NEW YORK CITY HOUSING AUTHORITY

2023

PNA TECHNICAL REPORT

PHYSICAL NEEDS ASSESSMENT

STV 100 Years / AECOM

a joint venture

Prepared For:

New York City Housing Authority
90 Church Street
New York, NY, 10007

Prepared By:

NYCHA PNA 2023 JV
STV | AECOM
New York, NY 10003

Authors:

Peter O'Hanlon
Program Manager
STV Inc.

Stirling Edward Moore, AIA
Program Executive
AECOM

Approved By:

NYCHA PNA 2023 JV
STV | AECOM
New York, NY 10003

ABOUT STV

STV is an award-winning professional firm consistently ranking among the country's top companies in education, justice, highways, bridges, rail, and mass transit sectors. Our success is the direct result of our employees' commitment to innovation and quality.

ABOUT AECOM

AECOM is the world’s trusted infrastructure consulting firm, partnering with clients to solve the world’s most complex challenges and build legacies for generations to come. At AECOM, we believe infrastructure creates opportunity for everyone – uplifting communities, improving access, and sustaining our planet.

Table of Contents

List of Figures

List of Tables

List of Appendices

1 Executive Summary

1.1 Preamble

The New York City Housing Authority's (NYCHA) portfolio of assets is impressive when considering its scale: 2,411 buildings in 335 developments across five (5) boroughs; 450 community centers, senior centers, and other types of facilities;177,569 apartments; over 360,000 residents, which is approximately four percent (4%) of the population of New York City. Given the important role that NYCHA's portfolio plays in the context of New York City, it is critical to note that many of these structures, more than 70 percent, were built before 1969 and continue to age. This means that as time goes by, the physical needs apparent within this portfolio accumulate year over year, and the Physical Needs Assessment (PNA) program seeks to capture details of these needs to support informed rehabilitation planning efforts.

The PNA, and its robust data set, is essentially defensible evidence to support and justify investment in NYCHA's portfolio. The PNA provides an immense amount of asset data that sets a foundation for addressing immediate, short-term, and mid-term physical needs. The PNA is at the core of NYCHA's lifecycle asset management program and provides the data and details about needs, such that decisions can be made on how to address, defer, or transfer those needs. Importantly, the PNA is a window into the physical needs at both the micro and macro ends, such that NYCHA can leverage the information within the PNA database to better focus the efforts and work of the Authority and its Asset & Capital Management Division.

A critical step in addressing the needs of this portfolio is to perform periodic needs assessments through the PNA Program. NYCHA developed a Request for Proposal (RFP 347877) to provide inspection services for a subset of the developments and analysis of all the developments in their portfolio, consistent with industry best-practice approaches. The objective of the PNA is to document the current state of the assets and estimate the rehabilitation cost. Through a subset of assets being inspected, the data from the inspections was used to determine the trend of deterioration by comparing the rating of the same item from 2017 to 2023, and this rate of change was used to validate and update the deterioration curves applied to the inspected assets as well as to estimate the condition and rehabilitation cost of assets at developments that were not inspected. The rehabilitation cost is shown over multiple years to assist NYCHA with Capital Planning. The STV|AECOM Joint Venture (JV) was selected to assist NYCHA with the 2023 PNA.

1.2 Overview

NYCHA currently directly manages 264 housing developments across five (5) boroughs in New York City (note that some developments have moved or will move from NYCHA to PACT compared to the 2017 PNA). For the 2023 PNA, 30 developments were selected as a representative sample, out of 264 developments, to be physically inspected (See Appendix C for list of developments). The sample developments were selected based on the distribution of developments by Borough, Construction Decade, Building Style, and Heating/Fuel Type. Depending on the size of each development, 10% to 15% of the apartments were inspected in each of the 30 developments. The 28,724 apartments at these 30 sample sites comprise approximately 18% of the total apartments at the 264 NYCHA managed developments. One apartment wall was opened in several apartments in different buildings throughout the developments.

Data captured through the inspections at the selected 30 properties was analyzed and in conjunction with data collected for the 2017 PNA, an extrapolation process was applied to account for deterioration that had occurred since 2017.This process resulted in updated condition and useful life

data for the remainder of the NYCHA portfolio. A robust set of rules and highly detailed processes for data modeling and extrapolation methods is discussed in this report.

Figure 1 Map of NYCHA Developments

The inspections included a representative sample survey of apartments, and a complete survey of building exteriors, sites, and building common areas for the 30 sample developments. Sample apartment selections were based on a statistical representation of the overall building. Considerations were made to include factors such as apartment types, number of bedrooms, upper floor, middle floor, and lower floor conditions. In addition to documenting current conditions, any hazardous conditions observed were noted and relayed to NYCHA immediately so that corrective actions could be taken, minimizing time delays.

Unit costs, defined as replacement or rehabilitations costs by asset system or asset component, were developed to allow comprehensive rehabilitation costs to be captured across NYCHA's developments and entire portfolio. The representative costs defined at the portfolio and development level were made up of many instances of unit costs being summed and based on specific needs for asset components and systems. Depending on an asset's condition and remaining useful life (RUL), corrective actions were recommended as either remediate or replace actions, and associated costs assigned accordingly. The suggested timing of rehabilitation efforts was based on the condition, current and/or projected deterioration, deficiencies noted, and the urgency of action related to the asset needing attention.

1.3 Methodology

The scope of this project included several technical areas of investigation, observation, review, data processing, and analysis, which culminated in a series of recommendations to the Authority regarding the state of and physical needs for all assets across the full property portfolio. Current conditions were observed, and those observations recorded from the perspective of professional architects, engineers, and asset managers. This included building, facility, and development site surveys that were conducted collaboratively with property staff and tenant representatives, who were invited and encouraged to participate in the PNA inspection process. Providing NYCHA with evidence of physical needs justifies funding needs for rehabilitation projects portfolio-wide, therefore staff, stakeholder, and professional service provider contribution is a necessary part of the PNA program.

Figure 2 Typical NYCHA Development

Methodologies used to provide standardization and structure to PNA delivery efforts included a rigorous training regimen for inspectors, use of a PNA digital ecosystem and technologies to support data capture, quality, and analytical work, as well as adherence to a robust data quality review process deployed in both office and field settings. A core workstream of the PNA program was the extensive conditions assessment effort required to capture and validate accurate and viable physical needs data. Data was required to be captured electronically via a tablet computer, therefore a centralized database also had to be developed and was used throughout all phases of PNA program delivery. Physical inspections were performed at 30 NYCHA property developments (See Appendix C for the list of properties) between July 2022 and October 2022.

Inspection Reports were generated after all data was quality reviewed and approved per program quality standards. Inspection Reports are unique for inspected apartment units, buildings, facilities, and developments. These reports (over 4,700 in total) were submitted to NYCHA for further quality control and final approval. They provide specific information on all apartment unit, building, and property assets considered under the PNA's area of responsibility and assessment scope.

Finally, PNA data and information was used to summarize the condition and rehabilitation cost of each development. Deterioration curves were developed to simulate and estimate the condition of assets aged over time. The rehabilitation cost took into account the associated impacts to cost such as inflation, market condition, cost of materials and labor, and other economic and financial influences. The PNA deterioration curve model defines anticipated needs for the entire NYCHA portfolio by considering current needs and other technical data points and applying deterioration curve math to predict likely future needs and costs with a high degree of accuracy and reliability.

1.4 Technical Standards & Use of Technologies

Precise protocols were followed for collecting and analyzing PNA data as there were more than 6,000,000 unique data entries recorded throughout the inspection process. This makes it vital that data be structured according to a defined hierarchy and data types be organized according to technical disciplines and asset classes. Data structure, standards, and usage protocol prompts logical reporting methods that can be plainly understood by the reader.

In the field, data collected by inspectors was entered into a handheld tablet computer through a conditions assessment data collection application. The PNA program's data collection application provided specific data capture forms based on the architectural, engineering, or specialty disciplines, as well as being defined by the type of assets being inspected. Features of the data capture forms included drop down selection menus, numerically limited choices for data integrity compliance, as well as open-ended, character-limited fields where the inspectors recorded data and information. The handheld tablet computers also provided the ability to take pictures, and the forms included photographic data capture fields to support observations. The data collection application was configured to require completion of all fields before the report could be submitted in most cases. If and when data could not be captured due to site-specific challenges or other physical, logistical, or technical impediments, then certain data fields could be omitted for these reasons and logged accordingly.

In the office, a database and companion quality and reporting web application were used to store data, facilitate data quality reviews, and generate inspection reports. A controlled, non-destructive environment was established which supported inspections data reviews against the information and inspection reports uploaded to the PNA database from the handheld tablet computers. The raw field data was thoroughly reviewed by technical experts from the appropriate architectural, engineering, and specialty disciplines, who scrutinized the information captured against the methodologies, standards, and discipline-specific experience to confirm inspection data and reports were accurate and logical.

As part of further analytical processes, a comparison between 2023 PNA data and 2017 PNA data was made to confirm condition and cost changes aligned with anticipated data deviation models calculated over a six (6) year period. Out of range deviations were reviewed and scrutinized for accuracy, and in some cases were adjusted due to errors, and in other cases proven to be justified due to assets being subjected to more extreme conditions or circumstances. In addition, mathematical and logic-based database queries were developed and run against the PNA dataset to isolate data anomalies, errors, omissions, and/or results outside the expected ranges. Any inconsistencies that were found to be minor and with clear reasons for their inconsistency were corrected. In cases where the inconsistencies were not clear, a re-inspection was requested, and a follow-up site inspection was scheduled to resolve the inconsistency and complete the inspection report.

1.5 PNA Inspections and Quality Processes

Quality control was inherent in the way the JV worked, as the nature of the NYCHA PNA project required a specifically tailored quality control process that would address any issues to arise during the project. The JV assigned a Quality Control team to oversee the project. The Quality Control team developed a Project Quality Manual at the beginning of the project and submitted it for NYCHA's review and approval.

Prior to any PNA inspections, all inspectors participated in an intensive training program. The training consisted of classroom as well as in-field training. The inspectors were initially shadowed by experienced personnel to provide guidance, reinforce the training, and confirm that the inspections were being conducted according to protocol.

Prior to every inspection, each survey team was given a pre-inspection information and data packet on the development and assets to be inspected. The pre-inspection packet included items such as NYCHA contact information, building height, number of facilities, site information, etc. Following each inspection, inspectors performed a self-check of the inspection report before uploading field-captured data.

After inspection data was uploaded to the server, it was reviewed by the QC Team. The QC Team reviewed the data against available known data points which was developed or existed as part of pre-survey efforts. In addition, the QC Team scrutinized the reports for errors, omissions, and inconsistencies, making simple revisions where necessary. If missing or inconsistent data was found, site and asset re-inspected were scheduled to correct inconsistencies or to capture missing data. Discipline Leaders reviewed comments from the QC Team and spot-checked the reports as part of the overall quality process.

In addition, mathematical and logic-based database queries were developed and run against the PNA dataset to isolate data anomalies, errors, omissions, and/or results outside the expected ranges. Non-conforming data and data discrepancies were flagged for review and evaluation by the QC Team and resolved accordingly.

For other program deliverables, each deliverable was reviewed according to the quality plan, which often required review by a Discipline Leader or senior technical expert to confirm accuracy and completeness of the deliverable. In addition, each deliverable was reviewed by the Project Manager or Quality Manager to confirm that the deliverable had been successfully reviewed according to the quality plan, conformed to the scope and contractual obligation, and was ready for submission to NYCHA.

1.6 Key Findings and Data Analysis

Key Findings

The total projected cost of all needs – remediate and replacement – over the next twenty (20) years is $78.34 billion (2023 Dollars). The bulk of this need is due greatly to the aging NYCHA portfolio, where the average age of a NYCHA building is roughly 60 years and 70 percent of the portfolio was built prior to 1970.

The 2023 PNA Program physically inspected 30 of the NYCHA-managed 264 developments, with a number of common issues identified at these 30 developments The 2023 PNA Program found the greatest physical needs identified according to both cost and deficiency are within apartments, and the most numerous and costly apartment-related needs are bathrooms, floors, and kitchens. Many developments also had pronounced needs within the heating (steam piping and condensate return piping) and windows subsystem groups. Other subsystem groups exhibiting elevated needs were elevators, doors, and interior finishes. Commonly observed deficiencies across the 30 developments surveyed are non-functioning smoke detectors, antiquated electrical components, damaged interiors, missing child guards, missing AC brackets, deteriorated windows, deteriorated roofs, deteriorated pumps, and leaking pipes.

Data captured through inspection and observation activities at the 30 selected developments was analyzed and used as the basis for the development of updated deterioration curves for all asset types/classes using rates of decay from prior inspections. These deterioration curves were then used to incrementally age all assets across NYCHA's portfolio from its 2017 condition to its anticipated condition in 2023. See Appendix B for additional information on deterioration curves.

Additional scope items not included in the 2017 PNA were also incorporated based on NYCHA data and analysis undertaken in the last few years, including: additional security needs, open spaces enhancements, façade repair, waste yard/recycling, decarbonization (heating systems, electrification), Section 504 / ADA requirements in apartments, and lead-based paint abatement.

The total cost of needs has been categorized into two (2) time periods: short-term needs and mid-term needs. Short-term needs can be identified as requiring immediate action, to be addressed within twelve (12) months, and to be addressed within five (5) years. Needs flagged for immediate action are typically linked to life safety, structural, security, and leak-related observations, as well as inoperable elevators. Mid-term needs can be identified as requiring rehabilitative actions between six (6) and 20 years beyond 2023.

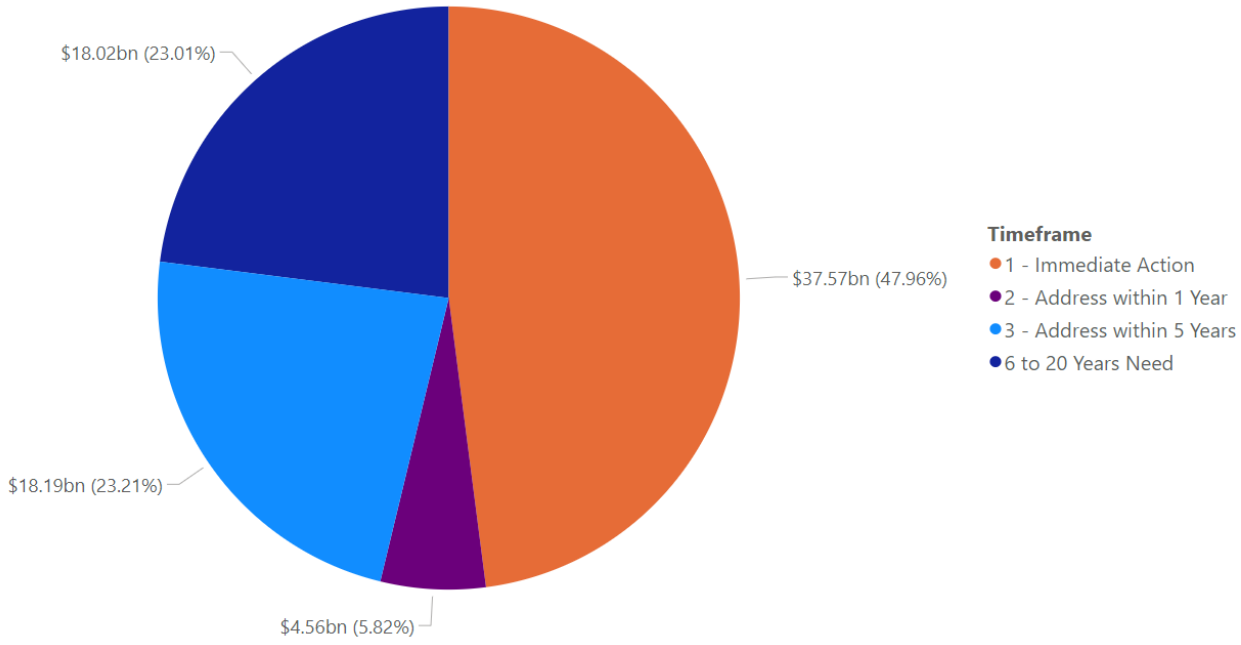

Figure 3 Total Rehabilitation Cost by Time Frame for the Entire NYCHA Portfolio

The total need for NYCHA in next 20 years is $78.34 billion. $37.57 billion of the need is immediate, which is approximately 47.96% of the total 20 years need. Detailed costs for all the NYCHA needs are summarized below and elaborated further in section 2.2.5 and section 9.

The total short-term cost (1 to 5 years) for the entire NYCHA portfolio is $60.32 billion. The three (3) major Disciplines contributing to this cost are Apartment (bathroom, floors, kitchens, doors, etc.), Decarbonization (space heat and domestic hot water), and Architectural (windows, roofs, parapets, main doors, etc.). This breakout into disciplines represents the technical methodology used to prepare the PNA. An alternative, more user-friendly breakout of the data, based on work types, is provided in separate reports made available outside of this technical document. Appendix G shows the relationship between inspected disciplines / systems and work types.

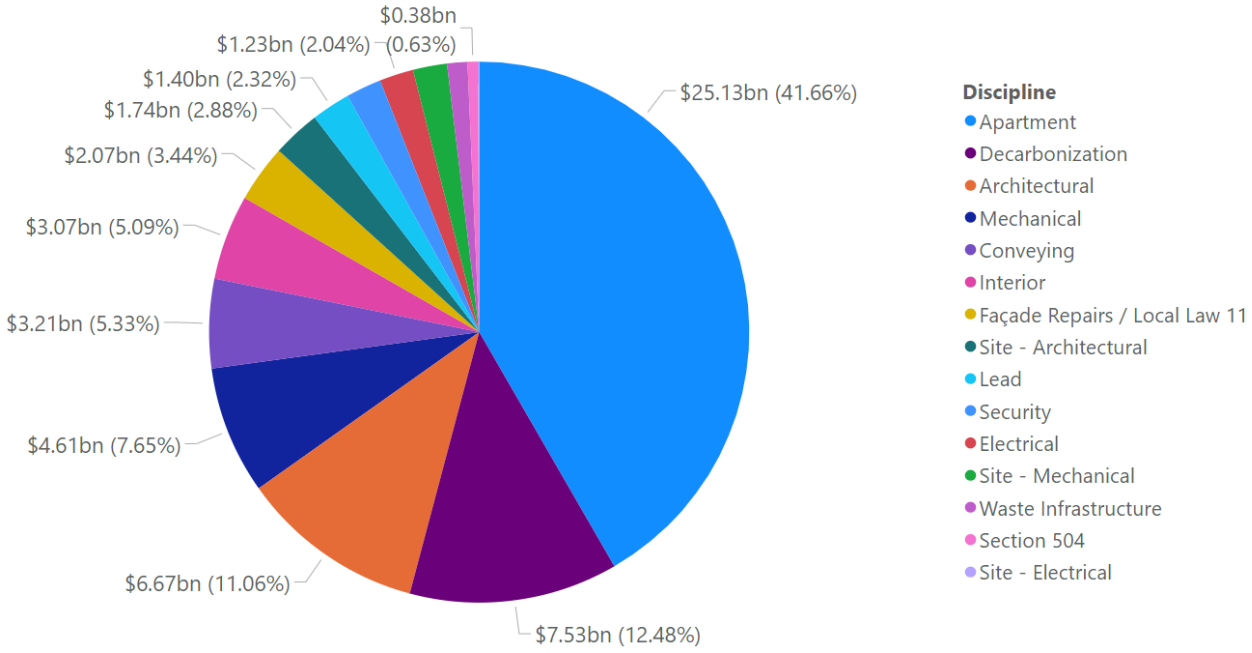

Figure 4 Total (Short-Term) Rehabilitation Cost by Discipline

NYCHA's greatest short-term needs across the portfolio are found within apartments. The total short-term need is estimated to be $25.13 billion, or roughly 41.66% of NYCHA's total needs burden. Subsystems contributing to this heightened need within apartments are bathrooms ($7.22 billion), floors ($5.81 billion), and kitchens ($5.70 billion).

Table 1 Highest Five (5) Apartment (Short-Term) Needs by Subsystem by Borough

Subsystem	BRONX	BROOKLYN	MANHATTAN	QUEENS	STATEN ISLAND	Total
Bathroom	$1.99bn	$2.21bn	$2.21bn	$0.59bn	$0.22bn	**$7.22bn**
Floor	$1.68bn	$1.72bn	$1.80bn	$0.43bn	$0.17bn	**$5.81bn**
Kitchen	$1.56bn	$1.66bn	$1.84bn	$0.47bn	$0.17bn	**$5.70bn**
Doors	$1.11bn	$1.08bn	$1.18bn	$0.31bn	$0.11bn	**$3.79bn**
Radiator / Convector / Baseboard	$0.29bn	$0.45bn	$0.40bn	$0.09bn	$0.03bn	**$1.26bn**
Total	**$6.63bn**	**$7.12bn**	**$7.43bn**	**$1.89bn**	**$0.70bn**	**$23.77bn**

NYCHA's second-most costly short-term needs are found to be heating systems, including decarbonization technologies for domestic hot water as well as space heat. The total short-term need for decarbonization is estimated to be $7.53 billion, or roughly 12.48% of NYCHA's total needs burden. Space heat accounts for $5.18 billion and Domestic Hot Water accounts for $2.35 billion of the $7.53 billion.

Table 2 Decarbonization (Short-Term) Needs by System by Borough

System	BRONX	BROOKLYN	MANHATTAN	QUEENS	STATEN ISLAND	Total
Decarbonization - Space Heat	$1.56bn	$0.98bn	$1.88bn	$0.50bn	$0.26bn	**$5.18bn**
Decarbonization - Domestic Hot Water	$0.61bn	$0.44bn	$0.97bn	$0.20bn	$0.13bn	**$2.35bn**
Total	**$2.16bn**	**$1.42bn**	**$2.85bn**	**$0.71bn**	**$0.38bn**	**$7.53bn**

NYCHA's third-most prominent short-term need group is the architectural discipline group. The total short-term needs cost for architectural systems and subsystems is estimated to be $6.67 billion, or roughly 11.06% of NYCHA's total physical needs burden. Architectural assets contributing most heavily to the physical needs burden are windows ($5.21 billion) and roofs ($1.10 billion).

Table 3 Highest Five (5) Architectural (Short-Term) Needs by Subsystem by Borough

Subsystem	BRONX	BROOKLYN	MANHATTAN	QUEENS	STATEN ISLAND	Total
Windows	$1.46bn	$1.39bn	$1.74bn	$0.46bn	$0.16bn	**$5.21bn**
Roof	$0.38bn	$0.36bn	$0.29bn	$0.05bn	$0.01bn	**$1.10bn**
Main Doors	$0.05bn	$0.04bn	$0.03bn	$0.01bn	$0.01bn	**$0.13bn**
Doors	$0.02bn	$0.02bn	$0.02bn	$0.01bn	$0.00bn	**$0.07bn**
Stairs / Ramps	$0.01bn	$0.01bn	$0.01bn	$0.00bn	$0.00bn	**$0.04bn**
Total	**$1.92bn**	**$1.82bn**	**$2.09bn**	**$0.53bn**	**$0.18bn**	**$6.55bn**

NYCHA's fourth-most numerous and costly short-term needs are found within the mechanical systems and subsystems groups. The total short-term need within the mechanical discipline is estimated to be $4.61 billion, or roughly 7.65% of NYCHA's total needs burden. Subsystems of greatest concern are steam piping ($1.92 billion), steam condensate return piping ($1.68 billion), and boiler systems ($0.35 billion)

NYCHA's fifth-most pressing short-term needs category is conveying (elevators). The total short-term needs cost assessed across conveying systems portfolio-wide is estimated to be at $3.21 billion, or roughly 5.33% of NYCHA's total needs burden. Since many of NYCHA's residential buildings are over seven (7) stories tall and a few buildings rise 30 or more stories high, working and reliable elevators are essential to the provision of safe NYCHA housing.

NYCHA's total short-term needs by disciplines and by boroughs are summarized below.

Table 4 Total (Short-Term) Needs by Discipline by Borough

Discipline	BRONX	BROOKLYN	MANHATTAN	QUEENS	STATEN ISLAND	**Total**
Apartment	$7.03bn	$7.51bn	$7.82bn	$2.04bn	$0.73bn	**$25.13bn**
Decarbonization	$2.16bn	$1.42bn	$2.85bn	$0.71bn	$0.38bn	**$7.53bn**
Architectural	$1.96bn	$1.88bn	$2.11bn	$0.54bn	$0.18bn	**$6.67bn**
Mechanical	$0.78bn	$1.85bn	$1.40bn	$0.53bn	$0.06bn	**$4.61bn**
Conveying	$0.73bn	$1.10bn	$0.89bn	$0.35bn	$0.14bn	**$3.21bn**
Interior	$0.80bn	$0.95bn	$0.93bn	$0.30bn	$0.09bn	**$3.07bn**
Façade Repairs / Local Law 11	$0.49bn	$0.69bn	$0.58bn	$0.27bn	$0.05bn	**$2.07bn**
Site - Architectural	$0.47bn	$0.54bn	$0.46bn	$0.19bn	$0.08bn	**$1.74bn**
Lead	$0.39bn	$0.40bn	$0.39bn	$0.19bn	$0.04bn	**$1.40bn**
Security	$0.30bn	$0.44bn	$0.33bn	$0.17bn	$0.05bn	**$1.28bn**
Electrical	$0.27bn	$0.42bn	$0.30bn	$0.20bn	$0.05bn	**$1.23bn**
Site - Mechanical	$0.26bn	$0.48bn	$0.28bn	$0.16bn	$0.05bn	**$1.23bn**
Waste Infrastructure	$0.17bn	$0.23bn	$0.23bn	$0.08bn	$0.03bn	**$0.73bn**
Section 504	$0.10bn	$0.11bn	$0.12bn	$0.04bn	$0.01bn	**$0.38bn**
Site - Electrical	$0.01bn	$0.02bn	$0.01bn	$0.00bn	$0.00bn	**$0.04bn**
Total	**$15.90bn**	**$18.03bn**	**$18.70bn**	**$5.77bn**	**$1.93bn**	**$60.32bn**

The total mid-term cost (6 to 20 years) for the entire NYCHA portfolio is $18.02 billion. The three (3) Disciplines contributing to this cost most substantially are Mechanical (domestic water system, heating, drainage / sewage system, etc.), Apartment (floors, light fixtures, kitchens, bathrooms etc.), and Interior (stairs, common area bathrooms / kitchen / finishes, roll down gates etc.).

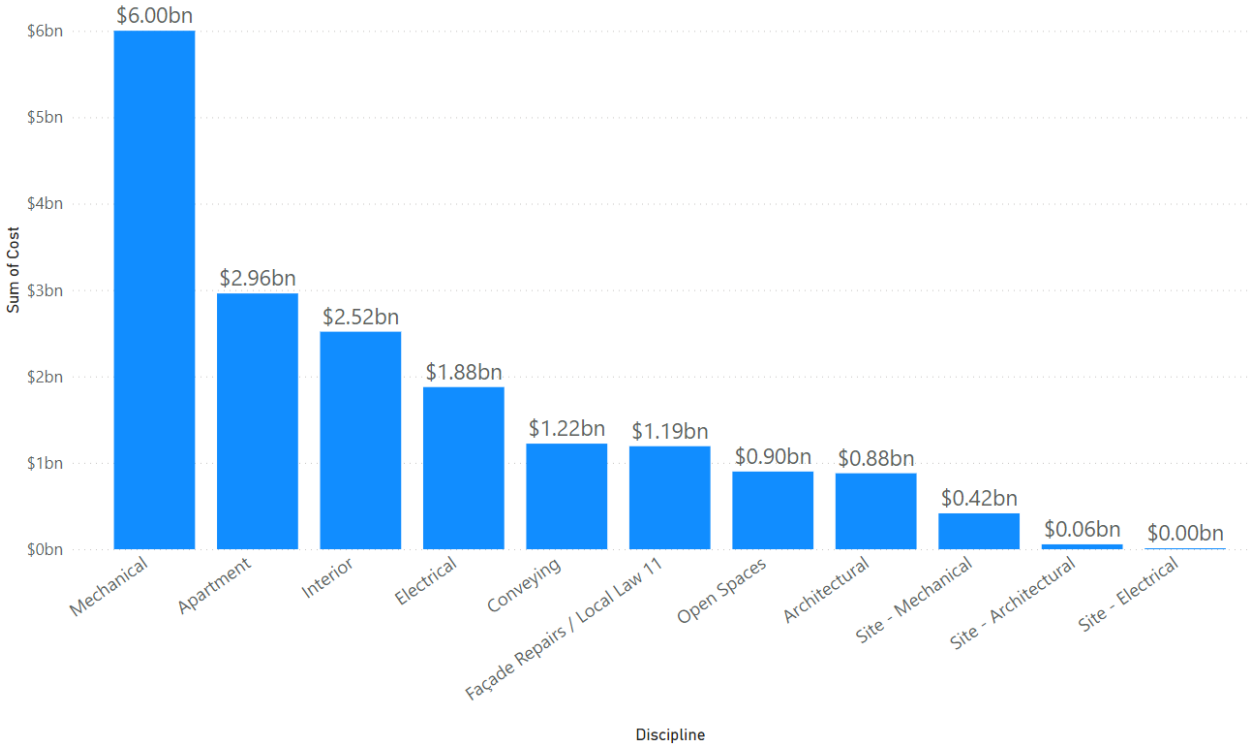

Figure 5 Total Rehabilitation Cost (Mid-Term only) by Discipline for the entire NYCHA Portfolio

Description of Analytical Processes

To calculate the costed action for the NYCHA's entire portfolio, a multi-step process was developed to determine ultimate corrective action(s) required and timeframes for completion for each system or subsystem group being costed. A detailed flowchart in Appendix D provides details of the data modeling and analytical processes followed under the 2023 PNA Program.

