Town of Sudbury

Facility Condition Assessment

Executive Summary Report

December 2nd, 2024

Alpha™ Facilities Solutions

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FACILITY CONDITION ASSESSMENT
TOWN OF SUDBURY

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EXECUTIVE SUMMARY

Introduction

Town of Sudbury entered into a contract with ALPHA Facilities Solutions, LLC (ALPHA) to provide facility condition assessment. The project was completed by a team consisting of engineers, architects, and construction professionals. Data collected during the Facility Condition Assessment phase of the project was input into Asset Planning and Performance Software (APPS) in order to estimate current and future funding requirements for facility sustainment. This predictive approach to asset management is known as Capital Planning and is used to anticipate funding and maintenance needs many years into the future.

The scope of work included the following:

1. Identify and document current and forecasted conditions of approximately 643,729 square feet of facilities.
2. Identify and document current site needs.
3. Identify and document remaining service life of major building systems to include envelope; architectural finishes; roofs; electrical; plumbing; and heating, ventilation, and air conditioning (HVAC).
4. Provide Rough Order of Magnitude (ROM) cost estimates for building system renewal and site repairs.
5. Forecast facility renewal requirements based on lifecycle analysis of existing systems over the span of the next 20 years for each facility.
6. Provide a Facility Condition Index (FCI) measurement to illustrate the relative condition of all facilities.

Acknowledgement

Finally, the ALPHA Team would like to take this opportunity to thank Town of Sudbury for allowing ALPHA to help the Town achieve its goals. We would also like to thank Sandra Duran and their staff for investing a substantial amount of their valuable time to work with us on this project; their knowledge of the facilities was superb and their contributions were invaluable.

Facility Condition Assessment Approach

Alpha's Asset Planning and Performance Software was used to document facility conditions, to determine current requirements, and to forecast future requirements for facilities within the Town of Sudbury. Parametric cost models contained within APPS were assigned to most buildings while new cost models were developed in instances where an appropriate cost model did not exist. New cost models developed by the ALPHA Team are also contained within APPS. System and component life cycles used within the cost models are based on average service life as shown in the Preventive Maintenance Guidebook: Best Practices to Maintain Efficient and Sustainable Buildings published by Building Owners and Managers Association (BOMA) International. When life cycle information is not provided by BOMA, we used our experience and professional judgment to suggest appropriate average service life for those components and systems. Unit costs, which are used to calculate renewal requirements, are also built into the cost models. Life cycles and unit costs have been adjusted on a location-specific basis as appropriate or as requested by Town personnel.

Although there are many factors that are important to obtain a successful outcome for a facility condition assessment, three provide the foundation for establishing a reliable cost model for each building. Those three factors are related to the following basic building information:

- Gross area
- Date built
- Building/location name

The gross area of a building, also known as gross square footage (GSF), is one of the basic building blocks for determining current replacement value (CRV) and generating system renewal costs, which are major components of a parametric-based effort. The date built for each facility provides the basis for establishing life cycles for many, and in some cases, all major building systems. Finally, although not critical to the outcome of the project, agreeing upon a building/location naming convention that is meaningful to all stakeholders enhances the usefulness and readability of the facility condition assessment report. Please note that GSF for each building was provided by the Town and generally was not validated as part of this project. It should be noted that some building names may have changed at the direction of the Town from what was indicated in documentation initially provided.

In order to determine basic building information, the ALPHA Team met with designated Town personnel to discuss Town-specific information such as building construction/renovation programs and building naming conventions. Scaled floor and site plans were generally not available, so square footages associated with additions and site features were obtained from a combination of sources to include Town records, satellite imagery, and professional judgment.

It is worth noting that, although most concealed systems may appear to be functional, the risk of failure increases with time when they have exceeded the average service life as predicted by BOMA. Consequently, this effort assumes that replacement of concealed systems that have exceeded the average service life as predicted by BOMA is appropriate. Based on the availability of resources and the tolerance for risk or potential out-of-service conditions, the Town may elect to defer immediate replacement of concealed systems that have exceeded average service life as appropriate.

Building condition requirements and site infrastructure requirements are documented within APPS Capital Planning Software and based on estimated quantities, RS Means, and client supplied data when available.

Prioritization of Needs

Finally, all needs contained within Brightly have been assigned a default priority based on importance to mission performance. Therefore, systems whose failure might render a building not suitable for occupancy have been ranked with a higher priority than those systems that have minimal or no impact on a facility's suitability for occupancy. For example, replacement of an HVAC system might take priority over replacement of flooring. Although additional priorities are available within Brightly, priorities used for this project are:

- High
- Medium
- Low

Needs contained within Brightly have been ranked in terms of urgency in order to aid in the prioritization for allocation of funds. The priorities of applicable systems for this project are as follows:

High

- Electrical - Branch Wiring
- Electrical - Communications and Security
- Electrical - Lighting
- Electrical - Other Electrical Systems
- Electrical - Service & Distribution
- Fire Protection - Sprinklers
- HVAC - Controls & Instrumentation
- HVAC - Cooling Generating Systems
- HVAC - Distribution Systems
- HVAC - Heat Generating Systems
- HVAC - Terminal & Package Units
- Roofing

Medium

- Conveying
- Exterior Enclosure - Exterior Doors
- Exterior Enclosure - Exterior Windows
- Interior Construction - Interior Doors
- Plumbing - Domestic Water Distribution
- Plumbing - Plumbing Fixtures
- Plumbing - Sanitary Waste

Low

- Exterior Enclosure - Exterior Walls
- Food Service Equipment
- Interior Construction - Fittings
- Interior Finishes - Ceiling Finishes
- Interior Finishes - Floor Finishes
- Interior Finishes - Wall Finishes
- Pedestrian Pavements
- Vehicular Pavements

Building Performance Metrics

As part of the FCA process, a facility condition index (FCI) was calculated for each facility. The FCI is used to quantify a facility's physical condition at a specific point in time and is calculated using the expired system replacement costs (costs associated with systems that are beyond average service life) and the current replacement value (CRV) of the building. Expired system replacement costs consist of work that is necessary to restore the facility to a condition equivalent to its original (like new) state.

The FCI can be helpful in several ways to include:

- Comparing the condition of one facility to a group of facilities
- Tracking trends (the extent of improvement or deterioration over time)
- Prioritizing capital improvement projects
- Making renovation versus replacement decisions

The FCI is calculated as shown in the example below.

Example 1: Total expired system replacement costs (Requirements) = $3,000,000

Current Replacement Value (CRV) = $10,000,000

$$FCI = \frac{\$3{,}000{,}000}{\$10{,}000{,}000} = .30$$

It is important to note there is no recognized standard for what constitutes an acceptable or unacceptable FCI. For example, the International Facility Management Association (IFMA) indicates that building condition is often defined in terms of the FCI as follows:

1. Good - 0% to 5%,
2. Fair - 5% to 10%,
3. Poor - 10% to 30%, and
4. Critical - greater than 30%

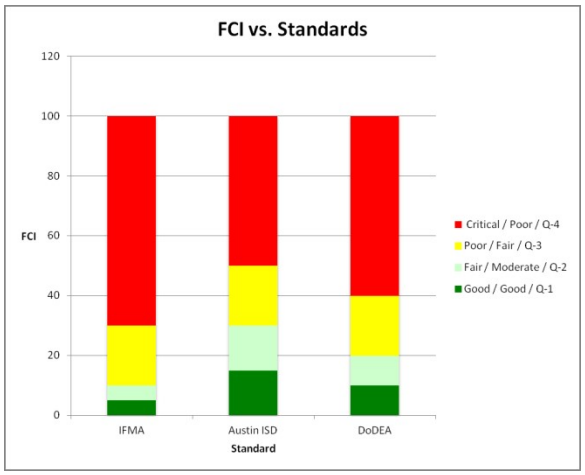


Figure 1. FCI Standards

The Renovate Versus Replacement Question

A question that often arises is at what point does it make sense to replace a facility rather than to renovate it? Again, there is no industry standard, but conventional thinking is that replacement of a facility should be seriously considered when the FCI rises above 50%. However, the FCI is not the only consideration when making renovation versus replacement decisions. One consideration that should be taken into account is whether a facility is functionally adequate for the intended use. Another consideration revolves around the magnitude of needed renovations. For example, when cost of renovation reaches or exceeds 50% of the replacement cost of the facility, requirements to meet Americans with Disabilities Act (ADA), Life Safety and possibly other codes may be triggered. When the requirement to meet current building codes or civil rights statutes, such as those mentioned above are triggered, additional costs will be incurred. Although it is not possible to predict what the additional costs will be until project requirements are identified and cost estimates are prepared, it has been our experience that additional cost can be expected to range from 5% to 20% depending upon the age of the facility.

Categorization of Costs

At this point, it is appropriate to review the different types of costs associated with facility renovation and construction and how they apply to this project. According to the American Institute of Architects (AIA), facility capital costs are normally subdivided into three major categories - site costs, hard costs, and soft costs. Site costs are normally associated with the owner's initial land acquisition and development costs for a project and are not a consideration in the context of this project. Hard costs are associated with direct construction costs while soft costs can be defined as any indirect costs incurred in addition to the direct construction costs. Soft costs include a variety of costs such as design fees, legal fees, taxes, insurance, owner's administration costs, and financing costs. Cost data produced by the parametric cost models within APPS includes hard costs including consideration of renewal costs, which accounts for the additional cost associated with replacing an existing building system versus constructing the system in a new facility.

It is important to remember that cost models are intended to produce rough order of magnitude (ROM) costs for purposes of developing a baseline from which to establish an FCI for each facility and to facilitate capital planning. It is not unusual for those new to the parametric cost estimating/life cycle analysis process to have expectations that are not completely in alignment with what the process is intended to yield. For example, the parametric cost estimating/life cycle analysis process generates ROM budgeting-level costs while costs that are more detailed are derived during formal preliminary design and final design cost estimating processes.

As a point of interest, *APPA: Leadership in Educational Facilities* published a paper citing research conducted by the *Building Research Board of the National Research Council* indicating, “Underfunding of maintenance and repair is a widespread and persistent problem.” The council concluded, “That an appropriate total budget allocation for routine maintenance and capital renewal is in the range of two to four percent of the aggregate current replacement value (CRV) of those facilities (excluding major infrastructure). When a backlog of deferred maintenance has been allowed to accumulate, spending must exceed this minimum level until the backlog has been eliminated.

Facility Condition Assessment

Facility-related data contained in this report was developed at the building level, which in turn, was rolled up at the campus level. Likewise, site infrastructure requirements were rolled up at the campus level. All data was then rolled up to provide an aggregate view of District facilities. Data within this report has been grouped as follows:

- Town
- School

This report includes the following content, which is found at campus and/or Executive Summary levels:

- Facility Description: Summary of Findings
- Current Needs (2024)
- Forecasted Needs (2029)
- Current and Forecasted Needs: Summarized by Reporting Period
- Current and Forecasted Needs: Summarized by System
- Need Priorities (High - Medium - Low)

Appendix B - Supplemental Information provides additional information the reader may find useful.

Site and Infrastructure Condition Assessment

A site infrastructure assessment was included in the scope of work for this project. The site infrastructure assessment is a visual evaluation of the site systems. The teams walked each site to determine the general condition of the systems and categorized them as follows:

- Good condition
- In need of repair
- In need of replacement

Estimated quantities were calculated by digitizing marked-up Google Earth aerial photographs. Google Earth Aerial photographs were used in lieu of site plans.

The site assessment was performed and the subsequent results grouped by location. Findings for each location were divided as follows:

- Pedestrian Pavements
- Vehicular Pavements
- Site Development

Please note that not all locations have all of the various infrastructure systems present.

We determined unit pricing for the various deficiency requirements by referencing 2024 RSMeans Building Construction Cost Data and Assembly Cost Data when available; industry sources were used as a supplemental source for unit pricing when needed.

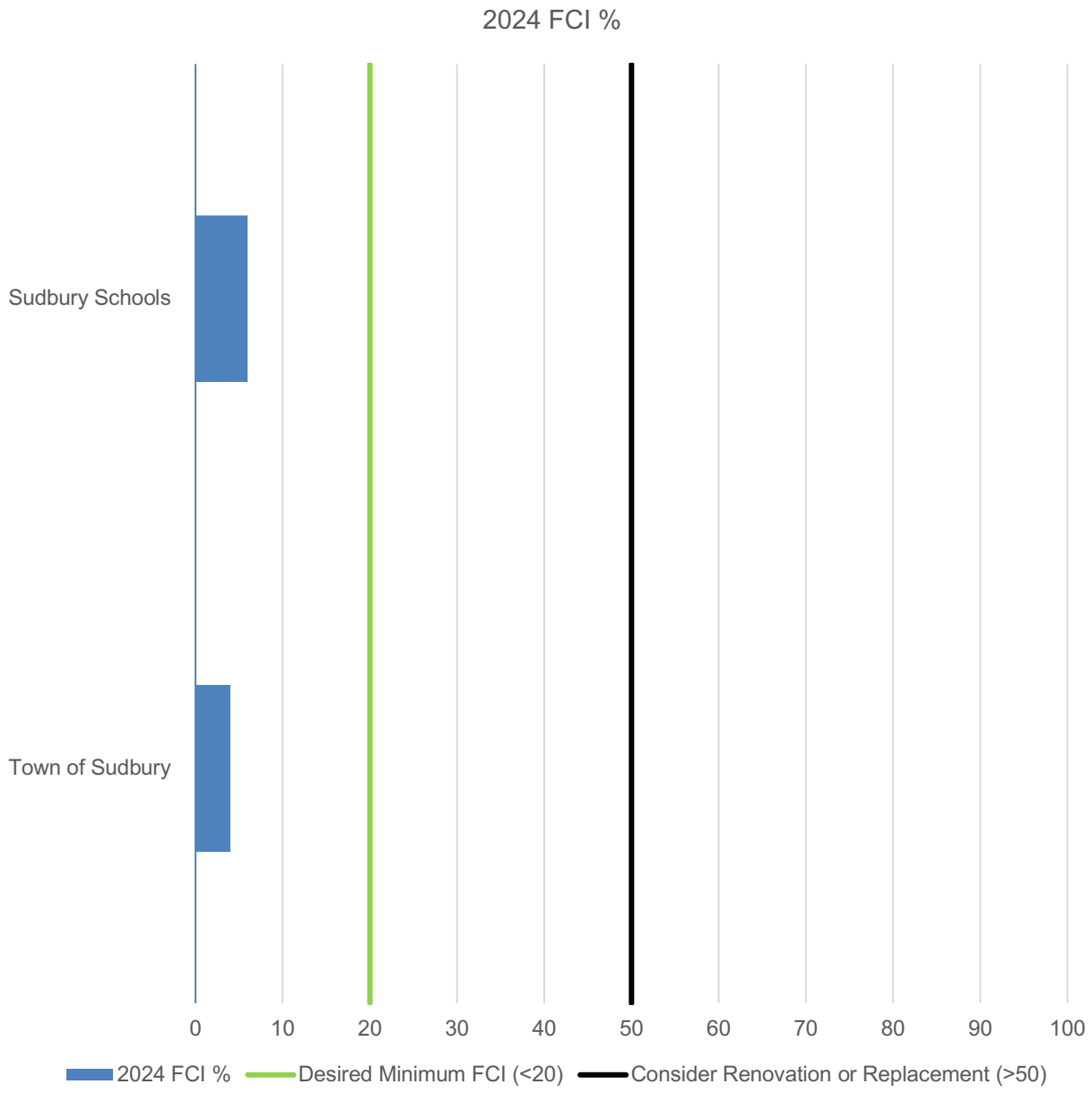
Overview of Findings

The Facility Condition Assessment and Town implementation project included 20 permanent facilities, 0 portables, totaling 643,729 square feet. The average FCI for the facilities assessed is 5 while the average FCI in five years is estimated to be 11 assuming current facility sustainment funding levels. The assessment team made the following general observations:

