



# Crystal Lake Public Library 2022 Capital Maintenance Plan



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# Contents

The primary product of this study is an active workbook. This report is a simplified set of filtered data to summarize findings, frame major conclusions and illustrate the ways in which the workbook can be used to plan for care of the facility.

\* Titles and format are held consistent with previous and current 20-year assessments but include only expenses planned through 2027 to allow occupancy through 2030.

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## Executive Summary

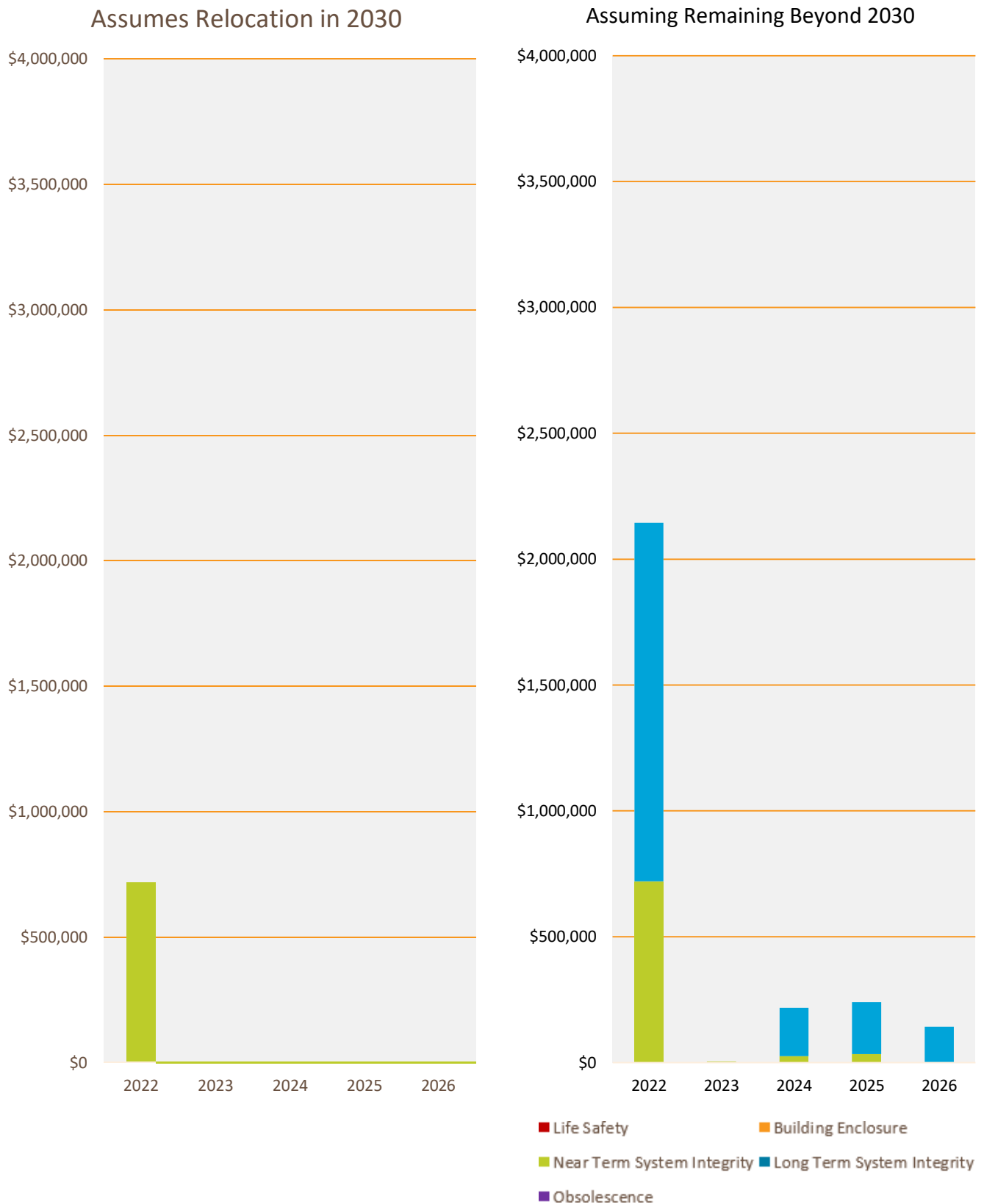
Near and long-term repair and replacement needs for the Library were reviewed in light of the 2019 Strategic Facilities Plan (SFP), recent renovations, and current condition of the building by a team of architects and engineers. The collected data was compiled and filtered into two sets of recommendations based on whether the Library can follow through on the SFP. That plan calls for relocation of library services to a new building by 2030.

**The recommendations consistent with the SFP are estimated at \$788,000 between now and the 2030 move date.** This work includes only items that require replacement or repair to keep the building open and safe. It defers as much as possible and favors short term patches and repairs over longer term repairs or replacements. This work includes windows and doors, concrete walks, paving, some plumbing, HVAC, and electrical work.

**The recommended repairs and replacements for staying in the building beyond 2030 are estimated at \$4,703,000 between now and 2031.** This is \$3,915,000 more than the amount estimated above.

An additional \$1,244,000 is needed between 2031 and 2041 to maintain the physical integrity of the building. This is a total of \$5,947,000 between now and 2041. These costs are based on repairs and replacements with longer lifespans and improved performance consistent with best practice as much as possible. These repairs do not address the accessibility issues at the north (main) entry, the space available for public use, building capacity or capabilities. Upgrades to water service, security and communications systems are included. An option to improve building effectiveness and HVAC system performance is discussed but is excluded from the cost analysis. Neither amount includes money or space required to meet the service needs of the community.

## Comparison of 5-Year Anticipated Costs by Priority & Strategic Facility Approach, 2022-2026





# Process, General Context, & Limitations

## Process

The Crystal Lake Public Library commissioned this study to

- Better understand the condition of the building,
- Prioritize needed repairs or replacements,
- Coordinate capital maintenance projects with service-based improvements to the building, and
- Identify appropriate funding levels to replace those building systems or components using designated reserve funds,
- Integrate these efforts with plans to move to a new facility.

A multi-step process was used to address these goals.

- In preparation for the systems evaluations, we reviewed the available documentation provided by the Library.
- Next, we convened a group of engineers and architects familiar with library building systems for a one-day walk-through of the facility. RTM Consulting Engineers was engaged for the mechanical and electrical engineering assessment. As part of this session, we met with building maintenance personnel and management staff to identify areas of known or suspected issues related to building performance.
- The results of these conversations and the walk through became the basis for development of specific life-expectancy and replacement cost schedules included in the workbook.
  - General notes relating to abnormal wear or deterioration in the condition of the components were included for each line.

- Each component or system occurs once in the tracking file. This is typically not an issue with long-lived systems or components. Shorter-lived components or parts are typically not considered a capital expense. For systems that fall in between, painting as an example (with a lifespan of 3 to 5 years) are tallied at their first occurrence only. Depending on the timing and nature of the action taken at that first occurrence, the interval to the next scheduled action could vary. Maintenance efforts and fiscal planning requires keeping the workbook current.
- A snapshot of a representative section of the workbook is shown at the end of this section.

- These schedules were constructed from established industry standards, consultation with system or component vendors/suppliers, and our individual experience.
- Any discernable violations of life safety, plumbing, mechanical or electrical codes were identified to the Library. This does not constitute a whole building code review or accessibility review.
- Building systems that appear to warrant more intensive investigation or inspection are identified in this report.
- Furnishings and Information technology systems were not included in the evaluation.
- The replacement schedules were submitted to the Library in draft form for review and comment. A final version included modifications as the Library deemed appropriate.

This narrative summarizes the findings.



## Context

This Capital Maintenance Plan is one element of a comprehensive evaluation and planning processes necessary to maintain the facility in proper condition and tuned to the service needs of the community. Major maintenance and renewal/replacement are part of a series of maintenance programs and budgets associated with long term stewardship of the facility. A full range of building related maintenance programs consists of:

- **Custodial Care:** Day to day periodic cleaning, painting and replacement of disposable supplies to keep the facility in safe, clean and orderly condition. Such efforts, while essential to the smooth operation and long-term care of the facility are not part of this study and are addressed by other means by the Library and should be included in the annual budgeting process.
- **Preventative Maintenance:** Regularly scheduled activities that carry out the diagnostic and corrective actions necessary to prevent premature failure or maximize or extend the useful life of a facility or its components. This includes a program of inspection, servicing, testing and replacement of systems and components that is cost effective on a life-cycle basis. Annual service agreements and testing regimens are not included in the study.
- **Major Maintenance:** Larger repair or rehabilitation efforts to protect the building and correct building code deficiencies. Major Maintenance is differentiated from Capital Repairs by the scale of the repair or replacement. Major Maintenance consists of activities less than \$10,000 in aggregate expense or with product life cycles less than 10 years. These items are include in the study.
- **Capital Repair or Replacement:** Scheduled and anticipated systematic upgrading of a system or component to a renewed functioning standard.

Unlike most plans, this is not a static document. The chief product of this study is a series of interconnected detailed schedules provided as an excel workbook for the Library's use. The schedules include opinions of both anticipated repair or replacement dates and probable cost. Entries related to condition are the result of the observations made by the review team and are an overview of wear at the time of the observation. Each item requires ongoing monitoring to assess the impact of continued building use, maintenance procedures, exposure and other factors that will influence the longevity of products and assemblies.

Within the workbook, Major Maintenance is differentiated from Capital Repairs by the scale of the repair or replacement. Capital Repairs consists of items greater than \$10,000 in aggregate expense or with product life cycles greater than 10 years. Because the schedule offers a finer level of differentiation than most studies, many of the individual items by their extent will fall below the "Capital Repair" threshold. Aggregation of the individual items into likely groups shifts the activity into the capital category. As an example, resealing the perimeter of a window is a small expense. Resealing all the soft joints on a building is a major endeavor and has a capital scale cost.

In the course of development, the schedule has evolved to include a number of items that the library may deem to be more appropriately scheduled as preventative maintenance or custodial care (painting is an example). In the interest of being inclusive, such items are included in the schedule and can be reassigned as appropriate to the library's management and annual budgeting model.

Other items may be deemed to be facility renewal to keep the building effective in its ability to support modern library service (upgrades to power and data networks and furnishings systems are an example).





## Prioritization

A second layer of definition is added to each evaluation. Items are designated for repair or replacement based on a priority basis:

- **Priority 1: Life Safety or Building Code.** Repairs or replacements are needed to meet the requirements of applicable code codes.
- **Priority 2: Building Enclosure.** Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building and includes roofs, walls, windows and other building enclosure systems.
- **Priority 3: Building System functionality is at risk.** This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.
  - The approach to these repairs or replacements will vary if the building continues to be used as a library or demolished as part of a planned building replacement project. The Library has targeted 2030 as the goal for moving into a new building.
  - **Priority 3.1:** Repairs that should be made on schedule because they protect the integrity of the building systems in the near-term and permit safe use of the facility until a new building is constructed or a determination made to stay in the existing facility.
  - **Priority 3.2:** Repairs that should be made only if the system or component fails. These are systems that may not have use as currently configured to a different owner with different needs of the building.

The priority rating for an item is not static. Carpet, as an example, can move from priority 4 because of its worn look, to priority 1 because the edges have deteriorated to the point where repairs can no longer prevent edges from becoming a tripping hazard.

It is important to note that a priority 1 item scheduled for repairs in 2030 is not a life safety or code related issue until the it wears past the condition predicted for 2030.

## Notes Related to the Covid-19 Pandemic

Because this study is premised on a “replace in kind” repair or replacement approach, it does not consider changes the Library may want to consider in response to the on-going COVID-19 pandemic.

Some of the building systems or materials may in some instances fall short of improvements or changes needed within the building to be better able to respond to similar public health crises.

Systematic evaluation of ventilation, indoor air quality, pathogen resistant or maintenance-friendly materials and cleaning processes is appropriate as part of any projects that develop from this study. Determining any changes in the Library’s expectations and obligations with respect to occupant comfort and health and the ability of existing systems or materials to meet those standards can



shift the focus of those projects from replacement to enhancement. If such shifts are deemed necessary, budgets will need to be adjusted based on those decisions.

Given the extent to which the current crisis has impacted society at large (as well as library service) and the advice of public health officials citing the importance of ventilation, physical separation, and aggressive cleaning in mitigating the spread and impact of various pathogens, we recommend that the Library contemplate allocating funds above those recommended in this study until such time as a more detailed assessment of the COVID-related aspects of the general layout, staff and public seating arrangements, indoor air distribution / quality ,and materials can be addressed.

### **Fit within Service Evaluations and Strategic Planning**

The projected costs are based on the current service models and delivery methodology. These are aspects of the building other than general wear and particular use that need to be considered in order to assure that the building is supporting the library's efforts in serving the community. Repairs or replacements are typically one for one unless there has been a service or other paradigm described that suggests a different approach is required. An example is the replacement of large fixed service desks with smaller, more interactive staff/public service points. This report does not replace a Strategic Plan, a Facilities Plan, or a Space/Needs Assessment. Aesthetic quality, fit with programmatic requirements, and comparisons with other facilities in the Library's peer group are outside the scope of this study.

### **Code Violations**

Other than the accessibility code requirements listed below and related concerns, there were code violations observed during the study.

### **Limitations**

The appended schedules include opinions of both anticipated repair or replacement dates and probable cost. All costs have a subjective component and require ongoing monitoring to assess the impact of continued building use, maintenance procedures, weather and other factors that will influence the longevity of products and assemblies.

All costs and anticipated budgets are based on 2021Q4 data and escalated at a rate of 3% per annum. Cost data is assembled from Library records, industry standards and current construction cost review by local construction and construction management firms. Unit costs include allowances for installation, removal of existing components or material, preparation of substrates, overhead and labor expenses (such as prevailing wage rates) associated with public sector projects, engineering or architectural design costs, permitting and other "ancillary" expenses. With these components added to the basic cost of the material, many unit costs will appear to be higher than many observers might expect. This is intentional.

Within this framework, it is important to remember that:

- No unit cost can anticipate all of the circumstances associated with procuring a specific repair or replacement.
- Many decisions regarding material selection, system development and project parameters have yet to be defined.
- Market conditions, as always, are beyond the control of the architect or estimator and will vary over time.