A simplified version of the steps used to model 2023 PNA costs is summarized below:

- Apply unit cost to each deficiency to calculate cost of remediation. Deficiencies are recommended to be addressed either immediately, within 1 year, or within 5 years.
- Calculate the cost of full system replacement of all applicable items. Full system replacement is due when an item's remaining useful life becomes zero.
- Compare the cost of deficiency remediation to the full system replacement as well as the timing of the deficiency remediation and the full system replacement. If any item went above the predefined threshold, performing full system replacement for the item was recommended. The predefined criteria are:
    - Remediation cost was greater than or equal to 70% of full system replacement cost.

    OR
    - Remediation cost was greater than or equal to 60% of full system replacement cost and average rating was greater than or equal to 3 (fair).

OR

- Remediation cost was greater than or equal to 50% of full system replacement cost and average rating was greater than or equal to 4 (between fair and poor).

OR

- Remediation timing and full system replacement timing (due to age) was within four (4) years of each other.

- If any item fell within any of the criteria mentioned above, a full system replacement was recommended. Timeframe for the action was given based on either the remaining useful life or the most aggressive deficiency remediation timing, whichever was the earliest.

Comparison of 2023 PNA with Previous Assessments

The 2017 PNA program included inspections in all 325 NYCHA developments. In contrast, the 2023 PNA program required inspections to be conducted at 30 developments, and that information used to update physical needs estimates at 264 developments managed by NYCHA today. To project needs across the entire NYCHA portfolio for the 2023 PNA, the PNA Team leveraged mathematical deterioration curve modeling to predict current and future needs based on anticipated conditions, remaining useful life, and according to the trends identified through data captured at the 30 surveyed properties. Deterioration curves were also developed to generate data points needed to define the future cost of needs. Cost modeling considered impacts to cost values over time such as inflation, market condition, cost of materials and labor, and other economic and financial influences.

Data from the 2017 PNA was used to validate extrapolation and deterioration modeling efforts and served as one of several baseline data points. The 30 developments inspected in 2023 are listed Appendix C. For both the 2017 and 2023 programs, between 10% and 15% of apartments were inspected at developments surveyed.

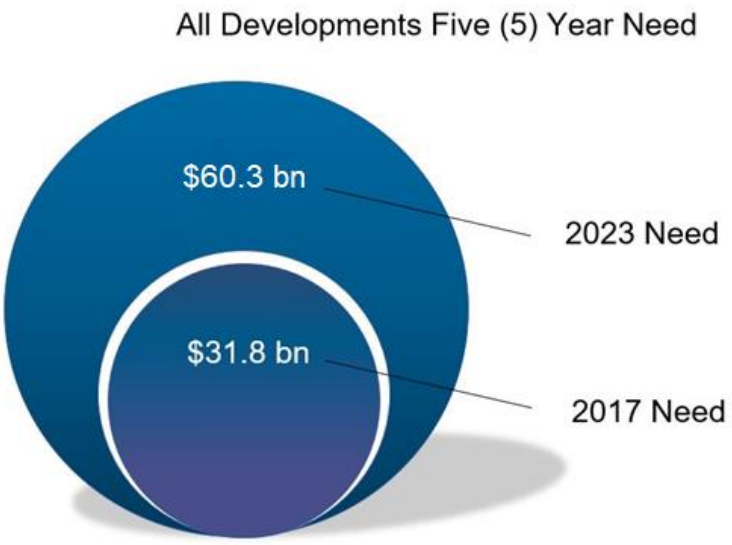

Figure 6 Five Year Need for All Developments

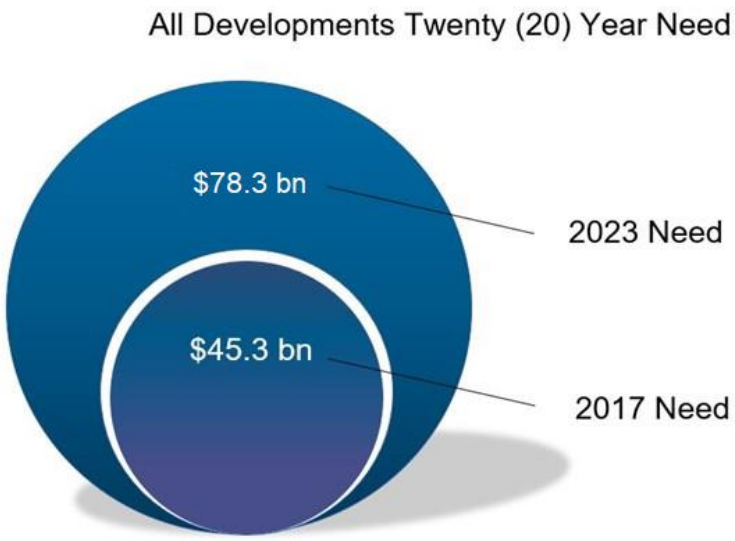

Figure 7 Twenty Year Need for All Developments

The following graphs show the 2017 as well as 2023 5-Year and 20-Year needs and change in need between these estimates based on various drivers discussed below. The second part of graph forecast the potential reduction in need in the next five years due to NYCHA's ongoing and planned capital projects, PACT Program and Public Housing Preservation Trust projects.

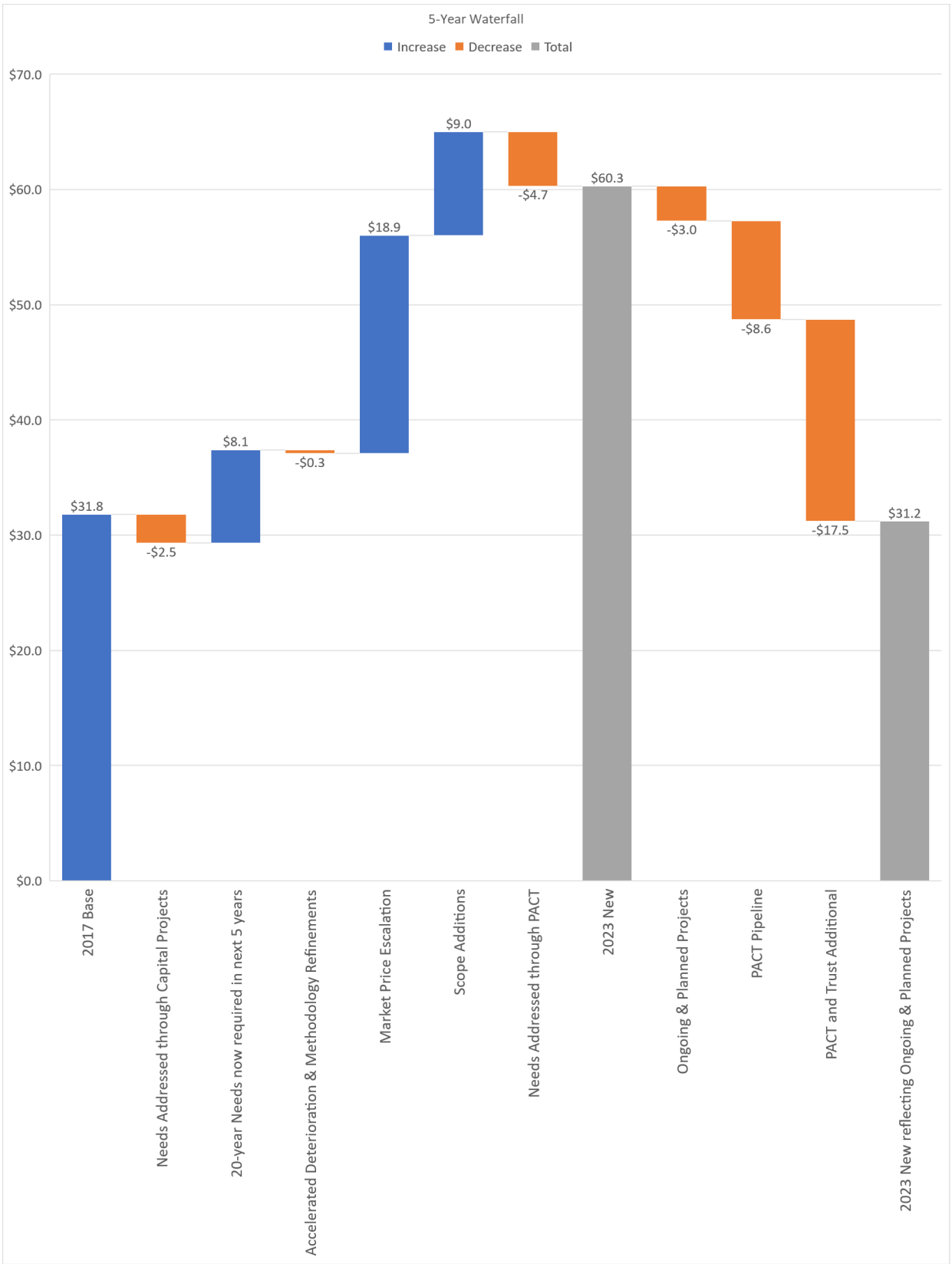

Figure 8 Five (5) – Year Waterfall Chart

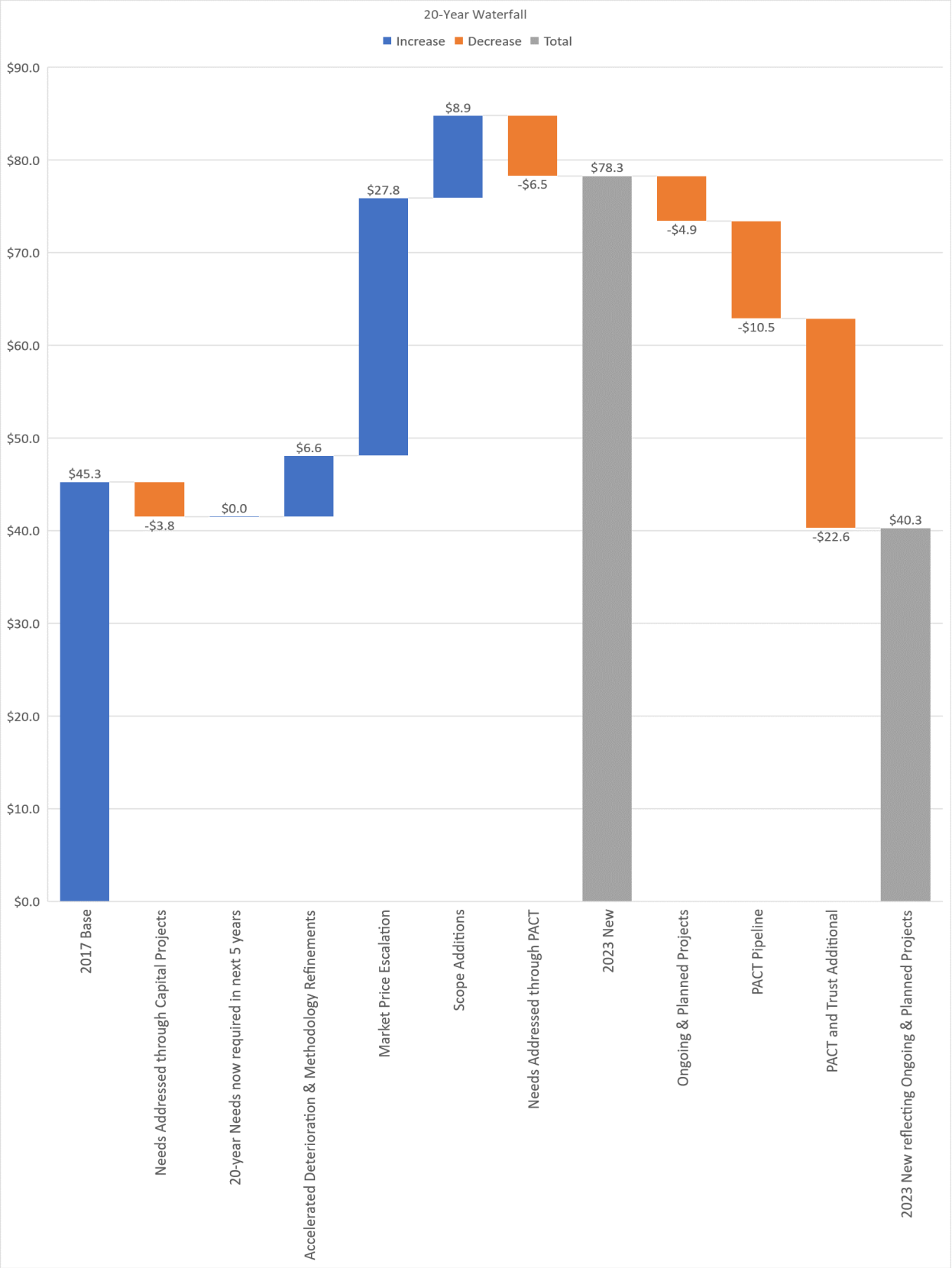

Figure 9 Twenty (20) – Year Waterfall Chart

Waterfall Categories:

1. Needs Addressed through Capital Projects – The value of the needs that were identified during the 2017 Physical Needs Assessment that have been addressed by completed Capital Projects since 2017. Percent of Change vs. the 2017 20-Year Cost: -8%.
2. 20 Years Needs Now Required in Next 5 Years – This category identifies the cost of needs that were required in Years 6-20 of the 2017 PNA that are required in Years 1-5. Percent of Change vs. the 2017 20-Year Cost: 0%.
3. Accelerated Deterioration and Methodology Refinements – This category reflects increases due to methodological modifications and refinements of the unit costs that the assessment uses to determine the cost of the needs. As part of the 2023 PNA, the unit costs were reevaluated. The reevaluation identified substantial increases in the scope of work required to address the rehabilitation and replacement needs identified in the 2023 PNA. One significant increase resulted from the fact that the 2017 PNA assumed replacement of interior piping (water lines, gas lines, etc.) would only actually be required 30% of the time that the PNA estimated it would be required. This was due to the PNA being a visual inspection and assessment of these items is unreliable. Additionally, it was assumed that replacement of these items would seldom actually be done. However, in the intervening years, NYCHA found that full scale replacement of these systems is actually required. In addition to the interior piping, a number of other systems had substantial increases due to a better understanding of the work required to address the needs. In order to better capture the costs to address needs, a change was made in the methodology of the PNA. The 2017 PNA assumed that all remediation and replacements would occur in the time frame projected by the PNA based solely on the urgency of the repair and the remaining useful life of the system regardless of their condition rating. This resulted in a number of systems where costs were assigned for both remediation and replacement in the same time frame. The 2023 PNA assumed that by performing the recommended remediations, the remaining useful life of the system is extended thus allowing the replacement to be postponed. Percent of Change vs. the 2017 20-Year Cost: + 15%.
4. Market Price Escalation - This category reflects the impact of normal inflation as well as the impact of market conditions. COVID dramatically impacted costs across the economy especially in the construction industry resulting in a substantial increase in costs. Percent of Change vs. the 2017 20-Year Cost: + 61%.
5. Scope Additions- For the 2023 PNA, a number of additional scope areas were included beyond what was part of the 2017 PNA. These additions included costs to account for Decarbonization, Façade repairs/Local Law 11, Waste Yards, Additional Security, and others. Percent of Change vs. the 2017 20-Year Cost: + 20%.
6. Needs Addressed Through PACT - This category reflects the reduction in needs due to the conversion of the developments to PACT. Since 2017, 60 developments containing over 14,000 apartments have converted to PACT. Percent of Change vs. the 2017 20-Year Cost: -14%.
7. 2023 New - This represents the NYCHA's estimated needs based on the 2023 Physical Needs Assessment.
8. Ongoing & Planned Projects - This category identifies the cost of needs that are being addressed by projects currently under construction and projects that are budgeted and planned. Percent of Change vs. the 2023 New 20-Year Cost: -6%.

9. PACT Pipeline - This category identifies the cost of needs at developments that are currently in resident engagement and planning to convert to 3rd party management via the PACT Program. Percent of Change vs. the 2023 New 20-Year Cost: -13%.
10. PACT and Trust Additional - This category identifies the cost of needs for the balance developments anticipated to be converted through the PACT Program and developments anticipated to be renovated through the Public Housing Preservation Trust. Percent of Change vs. the 2023 New 20-Year Cost: -29%.

The Challenge Ahead

Addressing needs totaling $60.32 billion in Years 1-5 and $78.34 billion in Years 1-20, particularly in a period when support for public housing and sustainable communities is diminishing at the federal level, is a daunting challenge to NYCHA, and one that will severely test its management and staff. Difficult choices are ahead. Additionally, NYCHA's efforts are aligned to HUD's five (5) strategic goals as outlined in the HUD FY 2022-2026 Strategic Plan, namely:

Strategic Goal 1: Support Underserved Communities

Strategic Goal 2: Ensure Access to and Increase the Production of Affordable Housing

Strategic Goal 3: Promote Homeownership

Strategic Goal 4: Advance Sustainable Communities

Strategic Goal 5: Strengthen HUD's Internal Capacity

In recent years, NYCHA management and maintenance personnel have invested heavily in roofs, parapets, and exterior walls to weatherproof building exteriors, as well as heating systems, elevators, lead-based paint abatement, and asbestos abatement. This is vital, necessary and should continue. Data from the 2023 PNA, however, suggest that another avenue of focus and investment should be apartment kitchens and bathrooms, whose conditions are frequently (and increasingly) related to the condition of the aging network of hot/cold water piping, waste and sewage piping, and related risers buried in the walls of NYCHA buildings. A holistic approach to future remediation/replacement is recommended, where aging piping networks are replaced along with kitchens and bathrooms.

This approach will require significantly increased capital funding and investment, and market prices continue to show large year-on-year increases. In terms of overall market conditions, the Cordell Construction Cost Index (CCCI) saw an increase of 11.9% over the 2022 calendar year. This was the largest annual increase yet registered, except for when a goods and services (GST) tax was introduced in 2000. The 2022 rise was considerably higher than the 7.3% recorded in 2021.

2 PNA Program Overview

The New York City Housing Authority (NYCHA) is a New York State chartered public benefit corporation established in 1934. NYCHA is the largest public housing authority in North America,

providing affordable public housing for over 360,000 authorized residents. NYCHA's mission is to increase opportunities for low- and moderate-income New Yorkers by providing safe, affordable housing and facilitating access to social and community services.

NYCHA, as the steward and keeper of NYC's public housing portfolio, must make informed decisions regarding its asset management and rehabilitation strategies. Therefore, the Authority must have on hand reliable data and information that supports capital and operational decision-making processes. The 2023 PNA allows for the collection, processing, and analysis of physical needs data, and the development of cost models and technological toolsets that enhance the decision-making and planning processes.

2.1 Overview & Background of the PNA Program

The PNA Program is a tool for lifecycle asset management practice. It is a source of truth for rehabilitation planning, facilities management activities, and capital planning support. The PNA Program is a mechanism to prompt engagement and elicit support from NYCHA's stakeholder groups. This important program is also a means for providing transparency to the many residents who rely upon NYCHA for housing and critical property management services.

Maintaining a comprehensive database of building condition information is essential to NYCHA's effective operation. HUD guidelines recommend that housing authorities conduct a physical needs assessment for every residential and non-residential property within their portfolios. NYCHA aims to complete a Physical Needs Assessment (PNA) approximately once every five (5) years to identify current facility conditions and physical needs. These assessments typically must include comprehensive inspections of various site, building, and utility components and their sub-components.

The PNA Program is a means for providing transparency into the physical needs, the costs to remedy those needs, shortfalls in funding, and the proposed pathways to rehabilitate NYCHA's many assets. The data and information provided through the PNA Program can directly inform facilities and property management teams of the needs at NYCHA's properties, as well as providing insight into logical schemas for prioritization of work and recommendations for activities meant to optimize the provision of rehabilitation and maintenance management services.

2.2 Overview of the Scope of Work & Key Performance Indicators

The 2023 PNA Program scope consists of nine (9) distinct areas of work (apartment, exterior building, interior building, conveying, electrical, mechanical, site-architectural, site-electrical, and site-mechanical). The results and product of these areas of work function as a technical body providing data, standards, methodologies, and recommendations which help guide NYCHA in its efforts to address the needs the housing portfolio. The subsections below provide a brief overview of the scope areas and requirements of the 2023 Physical Needs Assessment Program.

2.2.1 Inspections

The inspections of developments and apartments were limited to primarily visual inspections and interviews with site representatives. In addition to visual inspections, photographs were taken to capture the representative condition being described. One apartment wall was opened in several apartments in different buildings throughout the developments.

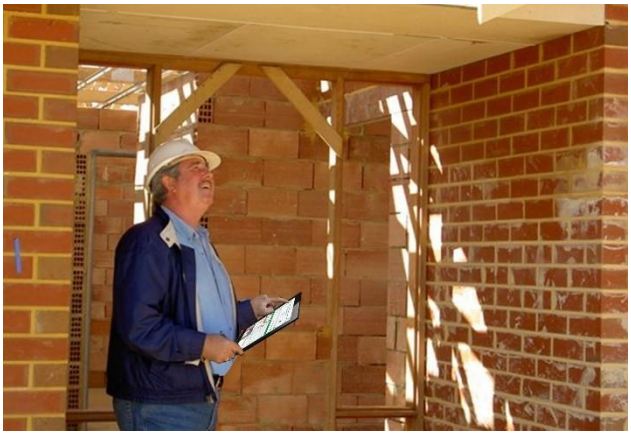

Figure 10 Typical Inspector Performing Inspection

NYCHA identified 668 site and physical components of the overall physical breakdown structure. A representative example of some of these items is listed below:

- Apartment (bathroom, kitchen, lighting, walls, ceilings, flooring, radiators, etc.).
- Exterior building (roof, windows, exterior walls, entry doors, loading docks, etc.).
- Interior building (common area bathroom, corridor finishes, gymnasium, lobby finishes, mailboxes, stairs, etc.).
- Conveying (freight elevator, passenger elevator, wheelchair lift, etc.).
- Electrical (corridor lighting, emergency generator sets, emergency/exit lights, fire alarm systems, electrical distribution panels, security systems, stair hall lighting, etc.).
- Mechanical (air conditioning, domestic water system, drainage / sewage system, gas service, building heating plant equipment and subcomponents, plumbing, non-residential kitchen, sprinkler system, ventilation, etc.).
- Site Architectural (fences, parking lots, playgrounds, retaining walls, sidewalks and curbs, etc.).
- Site Electrical (site lighting).
- Site Mechanical (exterior compactor, fire hydrant, storm piping, underground gas piping, underground steam piping, etc.).

The physical breakdown structure is listed in Appendix E.

For selected inspected elements, a Remaining Useful Life (RUL) was assigned based on the age of the element.

For selected elements, a rating scale of one (1) to five (5) was used to rate each item:

- Good (1)
- Between Good and Fair (2)
- Fair (3)
- Between Fair and Poor (4)

- Poor (5)

If an item had a deficiency, a potential action was assigned. There were four (4) primary potential actions:

- Repair
- Replace
- Replace/Upgrade
- Maintenance

In addition, the urgency of the potential action was assigned. There were three (3) time frames used for the project with their orders of precedence from one (1) to three (3):

- Immediate Action (1)
- Address within 12 months (2)
- Address within 5 years (3)

If corrective action was recommended, the purpose of the corrective action was assigned. There were five (5) reasons for the purpose of the action with their orders of precedence from one (1) to five (5):

- Life Safety (1)
- Structural (2)
- Security (3)
- Restore (4)
- Operations/Maintenance Savings (5)

2.2.2 Data Analysis & Modeling

The inspection data was uploaded to a server for analysis and modeling. Calculations were performed to assign average ratings for systems based on the individual item rating and weighting (relative importance). For the items that were not inspected, the average rating was calculated using the 2017 average rating, and applying the deterioration curve to the 2017 rating to determine the 2023 rating. Remaining useful life of the non-inspected items was calculated by subtracting six (6) from the 2017 remaining useful life. The cost was then calculated using the Unit Cost Library (UCL) for remediation and replacement. Remediation accounts for addressing identified deficiencies for a given asset. Replacement accounts for full asset replacement usually due to reaching the end of its useful life. Considering the average rating, the remediation cost was compared to the total replacement cost and a decision was made to either remediate or replace the item. In addition, the recommended action to address the concern include a timeframe. The following table was used to determine if a full replacement is recommended for items with any type of deficiency.

Table 5 PBS Replacement Criteria

Remediation Cost	Average Condition Rating
Greater than or equal to 50% of Replacement Cost	Greater than or equal to 4 ('Between Fair and Poor')
Greater than or equal to 60% of Replacement Cost	Greater than or equal to 3 ('Fair')
Greater than or equal to 70% of Replacement Cost	Any

If an item fell under any of the criteria listed in the table above, the full replacement was given as the recommended action. Timeframe for the action was based on either the remaining useful life or the most urgent deficiency remediation time, whichever was most aggressive. Any item that had any type of deficiency, regardless of recommended action (remediation or full replacement) was always part of the five (5) year timeframe.

If an item with deficiency did not fall under any of the criteria listed above, separate remediation cost and full replacement cost was calculated for that item. However, if the remediation timeframe and full replacement timeframe (which is based on remaining useful life) was within four (4) years of each other, full replacement was recommended for that item in order to avoid working on the same item multiple times within a five (5) year period. The timeframe for that item was based on either the remaining useful life or the most urgent deficiency remediation time, whichever is most aggressive

Timeframe for items without any deficiency was based on their remaining useful life. However, if an item had zero (0) years remaining useful life, but not in poor condition and free of deficiency, that item was given additional life extension based on subject matter experts' opinion.

2.2.3 Deterioration Curves

The data collected throughout the 30 developments was utilized to develop deterioration curves for each asset type using the rate of decay from prior inspections. These deterioration curves were then used to incrementally age each asset within NYCHA's full portfolio from its 2017 condition to its expected condition in 2023. If an asset reached the end of its useful life, it was flagged for replacement. Items that had not yet deteriorated to the point of replacement were continuously aged until their expected replacement year is identified.

There are several assumptions and variables that are used to drive the deterioration curves. The first is the asset type. The asset type sets the initial shape of the curve by aligning each asset with an existing curve library. The second is the useful life which determines the intersection of the age with the condition score (age vs. condition). Using the 2017 average condition score, the 2017 age vs. condition was assigned and using the 2023 average condition score, the 2023 age vs. condition was assigned. The slope between 2017 and 2023 was calculated to determine how quickly the asset was deteriorating and the curves were re-aligned based on the calculated slope and expected remaining useful life.

Due to the having observed data that is only seven (7) years apart, some assets with long life expectancy (80 years, for example), have a very small slope and very little change in condition over the seven (7) years. On the other hand, assets with a shorter expected life (25 years, for example) will have a steeper slope, and potentially more refinement in the curve shape.

Starting from a resource of asset classes and curve models across different regions, each Physical Breakdown Structure (PBS) node was assigned a default curve value to represent a correlation between condition and age of each asset. Next, using the condition data collected during the 2023 PNA, each asset was analyzed using the expected deterioration from 2017 to 2023 and its actual deterioration. This information helped define the shape of the curve and how quickly an asset would deteriorate between each condition score:

- Good (1)
- Between Good and Fair (2)
- Fair (3)
- Between Fair and Poor (4)
- Poor (5)

Using the expected lifecycle of each PBS, the start and end of the curve is pre-defined, as the asset should reach the end of its useful life in the year defined by its lifecycle, assuming no outside influence. An asset may reach the end of its life sooner than expected, or last longer than expected, and the condition scores collected will update each asset's position on its deterioration curve.

The figure below is an example of how the 2017 and 2023 condition rating was used to refine the deterioration curve for a gas fired forced air heater. The original expected life was 20 years (shown when the condition rating reaches 5) based on the 2017 observed condition. When the unit was inspected in 2023, the furnace had not deteriorated as much as anticipated. Using the 2023 observed condition and a maximum not to exceed life of 25 years, a new deterioration curve (green) was calculated. Note that the graph includes ratings of six (6) and seven (7) while rating score above does not list these. There are several reasons for the additional scores. The additional ratings provide prioritization / scoring to assets which are past their useful life. Since assets with a rating of Poor (5) may continue to operate but will continue to deteriorate. This allows better deterioration into the future and prioritize spending across many assets with the "same" condition score.

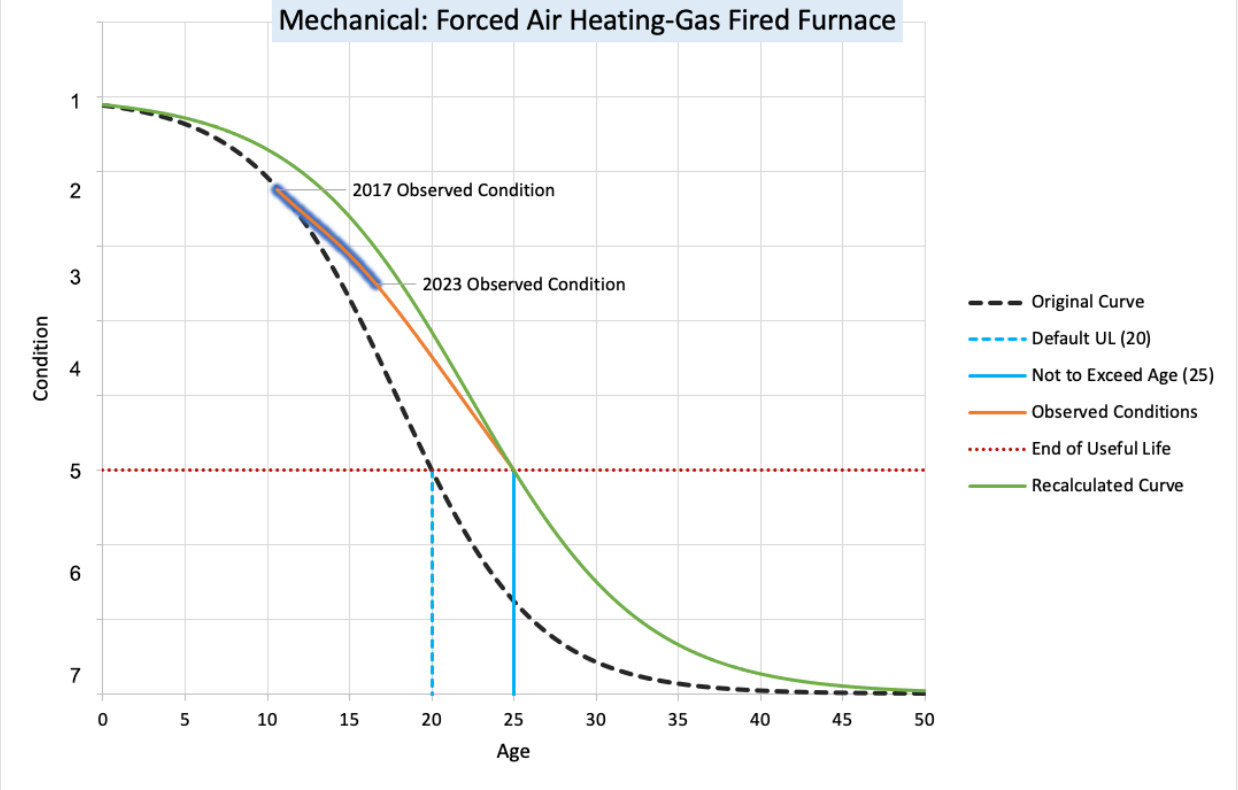

Figure 11 Example Deterioration Curve

2.2.4 Incorporation of Design Guidelines

In the current PNA, NYCHA's design guideline standards were considered during inspections and subsequent analysis. The prior 2017 PNA was updated with the results of the current 2023 comprehensive inspection and deterioration curves developed.