1. Nine facilities assessed were noted to utilize either the original domestic water piping or piping constructed before 1985. It is recommended that any building constructed before 1985 have a water quality test performed on a regular basis. The following buildings were noted to meet these conditions: DPW Rear Building Garage & Offices, Fire Department #2, Fire Department #3, Flynn Building Administration Offices, Haynes Meadow House, Hosmer House, Parks and Recreation Building, Peter Noyes Elementary School, and Town Hall.
2. Thirteen facilities assessed were noted to have roof covering systems beyond their recommended life. The following buildings were noted to meet these conditions: Curtis Middle School, DPW Rear Building Garage & Offices, DPW Salt Shed, Fairbanks Community Center, Fire Department #2, Fire Department Head Quarters, Flynn Building Administration Offices, Goodnow Library, and Haynes Elementary School, Hosmer House, Loring Elementary School, Nixon Elementary School, and Town Hall.
3. Ten facilities assessed were noted to utilize branch wiring that is 30+ years old, the recommended life cycle as defined by BOMA. It is recommended that infrared testing be performed on these systems prior to extending their life cycles. The following buildings were noted to meet these conditions: DPW Rear Building Garage & Offices, Fire Department #2, Fire Department #3, Fire Department Head Quarters, Flynn Building Administration Offices, Haynes Meadow House, Hosmer House, and Parks and Recreation Building, Peter Noyes Elementary and Town Hall.
4. Thirteen facilities assessed were noted to have either a portion of or the entire fire alarm and detection system beyond the recommended useful life of 15 years. The following buildings were noted to meet these conditions: Curtis Middle School, DPW Building Administration Offices, DPW Rear Building Garage & Offices, Fire Department #3, Fire Department Head Quarters, Flynn Building Administration Offices, Goodnow Library, Haynes Elementary School, Loring Elementary School, Nixon Elementary School, Parks and Grounds Building, Peter Noyes Elementary School and Town Hall.
5. Eight of the facilities assessed were noted to be using HVAC distribution system that is beyond the recommended lifecycle of 30 years. The following buildings were noted to meet these conditions: DPW Rear Building Garage & Offices, Fire Department Head Quarters, Flynn Building Administration Offices, Haynes Meadow House, Hosmer House, Parks and Recreation Building, Peter Noyes Elementary School, and Town Hall.
6. Observed significant accumulation of dirt and debris around roof drains across multiple facilities. Recommend clearing roof drains on a regular basis to prevent deterioration of roof coverings.
7. Several schools, including Curtis Middle School, Haynes Elementary School, Loring Elementary School, and Nixon Elementary School, were constructed or had a major renovation between 1995 and 1998. Multiple building systems are approaching the end of their 30 year lifecycle causing an increased FCI in 2029.
8. Many of the HVAC systems in service use R-22 refrigerant. As of January 2020, R-22 refrigerant is no longer produced and servicing existing equipment is limited to recycled refrigerant. Since supply is limited, costs to charge existing units leaking R-22 refrigerant have gone up and are expected to continue to rise.

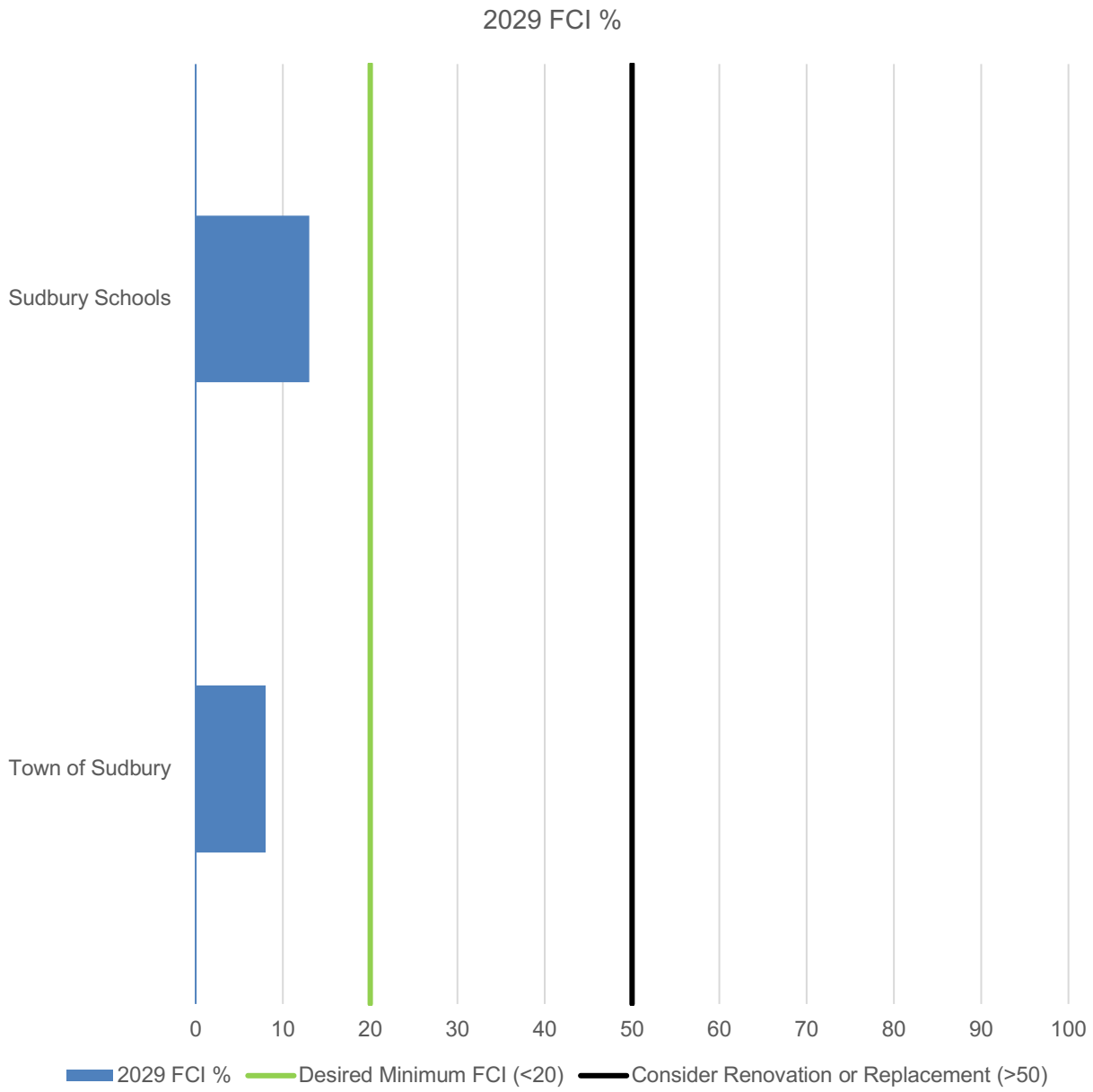
The information shown in the figure below shows the current (2024) FCI for all Town facilities in order of "worst first". The farthest right point on the blue bar for each building indicates the current FCI.

Figure 2. Current Facility Condition: Town of Sudbury



The information shown in the figure below shows the forecast (2029) FCI for all Town facilities in order of "worst first". The farthest right point on the blue bar for each building indicates the forecast FCI.

Figure 3. Forecast Facility Condition: Town of Sudbury



The following table summarizes findings by group. Please note the column labeled "Total Needs 2029" assumes no additional capital renewal funding is provided. A comprehensive list of expired systems and those expected to expire between now and the Year 2044 is shown in the Current and Forecasted Needs: Summarized by System - Town of Sudbury Table.

Table 1. Facility Description: Summary of Findings: Town of Sudbury

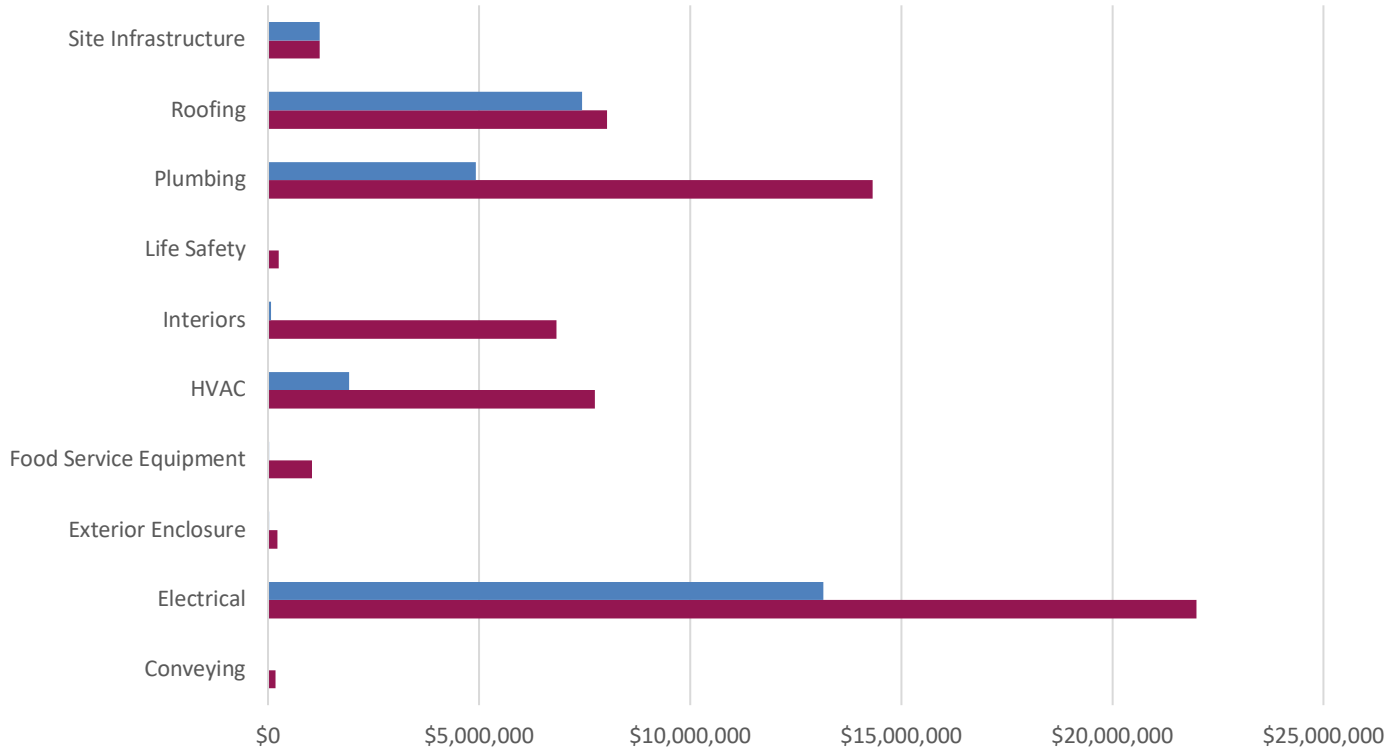
Group	Area (SF)	Total Needs 2024	Current Replacement Value	2024 FCI %	Total Needs 2029	2029 FCI %
Town	210,040	$7,221,812	$169,482,915	4	$13,287,078	8
School	433,689	$20,347,496	$368,635,650	6	$47,334,713	13
SUBTOTAL	***643,729***	***$27,569,308***	***$538,118,565***	***5***	***$60,621,791***	***11***
Site and Infrastructure (excluded from FCI calculations)		$1,216,278			$1,216,278	
TOTALS	**643,729**	**$28,785,587**	**$538,118,565**		**$61,838,069**	

Note: The average FCI for the Town of Sudbury facilities assessed is 5 while the average FCI in 5 years is estimated to be 11 assuming current sustainment levels.

The following Figures show the current and forecasted needs respectively for all facilities. Needs are grouped as follows:

- Conveying
- Electrical
- Exterior Enclosure
- Food Service Equipment
- HVAC
- Interiors
- Life Safety
- Plumbing
- Roofing
- Site Infrastructure

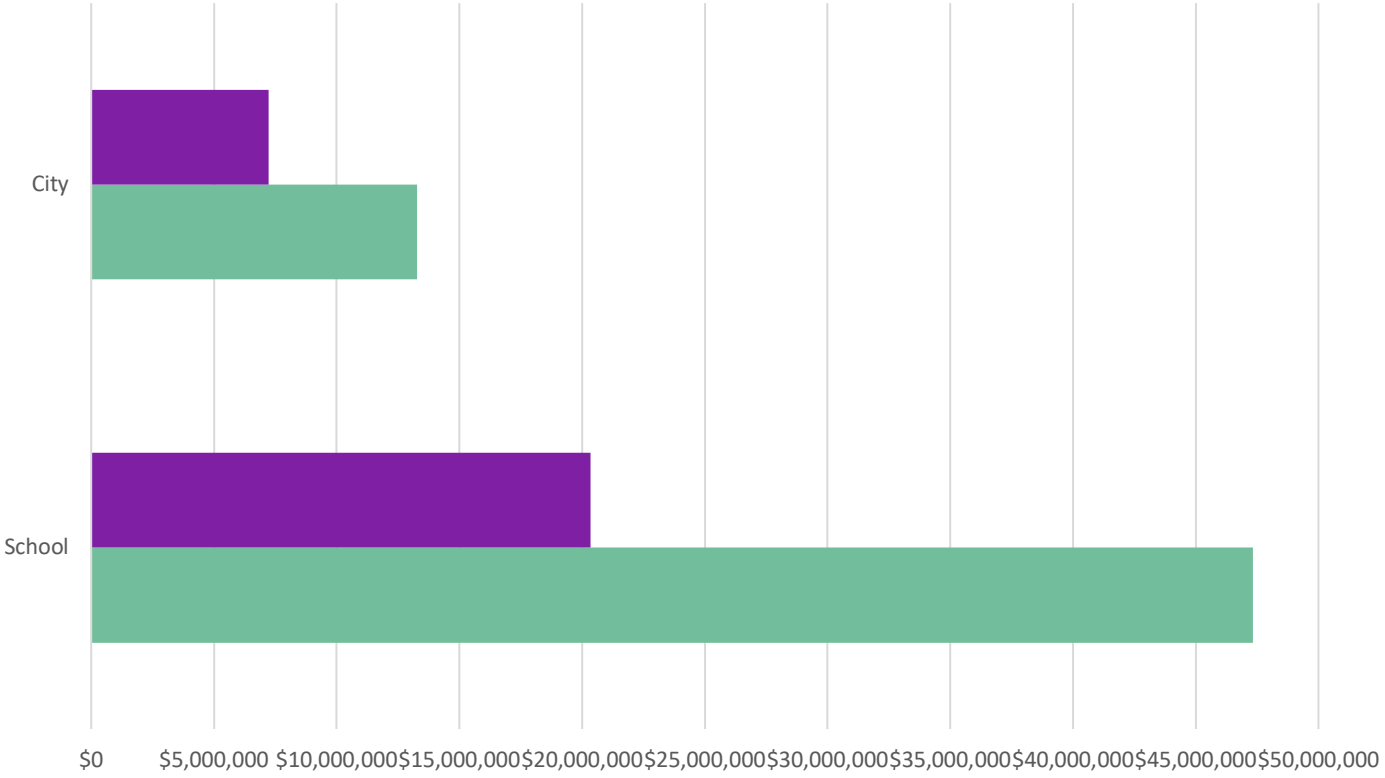
Figure 4. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by System Group: Town of Sudbury