Thus, no guarantee can be given nor inferred that costs will not vary from these schedules. In order to ensure conformance with projected costs it is imperative that



additional estimates are prepared, or specific proposals sought from potential vendors or contractors as the projected replacement or repair date nears.

Finally, the Library should review projected replacement dates based on both condition and reasonable financial planning parameters. Structuring repairs and replacements to coincide with major strategic planning initiatives, building renovations or replacements and revenue streams will maximize the community's return on its investment.



# The Planning Context: 2019 Facility Master Plan

While the context described in the previous section normally suffices, the age, character, and arrangement of the existing building and many of its more fixed components is more intertwined with the evaluation process than in a typical building. While it is not the purpose of a Facility Condition Assessment to address space effectiveness or define needs, a number of observations are offered here to help the library consider the timing, nature and extent of any investment in maintaining the physical condition of the building so that it does not inadvertently invest in an arrangement that is counter to desired or needed changes to the current underlying operations/service model. The limitations of this Facility Condition Assessment are in part offset by a **Facility Master Plan** dated May 6<sup>th</sup> 2019 and adopted by the Board of Trustees in November of 2019. That Master Plan considered the condition of the existing library building and, in the context of previous space needs assessment, community engagement efforts, and library board goals, defined a series of strategies and related costs to address

- the increasing need for significant repairs,
- the overall shortage of space with which to provide services to the community,
- the limited capabilities of the existing space given its physical constraints, age, and systems, and
- the need to make effective use of any investment in a way that achieves as much as practical from the funds available.

That Master Plan consisted of a facility evaluation phase and a strategic option comparison phase. The facility evaluation portion of the project had two components:

- Physical integrity – the ability to provide a safe environment that can be maintained and operated in a cost-effective manner, and

- Service utility – the ability to provide adequate space, light, heating and cooling, power, data, capacity, and ease of use to meet the community's needs

**The Physical Integrity Evaluation** concluded that a minimum of two steps were needed to maintain the library building in safe, effective operating condition:

- Phase 1 is a very near term (immediate) need to stabilize the building envelope (roof and exterior walls, windows) to limit damage from moisture intrusion and to reduce the likelihood of sudden and extended closure of the library due to failure of mechanical system components.
- Phase 2 is the identification and implantation of more extensive repairs and replacements to permit use of the building over an extended period with less reliance on emergency repairs and substandard occupancy conditions. The Phase 2 Repairs were defined to fit 5-year, 10-year, or 20-year timeframes.
  - The time frames should be defined based on strategic needs for quantity and quality of space. The 20-year timeframe repairs are those that, if completed, would make the building cost effective and efficient to operate for at least 20 years before additional significant repairs would be needed. This represents a commitment to utilize the space in some significant way to meet the community's service needs.
  - The 5-year timeframe repairs are those that, if completed, would extend the basic utility of the facility about 5 years. More emphasis is placed on patching and extending the life of already exhausted systems while less emphasis is placed on efficiency and meeting contemporary



Performance standards. This represents a commitment to replacing the building in some manner in order to meet the community's service needs.

**The Facility Effectiveness Evaluation** (aka Service Utility Evaluation) confirmed the conclusions of previous studies: The building lacks space and capability when compared to community need, current planning standards, and peer libraries. The study team defined five options that represent milestone options to address the library's space deficiencies.

**OPTION 1: Refurbish the existing library space** to better serve the community. This includes reorganizing the staff zone to reflect changes in library operations, conversion of material handling functions to an automated system; and conversion of underutilized staff space to public uses. Those public uses would see shifts from a primarily collection centric service model to one that combines collections with a wider array of activity spaces that support active, group, interactive, and social learning.

**OPTION 2: Refurbish the existing library spaces as noted in Option 1 and make small additions to the building that improve effectiveness, improve customer experience, ease the arrival and entry experience by adding a new entry pavilion and exterior drive-up services capabilities** (room and related drive lanes).

In addition to the staff zone reorganization and public space shifts described in Option 1, the hill and awkward stairs are replaced. This option increases safety and convenience for almost all users.

A drive-up return is introduced onto the east side of the building to facilitate early and late hour return of materials. This is off-street and separated from the parking areas and service zone as much as possible to facilitate safe, easy maneuvering.

**OPTION 3: Complete the refurbishments described in Option 1 and add the functionality described in Option 2 as part of an expansion of the exiting building** along the north edge of the current facility. This portion of the Facility Master Plan focused on an expansion to 53,000 or 57,000 square feet.

While incorporating the access improvements described in Option 2, notable both for their safety and convenience factors, the big improvement is in the quantity and quality of space provided via the addition.

- More space is available for all of the public service functions resulting in meaningful quantities of high demand space and spatial attributes (floor to floor height) that permit a higher level of effectiveness in all types of public use space including individual and small group study or activity rooms, multi-purpose hands-on-learning environments, flexible exhibit/event spaces, and meeting/multi-purpose rooms.
- The space is also better adapted to support use of the collection and provide adequate seating for typical use levels seen in the youth, young adult, adult and senior populations using the building.
- Building systems are more efficient, more effective, more flexible, and better tailored to current and anticipated uses.

The 57,000 square foot facility aligns with current assessments of population growth and peer library sizes.



**OPTION 4: Replace the existing building with a new 53,000 to 57,000 square foot building** at the north end of the library site. This Option achieves the area totals of the expansion described in Option 3 with the added benefits of greater efficiency, effectiveness, and flexibility that comes by avoiding the impediments of the existing structure and related building systems constraints. In Option 3, 29.8% of the total space is new and fully functional / adaptable by virtue of its floor to floor height. In Option 4, 100% of the total space can be developed with an effective floor to floor height and with fewer structural impediments such as bearing walls, double rows of columns and offset floor levels.

This simplicity of structure is reflected in the construction cost. Renovation and expansion to 57,000 square feet is more expensive than construction of a new 57,000 square foot building.

The replacement building can be configured to allow expansion if needed.

**OPTION 5: Replace the existing building with a new 75,000 square foot building at the north end of the library site.** This is the referendum plan. It has the highest level of long-term utility based on its size and in being all new construction.

### Long-Term Strategies

Near and long-term strategies were defined by combining the options from the Physical Integrity Evaluation and the Service Utility Evaluation. Potential strategies to repair, renovate, expand or replace the existing building are combined based on alignment of the intended service life. All options require some form of the “immediate Repairs” component to allow sufficient time to secure the necessary funding for any of the longer term strategies.

**The evaluation process** filtered these options through four methods of evaluation including

- Conformance with Needs Statement / Program Requirements of 2016r-term fixes.
- Fit with Emerging Service Trends, community feedback, and library board priorities.
- Alignment with Space Allocation at Peer Libraries
- Space Attainable at Selected Construction Cost Ranges

A recommended option was identified as the result of each evaluation method for the Board of Trustees to consider. Each of the recommendations came with an assessment of the means by which the recommendation could be implemented, and the various funding commitments needed to take the recommended actions.



STRATEGIC OPTIONS			
A 5-Year Strategy	B 10-Year Strategy	C 15-Year Strategy	D 20-Year Strategy
<b>Physical Integrity Repair – Immediate Need – Prerequisite for all other steps</b>			
<input checked="" type="checkbox"/> <b>Complete Immediate Repairs to envelope and mechanical system, library automation, damaged interior finishes.</b> <input checked="" type="checkbox"/> <b>2019 design &amp; Engineering, 2020 construction</b>			
<b>Physical Integrity Repair – Longer Term</b>			
<input type="checkbox"/> Repairs as needed to make it through the next 5 years pending funding for one of the longer-term scenarios.  <input type="checkbox"/> 2020 design and engineering, 2021 start construction	<input checked="" type="checkbox"/> <b>Replacements and repairs as needed for an extended use of the library, approximately 10 years.</b>  <input checked="" type="checkbox"/> <b>2020 design and engineering, 2021 construction</b>	<input type="checkbox"/> Mostly new building systems, repairs and replacements as needed to permit long-term use of the existing building.  <input type="checkbox"/> 2020 design and engineering, 2021 start construction	<input type="checkbox"/> All new building systems, repairs and replacements as needed to permit long-term use of the existing building.  <input type="checkbox"/> 2020 design and engineering, 2021 start construction
<b>Utility Effectiveness Improvements (Upgrades)</b>			
<input type="checkbox"/> Refurbish Existing Library Space	<input checked="" type="checkbox"/> <b>Refurbish Existing Library Space</b>  <input checked="" type="checkbox"/> <b>Add Drive-Up Services</b>	<input type="checkbox"/> Refurbish Existing Library Space  <input type="checkbox"/> Add Drive-Up Services if part of Expansion  <input type="checkbox"/> Replace North Entry if part of Expansion	<input type="checkbox"/> Refurbish Existing Library Space  <input type="checkbox"/> Add Drive-Up Services
<b>Meet Strategic Space Need</b>			
---	<input type="checkbox"/> Draw/Bid 2026-2027 <input type="checkbox"/> Build 2028-2029 <input type="checkbox"/> Move 2030	<input type="checkbox"/> Expand or Replace Building, 57,000 sf	<input type="checkbox"/> <b>Replace Building, 72,000 sf</b>
\$4.68 M (repair only) \$8.56 M (repair + upgrade existing)	\$10.2 M	\$26.9 M (new) \$30.2 M (expand)	\$33.4 Million

2019 Facility Master Plan Matrix: Dates and Estimates need to be adjusted. Bold text indicates components of the Approved Master Plan. Orange highlighted components have been at least partially completed as part of the 2020 Repairs Project including Phase 2 renovations in response to COVID 19 impacts on operations.





The recommended Master Plan consists of two major multi-component steps.

1. **Make immediate repairs as needed** on the current building to maintain physical integrity, occupant safety and basic functionality for a period of one to three years
2. **Secure funding for a new library building of 72,000 square feet**, located on the north end of the library's current site with demolition of the existing building and construction of parking and other various related site improvements as needed
  - Develop necessary plans for refined cost estimates and referendum information
  - Secure approval for referendum
  - Conduct referendum
  - Design and Engineering
  - Refined Cost Estimating
  - Approvals
  - Bidding
  - Construction

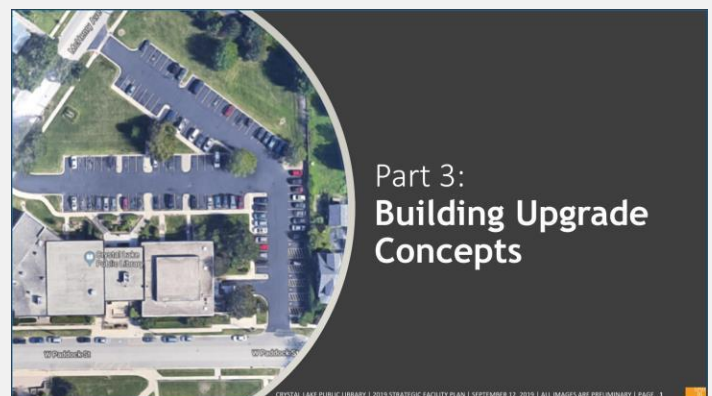
This plan has several key attributes that mark it as the best of the options considered:

- It makes a distinct improvement in the quality of service by providing an appropriate quantity and quality of space,
- It aligns with space available in other nearby libraries. This space comparisons with nearby libraries aligns with anticipated 2040 population,
- It provides sufficient space to blend collection and activity spaces into a flexible resource for community thus providing longevity of utility.
- It aligns cost with physical longevity.
- It reflects community input related to entry, drive up services, active learning, and collection depth.

- It reflects referendum feedback related to the cost of the project while preserving the library's ability to meet the overall goals set out as part of the referendum.
- It is less costly than the project proposed in the 2016 referendum.
- It maintains long-term strategic option to expand the building to the size described in the planning process leading up to the 2016 referendum.
- It abandons the constrained structure of the existing building allowing increased efficiency and effectiveness of building systems and performance by building users.

### 3. **Make additional repairs as needed to extend the useful life of the existing building until the new building can be occupied in 2030.**

More information on these and other aspects of the concepts and recommendations of the Facility Master Plan can be found in Part 3 Building Upgrade Concepts.



### Part 3: Building Upgrade Concepts

CRYSTAL LAKE PUBLIC LIBRARY | 2019 STRATEGIC FACILITY PLAN | SEPTEMBER 12, 2019 | ALL IMAGES ARE PRELIMINARY | PAGE 1





## The Planning Context: 2020 Repair Projects

The Library's consistent maintenance and "make it last a little longer" repair efforts to extend the life of existing systems has been effective but the various building systems and component parts systems were no longer predictably serviceable.

There were a number of failing systems that could have, if left unaddressed, caused a serious interruption of library service and or caused an acceleration in the deterioration of the building. Extended shutdowns, environmental contamination, compounded damage, and costly maintenance were to be expected if repairs were not completed.

Additionally, the building was ill equipped to address distancing requirements necessary to respond to COVID-19. Workspaces within the public and staff zones of the building were reconfigured to meet current planning standards for space based on function and general health and productivity considerations as well as recommendations to limit transmission of the virus. This includes a number of items identified in the Facility Master Plan. Measures included in the 2020 Repairs Project are identified with a checkmark.

Library Systems	<input checked="" type="checkbox"/> Replace failing automated check-out devices, gates <input checked="" type="checkbox"/> Reorganized staff zone per health recommendations
Improve Public Service Functions	<input checked="" type="checkbox"/> North Beacon reconfiguration <input checked="" type="checkbox"/> Improved browsing / displays in Youth and Adult Services <input checked="" type="checkbox"/> Drive up services <input checked="" type="checkbox"/> Passport privacy <input checked="" type="checkbox"/> More public seating and power <input checked="" type="checkbox"/> Wider aisles for social distancing and better browsing <input checked="" type="checkbox"/> Improved Story Time Room <input checked="" type="checkbox"/> Adult DIY space

Corrective measures identified as essential within 2020 included those listed in the following table. Measures included in the 2020 Repairs Project are identified with a checkmark.