Assessment categories related to NYCHA's design guideline standards included visual inspection of the exterior envelope, means of egress, Interior components of the buildings, Electrical systems such as Electrical Panels, Fire Alarm System, Lighting, Mechanical systems such as HVAC System and Plumbing Systems, Site components such as Paving, Playgrounds, Site Lighting and Drainage System, etc. During inspections, hazardous conditions were identified and reported with deficiencies.

2.2.5 2023 Scope Additions

Additional 2023 scope items, beyond the needs captured as part of the comprehensive inspection, were included. These scope items consisted of:

- Additional Security needs reflecting costs for eight (8) cameras per building in addition to elevator and lobby cameras along with doors and layered access control.
- Open Spaces needs were included and based off development Open Space Masterplans developed by NYCHA in the last few years.
- Façade repair needs based on Local Law 11 requirements including inspections, sidewalk sheds, and repair-work occurring over the next 10 years.

- Waste Yard/Recycling needs reflecting waste yard redesigns (includes exterior compactors), interior compactors, recycling stations, and pneumatic systems.
- Decarbonization needs reflecting costs for installation of different systems of domestic hot water and space heat that were each recommended based on the characteristics of the individual developments. These costs include the required level of Electrification for the developments as well. Windows – a key component of decarbonization – was already included in the base PNA estimates.
- Section 504 needs reflecting the costs for 504 accessibilities for apartments.
- Lead-Based Paint Abatement needs were based on XRF lead inspection results for the apartments. The costs reflect estimated values for lead abatement of apartments and building common space areas.
- Asbestos abatement costs were also incorporated into the UCL

With the consideration of the aforementioned list of information provided by NYCHA, the 2023 comprehensive inspection data and analysis is enhanced for a holistic view of assessed needs.

The total additional assessed need is estimated to be $15.48 billion. The largest contributors to the cost are decarbonization - space heat ($5.18 billion), Façade Repairs/Local Law 11 ($3.26 billion), and decarbonization – domestic hot water ($2.35 billion). It is to be noted that decarbonization, waste infrastructure, and Façade repairs/Local Law 11 costs overrides some portion of the apartment, mechanical, site- mechanical, and architectural (exterior) physical needs cost.

Table 6 Additional Assessed Needs by Borough

System	BRONX	BROOKLYN	MANHATTAN	QUEENS	STATEN ISLAND	**Total**
Decarbonization - Space Heat	$1,555.5M	$979.9M	$1,880.8M	$504.9M	$256.2M	**$5,177.2M**
Façade Repairs / Local Law 11	$692.9M	$1,008.6M	$1,086.5M	$328.7M	$148.1M	**$3,264.8M**
Decarbonization - Domestic Hot Water	$606.3M	$440.6M	$973.1M	$202.3M	$127.8M	**$2,350.2M**
Lead	$388.3M	$398.2M	$389.1M	$188.5M	$37.9M	**$1,402.0M**
Security	$298.1M	$436.4M	$326.8M	$165.3M	$48.9M	**$1,275.4M**
Open Spaces	$283.1M	$333.5M	$174.0M	$64.1M	$44.6M	**$899.3M**
Waste Infrastructure	$169.9M	$226.7M	$230.2M	$77.2M	$27.0M	**$731.0M**
Section 504	$98.8M	$114.6M	$118.2M	$36.0M	$10.4M	**$378.0M**
Total	**$4,093.0M**	**$3,938.5M**	**$5,178.6M**	**$1,566.8M**	**$700.9M**	**$15,477.9M**

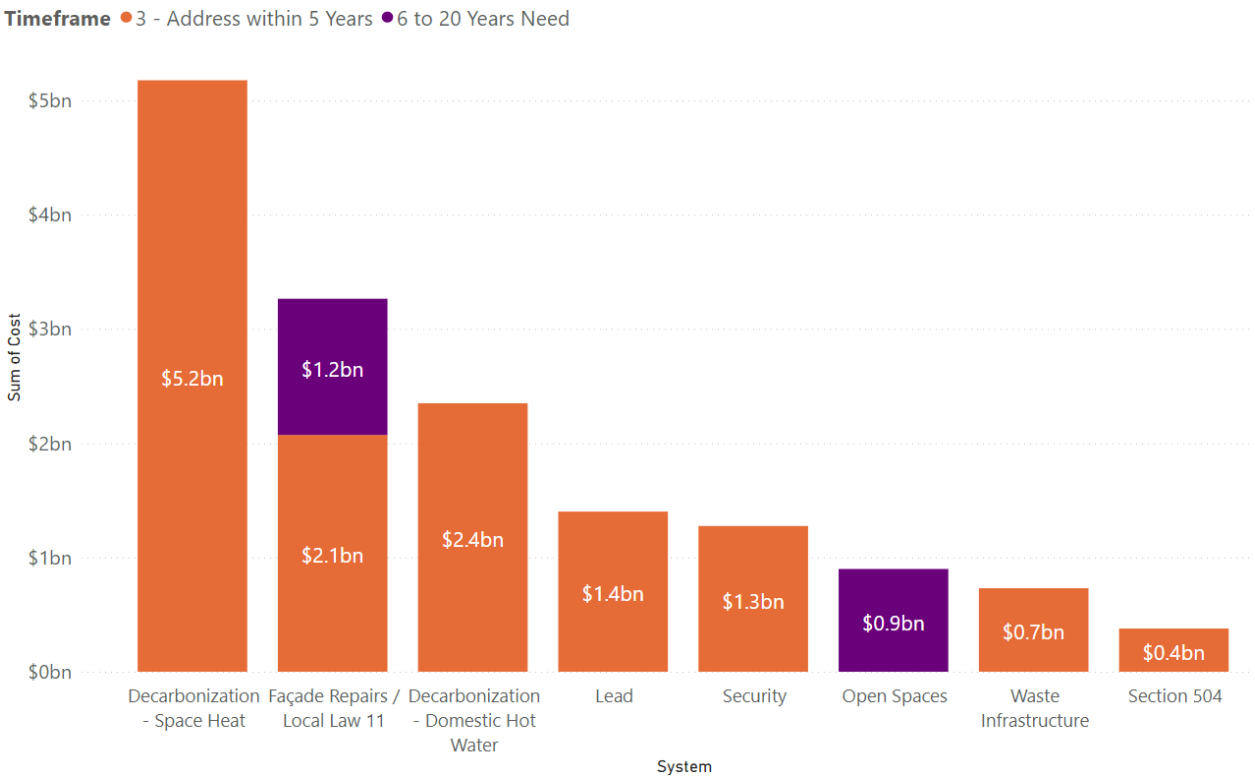

Figure 12 Additional Assessed Needs by Timeframe

2.2.6 Incorporation of Maximo Data

Maximo is an enterprise asset management system (or computerized maintenance management system) that is used to manage the maintenance and repair of physical assets, such as buildings, equipment, and infrastructure. Integrating asset data from Maximo can be useful in a physical needs assessment project to provide a more complete and accurate view of the condition of the facilities being assessed. Asset data refers to information about the physical assets of an organization, such as buildings, equipment, and infrastructure. NYCHA relies on the Maximo platform to support facilities maintenance planning, service request generation, and cataloging work orders.

Data from Maximo was integrated in the following manner:

Asset data was included in the assessment reports as a way to provide more information in the decision-making and planning process related to the repair, maintenance, or upgrade of the facilities. In order to incorporate data from Maximo, the team produced a mapping strategy to identify asset tags at the instance level. The mapping strategy was broken down into the following field categorizations: developments, buildings, facilities, and apartments. From here, individual instance assets were sorted by equipment IDs and model numbers, allowing the team to map these instances to the central inspection database using the unique identifier values. A series of condition logic testing was run to check the validity of these mapping strategies at the physical breakdown structure (PBS) level. Each PBS level conditionally filtered the asset list to support the logic selection of an asset ID in the Maximo database to an asset inspected in the field.

2.2.7 Updates to PNA & Capital Planning Data

A completed projects list was provided by NYCHA identifying work that had been completed since the 2017 PNA. This list was evaluated against those needs identified in 2017 to identify needs that had been addressed. In the case of deficiencies, these were marked as completed. In the case of system replacements, the asset's condition score was set back to Good, and its expected useful life became same as industry life.

Asset conditions collected during the 2017 PNA were incrementally aged by subtracting six (6) from their remaining useful life. If a value became negative, it was overwritten with zero (0). Assets that reached the end of their useful life by 2023 due to the calculated deterioration were flagged for immediate replacement. As assets reached the end of their useful life, they were scheduled for replacement in the future at the projected time they would reach the end of their useful life.

Items from 2017 that had any type of deficiency and no worked performed yet were added to the immediate needs list and included a recommended action year of 2023.

2.2.8 Unit Cost Library

The JV Team developed a Unit Cost Library (UCL) for each element in the Physical Breakdown Structure (PBS). The costs were developed according to 2023 values. Since NYCHA's assets vary widely, a median cost value for each element was selected to meet the highest number of scenarios. The use of a UCL allows system costs to be developed based on the scope of work. For additional information on the UCL development, refer to Section 8.

3 Technical Details

The JV conducted on-site inspections of physical needs at 30 NYCHA developments between July 2022 and October 2022. Prior to the inspections, all inspectors participated in an intensive training program that included both classroom and in-field training to ensure consistency and integrity through prescribed data collection methodologies. Data was collected on-site in a digital format through a tablet-based software application called ESRI Survey123. The inspections were conducted by inspectors with credentials in architecture, electrical engineering, mechanical engineering, or elevators and inspected components native to their respective discipline. Inspectors were under the supervision of a Team Leader that was either a licensed engineer or architect.

3.1 Technical Approach

The ESRI Survey123 software was customized for the NYCHA PNA project. The software has nine (9) predefined forms for building-related inspections and site-related inspections. Six (6) of the forms are for building inspections and three (3) of the forms are for site inspections. The specific forms are listed below:

Building-Related Forms

- Apartment – the living quarters of the tenants
- Architectural – exterior of the buildings, doors, roofs, etc.
- Conveying – elevators (Machine Room, Hoistway, Pit, and Elevator Cab)
- Electrical – electrical distribution, security systems, communications, lights, etc.
- Interior – stairways, hallways, common areas, etc.
- Mechanical – HVAC, compactor, water, sewer, gas pipes, etc.

Site-Related Forms

- Site – Architectural – fences, walls, parking lots, sidewalks, etc.
- Site – Electrical – site lighting
- Site – Mechanical – exterior compactor, underground piping, etc.

3.2 Methodologies

Inspectors used the tablet-based software to enter observations while on-site. The software guided the inspectors though the inspection process. It allowed for items to be added, such as multiple boilers or multiple fans. After every section of the form had been completed, the inspector reviewed all data as a self-check. The inspection data was then uploaded to the main database. The software was configured in a way that the data could only be uploaded if all sections of the form were complete.

3.3 Quality Control Processes

The quality of the inspection data was paramount to the project, since only a percentage of NYCHA's developments were inspected and the data from this subset of developments would be extrapolated to the entire portfolio. Therefore, there were several steps in the quality control process.

The first step in the quality control process was the training of inspectors. The training included both classroom and in-field training. After the training, inspectors were shadowed by experienced technical staff to reinforce the training, provide guidance, and confirm the inspections were being conducted in accordance to defined procedure.

After the inspection was complete, inspectors performed a self-check of the data to confirm the data entry was correct. Inspectors then uploaded the data from the tablet to the main database.

After the data was uploaded, the QA Team reviewed the data against all available pre-survey data. In addition, the QA Team scrutinized the reports for errors, omissions, and inconsistencies. If inconsistent data was found, an inspector was sent back to the site to re-inspect and to correct the inconsistency. The discipline leads reviewed comments from the QA Team and spot-checked the reports.

In addition, automatic queries were developed and executed against the reports. The purpose of these queries was to isolate discrepancies and errors. Non-conforming data and data discrepancies were flagged for review and evaluation by the QA Team.

Finally, further quality control review was undertaken by NYCHA staff in the PNA Team within the Asset & Capital Management Division, and any potential data quality issues were flagged to the JV for further analysis and remediation.

4 Data & Technological Details

A PNA project involves evaluating the condition of a facility or group of facilities and identifying any repairs, upgrades, or maintenance that are needed. The evaluation data was captured during each inspection and logged for further analysis. The data and technology used in the NYCHA 2023 PNA was dependent on the specific goals and scope of the project, as well as the resources available.

Examples of the types of data that were collected and analyzed during the physical needs assessment include:

1. **Architectural and Structural Data:** This includes information about the age and condition of the facility's structure, as well as any previous repairs or upgrades. This data was collected through visual inspections and interviews with site representatives.

2. **Mechanical and Electrical Data:** This includes information about the condition and performance of the facility's mechanical and electrical systems, such as heating, ventilation, and air conditioning (HVAC), plumbing, and electrical systems. This data was collected through visual inspections and interviews with site representatives.

In terms of technology, the physical needs assessment project used a variety of tools and systems to collect and analyze data, including:

1. **Mobile apps:** These were used to facilitate data collection and input, as well as to provide real-time access to the assessment team.

2. **Data analysis software:** These were used to analyze and interpret the data collected during the assessment, as well as to generate reports and summaries of the findings.

4.1 PNA Digital Ecosystem

The digital ecosystem of the PNA project was comprised of four (4) main digital systems: mobile inspection application, data repository, Quality Control Reporting tool, and Analysis Reporting Tool. Each system and subsystem belong to a complex and well-integrated data governance workflow, allowing teams to collect, analyze, report, and share data. The flow and management of data was pivotal to the data governance and digital integration process as shown in Figure 13.

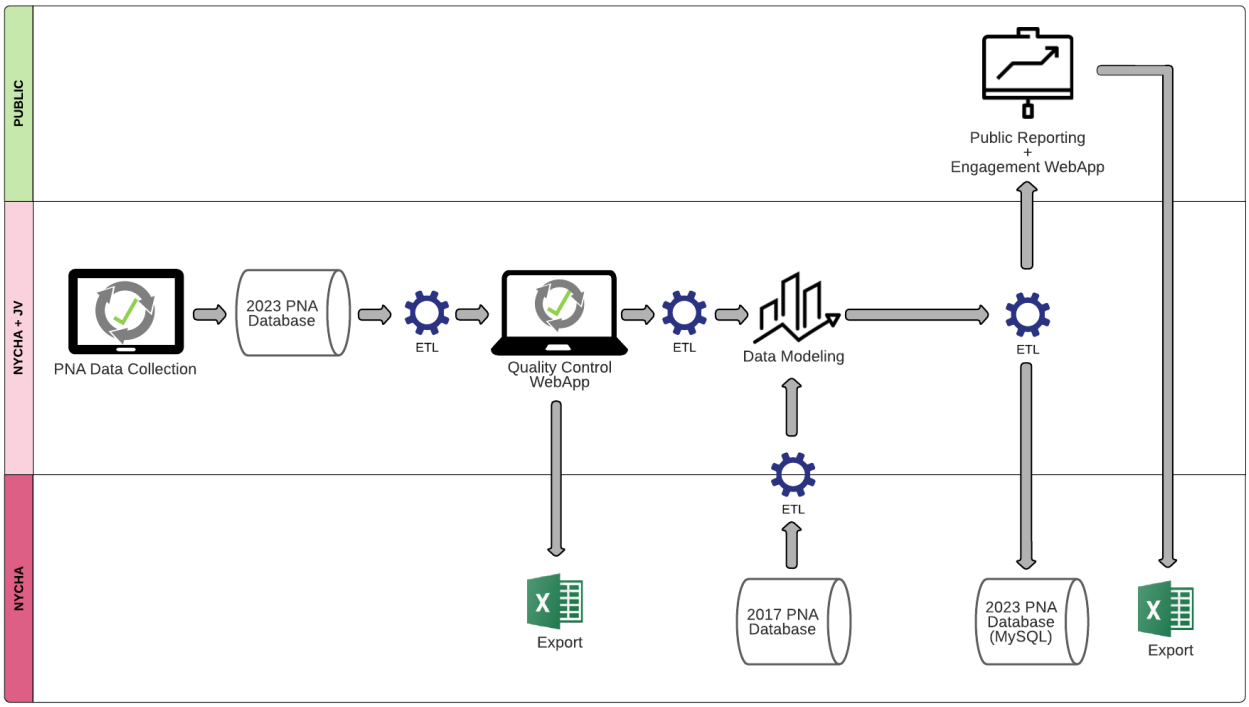

Figure 13 PNA Digital Ecosystem Data Flow Process

The data repository system was divided into three (3) subcomponents: inspection database, quality control database, and document database. These databases formed a centralized data repository for the project to store and organize information about the facilities being assessed. This repository was accessible to all members of the assessment team using data analysis applications, and included information such as the location, age, and condition of each facility, as well as any relevant documentation and photographs.

The ecosystem included a mobile application for inspections, allowing team members to easily collect and input data about the facilities during the assessment process. This included features such as the ability to record instances, deficiencies and take photos.

In addition to the database and mobile app, the digital ecosystem also included a Quality Control Reporting tool that allowed team members to easily generate reports of the assessment findings. This tool included features such as a customizable report template, automated data querying, and the ability to export the reports for submission.

The PlanSpend application is used to house the PNA data and perform data analytics, along with PowerBI as a dashboarding solution.

Overall, the digital ecosystem streamlined the physical needs assessment process, making it more efficient and effective for the assessment team and providing a reliable and comprehensive record of the condition of the facilities being assessed.

4.2 Interoperability between Digital Systems

Interoperability refers to the ability of different digital systems to work together and exchange data with each other in an efficient manner. In a PNA project, interoperability is important to ensure that all the data collected and analyzed is integrated and consistent, and that different systems and tools used in the assessment process can communicate with each other effectively.

There are a few keyways in which digital systems can be made interoperable in a PNA project:

1. Use of standardized data formats: Ensuring that all the systems and tools used in the assessment process use the same data formats and structures makes it easier to exchange and integrate data between different systems.
2. Use of APIs: Application Programming Interfaces (APIs) allow different systems to communicate with each other by providing a standard set of protocols for exchanging data. By using APIs, different systems can be connected, and data can be easily exchanged between them.
3. Use of a central database: A central database can serve as a hub for storing and organizing data collected during the assessment process and can be accessed by all the different systems and tools used in the assessment.

During the inspection process, data was collected in the field on the mobile inspection application and submitted to the inspection application database. Data was then transferred to the Quality Control Database for processing, structuring, analysis, and reporting. Next, the data moved through an Extract, Transform, and Load (ETL) process, as shown below:

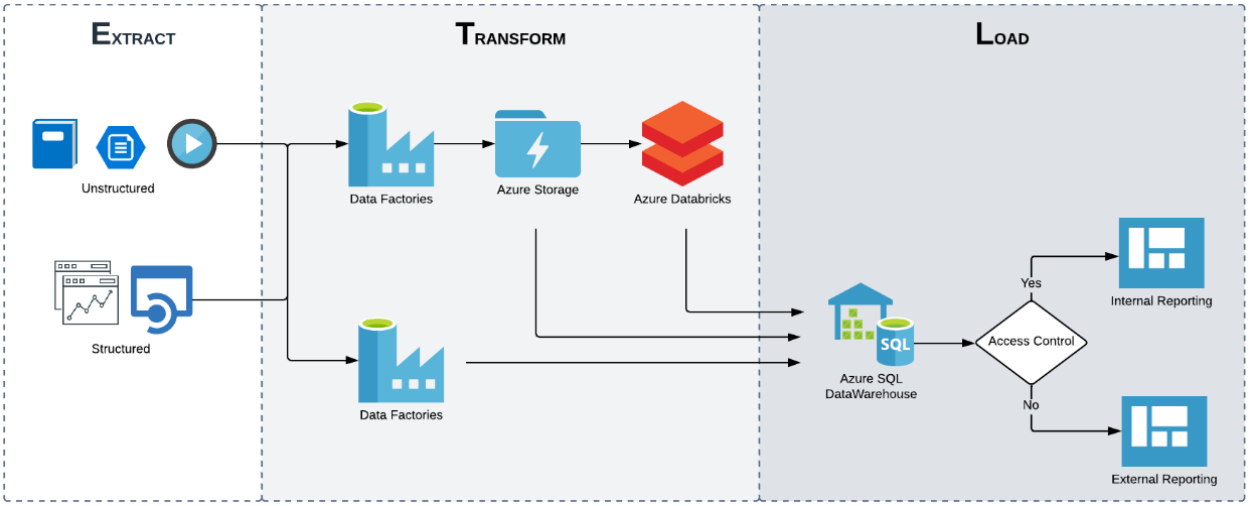

Figure 14 Data Flow in the ETL Process

Once the data was structured for reporting, the Quality Control team accessed it through the Quality Control Reporting tool for review. The data went through automated queries, checking data validation against the methodologies and physical breakdown structure of the project. Data was then formatted into reports, which were exported to the project's document repository for deliverable review.

The PlanSpend application was used to import the data for analysis. This system holds all development and building information as well as each system and component's condition score

history. Using the configured deterioration curves, industry life cycles, and costs, a recommended action and action year could be assessed for each system.

Overall, interoperability is important in a physical needs assessment project to ensure that all the data collected is consistent and integrated, and that different systems and tools used in the assessment process can communicate with each other effectively. This helped to streamline the assessment process and provide a more comprehensive and accurate view of the condition of the facilities being assessed.

5 PNA Portfolio Details

It is important to note that the JV's PNA inspectors did not physically inspect 100% of NYCHA's apartments (170,000 + apartments) in every development. As outlined in the contract scope, the JV inspected a percentage of the apartments (between 10% and 15%, depending on the size of the development) in the 30 developments listed in Appendix C. The apartments were selected to provide a representative sample for each building. For example, apartments were selected to include apartments on the lower floors, middle floors, and upper floors, as well as one (1) bedroom, two (2) bedrooms and three (3) bedrooms. In addition, the inspections included the specific items outlined in the contract. Appendix C provides development and building information on the 30 inspected developments and Appendix E provides the physical breakdown structure used for the inspections.

5.1 General Conditions of the Developments

Most developments exteriors were in varying states of condition with some common deficiencies observed for the exterior are with the roof, exterior walls, windows, doors, and missing or damaged AC brackets and child guards. Several developments had exterior walls in poor condition while columns and beams show normal wear based on the age of the building. Several developments have upgrades to the roof and primary doors. Several developments have deficiencies with the underground piping and several developments have active projects to upgrade the underground piping. Several developments had the exterior compactors replaced.

The apartments that were visited also had varying range of conditions, with common deficiencies being missing or non-functioning smoke detectors, mold in the bathrooms, antiquated electric panels as well as damaged walls, ceilings, and floors.

Site lighting varied from good (recently upgraded) to poor (non-functional). Some common deficiencies observed are damaged asphalt, damaged fences, damaged curbs, and playground safety matting.

5.2 General Conditions of Systems

As expected, many of the systems in the buildings are original to the building construction and are showing their age. Some of the buildings have antiquated power distribution panels while some buildings have been upgraded. A varying range of conditions were observed for heating system with common deficiencies being pumps, rusty pipes, and damaged insulation. Some buildings have had upgrades to the heating system. The HVAC systems are typically in fair condition with the most common upgrade being exhaust fans. The domestic water systems are also in varying conditions with common deficiencies being heat exchangers, damaged insulation, and leaking flanges.

6 Field Inspections

The STV/AECOM joint venture was contracted by NYCHA to provide a baseline PNA for 30 developments throughout five (5) boroughs of New York City by performing a comprehensive inspection of the 259 residential buildings, 24 non-residential buildings, and 10% - 15% of the 28,724 apartments in those developments. 3,204 apartments were actually inspected. The project included condition assessments of architectural, electrical, and mechanical components in buildings, facilities, and sites.

Prior to the PNA inspections, all inspectors participated in an intensive training program. The main objective of this training was to ensure consistent data acquisition and evaluation across individual inspectors, as well as instruction on using the tablet-based software tool. The training included classroom instruction, simulated inspections in a classroom setting, as well as in-field inspections.

6.1 Inspector Training Program

At the beginning of the project, a large group of engineers, architects, and other skilled workers were recruited to be trained for the PNA inspections contingent on their backgrounds. Six (6) different disciplines were assigned to develop the nine (9) types of reports that would be generated over the following months, each discipline trained to be able to identify the various items and conditions to be reported.

The training was conducted in the AECOM offices in downtown Manhattan. Each discipline was individually trained by qualified technical team leaders, with several trainers who were previous inspectors and quality checkers during the 2017 iteration of the PNA project. This allowed the incoming trainees to learn from previous experiences and pinpoint differences between the 2017 and 2023 PNA. Later, during inspections, trainers were available for inspections themselves or for consultation with any challenges encountered in the field.

The first week of training focused on classroom instruction for each specific discipline. The training included specific instructions for inspections and expectations for inspectors. Intermediate quizzes were used to ensure the trainees' understanding of the material prior to a final exam at the end of the training period. In addition, handouts were provided to each participant to reinforce the training and to provide reference material for inspectors.

Following the first week of training in the office, inspectors were divided into eight (8) teams to reinforce the classroom training and apply their learnings in practice. The teams were sent to two (2) different developments to practice field inspections. They were accompanied by their trainers to help supervise and assist with these trial-run inspections. Each inspector was able to practice in a team that was similar to their real project inspection team.

The training field inspections were conducted for three (3) days through multiple buildings to allow inspectors to become familiar with the inspection process.

Following the practice field inspections, inspectors returned to the AECOM office to complete two (2) more days of classroom training and take a final exam reflective of their discipline. During these final two (2) days of training, inspectors had the opportunity to ask any questions and to see the results of their practice inspections.

6.2 Field Inspections & Survey Activities

Each field inspection was scheduled in advance. The schedule considered participation by NYCHA development staff as well as tenant representatives. The tenant representatives were invited by NYCHA staff and encouraged to attend and participate during the site interviews and inspections.

When a team arrived at a development, it would report to the local management office to speak with a site representative. During the conversation with the site representatives, tenant representative, and inspectors used a predefined questionnaire (See Appendix A) to guide the discussion. Items discussed included the age, recent upgrades, known items of concern, and any unique features of

the development. All meeting participants received the questionnaire in advance which permitted their input in the event they could not attend the meeting.

The teams were accompanied by a NYCHA escort during the inspections. The escort was able to access restricted areas and answer questions about the facility. For apartment inspections, apartments were selected in advance and tenants were notified of the date that the inspection would occur. Typically, building inspections and apartment inspections were performed concurrently, since these inspections were conducted by different teams.

The building inspections typically started at the roof and progressed down to the basement level. Team members stayed together as a group with their escort. Any area that was not accessible was noted as such in the report.

The site facility inspections (Site-Architectural – fences, walls, parking lots, sidewalks, etc.; Site-Electrical – site lighting; Site-Mechanical – exterior compactor, underground piping, etc.) were handled in a similar manner, except for some developments where the facility was outsourced to a third party. In those cases, the team would have an interview with a representative of the third party.

Site inspections could be performed with or without an escort. Inspectors travelled about the site to evaluate their corresponding assets. Several developments were subject to active construction projects, making certain areas inaccessible to site and building exterior inspections.

If an inspector found a hazardous condition, a separate hazard report was developed and given to the site representative to verify that the local office had been notified. The report was then submitted to NYCHA for corrective action.

6.3 Special Circumstances & Conditions

With many of the inspections conducted outside, weather was an uncontrollable factor. If severe weather was forecasted for most of the day, which could have potentially presented a safety issue, no inspections were scheduled, and the appropriate personnel were notified. If a short duration storm occurred, inspectors were instructed to remain inside until it was safe to resume inspections.

If a schedule change prevented access for an apartment inspection, that particular apartment was not inspected, and the tenant was notified of the change. The inspectors then moved on to the next apartment on their schedule.

6.4 Post-Inspection Activities

After the inspections were conducted and the data checked by the inspector, the data was uploaded to the server. In the office, technical experts reviewed the data for accuracy and consistency with corresponding reports from the previous 2017 PNA. Obvious mistakes and omissions were corrected in the office. The technical experts also used queries on the data set to search for errors.

If there was an inconsistency that could not be corrected in the office, the report was flagged, and a different inspector was sent back to the site to clarify and re-submit information as needed.

One of the primary concerns of the post-inspection activities was to have the highest level of accuracy and data integrity. Processes were in place for manual checking, automated checking, and follow-up field inspections.

7 Analysis of Inspection Data

The data collected during the inspections of the 30 developments was used in conjunction with data from the 2017 PNA to aid in the updating of deterioration curves and needs estimates for the remainder of NYCHA's portfolio. The combined actual needs of the 30 developments and the updated needs for the remainder of NYCHA's portfolio were used to develop short-term and mid-term costs.

