions area, new roof on the west side of the building, and ADA renovations to one set of locker rooms. Supporting documentation was not provided in support of these claims but some of the work is evident.

**Summary of Significant Issues:**

Grading around the building slopes toward the structure.

Flooring finish is wearing faster than originally estimated.

The main parking area is in poor condition with significant areas of uneven paving.

**Summary of Energy Audit:**

EMG has conducted an Energy Audit on Leddy Park and Arena. The study included a review of the building’s construction features, historical energy and water consumption and costs, review of the building envelope, HVAC equipment, heat distribution systems, lighting, and the building’s operational and maintenance practices.

EMG has identified four Energy Conservation Measures (ECMs) for this property. The savings for each measure are calculated using standard engineering methods followed in the industry, and detailed calculations for ECM are provided in Appendix H for reference. A 10% discount in energy savings was applied to account for the interactive effects amongst the ECMs. In addition to the consideration of the interactive effects, EMG has applied a 15% contingency to the implementation costs to account for potential cost overruns during the implementation of the ECMs.

**Summary of Financial Information for Recommended Energy Conservation Measures**

Item	Estimate
Total Projected Initial ECM Investment	\$ 14,930 <i>(In Current Dollars)</i>
Estimated Annual Cost Savings Related to ECMs	\$18,062 <i>(In Current Dollars)</i>
Net Effective ECM Payback	0.83years
Estimated Annual Energy Savings	To Be Determined
Estimated Annual Cost Savings	To Be Determined

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## 1.2. SPECIAL ISSUES AND FOLLOW-UP RECOMMENDATIONS

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As part of the FCA, a limited assessment of accessible areas of the building(s) was performed to determine the presence of mold, conditions conducive to mold growth, and/or evidence of moisture. Property personnel were interviewed concerning any known or suspected mold, elevated relative humidity, water intrusion, or mildew-like odors. Sampling is not a part of this assessment.

There is visible suspected mold growth, mold odors and moisture in various locker rooms throughout the building. There is visible suspected mold growth on the ceilings. The suspected mold affects approximately 10 square feet of wall area.

The mold appears to be the result of poor ventilation. It was reported by the onsite point of contact that the ventilation systems only run when the building is being utilized for official games. All other times the ventilation systems are not running. During these periods of time, which is estimated to account for 80 percent of the time, the air inside the building is not being circulated or exchanged. The presence of mold in exterior and interior environments is normal and unavoidable. Exposure to mold or mold producing materials can be hazardous and should be avoided. The presence of mold does not necessarily constitute an exposure. This assessment does not constitute a comprehensive mold survey of the Project, and any conclusions are based solely on conditions readily observable in accessed areas.

Based on the apparent limited extent of mold (less than 30 square feet), the mold can be abated by the on-site maintenance staff as part of the property's routine maintenance program. Such persons should receive training in accordance with OSHA on proper cleanup methods, personal protection, and potential health/safety hazards. The cost of this work is not included in the cost tables.

The following issues should be considered:

- Verify that all warranties are transferable.
- Verify that any alterations, installations, or other improvements since the project was first constructed and occupied have been properly permitted and approved by municipal agencies.
- Verify that no defective materials or equipment are used at the property.

Copies of the documents listed below should be obtained:

- All roof, equipment and system warranties/guarantees and transfers. Manufacturers often levy a warranty transfer fee and require that the equipment or system be in pristine condition in order to provide such transfers. This requirement often necessitates upgrades, repairs, or servicing.
- All available site and building construction drawings and specifications.
- All government documents such as Certificates of Occupancy, permits, zoning variances, easements, tax receipts, and other pertinent records.

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## 1.3. OPINIONS OF PROBABLE COST

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Cost estimates are attached at the front of this report (following the cover page).

These estimates are based on Invoice or Bid Document/s provided either by the Owner/facility and construction costs developed by construction resources such as *R.S. Means* and *Marshall & Swift*, EMG's experience with past costs for similar properties, city cost indexes, and assumptions regarding future economic conditions.

Opinions of probable costs should only be construed as preliminary, order of magnitude budgets. Actual costs most probably will vary from the consultant's opinions of probable costs depending on such matters as type and design of suggested remedy, quality of materials and installation, manufacturer and type of equipment or system selected, field conditions, whether a physical deficiency is repaired or replaced in whole, phasing of the work (if applicable), quality of contractor, quality of project management exercised, market conditions, and whether competitive pricing is solicited, etc. ASTM E2018-08 recognizes that certain opinions of probable costs cannot be developed within the scope of this guide without further study. Opinions of probable cost for further study should be included in the PCR.

### 1.3.1. Methodology

#### Physical Needs Assessment:

Based upon site observations, research, and judgment, along with referencing Expected Useful Life (EUL) tables from various industry sources, EMG opines as to when a system or component will most probably necessitate replacement. Accurate historical replacement records, if provided, are typically the best source of information. Exposure to the elements, initial quality and installation, extent of use, the quality and amount of preventive maintenance exercised, etc., are all factors that impact the effective age of a system or component. As a result, a system or component may have an effective age that is greater or less than its actual chronological age. The Remaining Useful Life (RUL) of a component or system equals the EUL less its effective age. Projections of Remaining Useful Life (RUL) are based on continued use of the Property similar to the reported past use. Significant changes in tenants and/or usage may affect the service life of some systems or components.

Where quantities could not be derived from an actual take-off, lump sum costs or allowances are used. Estimated costs are based on professional judgment and the probable or actual extent of the observed defect, inclusive of the cost to design, procure, construct and manage the corrections.

The evaluation period identified in this report is defined as 20 years.

The physical condition of building component to be repaired is typically defined as being in one of five categories: Priority One through Five. For the purposes of this report, the following definitions are used:

**Priority One** - These items are to be addressed as Immediate. Items in this category require immediate action and include corrective measures to:

1. Correct life safety and/or code hazards
2. Repair item permitting water leaks into the building or structure
3. Repair mold or mildew conditions
4. Down unit repairs
5. Further study investigations

**Priority Two** - These items are to be addressed within the next 1 year. Items in this category require corrective measures to:

1. Return a system to normal operation
2. Stop deterioration to other systems
3. Stop accelerated deterioration
4. Replace items that have reached or exceeded their useful service life
5. ADA/UFAS deficiencies

**Priority Three** - These items are to be addressed within the next 2-3 years. Items in this category, if not corrected expeditiously, will become critical in the next several years. Items in this category include corrective measures to:

1. Stop intermittent interruptions

2. Correct rapid deterioration
3. Replace items that will reach or exceed their useful service life
4. Correct functionality and/or aesthetic issues that are not critical

**Priority Four** - These items are to be addressed within the next 3-5 years. Items in this category include conditions requiring appropriate attention to preclude predictable deterioration or potential downtime and the associated damage or higher costs if deferred further.

**Priority Five** - These items are to be addressed within 6-20 years. Items in this category represent a sensible improvement to the existing conditions. These are not required for the most basic function of the facility; however, Priority 5 projects will improve overall usability and/or reduce long-term maintenance costs.

#### Energy Audit:

All the ECMs are broken into two major categories:

1. **No/Low Cost Recommendations:** No/Low cost is defined as any project with initial investment of less than \$1000
2. **Capital Cost Recommendations:** Capital cost defined as any project with initial investment greater than \$1000

EMG screens ECMs based on the payback criteria.

Simple Payback Period –The number of years required for the cumulative value of energy or water cost savings less future non-fuel or non-water costs to equal the investment costs of the building energy or water system, without consideration of discount rates. ECMs with a payback period greater than the Expected Useful Life (EUL) of the project are not typically recommended, as the cost of the project will not be recovered during the lifespan of the equipment. These ECMs are recommended for implementation during future system replacement. At that time, replacement may be evaluated based on the premium cost of installing energy efficient equipment.

$$\text{Simple Payback} = \frac{\text{Initial Cost}}{\text{Annual Savings}}$$

### 1.3.2. Immediate Repairs and Short Term Costs

Immediate repairs are opinions of probable costs that require immediate action as a result of: (1) material existing or potential unsafe conditions, (2) material building or fire code violations, or (3) conditions that, if not addressed, have the potential to result in, or contribute to, critical element or system failure within one year or will most probably result in a significant escalation of its remedial cost.

Short term costs are opinions of probable costs to remedy physical deficiencies, such as deferred maintenance, that may not warrant immediate attention, but that require repairs or replacements, which should be undertaken on a priority basis in addition to routine preventive maintenance. Opinions of probable costs may include costs for testing, exploratory probing, and further analysis should this be deemed warranted by the consultant. The performance of such additional services is beyond the FCA scope of work. Generally, the time frame for such repairs is within one to two years. Short Term costs are included in the Replacement Reserves Report.

### 1.3.3. Replacement Reserves

Replacement Reserves are for recurring probable expenditures, which are not classified as operation or maintenance expenses. The replacement reserves should be budgeted for in advance on an annual basis. Replacement Reserves are reasonably predictable both in terms of frequency and cost. However, Replacement Reserves may also include components or systems that have an indeterminable life but, nonetheless, have a potential for failure within an estimated time period.

Replacement Reserves exclude systems or components that are estimated to expire after the reserve term and are not considered material to the structural and mechanical integrity of the subject property. Furthermore, systems and components that are not deemed to have a material effect on the use of the Property are also excluded. Costs that are caused by acts of God, accidents, or other occurrences that are typically covered by insurance, rather than reserved for, are also excluded.

Replacement costs are solicited from ownership/property management, EMG's discussions with service companies, manufacturers' representatives, and previous experience in preparing such schedules for other similar facilities. Costs for work performed by the ownership's or property management's maintenance staff are also considered.

EMG's reserve methodology involves identification and quantification of those systems or components requiring capital reserve funds within the assessment period. The assessment period is defined as the effective age plus the reserve term. Additional information concerning system's or component's respective replacement costs (in today's dollars), typical expected useful lives, and remaining useful lives were estimated so that a funding schedule could be prepared. The Replacement Reserves Schedule presupposes that all required remedial work has been performed or that monies for remediation have been budgeted for items defined in the Immediate Repairs Report.

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## 2. PURPOSE AND SCOPE

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### 2.1. PURPOSE

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EMG was retained by the client to render an opinion as to the Property's current general physical condition on the day of the site visit.

Based on the observations, interviews and document review outlined below, this report identifies significant deferred maintenance issues, existing deficiencies, and material code violations of record at municipal offices that affect the Property's use. Opinions are rendered as to its structural integrity, building system condition and the Property's overall condition. The report also notes building systems or components that have realized or exceeded their typical expected useful lives.

The physical condition of building components is typically defined as being in one of three categories: Good, Fair, and Poor. For the purposes of this report, the following definitions are used:

- Good = Satisfactory as-is. Requires only routine maintenance during the assessment period. Repair or replacement may be required due to a system's estimated useful life.
- Fair = Satisfactory as-is. Repair or replacement is required due to current physical condition and/or estimated remaining useful life.
- Poor = Immediate repair, replacement, or significant maintenance is required.

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### 2.2. SCOPE

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The standard scope of the Facility Condition Assessment includes the following:

- Visit the Property to evaluate the general condition of the building and site improvements, review available construction documents in order to familiarize ourselves with, and be able to comment on, the in-place construction systems, life safety, mechanical, electrical, and plumbing systems, and the general built environment.
- Identify those components that are exhibiting deferred maintenance issues and provide cost estimates for Immediate, Short Term, and Replacement Reserves based on observed conditions, maintenance history and industry standard useful life estimates. This will include the review of documented capital improvements completed within the last five-year period and work currently contracted for, if applicable.
- Provide a full description of the Property with descriptions of in-place systems and commentary on observed conditions.
- Provide a general statement of the subject Property's compliance to National Building Code Accessibility standards. This will not constitute a full survey, but will help identify exposure to issues and the need for further review.

- Perform a limited assessment of accessible areas of the building(s) for the presence of mold, conditions conducive to mold growth, and/or evidence of moisture. EMG will also interview Project personnel regarding the presence of any known or suspected mold, elevated relative humidity, water intrusion, or mildew-like odors. Potentially affected areas will be photographed. Sampling will not be considered in routine assessments.
- List the current utility service providers.
- Review maintenance records and procedures with the in-place maintenance personnel.
- Observe a representative sample of the interior tenant spaces/units, including vacant spaces/units, in order to gain a clear understanding of the property’s overall condition. Other areas to be observed include the exterior of the property, the roofs, interior common areas, and mechanical, electrical and elevator equipment rooms.
- Appropriate inquiries of municipal officials regarding the existence of pending unresolved building or fire code violations on file, and a determination of the current zoning category, flood hazard area, and seismic zone for the Property.
- Provide recommendations for additional studies, if required, with related budgetary information.
- Tenant responsibility for maintenance, repair or replacement of finishes, fixtures, or equipment is not addressed by this scope of services.
- Provide an Executive Summary at the beginning of this report with cost estimates as a quick, user-friendly summary of the Property’s condition and the assigned costs by category. These costs are tied to the report sections where reference to the issues are clearly defined and expanded.

**2.3. PERSONNEL INTERVIEWED**

The following personnel from the facility and government agencies were interviewed in the process of conducting the FCA:

Name and Title	Organization	Phone Number
Martha Keenan Capital Improvement Program Manager	City of Burlington	802.540.0701
Sybil Thomas Burlington Code Enforcement Department	Burlington Code Enforcement Office	802.863.0442
Nic Anderson Planning and Zoning Clerk	Burlington Planning Department	802.865.7188
Meghan Sweeney Administrative Assistant	Burlington Fire Department	802.865.5387

The FCA was performed with the assistance of Martha Keenan, Capital Improvement Program Manager, City of Burlington, the on-site Point of Contact (POC), who was cooperative and provided information that appeared to be accurate based upon subsequent site observations. The on-site contact is completely knowledgeable about the subject property and answered most questions posed during the interview process. The POC’s management involvement with the property has been for the past 7 months.

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## 2.4. DOCUMENTATION REVIEWED

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Prior to the FCA, relevant documentation was requested that could aid in the knowledge of the subject property's physical improvements, extent and type of use, and or assist in identifying material discrepancies between reported information and observed conditions. The review of submitted documents does not include comment on the accuracy of such documents or their preparation, methodology, or protocol. The Documentation Request Form is provided in Appendix E.

Although Appendix E provides a summary of the documents requested or obtained, the following list provides more specific details about some of the documents that were reviewed or obtained during the site visit.

- Original construction documents by Wieman, Lamphere Architects, dated April 20, 1973.

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## 2.5. PRE-SURVEY QUESTIONNAIRE

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A Pre-Survey Questionnaire was sent to the Client's representative prior to the site visit. The questionnaire is included in Appendix E. Information obtained from the questionnaire has been used in preparation of this report.

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## 2.6. WEATHER CONDITIONS

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The weather conditions on August 25 and 29, 2014 were clear, with temperatures in the 80's (°F) and light winds.

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## 3. CODE INFORMATION AND ACCESSIBILITY

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### 3.1. CODE INFORMATION, FLOOD ZONE AND SEISMIC ZONE

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According to Sybil Thomas of the Burlington Code Enforcement Department, there are no outstanding building code violations on file. The Building Department does not have an annual inspection program. They only inspect new construction, work that requires a building permit, and citizen complaints. A copy of the original Certificates of Occupancy were requested but were not available.

Based on a review of the zoning classification information at the Burlington Planning and Zoning Department, the property is located within zone HD, Medium Density Residential, zoning district and appears to be a conforming use.