Site	<input checked="" type="checkbox"/> Repair trip hazards, <input type="checkbox"/> Stop threatening water migration, <input type="checkbox"/> Seal coat parking lot
Roof	<input checked="" type="checkbox"/> Seal open joints, <input checked="" type="checkbox"/> Provide access ladders, <input type="checkbox"/> Replace insulation and roofing where ponding occurs, <input checked="" type="checkbox"/> Repair roof to wall joints
Exterior Walls	<input checked="" type="checkbox"/> Replace copings, sealants, mortar, weather stripping as required; <input checked="" type="checkbox"/> Cover exposed reinforcing steel
Interior Finishes	<input checked="" type="checkbox"/> Replace flooring in lobby area, <input checked="" type="checkbox"/> Tuck-point masonry at main stair, <input checked="" type="checkbox"/> Repair jagged millwork finishes
HVAC-Cooling	<input type="checkbox"/> Secure refrigerant to support 5 years of maintenance <input checked="" type="checkbox"/> Replace 1965 Condenser <input checked="" type="checkbox"/> Replace 1984 Condenser
HVAC-Heating	<input checked="" type="checkbox"/> Repair non-functioning heating equipment in 1965 building;
HVAC-Controls	<input checked="" type="checkbox"/> Conduct retro-commissioning, <input checked="" type="checkbox"/> Add control points, <input checked="" type="checkbox"/> Repair defective devices as possible
Power	<input checked="" type="checkbox"/> Provide minimal additional power
Lighting	<input checked="" type="checkbox"/> Provide additional lighting in dark sections of exit paths, main stair, and selected corners; <input checked="" type="checkbox"/> Reposition deflectors at up lights
Low-Voltage Systems	<input checked="" type="checkbox"/> Replace fire alarm system
Library Systems	<input checked="" type="checkbox"/> Replace failing automated check-out devices, gates, and related equipment with RFID and AMH



# 10-Year Strategy

This last piece of the recommended Master Plan included specific recommendations grouped together as a “**10-Year Strategy**” Some of these have been started or fully accomplished ahead of schedule.

## Completed items

- ☑ Replace all building sealants;
- ☑ Replace selected roof copings;
- ☑ Tuck-point selected portions of the exterior and interior masonry;
- ☑ Rebuild service entry;
- ☑ Replace the HVAC control systems throughout the building with DDC controls;
- ☑ Provide addition electrical receptacles.

## Partially completed items

- Replace concrete walkways that are out of plane;
- Replace all fluorescent lighting with LED fixtures;
- Replace selected windows, doors and door hardware.

## Remaining items:

- Repave entire parking area, replace curb and gutter as needed;
- Replace Roofs 4 and 5 as they age out.

## Conversion to VRF/DOAS HVAC System

Another item was included in the 10-Year Strategy: Removal of existing HVAC system entirely and replacement with a Variable Refrigerant Flow (VRF) system. Under this plan hot water and chilled water would be piped through the building through insulated pipes connected to all pieces of equipment

- Heating for the existing portion of the building would consist of (4) 1,000 MBH boilers
- The system would involve installing two new 90 Ton Air Cooled Chillers (ACC) on the roof;
- Based on RTMs calculations, the approximate size of the Dedicated Outdoor Air Supply (DOAS) would be 18,800 CFM, The AHU (Air handling Unit) would contain a wheel heat exchanger that would utilize the relief air from the space to preheat the incoming outside air;
- Extensive relocation and reconfiguration of all building systems is required to accommodate new plan.

This approach was reviewed again as part of the study and deemed more appropriate to a longer term use of the existing building than envisioned in the 8- year lifespan projected for the existing building under the current Strategic Facility Plan.



## Recent Building Issues

### Water Main

In late November of 2021 significant amounts of water were observed entering the building via various pipe entries in the foundation wall that forms the south edge of Room 132. The leak was traced to a water main running from Room 132 south and then west to a connection in McHenry Avenue. A section of the water main adjacent to the building had failed, water built up against the foundation, and worked its way through cracks and seams in the sealants around the various pipe entries.

The area outside of the building was excavated; a 10 foot section of pipe replaced; and transformer, paving, and adjacent landscape areas modified or rebuilt as needed to restore building operation and the site.

In the course of this process, it was determined that

- This failed section of pipe is a small percentage of the full run of the water main. This line is owned by the Library and runs parallel to the south edge of the 1985 and 1995 buildings.
- The leak resulted from the corrosive effects of acidic soils on the iron water main. Consequently, the new section of water main was wrapped in protective plastic.

Because the remainder of the original water main piping is of similar vintage and buried in similar soils, the Library should anticipate additional repair work at some point in the near future.

An alternative is to proactively replace the entire water service feeding the building. That cost, included in the workbook for 2032, is estimated at \$503,000 today, and increase to about \$672,000 in 2032. It has been suggested that the cost could possibly be less if the service were routed through the building. Engberg Anderson is skeptical.

### Foundation Cracks

An increase in the extent of cracking was observed at the junction between the 1984 building and the 1965 building. This can be seen at the south wall of the Hall (Room 123) leading from the Youth Services area up to the Ames Meeting Room. This is the area of the short ramp that connects the floors of the 1984 and 1965 buildings. In May of 2020 there was a small vertical crack that had developed along the west edge of the expansion joint on the south wall. By February of 2021, there was significant deformation of the vertical element of the joint and a horizontal extension to the west. This horizontal crack is in plane with another visible joint in the CMU wall located in an Electrical Room (133) directly behind that observed in the Hall. The CMU cracking continues down to the floor line. A diagonal crack is seen between the east – west wall of the hall and the north south wall of the 1965 building. The observed cracking is shown in the appended images.

Testing was conducted to seek evidence of water related displacement of base materials supporting the slab. Testing showed no evidence of suspected displacement:

- Visual evidence via coring appears as though the area immediately south of the cracked slab and the settling CMU wall is on compacted base material directly below the slab's lower surface.
- Video inspection of drain line shows no evidence of settlement or displaced base materials or damage to pipe indicating where water may be leaking from piping.

While the testing did not identify the cause of the cracking, it did not change the opinion of the structural engineer that the primary structure is not at risk and that it remains safe to occupy the building. This assessment is based on:



- Drawings available at this time which indicate a deep foundation system supporting the building's primary structure.
- Lack of visual distress to primary structural members.
- Behavior of concrete frame under stress.
- The areas showing damage are wall bearing on a slab-on-grade, they are very localized, and isolated in location.

Based on the observations and recommended options, the Library opted to:

- Repair the CMU and gypsum board assemblies, monitor the condition of the repairs monthly, and track changes over time to determine if the movement is continuing.
- Mark the location of the slab with respect to the east wall of the Electrical Equipment Room, install crack monitoring devices at the north CMU wall in the Electrical Equipment Room, and monitor these references monthly and track changes over time to determine if the movement is continuing.

The cracks in question were reviewed as part of this Facility Condition Assessment. Essentially:

- There has been no discernable movement from the crack monitors since their installation in June of 2021.
- The opinion of the structural engineer did not change: the primary structure is not at risk and that it remains safe to occupy the building.
- The water main leak may be a contributing factor, primary cause, or unrelated to the observed cracking.



## Accessibility

This study does not purport to be an accessibility assessment. In the course of conducting the evaluation of physical condition, several challenges were noted that could impose barriers for individuals seeking access to the Library's services.

- **Parking:** Accessible spaces to the east of the main south entry (the accessible public entrance to the building) do not conform to slope limitations within the Illinois Accessibility Code. Sealing the pavement may not trigger reworking these spaces so that they do conform, but the deterioration of the parking areas is such that a complete mill and overlay is needed. This level of repair usually triggers compliance with current codes. The Library should consider the spirit of the requirement and its own mission / goals with respect to accessibility even if the repairs do not trigger mandated compliance.

The majority of parking spaces available to the public are located north of the building. The most convenient entry from these spaces is at the upper level, approximately 8 feet above the sidewalk adjacent to the parking. These spaces do not provide accessible entry to the building for people with mobility issues. The stairs are steep, aging, and exposed to the elements, posing potential safety issues in the winter.



# Sample Worksheet

The primary product of this study is an active workbook. Because the workbook is an active file, it provides the library with a "living document" that can be kept current as repairs are made and used for future planning. This report presents a set of filtered data to summarize major conclusions and illustrate the ways in which the workbook can be used to assess the building and plan for future investments. The excerpt on this page and the next are offered to illustrate the level of detail in the "living document."

Capital Repair Assessment																			
Round Lake Area Public Library Enberg/Anderson ©2022				Clear Filters															
KEY: CR Capital Repair M Major				ZONES Common Envelope Public LL Site Staff Support Whole Building															
1 Life Safety, Code										2005 Repaired, replaced, or remodeled since Original Construction									
2 Building																			
3A Near Term																			
3B Long Term																			
4 Obsolete/Condo				1988 Initial Construction															
Key Sort				Location & Category						Product Data/Life Expectancy						Evaluated Condition			
1	2	3	4	5	6	7	8	9	10	15	16	17	18	19	20				
0	1	2	Zone	Room Number or Area / Zone	Building Year	CSI#	System	System Location	Component	Installed Date	Planned Service Life	Replace Year - Theor	Remaining Life - Theor	Evaluation Year	Condition				
▼	▲	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				
1	M	2	Site	Ramp/Retaining w/all	1988	03	Concrete	Ramp to LL	Retaining wall, concrete - repair	1988	35	2023	1	2022	Normal				
2	M	2	Envelope	Ext-North	1988	04	Masonry	Upper Level	Brick - repoint	1988	25	2013	-9	2022	Used Up				
3	M	2	Envelope	Ext-East	1988	04	Masonry	Upper Level	Brick - repoint	1988	25	2013	-9	2022	Better				
4	M	2	Envelope	Ext-West	1988	04	Masonry	Upper Level	Brick - repoint	1988	25	2013	-9	2022	Better				
5	M	2	Envelope	Ext-South	1988	04	Masonry	Upper Level	Brick - repoint	1988	25	2013	-9	2022	Better				
6	M	2	Envelope	Ext-East	1988	04	Masonry	Lower Level	Brick - repoint	1988	25	2013	-9	2022	Better				
7	M	2	Envelope	Ext-West	1988	04	Masonry	Lower Level	Brick - repoint	1988	25	2013	-9	2022	Used Up				
8	M	2	Envelope	Ext-South	1988	04	Masonry	Lower Level	Brick - repoint	1988	25	2013	-9	2022	Used Up				
9	CR	2	Envelope	Exterior	1988	04	Masonry	Upper Level	Brick - repoint	2003	25	2028	6	2022	Used Up				
10	M	2	Envelope	Exterior	1988	04	Masonry	Lower Level	Brick - repoint	2003	25	2028	6	2022	Better				
11	CR	3B	Whole Building	Whole Building	1988	06	Wood		Type A: Base + Counter + Upper	2000	20	2020	-2	2022	Used Up				
12	CR	3B	Whole Building	Whole Building	1988	06	Wood		Base Cabinets - replace	2000	20	2020	-2	2022	Better				
13	CR	3B	Whole Building	Whole Building	1988	06	Wood		Type F: Full Height Storage	2000	20	2020	-2	2022	Used Up				
14	M	2	Envelope	First Floor	1988	08	Doors & Windows	Lobby	Doors, Exterior Aluminum Entrance Operator - Replace	1988	20	2008	-14	2022	Used Up				
15	CR	2	Envelope	First Floor	1988	08	Doors & Windows	Lobby	Doors, Exterior Aluminum Entrance Sliders - Replace	1988	20	2008	-14	2022	Better				
15	M	2	Envelope	First Floor	1988	08	Doors & Windows		Doors, Exterior Hollow Metal - repaint	1988	10	1998	-24	2022	Used Up				
16	M	2	Envelope	First Floor	1988	08	Doors & Windows		Doors, Exterior Hollow Metal - replace	1988	30	2018	-4	2022	Used Up				
17	M	2	Envelope	Interior	1988	08	Doors & Windows	Lobby	Doors, Overhead Coiling Grille - Repair	1988	20	2008	-14	2022	Used Up				
18	M	2	Envelope	Interior	1988	08	Doors & Windows	Lobby	Doors, Overhead Coiling Grille - Repair	1988	20	2008	-14	2022	Used Up				
19	M	2	Envelope	Exterior	1988	08	Doors & Windows	Upper Level	Metal Louvers - large - replace	1988	40	2028	6	2022	Better				
20	CR	2	Envelope	Exterior	1988	08	Doors & Windows	Upper Level	Windows, Custom Wood - replace IGU	1988	20	2008	-14	2022	Used Up				
21	CR	2	Envelope	Exterior	1988	08	Doors & Windows	Upper Level	Windows, Custom Wood - replace IGU	2012	20	2032	10	2022	Normal				
22	CR	2	Envelope	Exterior	1988	08	Doors & Windows	Lower Level	Windows, Aluminum - replace IGU	2012	25	2037	15	2022	Normal				
23	CR	2	Envelope	Exterior	1988	08	Doors & Windows	Lower Level	Windows, Aluminum - replace IGU	1988	25	2013	-9	2022	Used Up				



														January 21, 2022	
														Project Number 213392	



## Summary Tables Assuming Library Relocates to New Facility by 2030

This set of tables limits the investment to minimum repairs needed to keep the facility operational through 2030. The items scheduled should be replaced only if necessary to keep the building open. Short term repairs are preferred unless the Library opts to stay in the building or delay a move to a later date. In those cases, the “Remain in Existing Building” tables should be used.