	Conveying	Electrical	Exterior Enclosure	Food Service Equipment	HVAC	Interiors	Life Safety	Plumbing	Roofing	Site Infrastructure
2024	$0	$13,150,569	$28,929	$27,456	$1,923,203	$75,469	$0	$4,920,295	$7,443,388	$1,216,278
2029	$176,577	$21,991,665	$220,776	$1,042,265	$7,743,199	$6,829,778	$255,009	$14,329,128	$8,033,394	$1,216,278

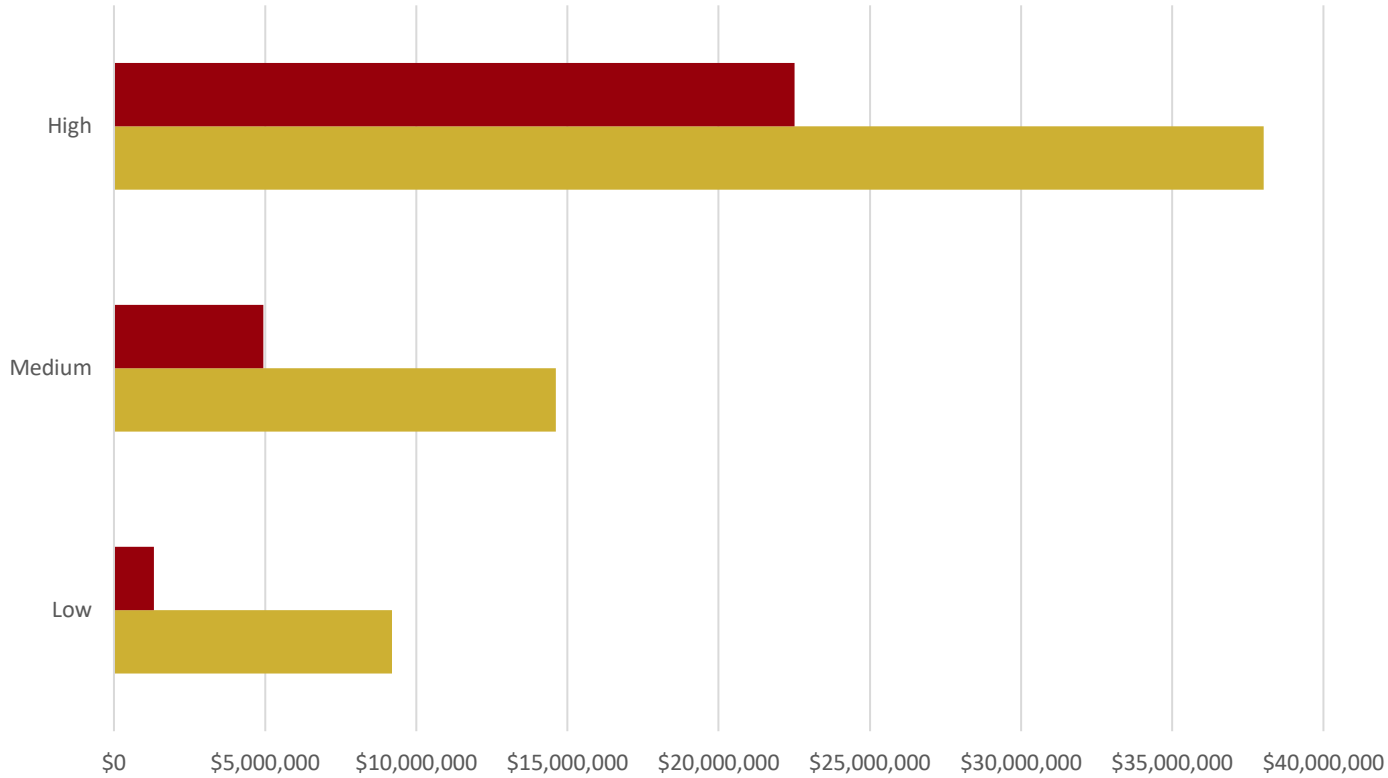
Figures below show the current and forecasted needs respectively for all Town facilities grouped by location.

Figure 5. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by Group: Town of Sudbury



	School	City
2024	$20,347,496	$7,221,812
2029	$47,334,713	$13,287,078

Figure 6. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by Priority: Town of Sudbury



	Low	Medium	High
2024	$1,319,204	$4,949,224	$22,517,159
2029	$9,203,175	$14,611,628	$38,023,267

Note: Forecasted Needs (2029) include Current Needs (2024)

Figure 7. Current and Forecasted Needs: Summarized by Reporting Period Current +10 Years: Town of Sudbury

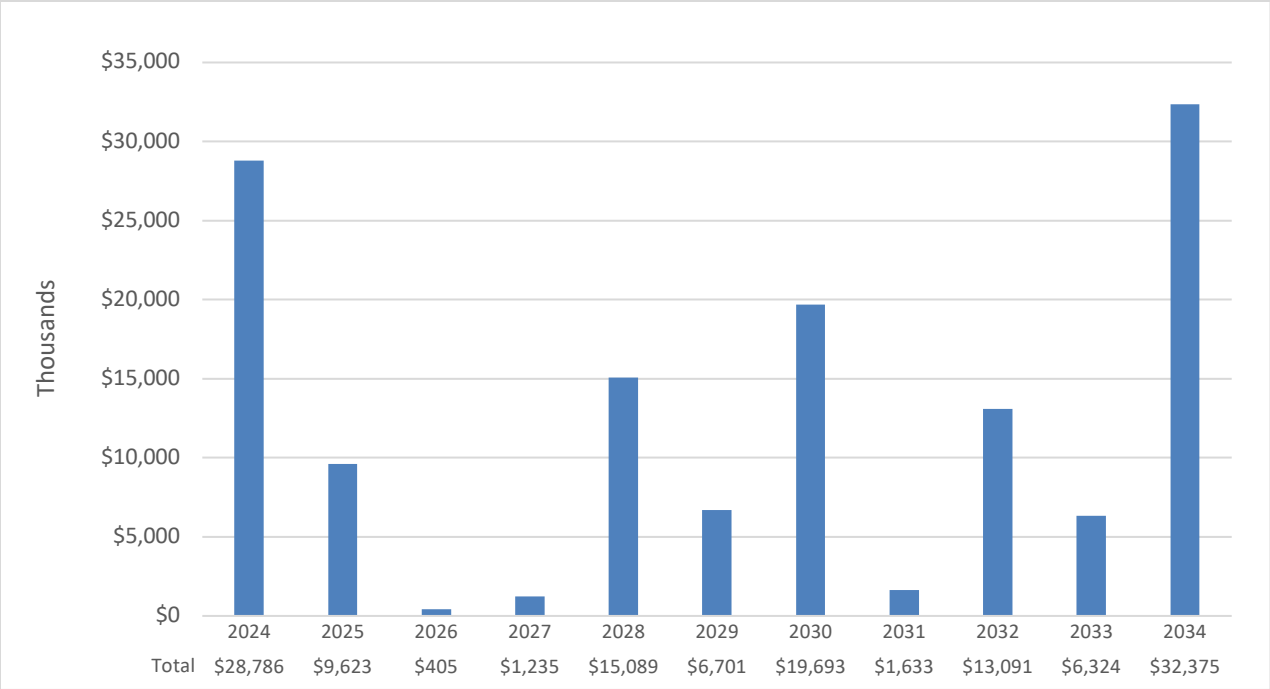


Figure 8. Current and Forecasted Needs: Summarized by Reporting Period Years 11-20: Town of Sudbury

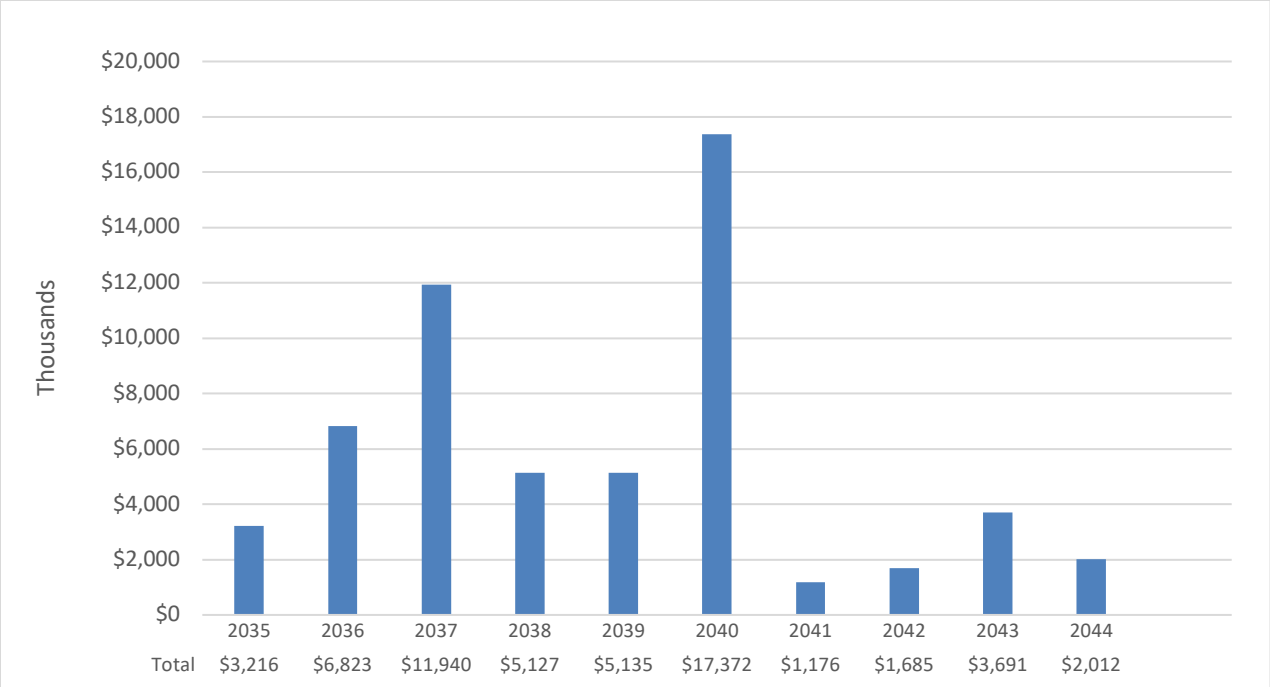


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Table 2. Current and Forecasted Needs Summarized by System (Current + 5 years): Town of Sudbury

System	2024	2025	2026	2027	2028	2029
Cumulative Needs by Year	***$28,785,587***	***$38,408,650***	***$38,813,363***	***$40,048,257***	***$55,137,020***	***$61,838,069***
Needs by Year	***$28,785,587***	***$9,623,063***	***$404,713***	***$1,234,893***	***$15,088,763***	***$6,701,049***
Exterior Enclosure	**$28,929**	**$188,000**	**$0**	**$0**	**$3,848**	**$0**
Exterior Walls (Finishes)	$0	$114,853	$0	$0	$0	$0
Exterior Windows	$0	$73,147	$0	$0	$0	$0
Exterior Doors	$28,929	$0	$0	$0	$3,848	$0
Roofing	**$7,443,388**	**$362,881**	**$168,474**	**$21,764**	**$36,888**	**$0**
Roof Coverings	$7,443,388	$362,881	$168,474	$21,764	$36,888	$0
Interior Construction	**$75,469**	**$0**	**$0**	**$0**	**$0**	**$0**
Interior Doors	$0	$0	$0	$0	$0	$0
Specialties	$75,469	$0	$0	$0	$0	$0
Interiors	**$0**	**$503,147**	**$236,239**	**$935,508**	**$18,838**	**$5,060,576**
Ceiling Finishes	$0	$108,826	$0	$32,874	$9,419	$352,733
Floor Finishes	$0	$356,325	$236,239	$0	$0	$4,090,222
Wall Finishes	$0	$37,996	$0	$902,634	$9,419	$617,621
Conveying	**$0**	**$176,577**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$176,577	$0	$0	$0	$0
Plumbing	**$4,920,295**	**$2,631,599**	**$0**	**$0**	**$6,777,233**	**$0**
Domestic Water Distribution	$1,007,152	$324,587	$0	$0	$1,065,506	$0
Plumbing Fixtures	$0	$171,882	$0	$0	$0	$0
Sanitary Waste	$3,913,143	$2,135,130	$0	$0	$5,711,727	$0
HVAC	**$1,923,203**	**$2,965,232**	**$0**	**$17,443**	**$2,187,106**	**$650,215**
Controls and Instrumentation	$0	$0	$0	$0	$0	$0
Cooling Generation	$0	$237,742	$0	$0	$5,384	$397,084
Distribution System	$1,914,051	$1,200,219	$0	$0	$2,181,722	$0
Heat Generation	$0	$669,257	$0	$17,443	$0	$2,262
Terminal & Package Units	$9,152	$858,014	$0	$0	$0	$250,869
Fire Protection	**$0**	**$0**	**$0**	**$255,009**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$0	$255,009	$0	$0
Electrical	**$13,150,569**	**$2,776,245**	**$0**	**$0**	**$6,064,851**	**$0**
Branch Wiring	$4,903,212	$1,990,102	$0	$0	$6,064,851	$0
Lighting	$207,984	$0	$0	$0	$0	$0
Service Distribution	$0	$0	$0	$0	$0	$0
Communications and Security	$5,743,342	$786,143	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$2,296,030	$0	$0	$0	$0	$0
Site Infrastructure	**$1,216,278**	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$112,939	$0	$0	$0	$0	$0
Vehicular Pavements	$1,103,340	$0	$0	$0	$0	$0
Food Service Equipment	**$27,456**	**$19,382**	**$0**	**$5,169**	**$0**	**$990,258**
Food Service Equipment	$27,456	$19,382	$0	$5,169	$0	$990,258

Table 3. Current and Forecasted Needs Summarized by System (Years 6 - 10): Town of Sudbury

System	2030	2031	2032	2033	2034
Cumulative Needs by Year	***$81,531,243***	***$83,164,626***	***$96,255,645***	***$102,579,187***	***$134,954,448***
Needs by Year	***$19,693,174***	***$1,633,383***	***$13,091,019***	***$6,323,542***	***$32,375,261***
Exterior Enclosure	**$321,990**	**$0**	**$198,848**	**$273,632**	**$1,189,564**
Exterior Walls (Finishes)	$269,684	$0	$138,202	$21,715	$175,196
Exterior Windows	$52,306	$0	$0	$251,917	$1,014,368
Exterior Doors	$0	$0	$60,646	$0	$0
Roofing	**$0**	**$1,558,308**	**$0**	**$1,191,578**	**$0**
Roof Coverings	$0	$1,558,308	$0	$1,191,578	$0
Interior Construction	**$0**	**$0**	**$1,277,896**	**$0**	**$0**
Interior Doors	$0	$0	$619,151	$0	$0
Specialties	$0	$0	$658,745	$0	$0
Interiors	**$3,081,927**	**$0**	**$8,211,343**	**$400,525**	**$3,197,815**
Ceiling Finishes	$3,081,927	$0	$649,390	$134,141	$3,197,815
Floor Finishes	$0	$0	$7,517,912	$129,751	$0
Wall Finishes	$0	$0	$44,041	$136,633	$0
Conveying	**$0**	**$0**	**$751,044**	**$0**	**$0**
Conveying Systems	$0	$0	$751,044	$0	$0
Plumbing	**$4,303,481**	**$0**	**$367,155**	**$3,727,592**	**$0**
Domestic Water Distribution	$1,281,702	$0	$69,771	$0	$0
Plumbing Fixtures	$0	$0	$0	$3,727,592	$0
Sanitary Waste	$3,021,779	$0	$297,384	$0	$0
HVAC	**$5,897,730**	**$40,915**	**$857,799**	**$629,110**	**$6,875,444**
Controls and Instrumentation	$0	$0	$0	$0	$6,243,652
Cooling Generation	$0	$0	$230,204	$25,196	$17,012
Distribution System	$5,553,943	$40,915	$398,470	$189,928	$30,905
Heat Generation	$7,537	$0	$2,262	$400,958	$515,935
Terminal & Package Units	$336,250	$0	$226,863	$13,028	$67,940
Fire Protection	**$0**	**$0**	**$341,886**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$341,886	$0	$0
Electrical	**$5,657,366**	**$34,160**	**$808,652**	**$28,318**	**$21,053,757**
Branch Wiring	$5,047,976	$0	$808,652	$0	$0
Lighting	$94,987	$0	$0	$0	$21,053,757
Service Distribution	$0	$0	$0	$0	$0
Communications and Security	$193,657	$34,160	$0	$28,318	$0
Exit Signs and Emergency Lighting	$320,746	$0	$0	$0	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$0	$0	$0	$0	$0
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$430,680**	**$0**	**$276,395**	**$72,787**	**$58,681**
Food Service Equipment	$430,680	$0	$276,395	$72,787	$58,681