According to Meghan Sweeney of the Burlington Fire Department, there are no major outstanding fire code violations on file. The most recent inspection was conducted by the Fire Department was within the current year.

According to information obtained from the appraisal, the property is not located in a flood hazard zone. FEMA flood map 50007C0119D of July 18, 2011 classifies the site to be in zone X.

According to the 1997 Uniform Building Code Seismic Zone Map of the United States, the property is located in Seismic Zone 2A, defined as an area of low to moderate probability of damaging ground motion.

According to the Wind Zone Map, published by the Federal Emergency Management Agency (FEMA), the property is located in Zone II and is not located in a Hurricane-Susceptible Region or Special Wind Region.

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### 3.2. ADA ACCESSIBILITY

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Generally, Title III of the Americans with Disabilities Act (ADA) prohibits discrimination by entities to access and use of "areas of public accommodations" and "commercial facilities" on the basis of disability. Regardless of its age, these areas and facilities must be maintained and operated to comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Buildings completed and occupied after January 26, 1992 are required to comply fully with the ADAAG. Existing facilities constructed prior to this date are held to the lesser standard of compliance to the extent allowed by structural feasibility and the financial resources available. As an alternative, a reasonable accommodation pertaining to the deficiency must be made.

During the FCA, a limited visual observation for ADA accessibility compliance was conducted. The scope of the visual observation was limited to those areas set forth in *EMG's Abbreviated Accessibility Checklist* provided in Appendix D of this report. It is understood by the Client that the limited observations described herein does not comprise a full ADA Compliance Survey, and that such a survey is beyond the scope of EMG's undertaking. Only a representative sample of areas was observed and, other than as shown on the Abbreviated Accessibility Checklist, actual measurements were not taken to verify compliance. The scope of the visual observation did not include any areas within tenant spaces.

At a public access property, the areas considered as a public accommodation besides the site itself and parking, are the exterior accessible route, the interior accessible route up to the tenant lease lines and the interior common areas, including the common area restrooms.

The facility does not appear to be accessible with Title III of the Americans with Disabilities Act. Elements as defined by the ADAAG that are not accessible as stated within the priorities of Title III are as follows:

***Restrooms***

- Wrap drain pipes below lavatory with insulation; protect against contact with hot, sharp, or abrasive surfaces.

A full ADA Compliance Survey may reveal additional aspects of the property that are not in compliance.

Corrections of these conditions should be addressed from a liability standpoint, but are not necessarily code violations. The Americans with Disabilities Act Accessibility Guidelines concern civil rights issues as they pertain to the disabled and are not a construction code, although many local jurisdictions have adopted the Guidelines as such. The cost to address the achievable items noted above is itemized in the Immediate Repairs Report.

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## 4. EXISTING BUILDING ASSESSMENT

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### 4.1. TENANT UNIT TYPES

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All 112,454 square feet of the building is occupied by the ice skating arena.

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### 4.2. TENANT UNITS OBSERVED

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Most of the arena was observed in order to gain a clear understanding of the property's overall condition. Other areas accessed included the exterior of the property and the roof.

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## 5. SITE IMPROVEMENTS

### 5.1. UTILITIES

The following table identifies the utility suppliers and the condition and adequacy of the services.

Site Utilities		
Utility	Supplier	Condition & Adequacy
Sanitary sewer	City of Burlington	Good
Storm sewer	City of Burlington	Good
Domestic water	City of Burlington	Good
Electric service	Burlington Electric Department Green Mountain Power	Good
Natural gas service	Vermont Gas Systems	Good

*Observations/Comments:*

- The utilities appear to be adequate for the property. There are no unique, on-site utility systems such as emergency electrical generators, septic systems, water or waste water treatment plants, or propane gas tanks.

### 5.2. PARKING, PAVING, AND SIDEWALKS

The main entrance drive is located along North Avenue on the east side of the property. The parking areas and drive aisles are paved with asphaltic concrete. Various service drive aisles throughout Leddy Park are not paved and are either dirt roads or topped with gravel. The entrance driveway aprons are paved with asphaltic concrete.



Based on a physical count, parking at the main parking area is provided for 267 cars. The parking ratio is 2.3 spaces per thousand square feet of floor area. Additional parking is located near the tennis courts on the east side of the property. The additional parking lot is an open lot provided for 52 cars. All of the parking stalls are located in open lots. There are 6 handicapped-accessible parking stalls, two of which are reserved for vans.

The sidewalks throughout the property are constructed of asphaltic concrete. There are various walking paths throughout Leddy Park that are groomed dirt, gravel, and mulch. Cast-in-place concrete steps with metal

handrails are located at grade changes. There is an additional stair case down to the beach that is constructed of wood.

The pavement edges do not have curbing. Surface runoff is directed to swales along the drive aisles or landscaped areas, which border the paved areas.

***Observations/Comments:***

- The property does not have a dedicated paving repair and maintenance contractor. On-site personnel maintain the paving and flatwork or a contractor is retained when required.
- Main parking lot - The asphalt pavement is in poor condition. There are significant signs of cracks and surface deterioration. There are areas throughout the parking lot where the ground has sunken creating large dips and valleys throughout the parking lot. The sunken ground is so wide spread throughout the parking area that the entire parking lot surface will require removal and the ground underneath will need re-leveling. Through conversation with the City of Burlington's Capitol Improvement Director; the city is investigating installing a geothermal system in the arena and the most convenient location for the geothermal wells would be in the main parking lot. If this is the case repair of the main parking area should be held off so it can be coordinated with the installation of the geo thermal system. But in the interim, EMG will provide costs of the parking lot repairs in the Replacement Reserves Cost Estimate (Table 2).
- Drive aisle and additional park lot - The asphalt pavement is in good to fair condition. There are no significant signs of cracks or surface deterioration. In order to maximize the pavement life, pothole patching, crack sealing, seal coating, and re-striping of the asphalt paving will be required during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The concrete pavement is in good condition. There are no significant signs of cracks or surface deterioration. Epoxy sealing of minor cracks will be required during the assessment period as part of the property management's routine maintenance program.

### 5.3. DRAINAGE SYSTEMS AND EROSION CONTROL

Storm water from the roofs, landscaped areas, and paved areas flows into on-site inlets and catch basins which then flow into ditches that are connected to nearby streams that empty into Lake Champlain.

The site is located on a bluff adjacent to Lake Champlain. Erosion control mesh has been installed along the bluffs and beach to control erosion along the water front.



***Observations/Comments:***

- There is no evidence of storm water runoff from adjacent properties. The storm water system appears to provide adequate runoff capacity. There is no evidence of major ponding or erosion.
- The erosion control mesh installed along the bluffs is in good condition and appears to be accomplishing the task it was meant to do. Routine maintenance will be required during the assessment period.

- The stream that runs through the northern part of the property shows evidence of some major erosion of the land. A large piece of ground and trees have collapsed and slid into the stream. This stream is one of the major storm water drainage ways for the area. A further study is required to investigate possible erosion control measures regarding the stream. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The landscaping around Leddy Arena slopes toward the building preventing proper water drainage away from the building. The ground and landscaping around the arena will require re-grading. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

#### 5.4. TOPOGRAPHY AND LANDSCAPING

The property slopes gently down from the east side of the property to the west property line. The property then steps down steeply at the water front of Lake Champlain.

The landscaping consists of trees, shrubs, and grasses. Flower beds are located throughout the site.

Surrounding properties include residential and commercial developments.

Reinforced concrete retaining walls are located at grade changes adjacent to Leddy Arena.



##### *Observations/Comments:*

- The topography and adjacent uses do not appear to present conditions detrimental to the property.
- The landscape materials are in good condition and will require routine maintenance during the assessment period.
- The retaining wall is in good condition. Routine maintenance will be required during the assessment period.
- The grass lawn on the north side of the property has wheel tread damage. The area no longer drains properly and the lawn in this area has become muddy. The area must be re-graded and new sod needs to be laid. The area of concern is small enough that it should be rolled into routine maintenance.

#### 5.5. GENERAL SITE IMPROVEMENTS

Property identification for Leddy Arena is provided by a wooden monument sign adjacent to the Bike Beltway route. Property identification for Leddy Park is provided by a stone monument sign adjacent to the main entrance drive.

Site lighting is provided by metal street light standards. The light standards are spaced along the drive aisles throughout the parking areas. Metal pole-mounted light fixtures are located along walkways and drive aisles throughout the property.



Exterior building illumination is provided by light fixtures surface-mounted on the exterior walls.

A perimeter fence is located along the north, east and south property lines. The fence is constructed of chain link with metal posts. The softball fields have an additional chain link fence. The softball field fencing is vinyl coated and has a safety cap that runs along the top of the fence.

Dumpsters are located adjacent to the concessions entrance.

*Observations/Comments:*

- The property and tenant identification signs are in good condition. Routine maintenance will be required during the assessment period.
- The exterior site and building light fixtures are in poor condition. The light fixtures are rusting and the lens is corroded, they will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The site fencing is in good to fair condition and will require routine maintenance during the assessment period.
- The dumpsters are owned and maintained by the refuse contractor.

## 6. BUILDING ARCHITECTURAL AND STRUCTURAL SYSTEMS

### 6.1. FOUNDATIONS

**Leddy Arena** - According to the structural drawings, the foundations consist of conventional reinforced concrete spread footings, which support wall and column loads.

**Tree shop building** – The foundation is a conventional slab on grade foundation.

**Restroom and storage building** - The foundation is a conventional slab on grade foundation.

#### *Observations/Comments:*

- The foundations and footings could not be directly observed during the site visit. There is no evidence of movement that would indicate excessive settlement.

### 6.2. SUPERSTRUCTURE

**Leddy Arena** - The building has structural steel columns, which support the upper floor and roof diaphragms. The upper floors have concrete-topped metal decks and are supported by steel beams and open-web steel joists. The roofs are constructed of metal decks, which are supported by steel beams and open web steel joists.

**Tree shop building** – The building is a conventional wood-framed structure and has concrete masonry unit block exterior bearing walls, which support the roof diaphragms. The roof diaphragms are constructed of manufactured wood trusses and are sheathed with plywood.



**Restroom and storage building** - The building has concrete masonry unit block exterior bearing walls, which support the roof diaphragms. The roof diaphragms are constructed of manufactured wood trusses and are sheathed with plywood.

#### *Observations/Comments:*

- **Leddy Arena** - The superstructure is exposed in some locations, which allows for limited observation. Walls and floors appear to be plumb, level, and stable. There are no significant signs of deflection or movement.

- **Tree shop building** - The superstructure is exposed in some locations, which allows for limited observation. Walls and floors appear to not be plumb, level, and stable. There are significant signs of deflection or movement. The eastern masonry wall of the building is pulling away from the main structure. Earth has been piled up against the wall to prevent the deflection but the entire wall appears to be pushing out from the top. An engineering analysis will be required to ascertain the cause of the deflection and possible solutions. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Restroom and storage building** - The superstructure is exposed in some locations, which allows for limited observation. Walls and floors appear to be plumb, level, and stable. There are no significant signs of deflection or movement.

### 6.3. ROOFING

**Leddy Arena** - The primary roof is classified as Skillion and Lean-to roof. The west slope of the roof is finished in a TPO membrane while the east slope is a standing seamed metal roof. The roofs have sheet metal flashing elements. The roof is insulated with fiberglass batts. Because of the specialized use of the facility industry specific insulation has been installed in the facility.

The roofs drain over the eaves to paved and landscaped areas.

There is a small localized area above the overhead service door that is equipped with metal gutters and a PVC flexible downspout. Additional metal gutters and downspouts are located above the east side's emergency exit doors.

There are no attics. The roof structures are exposed.

**Tree shop building** - The primary roof is classified as a gable roof. The roof is finished with asphalt shingles. The roofs have sheet metal flashing elements. The roof is not insulated.

The roofs drain over the eaves to paved and landscaped areas.

There are no attics. The roof structures are exposed. The building is ventilated by gable-end wall vents.

**Restroom and storage building** - The primary roof is classified as a gable roof. The roof is finished in standing seamed metal panels. The roofs have sheet metal flashing elements. The roof is not insulated.

The roofs drain over the eaves to paved and landscaped areas.

There are no attics. The roof structures are exposed. The building is ventilated by gable-end wall vents.

#### *Observations/Comments:*

- The property does not have a dedicated roof repair and maintenance contractor. On-site personnel maintain the roofs or a contractor is retained when required.



- **Leddy arena** - The roof finishes vary in age; the west slope of the roof was recently replaced while the east slope is estimated to be 15 years of age. The west is finished in a TPO membrane while the east is a standing metal seamed roof. Though the roofs were installed at different times and are of different ages their remaining useful lives are only a few years apart. Based on their estimated Remaining Useful Life (RUL), the roof membranes will require replacement during the assessment period. They should be replaced at the same time and if possible one material should be chosen. Due to the harsh winter conditions and the buildings proximity to Lake Champlain; a standing metal panel roof is recommended for the entire roof. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Tree shop building** - The roof appears to be original to the building and is in fair to poor condition. Based on their estimated Remaining Useful Life (RUL), the roof membrane will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Restroom and storage building** - The roof membrane is in good condition and will require routine maintenance during the assessment period.
- There is no evidence of active roof leaks in the Leddy arena or park building but active leaks were observed in the maintenance building.
- **Leddy arena** - There is no evidence of roof deck or insulation deterioration. The roof substrate and insulation should be inspected during any future roof repair or replacement work.
- There is no evidence of fire retardant treated plywood (FRT).
- The roof flashings are in good condition and will require routine maintenance during the assessment period.
- **Leddy arena** - Roof drainage appears not to be adequate. The flexible PVC downspout on the west side of the building only comes down 1/3 of the way of the wall and is positioned in a location where it discharges water onto an electrical panel. The downspout should continue the entire length of the wall and discharge at the ground. This can be completed as routine maintenance.
- **Leddy arena** - Above the east side emergency exits; snow guards have been installed to help mediate the buildup of snow pack on the exterior of the emergency exits. It was reported by the Client's representative that in the winter snow will build up on the exterior of the emergency exit doors and freeze thus preventing the doors from being operational. Given the geographical location of the building it is our opinion that snow guards will not help in preventing snow pack buildup. Given experience with similar arrangements, the snow guards will release the snow pack on the roof when it reaches the maximum tension level listed by the manufacturer of the snow guard. The only way to prevent snow pack build up outside the emergency doors is to either clear the snow pack by shoveling before it freezes or build a sloping covered area above the doors. Snow removal is considered routine maintenance but the costs for an architectural study to install a slopped porch above the doors will be included in the Replacement Reserves Cost Estimate (Table 2).
- The roof vents are in fair condition and will require routine maintenance during the assessment period.
- There is no evidence of moisture, water intrusion, or excessive daylight in the attics. The insulation in the attics appears to be adequate.

## 6.4. EXTERIOR WALLS

**Leddy arena** - The building has unfinished concrete masonry unit (CMU) exterior walls. Portions of the exterior walls are finished with factory-finished metal panels.

Horizontal and vertical bands of sealant are installed at glazing joints, spandrel panel joints, and at joints between finish transitions.

Building sealants (caulking) are located between dissimilar materials, at joints, and around window and door openings.

**Tree shop building** - The building has unfinished concrete masonry unit (CMU) exterior walls. Portions of the exterior walls are finished with painted wooden panels.

The building does not utilize the use of sealants or caulking.