## Anticipated Annual Capital Repair & Major Maintenance (CR & M) Costs, 2022 - 2030

	1	2	3.1				
	Life Safety	Building Enclosure	Near Term System Integrity			Sum 1-3.1	Average per year within 5 year period
2022	\$0	\$0	\$719,700			\$719,700	\$156,780
2023	\$0	\$0	\$4,600			\$4,600	
2024	\$0	\$0	\$25,500			\$25,500	
2025	\$0	\$0	\$34,100			\$34,100	
2026	\$0	\$0	\$0			\$0	
<b>5 Year Group</b>	<b>\$0</b>	<b>\$0</b>	<b>\$783,900</b>			<b>\$783,900</b>	
2027	\$0	\$0	\$4,900			\$4,900	\$980
2028	\$0	\$0	\$0			\$0	
2029	\$0	\$0	\$0			\$0	
2030	\$0	\$0	\$0			\$0	
2031	\$0	\$0	\$0			\$0	
<b>5 Year Group</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,900</b>			<b>\$4,900</b>	
2032							
2033							
2034							
2035							
2036							
<b>5 Year Group</b>							
2037							
2038							
2039							
2040							
2041							
<b>5 Year Group</b>							
<b>TOTAL</b>	<b>\$0</b>	<b>\$0</b>	<b>\$788,800</b>	<b>\$0</b>	<b>\$0</b>	<b>\$788,800</b>	

*Although the workbook indicates expenses in 2028, 2029, and 2030, this summary assumes that any capital replacements would be deferred in favor of minimal repairs as necessary to keep the Library operational until a 2030 move to a new facility.*



## 5-Year Anticipated Costs by Priority, 2022-2026 Assuming Relocation to New Facility in 2030

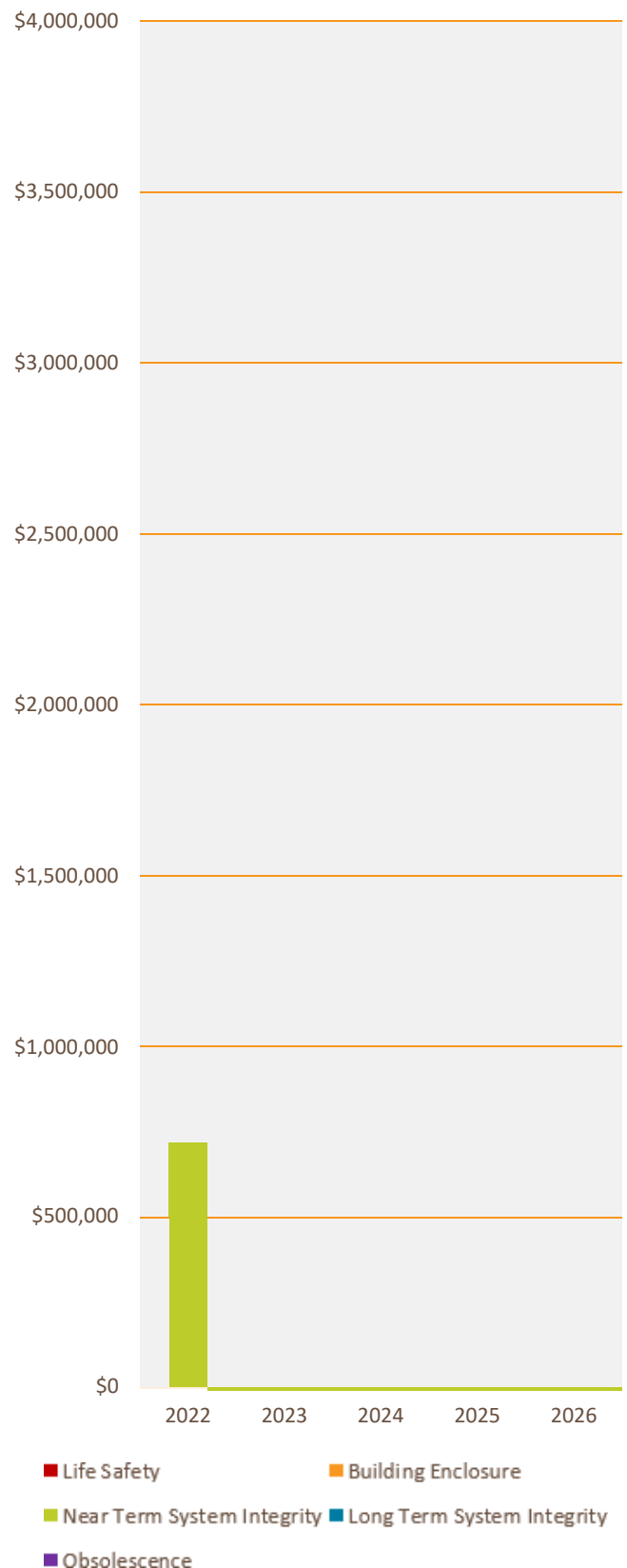
Significant cost categories should be considered carefully before making the anticipated repair or replacement. Priorities 1, 2 and 3A should be implemented as needed. Priorities 3B and 4 should be deferred as possible until a decision on location is made.

**Priority 1: Life Safety or Building Code.** Repairs or replacements are needed to meet the requirements of applicable codes.

**Priority 2: Building Enclosure.** Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building. Shifted to 3.1 or 3.2.

**Priority 3: Building System functionality is at risk.** This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.

- **Priority 3.1: Repairs that should be made if the Library is moving within 10 years.** These should be made on schedule because they protect the integrity of the building systems in the near-term and permit safe use of the facility until a new building is constructed or a determination is made to stay in the existing facility.
- **Priority 3.2: Repairs that should be made only if the system or component fails or if the Library is staying in the existing building.** These are systems that may not have use as currently configured or to a different owner with different needs.





## Summary Tables Assuming Library Remains in Existing Building

This set of tables extends the investment analysis to keep the facility operational through 2041 with some systems having significantly longer lifespans. The items scheduled should be replaced on an as needed basis or in coordinated groups of related work. Long-term repairs are preferred unless the Library continues with its strategic goal of relocating to a new facility by 2030. In that case, the “Relocate to New Building” tables should be used.



## Anticipated Annual Capital Repair & Major Maintenance (CR & M) Costs, 2022 - 2041

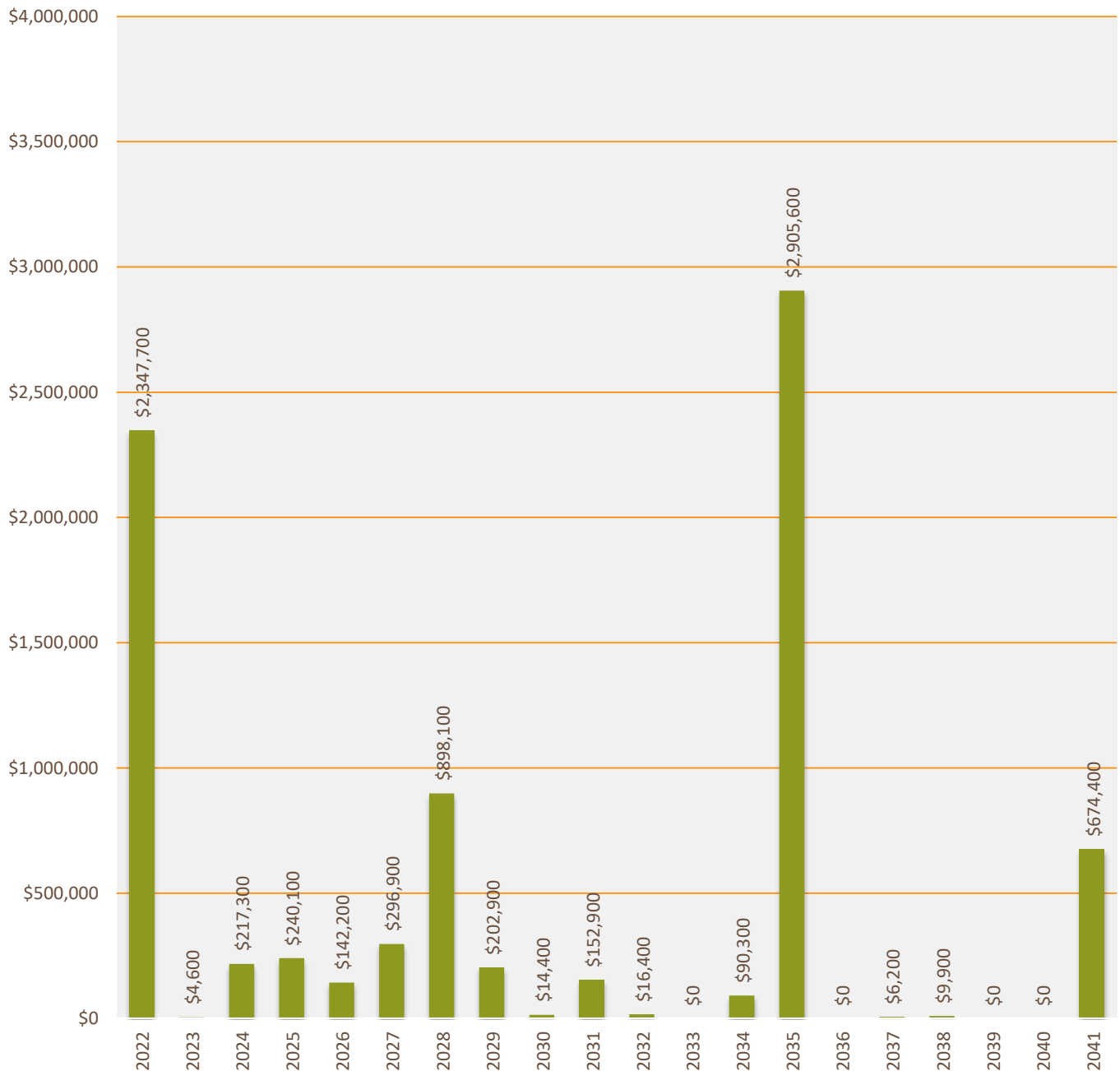
	1	2	3.1	3.2	4		
	Life Safety	Building Enclosure	Near Term System Integrity	Long Term System Integrity	Obsolescence	Sum 1-4	Average per year within 5 year period
2022	\$0	\$0	\$719,700	\$1,807,300	\$0	\$2,527,000	\$626,240
2023	\$0	\$0	\$4,600	\$0	\$0	\$4,600	
2024	\$0	\$0	\$25,500	\$191,800	\$0	\$217,300	
2025	\$0	\$0	\$34,100	\$206,000	\$0	\$240,100	
2026	\$0	\$0	\$0	\$142,200	\$0	\$142,200	
<b>5 Year Group</b>	<b>\$0</b>	<b>\$0</b>	<b>\$783,900</b>	<b>\$2,347,300</b>	<b>\$0</b>	<b>\$3,131,200</b>	
2027	\$0	\$0	\$4,900	\$292,000	\$0	\$296,900	\$314,420
2028	\$0	\$0	\$0	\$898,100	\$0	\$898,100	
2029	\$0	\$0	\$0	\$204,800	\$0	\$204,800	
2030	\$0	\$0	\$5,400	\$14,000	\$0	\$19,400	
2031	\$0	\$0	\$6,200	\$146,700	\$0	\$152,900	
<b>5 Year Group</b>	<b>\$0</b>	<b>\$0</b>	<b>\$16,500</b>	<b>\$1,555,600</b>	<b>\$0</b>	<b>\$1,572,100</b>	
2032	\$0	\$0	\$0	\$16,400	\$0	\$16,400	\$110,740
2033	\$0	\$0	\$0	\$0	\$0	\$0	
2034	\$0	\$0	\$19,000	\$71,300	\$0	\$90,300	
2035	\$0	\$0	\$45,800	\$401,200	\$0	\$447,000	
2036	\$0	\$0	\$0	\$0	\$0	\$0	
<b>5 Year Group</b>	<b>\$0</b>	<b>\$0</b>	<b>\$64,800</b>	<b>\$488,900</b>	<b>\$0</b>	<b>\$553,700</b>	
2037	\$0	\$0	\$0	\$6,200	\$0	\$6,200	\$138,100
2038	\$0	\$0	\$0	\$9,900	\$0	\$9,900	
2039	\$0	\$0	\$0	\$0	\$0	\$0	
2040	\$0	\$0	\$0	\$0	\$0	\$0	
2041	\$0	\$0	\$140,400	\$534,000	\$0	\$674,400	
<b>5 Year Group</b>	<b>\$0</b>	<b>\$0</b>	<b>\$140,400</b>	<b>\$550,100</b>	<b>\$0</b>	<b>\$690,500</b>	
<b>TOTAL</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,005,600</b>	<b>\$4,941,900</b>	<b>\$0</b>	<b>\$5,947,500</b>	

### Notes:

Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work. Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.



## 20-Year Anticipated CR & M Costs by Year



*Major expenses occur in predictable patterns. Near term expenses (2022) are reflective of the age of the building and the Library's efforts to scale maintenance to the strategic space need of the district: Deferred maintenance is building up. Mid-term expenses (2028) and longer term expenses (2035, 2041) reflect the aging of systems installed or repaired in recent renovations, many of which will have 10-, 20- and 25-year lifespans.*