7.1 Data Analyses

After data was collected in the field, it was uploaded to a server for analysis. The data was grouped by deficiency and individual items for further analysis.

The first step was to calculate an average rating for each item for which condition ratings were collected. For items that contributed to a system, a relative weight value (importance) was assigned. The next step was to calculate the system average rating based on the ratings and weighting factors of the individual components. If quantities were collected, quantity was also considered for any average rating calculation.

Since only a percentage of the apartments in each building were inspected, the inspected data was extrapolated to account for the cost of all of the apartments in the building.

7.2 Data Modeling

Using the calculated average condition rating and remediation cost of the component and system, a calculation was performed to determine if the component or system should be remediated or replaced. The time frame for remediation was assigned based on the urgency of the deficiency type. This provided the cost based on the time frame (immediate, within 12 months, within 5 years). If no deficiency was identified, a full system replacement time frame was determined by lifecycle analysis and rating using the deterioration curve. For each component, a standardized life expectancy value was assigned, such that if a component reached that age, it was recommended for replacement.

The table below summarizes the criteria used to determine whether an item with any sort of deficiency should be replaced.

Table 7 PBS Replacement Criteria

Remediation Cost	Average Condition Rating
Greater than or equal to 50% of Replacement Cost	Greater than or equal to 4 ('Between Fair and Poor')
Greater than or equal to 60% of Replacement Cost	Greater than or equal to 3 ('Fair')
Greater than or equal to 70% of Replacement Cost	Any

If an item fell under any of the criteria listed on the table above, the full replacement was given as the recommended action. Timeframe for that action was based on either remaining useful life or the most urgent deficiency remediation time, whichever was most aggressive. Since deficiencies are

always assigned within the five (5) year timeframe, this results in any item that had a deficiency always being part of the five (5) year timeframe.

If an item with deficiency did not fall under any of the criteria listed above, separate remediation cost and full replacement cost was calculated for that item. However, if the remediation timeframe and full replacement timeframe (which is based on remaining useful life) was within four (4) years of each other, full replacement was recommended for that item in the timeframe that the remediation would have occurred, thus removing the need for the remediation, in order to avoid working on the same item multiple times within a five (5) year period. Timeframe for that item was based on either remaining useful life or the most urgent deficiency remediation time, whichever is most aggressive

Timeframe for items without any deficiency was based on their remaining useful life. However, if an item had zero (0) remaining useful life, but not in poor condition and free of deficiency, that item was given additional life extension based on subject matter experts' opinion.

7.3 Data Extrapolation

The apartment inspections covered 10% to 15% of the apartments in a development. The apartment costs were multiplied by the extrapolation factor (determined by dividing the total number of apartments in a building by the number of apartments inspected) to project the cost for all of the apartments in the building. Finally, the development cost captured the sum of all the building costs, including the other disciplines (architectural, electrical, mechanical, etc.).

To calculate the cost for the non-inspected developments, the needs from the 2017 PNA were used. For those items that had been updated through a Capital Project, PBS items ratings and RUL were updated and all the deficiencies that had been worked on were removed from costing. For updated items, the condition rating was assigned as Good, and the RUL was assigned as the Industry Life Cycle less the years since the upgrade.

Items that did not have any project completed were aged incrementally, and their remaining useful life were subtracted by six (6). If an item went below zero (0), it was overwritten as zero (0) for remaining useful life. A new rating for those items were also calculated by using the deterioration curve (for deterioration curve methodology, please see section 2.2.3). Using the 2023 unit cost library, the same approach defined in section 7.2 was applied for those items and final cost and timeline was determined. Any item that had any type of deficiency in 2017 were automatically part of immediate need.

8 Development of Projected Costs

The JV developed a PNA Unit Cost Library (UCL) for this project, which reflects the work and consensus of many key individuals, discipline leaders, supporting team members, and cost estimators. The approach to the development of the 2023 UCL utilized industry standard practices, protocols, procedures, methodologies, and sources commonly used in cost estimating. A team of licensed and experienced professionals performed the analyses.

NYCHA's properties and facilities range in size from small townhomes with only a few apartments to larger high-rises with many apartments per building. The UCL had to apply a median-scalar cost modeling selection methodology that applies costs appropriate for component replacements and/or remediation activities that may be found in a wide range of typological scales. The cost modeling and evaluation process considered costed actions at the smallest, midline, and largest scales for a given cost node; then, the JV's cost estimators selected the most reasonable median-scalar cost from that range that would apply to the greatest number of scenarios. This median-scalar cost was captured in the UCL, as the JV believes this to be the most accurate way to represent cost across a large asset portfolio with a wide spectrum physical attribute scalar range such as that found in NYCHA's portfolio.

8.1 Unit Cost Library

The development of the unit cost library included the following steps.

8.1.1 Development of New 2023 Unit Costs

For the 2023 PNA, a completely new unit cost library was developed based on the updated PBS item and deficiency list. Primary sources for labor, materials and all related cost data included the following:

- Cost estimation from RS Means (a construction estimating database) for New York City
- Costing/pricing books and data published by the National Electrical Contractors Association (NECA) and other professional organizations
- Vendor's quotes and data
- Internal STV and AECOM databases
- Experience with and knowledge of the New York City construction market within the STV and AECOM cost estimators
- NYC Comptroller's Office 2022-2023 NYC Prevailing Wage Rates published on 7/1/2022
- Review process jointly with JV and NYCHA Cost Estimating Teams to validate the reasonableness of PBS & UCL unit costs
- Cost data provided by NYCHA Cost Estimating Team from prior NYCHA projects for related or similar unit cost items

8.1.2 Cost Escalation Factors

Based on New York Metro area construction costs, escalated increases were estimated at approximate 3.5% per year from 2017 to 2021, and at 4.5% for 2021 to 2022.

8.1.3 2023 Hard and Soft Costs

All unit prices reflect 2023 prevailing wage rates in New York City, work to be performed in confined spaces, and mid- and high-rise construction.

Architecture/Engineering Services reflect the complexity of NYCHA projects and include allowances for field surveys and hazardous materials surveys and tests.

Construction Management Services include allowances for materials testing, laboratory analyses, air quality monitoring and so forth.

In effect, 84¢ of every dollar spent on NYCHA construction is for "hard" costs like labor and materials, general conditions, overhead and profit, insurance, bonds, permits, and other; the remaining 16¢ is for "soft" costs, e.g., architecture, engineering and construction management services. The table and figure below illustrate this.

Table 8 Unit Cost Breakdown

Cost Types	Applied Percentages		NYCHA Project Dollar
"Hard" Costs (Construction-related)			
Labor and Materials	NA		$0.61
General Conditions and Construction-related Costs			
General Conditions ▪ Mobilization/Demobilization ▪ Temporary Protection (Sidewalk Bridges, etc.) ▪ Asbestos Mitigation ▪ Site Safety, Site Security ▪ Field Office/Utilities ▪ Clean-up ▪ Permits	12.5	.075	
Overhead & Profit	12.5	.075	
Insurance	2	.01	
Bonds	2	.01	
Contingency	10	.06	
Subtotal, General Conditions and Const-related Costs	39	0.23	$0.23
Subtotal, Hard Costs			**$0.84**
"Soft" Costs (A/E- and CM-related)			
Architectural/Engineering (A/E) Services	10	.07	
Construction Management (CM) Services	12	.07	
Program Management (PM) Services	4	.02	
Subtotal, Soft Costs	**26**	**0.16**	**$0.16**
Total Costs			**$1.00**

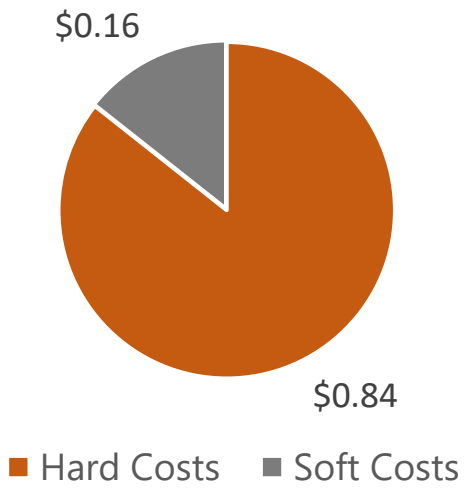

Figure 15 Breakdown of Estimated Hard Costs and Soft Cost per NYCHA Construction Dollar

The mark-ups for general conditions and construction-related costs (39 percent) and architecture, engineering and construction managements services (22 percent) track reasonably well with those used in other large institutions, agencies and authorities in the Greater New York area.

8.1.4 Comparative Analysis of 2017 and 2023 Unit Costs

The process started by comparing the 2017 Physical Breakdown Structure (PBS) with the 2023 PBS. The JV's discipline leads, cost estimators, and supporting team members compared node-to-node relationships where there were modifications of the PBS during the 2023 PNA program development process. If corresponding 2017 PBS nodes existed, costs were reviewed for escalation factors using the Base Unit Costs. If there were no corresponding node-to-node relationships between the 2017 and 2023 PBS, new Base Unit Costs were developed. From the analysis of both years Unit Cost Library, almost all costs have increased. The largest increases (percentwise) were Radiator / Convector / Baseboard, Motor Starter / Contactor, and Chilled and Condenser Water Piping. These increases are due in part to scope refinement which includes addressing of asbestos, as well as inflation / market conditions. Value or absolute dollarwise, the highest increases were in Hot Water and Steam Boiler, followed by Traction Freight and Passenger Elevators.

8.2 Cost Modeling

All items were part of the cost model based on their identified deficiencies and collected ratings. If any deficiency was identified for an item, this item was costed on each line-item level using the deficiency quantity and unit cost of the item, the material type, deficiency type, unit of measure, and corrective action type using the unit cost library. Depending on their total deficiency cost and average condition rating, items were also flagged for full replacement – the criteria for this and the details of costing process are shown in Section 7.2. A full flowchart diagram is also shown on Appendix D.

9 Key Findings by Category

Using the inspection data collected in the field, mid-term and short-term needs were determined. Short-term needs (immediate action, address within 12 months, and address within five (5) years) include costs that are deficiency-driven with an action of remediation or replacement. Mid-term needs (addressed between six (6) and 20 years) include costs that have a deficiency, but full system replacement is not required in the short-term (5 years), or asset that did not have any deficiencies today, but replacement will be required within 20 years. Condition ratings for each item were also calculated. The following sections detail the key findings by different categories.

9.1 Most Common Observations and Trends

Some of the most common deficiencies observed in the apartments are missing or non-functional smoke detectors, mold in the bathrooms, antiquated or obsolete electric panels, cracked and spalling walls and ceilings, and damaged floors. In the bathrooms and kitchens, the most reported deficiencies, were related to bathtubs, showerheads, sinks, toilets, vanities, kitchen cabinets, and sinks. The deterioration between the 2017 PNA and the 2023 PNA was as expected and was consistent with normal use. The condition of the apartments was consistent with the age of the buildings.

Some of the most common deficiencies observed during the architectural inspections were damaged or missing child guards and AC brackets, roofs, exterior walls, and windows. Several developments had upgrades to the roofs, primary doors, and exterior walls.

Some of the most common deficiencies observed during the electrical inspections were antiquated or obsolete power distribution systems and antiquated or obsolete and non-functioning lights. Some buildings have had electrical upgrade, some have not, and the electrical equipment is at the end of its useful life.

In most developments, mechanical systems were observed in varying states across a range of conditions. The most common heating systems deficiencies being pumps, rusty pipes, and damaged insulation. Some of the upgrades to the heating systems include gravity pumps and vacuum pumps, while other developments had major upgrades or were under construction.

HVAC systems were also observed in varying states across a range of conditions, many are at or approaching the end of their useful life and have significant needs. The most common upgrade being exhaust fan replacement. Some developments had upgrades to the direct expansion split air condition systems as well as window AC unit replacement.

Some common deficiencies of the drainage and sewer system observed were clogged and leaking pipes, defective sump pumps, and defective floor drains. The condition rating had minimal change from the 2017 PNA to the 2023 PNA.

The domestic water system’s common deficiencies were defective heat exchangers, damaged insulation, and leaking flanges. Some developments had upgrades such as circulating pumps and heat exchangers, while some developments had major upgrades. The deterioration of the non-upgraded items was as expected between the 2017 PNA and the 2023 PNA.

The most common observed deficiencies for building interiors were damaged doors, deteriorated ceiling and wall finishes, deteriorated floor finishes, and cracked glazed masonry. Some areas of

concern were entry doors, fire rated doors, non-fire rated doors, wall finishes, floor finishes, and interior stairs. Several developments have been upgraded due to damage from Super Storm Sandy.

Several developments had site-mechanical defective steam piping and steam condensate return piping, with several developments having upgrades to the steam piping and steam condensate piping while a few developments had active construction projects to replace the steam piping and steam condensate piping. A common upgrade for several developments was new exterior compactors.

The most common observed deficiencies for site-architectural were asphalt cracks, concrete cracks and damaged fences The key areas of concern were parking areas, non-vehicular paved areas, sidewalks, curbs, playground safety matting, and fences. The deterioration of the items was due to normal use and the condition rating deteriorated as expected from the 2017 PNA to the 2023 PNA.

The site lighting varied from good (recently upgraded) to poor (non-functional), with some common deficiencies being time clock not operational, photocell not functional, and antique or obsolete lighting. Many developments have had new area lighting installed.

The following graphs show the top ten (10) developments with the highest needs.

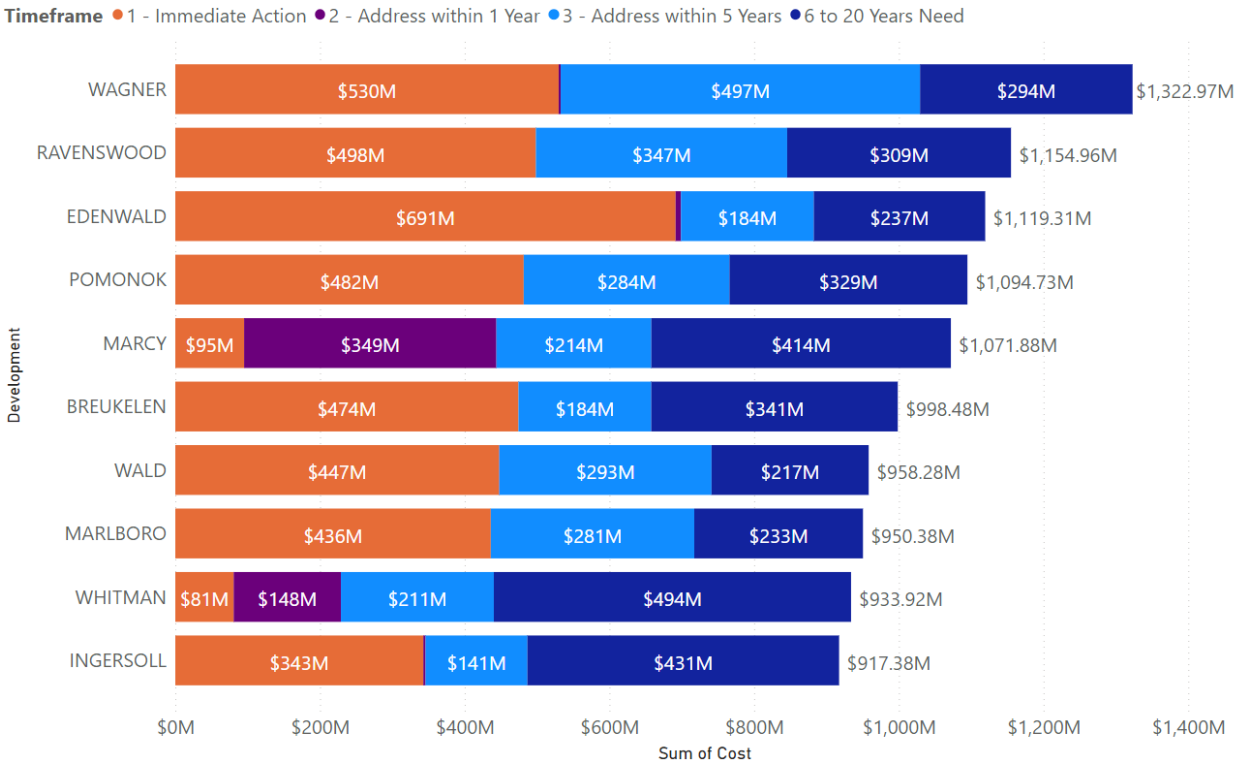

Figure 16 Developments with the Highest Needs by Timeframe

9.2 By System

9.2.1 Apartment Portfolio Wide Details

Figure 17 Typical Apartment Interior

Several key areas of concern were observed during the apartment inspections, including missing or non-functional smoke detectors which can be addressed through replacement, mold in the bathrooms which can be addressed by removing the mold using industry standards and providing better ventilation, cracked and spalling walls and ceiling which can be addressed through repairs, and damaged and deteriorated floors which can also be addressed through repairs. Some developments have had the electrical system updated, however, there were several developments with antiquated or obsolete fused toggle switch panelboards. This can be addressed with an upgrade to the electrical system. The most reported deficiencies in the bathroom and kitchens were related to bathtubs, showerheads, sinks, toilets, vanities, kitchen cabinets, and sinks. These can be addressed by replacement.

In general, the deterioration of the components was due to normal use and the condition deteriorated as expected between the 2017 and 2023 PNA. The exception is the antiquated electrical components which deteriorated more than expected during this six (6) year period.

The total rehabilitation (short-term) cost for apartments is $25.13 billion. The major subsystems contributing to this cost are bathrooms, floors, kitchens, doors, and radiators / convectors / baseboards.

The total rehabilitation (mid-term) cost for apartments is $2.96 billion. The major subsystems contributing to this cost are floors, light fixtures, kitchens, bathrooms, electric panel boards, and doors.

The following graphs depicts the major contributors and costs by Timeframe.

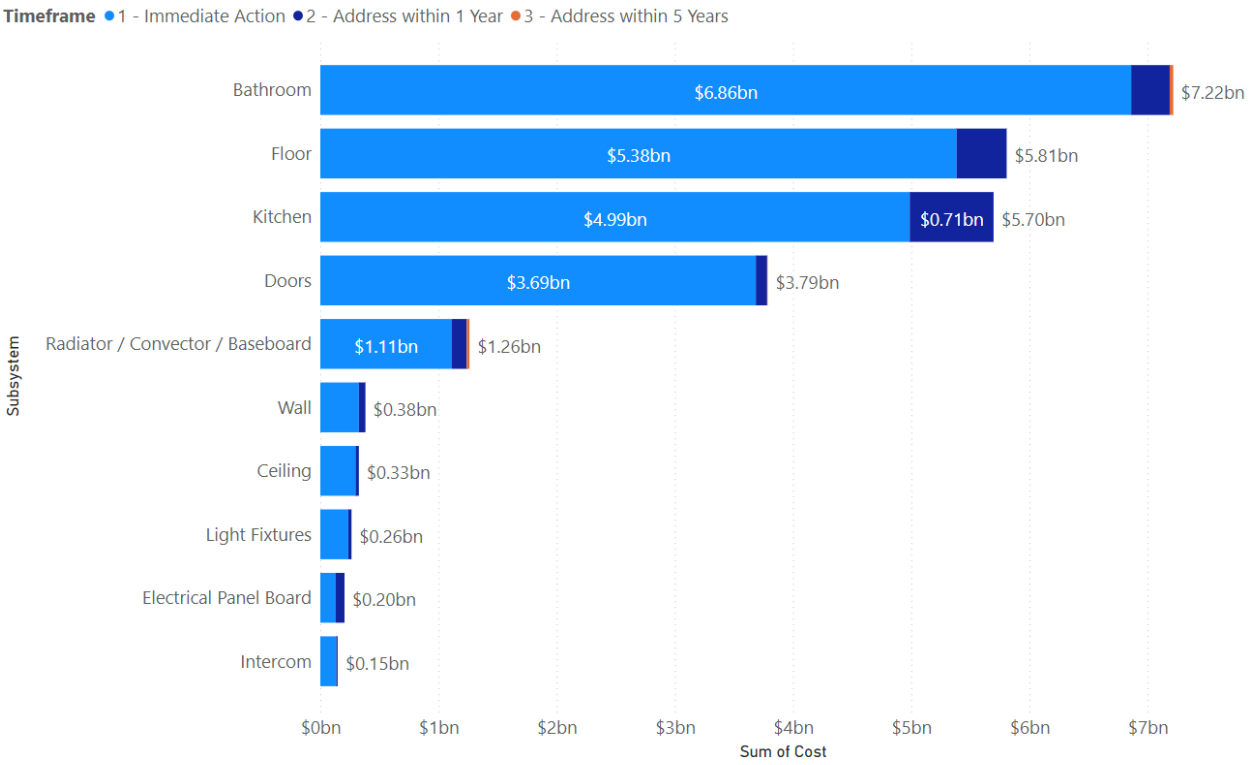

Figure 18 Greatest Rehabilitation Cost (Short-Term) by Subsystem for Apartments

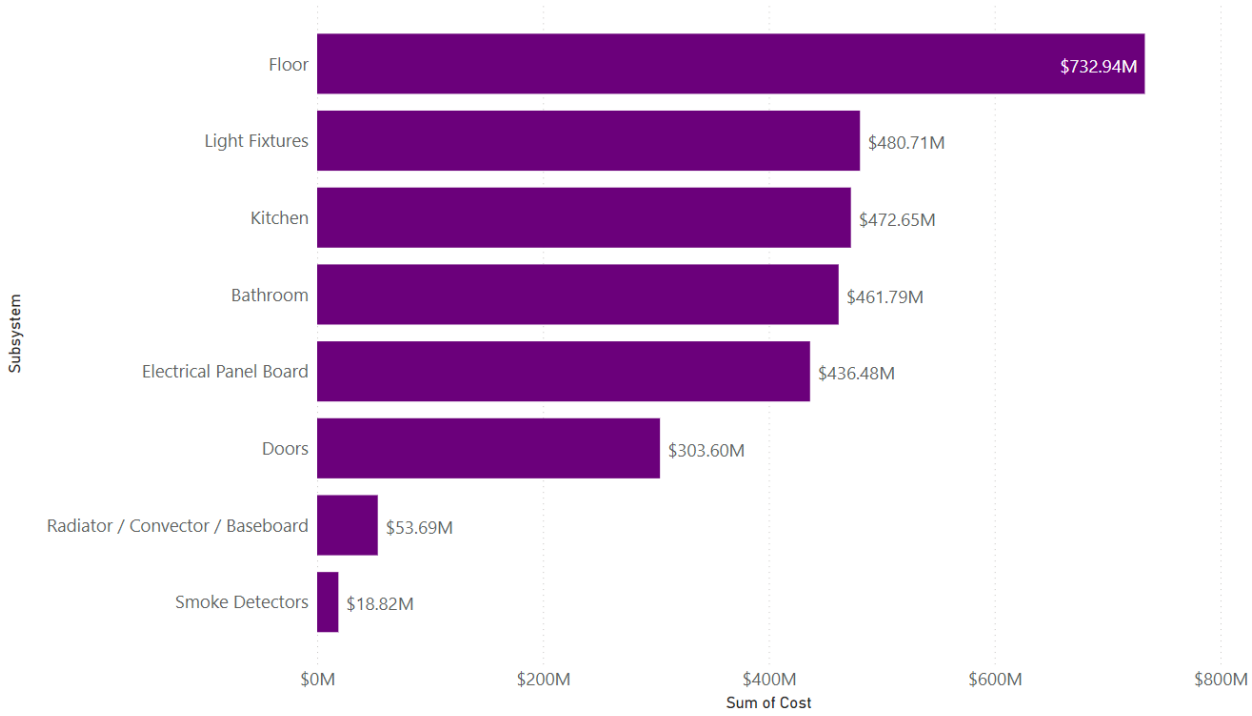

Figure 19 Greatest Rehabilitation Cost (Mid-Term) by Subsystem for Apartments

9.2.2 Architectural Portfolio Wide Details


Figure 20 Typical Building Exterior *(left)*, Parapet and Roof (*right*)

A key area of concern that was observed during the architectural inspections was damaged or missing child guard and AC brackets. Most building are in fair condition, with some buildings needing maintenance on the exterior walls and windows.

Some common observed deficiencies were roofs, doors, and windows. Between the 2017 PNA and the 2023 PNA most components deteriorated as expected. Some developments have had the primary doors replaces and roof improvements while other developments have active roof projects. There were a few developments with upgrades to the exterior.

The total rehabilitation (short-term) cost for architecture is $6.67 billion. The major subsystems contributing to this cost are windows and roofs.

The total rehabilitation (mid-term) cost for architecture is $879.09 million. The major subsystems contributing to this cost are windows, parapets, and roofs.

The following graphs depicts the major contributors and costs by Timeframe.

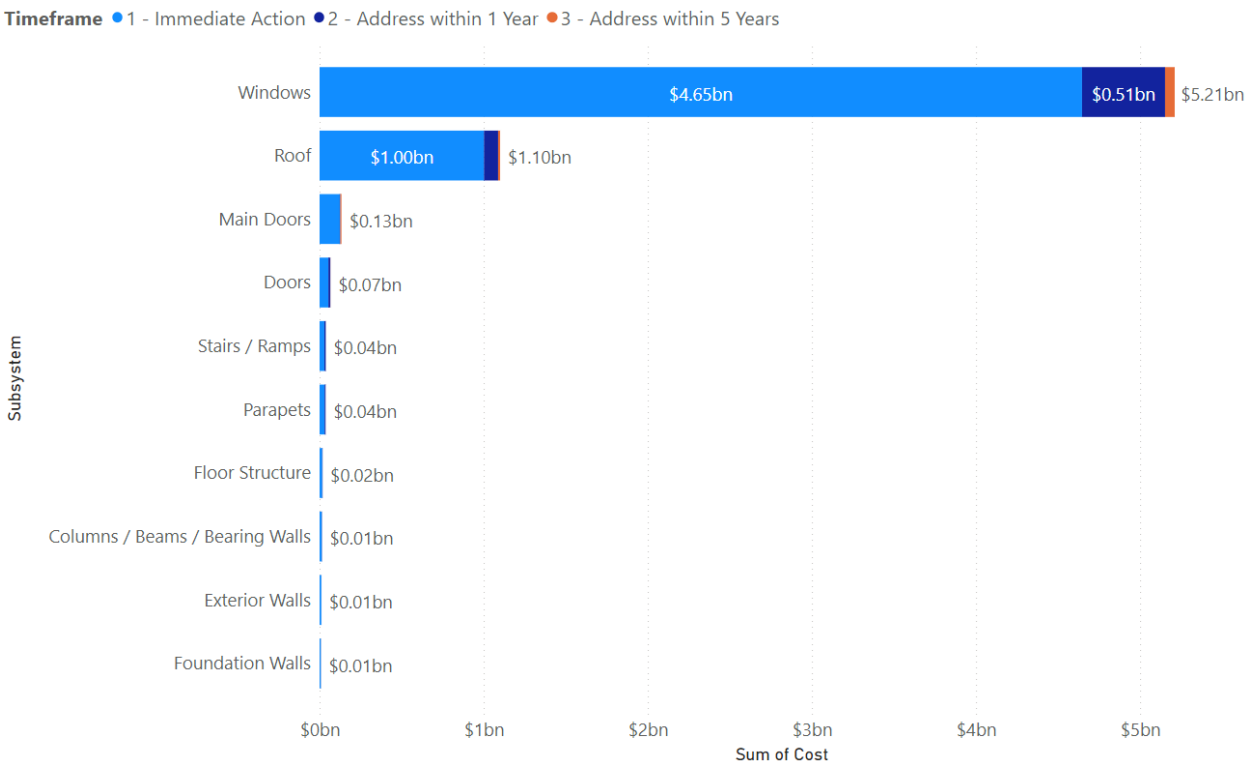

Figure 21 Greatest Rehabilitation Cost (Short-Term) by Subsystem for Architecture

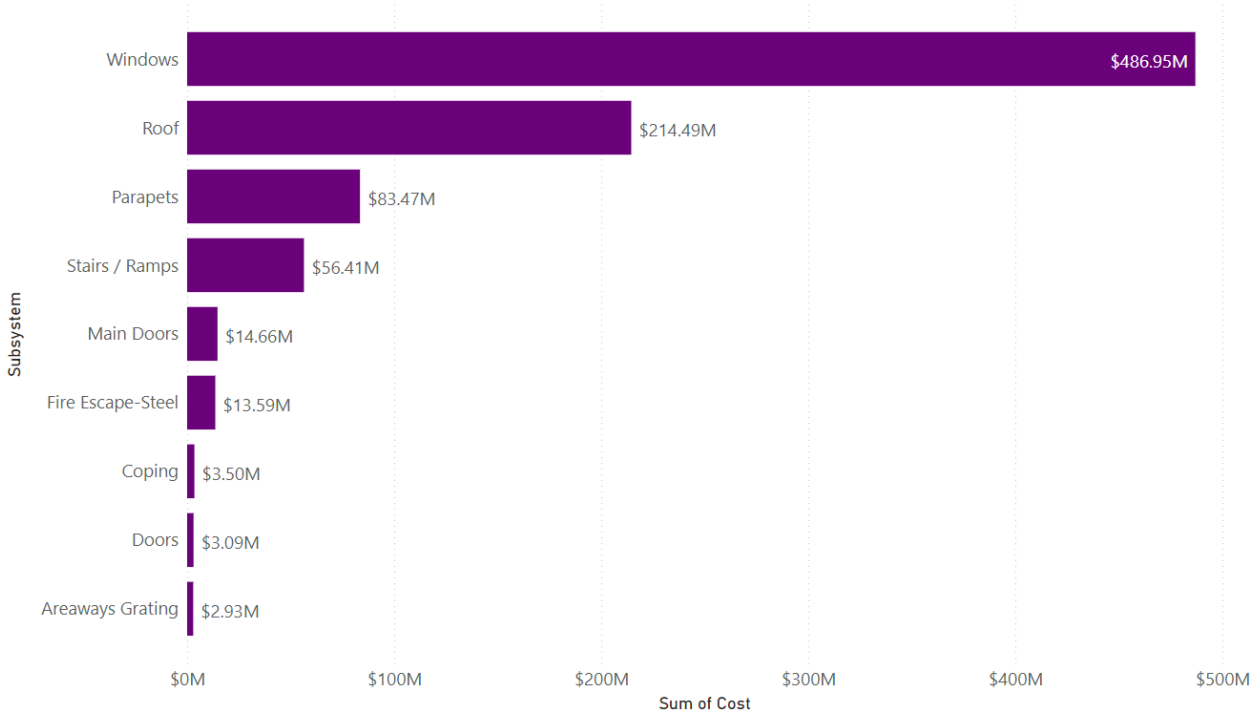

Figure 22 Greatest Rehabilitation Cost (Mid-Term) by Subsystem for Architecture

9.2.3 Conveying Portfolio Wide Details


Figure 23 Typical Elevator Shaft *(left)* and Passenger Traction Elevator (*right*)

Several key areas of concern were observed during the conveying inspections. Many machine rooms had damaged doors. This can be addressed through repair. Hoist machines and hoist ropes show signs of wear. This can be addressed through replacement.