**Restroom and storage building** - The building has unfinished concrete masonry unit (CMU) exterior walls. Portions of the exterior walls are finished with painted wooden panels.

Horizontal and vertical bands of sealant are installed at glazing joints, spandrel panel joints, and at joints between finish transitions.

Building sealants (caulking) are located between dissimilar materials, at joints, and around window and door openings.



### *Observations/Comments:*

- **Leddy arena** - The exterior finishes are in fair condition. The painted metal panels on the building have faded in color and some areas have graffiti on them. Painting will be required during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Leddy arena** - The CMU exterior finishes are in fair condition. The wall will require pressure washing to remove organic growth as well as re-pointing in various areas; mainly localized at the bottom and top corners of the exterior walls. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Leddy arena** - The sealant is no longer flexible or smooth. It is cracking and in poor condition and will require replacing during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Tree shop building** - The exterior finishes are in fair condition. Painting and patching will be required during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Restroom and storage building** - The exterior finishes are in good condition. Painting and patching will be required during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Restroom and storage building** - The sealant is flexible, smooth, and in good condition and will require routine maintenance during the assessment period.
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## 6.5. EXTERIOR AND INTERIOR STAIRS

The exterior stairs that lead down to the beach are constructed of wood and have open risers and wooden treads. The handrails and balusters are constructed of wood.

The interior stairs in Leddy arena are constructed of steel with concrete filled metal pan treads. The handrails and balusters are constructed of painted metal.

There are additional stairs built into the bleachers by the ice rink. The stairs are built into the bleachers steel structure. The treads are wooden and are finished in a non slip vinyl topping. The handrails and balusters are constructed of painted metal.



### *Observations/Comments:*

- The interior stairs, balusters, and handrails are in good condition and will require routine maintenance during the assessment period.
- The exterior stairs that led down to the beach are in poor condition. Many of the wooden treads are loose and have become offset from level thus resulting in a tripping hazard. As a result of the loose boards many nails have become exposed safety hazards. The wooden handrails are looses as well and there are areas of deteriorated wood in localized places. Based on the stair's current condition it will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

## 6.6. EXTERIOR WINDOWS AND DOORS

**Leddy arena** - The windows are metal-framed slider units of tinted glazing. The windows are single glazed with various double-glazed units in the office spaces.

The entrance doors are painted metal doors set in metal frames. The entrance doors have cylindrical locksets with pull/push handle hardware.

The service doors are painted metal doors set in metal frames. The doors have cylindrical locksets with pull/push handle hardware.

A total of one overhead door is located on the west side of the building. The door provides access to the zamboni garage. The overhead doors are flush-paneled metal doors and are equipped with mechanical openers.

**Tree shop building** – The building is not equipped with windows. There are acrylic panels set into the overhead doors that provide natural light.

The entrance door is a painted hollow-core wooden door set in wooden frames. The entrance door has cylindrical locksets with turn knob hardware.



A total of five overhead doors are located on the south side of the building. The door provides access to the storage and maintenance bays in the building. The overhead doors are flush-paneled metal doors and are equipped with mechanical openers.

**Restroom and storage building** – The building's rest rooms are equipped with single glazed windows set in metal frames. The windows are equipped with a metal mesh security element.

The exterior doors are painted metal doors set in metal frames. The entrance doors have cylindrical locksets with pull/push handle hardware.

*Observations/Comments:*

- **Leddy arena** – The windows are in poor condition. There is evidence of window leaks and window condensation. The seal in the double glazed windows have broken thus making them inefficient. Based on their current condition the windows will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Leddy arena** - The exterior doors and door hardware are in poor condition. The bottom parts of the doors have rusted, thus not allowing a proper seal while closed. It was also observed the weather stripping on all the doors is either missing or deteriorated. The doors are also heavily dented. Based on their current condition the exterior doors will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Leddy arena** - The overhead doors are in good condition and will require routine maintenance during the assessment period.
- **Tree shop building** – The exterior door and hardware is in poor condition. It is damaged and does not secure tightly. There is only one exterior door so the cost of replacement is considered routine maintenance.
- **Tree shop building** – The overhead doors are in poor condition. The door panels are heavily damaged as well as the wooden frames around them. Based on their current condition the overhead doors will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- **Restroom and storage building** - There is no evidence of window leaks or window condensation. The windows are in good condition and will require routine maintenance during the assessment period.
- **Restroom and storage building** – The exterior door and hardware is in good to fair condition. They are slightly dented and will require repainting. Repainting is considered routine maintenance.

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## 6.7. PATIO, TERRACE, AND BALCONY

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Not applicable. There are no patios, terraces, or balconies.

**6.8. COMMON AREAS, ENTRANCES, AND CORRIDORS**

The lobby contains directories, and a bulletin board. The ice rink, corridor, and offices are accessed directly from the lobby.

Additional office space, storage, observation lounge and restrooms are accessed from the second floor corridor beyond the lobby.

Common area restrooms located on the second floor adjacent to the observation lounge and on the first floor adjacent to the concessions area and pro shop.

The following table identifies the interior common areas and generally describes the finishes in each common area.



Common Area	Floors	Walls	Ceilings
Lobby	Vinyl floor tile	Painted CMU	Suspend T-Bar with acoustic tiles
Bleacher circulation above	Finished concrete	Painted CMU	Not finished
Bleacher circulation above	Finished concrete topped with slip resistance rubber mats	Painted CMU	Not finished
Offices	Carpet	Painted drywall and CMU	Suspend T-Bar with acoustic tiles
Common Area Restroom	Vinyl floor tile	Painted CMU	Suspend T-Bar with acoustic tiles
Common Corridor	Vinyl floor tile	Painted CMU	Suspend T-Bar with acoustic tiles
Observation lounge	Vinyl floor tile	Painted CMU	Suspend T-Bar with acoustic tiles
Concessions	Epoxy floor coating	Painted CMU	Suspend T-Bar with acoustic tiles
Pro shop	Being renovated at time of visit	Being renovated at time of visit	Being renovated at time of visit
Ice rink area	Finished concrete	Painted CMU	Not finished

*Observations/Comments:*

- The common areas different areas were renovated at various times. The most recent renovation involve the concessions area, select locker rooms and pro shop.

- The interior finishes in the common areas range from fair to poor condition. Based on its estimated Remaining Useful Life (RUL), the common area flooring finish will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2). Interior painting and wall finish replacement will also be required during the assessment period. The cost of this work is also included in the Replacement Reserves Cost Estimate (Table 2). Based on their estimated Remaining Useful Life (RUL), the ceiling tiles will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The flooring throughout the concessions area and select locker rooms were recently refinished as of last year. The flooring was coated in an epoxy surfacing material. With over a year of use the material has not held up well and is demonstrating signs of accelerated wear and tear. Based on the current condition and projected use of the facility it is recommended to replace the floor finish in 3 to 4 years. Because of the facility's heavy use it is recommended to choose an industrial grade flooring finish. There are a number of options on the market. One example would be a polyaspartic polyurea spray coating material. The coating is used in factories, warehouses, railway cars, and sporting complexes. Various ice rinks have been known to add an extra layer of quartz material to the polyaspartic polyurea coating. The extra layer adds increased durability and as well as increased slip resistance. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

## 7. BUILDING MECHANICAL AND PLUMBING SYSTEMS

### 7.1. BUILDING HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

Heating throughout most of the building is provided by two Smith GB300 boilers with 1,500 MBH input and 1,233 MBH output. The boilers are located in the mechanical room. Venting is achieved by a 16" diameter stack and combustion air is accomplished through two 38"x24" outside air dampers.



The main locker rooms, snack bar area, official's locker room, ice rink viewing area, bathrooms, and storage areas are heated by hot water unit heaters.

The high school locker rooms located beneath the main grandstand are heated by an American Standard Freedom 90 high efficiency natural gas furnace which is heating only and provides no cooling.

The second floor office areas and adjacent spaces are heated by an American Standard Freedom 90 high efficiency gas furnace and cooled by an American Standard Allegiance 10 five ton air cooled condensing unit.

Modine High Intensity Infrared Unit Heaters are installed over the main grandstand for the comfort of fans during events.

Building dehumidification is maintained by a Munters Corporation DryCool model A30 wheel desiccant dehumidifier with air being supplied via spiral ductwork above the main grandstand.

The main and secondary rink ice is maintained by a Bassai Advanced Ice Making Technology Refrigeration Control System by Docal Limited. This custom system utilizes two cylinder compressors, a Howe Corporation tube and shell heat exchanger, numerous pumps, brine tanks, and a Baltimore Aircoil Cooling Tower model VC-1-186-D.

Electric heaters are installed in locations throughout the facility to provide auxiliary heat.

The locker rooms, bathrooms, and other areas are ventilated by mechanical exhaust fans. Ventilation fans are sidewall discharged and connected by concealed ducts to each ventilated space. Ventilation in all areas is very poor and in immediate need of improvement.

The concession kitchen has a kitchen exhaust hood that is not adequately sized to accommodate the installed kitchen equipment.

#### *Observations/Comments:*

- The property does not have a dedicated HVAC repair and maintenance contractor. On-site personnel maintain the HVAC equipment or a contractor is retained when required.

- Records of the installation, maintenance, upgrades, and replacement of the HVAC equipment have been maintained since the property was first occupied.
- The HVAC equipment varies in age. HVAC equipment is reportedly replaced on an "as-needed" basis.
- The common area heating plant appears to be in good to fair condition. Based on its estimated Remaining Useful Life (RUL), the boilers will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The building ventilation appears to be in poor condition. Based on its estimated Remaining Useful Life (RUL), the exhaust systems will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The kitchen exhaust hood appears to be in poor condition. Based on its estimated Remaining Useful Life (RUL), the exhaust systems will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The building dehumidification system appears to be in good condition. Based on its estimated Remaining Useful Life (RUL), the dehumidification systems will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The rink ice making system appears to be in poor condition. Based on its estimated Remaining Useful Life (RUL), the ice making systems will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The gas fired furnaces and split system appears to be in fair condition. Based on its estimated Remaining Useful Life (RUL), the furnaces and condensing unit will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

## 7.2. BUILDING PLUMBING AND DOMESTIC HOT WATER

The plumbing systems include the incoming water service, the cold water piping system, and the sanitary sewer and vent system.

The risers and the horizontal distribution piping are copper. The soil and vent systems are a combination of PVC and cast iron.

The water meter is located in the main mechanical room.

Domestic hot water is supplied to the Zamboni storage tank, locker rooms, and rest rooms by a 160 MBH gas-fired water heater and two 200-gallons hot water storage tanks. The water heater and storage tanks are located in the mechanical room.

Domestic hot water supplied to the concession kitchen is supplied by a separate 7000 watt electric hot water heater.



The common area restrooms have commercial-grade fixtures and accessories including water closets and lavatories.

*Observations/Comments:*

- The plumbing systems appear to be well maintained and in good condition. The water pressure appears to be adequate. The plumbing systems will require routine maintenance during the assessment period.
- There is no evidence that the property uses polybutylene piping for the domestic water distribution system.
- The pressure and quantity of hot water appear to be adequate.
- The water heaters appear to be in good condition. Based on their estimated Remaining Useful Life (RUL), the water heaters will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The boilers appear to be in good condition. Based on their estimated Remaining Useful Life (RUL), the boilers will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The accessories and fixtures in the common area restrooms are in good condition and will require routine maintenance during the assessment period.

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### 7.3. BUILDING GAS DISTRIBUTION

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Gas service is supplied from the gas main on the adjacent public street. Multiple gas meters and regulators are located along the exterior walls of the building. The gas distribution piping within the building is malleable steel (black iron).

*Observations/Comments:*

- The pressure and quantity of gas appear to be adequate.
- The gas meters and regulators appear to be in good condition and will require routine maintenance during the assessment period.
- Only limited observation of the gas distribution piping can be made due to hidden conditions. The gas piping appears to be in good condition.

#### 7.4. BUILDING ELECTRICAL

The electrical supply lines run underground to pad-mounted transformer, which feed exterior-mounted electrical meters.

The main electrical service size is 600 amps, 277/480 volt three-phase four-wire alternating current (AC). A step down transformers is located within the electrical room stepping down to 208/120 volt supplying general building power. The electrical wiring is copper, installed in metallic conduit. Circuit breaker panels are located throughout the building.

The incoming service disconnects and several of the main panels were updated in February 2014 with new Square D and Siemens equipment, however all other equipment is original to the building and was manufactured by Federal Pacific (FPE) making it obsolete.

The facility has no back-up generator, therefore all emergency lighting and fire alarm systems rely on battery powered back-up.



##### *Observations/Comments:*

- The on-site electrical systems up to the meters are owned and maintained by the respective utility company.
- The electrical service and capacity appear to be adequate for the property's demands.
- The switchgear, circuit breaker panels, and electrical meters appear to be in good to poor condition and will require routine maintenance during the assessment period. The main switchgear, disconnects, and main panels were upgraded in February 2014. The majority of the remaining electrical system is original to the building and nearing the end of its useful life. Most of this equipment was manufactured by Federal Pacific (FPE) which is no longer in business with replacement parts hard to obtain. It is our recommendation that the Federal Pacific (FPE) be replaced.

#### 7.5. BUILDING ELEVATORS AND CONVEYING SYSTEMS

Not applicable. There are no elevators or conveying systems.

## 7.6. FIRE PROTECTION AND SECURITY SYSTEMS

The fire protection system consists of fire extinguishers and smoke detectors. Fire extinguishers are located throughout the common areas. Hard-wired smoke detectors are located throughout the common areas. The nearest fire hydrants are located along the property's drive aisles.

Common areas and corridors are equipped with battery back-up exit lights, illuminated exit signs, pull stations, alarm horns, and strobe light alarms.

A central fire alarm panel is located main electrical room and monitors the pull stations, smoke detectors, and flow switches. The alarm panel also sounds the alarm and automatically notifies the monitoring service or the fire department in the event of trouble.



The commercial kitchen in the concession area is equipped with a dry chemical fire extinguishing system. Fire suppression heads are located in the commercial kitchen exhaust hoods above the cooking areas, and the chemical tanks are mounted adjacent to the hood.

### *Observations/Comments:*

- Information regarding the fire alarm inspection contractor was requested but was not provided by the Client's representative.
- Information regarding fire department inspection information is included in Section 3.1. .
- The fire extinguishers are serviced annually and appear to be in good condition. The fire extinguishers were serviced and inspected within the last year.
- The pull stations and alarm horns appear to be in good condition and will require routine maintenance during the assessment period.
- Smoke detector replacement is considered to be routine maintenance.
- Exit sign and emergency light replacement is considered to be routine maintenance.
- The central alarm panel appears to be in good condition and is serviced regularly by a qualified fire equipment contractor. Based on inspection documents displayed by the panel, the central alarm panel has been inspected within the last year. Fire alarm panels contain sophisticated electronic circuits that are constantly energized. Over time, circuit components deteriorate or become obsolete. Even though an alarm panel may continue to function well past its estimated design life, replacement parts may become difficult to obtain and in many cases the alarm panel will not communicate with new devices it is supposed to monitor. Based on its estimated Remaining Useful Life (RUL), replacement is recommended during the reserve term. The estimated cost of this work is included in the Replacement Reserves Report.
- The dry chemical extinguishing systems appear to be in good condition and are serviced regularly by a qualified fire equipment contractor.
- The exit stairwells appear to be constructed in accordance with applicable codes in force at the time of construction.
- The stairwell doors and door hardware are fire-rated. Certification labels are displayed on the doors.