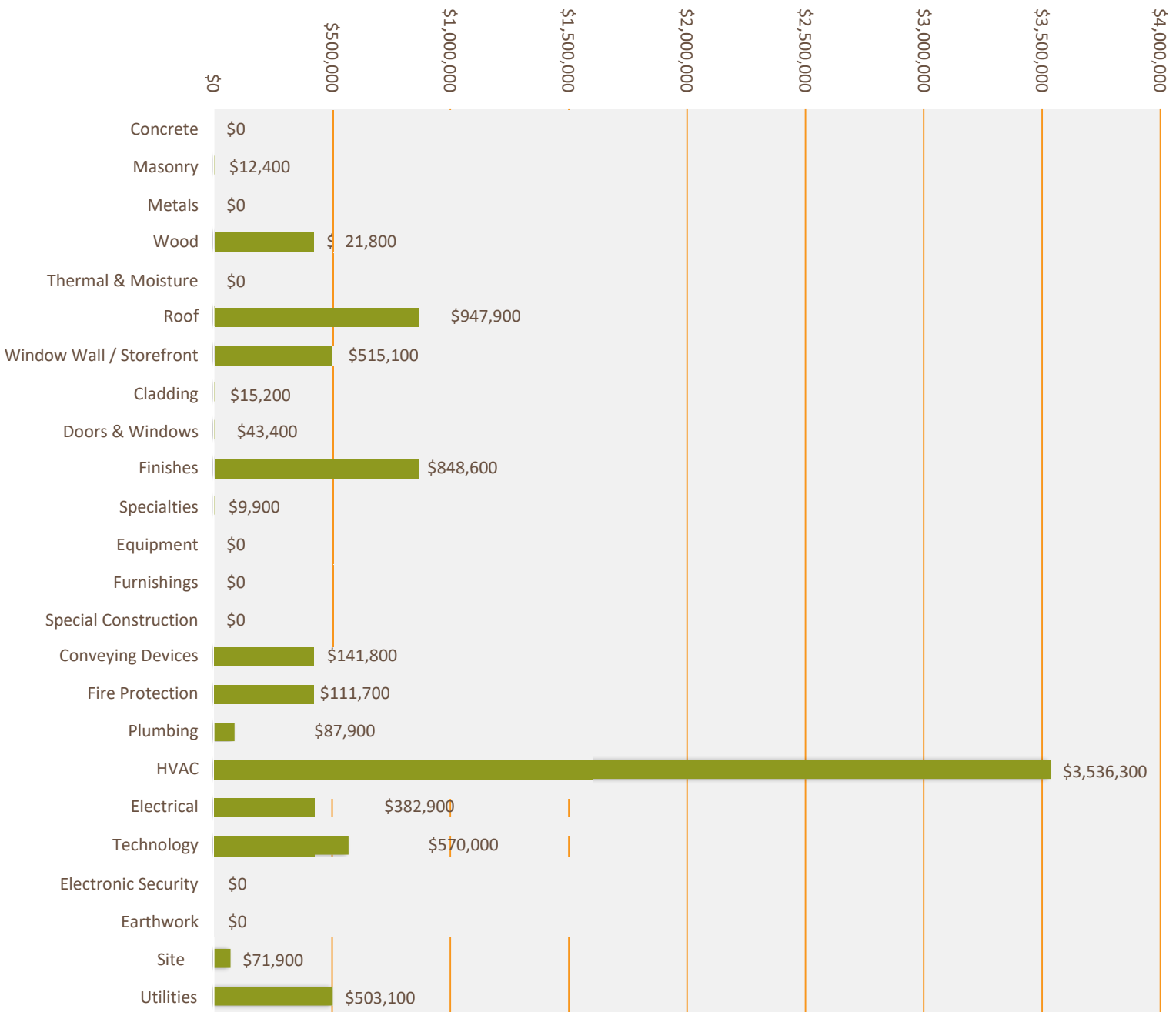
**Notes:**

*Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work.*

*Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence.*

*Actual expenses will recur within the 20 year window.*

## 20-Year Anticipated CR & M Costs by Category



## 5-Year Anticipated Costs by Priority, 2022-2026

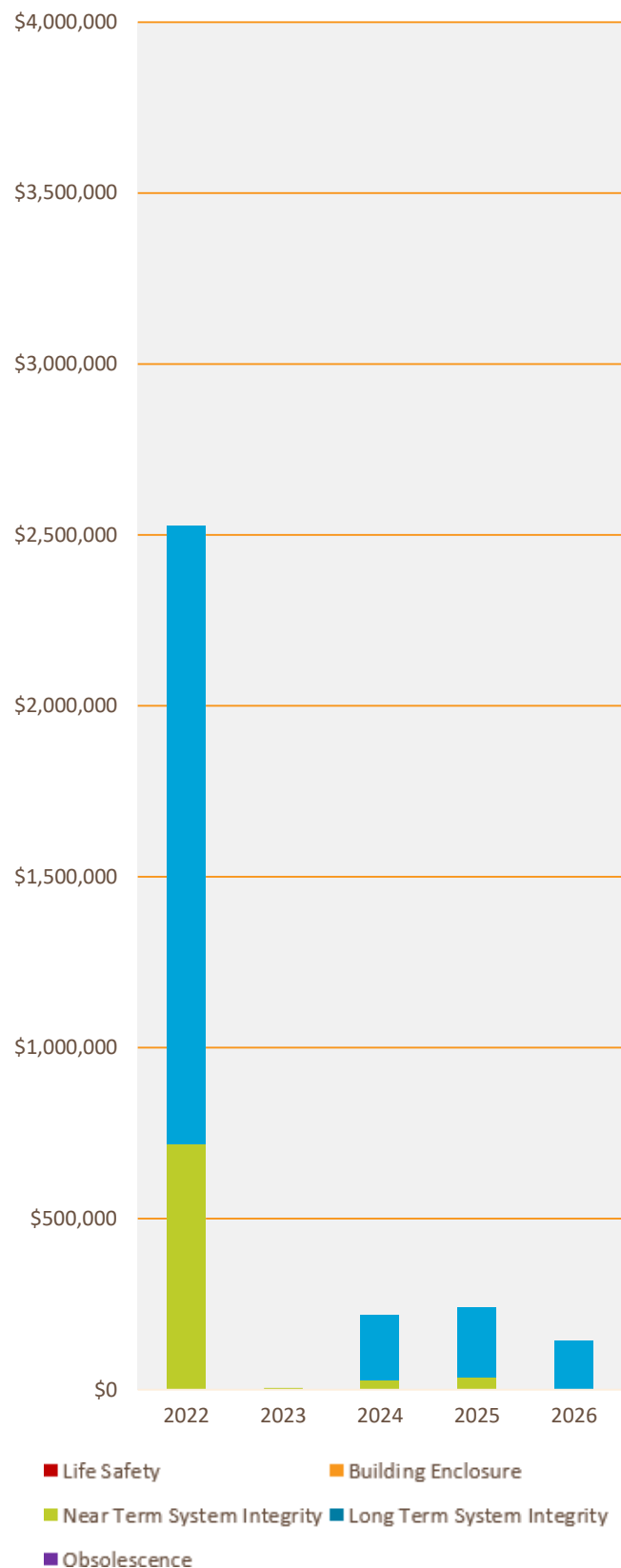
Significant cost categories should be considered carefully before making the anticipated repair or replacement. Priorities 1, 2 and 3A should be implemented as needed. Priorities 3B and 4 should be deferred as possible until a decision on location is made.

**Priority 1: Life Safety or Building Code.** Repairs or replacements are needed to meet the requirements of applicable codes.

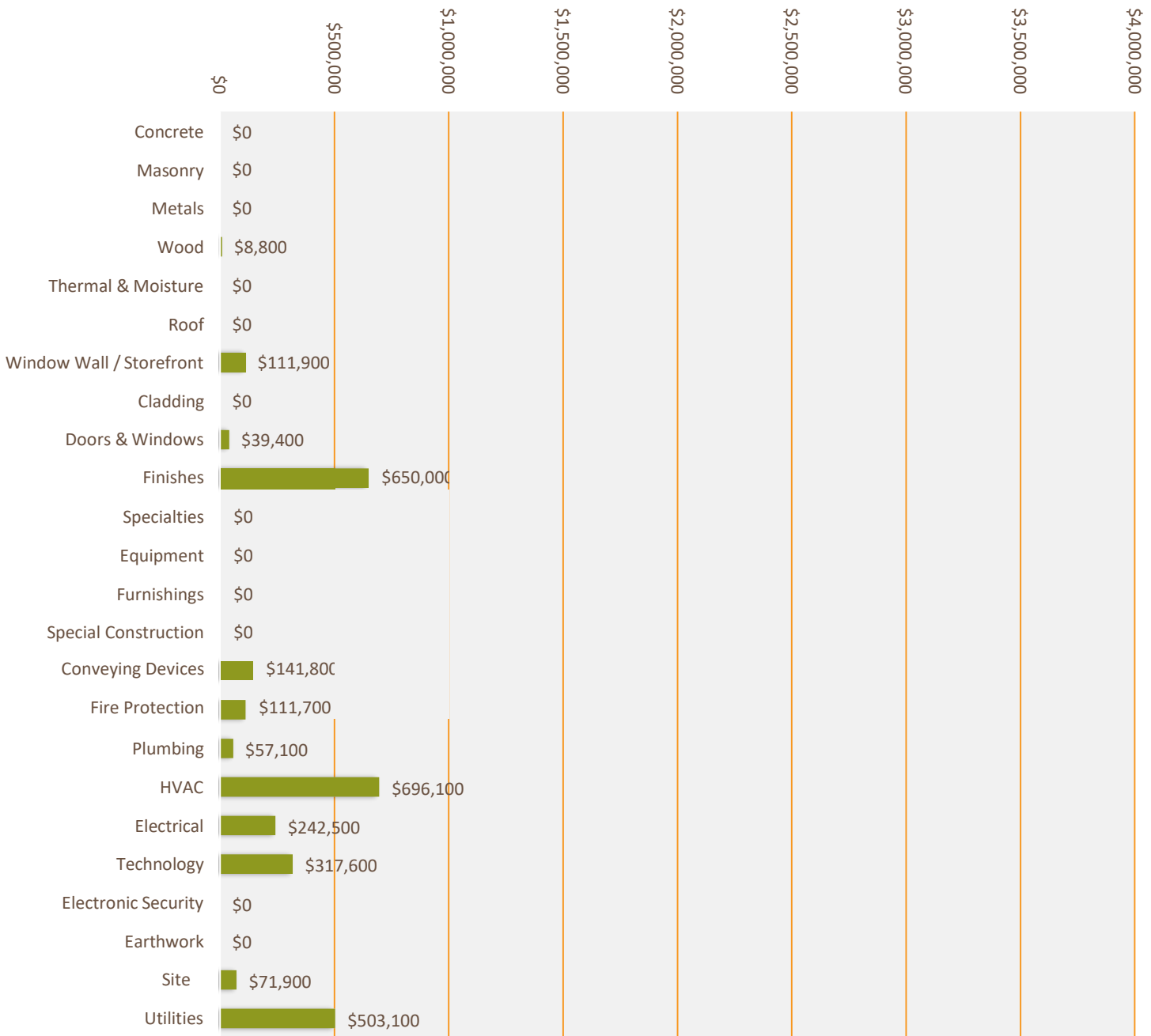
**Priority 2: Building Enclosure.** Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building. Shifted to 3.1 or 3.2.

**Priority 3: Building System functionality is at risk.** This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.

- **Priority 3.1: Repairs that should be made if the Library is moving within 10 years.** These should be made on schedule because they protect the integrity of the building systems in the near-term and permit safe use of the facility until a new building is constructed or a determination is made to stay in the existing facility.
- **Priority 3.2: Repairs that should be made only if the system or component fails or if the Library is staying in the existing building.** These are systems that may not have use as currently configured or to a different owner with different needs.



## 5-Year Anticipated CR & M Costs by Category, 2022-2026





## 5-Year Anticipated Costs by Priority 2027-2031

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

**Priority 1: Life Safety or Building Code.** Repairs or replacements are needed to meet the requirements of applicable codes.

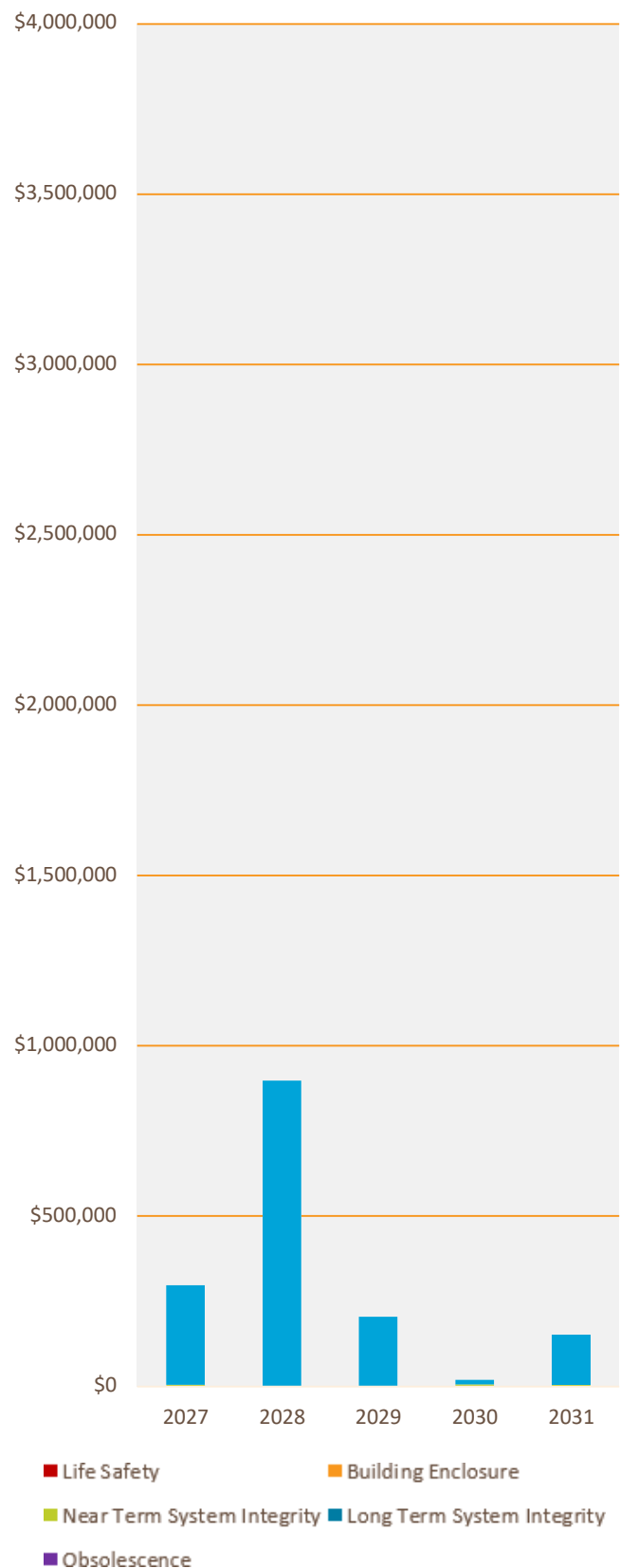
**Priority 2: Building Enclosure.** Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building. Shifted to 3.1 or 3.2.

**Priority 3: Building System functionality is at risk.** This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.

- **Priority 3.1: Repairs that should be made if the Library is moving within 10 years.** These should be made on schedule because they protect the integrity of the building systems in the near-term and permit safe use of the facility until a new building is constructed or a determination is made to stay in the existing facility.
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### Notes:

Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work. Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.



## 5-Year Anticipated Costs by Priority 2032-2036

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

**Priority 1: Life Safety or Building Code.** Repairs or replacements are needed to meet the requirements of applicable codes.