Some developments have had the elevators replaced, while most developments have elevators approaching the end of their useful life. Given the heavy uses of the elevators, the condition of the elevators, in general, consistently deteriorated between 2017 and 2023.

The most reported deficiency was damage to various pieces of equipment (hoistway swing doors, elevator cab doors, and rust on elevator car tops, guide rails, and hoistway entrance). There were several observations of exposed electrical wires.

It is noted that some elevators will be impacted by code updates regarding the requirement of a single plunger brake.

The total rehabilitation (short-term) cost for conveying is $3.21 billion. The major system contributing to this cost is the traction passenger elevator.

The total rehabilitation (mid-term) cost for conveying is $1.22 billion. The major system contributing to this cost is the traction passenger elevator.

The following graphs depicts the major contributors and costs by Timeframe.

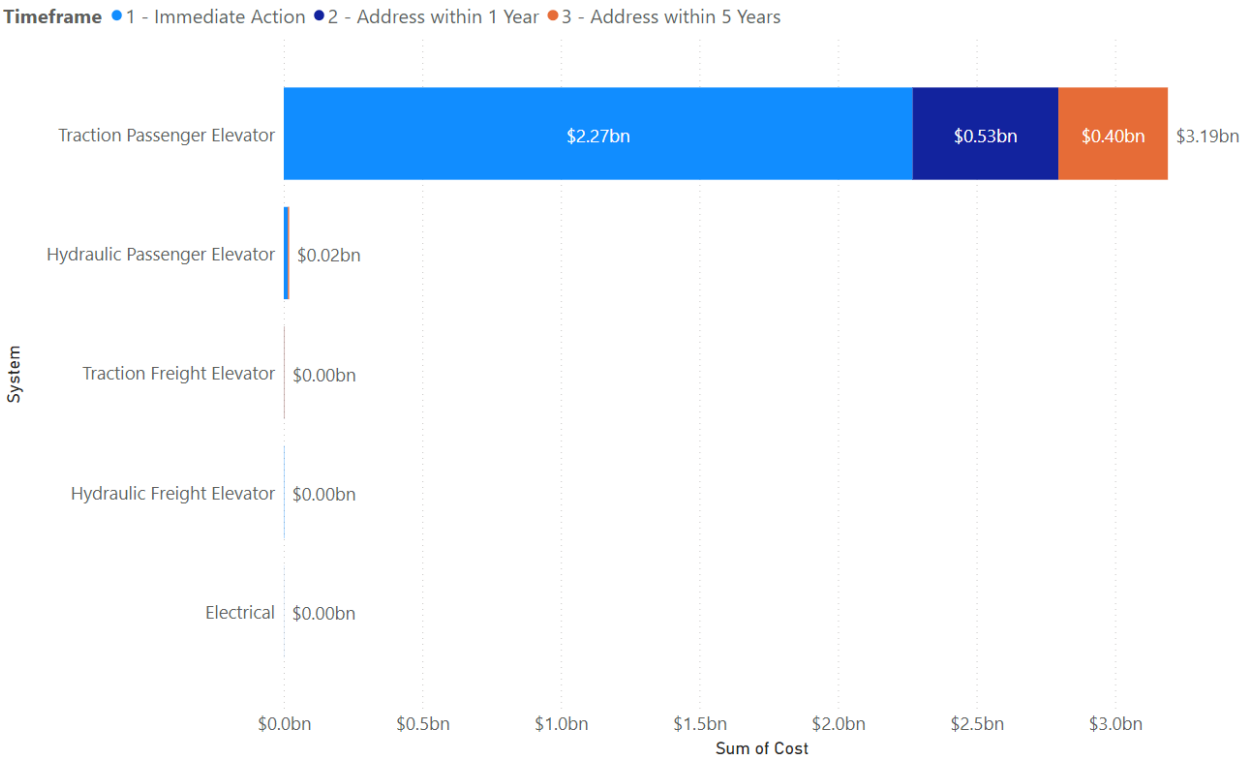

Figure 24 Greatest Rehabilitation Cost (Short-Term) by System for Conveying

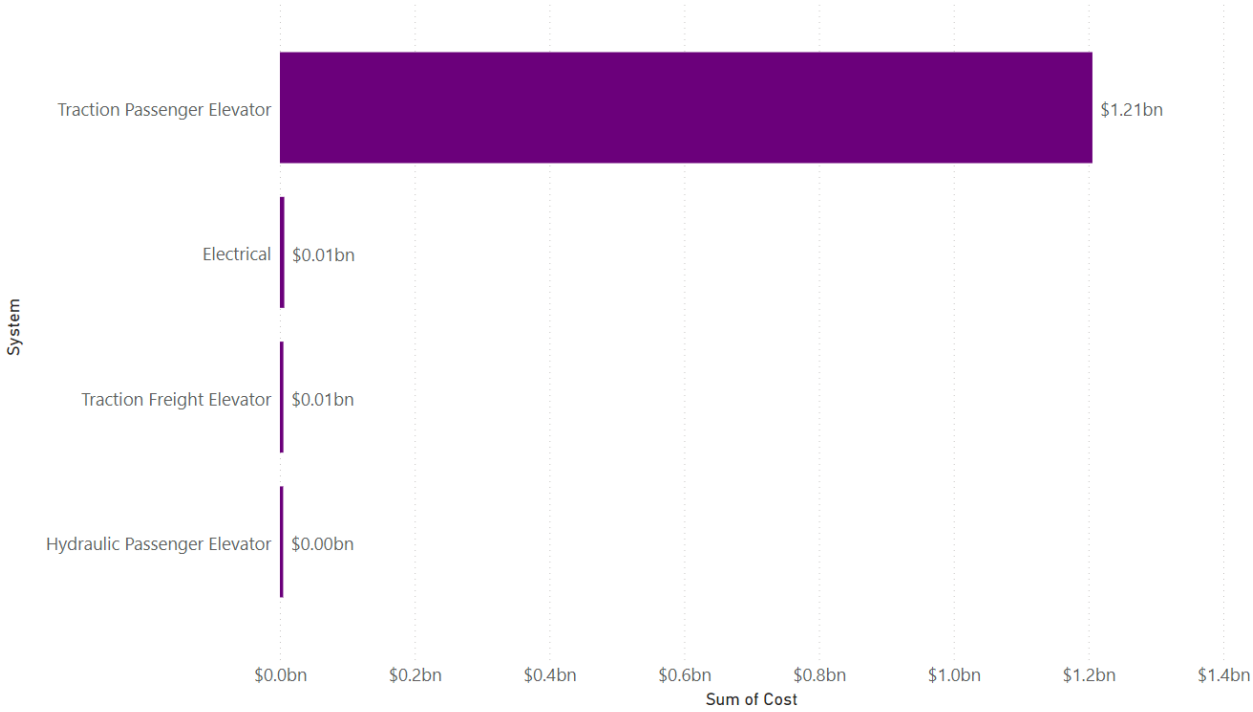

Figure 25 Greatest Rehabilitation Cost (Mid-Term) by System for Conveying

9.2.4 Electrical Portfolio Wide Details

Figure 26 Typical New Distribution Molded Case Circuit Breaker Panelboards (*left*) and antiquated Fused Knife Type Switchboard (*right*)

A key area of concern that was observed during the electrical inspections was antiquated or obsolete power distribution systems. While some buildings have had electrical system upgrades, others have not. This can be addressed through replacement.

The most observed deficiencies were antiquated or obsolete lighting and non-operational lights. Some developments have had lighting upgrades, while others have not. Between the 2017 PNA and the 2023 PNA, the lighting deteriorated slightly as expected.

Several of the developments have emergency generators. The emergency generators were rated between Good to Fair and Fair.

Several of the developments have transformers. The transformers were rated between Good to Fair and Fair and had very minor observed deterioration between the 2017 PNA and the 2023 PNA.

The total rehabilitation (short-term) cost for electrical is $1.23 billion. The major systems contributing to this cost are lighting, switchboard, lighting fixture, service switch, panel board, and security.

The total rehabilitation (mid-term) cost for electrical is $1.88 billion. The major systems contributing to this cost are service switch, switchboard, security, motor starter / contactor, and panel board.

The following graphs depicts the major contributors and costs by Timeframe.

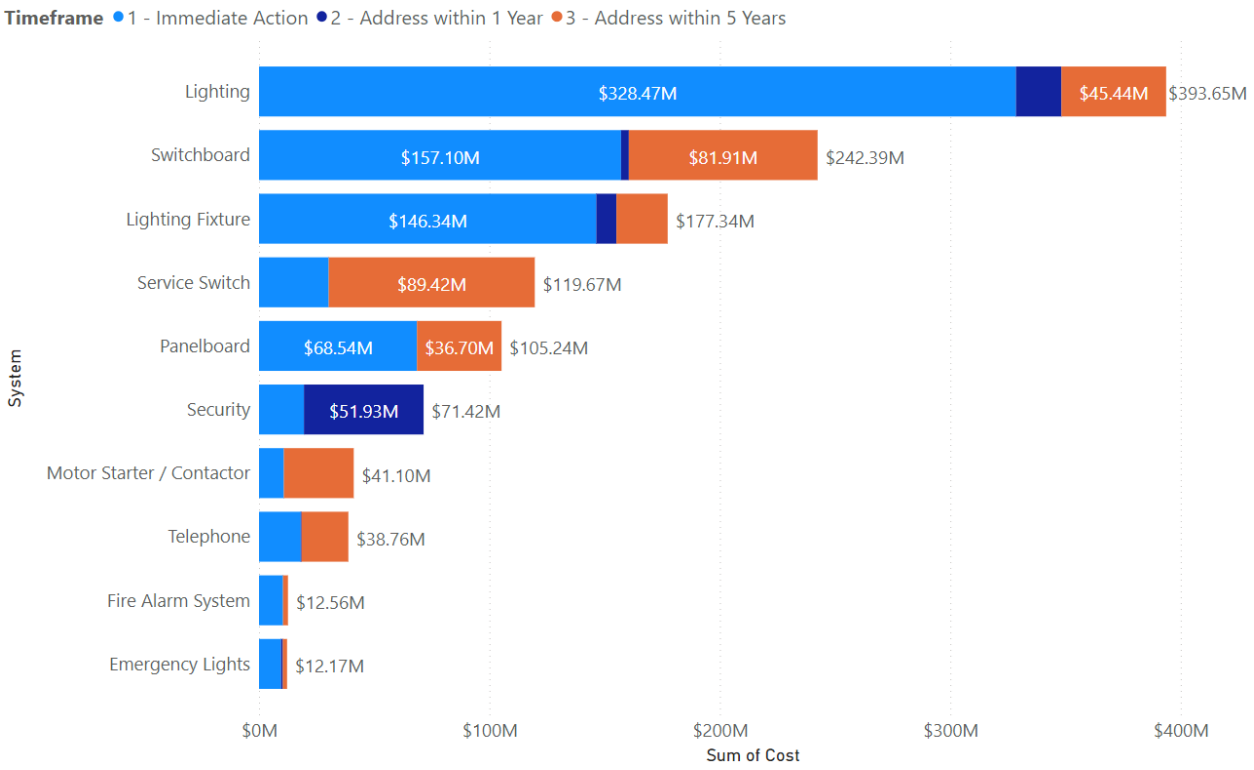

Figure 27 Greatest Rehabilitation Cost (Short-Term) by System for Electrical

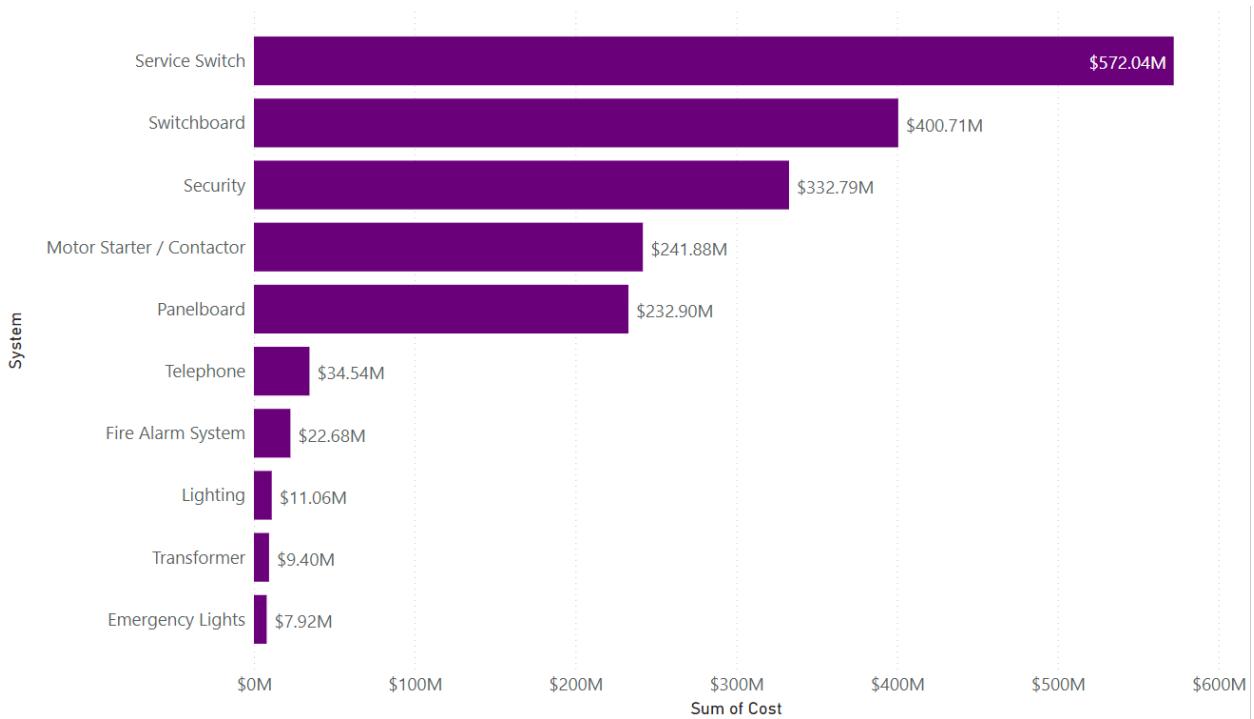

Figure 28 Greatest Rehabilitation Cost (Mid-Term) by System for Electrical

9.2.5 Interior Portfolio Wide Details

Figure 29 Typical Building Interior

The key areas of concern for interior were entry doors, fire rated doors, non-fire rated doors, wall finishes, floor finishes, and interior stairs. The most common observed deficiencies were damaged doors, deteriorated ceiling and wall finishes, deteriorated floor finishes, and cracked glazed masonry. Several developments have been upgraded due to damage from Super Storm Sandy. The deterioration of the non-upgraded items was as expected between the 2017 PNA and the 2023 PNA. Some developments have had improvements to the common areas, such as kitchens and bathrooms.

The total rehabilitation (short-term) cost for interior is $3.07 billion. The major subsystems contributing to this cost are entry doors, corridor finishes, fire rated doors, interior stairs, and common area kitchens.

The total rehabilitation (mid-term) cost for interior is $2.52 billion. The major subsystems contributing to this cost are interior stairs, common area bathrooms and kitchens.

The following graphs depicts the major contributors and costs by Timeframe.

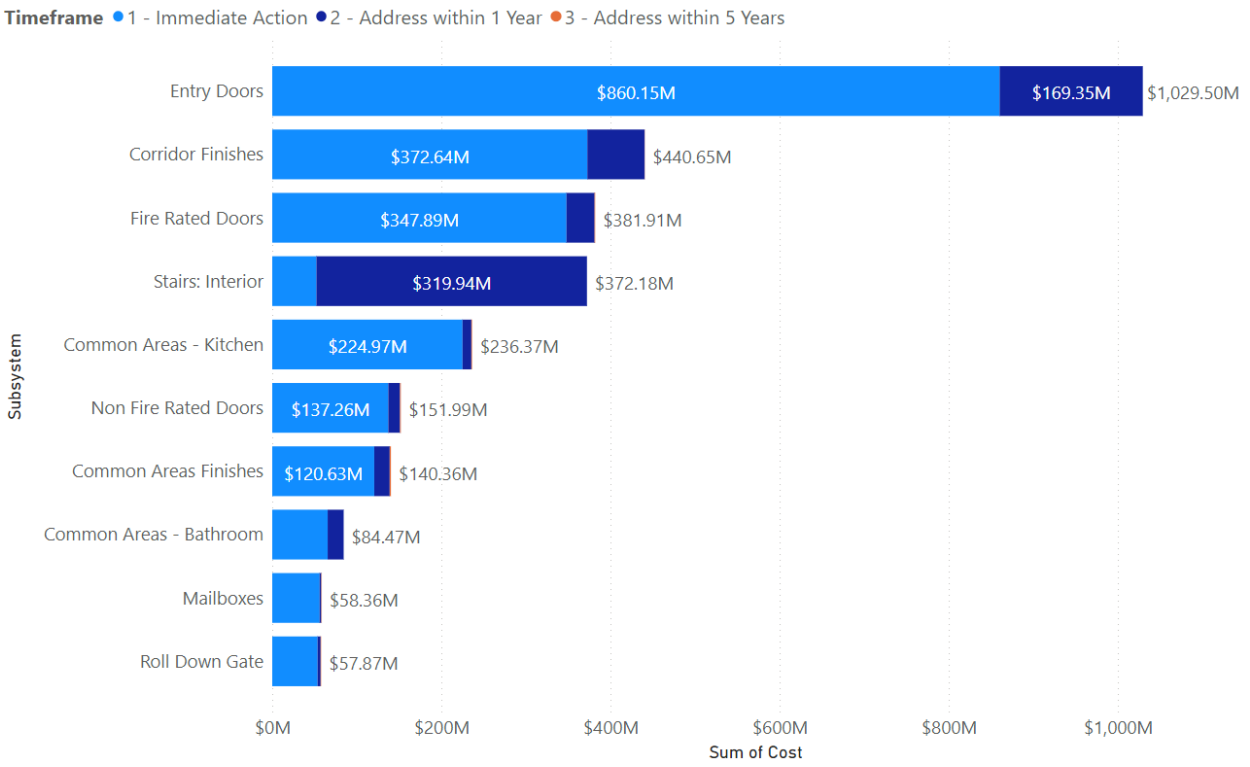

Figure 30 Greatest Rehabilitation Cost (Short-Term) by Subsystem for Interior

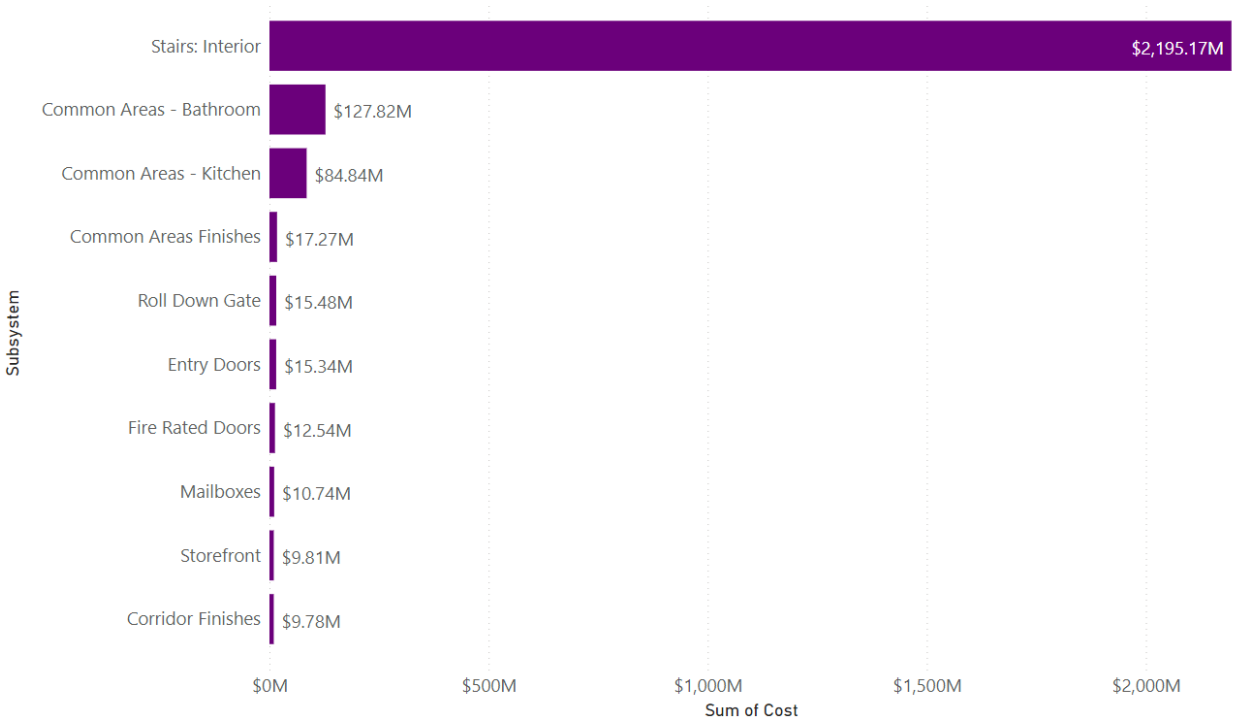

Figure 31 Greatest Rehabilitation Cost (Mid-Term) by Subsystem for Interior

9.2.6 Mechanical Portfolio Wide Details

Figure 32 Typical Packaged Roof Top Unit (*left*) and Steam Boiler (*right*)

In most developments, mechanical systems were observed in varying states across a range of conditions. Several developments have had upgrades to various components such as gravity pumps and vacuum pumps, while others had major upgrades or were under construction due to poor condition. As expected, due to the age of the equipment, several heating systems have deteriorated components such as pumps, rusty pipes, and damaged insulation. The deterioration from the 2017 PNA to the 2023 PNA was due to normal use and changed as expected.

The most common upgrade for the HVAC system was replacement of exhaust fans with some developments having major upgrades due to poor condition. There were also upgrades to some direct expansion split air conditioning systems as well replacement of some window AC units. These upgrades improved the condition rating of the HVAC systems from the 2017 PNA to the 2023 PNA. However, there were some defective exhaust fans and roof top packaged air conditioning units.

For drainage and sewage systems, there were some observed clogged and leaking pipes as well as defective sump pumps. A common observed deficiency was defective floor drains. The condition rating had minimal change from the 2017 PNA to the 2023 PNA.

Several developments have had some domestic water systems upgrades, such as circulating pumps and heat exchangers while other developments had major upgrades due to poor condition. However, there were observed deficiencies such as defective heat exchangers, damaged insulation, leaking flanges, and leaking gravity roof tanks. The deterioration of the non-upgraded items was as expected between the 2017 PNA and the 2023 PNA.

The total rehabilitation (short-term) cost for mechanical is $4.61 billion. The major systems contributing to this cost are heating, heating plant and domestic water systems.

The total rehabilitation (mid-term) cost for mechanical is $6.00 billion. The major systems contributing to this cost are domestic water systems, heating, and drainage / sewage systems.

The following graphs depicts the major contributors and costs by Timeframe.

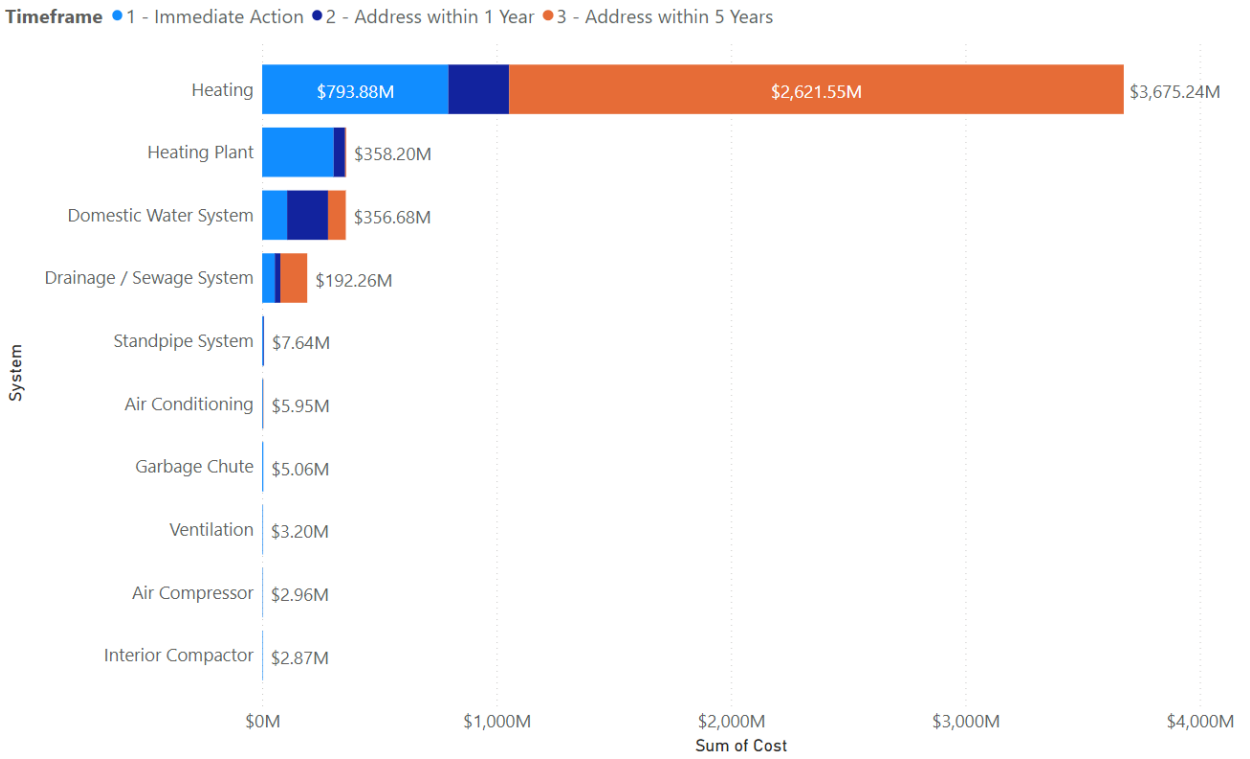

Figure 33 Greatest Rehabilitation Cost (Short-Term) by System for Mechanical

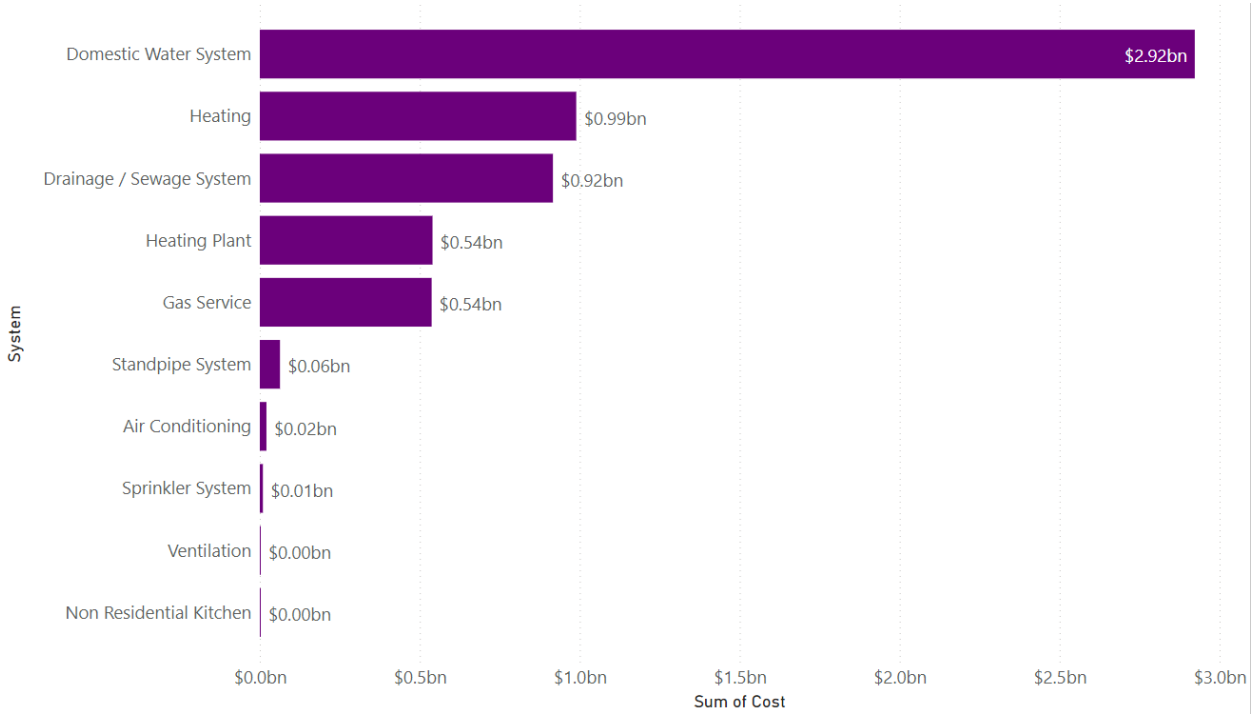

Figure 34 Greatest Rehabilitation Cost (Mid-Term) by System for Mechanical

9.2.7 Site – Architectural Portfolio Wide Details


Figure 35 Playground Area *(left)* and Parking Lot *(right)*

The key areas of concern for site-architectural were parking areas, non-vehicular paved areas, sidewalks, curbs, playground safety matting, and fences. The most common observed deficiencies were asphalt cracks, concrete cracks and damaged fences. The deterioration of the items was due to normal use and the condition rating deteriorated as expected from the 2017 PNA to the 2023 PNA.