## 8. INTERIOR SPACES

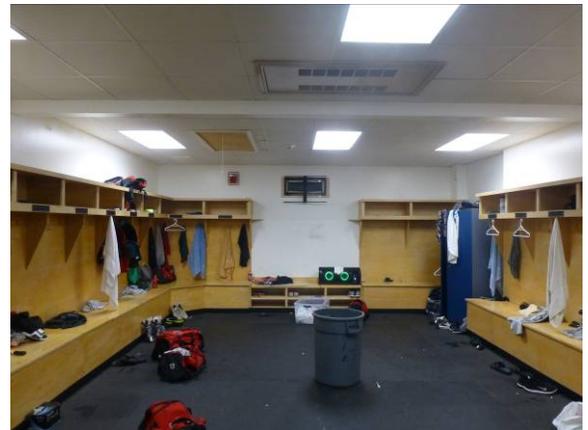
### 8.1. INTERIOR FINISHES

The following table generally describes the interior finishes of private use spaces:

Typical Tenant Unit Finishes			
Room	Floor	Walls	Ceiling
Locker room	Epoxy floor coating	Painted CMU	Painted drywall
Locker room rest rooms	Epoxy floor coating	Painted CMU	Painted drywall
Team locker rooms	Carpet	Painted CMU	Suspended T-bar system with acoustical tiles
Concessions kitchen	Vinyl tile	Painted drywall	Suspended T-bar system with acoustical tiles
Zamboni garage	Concrete	Painted CMU	Painted drywall

The interior doors are painted metal doors set in metal frames. The interior doors have cylindrical locksets with push/pull handle hardware. Various metal on the second floor have security glazing insets.

The doors in the office areas are stained hollow core wooden doors set in wooden frames. The interior doors have cylindrical locksets with knob handle hardware.



**Observations/Comments:**

- The interior finishes in the private areas range from fair to poor condition. Based on its estimated Remaining Useful Life (RUL), the common area flooring finish will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2). Interior painting and wall finish replacement will also be required during the assessment period. The cost of this work is also included in the Replacement Reserves Cost Estimate (Table 2). Based on their estimated Remaining Useful Life (RUL), the ceiling tiles will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- The interior doors and door hardware are in fair to poor condition. Some of the doors are seriously dented and various doors are missing their locksets. Some of the doors will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

**8.2. COMMERCIAL KITCHEN EQUIPMENT**

The concessions area has a variety of commercial kitchen appliances, fixtures, and equipment. The equipment is owned and maintained by the parks and recreational department. The owner is responsible for any necessary replacement costs.



The kitchen includes the following major appliances, fixtures, and equipment:

Appliance	Comment
Refrigerators	Up-right
Freezers	Up-right
Ranges	Gas
Ovens	Gas
Griddles / Grills	Gas
Fryers	Yes
Hood	Exhaust ducted to exterior
Dishwasher	N/A
Microwave	Yes
Ice Machines	Yes
Steam tables	N/A
Work tables	Stainless steel
Shelving	Acrylic covered wood

*Observations/Comments:*

- The kitchen appliances appear to be in fair condition. Based on their estimated Remaining Useful Life (RUL), some of the kitchen appliances will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).
- It was observed that the overhead exhaust hood was not fire code. The hood must totally cover a cooking area and the installed hood does not. To meet fire code standards the hood will require replacement with a larger one. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

**8.3. HVAC**

Not applicable. See Section 7.1. for descriptions and comments regarding the HVAC systems.

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**8.4. PLUMBING**

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Not applicable. See Section 0 for descriptions and comments regarding the building plumbing systems.

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**8.5. ELECTRICAL**

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Not applicable. See Section 0 for descriptions and comments regarding the building electrical systems.

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## 9. OTHER STRUCTURES

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**Leddy park softball dugouts** – The softball fields have two dugout structures. The structure is constructed of pressurized wood and is clad in wood fiber panels. The roof is finished in stainless sheet metal panels. The fiber panels and trim are painted. The structures sit on a poured concrete slab. Additional wooden benches are installed in the dugouts.



**Racket ball court** – A concrete racket ball and wall ball court structure is located adjacent to the tennis courts. The structure is constructed of poured concrete and sets on a concrete pad. The walls are painted and the wall ball court is fenced in with a chain link fence.

**Sport courts** - Adjacent to the restroom and storage building are basket ball courts and tennis courts. The tennis courts are fenced in with chain link fencing. Both sport court areas have painted surfaces.

### *Observations/Comments:*

- The dugouts were constructed only a few years ago and are in good condition and will require routine maintenance during the assessment period.
- The racket ball courts and sports courts are in fair condition and the concrete walls and court surface will require re-painting. The fencing is also in fair condition with localized areas of damage. The fencing and painting will require replacement during the assessment period. The cost of this work is included in the Replacement Reserves Cost Estimate (Table 2).

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## 10. ENERGY AUDIT - PURPOSE AND SCOPE

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The purpose of this Energy Audit is to provide The City of Burlington with a baseline of energy usage, the relative energy efficiency of the facility, and specific recommendations for Energy Conservation Measures. Information obtained from these analyses may be used to support a future application to an Energy Conservation Program, Federal and Utility grants towards energy conservation, as well as support performance contracting.

The approach taken in this energy audit began with a benchmarking analysis of the building and associated building systems by:

- 1) Developing an energy baseline that becomes the basis for the energy savings plan and cost savings plan.
- 2) Gathering utility data for each building and benchmarking against models by square footage, by facility use and type of structure.

The energy audit consisted of an onsite visual assessment to determine current conditions, itemize the energy consuming equipment (i.e. Boilers, split system cooling, DHW equipment); review lighting systems both exterior and interior; and review efficiency of all such equipment. The study also included interviews and consultation with operational and maintenance personnel.

## 11. FACILITY OVERVIEW AND EXISTING CONDITIONS

### 11.1. BUILDING OCCUPANCY

Typically, 40 to 600 people occupy the facility during normal operating hours. After hours occupants include approximately 2 people.

Facility Occupancy (avg. people/day)	22
Standard Operating Hours/day	11
Maintenance/ Staff Hours/day	11

#### Summary of Facility Operating Hours

	Hours Open to the Public	Hours Open to Employees
Monday-Friday	8am-5pm	7am-6pm
Saturday	8am-5pm	7am-6pm
Sunday	8am-5pm	7am-6pm

### 11.2. BUILDING ENVELOPE

The building envelope consists of the exterior shell, made up of the walls, windows, roof, and floor. The envelope provides building integrity and separates the exterior from the interior conditioned space.

#### Foundation:

**Leddy arena** - According to the structural drawings, the foundations consist of conventional reinforced concrete spread footings, which support wall and column loads.

**Tree shop building** – The foundation is a conventional slab on grade foundation.

Restroom and storage building - The foundation is a conventional slab on grade foundation.

**Structure:**

**Leddy Arena** - The building has structural steel columns, which support the upper floor and roof diaphragms. The upper floors have concrete-topped metal decks and are supported by steel beams and open-web steel joists. The roofs are constructed of metal decks, which are supported by steel beams and open web steel joists.

**Tree shop building** – The building is a conventional wood-framed structure and has concrete masonry unit block exterior bearing walls, which support the roof diaphragms. The roof diaphragms are constructed of manufactured wood trusses and are sheathed with plywood.

**Restroom and storage building** - The building has concrete masonry unit block exterior bearing walls, which support the roof diaphragms. The roof diaphragms are constructed of manufactured wood trusses and are sheathed with plywood.

**Exterior Walls:**

**Leddy arena** - The building has unfinished concrete masonry unit (CMU) exterior walls. Portions of the exterior walls are finished with factory-finished metal panels.

Horizontal and vertical bands of sealant are installed at glazing joints, spandrel panel joints, and at joints between finish transitions.

Building sealants (caulking) are located between dissimilar materials, at joints, and around window and door openings.

**Tree shop building** - The building has unfinished concrete masonry unit (CMU) exterior walls. Portions of the exterior walls are finished with painted wooden panels.

The building does not utilize the use of sealants or caulking.

**Restroom and storage building** - The building has unfinished concrete masonry unit (CMU) exterior walls. Portions of the exterior walls are finished with painted wooden panels.

Horizontal and vertical bands of sealant are installed at glazing joints, spandrel panel joints, and at joints between finish transitions.

Building sealants (caulking) are located between dissimilar materials, at joints, and around window and door openings.

**Roof:**

**Leddy Arena** - The primary roof is classified as Skillion and Lean-to roof. The west slope of the roof is finished in a TPO membrane while the east slope is a standing metal seamed roof. The roofs have sheet metal flashing elements. The roof is insulated with fiberglass batts. Because of the specialized use of the facility industry specific insulation has been installed in the facility.

The roofs drain over the eaves to paved and landscaped areas.

There is a small localized area above the overhead service door that is equipped with metal gutters and a PVC flexible downspout. Additional metal gutters and downspouts are located above the east side's emergency exit doors.

There are no attics. The roof structures are exposed.

**Tree shop building** - The primary roof is classified as gabled roof. The roof is finished with asphalt shingles. The roofs have sheet metal flashing elements. The roof is not insulated.

The roofs drain over the eaves to paved and landscaped areas.

There are no attics. The roof structures are exposed. The building is ventilated by gable-end wall vents.

**Restroom and storage building** - The primary roof is classified as gabled roof. The roof is finished in standing metal seamed panels. The roofs have sheet metal flashing elements. The roof is not insulated.

The roofs drain over the eaves to paved and landscaped areas.

There are no attics. The roof structures are exposed. The building is ventilated by gable-end wall vents.

#### Windows:

**Leddy Arena** - The windows are metal-framed slider units of tinted glazing. The windows are single glazed with a various double-glazed units in the office spaces.

**Tree shop building** – The building is not equipped with windows. There are acrylic panels set into the overhead doors that provide natural light.

**Restroom and storage building** – The building's rest rooms are equipped with single glazed windows set in metal frames. The windows are equipped with a metal mesh security element.

#### Doors:

**Leddy Arena** – The entrance doors are painted metal doors set in metal frames. The entrance doors have cylindrical locksets with pull/push handle hardware.

The service doors are painted metal doors set in metal frames. The doors have cylindrical locksets with pull/push handle hardware.

A total of one overhead door is located on the west side of the building. The door provides access to the zamboni garage. The overhead doors are flush-paneled metal doors and are equipped with mechanical openers.

**Tree shop building** – A total of five overhead doors are located on the south side of the building. The door provides access to the storage and maintenance bays in the building. The overhead doors are flush-paneled metal doors and are equipped with mechanical openers

**Restroom and storage building** – The exterior doors are painted metal doors set in metal frames. The entrance doors have cylindrical locksets with pull/push handle hardware.

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### **11.3. BUILDING HEATING, VENTILATION AND AIR-CONDITIONING (HVAC)**

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#### Heating:

The facility is heated by two central Natural Gas fired boilers. The boilers have a rated input capacity of 1,223,000 BTUH and are located in the main mechanical room.

#### Cooling:

The facility doesn't have a central cooling system. The office area of the facility is cooled by split system with a capacity of 5-tons.

**Air Distribution:**

Circulating pumps provide hot water to each temperature-controlled space by a two-pipe distribution system. The hot water supplies the radiators, unit heaters, and baseboard heaters.

Heating and cooling are provided in the common areas by a small split system consisting of a residential grade gas furnace and electric air cooled condensing unit. The furnace is within the office space and the condensing unit is located on grade.

**Space Ventilation:**

The restrooms and other areas are ventilated by mechanical exhaust fans. Large capacity ventilation fans are mounted on the roof and are connected by concealed ducts to each ventilated space.

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**11.4. BUILDING LIGHTING**

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**Space Lighting:**

The arena area lighting is high ball LED and metal halide fixtures. All other areas are lighting with linear fluorescents.

**Lighting Controls:**

The facility does not have any automatic lighting controls on internal light fixtures.

**Exterior Lighting:**

Utility-owned wood light poles provide site lighting. The poles are spaced along the drive aisles throughout the parking areas.

Surface-mounted light fixtures on the exterior walls provide the exterior building with site illumination.

Exterior lighting remains on from dusk to dawn.

**Emergency Lighting:**

The building emergency light fixtures and "EXIT" fixtures are continuously energized. In the event of a power failure, the emergency battery in each fixture will be activated to power these fixtures.

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**11.5. BUILDING ELEVATORS AND CONVEYING SYSTEMS**

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Not applicable. There are no elevators or conveying systems.

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## 11.6. BUILDING DOMESTIC WATER

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The water meter is located in the main mechanical room.

There are no central hot water systems. Domestic hot water is provided to the facility by two indirect natural gas fired water heaters, 200 gallon and 50 gallon, providing hot water to the Zamboni storage tank, locker rooms, and bathrooms. A separate 7000 watt electric hot water heater provides domestic hot water to the concession kitchen.

The common area restrooms have commercial-grade fixtures and accessories, including water closets and lavatories. The toilets consist of flush valve types. The typical flush volume was 1.6 GPF. The lavatories are equipped with aerators rated at 2.0 GPM. The lavatories are operated sensor controls. The shower heads have a rated capacity of 2.5 GPM.

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## 11.7. BUILDING NATURAL GAS AND ELECTRICITY

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### Natural Gas:

The building is connected to the natural gas utility (Vermont Gas). The gas main on the adjacent public street supplies the natural gas service. . The multiple gas meters and regulators are located along the exterior walls of the building. The gas distribution piping within the building is malleable steel (black iron).

The facility is individually metered for natural gas. There are a total of two natural gas meters at the property.

### Electricity:

The main electrical service size is 600 amps, 277/480-volt, three-phase, four-wire alternating current (AC). A step-down transformer is located in the main electrical room. The electrical wiring is copper, installed in metallic conduit. Circuit breaker panels are located throughout the building.

The facility is individually metered for electricity. There is one electric meter at the property.

- Emergency Electricity Generator:

Not applicable. There are no emergency generators systems.

## 12. ENERGY CONSERVATION MEASURES

EMG has identified 4 Energy Conservation Measures (ECMs) for this property.

List of Recommended Energy Conservation Measures For Leddy Park Arena															
ECM #	Description of ECM	Projected Initial Investment	Estimated Annual Energy Savings					Estimated Annual Water Savings	Estimated Cost Savings	Estimated Annual O&M Savings	Total Estimated Annual Cost Savings	Simple Payback	S.I.R.	Life Cycle Savings	Expected Useful Life (EUL)
			Natural Gas	Propane	No.2 Oil	Steam	Electricity								
		\$	Therms	Gallons	Gallons	Mlbs	kWh	kgal	\$	\$	\$	Years		\$	Years
<b>No/Low Cost Recommendations</b>															
1	Install Low Flow Faucet Aerators Details: Replace In Locker And Rest Rooms	\$500	146	0	0	0	0	19	\$276	\$0	\$276	1.81	4.71	\$1,855	10.00
<b>Totals for No/Low Cost Items</b>		<b>\$500</b>	<b>146</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>\$276</b>	<b>\$0</b>	<b>\$276</b>	<b>1.81</b>			
<b>Capital Cost Recommendations</b>															
1	Control External Air Leakage In Commercial Buildings Details: Entire Building	\$5,149	16,807	0	0	0	10,051	0	\$18,449	\$553	\$19,003	0.27	31.48	\$156,949	10.00
2	Replace Existing Refrigerator(s) With Energy Star Certified Refrigerator(s) Office And Concessions	\$1,833	0	0	0	0	2,462	0	\$320	\$0	\$320	5.73	2.08	\$1,987	15.00
3	Replace External Windows Details: Replace Windows In Office Area	\$5,500	228	0	0	0	1,787	0	\$465	\$5	\$470	11.71	1.67	\$3,704	30.00
	Interactive Savings Discount @ 10%		-1,718	0	0	0	-1,430	-2	-\$1,951	-\$56	-\$2,007				
	Total Contingency Expenses @ 15%	\$1,947													
<b>Total for Improvements</b>		<b>\$14,930</b>	<b>15,463</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12,870</b>	<b>17</b>	<b>\$17,559</b>	<b>\$502</b>	<b>\$18,062</b>	<b>0.83</b>			

## **13. UTILITY ANALYSIS**

Establishing the energy baseline begins with an analysis of the utility cost and consumption of the building. Utilizing the historical energy data and local weather information, we evaluate the existing utility consumption and assign it to the various end-uses throughout the buildings. The Historical Data Analysis breaks down utilities by consumption, cost and annual profile.