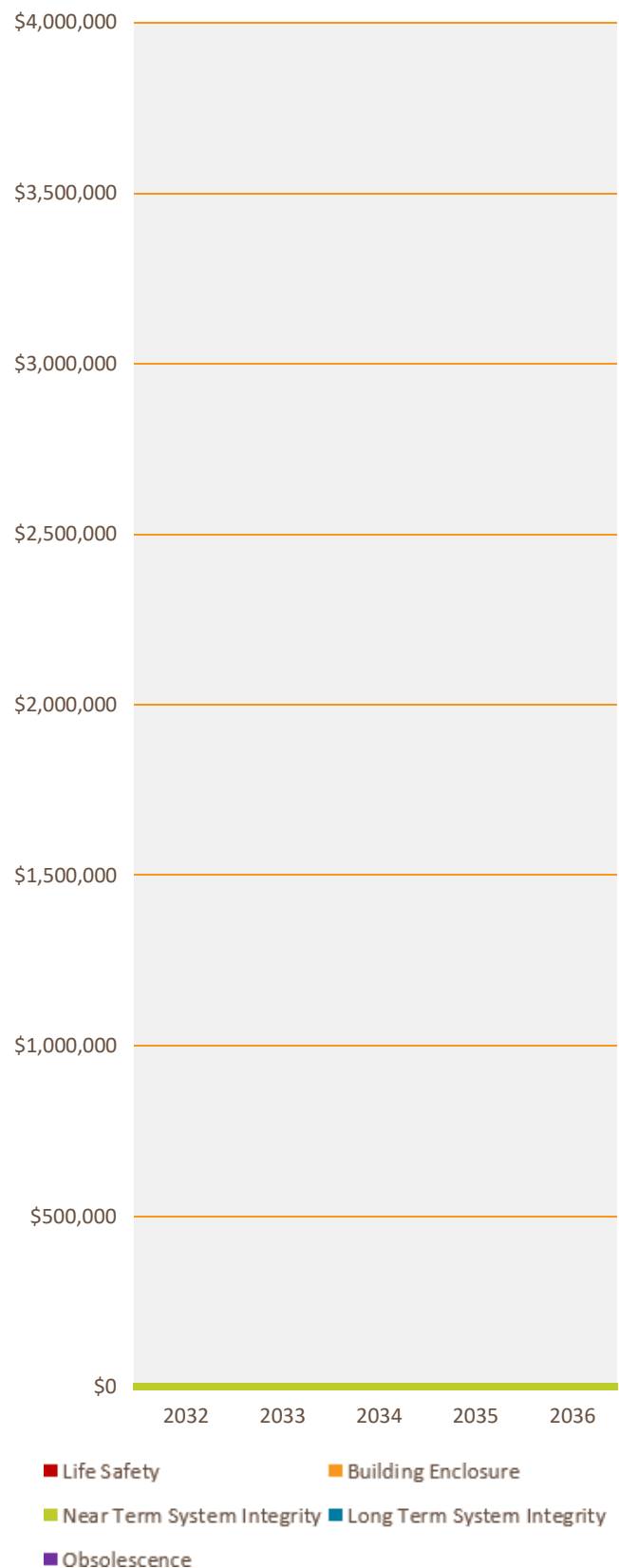
**Priority 2: Building Enclosure.** Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building. Shifted to 3.1 or 3.2.

**Priority 3: Building System functionality is at risk.** This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.

- **Priority 3.1: Repairs that should be made if the Library is moving within 10 years.** These should be made on schedule because they protect the integrity of the building systems in the near-term and permit safe use of the facility until a new building is constructed or a determination is made to stay in the existing facility.
- **Priority 3.2: Repairs that should be made only if the system or component fails or if the Library is staying in the existing building.** These are systems that may not have use as currently configured or to a different owner with different needs.

### Notes:

Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work. Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.



## 5-Year Anticipated Costs by Priority 2037 -2041

Significant cost categories should be considered carefully before making the anticipated repair or replacement.

**Priority 1: Life Safety or Building Code.** Repairs or replacements are needed to meet the requirements of applicable codes.

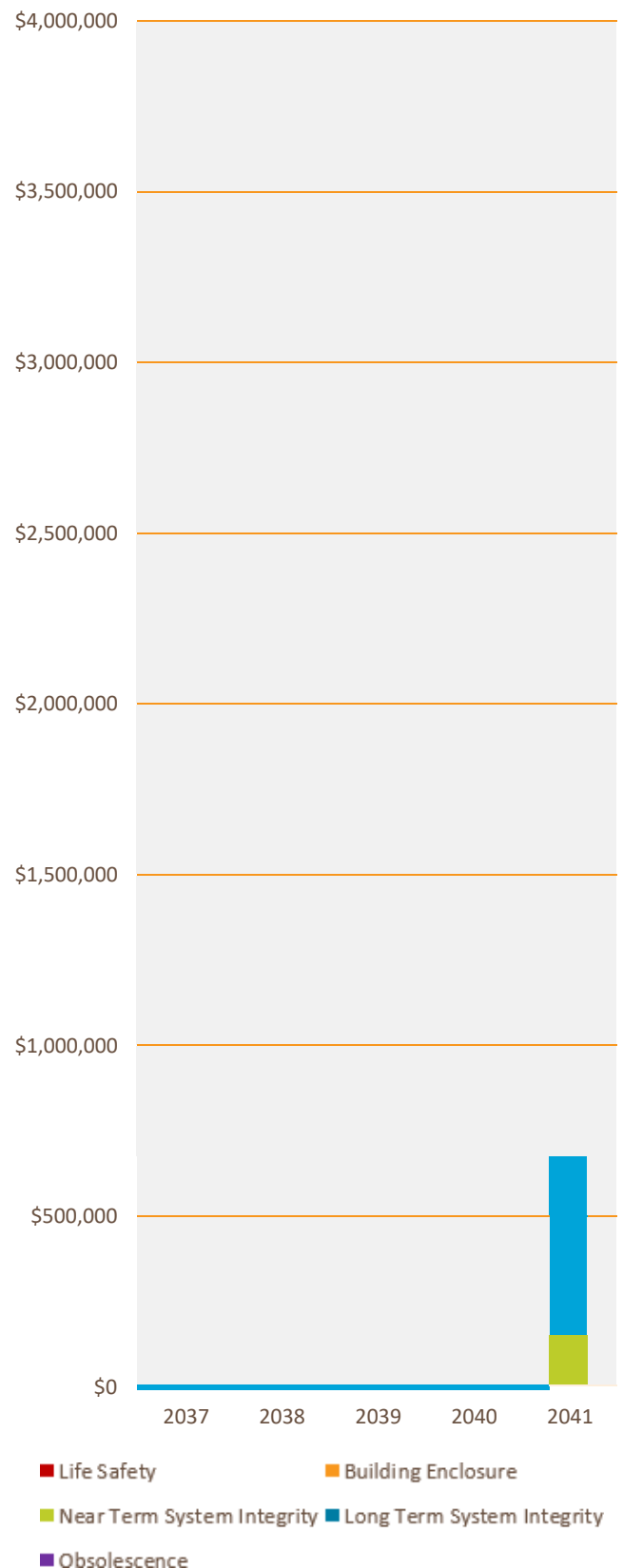
**Priority 2: Building Enclosure.** Repairs or replacements are needed to maintain thermal integrity or to prevent water intrusion into the building. Shifted to 3.1 or 3.2.

**Priority 3: Building System functionality is at risk.** This is typically related to primary building systems other than enclosure. Heating, cooling, ventilation, electrical, elevators, and other systems are found here unless there is a code related issue driving a higher priority rating.

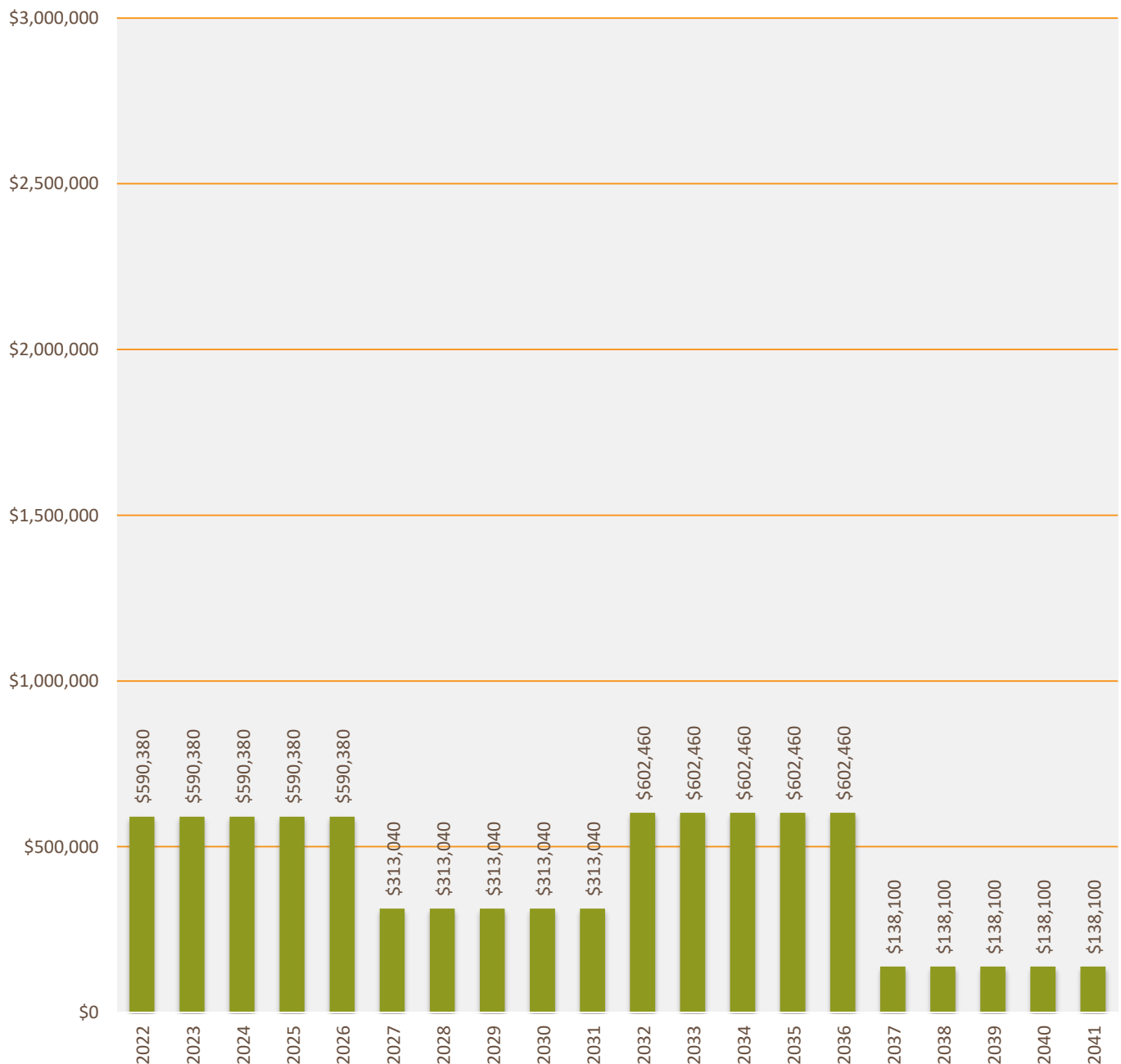
- **Priority 3.1: Repairs that should be made if the Library is moving within 10 years.** These should be made on schedule because they protect the integrity of the building systems in the near-term and permit safe use of the facility until a new building is constructed or a determination is made to stay in the existing facility.
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### Notes:

Costs are for repairs and replacements only. Many repairs will precipitate ancillary work (removal of ceilings, walls, floor or other intervening construction) that will add to the scheduled cost of the work. Short lifespan repairs (interior painting with a 3-5 year lifespan as an example) are included in the workbook only at the initial occurrence. Actual expenses will recur within the 20 year window.



## CR & M Costs Averaged Over 5 Year Periods



*Spikes in the repair / replacement costs can be mitigated by budgeting and expenditure strategies that look at 5 year planning periods. While there is merit in grouping as many repairs as practical into a single larger project (lower cost, less interference with public use of the building) there is value in separating the budgeting process from these larger expenditures. Setting aside smaller more manageable reserves over a series of years can be arranged to fund a major repair project. This graph illustrates the Capital Repair & Maintenance expenses averaged over a series of 5-year planning periods.*



# Narratives

The following supplement and are derived from the workbook. They are not intended to duplicate the detail and comprehensive nature of the workbook. Tables identifying impending work are only a partial list of the items included in the workbook.



# Site Conditions

## EXISTING SITE CHARACTERISTICS

### Parcel Information

The property identification numbers that the Crystal Lake Library owns includes: 19-05-202-032, 19-05-202-033, 19-05-202-006, 19-05-202-005, and 19-05-202-004. A partial survey was completed for the library in 2020. This site study focuses on the areas of the site that are currently developed for the library. The northernmost parcel is owned by the library, but is currently developed as residential. The library has plans to utilize this property in the future for a new building. This site study takes into consideration that within the next 10-20 years a new library building is proposed.

### Easements, Encroachments, Perimeter Roads

There are no provided easements or encroachments that were provided for the site. This information would appear on an ALTA survey.

The library site is adjacent to two perimeter roads. McHenry Avenue is located to the West and West Paddock Street is located to the South. Both perimeter roadways are bi-directional and controlled by stop signs at the intersection located by the library. West Paddock Street has parallel parking located along both sides of the right of way. There are right of way accesses to both the south and west portions of the site from the right of way. The south walk provides access to the upper floors of the library, while the west walk provides egress from the lower level of the library. There are driveways located along both West Paddock Street and McHenry Avenue.

### Topography and Drainage Characteristics

A partial topographic survey of the site was completed in 2020. Areas not surveyed include the areas north of

the existing parking lots and the south western portion of the site. In most locations the building site sits above the perimeter roadway elevations. The north portion of the building has lower door accesses that sit below the perimeter roadway elevations. These lower doors are the lowest parts of site and have retaining walls surrounding them. Water from the roadway would not be able to access these areas. The on-site storm sewer system does not tie into the City of Crystal Lake storm sewer. The site handles all of the stormwater with infiltration through the on-site drywell system, as well as infiltration basin located in the northeast corner of the site. These drywells require a maintenance schedule and should be monitored and inspected every year to verify that the stone has not silted up and is preventing the drywell from draining. The library should have maintenance performed on these drywells every other year to allow for the site to continue to drain properly.