Parking lots, paved areas, sidewalks and curbs were typically rated between fair and poor while fences were typically rated fair, and playground were rated between good and fair.

The total rehabilitation (short-term) cost for site-architectural is $1.74 billion. The major systems contributing to this cost are fences, non-vehicular paving, and parking lots.

The total rehabilitation (mid-term) cost for site-architectural is $56.64 million. The major systems contributing to this cost are non-vehicular paving, stairs / ramps, and playgrounds.

The following graphs depicts the major contributors and costs by Timeframe.

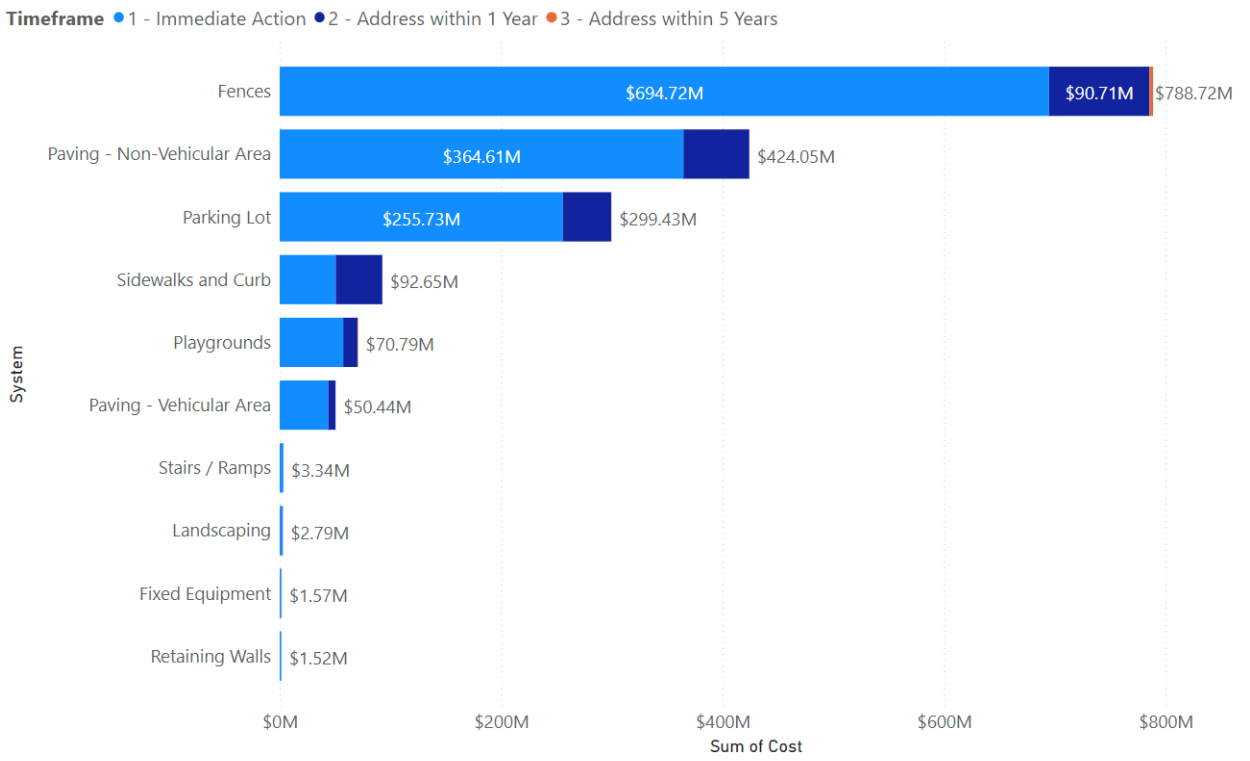

Figure 36 Greatest Rehabilitation Cost (Short-Term) by System for Site-Architectural

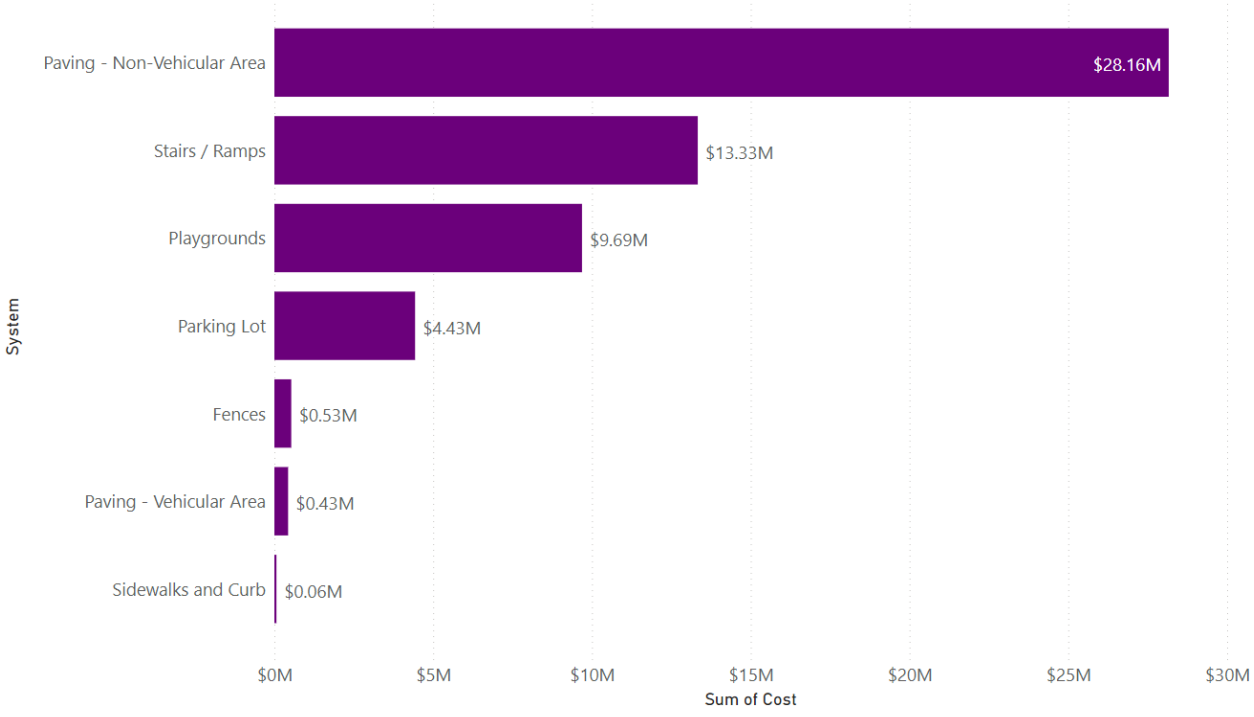

Figure 37 Greatest Rehabilitation Cost (Mid-Term) by System for Site-Architectural

9.2.8 Site – Electrical Portfolio Wide Details


Figure 38 Typical Site Lighting

The site lighting varied from good (recently upgraded) to poor (non-functional). Many developments have had new area lighting installed. For the developments that have not been upgraded, some of the common deficiencies are time clock not operational, photocell not functional, and antique or obsolete lighting. For the lights that were not upgraded, the condition rating deteriorated as expected from the 2017 PNA to the 2023 PNA.

The total rehabilitation (short-term) cost for site-electrical is $40.93 million. The major system contributing to this cost is lighting.

The total rehabilitation (mid-term) cost for site-electrical is $2.26 million. The major system contributing to this cost is lighting.

The following graphs depicts the major contributors and costs by Timeframe.

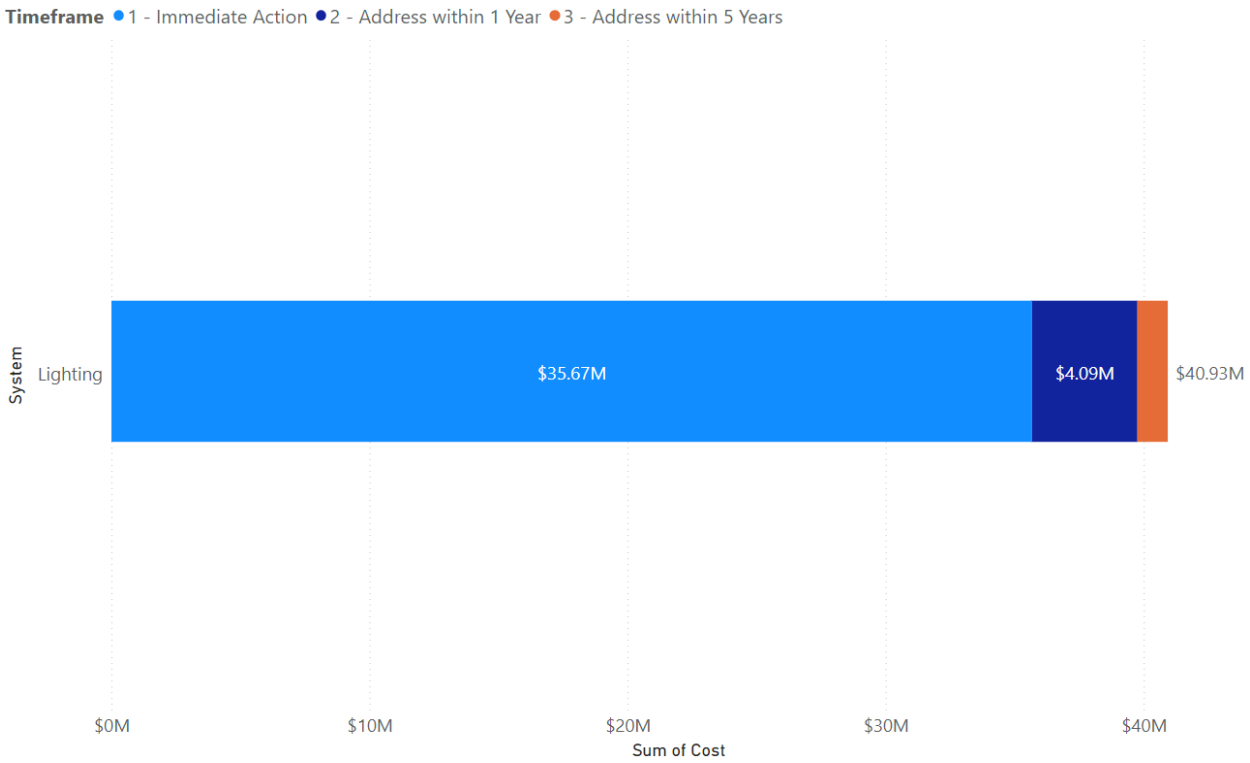

Figure 39 Total Rehabilitation Cost (Short-Term) by System for Site-Electrical

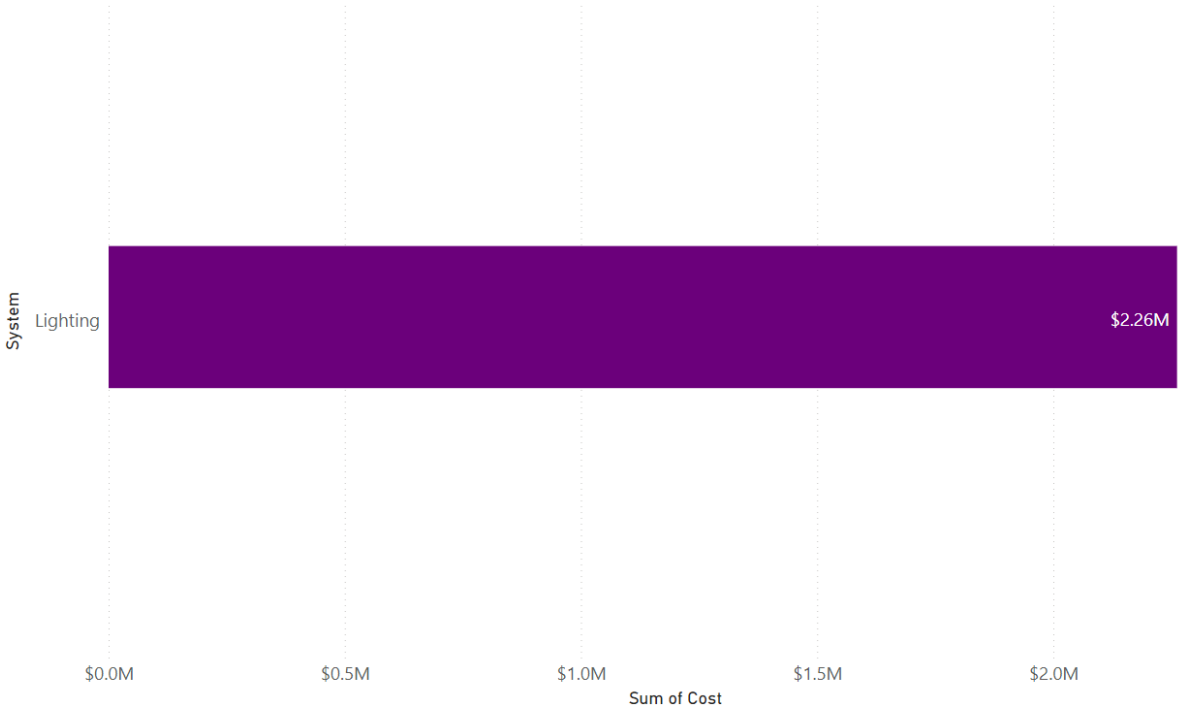

Figure 40 Total Rehabilitation Cost (Mid-Term) by System for Site-Electrical

9.2.9 Site – Mechanical Portfolio Wide Details

Figure 41 Typical Exterior Compactor

Most site-mechanical systems were in fair condition, with a key area of concern being defective steam piping and condensate return piping. Some developments had steam and steam condensate lines upgraded while other developments had active construction projects to replace the steam and steam condensate piping. Some developments had catch basins and fire hydrants with deficiencies. The most common upgrade was exterior compactors. Most items had very minor change in condition rating from the 2017 PNA to the 2023 PNA.

The total rehabilitation (short-term) cost for site-mechanical is $1.23 billion. The major systems contributing to this cost are underground hydronic piping, underground steam piping, underground condensate return piping, and underground natural gas piping.

The total rehabilitation (mid-term) cost for site-mechanical is $415.35 million. The major systems contributing to this cost are storm piping, underground hydronic piping, and underground steam piping.

The following graphs depicts the major contributors and costs by Timeframe.

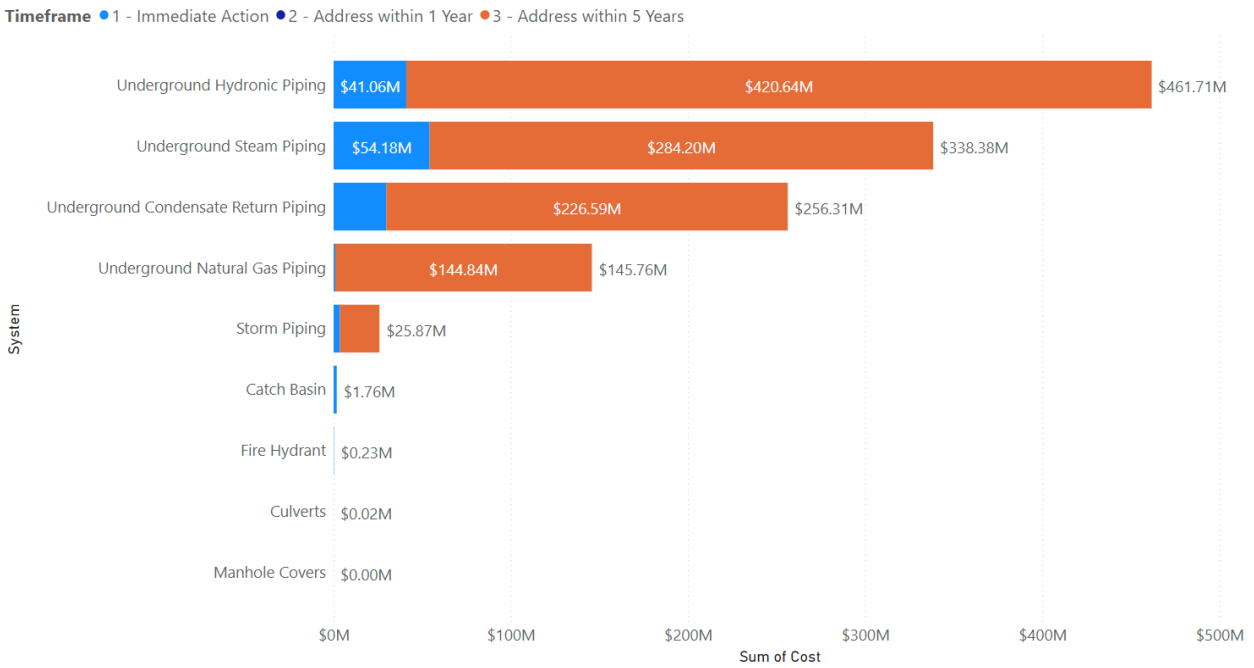

Figure 42 Greatest Rehabilitation Cost (Short-Term) by System for Site-Mechanical

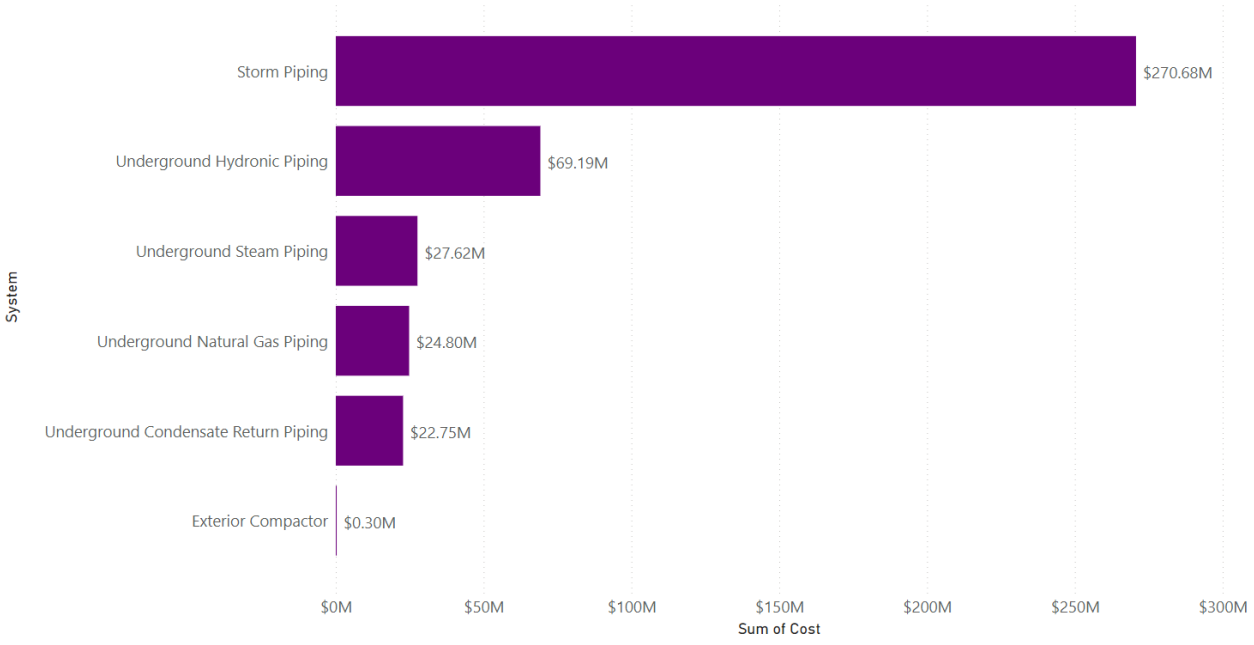

Figure 43 Greatest Rehabilitation Cost (Mid-Term) by System for Site-Mechanical

9.3 By Geolocation

9.3.1 The Bronx

There are 75 NYCHA managed developments within The Bronx. The short-term physical needs estimate for the developments in The Bronx is $15.9 billion. Mid-term cost for the Bronx is $3.8 billion.

9.3.2 Brooklyn

There are 79 NYCHA managed developments within Brooklyn. The short-term physical needs estimate for the developments in Brooklyn is $18.0 billion. Mid-term cost for Brooklyn is $6.3 billion.

9.3.3 Manhattan

There are 79 NYCHA managed developments within Manhattan. The short-term physical needs estimate for the developments in Manhattan is $18.7 billion. Mid-term cost for Manhattan is $5.1 billion.

9.3.4 Queens

There are 21 NYCHA managed developments within Queens. The short-term physical needs estimate for the developments in Queens is $5.8 billion. Mid-term cost for Queens is $2.3 billion.

9.3.5 Staten Island

There are 10 NYCHA managed developments within Staten Island. The short-term physical needs estimate for the developments in Staten Island is $1.9 billion. Mid-term cost for Staten Island is $0.6 billion.

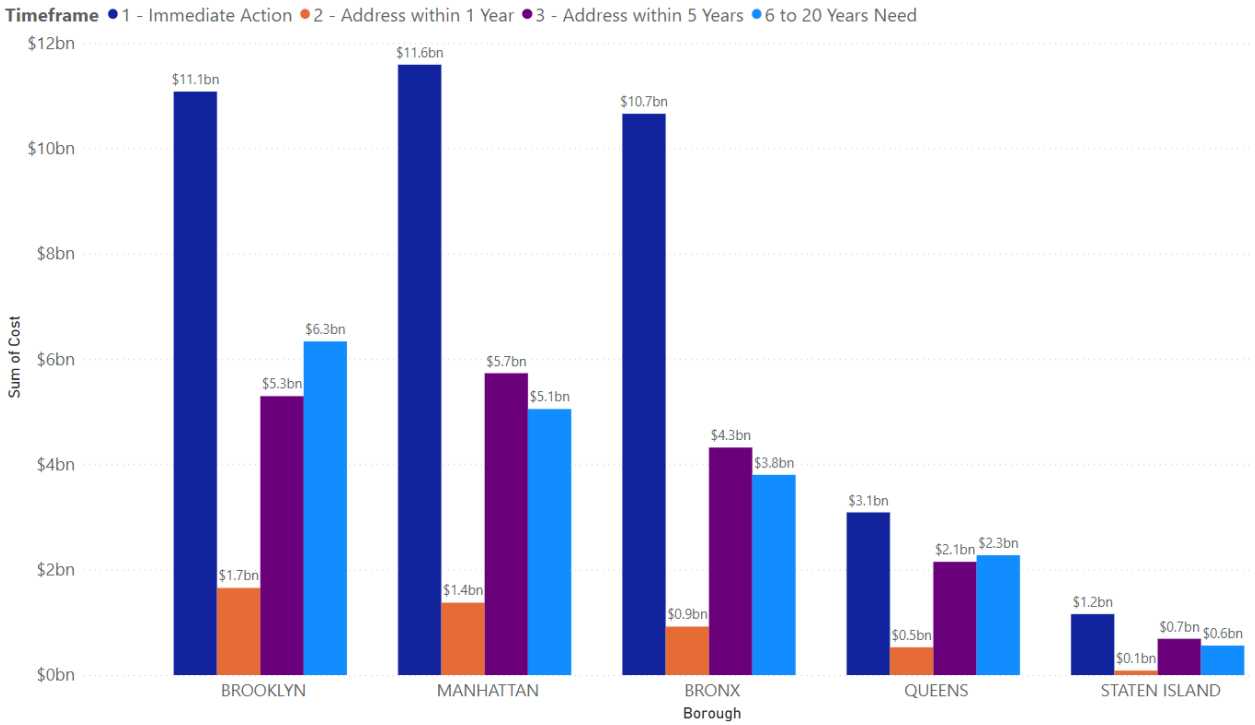

Figure 44 Total Rehabilitation Cost by Timeframe for Each Borough

10 References

The JV used multiple data sources for the PNA analysis to provide the highest level of quality and accuracy of the data. The different data sources were cross-checked to confirm consistency. In addition, as the data was being developed, the JV regularly met with NYCHA to review it and confirm accuracy.

10.1 List of References

- NYCHA Development Maps
- NYCHA Development Fact Sheets
- Maximo data
- Building Floor Plans
- 2017 PNA Reports
- Satellite Imagery and Information
- RS Means costing data for New York City
- Costing/pricing books and data published by the National Electrical Contractors Association (NECA) and other professional organizations
- Vendor's quotes and data
- Internal STV and AECOM databases
- NYC Comptroller's Office 2022-2023 NYC Prevailing Wage Rates published on 7/1/2022

11 Appendix A: Property Questionnaire

NYCHA Physical Needs Assessment (PNA)
Property Questionnaire

The following list of questions is intended to capture your understanding, expertise and insights about the physical conditions of the NYCHA property where you live or work. This information will inform the PNA team and site inspectors in the assessment of the site conditions, systems, assets, and components. The PNA will be used for capital planning and prioritization purposes.

Site and Buildings / General

1. How long have you been working/residing at the property?

2. To your knowledge, have any hazardous conditions been identified in the past year (life safety conditions, equipment problems, major maintenance problems)? What actions have been taken to remedy? Are reports of these conditions filed with NYCHA records?

3. Have renovations and/or upgrade projects (exterior, interior, etc.) been completed at this property in the past 5 years?

4. What repair, replacement, or modification projects are currently in progress/under construction at the property?

Site, Landscape, and Hardscape

1. Are there areas prone to regular flooding? Does flooding occur during both large and small rain events?

2. Are there deficiencies associated with playgrounds, paved areas/courts, driveways / parking areas, planted areas, lawns? Please explain / identify location.

3. Is there a playground located onsite?
   - Who is responsible for the maintenance? NYC Parks or NYCHA

4. Are there water sprays, fountains, or water bodies onsite?

- If yes, are they working? Deficiencies? Please explain / identify location.

5. Are fencing and/or retaining walls missing elements, damaged, or otherwise defective? Please explain / identify location.

6. Are landscaping elements (lawns, trees, plantings, etc.) damaged, dying, or missing? Please explain / identify location.

Structural

1. Are there noticeable structural deficiencies?

2. Are any Dunnage or Roof Support Structures heavily corroded and in need of extensive repairs or replacement? Please explain / identify location.

3. Are there deficiencies associated with structural elements exhibiting open cracks, spalled concrete with exposed steel rebars, or heavy corrosion? Please explain / identify location.

Roof, Parapets, and Bulkheads

1. What is the age of the roof?

2. Has a portion or the roof been replaced? If so, when?

3. Are there roof leaks? If yes, what is the severity level and cause?

4. Are there any deficiencies associated with:
   - Parapet, bulkhead, or exterior walls? Please explain / identify location.

   - Skylights? Please explain / identify location.

5. Are roof railings anchored securely to provide fall protection? Are they free of other defects? Please explain / identify location.

6. Are roof surfaces (primary or bulkhead) poorly pitched and/or holding water/ponding? Please explain / identify location.

Doors and Windows

1. Are windows original or replacement? If replaced, did this occur in the past 5 years?

2. Are there deficiencies associated with windows? Circle those that apply.
   - Broken, difficult to open and close, water/air infiltration. Please explain / identify location.

3. Are doors functioning properly? Are they self-closing, locking, easy to open? Do they have hardware problems or are they otherwise defective?
   - Entrance doors (primary or secondary)? Please explain / identify location.
   - Fire doors? Please explain / identify location.

4. Are there deficiencies associated with metal / glass storefronts? Circle those that apply.
   - Open cracks, open joints, broken glass, water/air infiltration. Please explain / identify location.

Interiors

1. Are there leaks in the basement? Through foundation walls? Please explain / identify location.

2. Are there deficiencies associated with interior stairs such as broken or otherwise damaged treads, risers, or hand railings? Please explain / identify location.

3. Are there deficiencies associated with lobbies or public corridor finishes (walls, floors, ceilings)? Please explain / identify location.

4. Are there deficiencies associated with mailboxes? Please explain / identify location.

Mechanical / General

1. Are mechanical systems original?

2. Has the heating plant been upgraded?

3. What is the frequency of mechanical system maintenance?

4. Are system components or equipment located in crawl spaces? What condition is this equipment in?

Mechanical / Site:

1. Have there been upgrades or modifications to site mechanical systems or components in the past year? Please explain / identify location.

2. Have there been upgrades or modifications to underground piping systems (hydronic, storm, natural gas, steam, condensate)? When?

3. What is the frequency of maintenance activities for site mechanical systems?

4. Are there deficiencies associated with the following? Please explain / identify location:
   - Underground piping or system components
   - Leaking pipes (domestic water, sewage / waste, storm mains, steam, condensate, hydronic)
   - Fire hydrants

Mechanical / Piping

1. Are there known locations of leaking pipes/overflows? This may include domestic water, sewage/waste, storm water, steam, condensate, or hydronic.