Table 4. Current and Forecasted Needs Summarized by System (Years 11 - 15): Town of Sudbury

System	2035	2036	2037	2038	2039
Cumulative Needs by Year	***$138,170,744***	***$144,993,566***	***$156,934,001***	***$162,060,694***	***$167,195,952***
Needs by Year	***$3,216,296***	***$6,822,822***	***$11,940,436***	***$5,126,692***	***$5,135,258***
Exterior Enclosure	**$71,730**	**$2,617,186**	**$3,548,608**	**$22,101**	**$1,691,885**
Exterior Walls (Finishes)	$71,730	$1,557,583	$2,998,775	$22,101	$465,304
Exterior Windows	$0	$0	$0	$0	$1,226,581
Exterior Doors	$0	$1,059,603	$549,832	$0	$0
Roofing	**$144,302**	**$0**	**$715,975**	**$67,523**	**$0**
Roof Coverings	$144,302	$0	$715,975	$67,523	$0
Interior Construction	**$0**	**$1,692,311**	**$5,132,492**	**$0**	**$0**
Interior Doors	$0	$1,625,763	$2,965,436	$0	$0
Specialties	$0	$66,548	$2,167,056	$0	$0
Interiors	**$243,760**	**$987,065**	**$1,705,884**	**$280,537**	**$342,548**
Ceiling Finishes	$243,760	$0	$0	$0	$152,394
Floor Finishes	$0	$980,585	$1,705,884	$280,537	$190,154
Wall Finishes	$0	$6,480	$0	$0	$0
Conveying	**$0**	**$0**	**$191,489**	**$0**	**$0**
Conveying Systems	$0	$0	$191,489	$0	$0
Plumbing	**$0**	**$0**	**$0**	**$0**	**$2,911,326**
Domestic Water Distribution	$0	$0	$0	$0	$0
Plumbing Fixtures	$0	$0	$0	$0	$2,911,326
Sanitary Waste	$0	$0	$0	$0	$0
HVAC	**$761,901**	**$40,056**	**$532,429**	**$149,082**	**$103,364**
Controls and Instrumentation	$149,895	$0	$0	$102,136	$0
Cooling Generation	$10,768	$21,536	$485,589	$10,768	$0
Distribution System	$485,492	$18,520	$13,675	$11,952	$16,798
Heat Generation	$15,074	$0	$22,827	$15,074	$68,262
Terminal & Package Units	$100,672	$0	$10,338	$9,152	$18,304
Fire Protection	**$1,201,658**	**$0**	**$0**	**$4,230,741**	**$0**
Sprinklers & Standpipe	$1,201,658	$0	$0	$4,230,741	$0
Electrical	**$717,576**	**$1,410,836**	**$20,209**	**$361,634**	**$0**
Branch Wiring	$153,379	$0	$0	$0	$0
Lighting	$376,632	$0	$0	$47,858	$0
Service Distribution	$0	$239,343	$0	$0	$0
Communications and Security	$0	$1,171,493	$20,209	$290,583	$0
Exit Signs and Emergency Lighting	$187,564	$0	$0	$23,193	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$0	$0	$0	$0	$0
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$75,368**	**$75,368**	**$93,351**	**$15,074**	**$86,135**
Food Service Equipment	$75,368	$75,368	$93,351	$15,074	$86,135

Table 5. Current and Forecasted Needs Summarized by System (Years 16 - 20): Town of Sudbury

System	2040	2041	2042	2043	2044
Cumulative Needs by Year	***$184,567,982***	***$185,743,544***	***$187,428,901***	***$191,120,261***	***$193,132,007***
Needs by Year	***$17,372,030***	***$1,175,562***	***$1,685,357***	***$3,691,360***	***$2,011,746***
Exterior Enclosure	**$3,823,054**	**$881,621**	**$0**	**$338,687**	**$0**
Exterior Walls (Finishes)	$850,197	$0	$0	$300,183	$0
Exterior Windows	$2,906,476	$881,621	$0	$0	$0
Exterior Doors	$66,382	$0	$0	$38,504	$0
Roofing	**$0**	**$0**	**$144,714**	**$1,024,804**	**$236,744**
Roof Coverings	$0	$0	$144,714	$1,024,804	$236,744
Interior Construction	**$403,517**	**$0**	**$0**	**$75,258**	**$0**
Interior Doors	$293,007	$0	$0	$70,152	$0
Specialties	$110,509	$0	$0	$5,106	$0
Interiors	**$51,168**	**$0**	**$65,127**	**$422,653**	**$0**
Ceiling Finishes	$0	$0	$0	$0	$0
Floor Finishes	$51,168	$0	$0	$102,968	$0
Wall Finishes	$0	$0	$65,127	$319,685	$0
Conveying	**$0**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$0	$0	$0	$0
Plumbing	**$9,228,249**	**$0**	**$0**	**$0**	**$242,064**
Domestic Water Distribution	$0	$0	$0	$0	$0
Plumbing Fixtures	$9,228,249	$0	$0	$0	$0
Sanitary Waste	$0	$0	$0	$0	$242,064
HVAC	**$638,917**	**$293,941**	**$288,235**	**$626,688**	**$67,726**
Controls and Instrumentation	$0	$0	$0	$449,245	$0
Cooling Generation	$0	$0	$0	$0	$0
Distribution System	$60,731	$51,900	$148,693	$25,630	$58,574
Heat Generation	$299,966	$223,737	$6,030	$0	$0
Terminal & Package Units	$278,220	$18,304	$133,512	$151,813	$9,152
Fire Protection	**$3,227,126**	**$0**	**$780,630**	**$0**	**$0**
Sprinklers & Standpipe	$3,227,126	$0	$780,630	$0	$0
Electrical	**$0**	**$0**	**$363,583**	**$1,203,270**	**$1,465,212**
Branch Wiring	$0	$0	$0	$0	$0
Lighting	$0	$0	$38,480	$828,893	$0
Service Distribution	$0	$0	$0	$0	$1,465,212
Communications and Security	$0	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$0	$0	$325,103	$374,378	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$0	$0	$0	$0	$0
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$0**	**$0**	**$43,068**	**$0**	**$0**
Food Service Equipment	$0	$0	$43,068	$0	$0

The following table provides an overall summary of findings for the portfolio of buildings included in this project.

Table 6. Facility Description: Summary of Findings: Town of Sudbury

Campus Name	Age (Years)	Area (SF)	Total Building Needs 2024	Current Replacement Value	2024 FCI %	Total Building Needs 2029	2029 FCI %
Sudbury Schools	24-74	433,689	$20,347,496	368,635,650	6	$47,334,713	13
Town of Sudbury	9-294	210,040	$7,221,812	169,482,915	4	$13,287,078	8
TOTALS		**643,729**	**$27,569,308**	**538,118,565**		**$60,621,791**	

The following table illustrates the current estimated needs by campus.

Table 7. Summary of Current Deficiencies: Town of Sudbury

Name	Year Built	Age (Years)	Building System	Site	Current Estimated Needs
Sudbury Schools	1950	74	$20,347,496	$646,077	$20,993,573
Town of Sudbury	1730	294	$7,221,812	$570,202	$7,792,014
				Total Estimated Needs	**$28,785,587**

Note: Please note that requirements are based on visual observations and interviews with Town personnel.

TOWN
FACILITY CONDITION INFORMATION

Town

The project included facilities at 1 locations totaling approximately 210,040 square feet. The table below contains location-specific information regarding current and forecast Facility Condition Indices. A comprehensive list of expired systems and those expected to expire between now and the Year 2044 is shown in the Forecasted Needs Summarized by System: Town Table.

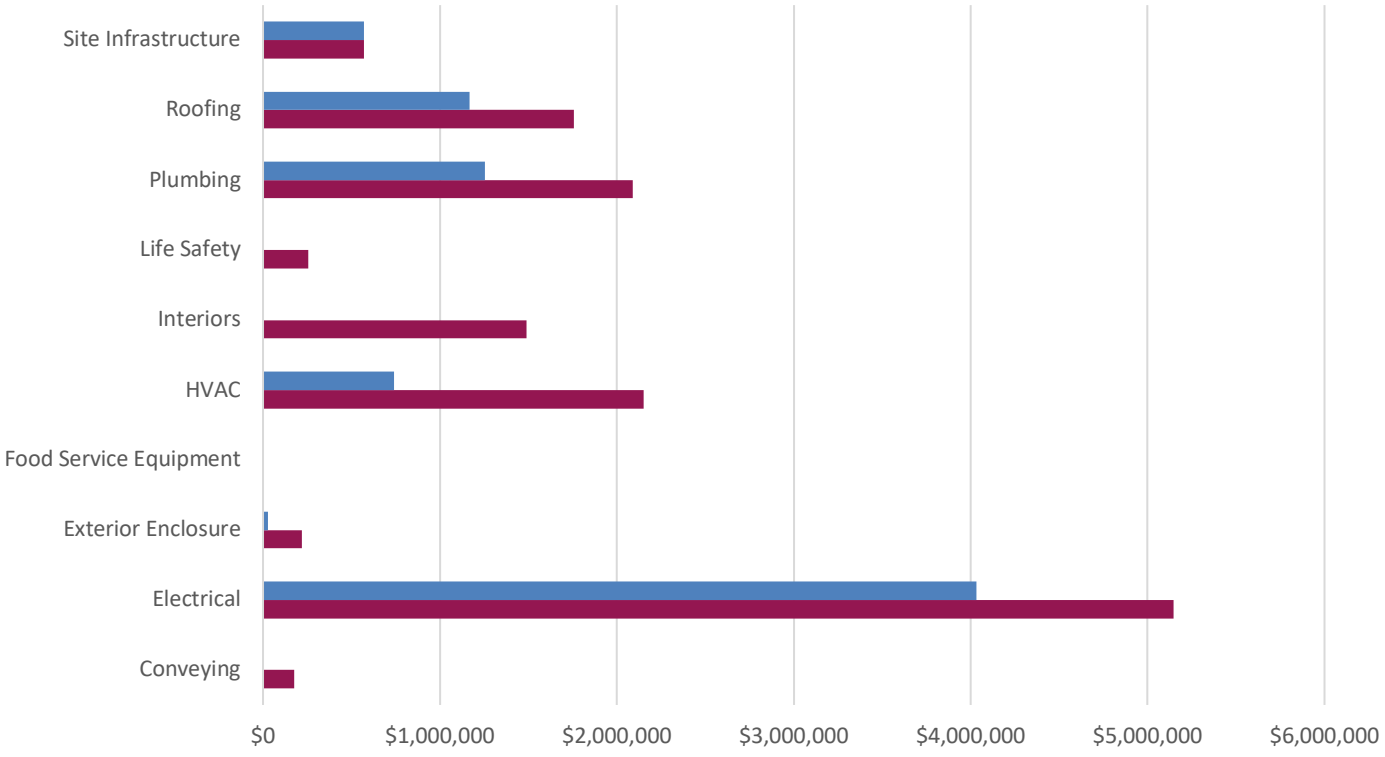
Table 8. Facility Description: Summary of Findings: Town

Name	Area (SF)	Total Needs 2024	Current Replacement Value	2024 FCI %	Total Needs 2029	2029 FCI %
Town of Sudbury	210,040	$7,221,812	169,482,915	4	$13,287,078	8
SUBTOTAL	***210,040***	***$7,221,812***	***$169,482,915***	***4***	***$13,287,078***	***8***
Site and Infrastructure (excluded from FCI calculations)		$570,202			$570,202	
TOTALS	**210,040**	**$7,792,014**	**$169,482,915**		**$13,857,279**	

Note: The average FCI for the Town facilities assessed is 4 while the average FCI in 5 years is estimated to be 8 assuming current sustainment levels.

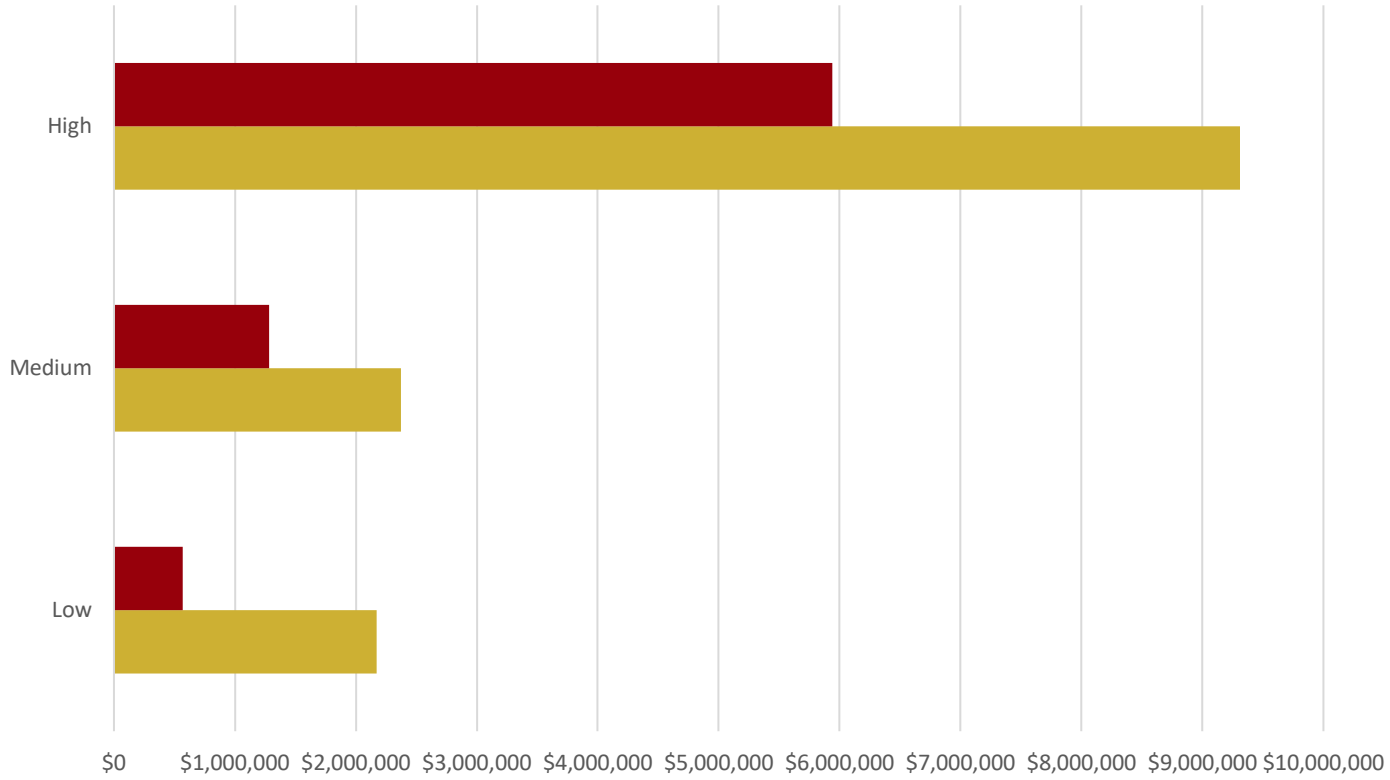
Figures below show the current and forecasted needs respectively for all Town locations grouped by system.