This data is analyzed, using standard engineering assumptions and practices. The analysis serves the following functions:

- Allows our engineers to benchmark the energy and water consumption of the facilities against consumption of efficient buildings of similar construction, use and occupancy.
- Generates the historical and current unit costs for energy and water
- Provides an indication of how well changes in energy consumption correlate to changes in weather.
- Reveals potential opportunities for energy consumption and/or cost reduction. For example, the analysis may indicate that there is excessive, simultaneous heating and cooling, which may mean that there is an opportunity to improve the control of the heating and cooling systems.

By performing this analysis and leveraging our experience, our engineers prioritize buildings and pinpoint systems for additional investigation during the site visit, thereby maximizing the benefit of their time spent on-site and minimizing time and effort by the customer’s personnel.

Based upon the utility information provided about Leddy Park and Arena, the following energy rates are utilized in determining existing and proposed energy costs.

Utility Rates used for Cost Analysis

Electricity (Blended Rate)	Natural Gas	Water / Sewer
\$0.13/kWh	\$1.02 /therm	\$6.58/kGal

The data analyzed provides the following information: 1) breakdown of utilities by consumption, 2) cost and annual profile, 3) baseline consumption in terms of energy/utility at the facility, 4) the Energy Use Index, or Btu/sq ft, and cost/sq ft. For multiple water meters, the utility data is combined to illustrate annual consumption for each utility type.

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### 13.1. ELECTRICITY

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Green Mountain power satisfies the electricity requirements of the facility.

#### Electricity Consumption and Cost Data

Electricity data was not provided.

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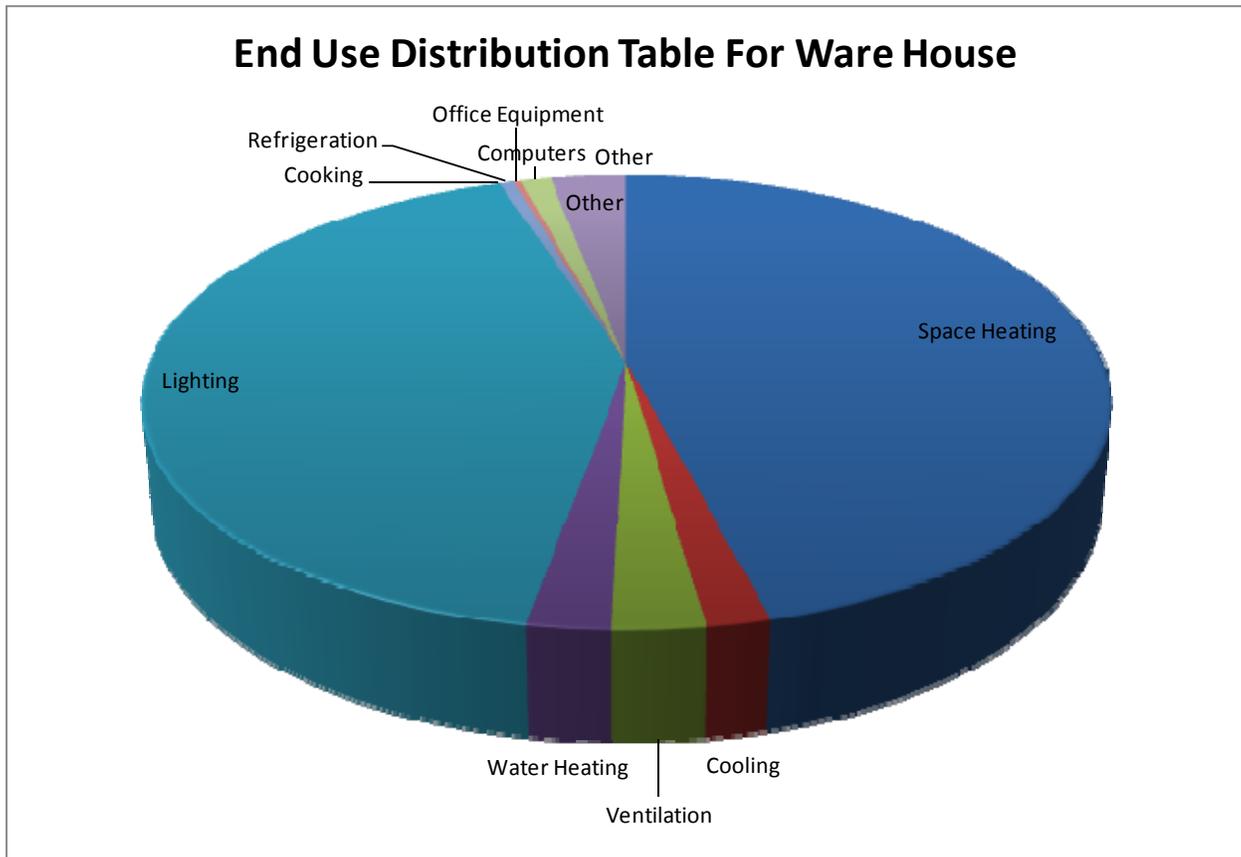
### 13.2. NATURAL GAS

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Vermont Gas System satisfies the natural gas requirements of the facility are satisfied by. Add sentences commenting on the trends observed in the natural gas consumption and costs.

Natural gas data was not provided.

**14. END USE ENERGY DISTRIBUTION**



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## 15. APPENDICES

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APPENDIX A: Photographic Record

APPENDIX B: Site Plan

APPENDIX C: Supporting Documentation

APPENDIX D: EMG Abbreviated Accessibility Checklist

APPENDIX E: Pre Survey Questionnaires and Documentation Request Checklist

APPENDIX F: Terminology

APPENDIX G: Glossary of Terms-Energy Audits

APPENDIX H: Energy Conservation Measures

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**APPENDIX A:  
PHOTOGRAPHIC RECORD**

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**EMG PHOTOGRAPHIC RECORD**

**Project No.: 110266.14R-010.294**

**Project Name: Leddy Park Arena**



Photo #1: Main signage



Photo #2: Building mounted signage



Photo #3: Park signage



Photo #4: Main parking area



Photo #5: Drive aisle



Photo #6: Bike way and signage



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #7: Beach access stairs



Photo #8: Park trail



Photo #9: Baseball park fencing



Photo #10: Exterior bleachers



Photo #11: Basket ball court



Photo #12: Stream drainage to the lake



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #13: Erosion control



Photo #14: Racket ball court



Photo #15: Mechanical fencing



Photo #16: Playground



Photo #17: North elevation of Leddy Arena



Photo #18: West elevation of Leddy Arena



ENGINEERING PEACE OF MIND

EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #19: South elevation of Leddy Arena



Photo #20: East elevation of Leddy Arena



Photo #21: Main entrance doors



Photo #22: Metal roofing

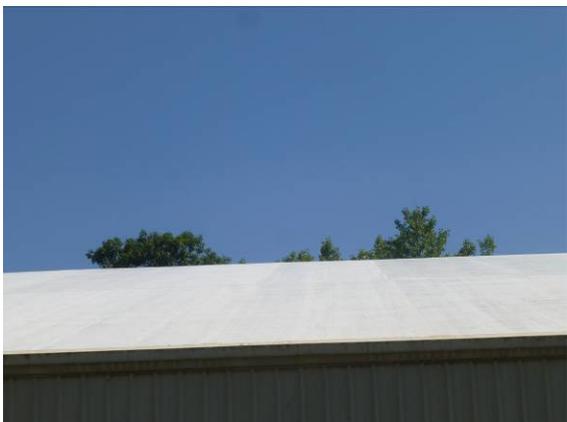


Photo #23: TPO roofing



Photo #24: Gas main



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #25: Window



Photo #26: Service door



Photo #27: Overhead door



Photo #28: Window



Photo #29: Main entrance



Photo #30: Interior doors at main entrance



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #31: Main office



Photo #32: Corridor



Photo #33: Office



Photo #34: Ceiling and light fixture detail

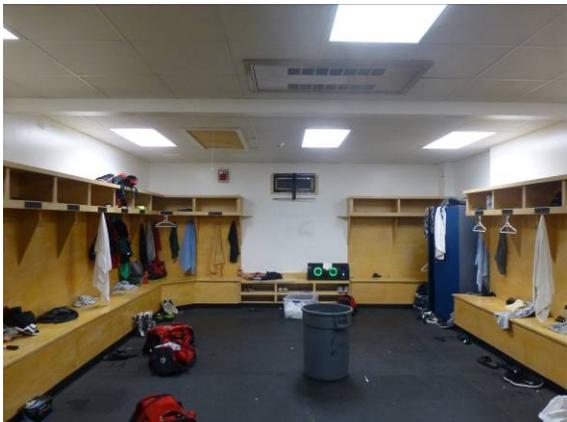


Photo #35: Locker room



Photo #36: Mezzanine level



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #37: Kitchen



Photo #38: Locker room



Photo #39: Bathroom



Photo #40: Showers



Photo #41: Bathroom



Photo #42: Zamboni garage



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #43: Ice rink



Photo #44: Interior stairs

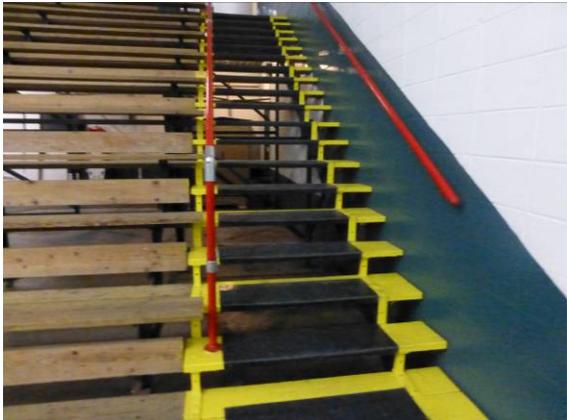


Photo #45: Bleacher stairs



Photo #46: Bleachers



Photo #47: Bleacher structure



Photo #48: Mezzanine flooring structure



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #49: Flooring structure



Photo #50: Ceiling insulation



Photo #51: Ceiling detail



Photo #52: Flooring detail



Photo #53: Wall insulation



Photo #54: Wall structure



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #55: Service garage front elevation



Photo #56: Service garage side elevation



Photo #57: Service garage side elevation



Photo #58: Service garage rear elevation



Photo #59: Service garage roofing



Photo #60: Service garage structure



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Park Arena



Photo #61: Service garage bathroom



Photo #62: Service garage interior space



Photo #63: Dugout



Photo #64: Park building elevation



Photo #65: Park building elevation



Photo #66: Park building elevation



**EMG PHOTOGRAPHIC RECORD**

**Project No.: 110266.14R-010.294**

**Project Name: Leddy Park Arena**



Photo #67:	Park building bathroom
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Photo #68:	Park building bathroom
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EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #1: Primary Natural Gas Meter at East Elevation of Building



Photo #2: Secondary Natural Gas Meter at North Elevation of Building



Photo #3: Incoming Electrical Service located in the Main Electrical Room



Photo #4: Primary Electrical Transformer and Electrical Meters at West Elevation of Building



Photo #5: Secondary Electrical Transformer located in the Main Electrical Room



Photo #6: New Square D Incoming Electrical Service Panels replaced in 2014



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #7: Original Federal Pacific Secondary Panel (typical throughout the building) in Need of Replacement



Photo #8: Main Fire Protection Panel located in the Main Electrical Room

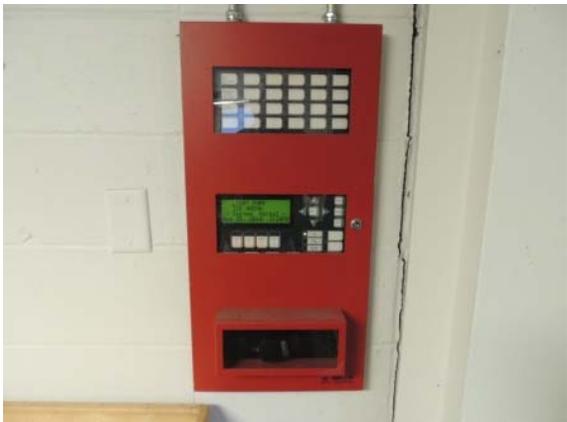


Photo #9: Secondary Fire Protection Panel located at the Main Lobby



Photo #10: Smith Gas-Fired Heating Hot Water Boilers located in the Main Mechanical Room



Photo #11: A.O. Smith Domestic Hot Water Boiler located in the Main Mechanical Room



Photo #12: Bradford White Domestic Hot Water Storage Tank located in the Main Mechanical Room



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #13: Bell & Gossett Circulation Pump located in the Main Mechanical Room



Photo #14: Bell & Gossett Circulation Pump located in the Main Mechanical Room



Photo #15: Expansion Tank located in the Main Mechanical Room



Photo #16: Hydronic Unit Heater located in the Main Mechanical Room



Photo #17: Hot Water Storage Tank Utilized for the Zamboni located in the Storage Area



Photo #18: Docal Limited Ice Making Equipment located in the Ice Making Equipment Room



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #19: Ice Build-up on the Ice Making Equipment



Photo #20: Ice Build-up on the Ice Making Equipment Piping



Photo #21: Ice Build-up on the Ice Making Equipment Pump



Photo #22: Brine Tanks for the Ice Making Equipment which Leak

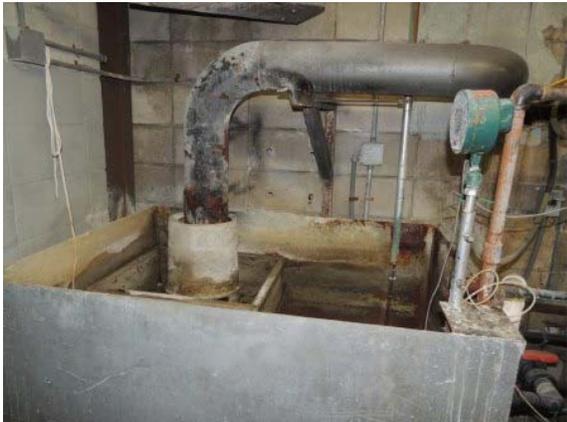


Photo #23: Ice Making Equipment Sump which is Severely Corroded



Photo #24: Ice Build-Up on Ice Making Supply Piping located in a Floor Trench



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #25: Bassai Ice Making Control System



Photo #26: Munsters Building Dehumidification System located in the North-East Corner of the Building