2. Does water backup with heavy rain fall?

3. Is there missing insulation on the heating service piping? Where?

Heating, Heating Plant, & Fuel Oil Storage

1. Are buildings using steam or hot water for heating?

2. Does each building have its own mechanical/tank room?

3. How many heating plants/boiler rooms are there in the development? Which building(s)?

4. What type of fuel is being used?

5. Is boiler's internal lining damaged?

6. Are there leaky or plugged boiler tubes? How many in each boiler?

7. What are the refractory conditions inside the boilers? Quantities per boiler?

8. Are there deficiencies associated with the following? Please explain / identify location:
   - Water column / low water cutoff
   - Safety valves or emergency stop switches
   - Burners or burner controls panels
   - Oil tanks, distributions pumps, or oil piping
   - Electric/gas/oil fired water heater
   - Flow alarm, fuel oil level gauge, combustion air louvers
   - Gas booster
   - CO/gas leak detection panels or sensors
   - Condensate return pump
   - F&T and/or terminal unit steam traps
   - Hot water heat exchangers and circulating pumps
   - Radiators, convectors, or baseboards

Air Conditioning

1. Any leaks in the cooling service piping?

2. Do any systems or components utilize obsolete refrigerant types?

3. Are there deficiencies associated with the following? Please explain / identify location:
   - Packaged/rooftop units
   - Packaged terminal air conditioning
   - DX split system (indoor unit, outdoor unit)
   - Thermostats
   - Control sub panels
   - DDC system

Ventilation

1. Have there been recent upgrades or replacements to ventilation systems (fan repair, motor replacement)?

2. Are there deficiencies associated with exhaust or supply fans? Please explain / identify location.

Elevators

1. What is the age of elevator systems onsite?

2. What is the frequency of elevator service and maintenance?

3. Are there recurring problems with the elevators onsite to include, doors, call systems, cabs, hoist

equipment, or other components?

4. How often do elevators go down for service and are inoperable?

Domestic Water System

5. What is the age of primary domestic water equipment/systems onsite?

6. Is the main city water service equipped with backflow preventer? What is its current condition?

7. Is water pressure sufficient onsite?

8. How is domestic water heated?

9. Is there a domestic hot water circulating pump?

10. Are there deficiencies associated with the following? Please explain / identify location:
    - Domestic hot water circulating pumps?
    - Domestic hot water heat exchangers?
    - Domestic hot water storage tank?
    - Rooftop water tanks?
    - Rooftop water tank supply pumps?

Drainage/Sewage System

1. What is the age of sanitary/sewer piping?

2. Have you experienced sewage system clogs, waste drainage, or outflow problems? Please explain / identify location.

3. Are there deficiencies associated with sewage ejector pumps or sump pumps (motor, pump, controls)?

4. Are roof drains clogged, draining slowly, and/or leaking? Please explain / identify location.

Gas Service

1. Were any gas leakages identified and reported in the past year? Please explain / identify location.

2. Is there a gas meter room in the building(s)?

3. Is the gas meter room vented?

4. Is there a gas pressure booster? Identify location.

Fire Protection/Sprinkler System

1. Does the property include a standpipe system? Identify location.

2. What is the age of the standpipe system?

3. Is the system equipped with standpipe hose cabinets?

4. Does the property / building(s) include a sprinkler system(s)? Identify location.

5. When was the sprinkler system installed?

6. Are there deficiencies associated with sprinkler heads or other components? Please explain / identify location.

Compactors

1. What is the age of the building(s) exterior / interior compactor(s)?

2. Are there deficiencies associated with exterior / interior compactors or garbage chutes? Please explain / identify location.

General - Electrical

1. Where are main electrical switchboards, distributions frames, panels, etc. located?

2. Have there been recent electrical or lighting system upgrades (interior / exterior / LED / energy efficiency conversions)?

3. Does the property / building(s) include the following? Please explain deficiencies / identify location:
   - Emergency generators
   - Automatic transfer switch

- Computer labs
- Cable TV system
- Stage lighting and theater dimmers

Security Systems:

1. Does the property / building(s) include a security system?
2. Is the system connected to a central station?
3. Are there deficiencies associated with the following? Please explain / identify location:
   - "Connection failure" messages
   - Sirens and/or strobes
   - CCTV cameras or other monitoring and recording components

Fire Alarm and Communications Systems

1. Are there deficiencies associated with fire alarm systems? Please explain / identify location.
2. Does a digital communicator dial out to a central station during alarm events?
3. Are there deficiencies associated with PA system amplifiers or components?

12 Appendix B: Deterioration Curves

The following provides additional explanation on the development of the deterioration curves.

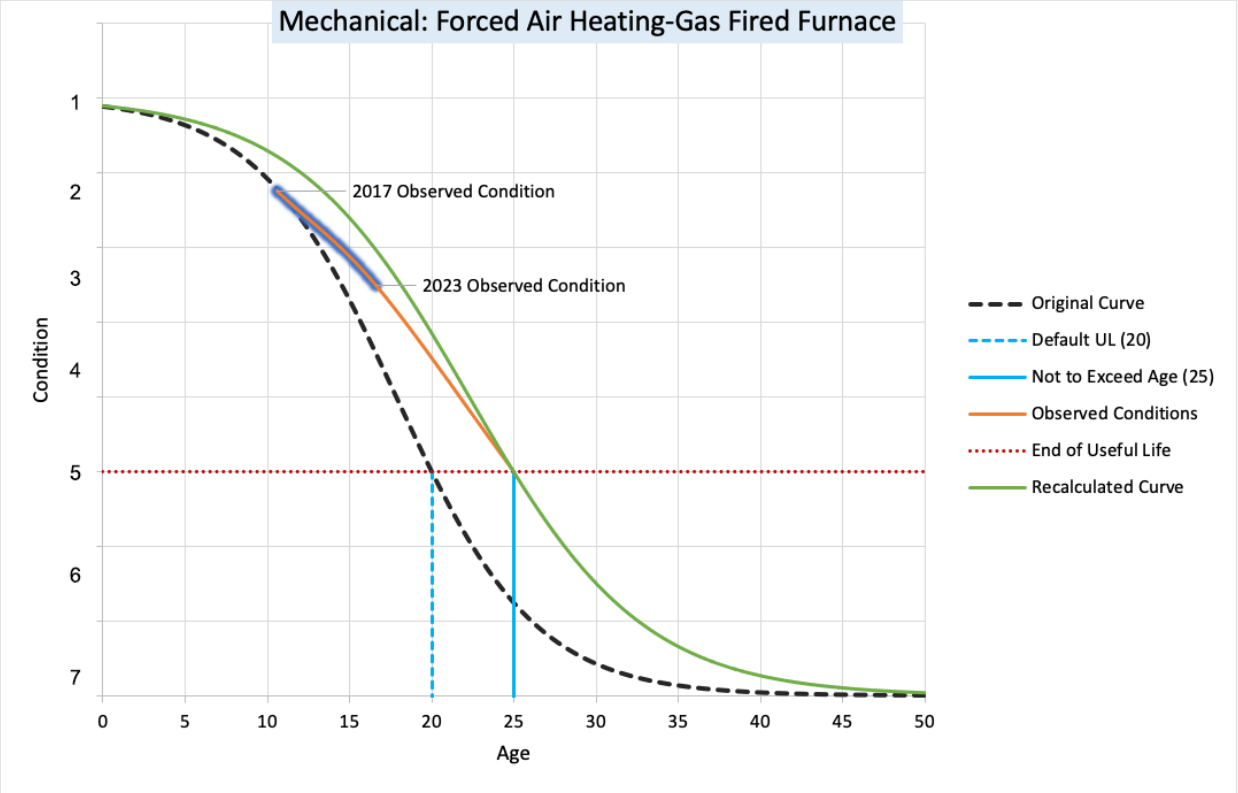

Figure 45 Example of Deterioration with Time

The following logistic equation is used:

$$y = J_0 + \frac{J_1}{\left(1 + e^{-C_0 - C_1 x - C_2 \sqrt{x}}\right)}$$

Each factor in the equation is described below.

C_0 is an x-translational parameter. Changing this value changes where along the lifecycle curve a new asset will start. Increasing this value shifts the curve uniformly to the right.

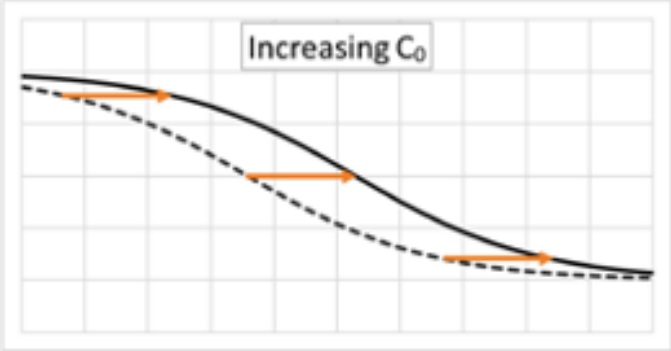

Figure 46 Increasing C_0 Moves the Deterioration Curve to the Right

C_1 is an x-scalar parameter. Changes to this value affect how quickly an asset progresses through the curve as it ages. Negative values indicate the curve progresses from high to low; positive values indicate the curve progresses from low to high. Increasing the magnitude (away from zero) shrinks the curve.

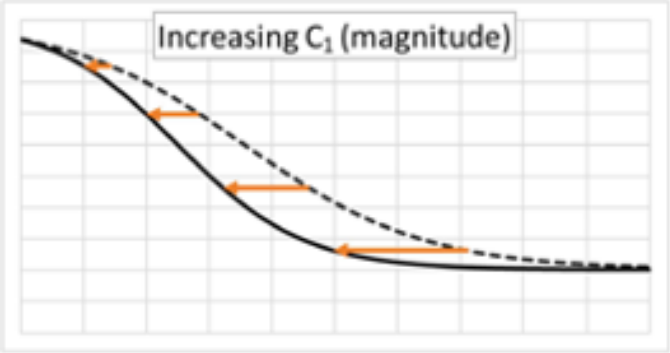

Figure 47 Increasing C_1 Changes the Slope of the Deterioration Curve

C_2 is an attenuating x-scalar parameter. Increasing the magnitude, in the same direction as C_1 (positive vs. negative), shrinks the curve and causes the asset to progress more quickly through it. However, the effect attenuates as the asset ages. This is useful for assets with extremely long “tails” such as concrete structures.

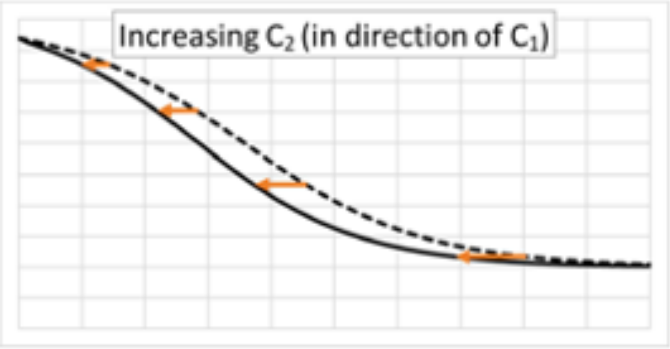

Figure 48 Increasing C_2 Shifts the Deterioration Curve to the Left but Keeps the End Points

J_0 is a y-translational parameter. This represents the minimum value that the asset asymptotically approaches, either as it ages (when C_1 is negative) or near the beginning of its life (when C_1 is positive).

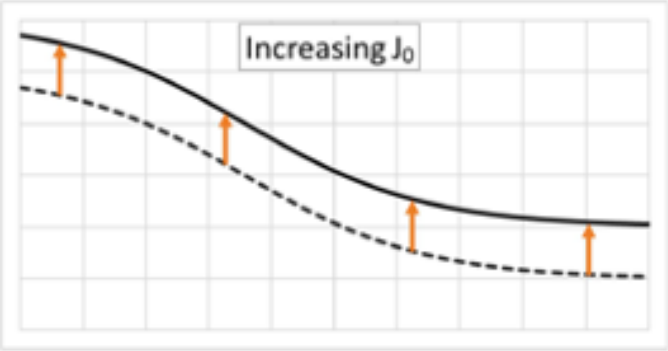

Figure 49 Increasing J_0 Shifts the Deterioration Curve Up

J_1 is a y-scalar parameter. This represents the size of the range between the minimum and maximum value. Increasing this value scales up the output value and increases the maximum value.

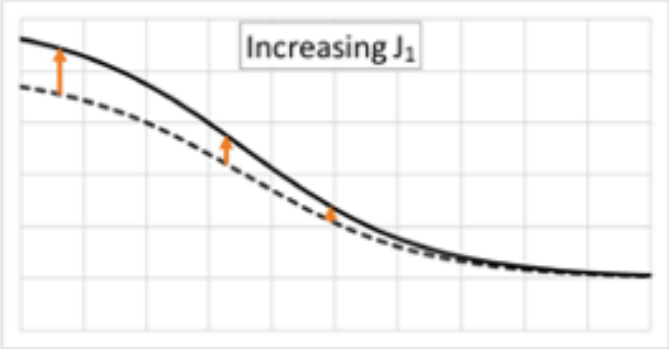

Figure 50 Increasing J_1 Shifts the Deterioration Curve at the Beginning of the Asset's Life

Each parameter of the equation is imported into the system, and each PBS item is then assigned a relative age based on its observed condition. Each asset is then incrementally aged each year until it reaches its end of useful life. At that point, a PBS Replacement will be recommended.

13 Appendix C: Development and Building Information for the Inspected Developments

Table 9 Development and Building Information for the Inspected Developments

Development	No. Apt. (Total)	Borough	No. Dwelling Bldg.	No. Non-dwelling Bldg.	No. Elevators	No. Floors
303 Vernon Avenue	234	Brooklyn	1	0	2	24
Albany	823	Brooklyn	6	0	12	14
Albany II	400	Brooklyn	3	0	6	13
Baruch	2,193	Manhattan	17	1	34	14
Baruch Houses Addition	197	Manhattan	1	0	2	23
Carey Gardens	682	Brooklyn	3	2	10	17
Castle Hill	2,024	The Bronx	14	0	29	12
Gravesend	633	Brooklyn	15	0	15	7
Harborview Terrace	377	Manhattan	2	0	5	14
Highbridge Gardens	699	The Bronx	6	0	12	14
International Tower	146	Queens	1	0	2	10
King Towers	1376	Manhattan	10	0	21	14
Lexington	448	Manhattan	4	0	8	14
Marble Hill	1,682	The Bronx	11	1	22	14
Marcy	1,716	Brooklyn	27	1	70	6
Polo Grounds Towers	1,613	Manhattan	4	4	24	30
Queensbridge North	1,542	Queens	13	1	48	6
Queensbridge South	1,604	Queens	13	2	49	6
Red Hook East	1,406	Brooklyn	16	3	48	6
Red Hook West	1,471	Brooklyn	14	1	44	14
Richmond Terrace	488	Staten Island	6	1	12	9
Rutgers	721	Manhattan	5	0	10	20
South Jamaica I	448	Queens	11	1	0	4
South Jamaica II	599	Queens	16	0	8	7
Straus	267	Manhattan	2	0	4	20
Taft	1,464	Manhattan	9	1	18	19
Taylor Street-Wythe Avenue	524	Brooklyn	5	1	10	11
Tompkins	1,045	Brooklyn	8	1	24	8
Two Bridges URA (Site 7)	250	Manhattan	1	0	4	26
Whitman	1,652	Brooklyn	15	3	32	6
Total	**28,724**		**259**	**24**	**585**	

14 Appendix D: Cost Analysis Flow Chart

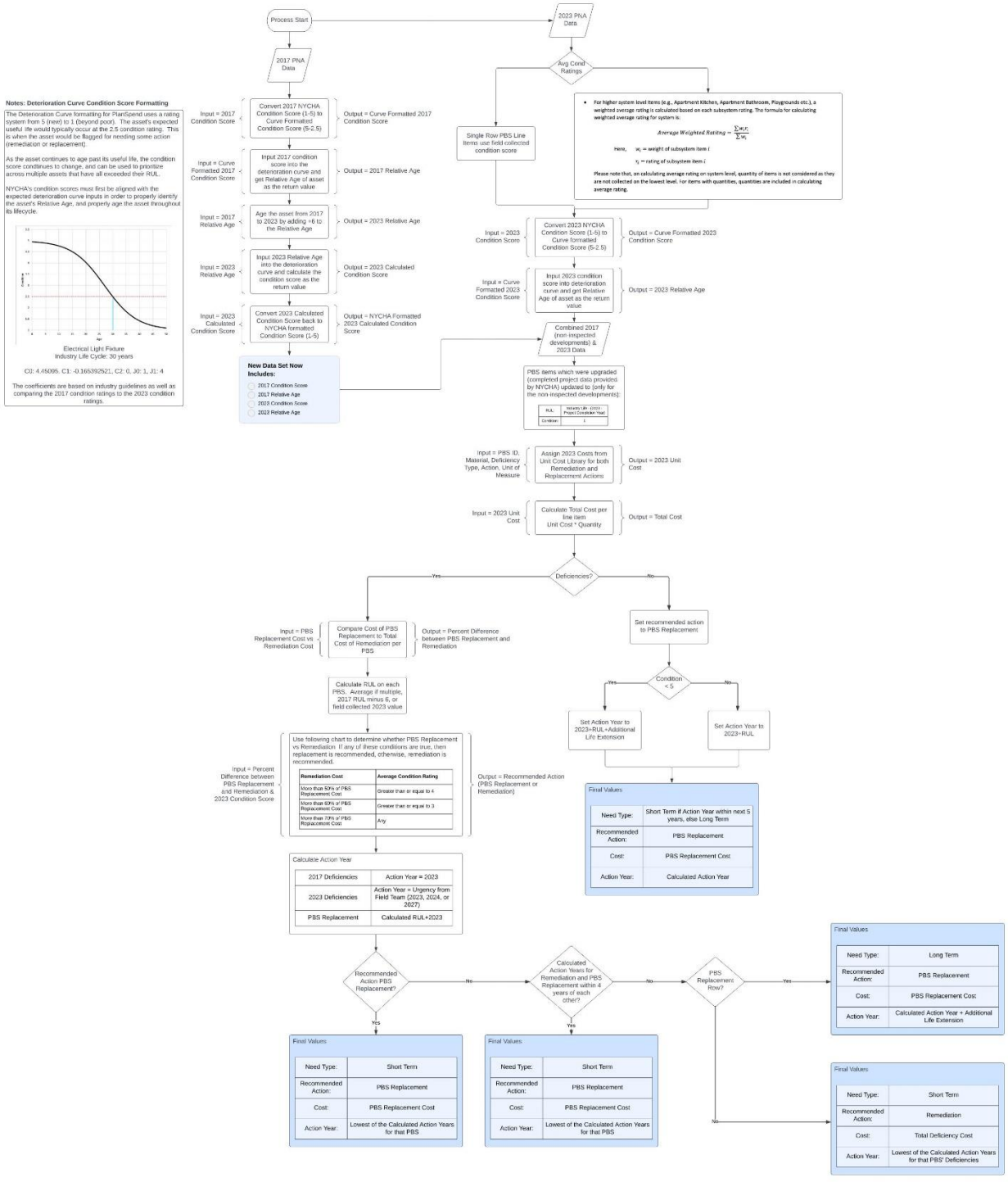

Figure 51 Flow Chart Illustrating the Process to Develop Remediation and Replacement Cost

15 Appendix E: Physical Breakdown Structure

Table 10 Physical Breakdown Structure

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
1	Apartment	Architectural			
2	Interior	Interior	Entry Doors		
3	Apartment	Architectural	Ceiling		
4	Apartment	Architectural	Floor		
5	Apartment	Architectural	Wall		
6	Apartment	Architectural	Closet		
7	Apartment	Architectural	Doors		
8	Apartment	Architectural	Bathroom		
9	Apartment	Architectural	Bathroom	Wall Finishes	
10	Apartment	Architectural	Bathroom	Door Saddle	
11	Apartment	Architectural	Bathroom	Bathtub	
12	Apartment	Architectural	Bathroom	Shower Head and Valve	
13	Apartment	Architectural	Bathroom	Shower Stall	
14	Apartment	Architectural	Bathroom	Sink	
15	Apartment	Architectural	Bathroom	Toilet	
16	Apartment	Architectural	Bathroom	Vanity	
17	Apartment	Architectural	Bathroom	Accessories	
18	Apartment	Architectural	Bathroom	Exhaust / Vent	
19	Apartment	Architectural	Kitchen		
20	Apartment	Architectural	Kitchen	Cabinets	
21	Apartment	Architectural	Kitchen	Sink	
22	Apartment	Architectural	Stairs		
23	Apartment	Architectural	Stairs	Stairs and Landings	
24	Apartment	Architectural	Stairs	Handrails	
25	Apartment	Mechanical			
26	Apartment	Mechanical	Thermostat		
27	Apartment	Mechanical	Terminal Unit Steam Trap		
28	Apartment	Mechanical	Radiator / Convector / Baseboard		
29	Apartment	Electrical			
30	Apartment	Electrical	Intercom		
31	Apartment	Electrical	Electrical Panel Board		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
32	Apartment	Electrical	Electrical Panel Board	Molded Case Circuit Breakers	
33	Apartment	Electrical	Electrical Panel Board	Fused Toggle Switch	
34	Apartment	Electrical	Light Fixtures		
35	Apartment	Electrical	Light Fixtures	Fluorescent	
36	Apartment	Electrical	Light Fixtures	Fluorescent	Pendant
37	Apartment	Electrical	Light Fixtures	Fluorescent	Recessed
38	Apartment	Electrical	Light Fixtures	Fluorescent	Surface
39	Apartment	Electrical	Light Fixtures	Incandescent	
40	Apartment	Electrical	Light Fixtures	Incandescent	Pendant
41	Apartment	Electrical	Light Fixtures	Incandescent	Recessed
42	Apartment	Electrical	Light Fixtures	Incandescent	Surface
43	Apartment	Electrical	Light Fixtures	LED	
44	Apartment	Electrical	Light Fixtures	LED	Pendant
45	Apartment	Electrical	Light Fixtures	LED	Recessed
46	Apartment	Electrical	Light Fixtures	LED	Surface
47	Apartment	Electrical	Smoke Detectors		
48	Architectural	Exterior			
49	Architectural	Exterior	Areaway Drains		
50	Architectural	Exterior	Areaway Slab		
51	Architectural	Exterior	Areaway Walls		
52	Architectural	Exterior	Areaways Grating		
53	Architectural	Exterior	Awnings and Canopies		
54	Architectural	Exterior	Balcony / Terrace		
55	Architectural	Exterior	Balcony / Terrace	Railings	
56	Architectural	Exterior	Balcony / Terrace	Drainage	
57	Architectural	Exterior	Chimney		
58	Architectural	Exterior	Coping		
59	Architectural	Exterior	Cornice		
60	Architectural	Exterior	Main Doors		
61	Architectural	Exterior	Main Doors	Primary	
62	Architectural	Exterior	Main Doors	Primary	Doors and Frames
63	Architectural	Exterior	Main Doors	Primary	Transom / Side Light
64	Architectural	Exterior	Main Doors	Secondary	

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
65	Architectural	Exterior	Main Doors	Secondary	Doors and Frames
66	Architectural	Exterior	Main Doors	Secondary	Transom / Side Light
67	Architectural	Exterior	Doors		
68	Architectural	Exterior	Door Lintels		
69	Architectural	Exterior	Exterior Walls		
70	Architectural	Exterior	Exterior Walls	Exterior Walls	
71	Architectural	Exterior	Exterior Walls	Bulkhead Walls	
72	Architectural	Exterior	Loading Dock		
73	Architectural	Exterior	Louver		
74	Architectural	Exterior	Parapets		
75	Architectural	Exterior	Roof		
76	Architectural	Exterior	Roof	Main Roof	
77	Architectural	Exterior	Roof	Main Roof	Roofing
78	Architectural	Exterior	Roof	Main Roof	Flashing
79	Architectural	Exterior	Roof	Main Roof	Hatch
80	Architectural	Exterior	Roof	Main Roof	Ladder
81	Architectural	Exterior	Roof	Main Roof	Leaders, Gutters, Downspouts
82	Architectural	Exterior	Roof	Main Roof	Pitch Pockets
83	Architectural	Exterior	Roof	Main Roof	Roof Fence
84	Architectural	Exterior	Roof	Main Roof	Roof Drains
85	Architectural	Exterior	Roof	Main Roof	Cupola
86	Architectural	Exterior	Roof	Main Roof	Dormer
87	Architectural	Exterior	Roof	Main Roof	Dunnage
88	Architectural	Exterior	Roof	Main Roof	Skylight
89	Architectural	Exterior	Roof	Main Roof	Water Tank Support Structure
90	Architectural	Exterior	Roof	Main Roof	Water Tank Enclosure
91	Architectural	Exterior	Roof	Low Roof	
92	Architectural	Exterior	Roof	Low Roof	Roofing
93	Architectural	Exterior	Roof	Low Roof	Flashing
94	Architectural	Exterior	Roof	Low Roof	Hatch
95	Architectural	Exterior	Roof	Low Roof	Ladder
96	Architectural	Exterior	Roof	Low Roof	Leaders, Gutters, Downspouts
97	Architectural	Exterior	Roof	Low Roof	Pitch Pockets

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
98	Architectural	Exterior	Roof	Low Roof	Roof Fence
99	Architectural	Exterior	Roof	Low Roof	Roof Drains
100	Architectural	Exterior	Roof	Low Roof	Cupola
101	Architectural	Exterior	Roof	Low Roof	Dormer
102	Architectural	Exterior	Roof	Low Roof	Dunnage
103	Architectural	Exterior	Roof	Low Roof	Skylight
104	Architectural	Exterior	Roof	Low Roof	Water Tank Support Structure
105	Architectural	Exterior	Roof	Low Roof	Water Tank Enclosure
106	Architectural	Exterior	Roof	Bulkhead Roof	
107	Architectural	Exterior	Roof	Bulkhead Roof	Roofing
108	Architectural	Exterior	Roof	Bulkhead Roof	Flashing
109	Architectural	Exterior	Roof	Bulkhead Roof	Hatch
110	Architectural	Exterior	Roof	Bulkhead Roof	Ladder
111	Architectural	Exterior	Roof	Bulkhead Roof	Leaders, Gutters, Downspouts
112	Architectural	Exterior	Roof	Bulkhead Roof	Pitch Pockets
113	Architectural	Exterior	Roof	Bulkhead Roof	Roof Fence
114	Architectural	Exterior	Roof	Bulkhead Roof	Roof Drains
115	Architectural	Exterior	Roof	Bulkhead Roof	Dunnage
116	Architectural	Exterior	Roof	Bulkhead Roof	Skylight
117	Architectural	Exterior	Stairs / Ramps		
118	Architectural	Exterior	Stairs / Ramps	Cheek / Flank Walls	
119	Architectural	Exterior	Stairs / Ramps	Railings	
120	Architectural	Exterior	Stairs / Ramps	Stairs / Ramps	
121	Architectural	Exterior	Windows		
122	Architectural	Exterior	Windows	Windows	
123	Architectural	Exterior	Windows	A/C Brackets and Sleeves	
124	Architectural	Exterior	Windows	Child Guards	
125	Architectural	Exterior	Windows	Exterior Guards	
126	Architectural	Exterior	Windows	Sills	
127	Architectural	Exterior	Windows	Interior Guards	
128	Architectural	Exterior	Windows Lintels		
129	Architectural	Exterior	Fire Escape-Steel		
130	Architectural	Structural			

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
131	Architectural	Structural	Columns / Beams / Bearing Walls		
132	Architectural	Structural	Roof Structure		
133	Architectural	Structural	Floor Structure		
134	Architectural	Structural	Foundation Walls		
143	Electrical	Computer Lab			
144	Electrical	Computer Lab	Dedicated Panel		
145	Electrical	Computer Lab	Raceway With Surge Protected Receptacles		
146	Electrical	Emergency Call System (For Sr Citizens)			
147	Electrical	Emergency Call System (For Sr Citizens)	Bells / Other Audible Devices		
148	Electrical	Emergency Call System (For Sr Citizens)	Remote Annunciator		
149	Electrical	Emergency Call System (For Sr Citizens)	Strobe Light		
150	Electrical	Emergency DC Standby Battery Power			
151	Electrical	Emergency DC Standby Battery Power	Lead-Acid Battery Bank		
152	Electrical	Emergency DC Standby Battery Power	Nickel-Cadmium Battery Bank		
153	Electrical	Emergency Generator Set			
160	Electrical	Emergency Generator Set	Automatic Transfer Switch (ATS)		
161	Electrical	Emergency Generator Set	Battery Charger		
162	Electrical	Emergency Lights	Emergency Light/Exit Light Panel		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
163	Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Fused Disconnect Switch	
164	Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Fused Knife Switch	
165	Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Fused Toggle Switch	
166	Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Molded Case Circuit Breakers	
167	Electrical	Emergency Lights	Emergency Lighting		
168	Electrical	Emergency Lights	Emergency Lighting	Battery Pack	
169	Electrical	Emergency Lights	Emergency Lighting	Non Battery Pack	
170	Electrical	Emergency Lights	Emergency Lighting	Relay Test Switch	
171	Electrical	Emergency Lights	Exit Lights		
172	Electrical	Emergency Lights	Exit Lights	Battery Pack	
173	Electrical	Emergency Lights	Exit Lights	Non Battery Pack	
174	Electrical	Emergency Lights	Exit/Emergency Combination		
175	Electrical	Emergency Lights	Exit/Emergency Combination	Battery Pack	
176	Electrical	Emergency Lights	Exit/Emergency Combination	Non Battery Pack	
177	Electrical	Fire Alarm System			
178	Electrical	Fire Alarm System	Fire Alarm System		
179	Electrical	Fire Alarm System	Fire Alarm System	Bells	
180	Electrical	Fire Alarm System	Fire Alarm System	CO Detector	
181	Electrical	Fire Alarm System	Fire Alarm System	Duct Smoke Detector	
182	Electrical	Fire Alarm System	Fire Alarm System	Fan Shutdown Controls	
183	Electrical	Fire Alarm System	Fire Alarm System	Fire Alarm Strobe	