Figure 9. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by System Group: Town



	Conveying	Electrical	Exterior Enclosure	Food Service Equipment	HVAC	Interiors	Life Safety	Plumbing	Roofing	Site Infrastructure
2024	$0	$4,030,878	$28,929	$0	$739,062	$0	$0	$1,254,880	$1,168,063	$570,202
2029	$176,577	$5,147,519	$220,776	$0	$2,151,673	$1,489,321	$255,009	$2,088,134	$1,758,069	$570,202

Figure 10. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by Priority: Town



	Low	Medium	High
2024	$570,202	$1,283,809	$5,938,004
2029	$2,174,376	$2,370,634	$9,312,270

Renewal Forecast

The renewal forecast below for Town locations shows the current backlog and projected facility sustainment requirements over the next 20 years. Please note the renewal forecast does not include potential costs associated with asbestos abatement, seismic evaluation; seismic retrofitting; hazardous material inspection, evaluation, and mitigation; and NFPA 101 and ADA upgrades. The renewal forecast is shown in the following figures:

Figure 11. Current and Forecasted Needs: Summarized by Reporting Period Current +10 Years: Town

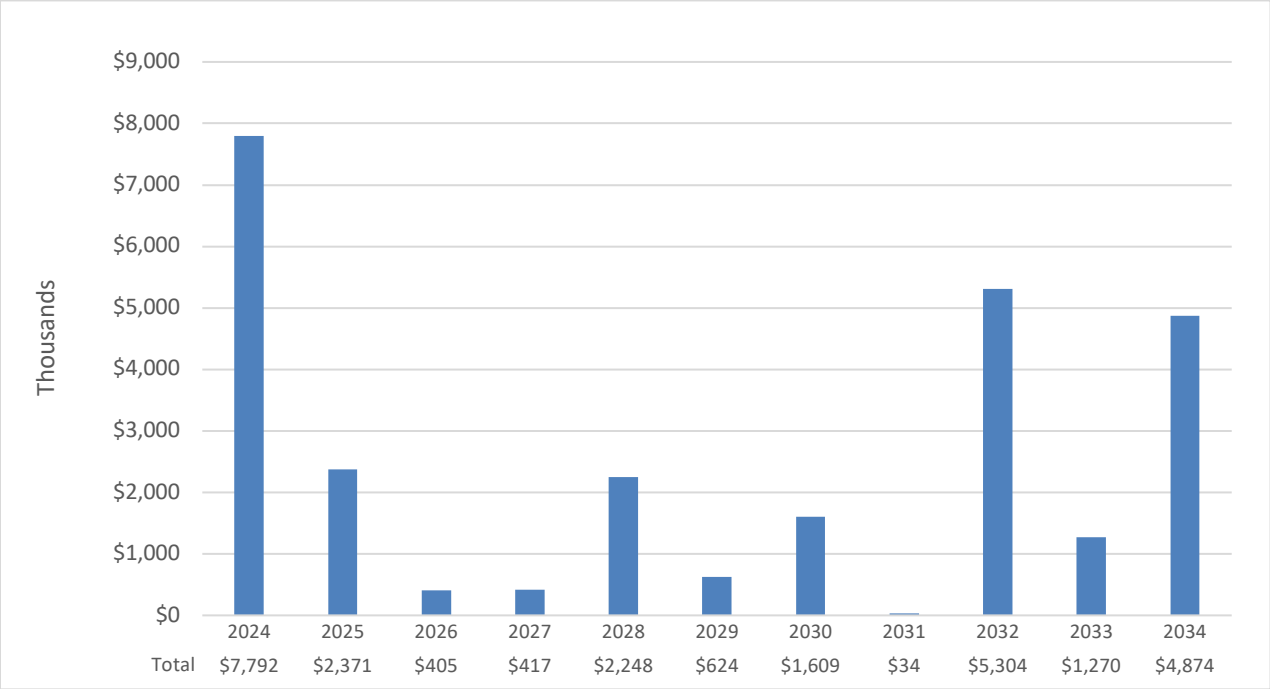


Figure 12. Current and Forecasted Needs: Summarized by Reporting Period Years 11-20: Town

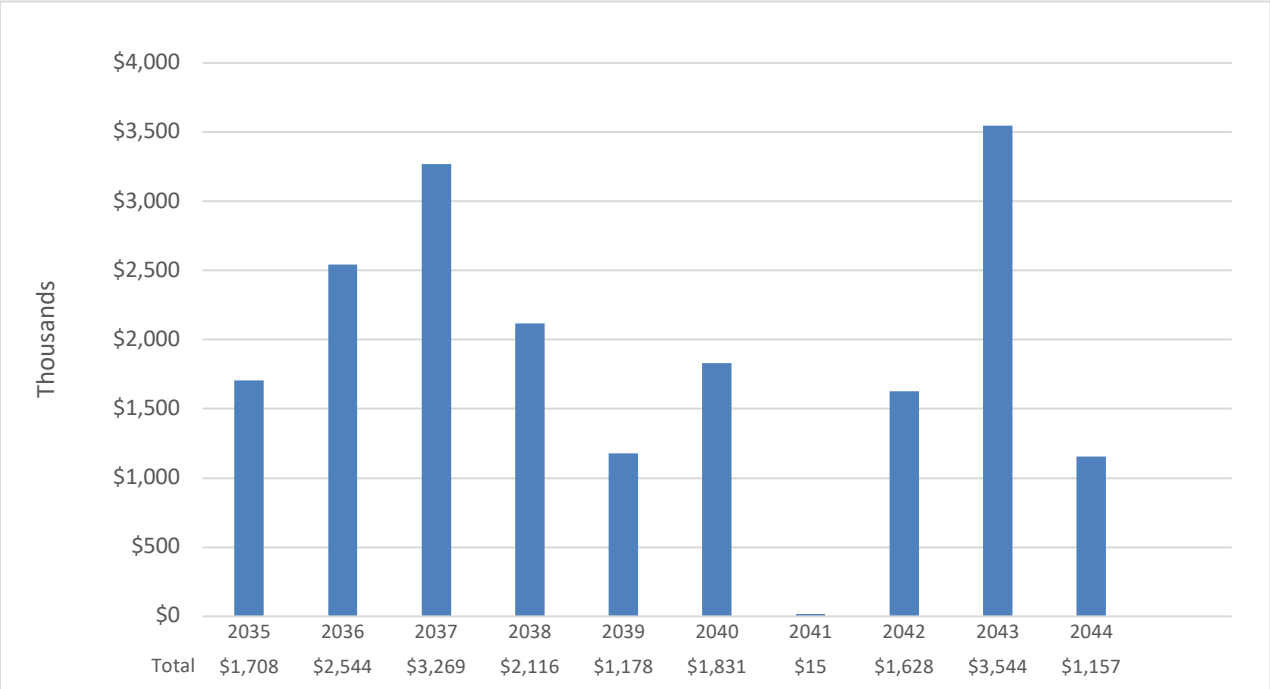


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Table 9. Current and Forecasted Needs Summarized by System (Current + 5 years): Town

System	2024	2025	2026	2027	2028	2029
Cumulative Needs by Year	***$7,792,014***	***$10,163,199***	***$10,567,912***	***$10,985,053***	***$13,232,848***	***$13,857,279***
Needs by Year	***$7,792,014***	***$2,371,186***	***$404,713***	***$417,141***	***$2,247,795***	***$624,431***
Exterior Enclosure	**$28,929**	**$188,000**	**$0**	**$0**	**$3,848**	**$0**
Exterior Walls (Finishes)	$0	$114,853	$0	$0	$0	$0
Exterior Windows	$0	$73,147	$0	$0	$0	$0
Exterior Doors	$28,929	$0	$0	$0	$3,848	$0
Roofing	**$1,168,063**	**$362,881**	**$168,474**	**$21,764**	**$36,888**	**$0**
Roof Coverings	$1,168,063	$362,881	$168,474	$21,764	$36,888	$0
Interior Construction	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Interior Doors	$0	$0	$0	$0	$0	$0
Specialties	$0	$0	$0	$0	$0	$0
Interiors	**$0**	**$503,147**	**$236,239**	**$140,368**	**$18,838**	**$590,729**
Ceiling Finishes	$0	$108,826	$0	$32,874	$9,419	$85,087
Floor Finishes	$0	$356,325	$236,239	$0	$0	$274,284
Wall Finishes	$0	$37,996	$0	$107,494	$9,419	$231,358
Conveying	**$0**	**$176,577**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$176,577	$0	$0	$0	$0
Plumbing	**$1,254,880**	**$171,882**	**$0**	**$0**	**$661,371**	**$0**
Domestic Water Distribution	$523,461	$0	$0	$0	$258,452	$0
Plumbing Fixtures	$0	$171,882	$0	$0	$0	$0
Sanitary Waste	$731,420	$0	$0	$0	$402,919	$0
HVAC	**$739,062**	**$968,699**	**$0**	**$0**	**$410,209**	**$33,702**
Controls and Instrumentation	$0	$0	$0	$0	$0	$0
Cooling Generation	$0	$58,575	$0	$0	$0	$9,906
Distribution System	$729,910	$137,170	$0	$0	$410,209	$0
Heat Generation	$0	$0	$0	$0	$0	$2,262
Terminal & Package Units	$9,152	$772,954	$0	$0	$0	$21,534
Fire Protection	**$0**	**$0**	**$0**	**$255,009**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$0	$255,009	$0	$0
Electrical	**$4,030,878**	**$0**	**$0**	**$0**	**$1,116,641**	**$0**
Branch Wiring	$1,937,605	$0	$0	$0	$1,116,641	$0
Lighting	$207,984	$0	$0	$0	$0	$0
Service Distribution	$0	$0	$0	$0	$0	$0
Communications and Security	$1,327,452	$0	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$557,838	$0	$0	$0	$0	$0
Site Infrastructure	**$570,202**	**$0**	**$0**	**$0**	**$0**	**$0**
Vehicular Pavements	$570,202	$0	$0	$0	$0	$0
Food Service Equipment	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Food Service Equipment	$0	$0	$0	$0	$0	$0

Table 10. Current and Forecasted Needs Summarized by System (Years 6 - 10): Town

System	2030	2031	2032	2033	2034
Cumulative Needs by Year	***$15,466,058***	***$15,500,218***	***$20,804,319***	***$22,074,188***	***$26,948,231***
Needs by Year	***$1,608,779***	***$34,160***	***$5,304,101***	***$1,269,869***	***$4,874,043***
Exterior Enclosure	**$321,990**	**$0**	**$198,848**	**$273,632**	**$713,044**
Exterior Walls (Finishes)	$269,684	$0	$138,202	$21,715	$175,196
Exterior Windows	$52,306	$0	$0	$251,917	$537,848
Exterior Doors	$0	$0	$60,646	$0	$0
Roofing	**$0**	**$0**	**$0**	**$0**	**$0**
Roof Coverings	$0	$0	$0	$0	$0
Interior Construction	**$0**	**$0**	**$698,641**	**$0**	**$0**
Interior Doors	$0	$0	$619,151	$0	$0
Specialties	$0	$0	$79,491	$0	$0
Interiors	**$101,142**	**$0**	**$2,022,403**	**$400,525**	**$903,015**
Ceiling Finishes	$101,142	$0	$649,390	$134,141	$903,015
Floor Finishes	$0	$0	$1,328,972	$129,751	$0
Wall Finishes	$0	$0	$44,041	$136,633	$0
Conveying	**$0**	**$0**	**$176,577**	**$0**	**$0**
Conveying Systems	$0	$0	$176,577	$0	$0
Plumbing	**$0**	**$0**	**$367,155**	**$547,582**	**$0**
Domestic Water Distribution	$0	$0	$69,771	$0	$0
Plumbing Fixtures	$0	$0	$0	$547,582	$0
Sanitary Waste	$0	$0	$297,384	$0	$0
HVAC	**$606,188**	**$0**	**$689,938**	**$19,812**	**$25,087**
Controls and Instrumentation	$0	$0	$0	$0	$0
Cooling Generation	$0	$0	$110,258	$19,812	$0
Distribution System	$271,553	$0	$354,001	$0	$0
Heat Generation	$7,537	$0	$2,262	$0	$15,935
Terminal & Package Units	$327,098	$0	$223,417	$0	$9,152
Fire Protection	**$0**	**$0**	**$341,886**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$341,886	$0	$0
Electrical	**$579,458**	**$34,160**	**$808,652**	**$28,318**	**$3,222,130**
Branch Wiring	$0	$0	$808,652	$0	$0
Lighting	$94,987	$0	$0	$0	$3,222,130
Service Distribution	$0	$0	$0	$0	$0
Communications and Security	$193,657	$34,160	$0	$28,318	$0
Exit Signs and Emergency Lighting	$290,814	$0	$0	$0	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$0**	**$0**	**$0**	**$0**	**$10,767**
Food Service Equipment	$0	$0	$0	$0	$10,767

Table 11. Current and Forecasted Needs Summarized by System (Years 11 - 15): Town

System	2035	2036	2037	2038	2039
Cumulative Needs by Year	***$28,655,897***	***$31,199,621***	***$34,468,748***	***$36,584,904***	***$37,762,424***
Needs by Year	***$1,707,666***	***$2,543,724***	***$3,269,128***	***$2,116,156***	***$1,177,519***
Exterior Enclosure	**$71,730**	**$1,241,314**	**$825,720**	**$22,101**	**$105,839**
Exterior Walls (Finishes)	$71,730	$515,287	$704,065	$22,101	$0
Exterior Windows	$0	$0	$0	$0	$105,839
Exterior Doors	$0	$726,027	$121,655	$0	$0
Roofing	**$144,302**	**$0**	**$715,975**	**$67,523**	**$0**
Roof Coverings	$144,302	$0	$715,975	$67,523	$0
Interior Construction	**$0**	**$532,946**	**$732,691**	**$0**	**$0**
Interior Doors	$0	$466,397	$610,936	$0	$0
Specialties	$0	$66,548	$121,755	$0	$0
Interiors	**$243,760**	**$530,122**	**$170,939**	**$280,537**	**$206,152**
Ceiling Finishes	$243,760	$0	$0	$0	$15,998
Floor Finishes	$0	$523,641	$170,939	$280,537	$190,154
Wall Finishes	$0	$6,480	$0	$0	$0
Conveying	**$0**	**$0**	**$191,489**	**$0**	**$0**
Conveying Systems	$0	$0	$191,489	$0	$0
Plumbing	**$0**	**$0**	**$0**	**$0**	**$777,347**
Domestic Water Distribution	$0	$0	$0	$0	$0
Plumbing Fixtures	$0	$0	$0	$0	$777,347
Sanitary Waste	$0	$0	$0	$0	$0
HVAC	**$530,297**	**$0**	**$518,754**	**$126,362**	**$77,414**
Controls and Instrumentation	$149,895	$0	$0	$102,136	$0
Cooling Generation	$10,768	$0	$485,589	$0	$0
Distribution System	$272,192	$0	$0	$0	$0
Heat Generation	$15,074	$0	$22,827	$15,074	$68,262
Terminal & Package Units	$82,368	$0	$10,338	$9,152	$9,152
Fire Protection	**$0**	**$0**	**$0**	**$1,242,925**	**$0**
Sprinklers & Standpipe	$0	$0	$0	$1,242,925	$0
Electrical	**$717,576**	**$239,343**	**$20,209**	**$361,634**	**$0**
Branch Wiring	$153,379	$0	$0	$0	$0
Lighting	$376,632	$0	$0	$47,858	$0
Service Distribution	$0	$239,343	$0	$0	$0
Communications and Security	$0	$0	$20,209	$290,583	$0
Exit Signs and Emergency Lighting	$187,564	$0	$0	$23,193	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$0**	**$0**	**$93,351**	**$15,074**	**$10,767**
Food Service Equipment	$0	$0	$93,351	$15,074	$10,767