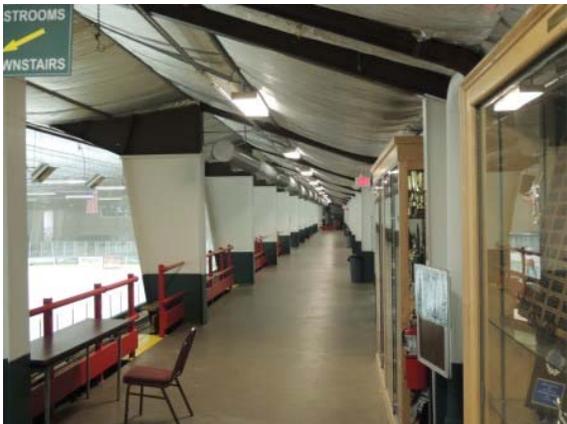


Photo #27: Building Dehumidification Ductwork located above the Main Grandstand

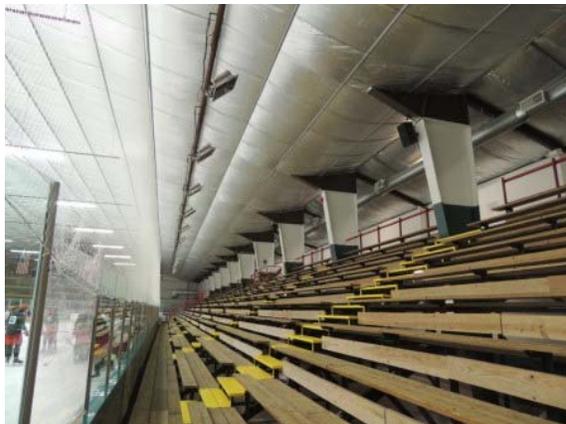


Photo #28: Modine Gas-Fired Radiant Heaters located above the Main Grandstand



Photo #29: Typical Modine Gas-Fired Radiant Heaters located above the Main Grandstand

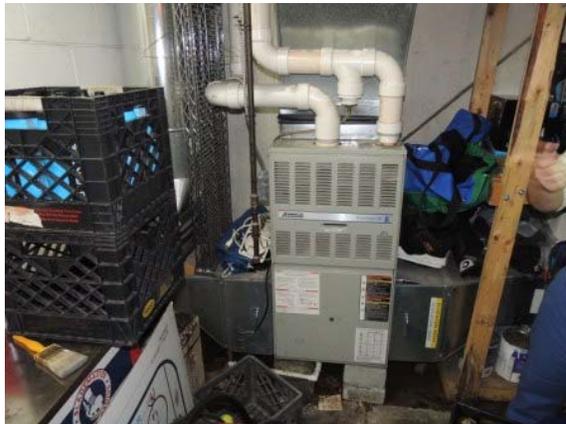


Photo #30: American Standard Gas-Fired Furnace (No Cooling) supplying the High School Locker Rooms located below the Main Grandstand



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #31: American Standard Gas-Fired Furnace with Cooling Coil supplying the Main Office Area located on the Second Floor



Photo #32: American Standard Air-Cooled Condensing Unit supplying the Main Office Area located on the Second Floor



Photo #33: Baltimore Air Coil Cooling Tower supplying the Ice Making Equipment located at the West Elevation



Photo #34: Lift Station located at the North Elevation



Photo #35: Sump Pump Located under the Main Grandstand



Photo #36: Typical Ceiling Mounted Hydronic Hot Water Heater



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #37: Typical Wall Mounted Hydronic Hot Water Heater



Photo #38: Typical Wall Mounted Hydronic Hot Water Radiant Heater



Photo #39: Typical Wall Mounted Electric Unit Heater



Photo #40: Concession Kitchen Exhaust Hood with Ansul Fire Protection



Photo #41: Concession Kitchen Ansul Fire Protection Control Panel



Photo #42: Concession Kitchen Utility Sink



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #43: Typical Shower Room Sink Area with Hands Free Faucets



Photo #44: Typical Shower Room Toilet Area with Hand Free Flush Valve



Photo #45: Typical Shower Room Area



Photo #46: Mop Sink located In Mechanical Room



Photo #47: Typical Side Wall Building Exhaust Fan

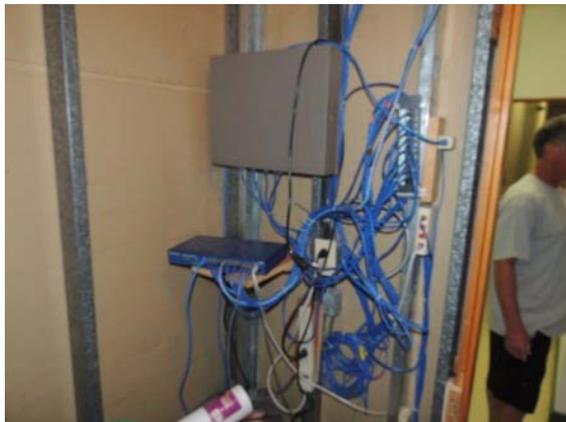


Photo #48: Telecommunications Equipment located in the Office Area



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #49: Typical Locker Room Recessed Florescent Lighting



Photo #50: Main Rink Overhead Florescent Lighting



Photo #51: Secondary Rink Metal Halide Overhead Lighting



Photo #52: Typical Utility Owned Site Lighting

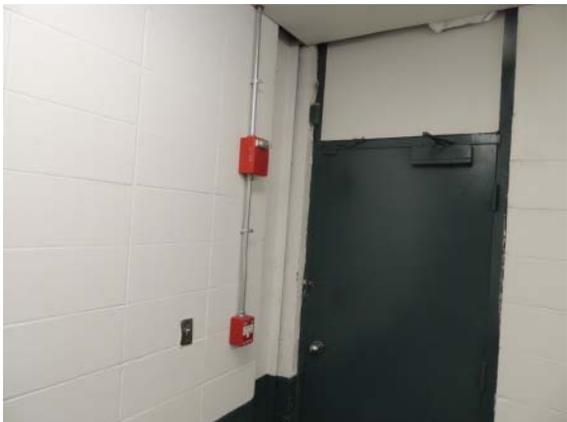


Photo #53: Typical Fire Alarm Pull Station and Fire Alarm with Strobe

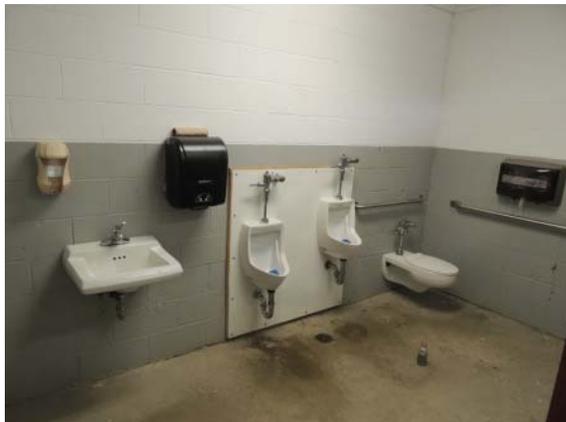


Photo #54: Typical Restroom Located in Out Building Located Near Tennis Courts



EMG PHOTOGRAPHIC RECORD

Project No.: 110266.14R-010.294

Project Name: Leddy Arena



Photo #55: Electrical Transformer Serving the Maintenance Building



Photo #56: Gas Meter Serving the Maintenance Building



Photo #57: Unit Heater Exhaust Flue Serving the Maintenance Building (typical)



Photo #58: Gas-Fired Unit Heater Serving the Maintenance Building (typical)



Photo #59: Surface Mounted Florescent Lighting Serving the Maintenance Building (typical)



Photo #60: Building Ventilation Louver Serving the Maintenance Building

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**APPENDIX B:  
SITE PLAN**

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Site Plan



		<p><b>Project Number:</b> 110266.14R-010.294</p>
		<p><b>Project Name:</b> Leddy Park Arena</p>
	<p>Not drawn to scale. The north arrow indicator is an approximation of 0° North.</p>	<p><b>On-Site Date:</b> August 25, 2014</p>

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**APPENDIX C:  
SUPPORTING DOCUMENTATION**

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RECORD OF COMMUNICATION

Date: August 25, 2014
Recorded by: Cheyenne Irby
Project Name: Leddy Park and Arena
Project Number: 110266.14R-010.294

Communication with: Sybil Thomas
of: Burlington Code Enforcement Office
Phone: 802.863.0442

Communication via:

- Telephone Conversation
Discussions During Site Inspection
Office Visitation/Meeting

Re:

Outstanding violations, Certificate of Occupancy, and other record information.

Summary of Communication:

See Section 2.5 for information regarding the Point of Contact



RECORD OF COMMUNICATION

<b>Date:</b>	August 25, 2014
<b>Recorded by:</b>	Cheyenne Irby
<b>Project Name:</b>	Leddy Park and Arena
<b>Project Number:</b>	110266.14R-010.294

<b>Communication with:</b>	Nic Anderson
<b>of:</b>	Burlington Planning and Zoning Department
<b>Phone:</b>	

Communication via:

<input type="checkbox"/>	Telephone Conversation
<input type="checkbox"/>	Discussions During Site Inspection
<input checked="" type="checkbox"/>	Office Visitation/Meeting

Re:

Outstanding violations, Certificate of Occupancy, and other record information.

Summary of Communication:

See Section 2.3 and 3.1 for information regarding the Point of Contact
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RECORD OF COMMUNICATION

Date: August 25, 2014
Recorded by: Cheyenne Irby
Project Name: Leddy Park and Arena
Project Number: 110266.14R-010.294

Communication with: Meghan Sweeney
of: Burlington Fire Department
Phone: 802.865.5387

Communication via:

- Telephone Conversation
Discussions During Site Inspection
Office Visitation/Meeting

Re:

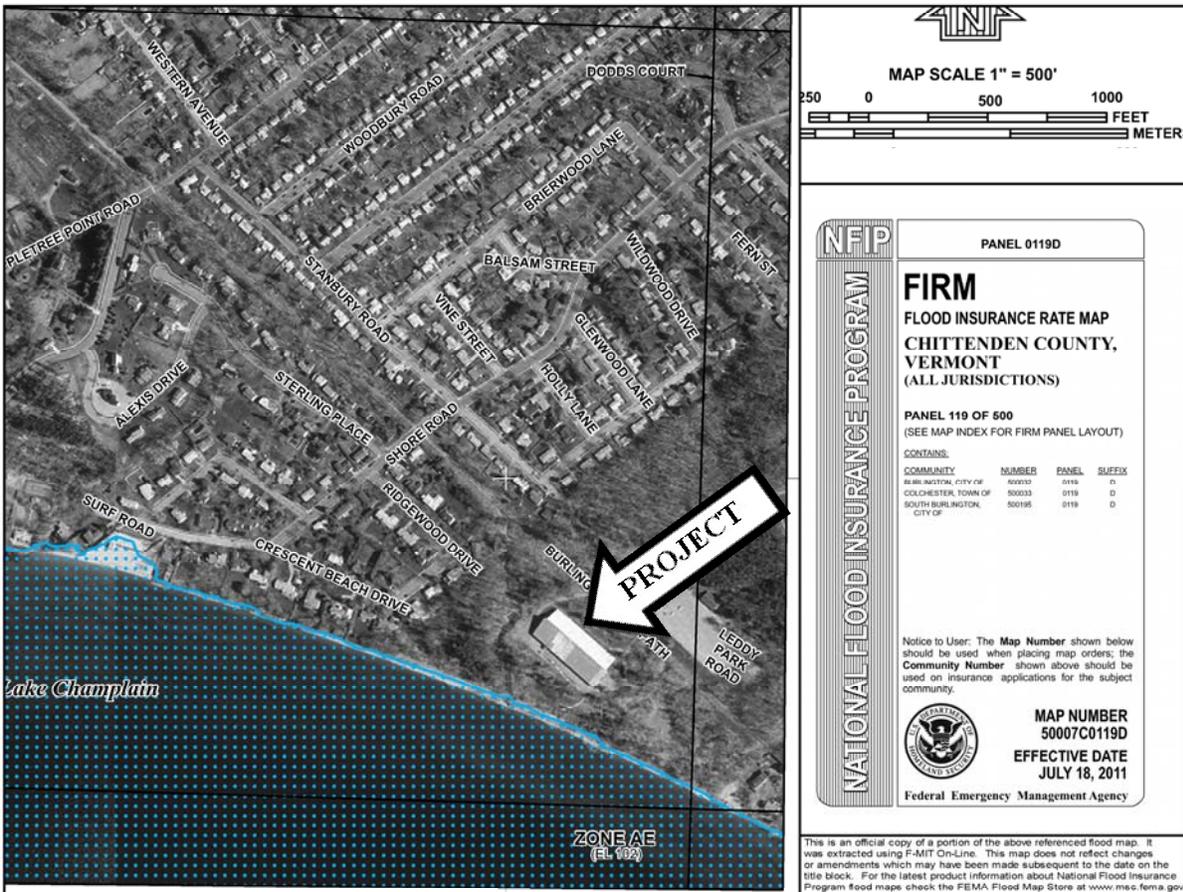
Outstanding fire code violations and inspection history

Summary of Communication:

See Section 2.3 and 3.1 for information regarding the Point of Contact



# Flood Map



	<p><b>Source:</b></p> <p>FEMA Map Number: 50007C0119D Dated: July 18, 2011</p>	<p><b>Project Number:</b></p> <p>110266.14R-010.294</p>
	<p style="text-align: center;">  </p> <p>Not drawn to scale. The north arrow indicator is an approximation of 0° North.</p>	<p><b>Project Name:</b></p> <p>Leddy Park Arena</p>
		<p><b>On-Site Date:</b></p> <p>August 25, 2014</p>

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**APPENDIX D:  
EMG ABBREVIATED ACCESSIBILITY CHECKLIST**

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**FACILITY CONDITION ASSESSMENT**

& ENERGY AUDIT

110266.14R-010.294

Property Name: Leddy Park and Arena

Date: August 25, 2014

Project Number: 110266.14R-010.294

EMG Abbreviated Accessibility Checklist					
	Building History	Yes	No	N/A	Comments
1.	Has the management previously completed an ADA review?		✓		
2.	Have any ADA improvements been made to the property?	✓			
3.	Does a Barrier Removal Plan exist for the property?		✓		
4.	Has the Barrier Removal Plan been reviewed/approved by an arms-length third party such as an engineering firm, architectural firm, building department, other agencies, etc.?		✓		
5.	Has building ownership or management received any ADA related complaints that have not been resolved?			✓	
6.	Is any litigation pending related to ADA issues?			✓	
	Parking	Yes	No	N/A	Comments
1.	Are there sufficient parking spaces with respect to the total number of reported spaces?	✓			
2.	Are there sufficient van-accessible parking spaces available (96" wide/ 96" aisle for van)?	✓			
3.	Are accessible spaces marked with the International Symbol of Accessibility? Are there signs reading "Van Accessible" at van spaces?	✓			
4.	Is there at least one accessible route provided within the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, if provided, and public streets and sidewalks?	✓			
5.	Do curbs on the accessible route have depressed, ramped curb cuts at drives, paths, and drop-offs?	✓			
6.	Does signage exist directing you to accessible parking and an accessible building entrance?		✓		



