

UNIVERSITY OF HOUSTON

Facility Condition Assessment

Brazos Hall

Asset 121

Inspected February 10, 2022



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FACILITY CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

ASSET CODE 121	CURRENT REPLACEMENT VALUE \$127,971,000
ASSET NAME BRAZOS HALL	FACILITY CONDITION NEEDS INDEX 0.07
ASSET USE Classroom / Academic	FACILITY CONDITION INDEX 0.00
YEAR BUILT 2009	10-YEAR \$/SF 63.03
GSF 147,788	
INSPECTION DATE 02/10/2022	

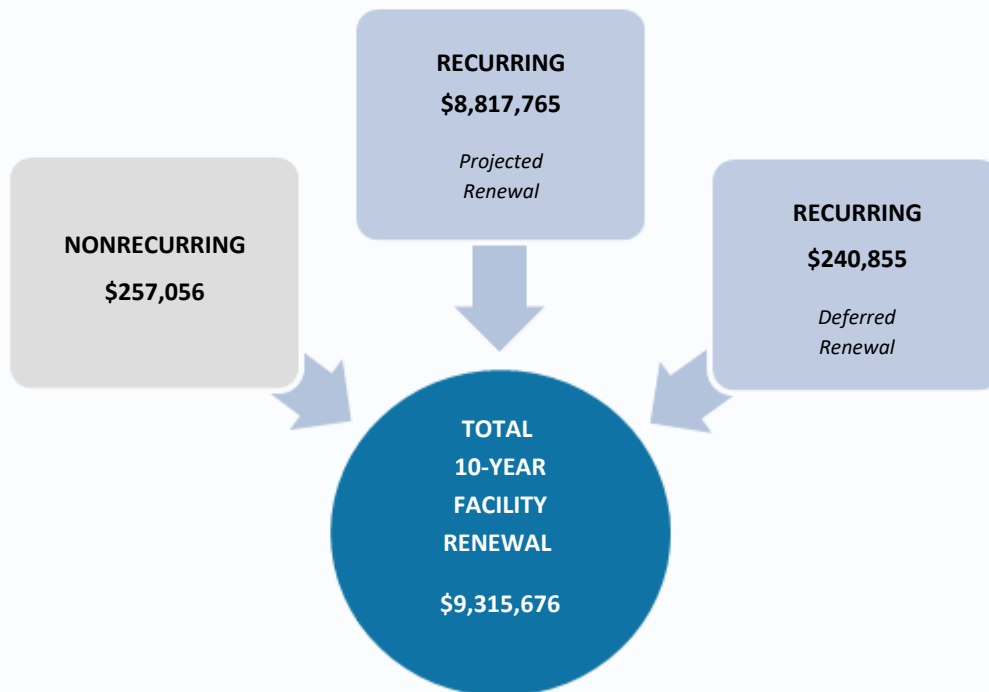
FCNI Scale

The FCNI for this asset is **0.07**

- Excellent Condition (typically new construction)
- Below Average Condition (major renovation required)
- Good Condition (maintained within lifecycle)
- Poor Condition (total renovation required)
- Fair Condition (normal renovations required)
- Replacement Indicated (unless historic)



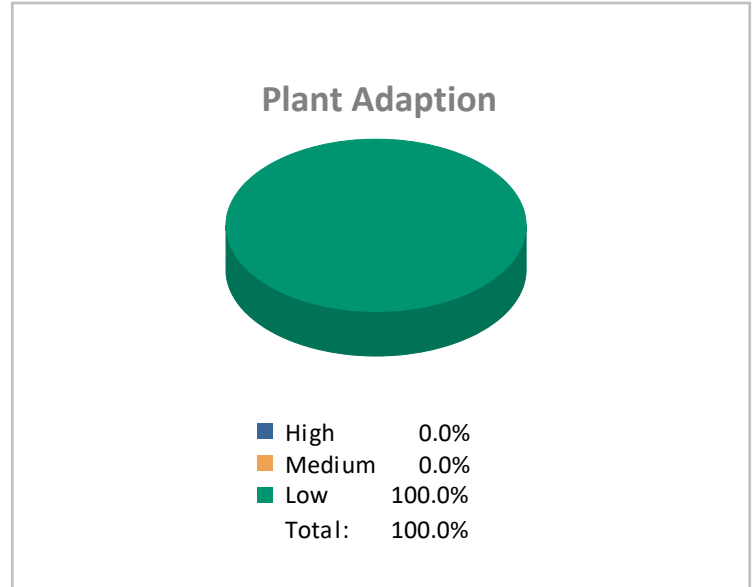
Total Facility Renewal Costs



Nonrecurring Costs

Project Cost by Priority

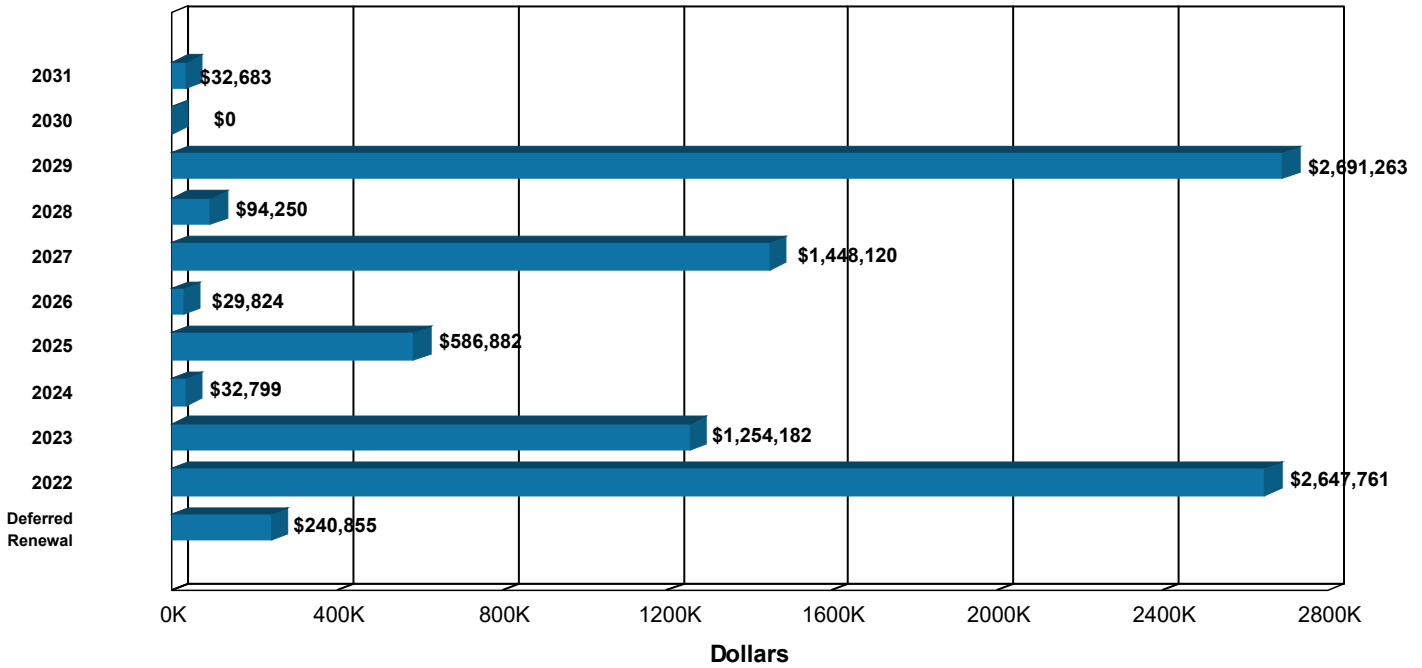
PLANT ADAPTION	
1 - High	\$0
2 - Medium	\$0
3 - Low	\$257,056



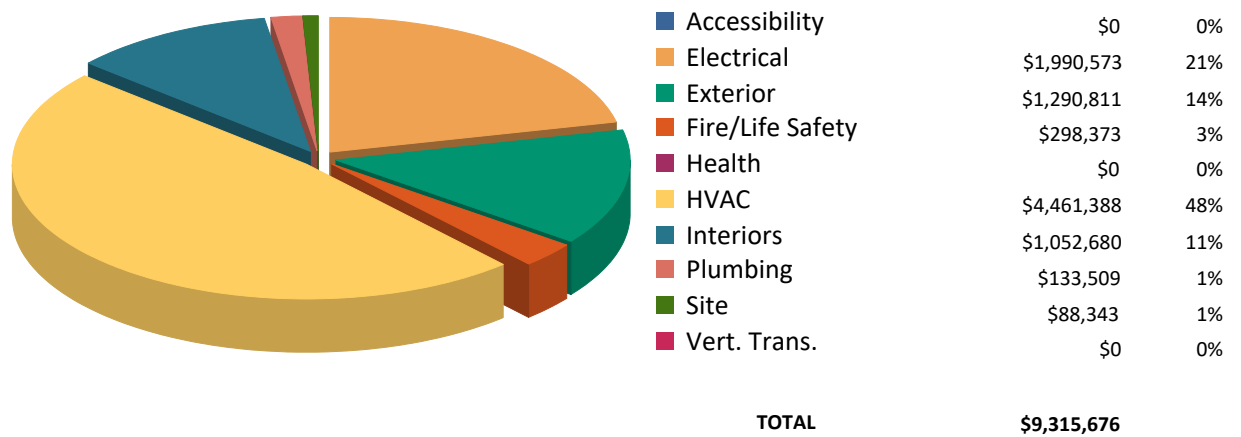
CORRECTIVE ACTION	
1 - High	\$0
2 - Medium	\$0
3 - Low	\$0

Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



ASSET SUMMARY

Brazos Hall was constructed in 2009 and is located on the University of Houston's Sugar Land campus. This three-story facility houses both administrative offices and general classrooms. The building is a steel structure with a modified bitumen roof and masonry exterior finishes. Brazos Hall totals 147,778 square feet.

Information for this report was gathered during an onsite visit on conducted on February 10, 2022.

Site

The site is landscaped with grass, shrubbery, and natural trees that are in good to fair condition. The 332-space concrete north parking lot is in good structural condition but should be scheduled for the restriping in the near term. The west asphalt parking lot is also in good structural condition but should be scheduled for a sealcoat and restriping at the end of the next ten years. The parking lots have concrete curb and gutter systems that are in good condition and should outlast the ten-year scope of this report.

Exterior Structure

The exterior finishes include standard brick and corrugated metal siding. Both are in good condition and should outlast the ten-year scope of this report. The modified bituminous roofing is in poor condition and should be scheduled for replacement in the near term. The roof has a complete lightning protection system installed. The aluminum-framed, double-pane windows and aluminum and glass storefront system at the main entrance are all in good condition with no recommendations.

Exterior doors are aluminum and glass at the main and secondary entrances and hollow metal at the services entrances. The main entrance doors have electric door operators. The doors are in good condition and both should outlast the ten-year scope of this report. The hollow-metal doors will require repainting within the scope to prolong their service life. All of the primary exit doors have panic bar hardware and the secondary exterior doors have commercial key set hardware. The is in fair to good condition and will need to be replaced at the end of the next ten years.

Interior Finishes/Systems

The carpets vary in condition throughout the building. Some are in fair condition and will need to be replaced in three to five years due to normal wear. The carpet in the office suites is also in fair to good condition and will need to be replaced in five to seven years. The newer carpet in rooms 103A and 103B is in very good condition and should outlast the ten-year scope of this report. The vinyl composition tile in the corridors and classrooms as well as the cork flooring in rooms 149 and 151 is in good condition with no recommendations at this time.

The ceramic wall and floor tile in the restrooms is in good condition and should outlast the ten year scope of this report. Ceiling finishes include suspended acoustical tile systems and painted hard surfaces all in good condition. The painted wall finishes are in good condition but will require repainting in the next ten years.