Table 12. Current and Forecasted Needs Summarized by System (Years 16-20): Town

System	2040	2041	2042	2043	2044
Cumulative Needs by Year	***$39,593,038***	***$39,608,220***	***$41,236,512***	***$44,780,893***	***$45,938,166***
Needs by Year	***$1,830,615***	***$15,182***	***$1,628,292***	***$3,544,381***	***$1,157,272***
Exterior Enclosure	**$130,434**	**$0**	**$0**	**$212,491**	**$0**
Exterior Walls (Finishes)	$0	$0	$0	$173,987	$0
Exterior Windows	$64,052	$0	$0	$0	$0
Exterior Doors	$66,382	$0	$0	$38,504	$0
Roofing	**$0**	**$0**	**$144,714**	**$1,024,804**	**$236,744**
Roof Coverings	$0	$0	$144,714	$1,024,804	$236,744
Interior Construction	**$403,517**	**$0**	**$0**	**$75,258**	**$0**
Interior Doors	$293,007	$0	$0	$70,152	$0
Specialties	$110,509	$0	$0	$5,106	$0
Interiors	**$51,168**	**$0**	**$65,127**	**$422,653**	**$0**
Ceiling Finishes	$0	$0	$0	$0	$0
Floor Finishes	$51,168	$0	$0	$102,968	$0
Wall Finishes	$0	$0	$65,127	$319,685	$0
Conveying	**$0**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$0	$0	$0	$0
Plumbing	**$900,524**	**$0**	**$0**	**$0**	**$242,064**
Domestic Water Distribution	$0	$0	$0	$0	$0
Plumbing Fixtures	$900,524	$0	$0	$0	$0
Sanitary Waste	$0	$0	$0	$0	$242,064
HVAC	**$344,973**	**$15,182**	**$231,170**	**$605,904**	**$24,550**
Controls and Instrumentation	$0	$0	$0	$449,245	$0
Cooling Generation	$0	$0	$0	$0	$0
Distribution System	$8,399	$0	$91,628	$4,846	$24,550
Heat Generation	$299,966	$6,030	$6,030	$0	$0
Terminal & Package Units	$36,608	$9,152	$133,512	$151,813	$0
Fire Protection	**$0**	**$0**	**$780,630**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$780,630	$0	$0
Electrical	**$0**	**$0**	**$363,583**	**$1,203,270**	**$653,915**
Branch Wiring	$0	$0	$0	$0	$0
Lighting	$0	$0	$38,480	$828,893	$0
Service Distribution	$0	$0	$0	$0	$653,915
Communications and Security	$0	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$0	$0	$325,103	$374,378	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$0**	**$0**	**$43,068**	**$0**	**$0**
Food Service Equipment	$0	$0	$43,068	$0	$0

SCHOOL
FACILITY CONDITION INFORMATION

School

The project included facilities at 1 locations totaling approximately 433,689 square feet. The table below contains location-specific information regarding current and forecast Facility Condition Indices. A comprehensive list of expired systems and those expected to expire between now and the Year 2044 is shown in the Forecasted Needs Summarized by System: School Table.

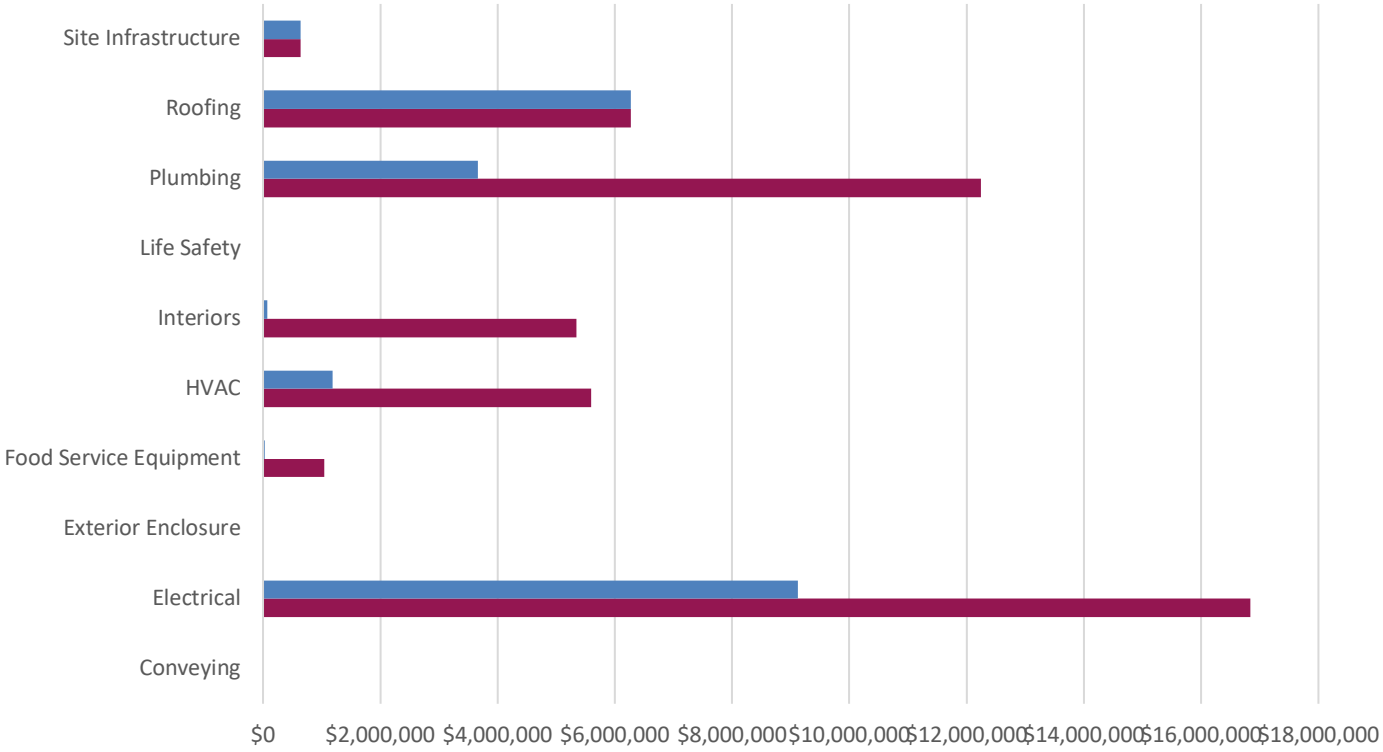
Table 13. Facility Description: Summary of Findings: School

Name	Area (SF)	Total Needs 2024	Current Replacement Value	2024 FCI %	Total Needs 2029	2029 FCI %
Sudbury Schools	433,689	$20,347,496	368,635,650	6	$47,334,713	13
SUBTOTAL	***433,689***	***$20,347,496***	***$368,635,650***	***6***	***$47,334,713***	***13***
Site and Infrastructure (excluded from FCI calculations)		$646,077			$646,077	
TOTALS	**433,689**	**$20,993,573**	**$368,635,650**		**$47,980,790**	

Note: The average FCI for the School facilities assessed is 6 while the average FCI in 5 years is estimated to be 13 assuming current sustainment levels.

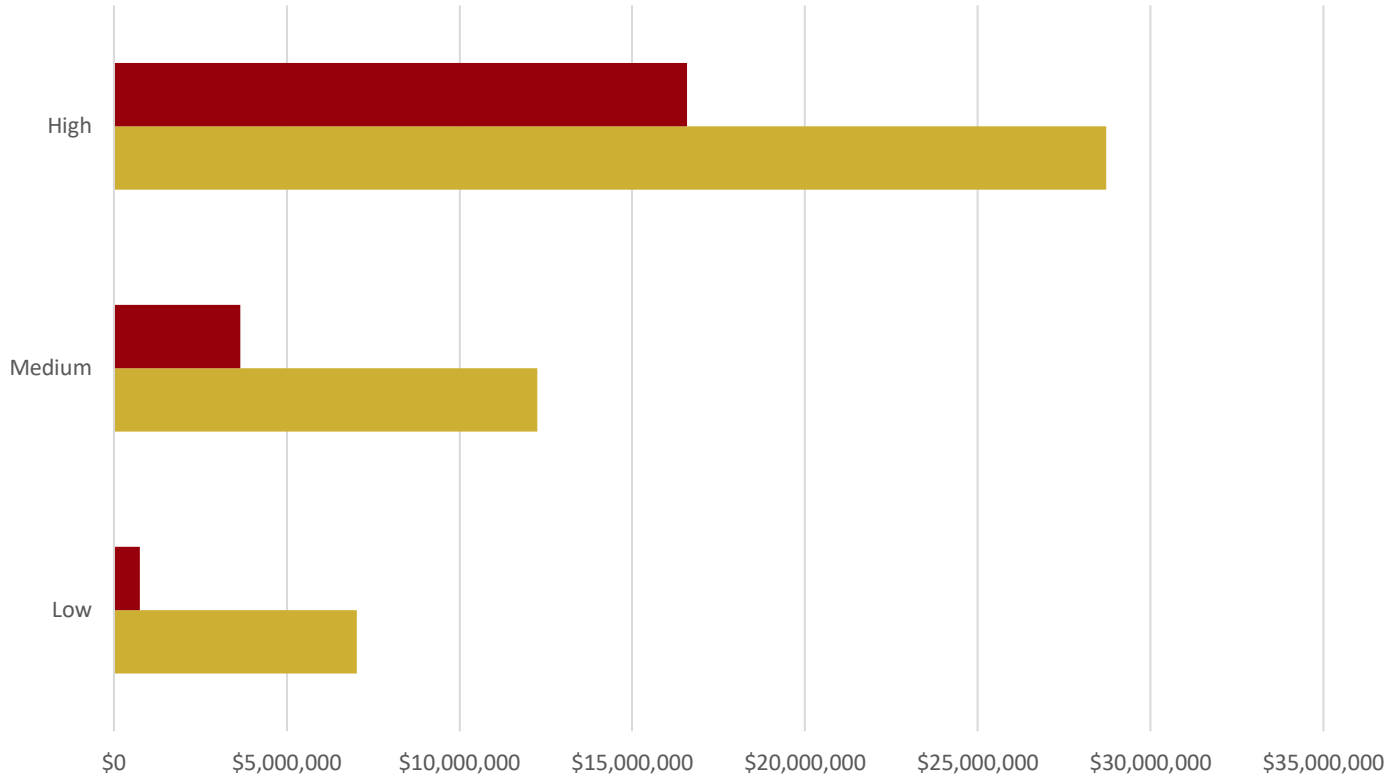
Figures below show the current and forecasted needs respectively for all School locations grouped by system.

Figure 13. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by System Group: School



	Conveying	Electrical	Exterior Enclosure	Food Service Equipment	HVAC	Interiors	Life Safety	Plumbing	Roofing	Site Infrastructure
2024	$0	$9,119,691	$0	$27,456	$1,184,140	$75,469	$0	$3,665,415	$6,275,325	$646,077
2029	$0	$16,844,147	$0	$1,042,265	$5,591,526	$5,340,457	$0	$12,240,994	$6,275,325	$646,077

Figure 14. Comparison of 2024 Current Needs vs. 2029 Forecasted Needs by Priority: School



	Low	Medium	High
2024	$749,002	$3,665,415	$16,579,156
2029	$7,028,799	$12,240,994	$28,710,997

Renewal Forecast

The renewal forecast below for School locations shows the current backlog and projected facility sustainment requirements over the next 20 years. Please note the renewal forecast does not include potential costs associated with asbestos abatement, seismic evaluation; seismic retrofitting; hazardous material inspection, evaluation, and mitigation; and NFPA 101 and ADA upgrades. The renewal forecast is shown in the following figures:

Figure 15. Current and Forecasted Needs: Summarized by Reporting Period Current +10 Years: School

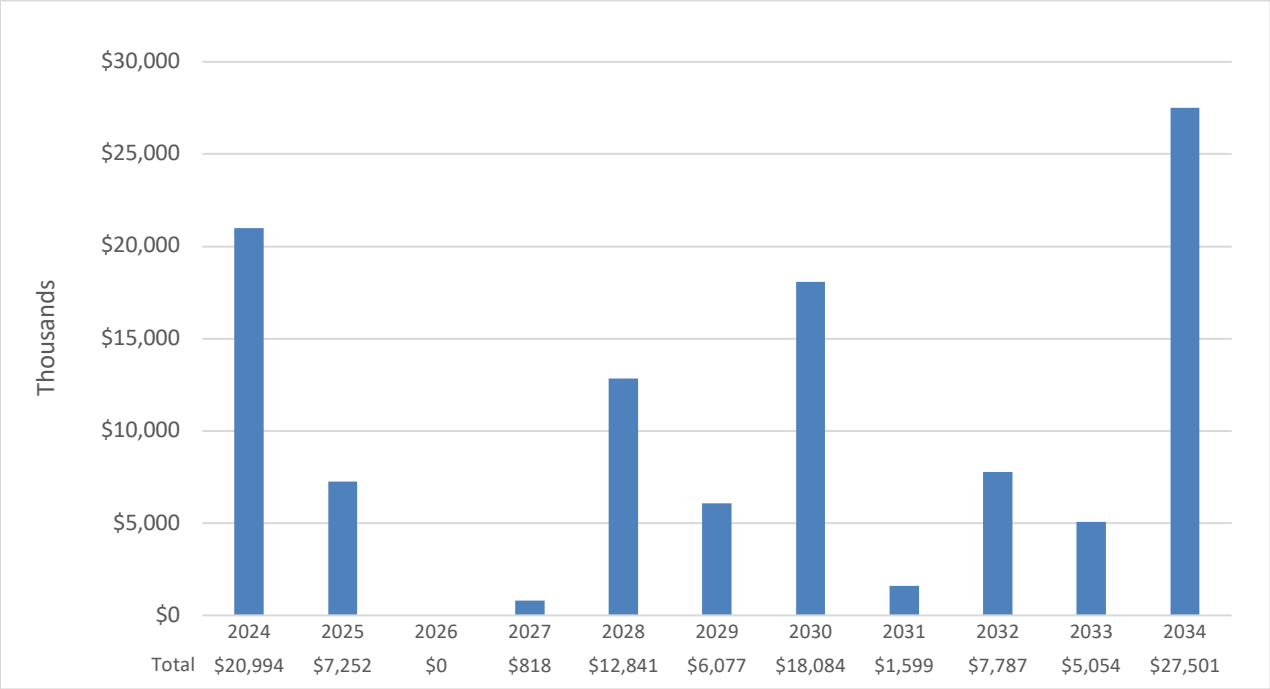


Figure 16. Current and Forecasted Needs: Summarized by Reporting Period Years 11-20: School