FACILITY CONDITION ASSESSMENT

& ENERGY AUDIT

110266.14R-010.294

EMG Abbreviated Accessibility Checklist					
	Ramps	Yes	No	N/A	Comments
1.	If there is a ramp from parking to an accessible building entrance, does it meet slope requirements? (1:12)	✓			
2.	Are ramps longer than 6 ft complete with railings on both sides?			✓	
3.	Is the width between railings at least 36 inches?			✓	
4.	Is there a level landing for every 30 ft horizontal length of ramp, at the top and at the bottom of ramps and switchbacks?			✓	
	Entrances/Exits	Yes	No	N/A	Comments
1.	Is the main accessible entrance doorway at least 32 inches wide?	✓			
2.	If the main entrance is inaccessible, are there alternate accessible entrances?			✓	
3.	Can the alternate accessible entrance be used independently?			✓	
4.	Is the door hardware easy to operate (lever/push type hardware, no twisting required, and not higher than 48 inches above the floor)?	✓			
5.	Are main entry doors other than revolving door available?	✓			
6.	If there are two main doors in series, is the minimum space between the doors 48 inches plus the width of any door swinging into the space?	✓			
	Paths of Travel	Yes	No	N/A	Comments
1.	Is the main path of travel free of obstruction and wide enough for a wheelchair (at least 36 inches wide)?	✓			
2.	Does a visual scan of the main path reveal any obstacles (phones, fountains, etc.) that protrude more than 4 inches into walkways or corridors?	✓			
3.	Are floor surfaces firm, stable, and slip resistant (carpets wheelchair friendly)?	✓			
4.	Is at least one wheelchair-accessible public telephone available?	✓			
5.	Are wheelchair-accessible facilities (toilet rooms, exits, etc.) identified with signage?	✓			



FACILITY CONDITION ASSESSMENT

& ENERGY AUDIT

110266.14R-010.294

EMG Abbreviated Accessibility Checklist					
6.	Is there a path of travel that does not require the use of stairs?	✓			
7.	If audible fire alarms are present, are visual alarms (strobe light alarms) also installed in all common areas?	✓			
Elevators		Yes	No	N/A	Comments
1.	Do the call buttons have visual signals to indicate when a call is registered and answered?				
2.	Are there visual and audible signals inside cars indicating floor change?				
3.	Are there standard raised and Braille marking on both jambs of each host way entrance?				
4.	Do elevator doors have a reopening device that will stop and reopen a car door if an object or a person obstructs the door?				
5.	Do elevator lobbies have visual and audible indicators of car arrival?				
6.	Does the elevator interior provide sufficient wheelchair turning area (51" x 68")?				
7.	Are elevator controls low enough to be reached from a wheelchair (48 inches front approach/54 inches side approach)?				
8.	Are elevator control buttons designated by Braille and by raised standard alphabet characters (mounted to the left of the button)?				
9.	If a two-way emergency communication system is provided within the elevator cab, is it usable without voice communication?				
Restrooms		Yes	No	N/A	Comments
1.	Are common area public restrooms located on an accessible route?	✓			
2.	Are pull handles push/pull or lever type?	✓			
3.	Are there audible and visual fire alarm devices in the toilet rooms?		✓		
4.	Are corridor access doors wheelchair-accessible (at least 32 inches wide)?		✓		
5.	Are public restrooms large enough to accommodate a wheelchair turnaround (60" turning diameter)?	✓			
6.	In unisex toilet rooms, are there safety alarms with pull cords?			✓	



EMG Abbreviated Accessibility Checklist					
7.	Are stall doors wheelchair accessible (at least 32" wide)?	✓			
8.	Are grab bars provided in toilet stalls?	✓			
9.	Are sinks provided with clearance for a wheelchair to roll under (29" clearance)?	✓			
10.	Are sink handles operable with one hand without grasping, pinching or twisting?	✓			
11.	Are exposed pipes under sink sufficiently insulated against contact?		✓		
12.	Are soap dispensers, towel, etc. reachable (48" from floor for frontal approach, 54" for side approach)?	✓			
13.	Is the base of the mirror no more than 40" from the floor?	✓			



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**APPENDIX E:  
PRE SURVEY QUESTIONNAIRES AND  
DOCUMENTATION REQUEST CHECKLIST**

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**PRE-SURVEY QUESTIONNAIRE**

**REQUEST FOR DOCUMENTATION**

On the day of the site visit, provide EMG's Field Observer the documents listed below. Signify which documents will be copied, available for review at the site, not available, or not applicable by placing a check mark in the appropriate columns. Also provide this completed checklist.

		Copies Provided	Reviewed at Site	Not Available	Not Applicable
1	<b>Maintenance Contractor List.</b> Provide the company name, phone number, and contact person of all maintenance contractors who serve the property, such as mechanical contractors, roof contractors, fire sprinkler and fire alarm testing contractors, and elevator contractors.	✓			
2	<b>Construction Documents (Blueprints).</b> Provide all available construction documents for the original construction of the building or for any tenant improvement work or other recent construction work.				
3	<b>Site plan.</b> Provide a site plan, preferably 8 1/2" X 11", which depicts the arrangement of buildings, roads, parking stalls, and other site features.				
4	<b>Certificates of Occupancy</b> and original <b>Building Permits.</b>				
5	<b>Tenant List.</b> For commercial properties, provide a tenant list, which identifies the names of each tenant, vacant tenant units, the floor area of each tenant space, and the gross and net leasable area of the building(s).				
6	<b>Apartment Unit Summary.</b> For apartment properties, provide a summary of the apartment unit types and quantities, including the floor area of each apartment unit as measured in square feet.				
7	<b>Hotel &amp; Nursing Home Room Summary.</b> For hotel or nursing home properties, provide a summary of the room types and room type quantities, including the floor area of each room type.				
8	<b>Occupancy Percentage.</b> Provide the current occupancy percentage and typical turnover rate records (for commercial and apartment properties).				
9	<b>Inspection Documents and Certificates.</b> Fire, building, and health department inspection reports and elevator inspection certificates.				
10	<b>Warranties.</b> Roof and HVAC warranties, or any other similar relevant documents.				
11	<b>Utility Companies.</b> The names of the local utility companies which serve the property, including the water, sewer, electric, gas, and phone companies.				
12	<b>Capital Improvement Summary.</b> A summary of recent (over the last 5 years) capital improvement work which describes the scope of the work and the cost of the improvements.				
13	<b>Proposed Improvements.</b> Pending contracts or proposals for future improvements.				
14	<b>Historical Costs.</b> Costs for repairs, improvements, and replacements.				
15	<b>Records.</b> Records of system & material ages (roof, MEP, paving, finishes, furnishings).				
16	<b>Brochures or Marketing Information.</b>				
17	<b>Appraisal,</b> either current or previously prepared.				
18	<b>Previous reports</b> pertaining to the physical condition of property.				
19	<b>ADA survey</b> and status of improvements implemented.				
20	<b>Litigation.</b> Current / pending litigation related to property condition.				

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**APPENDIX F:  
TERMINOLOGY**

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The following are definitions of terms utilized in this report.

TERMINOLOGY	
Actual Knowledge	Information or observations known first hand by EMG.
ADA	The Americans with Disabilities Act
Ancillary Structures	Structures that are not the primary improvements of the Property but which may have been constructed to provide support uses.
Appropriate Inquiry	A requests for information from appropriate entity conducted by a Freedom of Information Letter (FOIL), verbal request, or by written request made either by fax, electronic mail, or mail. A good-faith one time effort conducted to obtain the information in light of the time constraints to deliver the FCA.
ASTM	American Society for Testing and Materials
Base Building	That portion of the building (common area) and its systems that are not typically subject to improvements to suit tenant requirements.
Baseline	A minimum scope level of observation, inquiry, research, documentation review, and cost estimating for conducting a Facility Condition Assessment as normally conducted by EMG.
BOMA	Building Owners & Managers Association
Building	Referring to the primary building or buildings on the Property, which are within the scope of the FCA as defined under Section 2.
Building Codes	A compilation of rules adopted by the municipal, county and/or state governments having jurisdiction over the Property that govern the property's design &/or construction of buildings.
Building Department Records	Information concerning the Property's compliance with applicable Building, Fire and Zoning Codes that is readily available for use by EMG within the time frame required for production of the Facility Condition Assessment.
Building Systems	Interacting or interdependent components that comprise a building such as structural, roofing, side wall, plumbing, HVAC, water, sanitary sewer and electrical systems.
BUR	Built Up Roof
Client	The entity identified on the cover of this document as the Client.
Commercial Real Estate	Real property used for industrial, retail, office, agricultural, other commercial, medical, or educational purposes, and property used for residential purposes that has more than four (4) residential dwelling units.
Commercial Real Estate Transaction	The transfer of either a mortgage, lease, or deed; the re-financing of a commercial property by an existing mortgagee; or the transferring of an equity interest in commercial property.
Component	A piece of equipment or element in its entirety that is part of a system.
Consultant	The entity or individual that prepares the Facility Condition Assessment and that is responsible for the observance of, and reporting on the physical condition of Commercial Property.
Dangerous or Adverse Conditions	Situations which may pose a threat or possible injury to the Project Manager, or those situations which may require the use of special protective clothing, safety equipment, access equipment, or any precautionary measures.
Deferred Maintenance	Deficiencies that result from postponed maintenance, or repairs that have been put off until a later time and that require repair or replacement to an acceptable condition relative to the age of the system or property.
Dismantle	To take apart; disassemble; tear down any component, device or piece of equipment that is bolted, screwed, secured, or fastened by other means.



TERMINOLOGY	
DWV	Drainage Waste Ventilation
EIFS	Exterior Insulation and Finish System
EMS	Energy Management System
Engineering	Analysis or design work requiring extensive formal education, preparation and experience in the use of mathematics, chemistry, physics, and the engineering sciences as provided by a Professional Engineer licensed to practice engineering by any state of the 50 states.
Expected Useful Life (EUL)	The average amount of time in years that a system or component is estimated to function when installed new.
FEMA	Federal Emergency Management Agency
FFHA	Federal Fair Housing Act
Fire Department Records	Information generated or acquired by the Fire Department having jurisdiction over the Property, and that is readily available to EMG within the time frame required for production of the FCA.
FIRM	Flood Insurance Rate Maps
FM	Factory Mutual
FOIA	U.S. Freedom of Information Act (5 USC 552 et seq.)
FOIL	Freedom of Information Letter
FRT	Fire Retardant Treated
Guide	A series of options or instructions that do not recommend a specific course of action.
His	Referring to either a male or female Project Manager, or individuals interviewed by the Project Manager.
HVAC	Heating, Ventilating & Air Conditioning
IAQ	Indoor Air Quality
Immediate Repairs	Physical deficiencies that require immediate action as a result of: (i) existing or potentially material unsafe conditions, (ii) significant negative conditions impacting tenancy/marketability, (iii) material building code violations, or (iv) poor or deteriorated condition of critical element or system, or (v) a condition that if left "as is", with an extensive delay in addressing same, has the potential to result in or contribute to critical element or system failure within one (1) year.
Interviews	Interrogatory with those knowledgeable about the Property.
Material	Having significant importance or great consequence to the asset's intended use or physical condition.
MEP	Mechanical, Electrical, and Plumbing
NFPA	National Fire Protection Association
Observations	The results of the Project Manager's Walk-through Survey.
Observe	The act of conducting a visual, unaided survey of items, systems or conditions that are readily accessible and easily visible on a given day as a result of the Project Manager's walk-through.
Obvious	That which is plain or evident; a condition that is readily accessible and can be easily seen by the Project Manager as a result of his Walk-through without the removal of materials, moving of chattel, or the aid of any instrument, device, or equipment.
Owner	The entity holding the deed to the Property that is the subject of the FCA.
FCA	Facility Condition Assessment, the Purpose and Scope of which is defined in Section 2. of this report.



TERMINOLOGY	
Physical Deficiency	<p>Patent, conspicuous defects, or significant deferred maintenance of the Property's material systems, components, or equipment as observed during the Project Manager's Walk-through Survey.</p> <p>Material systems, components, or equipment that are approaching, have realized, or have exceeded their typical Expected Useful Life (EUL); or, that have exceeded their useful life result of abuse, excessive wear and tear, exposure to the elements, or lack of proper or adequate maintenance.</p> <p>This definition specifically excludes deficiencies that may be remedied with routine maintenance, miscellaneous repairs, normal operating maintenance, and conditions that do not present a material deficiency to the Property.</p>
PML	Probable Maximum Loss
Practically Reviewable	Information that is practically reviewable means that the information is provided by the source in a manner and form that, upon examination, yields information relevant to the property without the need for extraordinary analysis of irrelevant data.
Practice	A definitive procedure for performing one or more specific operations or functions that does not produce a test result.
Primary Improvements	The site and building improvements that are of fundamental importance with respect to the Property.
Project Manager	The individual Professional Engineer or Registered Architect having a general, well rounded knowledge of all pertinent site and building systems and components that conducts the on site visit and walk-through observation.
Property	The site and building improvements, which are specifically within the scope of the FCA to be prepared in accordance with the agreement between the Client and EMG.
Readily Accessible	Those areas of the Property that are promptly made available for observation by the Project Manager without the removal of materials or chattel, or the aid of any instrument, device, or equipment at the time of the Walk-through Survey.
Reasonably Ascertainable	Information that is publicly available, provided to EMG's offices from either its source or an information research/retrieval concern, practically reviewable, and available at a nominal cost for either retrieval, reproduction or forwarding.
Recreational Facilities	Spas, saunas, steam baths, swimming pools, tennis courts, playground equipment, and other exercise, entertainment, or athletic facilities.
Remaining Useful Life (RUL)	<p>The consultant's professional opinion of the number of years before a system or component will require replacement or reconditioning. The estimate is based upon observation, available maintenance records, and accepted EUL's for similar items or systems.</p> <p>Incident weather, exposure to the elements, demand on the system, quality of installation, extent of use, and the degree and quality of preventive maintenance exercised are all factors that could impact the RUL of a system or component. As a result, a system or component may have an effective age greater or less than its actual age. The RUL may be greater or less than its Expected Useful Life (EUL) less actual age.</p>
Replacement Costs	Costs to replace the system or component "in kind" based on Invoices or Bid Documents provided by the current owner or the client, construction costs developed by construction resources such as <i>Means</i> and <i>Dodge</i> , EMG's experience with past costs for similar properties, or the current owner's historical incurred costs.
Replacement Reserves	Major recurring probable expenditures, which are neither commonly classified as an operation or maintenance expense. Replacement Reserves are reasonably predictable both in terms of frequency and cost. However, they may also include components or systems that have an indeterminable life but nonetheless have a potential liability for failure within the reserve term.
RTU	Rooftop Unit



TERMINOLOGY	
RUL	Remaining Useful Life (See definition)
Short Term Repair Costs	Opinions of Costs to remedy Physical Deficiencies, such as deferred maintenance, that may not warrant immediate attention, but requiring repairs or replacements that should be undertaken on a priority basis, taking precedence over routine preventive maintenance work within a zero to one year time frame. Included are such Physical Deficiencies resulting from improper design, faulty installation and/or substandard quality of original system or materials. Components or systems that have realized or exceeded their Expected Useful Life (EUL) that may require replacement to be implemented within zero to one-year time frame are also included.
Shut-Down	Equipment or systems that are not operating at the time of the Project Manager’s Walk-through Survey. Equipment or systems may be considered shutdown if it is not in operation as a result of seasonal temperatures.
Significant	Important, material, and/or serious.
Site Visit	The visit to the property by EMG’s Project Manager including walk-through visual observations of the Property, interviews of available project personnel and tenants (if appropriate), review of available documents and interviews of available municipal personnel at municipal offices, all in accordance with the agreement for the Facility Condition Assessment.
Specialty Consultants	Practitioners in the fields of engineering, architecture; or, building system mechanics, specialized service personnel or other specialized individuals that have experience in the maintenance and repair of a particular building component, equipment, or system that have acquired detailed, specialized knowledge in the design, assessment, operation, repair, or installation of the particular component, equipment, or system.
Structural Component	A component of the building, which supports non-variable forces or weights (dead loads) and variable forces or weights (live loads).
Suggested Remedy	A preliminary opinion as to a course of action to remedy or repair a physical deficiency. There may be alternate methods that may be more commensurate with the Client’s requirements. Further investigation might make other schemes more appropriate or the suggested remedy unworkable. The suggested remedy may be to conduct further research or testing, or to employ Specialty Consultants to gain a better understanding of the cause, extent of a deficiency (whether observed or highly probable), and the appropriate remedy.
Survey	Observations as the result of a walk-through scan or reconnaissance to obtain information by EMG of the Property’s readily accessible and easily visible components or systems.
System	A combination of interacting or interdependent components assembled to carry out one or more functions.
Technically Exhaustive	The use of measurements, instruments, testing, calculations, exploratory probing or discover, and/or other means to discover and/or troubleshoot Physical Deficiencies, develop scientific or Engineering findings, conclusions, and recommendations. Such efforts are not part of this report unless specifically called for under Section 2.2.
Term	Reserve Term: The number of years that Replacement Reserves are projected for as specified in the Replacement Reserves Cost Estimate.
Timely Access	Entry provided to the Project Manager at the time of his site visit.
UST	Underground Storage Tank



TERMINOLOGY	
Walk-through Survey	The Project Manager’s site visit of the Property consisting of his visual reconnaissance and scan of readily accessible and easily visible components and systems. This definition connotes that such a survey should not be considered in depth, and is to be conducted without the aid of special protective clothing, exploratory probing, removal of materials, testing, or the use of special equipment such as ladders, scaffolding, binoculars, moisture meters, air flow meters, or metering/testing equipment or devices of any kind. It is literally the Project Manager’s walk of the Property and observations.