The interior rated and nonrated doors are in good condition and should outlast the ten-year scope of this report. The interior lever style door hardware, the panic bar door hardware, and the electric power operators are also in good condition. The metal coil overhead doors in the registrar's office should outlast the ten-year scope of this report. The wood and laminate casework in the break rooms and the wood casework with chemical resistant tops in the labs are all in good and should outlast the ten-year scope of this report. The 137 fixed seats in room 180 are in good condition with no recommendations.

Accessibility

Brazos Hall is accessible at both the primary and secondary entrances. Once inside, a hydraulic passenger elevator provides access to all floors. The door hardware is lever style and the signage and restrooms are ADA compliant. Dual-level drinking fountains are available on each floor. The parking lot provides an ample number of marked handicapped parking spaces.

Health

Emergency eyewash and shower stations in the laboratory spaces are original. No issues were observed and they should remain viable for the next ten years.

Fire/Life Safety

This facility contains a GE point addressable fire alarm and detection system with manual pull stations, smoke detectors, horn and strobe alarm systems, and a main fire alarm panel in the security office. The fire alarm system is original and should be evaluated for replacement due to technical obsolescence.

This facility is protected by a wet-pipe automatic fire suppression system that contains dropdown and exposed frangible glass sprinkler heads with manual support via dry-type handheld fire extinguishers. No issues were observed or reported during the inspection.

HVAC

The main HVAC system supplies cooling and ventilation via six belt-driven indoor air handling units which utilize chilled water. Two energy recovery air handling units, each with a return fan and enthalpy wheel, are located on the roof. Heating for the facility is utilized by electric duct heating elements. Fan coil units provide heating and cooling for select mechanical spaces while ductless split systems provide cooling for select spaces. No issues were observed with the majority of these HVAC systems and they are expected to remain viable for the next ten years. The two energy recovery air handling units and the

ductless split systems should be evaluated for replacement and/or rebuild within the next few years due to lifecycle depletion.

The laboratory fume hoods are in good condition. Two 15-hp mixed-flow, short stack exhaust fans, and two utility exhaust fans provide the necessary ventilation for the fume hoods. No issues were observed or reported with these systems.

Chilled water is generated through three 250-ton air-cooled packaged chillers and is circulated throughout via four 10-hp base-mounted pumps. The system is protected from thermal expansion via a bladder expansion tank. The chillers and expansion tank are original and should be evaluated for replacement within the next ten years due to lifecycle depletion.

The HVAC distribution network is a variable air volume (VAV) design with electric duct heating elements and consists of insulated ductwork, insulated mechanical piping, valves, terminal units, etc. The HVAC controls are a direct digital (DDC) design and original. The DDC controls should be evaluated for replacement. Field panels and major instrumentation have statistical service lives of ten years due to the advancement of technology. This advancement creates an obsolescence as software is constantly updated and replacement parts will be difficult to obtain. The HVAC distribution system is also original but should remain viable for the next ten years.

Electrical

Power is fed to this facility from a utility-owned transformer at 277/480 volts and routed to a main 4,000-amp switchboard. Power is further reduced to 120/208 volts through dry-type stepdown transformers in the stacked electrical closets. The distribution system consists of downline electrical system components beyond the main switchboard including the distribution feeders, conduits, secondary stepdown transformers, local panelboards, load centers, safety switches, fused disconnects, receptacles, switches, and similar terminal elements. The network is original and should remain viable for the next ten years.

Variable frequency drives (VFDs) control the motors associated with the air handling units and thermal media pumps. The majority of the VFDs are original and should be evaluated for replacement due to technical obsolescence. The VFDs for EARU-1 and EARU-2 were recently replaced and should remain viable for the next ten years.

The emergency power network consists of a 400-kW diesel-fired generator with an associated 800-amp automatic transfer switch. Emergency power serves the typical life-safety devices as well as some mechanical systems associated with the small laboratories. No issues were observed with the network and components and they are expected to remain viable for the next ten years.

The interior lighting for the first floor consists of various T5/T8 fluorescent and CFL fixtures. Although the lighting system appears to be in usable condition, it will fulfil its financially viable life expectancy within the next ten years. Lighting technology is rapidly advancing and expectations for lamp durability, quality, intensity control, and efficiency are increasing with the advancement of LED lighting options. The lighting fixtures should be considered for upgrade to LED technology. Additionally, automated

on/off timer lighting controls and occupancy sensing on/off lighting controls are recommended to be added throughout to save energy and reduce operational costs through extended lamp life. Timers should be controlled by building automation systems or be otherwise digitally programmable. The occupancy sensors should be preset for preferred inactivity periods for activation.

Exterior lighting consists of recessed can CFL sconces and HID wallpacks. While currently functional, the exterior lighting fixtures are considerably less efficient and require more frequent maintenance than modern LED-based outdoor lighting fixtures. It is recommended that the exterior lighting be replaced with LED fixtures.

Plumbing

Potable water supply, sanitary sewer, and stormwater handling systems serve this facility. The supply piping is copper with soldered connections. The drain piping is cast-iron with hubless connections and PVC. The piping networks are original and should remain viable for the next ten years. Four backflow preventers serve the fire suppression, water main, and makeup water. The backflow preventers are original and should be evaluated for replacement within the next ten years due to lifecycle depletion and prior to failure.

Domestic hot water is generated through two 800-MBH commercial gas-fired water heaters with the system protected from thermal expansion via a bladder expansion tank. No issues were observed or reported and the components should remain viable for the next ten years.

A reverse osmosis/deionized (RODI) water treatment system with an industrial water softener serves the various laboratories. The treated water is stored in a 1,050-gallon poly tank with two 0.75-hp booster/circulation pumps. The RODI and water softener systems are original and should be evaluated for replacement within the next ten years due to service life depletion. The pumps and tank should remain viable for the next ten years.

The process air compressor with an associated refrigerated air dryer and the rotary vane vacuum system in the main mechanical room are original. While no issues were observed or reported, they should be evaluated for replacement within the next ten years due to service life depletion.

Plumbing fixtures include tankless water closets, countertop vanities, urinals, a shower, stainless-steel sinks, dual-level drinking fountains, and floor-mounted mop sinks. All of the plumbing fixtures are in good working order and should outlast the ten-year scope of this report.

Vertical Transportation

Three hydraulic-controlled passenger elevators, two with capacities of 2,500 pounds and the other with a 5,000-pound capacity serve the building. The cars and controls for these three-stop elevators appear to be in good condition. No detailed elevator testing or performance measurement was performed as part of assessment of these systems.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors examined the accessible equipment and various building components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

ISES Corporation
3100 Breckinridge Boulevard, Suite 400
Duluth, GA 30096

Project Manager

Jerry Watkins
770.674.3146
jerryw@isescorp.com

Date of Inspection

February 10, 2022

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Andrew Derrick	Project Engineer	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
John Pasley	Facility Assessor	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health

Client Contact

NAME	POSITION
Thomas Brents, LEED AP	Facilities Planner

DEFINITIONS

The following information is a clarification of the Facility Condition Assessment report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Renewable Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the university a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Houston using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Also included in the renewal costs are the construction markup (general contractor profit and overhead, construction management, permitting, accounting, site security, insurance, bonds, sales tax, institutional fees, site utilities, refuse fees, and insurance) and professional fees (architect or engineer design fees and in-house design costs).

GLOBAL MARKUP	%
Local Labor Index	68.0
Local Materials Index	98.3
Construction Markup	20.0
Professional Fees	16.0

Recurring Costs

Renewable Component Inventory and Cost Projections

The Renewable Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major systems and components within a facility. Each indicated component has the following associated information:

CATEGORY	DESCRIPTION
Component Code	A four-digit code assigned by AMS to the component
Component Description	Description of the individual component
Identifier	Identifying information can be entered as necessary.
Customer ID	Customer-provided equipment ID number
Location	The location of each component can be entered if applicable.
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Complexity Factor	Adjusts the component replacement costs when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	The unit cost multiplied by quantity, in today's dollars (note that this is a one-time renewal/replacement cost)
Install Date	This is the year that the component was or is estimated to have been installed. When this data is not available, the default is the year the asset was constructed.
Useful Life	Average life expectancy of the component
Useful Life Adjustment	An optional adjustment that lengthens or reduces the first lifecycle of the component
Replacement Year	Expresses when the next replacement should occur and is the sum of the install date, useful life, and any useful life adjustment

The component listing forms the basis of the Recurring Costs by Year report, which provides a year-by-year list of projected recurring renewal costs (in future year dollars) over the next ten years. Each individual component is assigned a replacement year based on lifecycles. For items already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot (\$/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- **Deferred Renewal**
Recurring repairs, generated by the Renewable Component Inventory, that are past due for completion and have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral could impair the proper functioning of the facility. Deferred Renewal upgrades should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.
- **Projected Renewal**
Recurring renewal efforts, generated by the Renewable Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Renewable Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- **Plant Adaption**
Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).
- **Corrective Action**
Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- **Priority 1 – High**
Items in this category include:
 - a. correcting a cited safety hazard
 - b. stopping accelerated deterioration
 - c. returning a facility to normal operation
- **Priority 2 – Medium**
Items in this category include:
 - a. repairs to prevent further deterioration
 - b. improvements to facility approach/entry and access to goods and services (DOJ ADA title III, priorities 1 and 2)
 - c. correction of potential safety hazards

- **Priority 3 – Low**

Items in this category include:

- a. improving access to restrooms and other amenities (DOJ ADA title III, priorities 3 and 4)
- b. bringing a facility into compliance with current building codes as grandfather clauses expire
- c. increasing usability following an occupancy or use change
- d. actions that are recommended but not required by code

Project Subclass

Subclass ratings are assigned to accessibility upgrade activities based on the four Department of Justice priority rankings recommended by the Title III regulations for planning readily achievable barrier removal projects. These ratings are:

- DOJ1 Accessible approach and entrance
- DOJ2 Access to goods and services
- DOJ3 Access to restrooms
- DOJ4 Any other necessary measures

Category Codes

CATEGORY CODE*	SYSTEM DESCRIPTION
AC1A – AC4B	ACCESSIBILITY
EL1A – EL8A	ELECTRICAL
ES1A – ES6E	EXTERIOR STRUCTURE
FS1A – FS6A	FIRE/LIFE SAFETY
HE1A – HE7A	HEALTH
HV1A – HV8B	HVAC
IS1A – IS6D	INTERIOR FINISHES/SYSTEMS
PL1A – PL5A	PLUMBING
SI1A – SI4A	SITE
VT1A – VT7A	VERTICAL TRANSPORTATION

<i>Example:</i> Category Code = EL5A	
EL	System Description
5	Component Description
A	Element Description

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

<i>Example</i>			
Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings

Floor plans for this facility are provided as a reference.

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

<i>Example:</i>	
Photo Number: 0001006e	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

Sustainability/Energy Analysis

Energy/resource conservation measures (ECMs) are recommendations that will reduce resource consumption or the rate of growth in consumption. Examples include improving the efficiency of an HVAC system (e.g., digital motor speed controls, exhaust energy recovery, retrocommissioning) or directly reducing the consumption of a resource (e.g., low flow plumbing fixtures, high-efficiency lighting, or structural insulation improvement). Where significant conservation opportunities are evident for this facility, ECMs are identified and tabulated in Section 7 as a basis for further viability investigation.