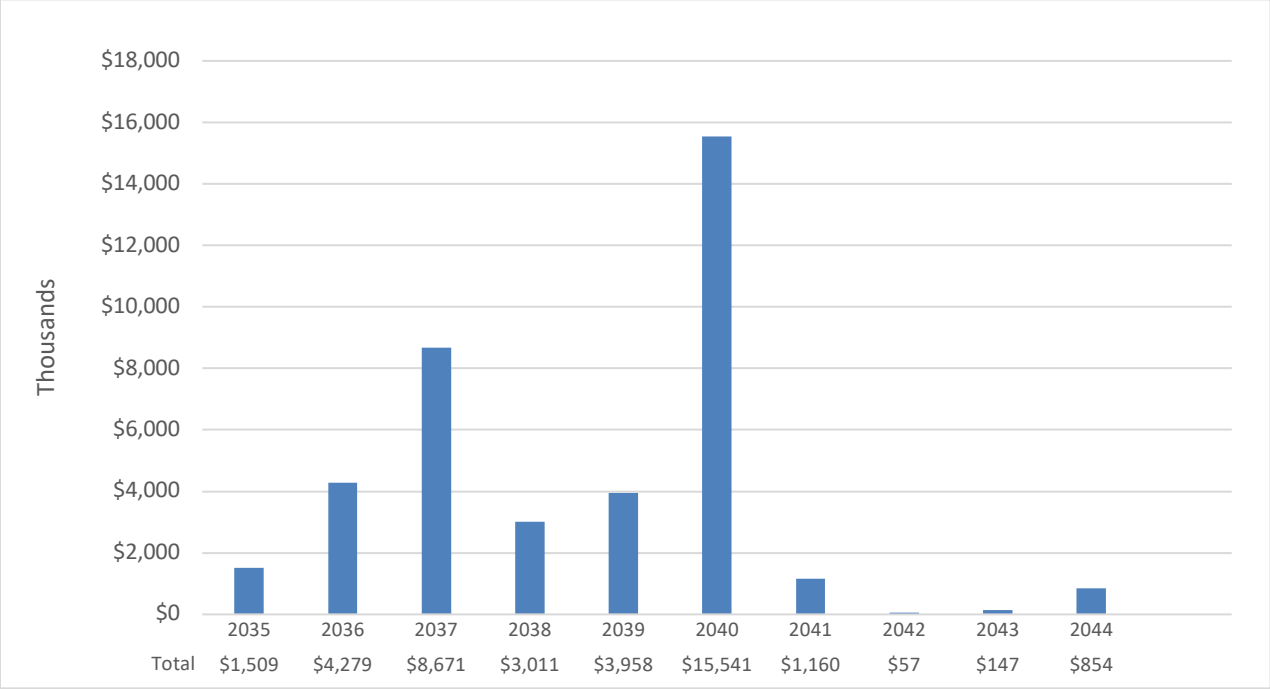


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Table 14. Current and Forecasted Needs Summarized by System (Current + 5 years): School

System	2024	2025	2026	2027	2028	2029
Cumulative Needs by Year	***$20,993,573***	***$28,245,451***	***$28,245,451***	***$29,063,203***	***$41,904,172***	***$47,980,790***
Needs by Year	***$20,993,573***	***$7,251,878***	***$0***	***$817,752***	***$12,840,969***	***$6,076,618***
Exterior Enclosure	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Exterior Walls (Finishes)	$0	$0	$0	$0	$0	$0
Exterior Windows	$0	$0	$0	$0	$0	$0
Exterior Doors	$0	$0	$0	$0	$0	$0
Roofing	**$6,275,325**	**$0**	**$0**	**$0**	**$0**	**$0**
Roof Coverings	$6,275,325	$0	$0	$0	$0	$0
Interior Construction	**$75,469**	**$0**	**$0**	**$0**	**$0**	**$0**
Interior Doors	$0	$0	$0	$0	$0	$0
Specialties	$75,469	$0	$0	$0	$0	$0
Interiors	**$0**	**$0**	**$0**	**$795,140**	**$0**	**$4,469,847**
Ceiling Finishes	$0	$0	$0	$0	$0	$267,646
Floor Finishes	$0	$0	$0	$0	$0	$3,815,938
Wall Finishes	$0	$0	$0	$795,140	$0	$386,263
Conveying	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$0	$0	$0	$0	$0
Plumbing	**$3,665,415**	**$2,459,717**	**$0**	**$0**	**$6,115,862**	**$0**
Domestic Water Distribution	$483,691	$324,587	$0	$0	$807,054	$0
Plumbing Fixtures	$0	$0	$0	$0	$0	$0
Sanitary Waste	$3,181,724	$2,135,130	$0	$0	$5,308,808	$0
HVAC	**$1,184,140**	**$1,996,533**	**$0**	**$17,443**	**$1,776,896**	**$616,513**
Controls and Instrumentation	$0	$0	$0	$0	$0	$0
Cooling Generation	$0	$179,167	$0	$0	$5,384	$387,178
Distribution System	$1,184,140	$1,063,049	$0	$0	$1,771,512	$0
Heat Generation	$0	$669,257	$0	$17,443	$0	$0
Terminal & Package Units	$0	$85,060	$0	$0	$0	$229,335
Fire Protection	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$0	$0	$0	$0
Electrical	**$9,119,691**	**$2,776,245**	**$0**	**$0**	**$4,948,211**	**$0**
Branch Wiring	$2,965,607	$1,990,102	$0	$0	$4,948,211	$0
Lighting	$0	$0	$0	$0	$0	$0
Service Distribution	$0	$0	$0	$0	$0	$0
Communications and Security	$4,415,891	$786,143	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$1,738,192	$0	$0	$0	$0	$0
Site Infrastructure	**$646,077**	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$112,939	$0	$0	$0	$0	$0
Vehicular Pavements	$533,138	$0	$0	$0	$0	$0
Food Service Equipment	**$27,456**	**$19,382**	**$0**	**$5,169**	**$0**	**$990,258**
Food Service Equipment	$27,456	$19,382	$0	$5,169	$0	$990,258

Table 15. Current and Forecasted Needs Summarized by System (Years 6 - 10): School

System	2030	2031	2032	2033	2034
Cumulative Needs by Year	***$66,065,185***	***$67,664,408***	***$75,451,326***	***$80,504,999***	***$108,006,217***
Needs by Year	***$18,084,395***	***$1,599,223***	***$7,786,918***	***$5,053,673***	***$27,501,218***
Exterior Enclosure	**$0**	**$0**	**$0**	**$0**	**$476,520**
Exterior Walls (Finishes)	$0	$0	$0	$0	$0
Exterior Windows	$0	$0	$0	$0	$476,520
Exterior Doors	$0	$0	$0	$0	$0
Roofing	**$0**	**$1,558,308**	**$0**	**$1,191,578**	**$0**
Roof Coverings	$0	$1,558,308	$0	$1,191,578	$0
Interior Construction	**$0**	**$0**	**$579,255**	**$0**	**$0**
Interior Doors	$0	$0	$0	$0	$0
Specialties	$0	$0	$579,255	$0	$0
Interiors	**$2,980,784**	**$0**	**$6,188,940**	**$0**	**$2,294,800**
Ceiling Finishes	$2,980,784	$0	$0	$0	$2,294,800
Floor Finishes	$0	$0	$6,188,940	$0	$0
Wall Finishes	$0	$0	$0	$0	$0
Conveying	**$0**	**$0**	**$574,467**	**$0**	**$0**
Conveying Systems	$0	$0	$574,467	$0	$0
Plumbing	**$4,303,481**	**$0**	**$0**	**$3,180,010**	**$0**
Domestic Water Distribution	$1,281,702	$0	$0	$0	$0
Plumbing Fixtures	$0	$0	$0	$3,180,010	$0
Sanitary Waste	$3,021,779	$0	$0	$0	$0
HVAC	**$5,291,542**	**$40,915**	**$167,861**	**$609,298**	**$6,850,357**
Controls and Instrumentation	$0	$0	$0	$0	$6,243,652
Cooling Generation	$0	$0	$119,946	$5,384	$17,012
Distribution System	$5,282,390	$40,915	$44,469	$189,928	$30,905
Heat Generation	$0	$0	$0	$400,958	$500,000
Terminal & Package Units	$9,152	$0	$3,446	$13,028	$58,788
Fire Protection	**$0**	**$0**	**$0**	**$0**	**$0**
Sprinklers & Standpipe	$0	$0	$0	$0	$0
Electrical	**$5,077,908**	**$0**	**$0**	**$0**	**$17,831,627**
Branch Wiring	$5,047,976	$0	$0	$0	$0
Lighting	$0	$0	$0	$0	$17,831,627
Service Distribution	$0	$0	$0	$0	$0
Communications and Security	$0	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$29,932	$0	$0	$0	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$0	$0	$0	$0	$0
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$430,680**	**$0**	**$276,395**	**$72,787**	**$47,914**
Food Service Equipment	$430,680	$0	$276,395	$72,787	$47,914

Table 16. Current and Forecasted Needs Summarized by System (Years 11 - 15): School

System	2035	2036	2037	2038	2039
Cumulative Needs by Year	***$109,514,847***	***$113,793,945***	***$122,465,253***	***$125,475,789***	***$129,433,528***
Needs by Year	***$1,508,630***	***$4,279,098***	***$8,671,308***	***$3,010,536***	***$3,957,739***
Exterior Enclosure	**$0**	**$1,375,872**	**$2,722,888**	**$0**	**$1,586,047**
Exterior Walls (Finishes)	$0	$1,042,296	$2,294,710	$0	$465,304
Exterior Windows	$0	$0	$0	$0	$1,120,743
Exterior Doors	$0	$333,576	$428,178	$0	$0
Roofing	**$0**	**$0**	**$0**	**$0**	**$0**
Roof Coverings	$0	$0	$0	$0	$0
Interior Construction	**$0**	**$1,159,366**	**$4,399,800**	**$0**	**$0**
Interior Doors	$0	$1,159,366	$2,354,499	$0	$0
Specialties	$0	$0	$2,045,301	$0	$0
Interiors	**$0**	**$456,944**	**$1,534,945**	**$0**	**$136,395**
Ceiling Finishes	$0	$0	$0	$0	$136,395
Floor Finishes	$0	$456,944	$1,534,945	$0	$0
Wall Finishes	$0	$0	$0	$0	$0
Conveying	**$0**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$0	$0	$0	$0
Plumbing	**$0**	**$0**	**$0**	**$0**	**$2,133,979**
Domestic Water Distribution	$0	$0	$0	$0	$0
Plumbing Fixtures	$0	$0	$0	$0	$2,133,979
Sanitary Waste	$0	$0	$0	$0	$0
HVAC	**$231,604**	**$40,056**	**$13,675**	**$22,720**	**$25,950**
Controls and Instrumentation	$0	$0	$0	$0	$0
Cooling Generation	$0	$21,536	$0	$10,768	$0
Distribution System	$213,300	$18,520	$13,675	$11,952	$16,798
Heat Generation	$0	$0	$0	$0	$0
Terminal & Package Units	$18,304	$0	$0	$0	$9,152
Fire Protection	**$1,201,658**	**$0**	**$0**	**$2,987,816**	**$0**
Sprinklers & Standpipe	$1,201,658	$0	$0	$2,987,816	$0
Electrical	**$0**	**$1,171,493**	**$0**	**$0**	**$0**
Branch Wiring	$0	$0	$0	$0	$0
Lighting	$0	$0	$0	$0	$0
Service Distribution	$0	$0	$0	$0	$0
Communications and Security	$0	$1,171,493	$0	$0	$0
Exit Signs and Emergency Lighting	$0	$0	$0	$0	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$0	$0	$0	$0	$0
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$75,368**	**$75,368**	**$0**	**$0**	**$75,368**
Food Service Equipment	$75,368	$75,368	$0	$0	$75,368

Table 17. Current and Forecasted Needs Summarized by System (Years 16-20): School

System	2040	2041	2042	2043	2044
Cumulative Needs by Year	***$144,974,944***	***$146,135,324***	***$146,192,389***	***$146,339,368***	***$147,193,841***
Needs by Year	***$15,541,415***	***$1,160,380***	***$57,065***	***$146,979***	***$854,473***
Exterior Enclosure	**$3,692,620**	**$881,621**	**$0**	**$126,195**	**$0**
Exterior Walls (Finishes)	$850,197	$0	$0	$126,195	$0
Exterior Windows	$2,842,424	$881,621	$0	$0	$0
Exterior Doors	$0	$0	$0	$0	$0
Roofing	**$0**	**$0**	**$0**	**$0**	**$0**
Roof Coverings	$0	$0	$0	$0	$0
Interior Construction	**$0**	**$0**	**$0**	**$0**	**$0**
Interior Doors	$0	$0	$0	$0	$0
Specialties	$0	$0	$0	$0	$0
Interiors	**$0**	**$0**	**$0**	**$0**	**$0**
Ceiling Finishes	$0	$0	$0	$0	$0
Floor Finishes	$0	$0	$0	$0	$0
Wall Finishes	$0	$0	$0	$0	$0
Conveying	**$0**	**$0**	**$0**	**$0**	**$0**
Conveying Systems	$0	$0	$0	$0	$0
Plumbing	**$8,327,725**	**$0**	**$0**	**$0**	**$0**
Domestic Water Distribution	$0	$0	$0	$0	$0
Plumbing Fixtures	$8,327,725	$0	$0	$0	$0
Sanitary Waste	$0	$0	$0	$0	$0
HVAC	**$293,944**	**$278,759**	**$57,065**	**$20,784**	**$43,176**
Controls and Instrumentation	$0	$0	$0	$0	$0
Cooling Generation	$0	$0	$0	$0	$0
Distribution System	$52,332	$51,900	$57,065	$20,784	$34,024
Heat Generation	$0	$217,707	$0	$0	$0
Terminal & Package Units	$241,612	$9,152	$0	$0	$9,152
Fire Protection	**$3,227,126**	**$0**	**$0**	**$0**	**$0**
Sprinklers & Standpipe	$3,227,126	$0	$0	$0	$0
Electrical	**$0**	**$0**	**$0**	**$0**	**$811,297**
Branch Wiring	$0	$0	$0	$0	$0
Lighting	$0	$0	$0	$0	$0
Service Distribution	$0	$0	$0	$0	$811,297
Communications and Security	$0	$0	$0	$0	$0
Exit Signs and Emergency Lighting	$0	$0	$0	$0	$0
Site Infrastructure	**$0**	**$0**	**$0**	**$0**	**$0**
Pedestrian Pavements	$0	$0	$0	$0	$0
Vehicular Pavements	$0	$0	$0	$0	$0
Food Service Equipment	**$0**	**$0**	**$0**	**$0**	**$0**
Food Service Equipment	$0	$0	$0	$0	$0

APPENDICES

APPENDICES

Appendix A -Typical System Lifecycles

System and component life cycles used in the cost models for this project were based on average service life as shown in the *Preventive Maintenance Guidebook: Best Practices to Maintain Efficient and Sustainable Buildings* published by Building Owners and Managers Association (BOMA) International. When life cycle information is not provided by BOMA, life cycles have been assigned using ALPHA's professional judgment.

Table 18. Typical Life Cycles

System	Lifecycle (Years)
Roofing	
Built-up	25
Composition Shingle	20
Metal Panels	25
Modified Bitumen	20
Standing Seam Metal	35
Building Exterior	
Exterior Doors	25
Exterior Walls (Finishes)	10-30
Exterior Windows	30
Interior Finishes	
Interior Doors	25
Ceiling (Acoustical Tile and Grids)	20
Ceiling (Painted)	10
Walls	10
Floors	15
Built-in Equip/Specialties	
Built-in Equip/Specialties	20
Conveying Systems	
Elevators	35
Chair Lifts	15
Plumbing	

System	Lifecycle (Years)
Plumbing Fixtures	30
Domestic Water Distribution	30
Sanitary Waste	30
Fire Protection	
Fire Sprinklers and Standpipe (Piping and Risers)	40
Fire Detection (Activation Devices)	10
Fire Detection (Notification Devices and	15
Fire Detection (Wiring)	30
HVAC	
Cooling Generating	25
Controls	20
Distribution	30
Heat Generating	30
Terminal and Package Units	15
Electrical	
Branch Wiring	30
Lighting	20
Service and Distribution	40
Generators	20
Equipment	
Institutional Equipment	25
Other Equipment	15-25

Capital Planning v. Budgeting

While traditional budgets may be perceived as reacting to short-term needs based on the historical performance of facilities and systems, a capital plan anticipates both short- and long-term degradation by employing a facility condition assessment and predictive cost modeling.