### Accessible Parking

The existing accessible parking spaces are located at the southeast corner of the site. The slope of the current accessible parking spaces exceeds the allowable slope of 2%. The entirety of the existing drive is sloped at approximately 5%. This does not allow for the accessible parking spaces to be located along the east drive. The civil engineer provided options for recommendations to handle the non-compliance.

1. Relocated the accessible spaces to the north lot in order to avoid the drastic changes to the east parking lot needed to provide a 2% slope. If spaces are relocated, the existing right of way sidewalk along McHenry Avenue and West Paddock Street would serve as the accessible route to the south entry, the only entrance with accessible access. This is an exceptionally long route and not in keeping with the spirit of the Accessibility Code.



2. The other option would be to repave the east parking lot. This option is expensive as it involves regrading the site, blending the topography with adjacent parcels, and impacts access to the drive-up services area. This option still forces users to travel an extended route to the south (accessible) entry.

While not identified by the civil engineer, the Library has previously considered rebuilding the north entry to be an enclosed, at grade, accessible entry point with nearby accessible parking that complies with the requirements and spirit of the Accessibility Code. This is the best of the available options.

### **Land Cover, Trees, Existing Structures**

The site has grass in most open space areas. There are mulch areas located against the building. There are still a couple areas of the site that are paved with brick pavers. There are a variety of other paver and crushed gravel paths around the site. This includes a memorial bench area with an exposed aggregate concrete patio and a variety of different style pavers.

The site has many mature trees and bushes on the site. The trees are located primarily located around the perimeter of the site.

### **Parking Areas**

There is an asphalt parking lot in the southwest corner of the site. The asphalt surfacing is worn but the subbase appears to be in good condition in most areas. Alligator cracking is present in a few areas. The library should anticipate needing to budget for a few areas of full depth replacement.

However, the majority of the recommended replacement would be a mill and overlay with the addition of the Tensar GlasPave product. This addition will assist in helping the library extend the longevity of the mill and overlay to better keep the pavement until the construction of the new building.

In general, the curbs are aging and worn, but do not need replacement at this time.

Multiple sidewalk areas require maintenance. The sidewalk in the worst condition is at the northeast corner of the building. There are also areas located at the northwest corner of the building that are tripping hazards. Three areas in the north lot have worn concrete and stamped ADA detectable warning tiles that is recommended to be replaced.

### **Water Service**

Within the past year, the Library experienced a water main break of the existing 1984 DIP water service. This length of the pipe extends from the south building entryway west along Paddock Street to McHenry Avenue. The water service has a theoretical service life of up to 75-100 years. Given that information, it is feasible that the pipe would not have another break before the library plans to rebuild. The Library should weigh the probability as the impact of another failure and determine if replacing the remaining pipe (as scheduled in this study) is appropriate. That investment may be needed for multiple generations or it may have a utility of only 10 years. The Library could consider an alternate strategy of budgeting an allowance to repair a break every 5 years. This option is much more cost effective if the existing building is demolished in the next 10 years. The same strategy should be followed for the service built in 1965.

### **Wetlands/Bodies of Water**

There are no wetlands on the site based on the National Wetlands Inventory Map.

### **Floodplain**

A review of the Federal Emergency Management Agency map shows that there is no floodplain on the site.



## Stormwater Management

The site is in McHenry County and follows the McHenry County Stormwater Management Ordinance. The site is currently limited to not increasing the impervious surface coverage per zoning requirements of the City of Crystal Lake. Given this item, it is unlikely any proposed maintenance work will trigger any stormwater management requirements as the site is currently detained for and utilizes infiltration as the main means of handling the stormwater on site. The library has a large system of drywells, as well as an infiltration basin located at the northeast corner of the site. The site does not discharge to the City of Crystal Lake storm sewer.

Per observations the water along McHenry Avenue ponds substantially within the right of way, encroaching on the library property along the west property line before reaching the overflow spill elevation on McHenry Avenue. The spill point occurs before the building elevation is reached. This is due to a lack of storm sewer capacity for the City of Crystal Lake storm sewer within McHenry Avenue. At this point, no recommendations to remediate are suggested as the water does not appear to be able to reach the building from the street right of way. This area should, however, be monitored for further issues.

## RECOMMENDATIONS

### Summary

The report presents the findings of an initial site engineering study for the subject property. Items of note or concern and/or issues of warranting further study are summarized as follows:

- If the Library intends to construct a new facility, and if the Library is willing to assume the risks, the civil engineer recommends budgeting an allowance for a break approximately every 5 years. The alternative is replacement of the existing water services
- The site relies on drywells to infiltrate the stormwater on site. These areas should receive maintenance cleaning every other year to be able to maintain drainage on site.
- The concrete walk and asphalt are aged and cracked. Mill and overlay for the site asphalt pavement is recommended. Specific areas of concrete sidewalk are recommended to occur sooner as they are in the worst condition. However, it should be noted that most site concrete on site is showing wear. These area were not addressed as part of the 2020 Repairs Project and should be monitored and replaced as needed..
- The existing accessible parking spaces are non-compliant. These spots will likely need to move locations to become compliant.



## Impending Site Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe ***and*** are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building. Items below the green line should be addressed only if the Library is staying in the building beyond 2030.

[illegible]

System is **Better** than normal

System is	Normal	, matching predicted wear
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System is	Wearing	faster than normal
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System is	Used Up	and needs replacing
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## Impending Site Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe **and** are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building. Items below the green line should be addressed only if the Library is staying in the building beyond 2030.

Type	Priority	Zone	Room	System	Item	Evaluated	Condition	Remaining Life	Replacement Year	Replacement Cost
M	3.1	Site	Sidewalks-McHenry Avenue	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 4,600
M	3.1	Site	Sidewalks-North	Site	Sidewalks, concrete - replace	2022	Used Up	-2	2022	\$ 5,400
M	3.1	Site	Sidewalks-Paddock Street	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 4,000
M	3.2	Site	Sidewalks-McHenry Avenue	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 2,300
M	3.2	Site	Sidewalks-Paddock Street	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 2,000
M	3.2	Site	South Entry Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 3,900
M	3.2	Site	North Entry Stairs - 1 Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 1,700
M	3.2	Site	North Entry Stairs - 2 Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 2,400
M	3.2	Site	North Entry Stairs - 3 Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 2,400
M	3.2	Site	North Entry Stairs - 4 Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 2,800
M	3.2	Site	North Entry Stairs - 5 Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 1,800
M	3.2	Site	South Entry Stair Paving	Site	Sidewalks, concrete - replace	2022	Used Up	-13	2022	\$ 4,300
M	3.2	Site	Sidewalks-North	Site	Sidewalks, concrete - replace	2022	Used Up	-2	2022	\$ 2,700
M	3.2	Site	Sidewalks -East	Site	Sidewalks, concrete - replace	2022	Normal	24	2046	\$ 2,700
M	3.1	Site	Sidewalks -East	Site	Sidewalks, concrete - replace	2022	Normal	24	2046	\$ 5,400

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System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing

## Impending Site Items Sorted by Budget Year

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[illegible]

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[illegible]

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System is **Used Up** and needs replacing



# Building Structure

In addition to the discussion on Foundation Cracks in the Recent Building Issues section, the structural engineer reviewed the cracks in the original building foundation. The notes are as follows.

## Basement Masonry Wall Cracks in Original Building Foundation

Cracking was observed in the Concrete Masonry Unit (CMU) walls of the basement storage rooms 148 and 149. Most of the cracks followed mortar joints, and none of them appear to be new. In review of the building drawings from 1965, this portion of the building was constructed with the original structure in 1952. It is load-bearing CMU walls supporting a Dox-Plank floor system (Dox-Plank is a system constructed of reinforced concrete masonry units cast in 16" wide planks). This portion of the building has no control joints constructed into the wall system to allow for movement as this was not common in the 1950's. Cracks have also been observed in the Dox-Plank system parallel to the span.

### Room 149

The observed cracks in the walls of Room 149 are located around pipe penetrations near the upper corner of the door, which is a weakened location. The cracks run from the holes of the pipe penetrations to the corner of the door. This condition is common, and these cracks have been patched in the past.

It is recommended to either patch with mortar or grout or repair with an injection-applied epoxy product. However, it is not an immediate concern for the safety of the structure. Crack repair would mainly be to minimize further cracking and spreading over time.

The cracks in the Dox-Plank running parallel to the span are due to deflection of the plank. It is likely that the cracked plank is partially bonded to the adjacent plank that is bearing on the parallel wall. The plank wants to flex slightly when loads above are applied while the parallel wall wants to hold it from moving. This movement may continue to happen, even when repaired.

Repair with an injection-applied epoxy product would be recommended.

### Room 148

Cracks have been observed in the east wall of Room 148. The east wall of this room is partially below the grade line of the other side. The horizontal cracks are in the mortar joint directly above this transition at the adjacent floor line.

This crack can be repaired by patching mortar (similar to a re-pointing method) or injection-applied epoxy system.



# Roof Assemblies

## Existing Conditions

The existing roof was installed in three phases that correspond to the major portions of the building. There are 5 major zones to the overall roof.

- Roofs 1A and 1B cover the 1965 portion of the building.
  - Roof 1A is the lower, perimeter section.
  - Roof 1B is the higher, central section of roof.
- Roof 2 covers the entry zone of the 1984 portion of the building.
- Roof 3 covers the majority of the 1984 portion of the building, that portion west of the entries and east of the 1995 addition.
- Roofs 4 and 5 cover the 1995 portion of the building.
  - Roof 4 is the lower portion of the roof of the 1995 addition.
  - Roof 5 is the upper portion of the roof of the 1995 addition.

Roofs 1A, 1B, 2, and 3 were replaced in 2007. Reroofing should be anticipated in 2032.

Roofs 4 and 5 are original and are nearing the end of their life expectancy.

Generally, the roofs are in good condition. Specific issues include:

- Several small areas show ponding after normal rain events.
- There is a small area east of Roof 5 that collects a large volume of water in an irregularly shaped space that is the location for a roof top HVAC unit.

## Priority 3.1 10-Year Repairs (Priority 3.1)

*If necessary:*

- Remove roofing at RTU, install additional insulation to provide positive drainage away from RTU curb. Replace roofing.
- Remove sections of roof at areas of ponding, replace insulation, protection board and roofing as needed to eliminate depressions and promote flow of water to drains.

## Beyond 10-Year Repairs (Priority 3.2)

- Replace Roofs 4 and 5.

## Impending Roof Items Sorted by Budget Year

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[illegible]

System is **Better** than normal

System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing



# Exterior Wall Assemblies

## Masonry

### Mortar Joint Repair

Overall, the conditions of the mortar joints are satisfactory. There are a few isolated locations that require some repair. However, the majority of the brick walls are currently acceptable. Areas requiring consideration for repair are within the 1984 addition of the building.

On the south façade of the building, at the east side of the entrance door and windows, some mortar joints in the soldier coursing have been repaired in the past. These joints need to be repaired / replaced again. Similar conditions may occur at isolated location elsewhere on the building.

The condition of the mortar joint at the base of the recessed soldier course in the 1984 addition should be reviewed further. In areas where the mortar joint is not pitched away from the face, it may be allowing water to sit in the joint and deteriorate the mortar. A portion of this part of the building will require repair of this horizontal joint where water has started deteriorating the joint, however all of it should be sealed with a flexible exterior caulk (same product used

for control joint repair) to seal the joint from future water issues. There is about 230 linear feet (exterior north and south elevations of the 1984 addition) of this joint condition and approximately 25% to 50% needs to be repaired.

### Exterior Brick Control Joints and Building Expansion Joints

The condition of the control joints and building expansion joints in the exterior brick façade have been reviewed. While the condition of most of these joints appear to be satisfactory, the remaining expected life of these joints is fairly short. These joints should be reviewed and any locations showing wear should be touched up. Periodic observations of these joints should be performed to make sure that they maintain a good condition. A full replacement of the caulk joints is not required at this time.

Building expansion joints occur on the north side and south side between the 1965 building and the 1984 addition and at the joint between the 1984 addition and the 1995 addition. In total, there is about 60 linear feet of building expansion joint caulk.



Figure 1  
Mortar joint repair example location



Figure 2  
Concrete base cracking example at 1965 Building



Figure 3  
Steel lintels to be cleaned and painted





There are ten control joints around the building, and most of them occur at windows or recessed vestibules, and they don't extend the full height of the building wall. However, two of them (near wall corners) do extend the full height of the building. All of these brick control joints are within the 1984 addition of the building. In total, there is about 90 linear feet of control joint caulk.

### **Concrete Base Crack Repair**

On the 1965 Building, there is a concrete base on the exterior façade at the floor line that is around the entire perimeter of that portion of the building. This concrete base has at least five locations where a vertical crack is visible. Each of these cracks should be repaired with an injection-applied epoxy system, sanded smooth, and painted to match existing finishes.

### **Steel Lintels**

Throughout the 1984 addition of the building, steel angles are used to support the brick over windows and doors. Some of these lintels are starting to show signs of rust. As of right now, it appears as though this rust is only on the surface and not fully corroding the steel. However, to minimize the potential of deeper corrosion, the rust should be cleaned from the surface and the steel painted.

## **Windows & Doors**

### Windows

Windows leak air and conduct heat across the wall assembly. The heat loss/gain needs to be minimized with effective perimeter sealants and offset with proper distribution of warm or cool air. Given the age of the building, some replacement of failing glass units should be anticipated.

### Doors

All of the doors are showing significant wear. Replacement is warranted. Consideration should be given to weight, material, operating hardware, and protective hardware. All can be obtained in profiles and patterns that are in keeping with the building's aesthetic.

Special consideration should be given to the main entry doors. The arrangement, weight, power assisted operation, and spacing should all be investigated thoroughly before a "replace in place" strategy is implemented. Heavier duty operators, lighter doors, and a deeper vestibule would be of benefit. Replacing the solid doors with 15-lite glass doors would improve safety and comfort at the entry.