FACILITY CONDITION ASSESSMENT

SECTION 2

**COST SUMMARIES
AND TOTALS**

RENEWAL NEEDS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	High	Medium	Low	Deferred Renewal	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	TOTAL
ACCESSIBILITY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
EXTERIOR	0	0	0	0	0	1,254,182	0	0	0	0	3,946	0	0	32,683	\$1,290,811
INTERIOR	0	0	0	0	0	0	0	586,882	0	0	35,811	429,987	0	0	\$1,052,680
PLUMBING	0	0	0	0	0	0	3,351	0	0	0	0	130,158	0	0	\$133,509
HVAC	0	0	0	207,005	2,647,761	0	6,845	0	0	1,112,636	0	487,141	0	0	\$4,461,388
FIRE/LIFE SAFETY	0	0	0	0	0	0	0	0	0	298,373	0	0	0	0	\$298,373
ELECTRICAL	0	0	257,056	0	0	0	22,603	0	29,824	37,112	0	1,643,977	0	0	\$1,990,573
SITE	0	0	0	33,850	0	0	0	0	0	0	54,493	0	0	0	\$88,343
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
SUBTOTAL	\$0	\$0	\$257,056	\$240,855	\$2,647,761	\$1,254,182	\$32,799	\$586,882	\$29,824	\$1,448,120	\$94,250	\$2,691,263	\$0	\$32,683	\$9,315,676
TOTAL NONRECURRING PROJECT NEEDS			\$257,056	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										\$9,058,619	

CURRENT REPLACEMENT VALUE	\$127,971,000
FACILITY CONDITION NEEDS INDEX	0.07
FACILITY CONDITION INDEX	0.00

GSF	TOTAL 10-YEAR FACILITY RENEWAL NEEDS	10-YEAR NEEDS/SF
147,788	\$9,315,676	\$63.03

RENEWAL NEEDS BY SYSTEM

All costs shown as Present Value

CATEGORY	NONRECURRING PROJECT COSTS	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	\$0	\$0	\$0
EXTERIOR	\$0	\$1,290,811	\$1,290,811
INTERIOR	\$0	\$1,052,680	\$1,052,680
PLUMBING	\$0	\$133,509	\$133,509
HVAC	\$0	\$4,461,388	\$4,461,388
FIRE/LIFE SAFETY	\$0	\$298,373	\$298,373
ELECTRICAL	\$257,056	\$1,733,516	\$1,990,573
SITE	\$0	\$88,343	\$88,343
VERT. TRANS	\$0	\$0	\$0
HEALTH	\$0	\$0	\$0
TOTALS	\$257,056	\$9,058,619	\$9,315,676

FACILITIES RENEWAL PLAN
RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
121 BA25	HVAC CONTROLS - FIELD PANELS/OPS SOFTWARE - CLASSROOM	DDC FP		THROUGHOUT	D3060	Deferred Renewal	135,424
121 BA48	HVAC CONTROLS - MAJOR INSTRUMENTATION - CLASSROOM	DDC MI		THROUGHOUT	D3060	Deferred Renewal	71,581
121 SI23	CONCRETE VEHICULAR PAVING - STRIPE	VEHICLE PARKING STRIPES		NORTH PARKING LOT	G2020	Deferred Renewal	33,850
121 HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-1-1		ROOF	D3030	2022	4,998
121 HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-2-1		ROOF	D3030	2022	4,998
121 HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-3-1		ROOF	D3030	2022	4,998
121 HU19	DUCTLESS DX SPLIT SYSTEM (>2 TON)	CU-1-2		ROOF	D3030	2022	4,584
121 AH21	AIR HANDLING UNIT - OUTDOOR PACKAGE (>17 HP)	EARU-2		ROOF	D3040	2022	1,314,092
121 AH21	AIR HANDLING UNIT - OUTDOOR PACKAGE (>17 HP)	EARU-1		ROOF	D3040	2022	1,314,092
121 RR06	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	UN-BALLASTED MOD BIT		MAIN ROOF	B3010	2023	1,254,182
121 AD09	AIR DRYER, REFRIGERATED (26-50 CFM)	AD-1		PH	D2090	2024	3,351
121 TK29	EXPANSION TANK, DIAPHRAGM (25-44 GAL)	ET-1, CHW		PH	D3040	2024	6,845
121 VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-1		PH	D5010	2024	5,651
121 VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-2		PH	D5010	2024	5,651
121 VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-3		PH	D5010	2024	5,651
121 VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-4		PH	D5010	2024	5,651

FACILITIES RENEWAL PLAN
RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
121 IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		GENERAL AREAS	C3020	2025	586,882
121 VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-6		346	D5010	2026	9,456
121 VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-4		246	D5010	2026	9,456
121 VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	VFD AHU-5		346	D5010	2026	10,913
121 CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-1		ROOF	D3030	2027	370,879
121 CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-2		ROOF	D3030	2027	370,879
121 CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-3		ROOF	D3030	2027	370,879
121 FA01	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	2027	269,991
121 FA05	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER UP TO 700 POINTS	PA, GE		174	D4030	2027	28,383
121 VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-3		246	D5010	2027	12,371
121 VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-2		146	D5010	2027	12,371
121 VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-1		146	D5010	2027	12,371
121 EF04	EXTERIOR DOOR OR WINDOW APPLIED FINISH	PAINTED METAL DOORS		SERVICE ENTRANCE	B2010	2028	3,946
121 IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		267, 368, 368 SUITES	C3020	2028	35,811
121 SI06	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	NEW ASPHALT PARKING		WEST PARKING LOT	G2020	2028	20,643
121 SI23	CONCRETE VEHICULAR PAVING - STRIPE	VEHICLE PARKING STRIPES		NORTH PARKING LOT	G2020	2028	33,850

FACILITIES RENEWAL PLAN
RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
121 IW01	WALL FINISH - APPLIED, STANDARD	PAINTED HARD SURFACE		GENERAL AREAS	C3010	2029	429,987
121 BF01	BACKFLOW PREVENTER (<=1 INCH)	BFP-MU		PH	D2020	2029	1,125
121 BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-1		168	D2020	2029	8,273
121 BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-2		168	D2020	2029	8,273
121 BF04	BACKFLOW PREVENTER (3-4 INCHES)	BFP-FIRE		168	D2020	2029	9,395
121 WT01	WATER SOFTENER (41 - 70 GPM)	WS-1		168	D2020	2029	42,336
121 WT07	REVERSE OSMOSIS SYSTEM (>10,000 GPD)	RODI		168	D2020	2029	33,337
121 PG01	AIR COMPRESSOR - MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER	AC-1		PH	D2090	2029	7,652
121 PG07	VACUUM PUMP - ROTARY VANE (>4<=6 HP)	VP-1		PH	D2090	2029	19,767
121 BA02	HVAC CONTROLS - TERMINAL ASSEMBLIES - CLASSROOM	DDC TA		THROUGHOUT	D3060	2029	487,141
121 VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD EARU-1 SF		PH	D5010	2029	15,711
121 VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD EARU-2 SF		PH	D5010	2029	15,711
121 LE02	COM EXTERIOR BLDG MT DECO LIGHTING (COACH, SCONCE, PEND, SOFFIT)	SCONCE		EXT	D5020	2029	2,806
121 LE02	COM EXTERIOR BLDG MT DECO LIGHTING (COACH, SCONCE, PEND, SOFFIT)	REC CAN		EXT SOFF	D5020	2029	8,419
121 LE03	COM EXTERIOR BLDG MT HI FLOOD LIGHTING (WALLPACK, WALLWASH)	HID WALLPACK		EXT	D5020	2029	9,242
121 LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	T8, CFL		THROUGHOUT	D5020	2029	1,592,088

FACILITIES RENEWAL PLAN
RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE		COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
121	DR34	DOOR LOCK, COMMERCIAL-GRADE, EXTERIOR	COMMERCIAL KEYSET		SERVICE ENTRANCE	B2030	2031	9,191
121	DR36	DOOR PANIC HARDWARE, EXTERIOR	PUSH PULL		MAIN, SECONDARY ENTRY	B2030	2031	23,492
TOTAL								\$9,058,619

FACILITIES RENEWAL PLAN
NONRECURRING PROJECT COSTS

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
121EL01	INSTALL OCCUPANCY SENSOR & TIMING LIGHTING CONTROLS	D5020	3	Plant Adaption	257,056
TOTAL					\$257,056

FACILITY CONDITION ASSESSMENT

SECTION 3

**NONRECURRING
PROJECT DETAILS**

All costs shown as Present Value

INSTALL OCCUPANCY SENSOR & TIMING LIGHTING CONTROLS			
Project Number:	121EL01	Category Code:	
Priority Sequence:	1	EL4C	
Priority Class:	Low	System:	ELECTRICAL
Project Class:	Plant Adaption	Component:	DEVICES AND FIXTURES
Date Basis:	5/2/2022	Element:	LIGHTING CONTROLLERS

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Floor-wide: Floor(s) 1,2,3

Description

Automated on/off timer lighting controls and occupancy sensing on/off lighting controls are recommended to be added throughout to save energy and reduce operational costs through extended lamp life. Timers should be controlled by building automation systems or be otherwise digitally programmable. The occupancy sensors should be preset for preferred inactivity periods for activation.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Programmable timer, interface wiring, wall mounted occupancy switches, ceiling mounted sensor/switches, and related materials	SF	147,788	\$0.78	\$115,275	\$0.71	\$104,929	\$220,204
Base Material/Labor Costs				\$115,275		\$104,929	
Indexed Material/Labor Costs				\$113,315		\$71,352	\$184,667
Construction Mark Up at 20.0%							\$36,933
Original Construction Cost							\$221,600
Date of Original Estimate:	5/2/2022					Inflation	\$0
Current Year Construction Cost							\$221,600
Professional Fees at 16.0%							\$35,456
TOTAL PROJECT COST							\$257,056

FACILITY CONDITION ASSESSMENT

SECTION 4

LIFECYCLE COMPONENT
INVENTORY

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
EF04	EXTERIOR DOOR OR WINDOW APPLIED FINISH	PAINTED METAL DOORS		SERVICE ENTRANCE	9	EA	1.00	\$3,946	2017	11		2028
EW12	WALL, EXTERIOR, PANEL JOINT RESTORATION	CORRUGATED METAL		PENTHOUSE	1,260	SF	1.00	\$25,826	2009	25		2034
WN05	GLASS, STOREFRONT	ALUMINUM AND GLASS		MAIN ENTRANCES	370	SF	1.00	\$51,607	2009	40		2049
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	ALUMINUM AND GLASS		ALL ELEVATIONS	1,480	SF	1.00	\$241,531	2009	40		2049
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	FULL GLASS		MAIN, SECONDARY ENTRY	18	LEAF	1.00	\$55,395	2009	25		2034
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	PAINTED METAL		SERVICE ENTRANCE	9	LEAF	1.00	\$19,563	2009	40		2049
DR28	DOOR OPERATOR, POWER-ASSIST	ELECTRIC POWERED		MAIN ENTRANCE	2	EA	1.00	\$14,685	2009	20	4	2033
DR34	DOOR LOCK, COMMERCIAL-GRADE, EXTERIOR	COMMERCIAL KEYSSET		SERVICE ENTRANCE	9	EA	1.00	\$9,191	2019	12		2031
DR36	DOOR PANIC HARDWARE, EXTERIOR	PUSH PULL		MAIN, SECONDARY ENTRY	18	EA	1.00	\$23,492	2019	12		2031
RR06	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	UN-BALLASTED MOD BIT		MAIN ROOF	50,210	SF	1.35	\$1,254,182	2009	20	-6	2023
DR01	DOOR AND FRAME, INTERIOR, NON-RATED	STANDARD DOORS		GENERAL AREAS	168	LEAF	1.00	\$388,479	2009	60		2069
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	RATED DOORS		CORRIDORS, STAIRS	146	LEAF	1.00	\$584,466	2009	60		2069
DR03	DOOR - OVERHEAD, INTERIOR	METAL COIL		REGISTRAR	60	SF	1.00	\$6,276	2009	45		2054
DR03	DOOR - OVERHEAD, INTERIOR	METAL COIL		REGISTRAR	204	SF	1.00	\$21,338	2009	45		2054