- **Budgeting:** Traditional, cost-based, budgeting practices describe a system by which a prior period's budget is adjusted to provide for the fluctuating cost of maintaining facilities. Traditional budgeting issues may include: 1) anticipated needs; 2) organizational growth; 3) the acquisition of new assets; 4) operations and maintenance; 5) deferred maintenance; and, 6) insurance.
- **Capital Planning:** Capital planning differs from budgeting in that it considers a broader range of financial considerations over an extended timeline so as to more effectively predict and manage the fiscal needs of a real estate portfolio. Financial considerations may include the cost of capital, depreciation, organizational risk and return on investment (ROI). Similar in concept to the accounting principle of anticipating the capital depreciation of plant value, a capital renewal plan anticipates and attempts to counteract the ongoing deterioration of facility systems and components in order to extend a facility's life and value.

Facility Condition Index

A Facility Condition Index is considered to be a key building performance metric. As part of the FCA process, a facility condition index (FCI) is calculated for each facility. The FCI is used to quantify a facility's physical condition at a specific point in time and is calculated using the expired system replacement costs (costs associated with systems that are beyond average service life) and the current replacement value (CRV) of the building. Expired system replacement costs consist of work that is necessary to restore the facility to a condition equivalent to its original (like new) state.

Example: Total expired system replacement costs (Requirements) = $3,000,000

Current Replacement Value (CRV) = $10,000,000

$$FCI = \frac{\$3{,}000{,}000}{\$10{,}000{,}000} = .30$$

Present Value and Nominal Value

In the calculation of FCI sums, monetary values can be discounted to incorporate the time value of money, or be expressed in constant terms, ignoring the effects of inflation and interest. Because the cost of capital can vary significantly according to time, portfolio types, and project programs, all monetary terms in this report are expressed as nominal values.

- **Nominal Value:** Expresses monetary values, without adjusting for inflation or interest (also known as face value or par value).
- **Present Value:** The current worth of a future sum of money or stream of cash flows given a specified rate of return. Future cash flows can be discounted at a client specified discount rate to reflect the owner's internal cost of capital.

Hard and Soft Costs

Unless otherwise stated, the costs indicated in this report represent hard costs only. Because soft costs vary regionally and periodically, provisions for soft cost expenses should be considered in addition to the hard costs indicated. For the purpose of this report, Hard and Soft costs are defined as follows:

- **Hard costs:** Direct costs incurred in relation to a specific construction project. Hard cost may include labor, materials, equipment, etc.
- **Soft cost:** Indirect costs incurred in addition to the direct construction cost. Soft costs may include professional services, financing, taxes, etc.

Building Systems

A building system describes a mechanism, or group of mechanisms that perform a given role to maintain the functionality of a facility. Examples of building systems may include roofing, plumbing or heating, ventilation and air conditioning (HVAC) systems.

Per the Uniformat classification standard, building systems have been grouped as follows:

- Foundations
- Superstructure
- Exterior Enclosure
- Roofing
- Interior Construction
- Interior Finishes
- Conveying Systems
- Plumbing
- HVAC
- Fire Protection
- Electrical

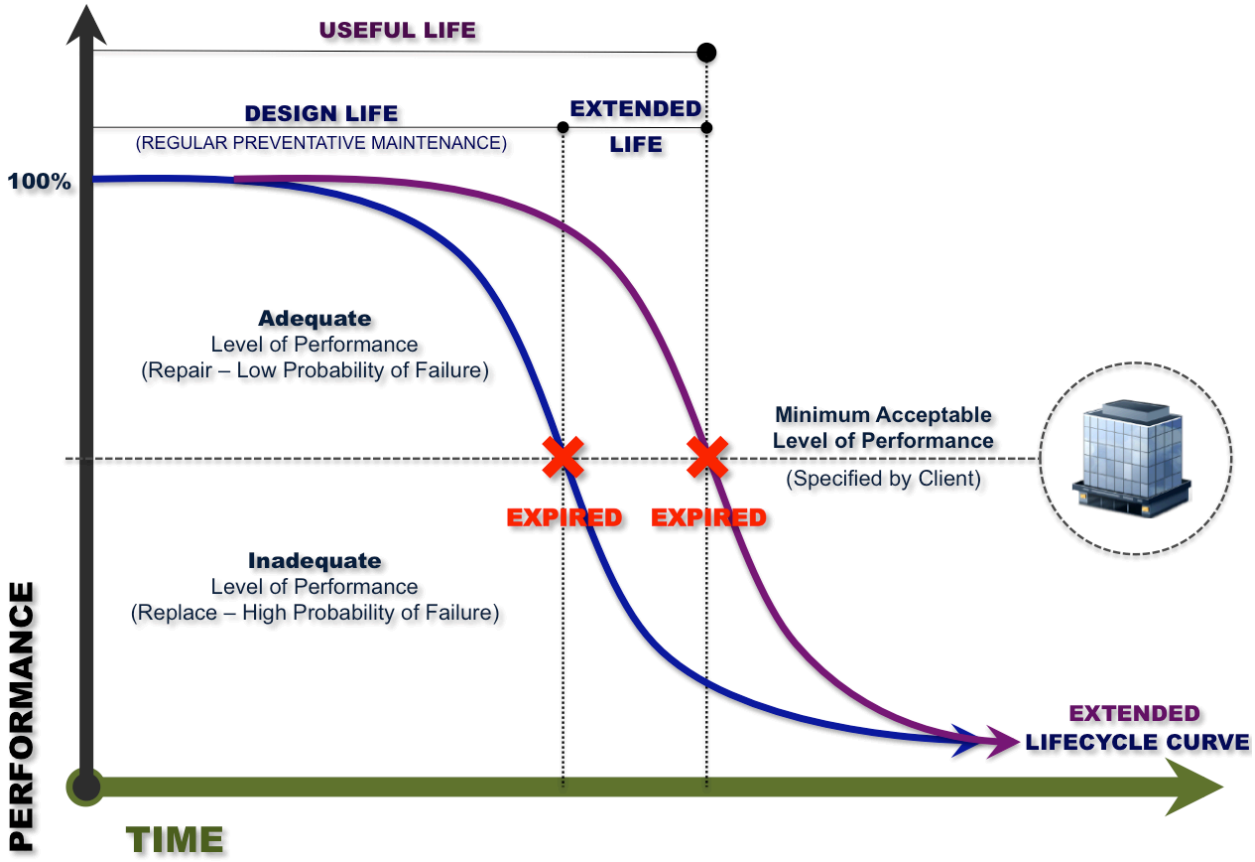
System States

The design life of a building system or component describes the duration for which a system is expected to perform within normal operational parameters. The design life may be shortened for a variety of reasons including, neglect or inadequate maintenance or extended as a result of robust preventative / predictive maintenance. This extended or shortened design life is defined as a system's useful life, and quantifies the duration for which a system, or component, operates within a minimally accepted level of performance.

As illustrated in the figure below, a facility condition analysis will make an appraisal of systems and components and recommend one of a series of actions necessary to ensure the continued functionality of a facility:

- **Missing:** A system or component may be deemed missing if the element absent, but is required for the operation of a facility (Example: ADA requirements for accessible ramps).
- **Extended:** The life cycle of a system or component may be extended beyond its anticipated design life, if the element is deemed to be performing adequately.
- **Expired:** A system or component may be recommended for replacement (at any time) if the element is deemed to be performing inadequately.

Figure 17. System or Component Life Cycle Curve



System Actions

A deficiency describes a condition in which there exists the need to repair an item that is damaged, missing, inadequate or insufficient for an intended purpose. Deficiencies are typically associated with underperforming systems or components, and describe activities that are required to extend their useful life.

- **Repair:** Describes a condition in which it is recommended that the building system or component be serviced to provide additional useful life. Repairs are curative in nature, while maintenance by contrast is preventative.
- **Replace:** Describes a condition in which it is recommended that the building system or component be removed and replaced with a new system or component. Replacement needs may vary according to building type, region, use, and maintenance management.

Multiple building systems are considered “non-renewable” because the replacement of those systems would typically be so costly as to require the replacement of the entire facility (Example: Foundations). Accordingly, there are no deficiencies or costs associated to non-renewable system.

Additionally, per client preferences, many aspects of the built environment may not be part of the scope of a facility condition analysis.

Cost Models

Cost estimation models are parametric equations used to predict the costs or the life cycle of a building system or component. The projections of the cost models are factored into capital plans, budgeting tools and other financial planning mechanisms. The rough order of magnitude cost estimates contained in this report are based on the cost models available within the client's database platform.

It is important to note that there are a variety of cost model equations employed in the building industry and it is not uncommon for prices derived from the client's database platform to vary from external references. If required, adjustments can typically be made to the facility condition data in order to facilitate comparison with external cost models, better reflect local conditions or perform sensitivity analyses.

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Appendix C - Glossary

ACBM: Asbestos-containing Building Material

ADA: Americans with Disabilities Act

AHERA: Asbestos Hazard Emergency Response Act

ALPHA: ALPHA Facilities Solutions, LLC

Alterations: Work performed to change the interior arrangements or other physical characteristics of an existing facility or fixed equipment so that it can be used more effectively for its current designated purpose or adapted to a new use.

ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers

ASTM: American Society for Testing and Materials

BOMA: Building Owners and Managers Association

Budgeting: A system by which a prior period's estimate of income and expenditure is adjusted to account for operational realities in order to provide for the cost of maintaining facilities. Traditional budgeting issues may include anticipated needs, organizational growth, the acquisition of new assets, operations and maintenance, deferred maintenance and insurance.

Building: An enclosed and roofed structure that can be traversed without exiting to the exterior.

Building Addition: An area, space or component of a building added to the existing structure, after the original building's year built date.

Capital Renewal: The planned replacement of building subsystems such as roofs, electrical systems, HVAC systems, and plumbing systems that have reached the end of their useful lives. Without significant reinvestment in building subsystems, older facilities will fall into a state of deteriorating condition and functionality, and the repair and maintenance costs will increase (International Facilities Management Association).

Calculated Next Renewal: The year a system or element would be expected to expire, based solely on the date it was installed and the expected service life of the system.

Condition: Condition refers to the state of physical fitness or readiness of a facility, system or systemic element for its intended use.

Cost Model: Parametric equations used to quantify the condition of building systems and estimate the cost necessary to sustain a facility over a given set of reporting periods. These estimated costs can be presented over a timeline to represent a capital renewal schedule.

Current Replacement Value (CRV): CRV is a standard industry cost estimate of materials, supplies and labor required to replace facility at existing size and functional capability. Please note that the terms Plant Replacement Value and Current Replacement Value have the same meaning in the context of determining Facility Condition Index.

Deficiency: A deficiency describes a condition in which there exists the need to repair a building system or component that is damaged, missing, inadequate or insufficient for an intended purpose.

Element: Elements are the major components that comprise building systems.

Facility: A facility refers to site(s), building(s), or building addition(s) or combinations thereof that provide a particular service or support of an educational purpose.

Facility Condition Assessment (FCA): The process of performing a physical evaluation of the condition of a facility and its systems. The findings of this analysis may be used in conjunction with cost models to estimate the current and future funding streams necessary to maintain a real estate portfolio.

Facility Condition Index (FCI): FCI is an industry-standard measurement of a facility's condition that is the ratio of the cost to correct a facility's deficiencies to the Current Replacement Value of the facilities – the higher the FCI, the poorer the condition of the facility. After an FCI is established for all buildings within a portfolio, a building's condition can be ranked relative to other buildings. The FCI may also represent the condition of a portfolio based on the cumulative FCIs of the portfolio's facilities.

Gross Square Feet (GSF): The size of the enclosed floor space of a building in square feet, measured to the outside face of the enclosing walls.

Hard Costs: Direct costs incurred in relation to a specific construction project. Hard costs may include labor, materials, equipment, etc.

Heating, Ventilation and Air Conditioning (HVAC): A term used to describe building systems responsible for maintaining the temperature, humidity and air quality control.

IFMA: International Facilities Management Association.

Indoor Air Quality (IAQ): A metric used to quantify the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants.

Install Year: The year a building or system was built or the most recent major renovation date (where a minimum of 70% of the system's Current Replacement Value (CRV) was replaced).

Inflation: The trend of increasing prices from one year to the next, representing the rate at which the real value of an investment is eroded and the loss in spending power over time.

Interest: The charge for the privilege of borrowing money, typically expressed as an annual percentage rate and commonly calculated using simple or compound interest calculation.

Life Cycle: The period of time that a building, system or element can be expected to adequately serve its intended function.

Maintenance: Work necessary to realize the originally anticipated life of a fixed asset, including buildings, fixed equipment and infrastructure. Maintenance is preventative, whereas repairs are curative.

Mechanical, Electrical and Plumbing (MEP): A term used to describe building systems related to the provision of HVAC, electric and plumbing services to a facility.

Needs: In the context of this report, needs are the backlog of capital renewal requirements.

Next Renewal: The assessor adjusted expected useful life of a system or element as a result of on-site inspection.

Nominal Value: A value expressed in monetary terms for a specific year or years, without adjusting for inflation – also known as face value or par value.

Operations: Activities related to normal performance of the functions for which a building is used (e.g., utilities, janitorial services, waste treatment).

O&M: Operations and Maintenance

Parametric Cost Modeling: Parametric statistics is a branch of statistics that assumes that the data has come from a type of probability distribution and makes inferences about the parameters of the distribution.

Plant Replacement Value (PRV): PRV represents the cost to design and construct a notional facility to current standards to replace an existing facility at the same location. Please note that the terms Plant Replacement Value (PRV) and Current Replacement Value (CRV) have the same meaning in the context of determining Facility Condition Index (FCI).

Present Value (PV): The current worth of a future sum of money or stream of cash flows given a specified rate of return. Future cash flows are discounted at a client specified discount rate.

Real Interest Rate: A net interest rate adjusted to remove the effects of inflation. It is the amount by which the nominal interest rate is higher than the inflation rate.

Repairs: Work to restore damaged or worn-out facilities to normal operating condition. Repairs are curative, whereas maintenance is preventative.

Replacements: An exchange of one fixed asset for another that has the same capacity to perform the same function. In contrast to repair, replacement generally involves a complete identifiable item of reinvestment (e.g., a major building component or subsystem).

Return on Investment (ROI): ROI is a financial indicator used to evaluate the performance of an investment and as a means to compare benefit.

Rough Order of Magnitude (ROM): ROM cost estimates are the most basic of cost estimate classifications.

RSMeans: An independent third-party provider of building industry construction cost data.

Site: A facility's grounds and its utilities, roadways, landscaping, fencing and other typical land improvements needed to support the facility.

Soft Costs: Indirect costs incurred in addition to the direct construction cost. Soft costs may include professional services, financing, taxes, etc.

System: System refers to building and related site work elements as described by ASTM Uniformat II, Classification for Building Elements (E1557-97), a format for classifying major facility elements common to most buildings. Elements usually perform a given function, regardless of the design specification, construction method or materials used. See also, "Uniformat II".

Uniformat II: Uniformat II (commonly referred to simply as Uniformat), is ASTM Uniformat II, Classification for Building Elements (E1557-97) – A methodology for classifying major facility components common to most buildings.

Year Built: The year that a building or addition was originally built, based on substantial completion or occupancy.

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