System is	Used Up	and needs replacing
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## Impending Exterior Wall Assembly Items Sorted by Budget

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Type	Priority	Zone	Room	System	Item	Evaluated	Condition	Remaining Life	Replacement Year	Replacement Cost
M	3.2	Envelope	Façade - East	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 2,900
M	3.2	Envelope	Façade - South	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 2,900
M	3.2	Envelope	Façade - West	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 2,900
M	3.2	Envelope	Façade - North	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 2,900
M	3.2	Envelope	Façade - East	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 600
M	3.2	Envelope	Façade - South	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 600
M	3.2	Envelope	Façade - West	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 600
M	3.2	Envelope	Façade - North	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 600
M	3.2	Envelope	Façade - East	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 300
M	3.2	Envelope	Façade - South	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 300
M	3.2	Envelope	Façade - West	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 300
M	3.2	Envelope	Façade - North	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Better	10	2032	\$ 300
M	2	Envelope	Façade - Southwest	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Normal	23	2045	\$ 5,700
M	2	Envelope	Façade - Northwest	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Normal	23	2045	\$ 2,000
M	2	Envelope	Façade - Northwest	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Normal	23	2045	\$ 900
M	2	Envelope	Façade - Northwest	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Normal	23	2045	\$ 1,400
M	2	Envelope	Façade - Northwest	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Normal	23	2045	\$ 9,300
M	2	Envelope	Façade - Northeast	Cladding	Aluminum Wall Panels, Route & Return, replace	2022	Normal	23	2045	\$ 4,400

System is **Better** than normal

System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing



## Impending Exterior Wall Assembly Items Sorted by Budget

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Type	Priority	Zone	Room	System	Item	Evaluated	Condition	Remaining Life	Replacement Year	Replacement Cost
CR	3.1	Envelope	Façade - South	Window Wall / Storefront	Window Wall - Storefront, replace system	2022	Used Up	-17	2022	\$ 24,900
CR	3.1	Envelope	Façade - North	Window Wall / Storefront	Window Wall - Storefront, replace system	2022	Used Up	-17	2022	\$ 43,200
CR	3.1	Envelope	Façade - North	Window Wall / Storefront	Window Wall - Storefront, replace system	2022	Used Up	-17	2022	\$ 43,800
M	3.2	Envelope	Façade - East	Window Wall / Storefront	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 400
M	3.2	Envelope	Façade - South	Window Wall / Storefront	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 400
M	3.2	Envelope	Façade - North	Window Wall / Storefront	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 600
M	3.2	Envelope	Façade - North	Window Wall / Storefront	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 600
M	3.2	Envelope	Façade - South	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 1,800
CR	3.2	Envelope	Façade - Southwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 28,500
CR	3.2	Envelope	Façade - Southwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 82,000
CR	3.2	Envelope	Façade - Southwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 49,600
M	3.2	Envelope	Façade - Northwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 9,300
CR	3.2	Envelope	Façade - Northwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 14,700
CR	3.2	Envelope	Façade - Northwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 17,800
CR	3.2	Envelope	Façade - Northwest	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 91,900
CR	3.2	Envelope	Façade - Northeast	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 19,000
CR	3.2	Envelope	Façade - Northeast	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 49,400
CR	3.2	Envelope	Façade - Northeast	Window Wall / Storefront	Windows, Aluminum Clad - replace units	2022	Normal	13	2035	\$ 30,600

System is **Better** than normal

System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing



## Impending Exterior Wall Assembly Items Sorted by Budget

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Type	Priority	Zone	Room	System	Item	Evaluated	Condition	Remaining Life	Replacement Year	Replacement Cost
M	3.1	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-8	2022	\$ 4,400
M	3.1	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-8	2022	\$ 4,400
M	3.1	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-2	2022	\$ 4,400
M	3.1	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum Entrance Operator - Replace	2022	Used Up	-2	2022	\$ 1,900
M	3.1	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-2	2022	\$ 4,400
M	3.1	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum Entrance Operator - Replace	2022	Used Up	-2	2022	\$ 1,900
M	3.1	Envelope	Façade - South	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-2	2022	\$ 4,400
M	3.1	Envelope	Façade - South	Doors & Windows	Doors, Exterior Aluminum Entrance Operator - Replace	2022	Used Up	-2	2022	\$ 1,900
M	3.1	Envelope	Façade - South	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-2	2022	\$ 4,400
M	3.1	Envelope	Façade - South	Doors & Windows	Doors, Exterior Aluminum Entrance Operator - Replace	2022	Used Up	-2	2022	\$ 1,900
M	3.2	Envelope	Façade - Southwest	Doors & Windows	Doors, Exterior Hollow Metal - replace	2022	Used Up	-2	2022	\$ 1,000
M	3.2	Envelope	Façade - North	Doors & Windows	Doors, Exterior Aluminum - replace	2022	Used Up	-2	2022	\$ 4,400
M	3.2	Envelope	Façade - East	Doors & Windows	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 100
M	3.2	Envelope	Façade - South	Doors & Windows	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 100
M	3.2	Envelope	Façade - South	Doors & Windows	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 100
M	3.2	Envelope	Façade - South	Doors & Windows	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 100
M	3.2	Envelope	Façade - South	Doors & Windows	Windows, replace perimeter sealant	2022	Normal	7	2029	\$ 200

System is **Better** than normal

System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing

[illegible]

System is	Used Up	and needs replacing
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# Building Systems

Near term repairs and replacements are scheduled for each of the primary building systems and water service. Priority assignments are in keeping with the strategic decision of whether to remain in the existing building (Priority 3.2) or relocate to a new facility in 2030 (Priority 3.2).

A separate line item is provided to aid in understanding the current condition of the building, how it differs from current best practices, and the cost of mitigating the various issues associated with existing legacy structure and systems.

## HVAC System Replacement

One of the key systems is the existing HVAC system. If the Library opts to stay in the current building, we suggest replacing the existing HVAC system with a 3-pipe energy recovery VRF (variable refrigerant flow) system with (3) roof mounted dedicated outside air units to provide ventilation.

- **Address interior height issues.** There is a desire for higher ceilings. This option would provide the best opportunity to create higher ceilings. We will not have the need for very large ducts of the current system. With three (3) dedicated outside air units (DOAS units), roof mounted, the minimum code required ventilation air can be circulated with smaller ducts sizes compared to having one (1) larger unit with a good amount of horizontal distribution.
- **Reuse some existing infrastructure.** The building is currently all electric (i.e.- no gas) and having VRF would keep it that way.
- **Provide increased control.** Unlimited zones of control. VRF utilizes indoor “evaporator” units where each one can be an individual temperature control zone.

- **Reduced local ductwork.** There is no ductwork required for each zone of control. There are numerous types of “evaporator” units available. The library could utilize ceiling and wall mounted styles where there is no distribution ductwork. In a conventional VAV system, VAV boxes are connected via local ductwork to ceiling diffusers. With VRF only “evaporators” mounted in the ceiling or exposed on the wall are needed. The connections are via refrigerant piping between the “evaporators” and the roof mounted condensing units.
- **Supplemental heat.** For areas with very tall glass heights, supplemental electric baseboard would be used which is the current arrangement.
- **VRF is a very efficient system.** Similar to a VAV system with reheat, we can provide simultaneous heating and cooling.....meaning some zones can be providing heat while others are providing cooling at the same time. The best part is when you are at a certain time of the year where you have some zones in heating and some in cooling. VRF utilizes energy recovery modules where the heat being rejected from cooling of the warm rooms is basically transferred to the cool rooms for heating. During this process, very little compressor energy is being used.

The workbook includes approximately \$2,460,000 for this work in 2035.

## Impending Fire Protection Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe ***and*** are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building.

Items below the green line should be addressed only if the Library is staying in the building beyond 2030.

[illegible]

System is **Better** than normal

System is	Normal	, matching predicted wear
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System is	Wearing	faster than normal
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System is	Used Up	and needs replacing
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## Impending Plumbing Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe **and** are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building. Items below the green line should be addressed only if the Library is staying in the building beyond 2030.

Type	Priority	Zone	Room	System	Item	Evaluated	Condition	Remaining Life	Replacement Year	Replacement Cost
M	3.1	MEP FP Systems	240	Plumbing	Electric Drinking Fountain	2022	Used Up	-7	2022	\$ 4,200
M	3.1	MEP FP Systems	144	Plumbing	Sewage Ejector Pump	2022	Used Up	-8	2022	\$ 6,200
M	3.1	MEP FP Systems	144	Plumbing	Electric Water Heater - Low Boy	2022	Used Up	-10	2022	\$ 2,600
M	3.1	MEP FP Systems	132	Plumbing	Sump Pump	2022	Used Up	-22	2022	\$ 4,500
M	3.1	MEP FP Systems	132	Plumbing	Sewage Ejector Pump	2022	Used Up	-1	2022	\$ 6,200
M	3.1	MEP FP Systems	209/210 alcove	Plumbing	Electric Drinking Fountain	2022	Used Up	-7	2022	\$ 4,200
M	3.1	MEP FP Systems	106	Plumbing	Electric Water Heater	2022	Used Up	-7	2022	\$ 4,800
M	3.1	MEP FP Systems	123	Plumbing	Electric Drinking Fountain	2022	Used Up	-7	2022	\$ 4,200
M	3.1	MEP FP Systems	106C	Plumbing	Sewage Ejector Pump	2022	Used Up	-12	2022	\$ 6,200
M	3.1	MEP FP Systems	106	Plumbing	Sump Pump	2022	Used Up	-12	2022	\$ 4,500
M	3.1	MEP FP Systems	106	Plumbing	Stormwater Ejector Pump	2022	Normal	1	2023	\$ 4,600
M	3.1	MEP FP Systems	144	Plumbing	Sump Pump	2022	Normal	3	2025	\$ 4,900
M	3.1	MEP FP Systems	220	Plumbing	Electric Drinking Fountain	2022	Normal	5	2027	\$ 4,900
M	3.1	MEP FP Systems	104A	Plumbing	Electric Drinking Fountain	2022	Normal	8	2030	\$ 5,400
M	3.1	MEP FP Systems	132	Plumbing	Electric Water Heater	2022	Normal	9	2031	\$ 6,200
CR	3.1	MEP FP Systems	1985 Building Mech Room	Plumbing	Replace failing check valves and leaking gate valves	2022	Normal	13	2035	\$ 14,300
CR	3.1	MEP FP Systems	Mech Room 121	Plumbing	AHU-B Condensate Drain	2022	Normal	23	2045	\$ 35,500

System is **Better** than normal

System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing



## Impending HVAC Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe <b>and</b> are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building. Items below the green line should be addressed only if the Library is staying in the building beyond 2030.								Remaining Life	Replacement Year	Replacement Cost
Type	Priority	Zone	Room	System	Item	Evaluated	Condition			
M	3.1	MEP FP Systems		HVAC	Accessories	2022	Used Up	-13	2022	\$ 4,300
CR	3.1	MEP FP Systems	121, 1985 Building	HVAC	Air Handling Unit - AHU-2	2022	Used Up	-8	2022	\$ 180,100
CR	3.1	MEP FP Systems	Outdoors	HVAC	Condensing Unit - Computer Room	2022	Normal	0	2022	\$ 11,700
CR	3.1	MEP FP Systems	1965 Building	HVAC	Duct heaters tripping	2022	Used Up	-17	2022	\$ 20,000
CR	3.1	MEP FP Systems		HVAC	Electric Unit Heaters	2022	Used Up	-13	2022	\$ 17,600
M	3.1	MEP FP Systems	1965 & 1985 Building	HVAC	Freezestats tripping	2022	Used Up	-17	2022	\$ 5,300
CR	3.1	MEP FP Systems		HVAC	IT Room A/C, 8T, Dedicated	2022	Used Up	-13	2022	\$ 28,000
M	3.1	MEP FP Systems	Roof	HVAC	Powered Roof Ventilator	2022	Used Up	-7	2022	\$ 5,300
CR	3.1	MEP FP Systems	121, 1985 Building	HVAC	Return Fan serving AHU-2	2022	Used Up	-10	2022	\$ 14,400
M	3.1	MEP FP Systems	106, 1995 Building	HVAC	Variable Frequency Drive serving AHU-1	2022	Used Up	-2	2022	\$ 7,100
CR	3.1	MEP FP Systems	1965 Building	HVAC	Various temperature issues including Kim's office	2022	Used Up	-17	2022	\$ 42,700
CR	3.2	MEP FP Systems		HVAC	Air devices - diffusers, grilles..	2022	Normal	2	2024	\$ 17,000
CR	3.2	MEP FP Systems		HVAC	Duct insulation	2022	Normal	2	2024	\$ 49,500
CR	3.1	MEP FP Systems		HVAC	Mechanical VFD, starters, etc	2022	Normal	2	2024	\$ 25,500
CR	3.2	MEP FP Systems		HVAC	New electrical panels for mechanical systems	2022	Normal	2	2024	\$ 13,400
CR	3.2	MEP FP Systems		HVAC	Sheet metal accessories	2022	Normal	2	2024	\$ 24,100
CR	3.2	MEP FP Systems		HVAC	Sound attenuation	2022	Normal	2	2024	\$ 24,100
CR	3.2	MEP FP Systems	106, 1995 Building	HVAC	Air Handling Unit - AHU-1	2022	Normal	3	2025	\$ 174,900
CR	3.2	MEP FP Systems	Roof	HVAC	Rooftop Unit - RTU-2	2022	Normal	3	2025	\$ 11,700
CR	3.2	MEP FP Systems	Roof	HVAC	Rooftop Unit -RTU-1	2022	Normal	3	2025	\$ 11,700

System is **Better** than normal

System is **Normal**, matching predicted wear

System is **Wearing** faster than normal

System is **Used Up** and needs replacing

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System is	Used Up	and needs replacing
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## Impending Technology Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe ***and*** are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building. Items below the green line should be addressed only if the Library is staying in the building beyond 2030.

[illegible]

System is **Better** than normal

System is **Normal**, matching predicted wear

System is	Wearing	faster than normal
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System is **Used Up** and needs replacing

## Impending Utility Items Sorted by Budget Year

Items above the green line fit within the 2022 – 2027 timeframe and are Priority 1, 2, or 3.1; They should be considered within in the strategic goal of relocating the Library to a new building.

Items below the green line should be addressed only if the Library is staying in the building beyond 2030.

[illegible]

System is **Better** than normal

System is **Normal**, matching predicted wear

System is	Wearing	faster than normal
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System is	Used Up	and needs replacing
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System is	Better	than normal
System is	Normal	, matching predicted wear
System is	Wearing	faster than normal
System is	Used Up	and needs replacing