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
DR24	DOOR LOCK, COMMERCIAL-GRADE, INTERIOR	LEVER TYPE		GENERAL AREAS	168	EA	1.00	\$133,719	2009	35		2044
DR24	DOOR LOCK, COMMERCIAL-GRADE, INTERIOR	LEVER TYPE		GENERAL ROOMS	117	EA	1.00	\$93,126	2009	35		2044
DR26	DOOR PANIC HARDWARE, INTERIOR	PUSH PULL		CORRIDORS, STAIRS	29	EA	1.00	\$37,845	2009	30		2039
CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD	WOOD, LAMINATE TOP		BREAK RMS	48	LF	1.00	\$27,622	2009	30		2039
CW04	CASEWORK - LABORATORY, INCLUDES REAGENT SHELF AND TOP	WOOD, CHEM TOP		LABS	575	SF	1.00	\$92,112	2009	40		2049
SF01	SEATING, FIXED, FOLDING, STANDARD	FOLDING, VINYL		ROOM 180	137	EA	1.00	\$51,644	2009	40		2049
IW01	WALL FINISH - APPLIED, STANDARD	PAINTED HARD SURFACE		GENERAL AREAS	182,240	SF	1.00	\$429,987	2017	12		2029
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT		RESTROOMS	15,850	SF	1.00	\$648,491	2009	60		2069
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		GENERAL AREAS	44,740	SF	1.00	\$586,882	2009	12	4	2025
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		267, 368, 368 SUITES	2,730	SF	1.00	\$35,811	2012	12	4	2028
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		103A, B	7,090	SF	1.00	\$93,004	2019	12	3	2034
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	COMPOSITE VINYL TILE		GENERAL AREAS	39,870	SF	1.00	\$272,124	2009	20	4	2033
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC TILE		RESTROOMS	7,350	SF	1.00	\$248,414	2009	40		2049
IF22	FLOORING - CORK, TILE OR ROLL	CORK TILES		151, 149 ROOMS	3,150	SF	1.00	\$68,722	2009	25		2034
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	SUSPENDED ACOUSTICAL CEILING		GENERAL AREAS	89,190	SF	1.00	\$956,972	2009	45		2054

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
IC04	CEILING FINISH - APPLIED PAINT OR STAIN, STANDARD	PAINTED HARD SURFACE		GENERAL AREAS	8,390	SF	1.00	\$19,796	2017	24		2041
VT03	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	ELEV-1		158	1	EA	1.00	\$245,439	2009	25		2034
VT03	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	ELEV-2		158	1	EA	1.00	\$245,439	2009	25		2034
VT03	ELEVATOR MODERNIZATION - HYDRAULIC 2-5 FLOORS	ELEV-3		158	1	EA	1.00	\$245,439	2009	25		2034
DF01	DRINKING FOUNTAIN, DUAL-LEVEL	DUAL LEVEL DRINKING FOUNTAIN		CORRIDORS, STAIRS	3	EA	1.00	\$9,079	2009	25		2034
FX01	PLUMBING FIXTURE - LAVATORY, COUNTER	AUTO SENSOR		RESTROOMS	30	EA	1.00	\$25,509	2009	25		2034
FX04	PLUMBING FIXTURE - SINK, KITCHEN	SINGLE LEVER		BREAKROOMS	5	EA	1.00	\$3,882	2009	20	4	2033
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLOOR MOUNTED		JANITORIAL CLOSETS	3	EA	1.00	\$5,249	2009	50		2059
FX08	PLUMBING FIXTURE - SHOWER VALVE AND HEAD	SINGLE LEVER		RESTROOMS	6	EA	1.00	\$6,688	2009	35		2044
FX10	PLUMBING FIXTURE - URINAL	AUTO FLUSH		RESTROOMS	17	EA	1.00	\$17,145	2009	35		2044
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	AUTO FLUSH		RESTROOMS	55	EA	1.00	\$103,151	2009	35		2044
FX15	PLUMBING FIXTURE - EMERGENCY EYEWASH	EM EYEWASH		LABS	2	EA	1.00	\$2,093	2009	35		2044
FX16	PLUMBING FIXTURE - EMERGENCY COMBINATION SHOWER/EYEWASH	EM EYEWASH SHOWER		LABS	7	EA	1.00	\$10,550	2009	35		2044
BF01	BACKFLOW PREVENTER (<=1 INCH)	BFP-MU		PH	1	EA	1.00	\$1,125	2009	20		2029
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-1		168	1	EA	1.00	\$8,273	2009	20		2029

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-2		168	1	EA	1.00	\$8,273	2009	20		2029
BF04	BACKFLOW PREVENTER (3-4 INCHES)	BFP-FIRE		168	1	EA	1.00	\$9,395	2009	20		2029
PP05	PUMP - ELECTRIC (<=10 HP)	RO-PUMP-1		168	0.75	HP	1.00	\$1,318	2009	30		2039
PP05	PUMP - ELECTRIC (<=10 HP)	RO-PUMP-2		168	0.75	HP	1.00	\$1,318	2009	30		2039
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	147,788	SF	1.00	\$1,521,051	2009	50		2059
TK04	WATER TANK (275-1,649 GAL)	RO-TANK		168	1,050	GAL	1.00	\$63,607	2009	30		2039
TK16	EXPANSION TANK, DIAPHRAGM (45-69 GAL)	ET-DHW-1		PH ROOM C	60	GAL	1.00	\$10,096	2009	20	4	2033
WH06	WATER HEATER - COMMERCIAL, GAS (>613 MBH INPUT)	WH-1		PH ROOM C	800	MBH	1.00	\$37,006	2009	25		2034
WH06	WATER HEATER - COMMERCIAL, GAS (>613 MBH INPUT)	WH-2		PH ROOM C	800	MBH	1.00	\$37,006	2009	25		2034
WT01	WATER SOFTENER (41 - 70 GPM)	WS-1		168	48	GPM	4.00	\$42,336	2009	20		2029
WT07	REVERSE OSMOSIS SYSTEM (>10,000 GPD)	RODI		168	10,500	GPD	1.00	\$33,337	2009	20		2029
PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON		THROUGHOUT	147,788	SF	1.00	\$2,298,356	2009	60		2069
AD09	AIR DRYER, REFRIGERATED (26-50 CFM)	AD-1		PH	1	EA	1.00	\$3,351	2009	15		2024
PG01	AIR COMPRESSOR - MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER	AC-1		PH	3	HP	1.00	\$7,652	2009	20		2029
PG07	VACUUM PUMP - ROTARY VANE (>4<=6 HP)	VP-1		PH	5	HP	1.00	\$19,767	2009	20		2029

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTR DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-1		ROOF	250	TON	1.25	\$370,879	2009	18		2027
CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-2		ROOF	250	TON	1.25	\$370,879	2009	18		2027
CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-3		ROOF	250	TON	1.25	\$370,879	2009	18		2027
HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-1-1		ROOF	2	TON	1.00	\$4,998	2009	13		2022
HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-2-1		ROOF	2	TON	1.00	\$4,998	2009	13		2022
HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-3-1		ROOF	2	TON	1.00	\$4,998	2009	13		2022
HU19	DUCTLESS DX SPLIT SYSTEM (>2 TON)	CU-1-2		ROOF	3	TON	1.00	\$4,584	2009	13		2022
AH03	AIR HANDLING UNIT - INDOOR (1.75-2.75 HP)	FCU, APPROX 5		THROUGHOUT	2.50	HP	1.00	\$26,869	2009	35		2044
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-6		346	25	HP	1.00	\$154,011	2009	35		2044
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-4		246	25	HP	1.00	\$154,011	2009	35		2044
AH11	AIR HANDLING UNIT - INDOOR (27-35 HP)	AHU-5		346	30	HP	1.00	\$197,536	2009	35		2044
AH12	AIR HANDLING UNIT - INDOOR (35-45 HP)	AHU-3		246	40	HP	1.00	\$246,251	2009	35		2044
AH12	AIR HANDLING UNIT - INDOOR (35-45 HP)	AHU-2		146	40	HP	1.00	\$246,251	2009	35		2044
AH12	AIR HANDLING UNIT - INDOOR (35-45 HP)	AHU-1		146	40	HP	1.00	\$246,251	2009	35		2044
AH21	AIR HANDLING UNIT - OUTDOOR PACKAGE (>17 HP)	EARU-2		ROOF	60	HP	1.25	\$1,314,092	2009	13		2022

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
AH21	AIR HANDLING UNIT - OUTDOOR PACKAGE (>17 HP)	EARU-1		ROOF	60	HP	1.25	\$1,314,092	2009	13		2022
AH33	ENTHALPY WHEEL, ENERGY RECOVERY, AIR TO AIR (>20000 CFM)	ENTH-EARU-1		ROOF	29,500	CFM	1.00	\$81,402	2009	25		2034
AH33	ENTHALPY WHEEL, ENERGY RECOVERY, AIR TO AIR (>20000 CFM)	ENTH-EARU-2		ROOF	29,500	CFM	1.00	\$81,402	2009	25		2034
FN07	FAN - AXIAL, RETURN (>20 HP) 38,500 CFM	EARU-1 EF		ROOF	40	HP	1.00	\$70,928	2009	35		2044
FN07	FAN - AXIAL, RETURN (>20 HP) 38,500 CFM	EARU-2 EF		ROOF	40	HP	1.00	\$70,928	2009	35		2044
FN33	FAN - UTILITY SET (1.25-4 HP)	EF-1		ROOF	1.50	HP	1.00	\$6,715	2009	40		2049
FN33	FAN - UTILITY SET (1.25-4 HP)	EF-2		ROOF	1.50	HP	1.00	\$6,715	2009	40		2049
FN40	FAN - MIXED-FLOW, SHORT STACK, EXHAUST (<=30 HP)	FEF-1		ROOF	15	HP	1.00	\$71,960	2009	40		2049
FN40	FAN - MIXED-FLOW, SHORT STACK, EXHAUST (<=30 HP)	FEF-2		ROOF	15	HP	1.00	\$71,960	2009	40		2049
HD01	HOOD, FUME	FH-355		355	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-357-1		357	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-357-2		357	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-359-1		359	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-359-2		359	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-247		247	4	LF	1.00	\$10,128	2009	35		2044

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
HD01	HOOD, FUME	FH-251		251	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-253		253	4	LF	1.00	\$10,128	2009	35		2044
HD01	HOOD, FUME	FH-257		257	4	LF	1.00	\$10,128	2009	35		2044
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	VAV		THROUGHOUT	147,788	SF	1.00	\$5,043,353	2009	45		2054
PH01	PUMP - ELECTRIC (<=10 HP)	CHWP-1		PH	10	HP	1.00	\$17,568	2009	30		2039
PH01	PUMP - ELECTRIC (<=10 HP)	CHWP-2		PH	10	HP	1.00	\$17,568	2009	30		2039
PH01	PUMP - ELECTRIC (<=10 HP)	CHWP-3		PH	10	HP	1.00	\$17,568	2009	30		2039
PH01	PUMP - ELECTRIC (<=10 HP)	CHWP-4		PH	10	HP	1.00	\$17,568	2009	30		2039
TK29	EXPANSION TANK, DIAPHRAGM (25-44 GAL)	ET-1, CHW		PH	30	GAL	1.00	\$6,845	2009	15		2024
BA02	HVAC CONTROLS - TERMINAL ASSEMBLIES - CLASSROOM	DDC TA		THROUGHOUT	147,788	SF	1.00	\$487,141	2009	20		2029
BA25	HVAC CONTROLS - FIELD PANELS/OPS SOFTWARE - CLASSROOM	DDC FP		THROUGHOUT	147,788	SF	1.00	\$135,424	2009	10	2	DR
BA48	HVAC CONTROLS - MAJOR INSTRUMENTATION - CLASSROOM	DDC MI		THROUGHOUT	147,788	SF	1.00	\$71,581	2009	10	2	DR
FS01	FIRE SPRINKLER SYSTEM - WET	WET PIPE		THROUGHOUT	147,788	SF	0.75	\$1,438,456	2009	80		2089
FA01	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	147,788	SF	0.42	\$269,991	2009	18		2027
FA05	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER UP TO 700 POINTS	PA, GE		174	1	EA	1.00	\$28,383	2009	18		2027