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**APPENDIX G:  
GLOSSARY OF TERMS-ENERGY AUDITS**

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### Glossary of Terms and Acronyms-Energy Audit

ECM – Energy Conservation Measures are projects recommended to reduce energy consumption. These can be No/Low cost items implemented as part of routine maintenance or Capital Cost items to be implemented as a capital improvement project.

Initial Investment – The estimated cost of implementing an ECM project. Estimates typically are based on R.S. Means Construction cost data and Industry Standards.

Annual Energy Savings – The reduction in energy consumption attributable to the implementation of a particular ECM. These savings values do not include the interactive effects of other ECMs.

Cost Savings – The expected reduction in utility or energy costs achieved through the corresponding reduction in energy consumption by implementation of an ECM.

Simple Payback Period – The number of years required for the cumulative value of energy or water cost savings less future non-fuel or non-water costs to equal the investment costs of the building energy or water system, without consideration of discount rates.

EUL – Expected Useful Life is the estimated lifespan of a typical piece of equipment based on industry accepted standards.

RUL – Remaining Useful Life is the EUL minus the effective age of the equipment and reflects the estimated number of operating years remaining for the item.

SIR – The savings-to-investment ratio is the ratio of the present value savings to the present value costs of an energy or water conservation measure. The numerator of the ratio is the present value of net savings in energy or water and non-fuel or non-water operation and maintenance costs attributable to the proposed energy or water conservation measure. The denominator of the ratio is the present value of the net increase in investment and replacement costs less salvage value attributable to the proposed energy or water conservation measure. It is recommended that energy-efficiency recommendations be based on a calculated SIR, with larger SIRs receiving a higher priority. A project typically is recommended only if the SIR is greater than or equal to 1.0, unless other factors outweigh the financial benefit.

Life Cycle Cost - The sum of the present values of (a) Investment costs, less salvage values at the end of the study period; (b) Non-fuel operation and maintenance costs; (c) Replacement costs less salvage costs of replaced building systems; and (d) Energy and/or water costs.

Life Cycle Savings – The sum of the estimated annual cost savings over the EUL of the recommended ECM, expressed in present value dollars.

Building Site Energy Use Intensity - The sum of the total site energy use in thousand of Btu per unit of gross building area. Site energy accounts for all energy consumed at the building location only not the energy consumed during generation and transmission of the energy to the site.

Building Source Energy Use Intensity – The sum of the total source energy use in thousand of Btu per unit of gross building area. Source energy is the energy consumed during generation and transmission in supplying the energy to your site.

Building Cost Intensity - This metric is the sum of all energy use costs in dollars per unit of gross building area.

Greenhouse Gas Emissions - Although there are numerous gases that are classified as contributors to the total for Greenhouse Emissions , the scope of this energy audit focuses on carbon dioxide (CO<sub>2</sub>). Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement).

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**APPENDIX H:  
ENERGY CONSERVATION MEASURES**

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UIC	Replace Existing Refrigerator(s) With Energy Star Certified Refrigerator(s)		
EAA1	Office and concessions		
Number of Refrigerators To Be Replaced			3
		Qty	
Details of Existing Refrigerator:	1990-1992 Top Freezer 7.5-16.4 CuFt -1202.5 kWh		
Estimated Annual Energy Consumption By The Existing Refrigerator:			1,203 kWh/Year
Proposed New Refrigerator:	2010 -2012 Top Freezer 16.0-19.5 CuFt-382 kWh/Yr		
Estimated Proposed Annual Energy Consumption of The New Refrigerator:			382 kWh/Year
Annual Kwh Savings Per Unit (Kwh/year)			821 kWh
Total Annual Kwh Savings (Kwh/year)			2,462 kWh
Current Electrical Tariff (\$/Kwh)			\$0.13 \$/kWh
Annual Cost Savings From All Refrigerators (\$\$)			\$320 \$\$
Total Installation Cost Including, Eco Friendly Disposal Of Existing Refrigerator (\$\$)			
	3	\$50	\$561
No. of Units		Disposal Tax	Unit Cost
			\$1,833
			Total Cost
Simple Return on Investment			5.73 Yrs
<b>Note-</b> Average Life of a Refrigerator is 15 Years			
<i>Type of Recommendation</i>		Capital Cost ECM Recommendation	

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**ECM DESCRIPTION:**

One of the highest 'silent' energy consuming devices in any home/office is the refrigerator, which runs all year long. Having a low energy consuming refrigerator thus results in a considerable reduction in the annual energy costs. On an average a useful life of any refrigerator is approximately 19 years and hence EMG recommends replacing the current refrigerator at the end of its useful life with a new energy star certified low energy refrigerator. EMG strongly recommends replacing the existing older non energy star refrigerators with new energy efficient Energy Star Certified refrigerators of the appropriate type. The expected useful life of new refrigerators is approximately 15 years.

**Summary:**

Initial Investment:	\$1,833.00	Simple Payback:	5.73
Annual Cost Savings:	\$320.00		

UIC		Install Low Flow Faucet Aerators	
EAP2	Details: Replace in locker and rest rooms		
Property Type:	<input type="text" value="Commercial"/>	Estimated No. of Operational Weeks	<input type="text" value="52"/>
No. of Occupants	<input type="text" value="50"/>	Number of Occupied Days/Week (Max 7)	<input type="text" value="6"/>
KITCHEN FAUCETS		BATHROOM FAUCETS	
Do You Want To Replace Kitchen Faucets Aerators	<input type="text" value="Yes"/> (Select)	Do You Want To Replace Bathroom Faucets Aerators	<input type="text" value="Yes"/> (Select)
Total Number of Faucet Aerators To Be Replaced	<input type="text" value="0"/>	Total Number of Faucet Aerators To Be Replaced	<input type="text" value="16"/>
Total Number of Faucets To Be Replaced:	<input type="text" value="0"/>	Total Number of Faucets To Be Replaced:	<input type="text" value="0"/>
GPM of Existing Faucet Aerators	<input type="text" value="2.2"/> GPM	GPM of Existing Faucet Aerators	<input type="text" value="3.2"/> GPM
GPM of Proposed Faucet Aerator	<input type="text" value="1"/> GPM	GPM of Proposed Faucet Aerator	<input type="text" value="0.5"/> GPM
Estimated Number of Uses Per Day	<input type="text" value="4"/>	Estimated Number of Uses Per Day	<input type="text" value="3"/>
Estimated Time Per Faucet Use	<input type="text" value="0.16"/> Mins	Estimated Time Per Faucet Use	<input type="text" value="0.16"/> Mins
Annual Water Savings From Kitchen Faucets	<input type="text" value="7.19"/> kGal	Annual Water Savings From Bathroom Faucets	<input type="text" value="12.13"/> kGal
WATER & ENERGY SAVING CALCULATION		COST SAVING CALCULATION	
Select Type of Water Heater Fuel:	<input type="text" value="Natural Gas"/> (Select)	Property Location in United States	<input type="text" value="Northern Localities"/>
Energy Factor of Domestic Hot Water Heater:	<input type="text" value="0.75"/> EF	Heating Fuel Tariff	<input type="text" value="\$1.02"/> \$/Therm
Hot Water Discharge Temperature at Faucet	<input type="text" value="120.00"/> F	Water Tariff (\$/1000 Gal)	<input type="text" value="\$6.58"/> \$/kGal
Equivalent Heating Fuel Savings: <small>Savings Discounted by 15% to Account For Cold Water Use</small>	<input type="text" value="146"/> Therms	Annual Cost Savings In Form of Water	<input type="text" value="\$127"/> \$
Annual Water Savings	<input type="text" value="19.32"/> kGal	Annual Energy Savings From Water Heater	<input type="text" value="\$149"/> \$
COST BENEFIT ANALYSIS			
Estimated Total Annual Cost Savings	<input type="text" value="\$276"/> \$\$	Estimated Total Installation Cost	<input type="text" value="\$500"/> \$\$
Simple Payback Period	<input type="text" value="1.81"/> Years	Type of Recommendation	<input type="text" value="No/Low Cost ECM Recommendation"/>

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**ECM EXPLANATION:**

By reducing the flow of water coming from the restroom faucets, aerators can generate energy savings at low cost and with easy installation. The savings generated would be in the form of reduced water and sewer costs and at the same time aerators would save energy by reducing the demand for hot water. The average faucet has a flow rate of about 2 to 4 GPM. Adding a screw-in faucet aerator reduces the flow to 0.5 to 1.5 GPM in the bathroom and 2.2 GPM in the kitchen. In addition to saving energy and water, the "foamier" water that comes from faucet aerators wets objects better than water from a faucet with no aerator, which tends to bounce off the object rather than thoroughly wetting it.

EMG recommends replacing the proposed faucet aerators with new low flow aerators as mentioned above. The proposed ECM shall also result in an annual energy saving in form of reduction in water heating bills.

**Summary:**

Initial Investment: \$500      Estimated Annual Cost Savings: \$276      Simple Payback Period (Yrs): 1.81

<b>UIC</b>	<b>Control External Air Leakage In Commercial Buildings</b>		
<b>EAE4A</b>	<b>Details: Entire building</b>		
<b>ENTER EXISTING CONDITION</b>			
Insert Existing Estimated Air Change Rate/Hr (ACH 1): <small>(Existing Air Changes Per Hour, 3 is very leaky and 0.35 ideal)</small>	<input type="text" value="1.50"/>	Cubic Feet/Min (CFM 1):	<input type="text" value="22,250"/>
Insert Proposed Estimated Air Change Rate/Hr (ACH 2):	<input type="text" value="1.00"/>	Cubic Feet/Min (CFM 2):	<input type="text" value="14,833"/>
Estimated Space Volume Under Consideration	<input type="text" value="890,000"/>	Cu.Ft	
<b>WINTER</b>		<b>SUMMER</b>	
Select Type of Heating Fuel	<input type="text" value="Natural Gas"/> (Select)	Is The Building Cooled?	<input type="text" value="Yes"/>
Estimated Annual Heating Plant Efficiency	<input type="text" value="80.00"/> %	Estimated Annual Cooling Plant Efficiency	<input type="text" value="14.00"/> EER
Annual Heating Degree Days(HDD):	<input type="text" value="6,994"/>	Annual Cooling Degree Days(CDD):	<input type="text" value="732"/>
Estimated Total Annual Input Heating Energy Savings	<input type="text" value="16,807"/> Therms	Estimated Total Annual Input Cooling Energy Savings	<input type="text" value="10,051"/> kWh
Cost/Unit of Heating Fuel:	<input type="text" value="\$1.02"/> \$/Therm	Cost/Unit For Electricity	<input type="text" value="\$0.13"/> \$\$
Estimated Annual Heating Cost Savings	<input type="text" value="\$17,143"/> \$\$	Estimated Annual Cooling Cost Savings	<input type="text" value="\$1,307"/> \$\$
<b>Cost Analysis</b>			
Install Flush Mounted, Vinyl Door Sweeps ?	<input type="text" value="Yes"/>	Total Length of Door Sweeps to Be Installed: <small>(3.5' Standard Width Door)</small>	<input type="text" value="60"/> LF
Install Window Air Conditioner Covers For Winter:	<input type="text" value="No"/>	Number of Air Conditioner Covers To Be Installed: <small>(Covers would meet HUD Chapter-12 Energy Conservation Compliance Section 329C)</small>	<input type="text" value="1"/>
<b>Estimated Annual O&amp;M Savings</b>	<input type="text" value="\$553"/>	Estimated Length of Joints To Be Re-Caulked: <small>(Includes Demolition and Re-Caulking)</small>	<input type="text" value="1600"/> LF
Total Estimated Annual Cost Savings	<input type="text" value="\$19,003"/>	Total Cost For Controlling Air Leakage	<input type="text" value="\$5,149"/>
Simple Pay Back Period	<input type="text" value="0.27"/> Yrs	<i>Type of Recommendation</i>	<b>Capital Cost ECM Recommendation</b>

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**ECM DESCRIPTION:**  
 One of the most commonly used methods for reducing air leakage through building structures is caulking and weather stripping. Particularly effective measures include caulking cracks around windows and door frames and weather stripping around windows and doors. Weather-stripping and caulking of doors and windows, helps in thermally isolating of the building with the outside atmosphere. This prevents the infiltration of external un-conditioned air along with moisture and humidity into the conditioned space at the same time, prevents the conditioned air from escaping out. A precisely thermally isolated building directly affects the cooling and heating load on the facilities HVAC system as it has to put in less effort in maintaining the desired temperature inside the facility. As per ASHRAE a well insulated and ventilated building will reduce the energy consumption and operating costs. In order to ensure proper thermal isolation of the property, EMG recommends ensuring that the weather-stripping and caulking of all external doors and windows remains intact. It is also recommended that door sweeps be installed under all the doors opening into conditioned space. Any visible cracks between the window frame and wall should be plugged by caulking. In case of building with window airconditioners, EMG recommends use of interior/exterior window airconditioner covers so as to prevent cold air drafts into the conditioned space during the winter so as to save on heating costs.

**SUMMARY:**  
 Initial Investment: \$5,149      Simple Pay Back Period: 0.27 Yrs  
 Annual Energy Cost Savings: \$19,003