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	UHSMCC2		PH	6	EA	1.00	\$494,645	2009	25		2034
MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	UHSMCC1		154	3	EA	1.00	\$247,323	2009	25		2034
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	120/208, 277/480		THROUGHOUT	147,788	SF	1.00	\$3,453,046	2009	50		2059
SG07	MAIN SWITCHBOARD W/BREAKERS (>2500 AMP)	UHSMDSG		154	4,000	AMP	1.00	\$363,533	2009	40		2049
TX27	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (75-112.5 KVA)	T-UHS3NLB		346	112.50	KVA	1.00	\$17,524	2009	40		2049
TX27	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (75-112.5 KVA)	T-UHS2NLA		256	112.50	KVA	1.00	\$17,524	2009	40		2049
TX27	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (75-112.5 KVA)	T-UHS1NLA		156	112.50	KVA	1.00	\$17,524	2009	40		2049
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-1		PH	10	HP	1.00	\$5,651	2009	15		2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-2		PH	10	HP	1.00	\$5,651	2009	15		2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-3		PH	10	HP	1.00	\$5,651	2009	15		2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-4		PH	10	HP	1.00	\$5,651	2009	15		2024
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-6		346	25	HP	1.00	\$9,456	2009	17		2026
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-4		246	25	HP	1.00	\$9,456	2009	17		2026
VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	VFD AHU-5		346	30	HP	1.00	\$10,913	2009	17		2026
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD EARU-1 EF		PH	40	HP	1.00	\$12,371	2015	18		2033

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD EARU-2 EF		PH	40	HP	1.00	\$12,371	2018	18		2036
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-3		246	40	HP	1.00	\$12,371	2009	18		2027
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-2		146	40	HP	1.00	\$12,371	2009	18		2027
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-1		146	40	HP	1.00	\$12,371	2009	18		2027
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD EARU-1 SF		PH	60	HP	1.00	\$15,711	2009	20		2029
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD EARU-2 SF		PH	60	HP	1.00	\$15,711	2009	20		2029
LE02	COM EXTERIOR BLDG MT DECO LIGHTING (COACH, SCONCE, PEND, SOFFIT)	REC CAN		EXT SOFF	15	EA	1.00	\$8,419	2009	20		2029
LE02	COM EXTERIOR BLDG MT DECO LIGHTING (COACH, SCONCE, PEND, SOFFIT)	SCONCE		EXT	5	EA	1.00	\$2,806	2009	20		2029
LE03	COM EXTERIOR BLDG MT HI FLOOD LIGHTING (WALLPACK, WALLWASH)	HID WALLPACK		EXT	11	EA	1.00	\$9,242	2009	20		2029
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	T8, CFL		THROUGHOUT	147,788	SF	1.00	\$1,592,088	2009	20		2029
GN04	GENERATOR - DIESEL (200-500 KW)	EGEN		EXT CY	400	KW	1.00	\$209,656	2009	25		2034
GN16	SWITCH - AUTO TRANSFER, 480 V (>400 AMP)	ATS		170	800	AMP	1.00	\$24,853	2009	25		2034
LP01	LIGHTNING PROTECTION	ELECTRICAL GROUND		MAIN ROOF	50,210	SF	1.00	\$80,617	2009	50		2059
SI15	ASPHALT PAVING CRACK SEAL	NEW ASPHALT PARKING		WEST PARKING LOT	5,370	SY	1.00	\$18,597	2021	3	10	2034
SI16	ASPHALT PAVING MILL AND OVERLAY - LOW TRAFFIC	NEW ASPHALT PARKING		WEST PARKING LOT	5,370	SY	1.00	\$128,765	2021	30		2051

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
SI22	CONCRETE CURB AND GUTTER, AVERAGE	CURB AND GUTTER		WEST PARKING LOT	2,300	LF	1.00	\$133,962	2021	40		2061
SI22	CONCRETE CURB AND GUTTER, AVERAGE	CURB AND GUTTER		NORTH PARKING LOT	925	LF	1.00	\$53,876	2009	40		2049
SI06	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	NEW ASPHALT PARKING		WEST PARKING LOT	5,370	SY	1.00	\$20,643	2021	7		2028
SI23	CONCRETE VEHICULAR PAVING - STRIPE	VEHICLE PARKING STRIPES		NORTH PARKING LOT	13,660	SY	1.00	\$33,850	2009	7	5	DR
Grand Total:								\$31,729,549				

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

DEFERRED RENEWAL									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
BA25	HVAC CONTROLS - FIELD PANELS/OPS SOFTWARE - CLASSROOM	DDC FP		THROUGHOUT	D3060	147,788	SF	\$135,424	DR
BA48	HVAC CONTROLS - MAJOR INSTRUMENTATION - CLASSROOM	DDC MI		THROUGHOUT	D3060	147,788	SF	\$71,581	DR
SI23	CONCRETE VEHICULAR PAVING - STRIPE	VEHICLE PARKING STRIPES		NORTH PARKING LOT	G2020	13,660	SY	\$33,850	DR
TOTAL DEFERRED RENEWAL COST								\$240,855	

2022									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
HU19	DUCTLESS DX SPLIT SYSTEM (>2 TON)	CU-1-2		ROOF	D3030	3	TON	\$4,584	2022
HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-1-1		ROOF	D3030	2	TON	\$4,998	2022
HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-2-1		ROOF	D3030	2	TON	\$4,998	2022

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

HU18	DUCTLESS DX SPLIT SYSTEM (1-2 TON)	CU-3-1		ROOF	D3030	2	TON	\$4,998	2022
AH21	AIR HANDLING UNIT - OUTDOOR PACKAGE (>17 HP)	EARU-2		ROOF	D3040	60	HP	\$1,314,092	2022
AH21	AIR HANDLING UNIT - OUTDOOR PACKAGE (>17 HP)	EARU-1		ROOF	D3040	60	HP	\$1,314,092	2022
2022 PROJECTED COMPONENT REPLACEMENT COST								\$2,647,761	

2023

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
RR06	ROOF - BITUMINOUS, 3-PLY, SBS MODIFIED BITUMEN, MOP	UN-BALLASTED MOD BIT		MAIN ROOF	B3010	50,210	SF	\$1,291,807	2023
2023 PROJECTED COMPONENT REPLACEMENT COST								\$1,291,807	

2024

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
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RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

AD09	AIR DRYER, REFRIGERATED (26-50 CFM)	AD-1		PH	D2090	1	EA	\$3,555	2024
TK29	EXPANSION TANK, DIAPHRAGM (25-44 GAL)	ET-1, CHW		PH	D3040	30	GAL	\$7,262	2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-1		PH	D5010	10	HP	\$5,995	2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-2		PH	D5010	10	HP	\$5,995	2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-3		PH	D5010	10	HP	\$5,995	2024
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD CHWP-4		PH	D5010	10	HP	\$5,995	2024
2024 PROJECTED COMPONENT REPLACEMENT COST								\$34,797	

2025									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		GENERAL AREAS	C3020	44,740	SF	\$641,301	2025
2025 PROJECTED COMPONENT REPLACEMENT COST								\$641,301	

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

2026									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-6		346	D5010	25	HP	\$10,642	2026
VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	VFD AHU-5		346	D5010	30	HP	\$12,283	2026
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-4		246	D5010	25	HP	\$10,642	2026
2026 PROJECTED COMPONENT REPLACEMENT COST								\$33,568	

2027									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-1		ROOF	D3030	250	TON	\$429,950	2027
CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-2		ROOF	D3030	250	TON	\$429,950	2027
CH10	CHILLER - AIR COOLED PACKAGE (>150 TONS)	CH-3		ROOF	D3030	250	TON	\$429,950	2027
FA05	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER UP TO 700 POINTS	PA, GE		174	D4030	1	EA	\$32,903	2027

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

FA01	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	147,788	SF	\$312,993	2027
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-3		246	D5010	40	HP	\$14,341	2027
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-2		146	D5010	40	HP	\$14,341	2027
VF08	VARIABLE FREQUENCY DRIVE (30-40 HP)	VFD AHU-1		146	D5010	40	HP	\$14,341	2027
2027 PROJECTED COMPONENT REPLACEMENT COST								\$1,678,769	

2028									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
EF04	EXTERIOR DOOR OR WINDOW APPLIED FINISH	PAINTED METAL DOORS		SERVICE ENTRANCE	B2010	9	EA	\$4,711	2028
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILES		267, 368, 368 SUITES	C3020	2,730	SF	\$42,760	2028
SI06	ASPHALT VEHICULAR PAVING - SEALCOAT AND STRIPE	NEW ASPHALT PARKING		WEST PARKING LOT	G2020	5,370	SY	\$24,649	2028
2028 PROJECTED COMPONENT REPLACEMENT COST								\$72,120	

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

2029									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IW01	WALL FINISH - APPLIED, STANDARD	PAINTED HARD SURFACE		GENERAL AREAS	C3010	182,240	SF	\$528,830	2029
WT01	WATER SOFTENER (41 - 70 GPM)	WS-1		168	D2020	48	GPM	\$52,068	2029
WT07	REVERSE OSMOSIS SYSTEM (>10,000 GPD)	RODI		168	D2020	10,500	GPD	\$41,000	2029
BF01	BACKFLOW PREVENTER (<=1 INCH)	BFP-MU		PH	D2020	1	EA	\$1,383	2029
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-1		168	D2020	1	EA	\$10,175	2029
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-2		168	D2020	1	EA	\$10,175	2029
BF04	BACKFLOW PREVENTER (3-4 INCHES)	BFP-FIRE		168	D2020	1	EA	\$11,555	2029
PG01	AIR COMPRESSOR - MEDICAL/LABORATORY PCKG (=10 HP), WITH DRYER	AC-1		PH	D2090	3	HP	\$9,411	2029
PG07	VACUUM PUMP - ROTARY VANE (>4<=6 HP)	VP-1		PH	D2090	5	HP	\$24,311	2029
BA02	HVAC CONTROLS - TERMINAL ASSEMBLIES - CLASSROOM	DDC TA		THROUGHOUT	D3060	147,788	SF	\$599,122	2029
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD EARU-1 SF		PH	D5010	60	HP	\$19,323	2029
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD EARU-2 SF		PH	D5010	60	HP	\$19,323	2029

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

LE03	COM EXTERIOR BLDG MT HI FLOOD LIGHTING (WALLPACK, WALLWASH)	HID WALLPACK		EXT	D5020	11	EA	\$11,366	2029
LE02	COM EXTERIOR BLDG MT DECO LIGHTING (COACH, SCONCE, PEND, SOFFIT)	REC CAN		EXT SOFF	D5020	15	EA	\$10,355	2029
LE02	COM EXTERIOR BLDG MT DECO LIGHTING (COACH, SCONCE, PEND, SOFFIT)	SCONCE		EXT	D5020	5	EA	\$3,452	2029
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	T8, CFL		THROUGHOUT	D5020	147,788	SF	\$1,958,067	2029
2029 PROJECTED COMPONENT REPLACEMENT COST								\$3,309,914	

No Projected Component Replacement Cost for Asset No. 121 for 2030

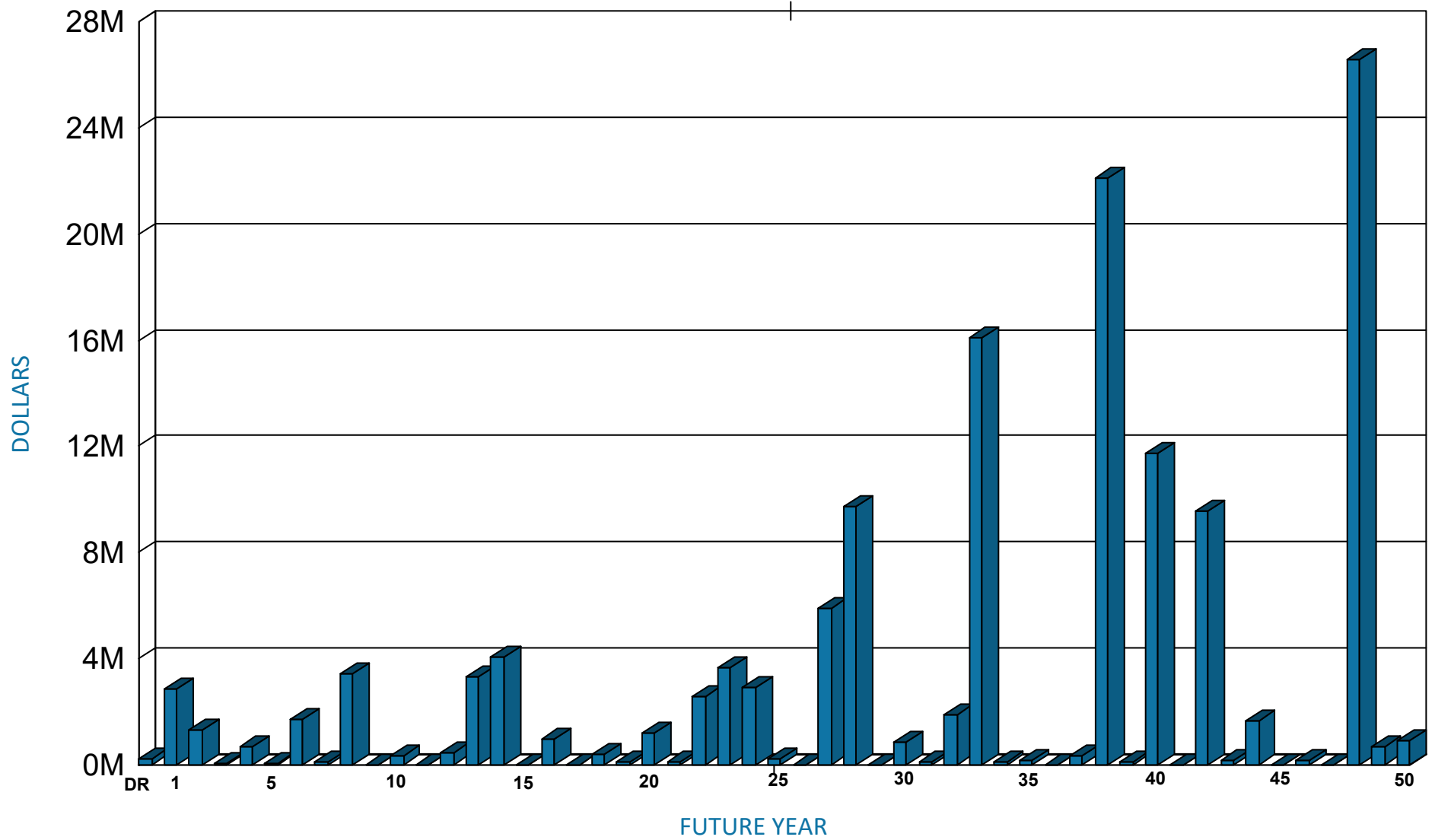
2031									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
DR34	DOOR LOCK, COMMERCIAL-GRADE, EXTERIOR	COMMERCIAL KEYSET		SERVICE ENTRANCE	B2030	9	EA	\$11,993	2031

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

DR36	DOOR PANIC HARDWARE, EXTERIOR	PUSH PULL		MAIN, SECONDARY ENTRY	B2030	18	EA	\$30,652	2031
2031 PROJECTED COMPONENT REPLACEMENT COST								\$42,644	

RECURRING COMPONENT EXPENDITURE PROJECTIONS

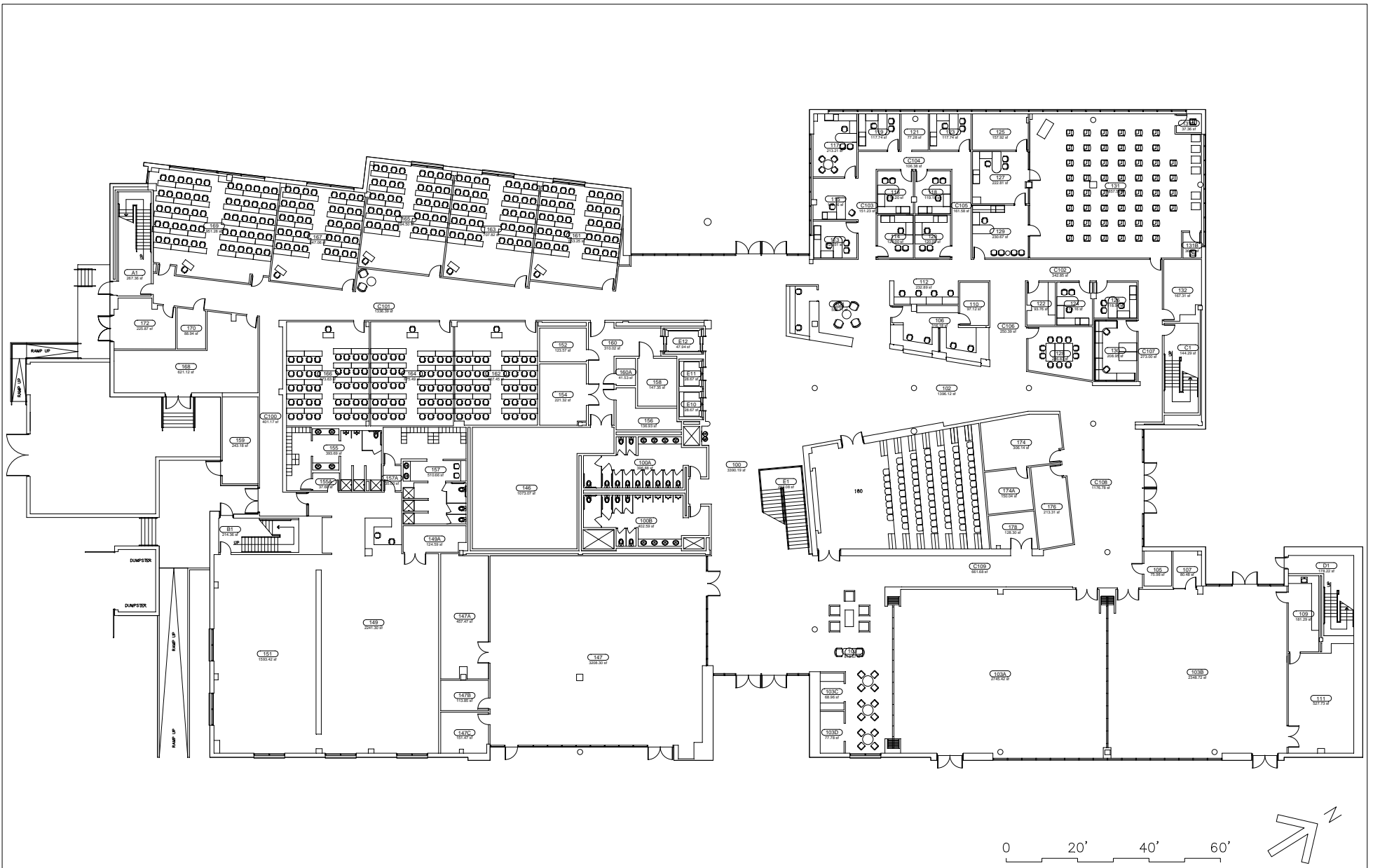


Average Annual Renewal Cost per SF \$7.48

FACILITY CONDITION ASSESSMENT

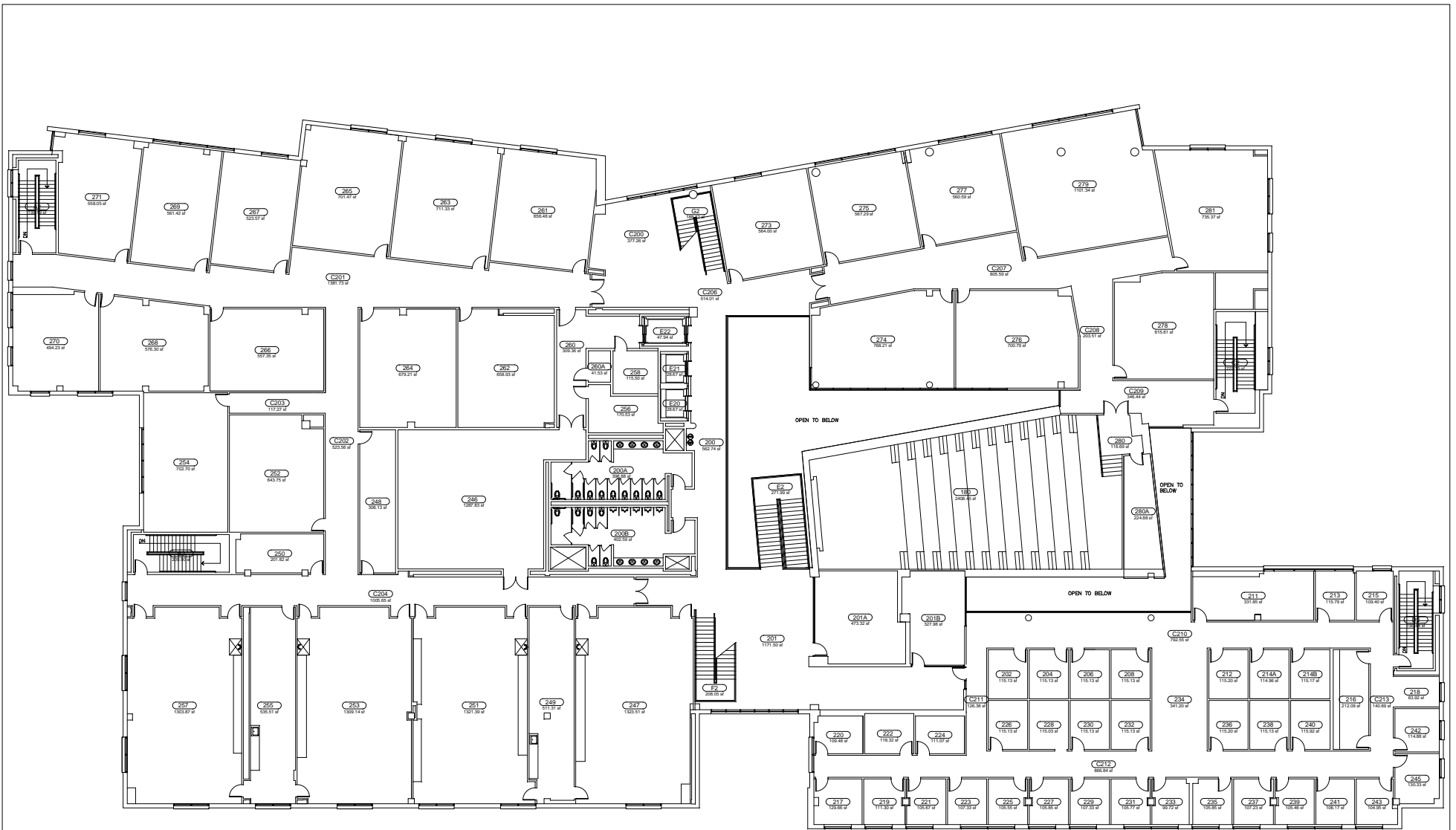
SECTION 5

DRAWINGS



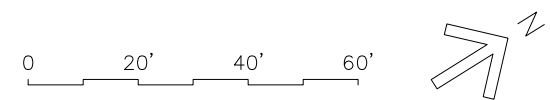
Brazos Hall

UNIVERSITY OF HOUSTON SYSTEM FACILITIES PLANNING AND CONSTRUCTION	BUILDING NUMBER: 121	BUILDING ABBREVIATION: FBA2	FLOOR LEVEL: 01	CAMPUS: UH-SYS	DATE ISSUED: 11/19/2014	SHEET: 01 OF 03
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Brazos Hall

UNIVERSITY OF HOUSTON SYSTEM FACILITIES PLANNING AND CONSTRUCTION	BUILDING NUMBER: 121	BUILDING ABBREVIATION: FBA2	FLOOR LEVEL: 02	CAMPUS: UH-SYS	DATE ISSUED: 11/19/2014	SHEET: 02 OF 03
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Brazos Hall

UNIVERSITY OF HOUSTON SYSTEM FACILITIES PLANNING AND CONSTRUCTION	BUILDING NUMBER: 121	BUILDING ABBREVIATION: FBA2	FLOOR LEVEL: 03	CAMPUS: UH-SYS	DATE ISSUED: 01/27/2017	SHEET: 03 OF 03
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FACILITY CONDITION ASSESSMENT

SECTION 6

PHOTOGRAPHS



121001a 2/10/2022
Modified bitumen roofing
Main roof



121001e 2/10/2022
Mixed flow, short stack exhaust fans
Roof



121002a 2/10/2022
Modified bitumen roofing
Main roof



121002e 2/10/2022
Air-cooled packaged chillers
Roof



121003a 2/10/2022
Carpet tiles
Third floor corridor



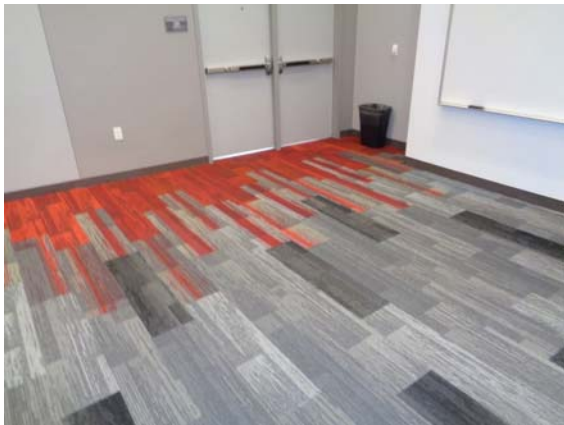
121003e 2/10/2022
Air handling unit EARU-1
Roof



121004a 2/10/2022
Carpet tiles
First floor corridor



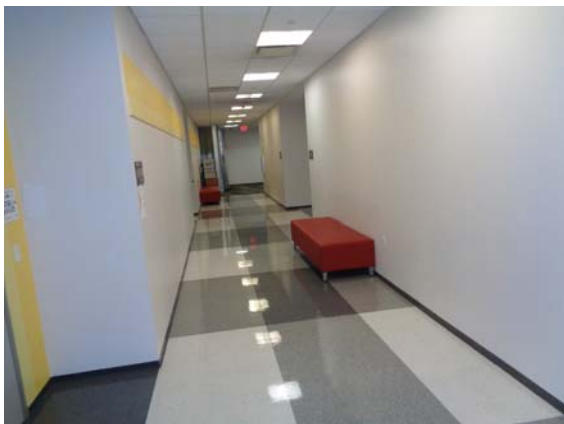
121004e 2/10/2022
Air handling unit EARU-2
Roof



121005a 2/10/2022
Carpet tiles
Room 180



121005e 2/10/2022
Utility exhaust fan
Roof



121006a 2/10/2022
Composite vinyl tile flooring
Third floor corridor



121006e 2/10/2022
Utility exhaust fan
Roof



121007a 2/10/2022
Composite vinyl tile flooring
Break room



121007e 2/10/2022
HID wallpack
Roof



121008a 2/10/2022
Ceramic tile flooring
Restroom



121008e 2/10/2022
Ductless split condensing units
Roof



121009a 2/10/2022
Ceramic tile flooring
Restroom



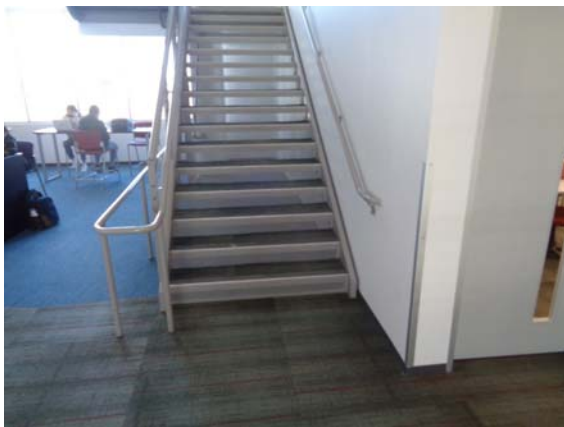
121009e 2/10/2022
Rotary vane vacuum pump system
Penthouse



121010a 2/10/2022
Carpet stair treads
Stair A1



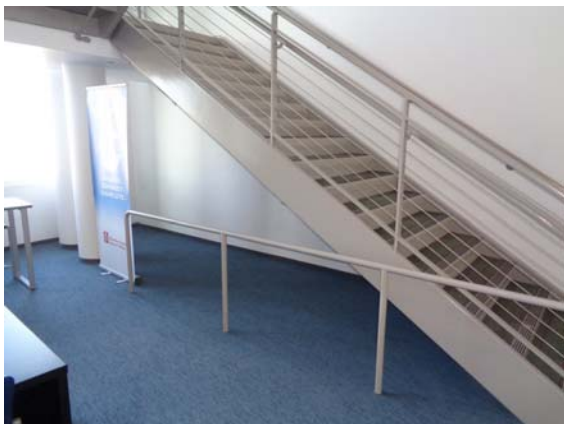
121010e 2/10/2022
Motor control center
Penthouse



121011a 2/10/2022
Carpet stair treads
Stair C1



121011e 2/10/2022
Process air compressor
Penthouse



121012a 2/10/2022
Compliant stair rails
Stair C1



121012e 2/10/2022
Refrigerated air dryer
Penthouse



121013a 2/10/2022
Suspended acoustical ceiling
Lab 387



121013e 2/10/2022
Chilled water expansion tank
Penthouse



121014a 2/10/2022
Painted hard surface ceiling
Second floor, lobby



121014e 2/10/2022
Fan coil unit
Penthouse



121015a 2/10/2022
Painted hard surface walls
Third floor corridor



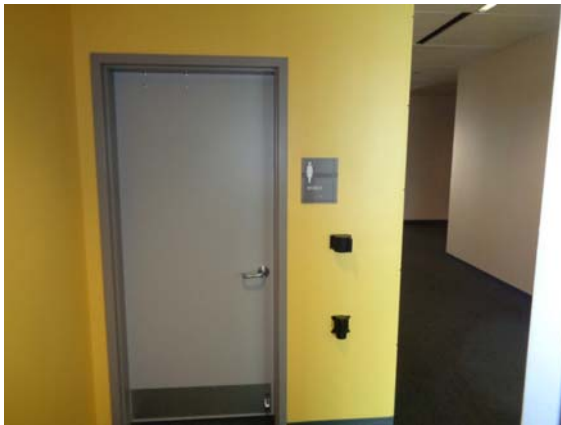
121015e 2/10/2022
Chilled water pump
Penthouse



121016a 2/10/2022
Ceramic tile walls
Restroom



121016e 2/10/2022
Chilled water pump
Penthouse



121017a 2/10/2022
Standard interior door
Restroom 300A



121017e 2/10/2022
Backflow preventer for makeup water
Penthouse



121018a 2/10/2022
Rated exterior doors, roof access
Mechanical room



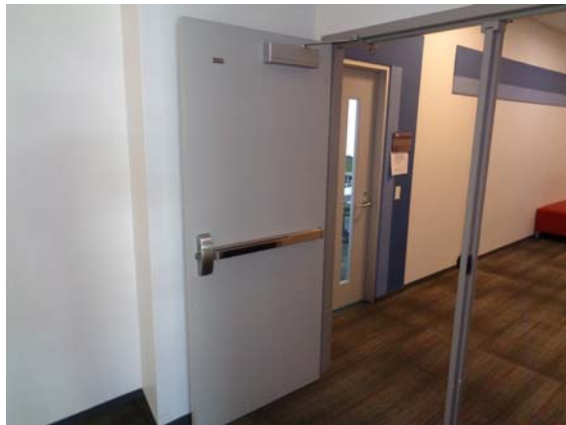
121018e 2/10/2022
VFDs for chilled water pumps
Penthouse



121019a 2/10/2022
Lever style door hardware
Restroom 385



121019e 2/10/2022
Chilled water pump
Penthouse



121020a 2/10/2022
Panic bar door hardware
Second floor, corridor



121020e 2/10/2022
Chilled water pump
Penthouse



121021a 2/10/2022
Metal coil interior door
Registrar office 106



121021e 2/10/2022
VFDs for EARU supply fans and exhaust fans
Penthouse



121022a 2/10/2022
Metal coil interior door
Registrar office 106



121022e 2/10/2022
Commercial gas-fired water heaters
Penthouse



121023a 2/10/2022
Lab casework
Lab 387



121023e 2/10/2022
Domestic hot water expansion tank
Penthouse



121024a 2/10/2022
Standard casework
Break room



121024e 2/10/2022
HVAC field panel
Penthouse



121025a 2/10/2022
Aluminum and glass exterior doors
Main entrance



121025e 2/10/2022
Air handling unit AHU-6
Mechanical room 346



121026a 2/10/2022
Hollow-metal exterior doors
Receiving area



121026e 2/10/2022
Air handling unit AHU-5
Mechanical room 346



121027a 2/10/2022
Exterior commercial hardware
Receiving area



121027e 2/10/2022
VFDs for AHU-5 and AHU-6
Mechanical room 346



121028a 2/10/2022
Power operated exterior doors
Main entrance



121028e 2/10/2022
Typical laboratory fume hood
Laboratory 355



121029a 2/10/2022
Standard brick exterior wall
North elevation



121029e 2/10/2022
Typical emergency shower
Laboratory 355



121030a 2/10/2022
Cement masonry block exterior wall
North elevation



121030e 2/10/2022
Typical emergency eyewash station
Laboratory 355



121031a 2/10/2022
Aluminum and glass doors and storefront
West elevation



121031e 2/10/2022
Fire suppression sprinkling device
Third floor corridor



121032a 2/10/2022
Exterior brick wall
South elevation



121032e 2/10/2022
Elevator 1 interior
Elevator 1



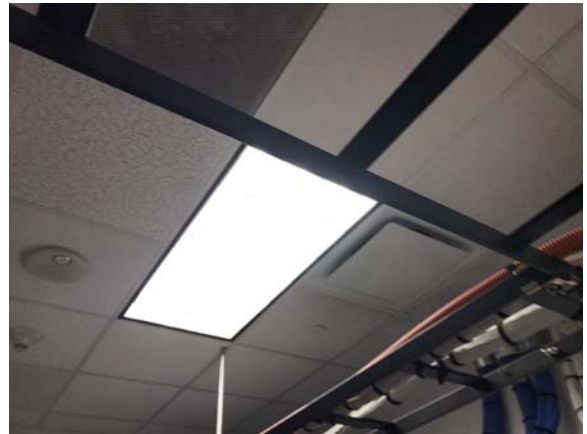
121033a 2/10/2022
Entrance steps and rails
Main entrance area



121033e 2/10/2022
Elevator 2 interior
Elevator 2



121034a 2/10/2022
ADA-compliant wheelchair ramp and rails
Main entrance



121034e 2/10/2022
Recessed T8 lighting fixture
Room 304



121035a 2/10/2022
Exterior finishes
South elevation



121035e 2/10/2022
Air handling unit AHU-3
Mechanical room 246



121036a 2/10/2022
Dual-level drinking fountains
Corridors



121036e 2/10/2022
Air handling unit AHU-4
Mechanical room 246



121037a 2/10/2022
Auto flush water closet
Restroom



121037e 2/10/2022
Local panelboards
Electrical room 256



121038a 2/10/2022
Auto sensor vanity
Restroom



121038e 2/10/2022
Typical dry-type transformer
Electrical room 256



121039a 2/10/2022
Auto flush urinal
Restroom



121039e 2/10/2022
Ceiling-mounted CFL lighting fixture
Second floor corridor



121040a 2/10/2022
Shower head and valve
Restroom



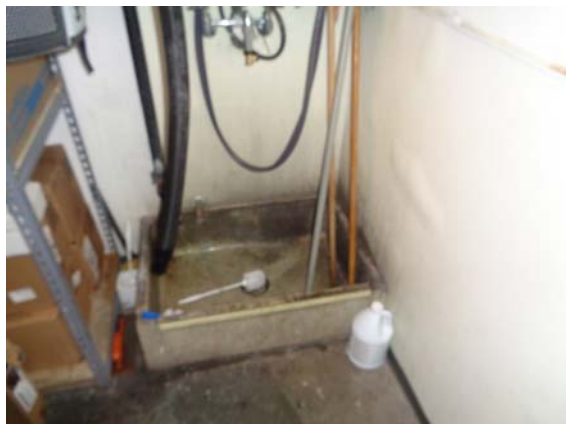
121040e 2/10/2022
Suspended T8 lighting fixture
Room 247



121041a 2/10/2022
Stainless-steel sink
Break room



121041e 2/10/2022
Recessed can HID lighting fixtures
Room 280



121042a 2/10/2022
Floor-mounted mop sink
Janitorial closet



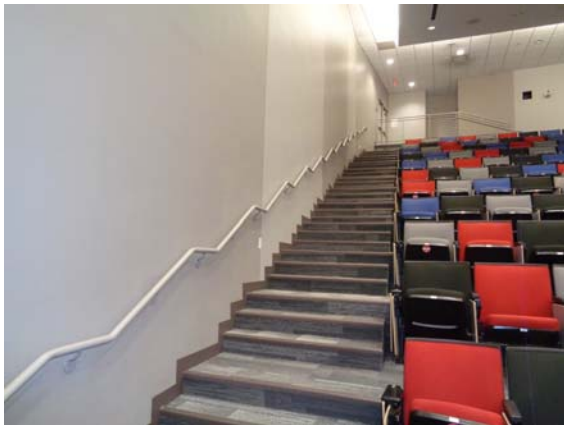
121042e 2/10/2022
Elevator 3 hydraulic controls
Elevator mechanical room 158



121043a 2/10/2022
Fixed auditorium seating
Room 180



121043e 2/10/2022
Elevator 2 hydraulic controls
Elevator mechanical room 158



121044a 2/10/2022
Compliant wall-mounted hand rails
Room 180



121044e 2/10/2022
Elevator 1 hydraulic controls
Elevator mechanical room 158



121045a 2/10/2022
Lightning protection system
Main roof



121045e 2/10/2022
Fan coil unit
Main electrical room 154



121046a 2/10/2022
Concrete parking lot striping
North lot



121046e 2/10/2022
Main switchboard
Main electrical room 154



121047a 2/10/2022
Concrete curb and gutter
North lot



121047e 2/10/2022
Motor control center
Main electrical room 154



121048a 2/10/2022
Asphalt parking lot
Aerial view



121048e 2/10/2022
VFDs for AHU-1 and AHU-2
Mechanical room 156



121049e 2/10/2022
Air handling unit AHU-1
Mechanical room 156



121050e 2/10/2022
Air handling unit AHU-2
Mechanical room 156



121051e 2/10/2022
RO system and storage tank
Mechanical room 156



121052e 2/10/2022
Industrial water softener
Mechanical room 156



121053e 2/10/2022
RO pumps
Mechanical room 156



121054e 2/10/2022
Backflow preventers for water main
Mechanical room 156



121055e 2/10/2022
Backflow preventer for fire suppression
Mechanical room 156



121056e 2/10/2022
Diesel-fired emergency generator
Exterior courtyard



121057e 2/10/2022
Automatic transfer switch
Main electrical room 154



121058e 2/10/2022
Recessed CFL and T8 lighting fixtures
Room 149



121059e 2/10/2022
Main fire alarm panel
Room 174



121060e 2/10/2022
Recessed can lighting fixtures
Exterior soffit



121061e

2/10/2022

CFL sconce lighting fixture

Loading dock

FACILITY CONDITION ASSESSMENT

SECTION 7

PRELIMINARY ENERGY
ASSESSMENT

INTRODUCTION

A Preliminary Energy Assessment (PEA) was conducted to identify energy conservation opportunities. The PEA is intended to be a preliminary energy screening only. The goal is to identify potential energy savings opportunities in a building. It is not equivalent to an American Society of Heating, Refrigeration, or Air Conditioning Engineers (ASHRAE) Level 1, 2, or 3 audit. The PEA has two sections: 1) Benchmarking Data and 2) Energy Conservation Opportunities. Basic building information is provided in **Table 1**.

TABLE 1. BUILDING INFORMATION	
Client	University of Houston
Asset Number	121
Asset Name	BRAZOS HALL
Year Built or Last Energy Renovation	2009

BENCHMARKING DATA

The purpose of benchmarking building performance is to determine how well a building performs in comparison to other similar buildings. For this analysis, buildings were assessed based on their primary use (e.g., education, food sales, food service, etc.) and year constructed. Two metrics -- energy use intensity and energy end use -- are presented for the building manager to use to assess how efficiently the building performs compared to similar buildings.

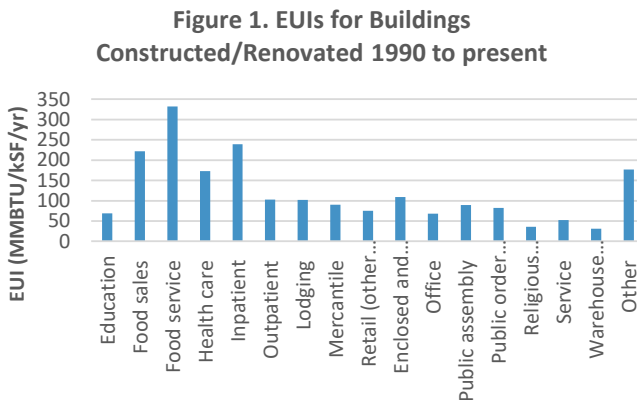
Metric #1: Energy Use Intensity (EUI)

EUI is a measure of energy consumption per square foot of building space per year. The units of measurement are million British thermal units per thousand square foot per year (MMBTU/kSF/yr). The US-DOE EUI can be compared to the actual EUI of the client building to determine how efficient the building is compared to other similar buildings. A building manager can calculate EUI by summing total energy consumption per year (in MMBTU/yr) and dividing it by the building area (in kSF). Benchmarking data from the U.S. Energy Information Administration (EIA) Commercial Building Energy Consumption Survey (CBECS) database was used for this analysis.

Basic information about the building use and the time of the most recent major HVAC or lighting upgrade is provided in **Table 2**. That information is used to determine the Benchmark EUI. The building manager can calculate the Building EUI and compare it to the Benchmark EUI to determine how building efficiency compares to similar buildings (see **Table 3**). In addition, **Figure 1** shows the EUIs of various building types for further comparison.

TABLE 2. BUILDING DETAILS	
FCA Building Type	Classroom
Range of Years Constructed/Last Major Energy Renovation	1990 to present
Benchmark EUI (MMBTU/kSF/yr) =	69
Building EUI to be Calculated by Client (MMBTU/kSF/yr) =	

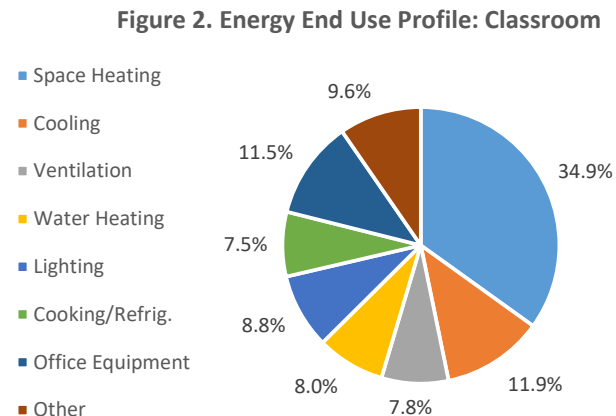
TABLE 3. EUI COMPARISON	
Very Energy Efficient (consumes more than 30% less energy)	EUI < 48.3
Energy Efficient (consumes 10% to 30% less energy)	48.3 <= EUI <= 62.1
Similar (consumes within 10% less or 10% more energy)	62.1 < EUI < 75.9
Energy Inefficient (consumes 10% to 30% more energy)	75.9 <= EUI <= 89.7
Very Energy Inefficient (consumes more than 30% more energy)	EUI > 89.7



Metric #2: Energy End Use

Energy end use data characterizes how energy is used by profiling energy consumption into end use categories such as space heating, cooling, ventilation, lighting, etc. When energy end use data is presented in a pie chart, high energy-consuming activities are readily identified. A building manager can determine the energy end use profile for a building by analyzing trend data from a Building Automation System and/or Energy Management Control System.

TABLE 4. ENERGY END USE PROFILE: CLASSROOM	
Space Heating	34.9%
Cooling	11.9%
Ventilation	7.8%
Water Heating	8.0%
Lighting	8.8%
Cooking/Refrig.	7.5%
Office Equipment	11.5%
Other	9.6%
Total	100.0%



References:

1. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. "Technologies and Products by Category." Efficient Technologies and Products for Federal Facilities. DOE. <http://energy.gov/eere/femp/efficient-technologies-and-products-federal-facilities>. Accessed: June 2016.
2. U.S. Energy Information Administration [EIA]. "2012 CBECS Survey Data." Commercial Building Energy Consumption Survey. EIA. <http://www.eia.gov/consumption/commercial/data/2012/index.cfm?view=consumption#c1-c12>, Accessed: June 2016.

ENERGY CONSERVATION OPPORTUNITIES

This section presents energy conservation measures (ECMs) recommended for further investigation. Recommended ECMs are categorized into one or more cost categories to indicate an approximate level of resources required to implement the ECM. These cost categories are:

Operation and Maintenance Measures (O&M): O&M actions usually (a) can be completed by in-house maintenance personnel and (b) result in an immediate return on investment.

Low-Cost/No-Cost Measures (LC/NC): LC/NC measures typically (a) can be done by in-house personnel, (b) require little to no investment cost, and (c) result in significant energy savings. In other words, LC/NC measures typically have a quick payback period (less than one year).

Capital Improvement Measures (CAP): CAP measures are major capital investments that usually require significant time (i.e., approximately six months to three years) for planning, design, and implementation. Oftentimes, a request for proposal, design/bid/build (D/B/B), and/or design/build (D/B) package is required. The return on investment for CAP projects ranges significantly, varying from a payback period from one to twenty plus years.

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
Lighting - Interior, Controls	INSTALL LIGHTING CONTROLS. Oftentimes, lighting fixtures on switches do not get turned off when a space is unoccupied. Occupancy sensors, photocell sensors, and lighting control systems can help reduce lighting energy consumption. For example, consider installing occupancy sensors in offices, common areas, and other areas that have variable occupancy. In areas where there is natural lighting, consider using photocell sensors to dim or shut off fixtures that aren't needed. Alternatively, install a comprehensive light control system that uses time clock schedules, occupancy sensors, photocell sensors, etc., to monitor and control lighting throughout an entire building.	N/A, Varies
Lighting - Exterior	INSTALL EFFICIENT LIGHTING FIXTURES. While incandescent lamp fixtures have a low initial cost, the lamps are energy inefficient and have a short useful life. Consider CFL and LED lighting instead. HID lamps are necessary in some applications; however, alternatives such as high intensity T5 or LED fixtures should be considered. T12 lamps are an outdated lighting technology that should be replaced with newer technologies such as high intensity fluorescent or LED lamp fixtures.	N/A, Varies
Lighting - Exterior, Controls	INSTALL LIGHTING CONTROLS. Consider using photocell sensors or timeclocks to shut off building/parking lot fixtures during daylight hours.	N/A, Varies
HVAC - Unitary Equipment	INSTALL EFFICIENT UNITARY EQUIPMENT. Consider replacing the existing equipment with FEMP recommended/ENERGY STAR qualified unitary equipment.	LC/NC; CAP