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
184	Electrical	Fire Alarm System	Fire Alarm System	Heat Detector	
185	Electrical	Fire Alarm System	Fire Alarm System	Horns	
186	Electrical	Fire Alarm System	Fire Alarm System	Magnetic Door Holder Contactors	
187	Electrical	Fire Alarm System	Fire Alarm System	Smoke Detector	
188	Electrical	Fire Alarm System	Fire Alarm System	Sprinkler Flow Switch	
189	Electrical	Fire Alarm System	Fire Alarm System	Tamper Switch	
190	Electrical	Fire Alarm System	Fire Alarm System	Manual Pull Station	
191	Electrical	Fire Alarm System	Fused Cutout Panel		
192	Electrical	Fire Alarm System	Main Panel		
193	Electrical	Fire Alarm System	Main Panel	Bells at Panel	
194	Electrical	Fire Alarm System	Main Panel	F A C P (Electronic)	
195	Electrical	Fire Alarm System	Main Panel	F A C P (Standard)	
196	Electrical	Fire Alarm System	Main Panel	Remote Annunciator	
197	Electrical	Fire Alarm System	Main Panel	Remote Annunciator	Display Monitor
198	Electrical	Fire Alarm System	Main Panel	Remote Annunciator	Panel
199	Electrical	Fire Alarm System	Main Panel	Remote Annunciator	Printer
200	Electrical	Fire Alarm System	Sub-Panel		
201	Electrical	Fire Alarm System	Sub-Panel	Bells at Panel	
202	Electrical	Fire Alarm System	Sub-Panel	Electronic	
203	Electrical	Fire Alarm System	Sub-Panel	Standard	
204	Electrical	Fire Alarm System	Fire Pump Digital Alarm Communicator		
205	Electrical	Grounding System			

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
206	Electrical	LAN			
207	Electrical	LAN	Local Distribution Frame (L/LDF)		
208	Electrical	LAN	Main Equipment Rack (MDF)		
209	Electrical	Lighting	Exterior Security / Riot Lights		
210	Electrical	Lighting	Stage Theater		
211	Electrical	Lighting	Theater House Lights		
212	Electrical	Lighting Fixture	Fluorescent		
213	Electrical	Lighting Fixture	Fluorescent	Pendant Mounted	
214	Electrical	Lighting Fixture	Fluorescent	Recessed Mounted	
215	Electrical	Lighting Fixture	Fluorescent	Surface Mounted	
216	Electrical	Lighting Fixture	HID		
217	Electrical	Lighting Fixture	HID	Pendant Mounted	
218	Electrical	Lighting Fixture	HID	Recessed Mounted	
219	Electrical	Lighting Fixture	HID	Surface Mounted	
220	Electrical	Lighting Fixture	Incandescent		
221	Electrical	Lighting Fixture	Incandescent	Pendant Mounted	
222	Electrical	Lighting Fixture	Incandescent	Recessed Mounted	
223	Electrical	Lighting Fixture	Incandescent	Surface Mounted	
224	Electrical	Lighting Fixture	LED		
225	Electrical	Lighting Fixture	LED	Pendant Mounted	
226	Electrical	Lighting Fixture	LED	Recessed Mounted	
227	Electrical	Lighting Fixture	LED	Surface Mounted	
228	Electrical	Lightning Protection			
229	Electrical	Local Sound System			

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
230	Electrical	Local Sound System	Auditorium		
231	Electrical	Local Sound System	Cafeteria		
232	Electrical	Local Sound System	Community Center / Other Areas		
233	Electrical	Local Sound System	Gym		
234	Electrical	Motor Control Center			
235	Electrical	Motor Control Center	Combination - Circuit Breaker Type		
236	Electrical	Motor Control Center	Combination - Fused Type		
237	Electrical	Motor Starter / Contactor			
238	Electrical	Motor Starter / Contactor	Combination Circuit Breaker Type		
239	Electrical	Motor Starter / Contactor	Combination Fused Type		
240	Electrical	Panelboard			
241	Electrical	Panelboard	Fused Disconnect Switch		
242	Electrical	Panelboard	Fused Knife Switch		
243	Electrical	Panelboard	Fused Toggle Switch		
244	Electrical	Panelboard	Molded Case Circuit Breakers		
245	Electrical	Public Address System			
246	Electrical	Security			
247	Electrical	Security	Intrusion Alarm		
248	Electrical	Security	Intrusion Alarm	Central Control Panel	
249	Electrical	Security	Intrusion Alarm	Infrared Sensors	
250	Electrical	Security	Intrusion Alarm	Panic Switches	
251	Electrical	Security	Intrusion Alarm	Remote Annunciator	
252	Electrical	Security	Intrusion Alarm	Sirens / Strobe	

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
253	Electrical	Security	Intrusion Alarm	Ultra-Sonic Sensors	
254	Electrical	Security	Closed Circuit Television System		
255	Electrical	Service Switch			
256	Electrical	Switchboard			
257	Electrical	Switchboard	Air Circuit Breaker		
258	Electrical	Switchboard	Fused Disconnect Switch		
259	Electrical	Switchboard	Fused Knife Switch		
260	Electrical	Switchboard	Molded Case Circuit Breaker		
261	Electrical	Telephone			
262	Electrical	Telephone	PBX / Intercom		
263	Electrical	Telephone	Standard		
264	Electrical	Transformer			
265	Electrical	Transformer	Dry Type		
266	Electrical	Transformer	Liquid Type		
267	Electrical	TV System			
268	Electrical	TV System	Cable Service		
270	Electrical	Electro-Magnetic / Mechanical Locking System			
271	Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures		
272	Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures	Gas Meter Room	
273	Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures	Paint Spray Area	
274	Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures	Paint Storage Area	
275	Interior	Interior	Fire Rated Doors		
279	Interior	Interior	Non Fire Rated Doors		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
280	Interior	Interior	Closets		
281	Interior	Interior	Lobby Finishes		
282	Interior	Interior	Lobby Finishes	Ceiling	
283	Interior	Interior	Lobby Finishes	Floor	
284	Interior	Interior	Lobby Finishes	Walls	
285	Interior	Interior	Corridor Finishes		
286	Interior	Interior	Corridor Finishes	Ceiling	
287	Interior	Interior	Corridor Finishes	Floor	
288	Interior	Interior	Corridor Finishes	Walls	
289	Interior	Interior	Roll Down Gate		
290	Interior	Interior	Storefront		
291	Interior	Interior	Common Areas Finishes		
292	Interior	Interior	Common Areas Finishes	Ceiling	
293	Interior	Interior	Common Areas Finishes	Floor	
294	Interior	Interior	Common Areas Finishes	Walls	
295	Interior	Interior	Common Areas - Bathroom		
296	Interior	Interior	Common Areas - Bathroom	Ceramic Tiles	
297	Interior	Interior	Common Areas - Bathroom	Door Saddle	
298	Interior	Interior	Common Areas - Bathroom	Shower Head and Valve	
299	Interior	Interior	Common Areas - Bathroom	Shower Stall	
300	Interior	Interior	Common Areas - Bathroom	Sink	
301	Interior	Interior	Common Areas - Bathroom	Toilet	
302	Interior	Interior	Common Areas - Bathroom	Urinal	
303	Interior	Interior	Common Areas - Bathroom	Accessories	
304	Interior	Interior	Common Areas - Bathroom	Exhaust / Vent	
305	Interior	Interior	Common Areas - Kitchen		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
306	Interior	Interior	Common Areas - Kitchen	Cabinets	
307	Interior	Interior	Common Areas - Kitchen	Sink	
308	Interior	Interior	Gymnasium		
309	Interior	Interior	Gymnasium	Ceiling	
310	Interior	Interior	Gymnasium	Floor	
311	Interior	Interior	Gymnasium	Walls	
312	Interior	Interior	Gymnasium	Fixed Equipment	
313	Interior	Interior	Gymnasium	Score Board	
314	Interior	Interior	Gymnasium	Seating	
315	Interior	Interior	Gymnasium	Stage	
316	Interior	Interior	Locker Room and Shower		
317	Interior	Interior	Locker Room and Shower	Lockers / Cabinets	
318	Interior	Interior	Locker Room and Shower	Ceiling	
319	Interior	Interior	Locker Room and Shower	Floor	
320	Interior	Interior	Locker Room and Shower	Walls	
321	Interior	Interior	Cabinet Work		
322	Interior	Interior	Directories		
323	Interior	Interior	Display Unit		
324	Interior	Interior	Mailboxes		
327	Interior	Interior	Stairs: Interior		
328	Interior	Interior	Stairs: Interior	Stairs and Landings	
329	Interior	Interior	Stairs: Interior	Handrails	
349	Electrical	Lighting	Corridor Lighting		
350	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	
351	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	Pendant Mounted
352	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	Recessed Mounted
353	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	Surface Mounted
354	Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
355	Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	Pendant Mounted
356	Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	Recessed Mounted
357	Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	Surface Mounted
358	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	
359	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	Pendant Mounted
360	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	Recessed Mounted
361	Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	Surface Mounted
362	Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	
363	Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	Pendant Mounted
364	Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	Recessed Mounted
365	Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	Surface Mounted
366	Electrical	Lighting	Stairhall Lighting		
367	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	
368	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	Pendant Mounted
369	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	Recessed Mounted
370	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	Surface Mounted
371	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	
372	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	Pendant Mounted
373	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	Recessed Mounted
374	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	Surface Mounted
375	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	
376	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	Pendant Mounted
377	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	Recessed Mounted

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
378	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	Surface Mounted
379	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	
380	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	Pendant Mounted
381	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	Recessed Mounted
382	Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	Surface Mounted
405	Site - Architectural	Building Signage			
406	Site - Architectural	Fences			
407	Site - Architectural	Site Walls (Not Retaining Walls)			
408	Site - Architectural	Retaining Walls			
409	Site - Architectural	Fixed Equipment			
410	Site - Architectural	Landscaping			
411	Site - Architectural	Parking Lot			
412	Site - Architectural	Paving - Non-Vehicular Area			
413	Site - Architectural	Paving - Vehicular Area			
414	Site - Architectural	Sidewalks and Curb			
415	Site - Architectural	Playgrounds			
416	Site - Architectural	Playgrounds	Benches		
417	Site - Architectural	Playgrounds	Matting		
418	Site - Architectural	Playgrounds	Play Equipment		
419	Site - Architectural	Playgrounds	Water Sprays		
420	Site - Architectural	Stairs / Ramps			
421	Site - Architectural	Stairs / Ramps	Cheek / Flank Walls		
422	Site - Architectural	Stairs / Ramps	Railings		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
423	Site - Architectural	Stairs / Ramps	Stairs / Ramps		
424	Site - Electrical	Lighting			
425	Site - Mechanical	Underground Hydronic Piping			
426	Site - Mechanical	Exterior Compactor			
427	Site - Mechanical	Storm Piping			
428	Site - Mechanical	Catch Basin			
429	Site - Mechanical	Culverts			
430	Site - Mechanical	Storm Water Dry Well			
431	Site - Mechanical	Underground Natural Gas Piping			
432	Site - Mechanical	Underground Steam Piping			
433	Site - Mechanical	Underground Condensate Return Piping			
434	Site - Mechanical	Manhole Covers			
435	Site - Mechanical	Fire Hydrant			
436	Mechanical	Air Conditioning			
437	Mechanical	Air Conditioning	Chilled Water System		
438	Mechanical	Air Conditioning	Chilled Water System	Air Cooled Condenser	
439	Mechanical	Air Conditioning	Chilled Water System	Chilled Water Piping	
440	Mechanical	Air Conditioning	Chilled Water System	Cold Water Piping (Chilled Water Makeup)	
441	Mechanical	Air Conditioning	Chilled Water System	Chilled Water Pump / Motor	
442	Mechanical	Air Conditioning	Chilled Water System	Chiller Absorption	
443	Mechanical	Air Conditioning	Chilled Water System	Chiller - Packaged	
444	Mechanical	Air Conditioning	Chilled Water System	Chiller, Water Cooled	

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
445	Mechanical	Air Conditioning	Chilled Water System	Chiller, Air Cooled	
446	Mechanical	Air Conditioning	Chilled Water System	Chillers, Emergency Stop Switch	
447	Mechanical	Air Conditioning	Chilled Water System	Fan Coil Unit	
452	Mechanical	Air Conditioning	Dx Split Air-Cooled System		
453	Mechanical	Air Conditioning	Dx Split Air-Cooled System	Outdoor Unit	
454	Mechanical	Air Conditioning	Dx Split Air-Cooled System	Indoor Unit	
455	Mechanical	Air Conditioning	Packaged / Rooftop Unit		
456	Mechanical	Air Conditioning	Water Source Heat Pump		
457	Mechanical	Air Conditioning	Central Station Air Handler		
458	Mechanical	Air Conditioning	Packaged Terminal Air Conditioning		
459	Mechanical	Air Conditioning	Window Type A/C		
460	Mechanical	Climate Control			
461	Mechanical	Climate Control	Heat Timer		
462	Mechanical	Climate Control	Temperature Control Zone Valves		
463	Mechanical	Climate Control	Temperature Control Sub-Panel		
465	Mechanical	Climate Control	Electric Damper Actuator		
466	Mechanical	Climate Control	Temperature Control Thermostat		
467	Mechanical	Climate Control	Direct Digital Control System - DDC Computer		
468	Mechanical	Air Compressor			
469	Mechanical	Interior Compactor			
470	Mechanical	Garbage Chute			

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
471	Mechanical	Domestic Water System			
472	Mechanical	Domestic Water System	In Line Pressure Booster Pump / Motor		
473	Mechanical	Domestic Water System	Shell and Tube Heat Exchanger (Instantaneous)		
474	Mechanical	Domestic Water System	Domestic Water Heat Exchanger - Tank Type		
475	Mechanical	Domestic Water System	Gravity System		
476	Mechanical	Domestic Water System	Gravity System	Supply Pump	
477	Mechanical	Domestic Water System	Gravity System	Roof Tank	
478	Mechanical	Domestic Water System	Backflow Preventer Assembly		
479	Mechanical	Domestic Water System	Backflow Preventer Assembly	Double Check Valve	
480	Mechanical	Domestic Water System	Backflow Preventer Assembly	RPZ	
481	Mechanical	Domestic Water System	Pressure Booster System		
482	Mechanical	Domestic Water System	Distribution Piping		
483	Mechanical	Domestic Water System	Electric Water Heater		
484	Mechanical	Domestic Water System	Gas Fired Water Heater		
485	Mechanical	Domestic Water System	Oil Fired Water Heater		
486	Mechanical	Domestic Water System	Remote Water Heater Storage Tank		
487	Mechanical	Domestic Water System	Domestic Hot Water Circulating Pump		
488	Mechanical	Drainage / Sewage System			

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
489	Mechanical	Drainage / Sewage System	Sewage / Waste Piping		
490	Mechanical	Drainage / Sewage System	Sewage Ejector Pump		
491	Mechanical	Drainage / Sewage System	Building Storm Piping		
492	Mechanical	Drainage / Sewage System	Floor Drain		
493	Mechanical	Drainage / Sewage System	Vent Piping		
494	Mechanical	Drainage / Sewage System	Sump Pump		
495	Mechanical	Non Residential Spaces			
496	Mechanical	Non Residential Spaces	Plumbing Fixtures		
497	Mechanical	Non Residential Spaces	Plumbing Fixtures	Drinking Fountain	
498	Mechanical	Non Residential Spaces	Plumbing Fixtures	Utility Sink	
499	Mechanical	Gas Service			
500	Mechanical	Gas Service	Gas Booster		
501	Mechanical	Gas Service	Distribution Piping		
502	Mechanical	Gas Service	Gas Meter Room Vent		
503	Mechanical	Heating			
504	Mechanical	Heating	Back Flow Preventer		
505	Mechanical	Heating	Condensate Flash Tank		
506	Mechanical	Heating	Condensate Quench Tank		
507	Mechanical	Heating	Hot Water Circulation Pump / Motor		
508	Mechanical	Heating	F/T Steam Trap		
509	Mechanical	Heating	Terminal Unit Steam Trap		
510	Mechanical	Heating	Expansion Tank		
511	Mechanical	Heating	Steam Fan Coil Unit		
512	Mechanical	Heating	Air Curtain		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
513	Mechanical	Heating	Radiator / Convector / Baseboard		
514	Mechanical	Heating	Unit Heater		
515	Mechanical	Heating	Heating Surface - Heating Coils (In Ductwork)		
516	Mechanical	Heating	Hot Water Heat Exchanger		
517	Mechanical	Heating	Steam Piping		
518	Mechanical	Heating	Steam Condensate Return Gravity System		
519	Mechanical	Heating	Steam Condensate Return Piping		
520	Mechanical	Heating	Steam Condensate Return Vacuum System		
521	Mechanical	Heating	Hot Water Piping (Hydronic Supply)		
522	Mechanical	Heating	Hot Water Piping (Hydronic Return)		
523	Mechanical	Heating Plant			
524	Mechanical	Heating Plant	Oil / Water Separation System		
525	Mechanical	Heating Plant	Boiler System		
526	Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	
527	Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Boiler
528	Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Gas / Oil Burner

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
529	Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Oil Burner
530	Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Gas Burner
531	Mechanical	Heating Plant	Boiler System	Boiler, Steam	
532	Mechanical	Heating Plant	Boiler System	Boiler, Steam	Boiler
533	Mechanical	Heating Plant	Boiler System	Boiler, Steam	Gas / Oil Burner
534	Mechanical	Heating Plant	Boiler System	Boiler, Steam	Oil Burner
535	Mechanical	Heating Plant	Boiler System	Boiler, Steam	Gas Burner
536	Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	
537	Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Boiler
538	Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Gas / Oil Burner
539	Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Oil Burner
540	Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Gas Burner
541	Mechanical	Heating Plant	Boiler Auxiliaries		
542	Mechanical	Heating Plant	Boiler Auxiliaries	Back Flow Preventer	
543	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Breeching - Natural Draft	
544	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Breeching - Forced Draft	
545	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Damper (In Breeching)	
546	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Emergency Stop Switch	
547	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater System	
548	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater System	Tank
549	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater System	Pump

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
550	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater Treatment	
551	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Header Valves	
552	Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Makeup Water Piping	
553	Mechanical	Heating Plant	Boiler Auxiliaries	Burner Control System	
556	Mechanical	Heating Plant	Boiler Auxiliaries	Steam and Condensate Piping In Boiler Room	
558	Mechanical	Heating Plant	Fuel Systems		
559	Mechanical	Heating Plant	Fuel Systems	CO/Gas Leak Detection	
560	Mechanical	Heating Plant	Fuel Systems	Combustion Air Louvers/Dampers	
561	Mechanical	Heating Plant	Fuel Systems	Fuel Oil Level Gauge	
562	Mechanical	Heating Plant	Fuel Systems	Fuel Oil Piping	
563	Mechanical	Heating Plant	Fuel Systems	Fuel Oil Storage	
564	Mechanical	Heating Plant	Fuel Systems	Fuel Transfer Pumps / Motors	
565	Mechanical	Heating Plant	Fuel Systems	Gas Train and Vents at the Boilers	
566	Mechanical	Heating Plant	Fuel Systems	Oil Leak Detector	
567	Mechanical	Heating Plant	Fuel Systems	Overfill Alarm	
568	Mechanical	Forced Air Heating			
569	Mechanical	Forced Air Heating	Gas Fired Furnace		
570	Mechanical	Non Residential Kitchen			
571	Mechanical	Non Residential Kitchen	Gas Service		
572	Mechanical	Non Residential Kitchen	Grease Trap		
573	Mechanical	Non Residential Kitchen	Refrigeration Unit		
574	Mechanical	Non Residential Kitchen	Dishwasher		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
575	Mechanical	Non Residential Kitchen	Food Disposer		
576	Mechanical	Non Residential Kitchen	Range		
577	Mechanical	Non Residential Kitchen	Range Hood		
578	Mechanical	Non Residential Kitchen	Range Hood Exhaust Fan		
579	Mechanical	Non Residential Kitchen	Kitchen Exhaust Fan		
580	Mechanical	Non Residential Kitchen	Range Hood Fire Suppression System		
581	Mechanical	Non Residential Kitchen	Sink		
582	Mechanical	Sprinkler System			
583	Mechanical	Sprinkler System	Shut Off Valve		
584	Mechanical	Sprinkler System	Booster Pump/Motor		
585	Mechanical	Sprinkler System	Booster Pump Controller		
586	Mechanical	Sprinkler System	Sprinkler Heads		
587	Mechanical	Sprinkler System	Piping		
588	Mechanical	Sprinkler System	Sprinkler Alarm Valve Assembly		
589	Mechanical	Sprinkler System	Valve Chain		
590	Mechanical	Sprinkler System	Water Gong		
591	Mechanical	Standpipe System			
592	Mechanical	Standpipe System	Shut Off Valve		
593	Mechanical	Standpipe System	Standpipe Cabinet		
594	Mechanical	Standpipe System	Piping		
605	Mechanical	Ventilation			
606	Mechanical	Ventilation	HV Unit		

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
607	Mechanical	Ventilation	Air Terminal Box		
608	Mechanical	Ventilation	Duct - Flexible Connection		
609	Mechanical	Ventilation	Duct - Register / Diffuser		
610	Mechanical	Ventilation	Ductwork, Metal		
611	Mechanical	Ventilation	Exhaust Fan		
612	Mechanical	Ventilation	Supply Fan (Blower)		
613	Mechanical	Ventilation	Return Fan		
614	Mechanical	Ventilation	Fire Damper		
615	Mechanical	Ventilation	FSD Combination		
616	Mechanical	Ventilation	Smoke Damper		
630	Architectural	Exterior	Areaway Ladder		
631	Apartment	Electrical	Emergency Call System (For Sr Citizens)		
632	Apartment	Electrical	Emergency Call System (For Sr Citizens)	Bells / Other Audible Devices	
633	Apartment	Electrical	Emergency Call System (For Sr Citizens)	Remote Annunciator	
634	Apartment	Electrical	Emergency Call System (For Sr Citizens)	Strobe Light	
636	Apartment				
637	Architectural				
639	Electrical				
640	Interior	Interior			
642	Mechanical				
643	Site - Architectural				
644	Site - Electrical				
645	Site - Mechanical				
646	Conveying				
647	Conveying	Hydraulic Passenger Elevator			

PBS ID	Discipline	Pbs1	Pbs2	Pbs3	Pbs4
648	Conveying	Traction Passenger Elevator			
649	Conveying	Hydraulic Freight Elevator			
650	Conveying	Traction Freight Elevator			
651	Conveying	Wheelchair Lift			
652	Conveying	Electrical	Elevator Recall		
653	Conveying	Electrical	Intercom System for Elevators		
654	Mechanical	Air Conditioning	Cooling Tower		
655	Mechanical	Air Conditioning	Cooling Tower Pump		
656	Mechanical	Air Conditioning	Condenser Water Piping		
657	Electrical	Emergency Generator Set	Diesel		
658	Electrical	Emergency Generator Set	Natural Gas		
659	Electrical	Emergency Generator Set	Fuel Storage (Day Tank)		
660	Electrical	Emergency Generator Set	Flue Exhaust Piping		
661	Electrical	Emergency Generator Set	Prime Mover / Alternator		
662	Mechanical	Standpipe System	Siamese Connection		
663	Electrical	Lighting			
664	Electrical	Lighting Fixture			
665	Electrical	Emergency Lights			
668	Conveying	Electrical			

16 Appendix F: Individual Development Comparison

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
1010 EAST 178TH STREET		$46,933,776		$96,543,014	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
104-14 TAPSCOTT STREET		$9,912,253	$14,400	$18,442,409	1. Apartments | Apartment Renovation 2. Roofs | Building Roof/Parapets/Misc 3. Heating | Decarbonization
1162-1176 WASHINGTON AVENUE		$24,721,765	$6,164,971	$31,707,536	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
131 SAINT NICHOLAS AVENUE		$30,528,707	$8,477,148	$45,575,012	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
1471 WATSON AVENUE		$24,838,025	$3,545,210	$41,387,387	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
154 WEST 84TH STREET		$10,543,957	$117,505	$18,152,327	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Heating | Decarbonization
303 VERNON AVENUE	Yes	$51,463,542		$91,191,477	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
335 EAST 111TH STREET		$18,822,027	$64,367	$34,611,095	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Heating System
344 EAST 28TH STREET		$46,550,008	$1,538,688	$94,424,924	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
45 ALLEN STREET		$32,812,204	$1,087,391	$56,812,480	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
572 WARREN STREET		$49,232,267	$493,778	$86,846,955	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
830 AMSTERDAM AVENUE		$41,259,449	$1,417,854	$75,856,543	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
ADAMS		$206,619,814	$16,035,341	$415,113,014	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
ALBANY	Yes	$203,771,030		$413,641,866	1. Apartments | Apartment Renovation 2. Heating | Underground Steam and Condensate Return Piping 3. Apartments | Apartment Bathroom
ALBANY II	Yes	$88,987,235		$172,910,876	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
AMSTERDAM		$277,132,836	$6,075,000	$539,820,244	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
AMSTERDAM ADDITION		$42,193,444	$1,351,629	$81,126,434	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
ARMSTRONG I		$138,773,704	$47,427,981	$178,235,369	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Hot Water System
ARMSTRONG II		$95,651,670	$34,225,455	$107,201,541	1. Apartments | Apartment Renovation 2. Heating | Hot Water System 3. Apartments | Apartment Bathroom
ASTORIA		$346,164,075	$46,464,645	$617,983,827	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Building Windows
ATLANTIC TERMINAL SITE 4B		$59,402,272	$8,574,436	$108,392,420	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
AUDUBON		$41,998,042	$1,336,307	$63,730,878	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
BAILEY AVENUE-WEST 193RD STREET		$53,855,501	$1,717,505	$114,413,039	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
BAISLEY PARK		$107,739,424	$4,557,157	$203,740,183	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BARUCH	Yes	$490,465,506		$801,321,076	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
BARUCH HOUSES ADDITION	Yes	$32,888,595		$66,743,031	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BAY VIEW		$447,501,238	$118,359,744	$665,441,350	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
BAYCHESTER		$125,968,647	$6,595,351	$225,786,656	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
BEACH 41ST STREET-BEACH CHANNEL DRIVE		$177,398,087	$9,785,971	$337,981,034	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
BEDFORD-STUYVESANT REHAB		$27,985,264	$4,598,177	$57,540,270	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
BELMONT-SUTTER AREA		$26,391,783	$52,200	$46,618,261	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Heating | Decarbonization
BERRY		$139,497,589	$26,572,199	$271,400,852	1. Apartments | Apartment Renovation 2. Elevators | Elevators 3. Apartments | Apartment Bathroom
BERRY STREET-SOUTH 9TH STREET		$45,686,163	$3,064,303	$90,657,893	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
BETANCES I		$79,659,101	$15,449,047	$162,728,199	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Local Law 11
BETANCES II, 13		$16,612,664		$25,426,787	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
BETANCES II, 18		$33,994,208	$3,577,072	$47,513,118	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Local Law 11
BETANCES II, 9A		$14,017,842		$21,008,333	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Heating | Decarbonization

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
BETANCES III, 13		$9,014,966		$16,866,538	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
BETANCES III, 18		$5,648,487		$11,386,043	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
BETANCES III, 9A		$13,573,294	$3,361,321	$21,949,791	1. Building Exterior/Facade/Window | Local Law 11 2. Elevators | Elevators 3. Apartments | Apartment Renovation
BETANCES IV		$100,963,970	$4,245,000	$172,413,418	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Local Law 11
BETANCES V		$36,650,996	$7,230,738	$67,209,092	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Building Exterior/Facade/Window | Building Windows
BETANCES VI		$66,016,930	$2,400,000	$86,217,374	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Decarbonization

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
BETHUNE GARDENS		$42,534,413	$530,145	$78,022,594	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
BLAND		$108,756,312	$5,027,829	$244,923,112	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
BORINQUEN PLAZA I		$172,691,987	$17,160,855	$252,317,279	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Hot Water System
BORINQUEN PLAZA II		$154,059,070	$13,363,319	$245,559,618	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
BOSTON ROAD PLAZA		$48,984,811	$5,537,477	$86,301,458	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BOSTON SECOR		$131,694,419	$10,246,122	$245,330,413	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BOULEVARD		$341,799,364	$33,202,936	$690,037,859	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BOYNTON AVENUE REHAB		$27,603,213	$9,874,302	$39,286,676	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
BRACETTI PLAZA		$32,869,394	$1,608,119	$49,851,906	1. Apartments | Apartment Renovation 2. Elevators | Elevators 3. Apartments | Apartment Bathroom
BREUKELEN		$541,402,175	$24,762,394	$998,475,334	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Roofs | Building Roof/Parapets/Misc
BREVOORT		$252,987,950	$15,375,504	$524,433,741	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Heating | Building Steam Piping
BRONX RIVER		$293,874,425	$30,667,021	$592,840,816	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
BRONX RIVER ADDITION		$38,494,152	$2,690,764	$66,144,895	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
BROWN		$42,815,811	$1,828,295	$76,484,381	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BROWNSVILLE		$352,214,007	$27,231,170	$737,968,447	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
BRYANT AVENUE-EAST 174TH STREET		$17,842,315	$953,387	$30,298,878	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
BUSHWICK		$315,718,093	$32,085,540	$539,444,515	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
BUSHWICK II (GROUPS A & C)		$112,650,387	$443,799	$165,327,917	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Roofs | Building Roof/Parapets/Misc
BUSHWICK II (GROUPS B & D)		$101,235,321	$397,846	$170,029,638	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Roofs | Building Roof/Parapets/Misc
BUSHWICK II CDA (GROUP E)		$74,994,253	$9,199,436	$114,808,548	1. Apartments | Apartment Renovation 2. Roofs | Building Roof/Parapets/Misc 3. Apartments | Apartment Bathroom
BUTLER		$318,708,816	$9,276,078	$593,511,441	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
CAMPOS PLAZA II		$57,944,807	$2,941,808	$122,589,347	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
CAREY GARDENS	Yes	$150,242,632		$268,930,212	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
CARLETON MANOR		$39,251,672	$1,075,260	$72,006,810	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
CARVER		$312,021,368	$33,644,230	$555,922,541	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
CASSIDY-LAFAYETTE		$102,408,132	$21,382,047	$136,183,759	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
CASTLE HILL	Yes	$447,716,284		$835,708,767	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
CHELSEA		$92,779,624	$3,127,925	$178,933,772	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
CHELSEA ADDITION		$27,465,820	$800,000	$47,501,323	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
CLAREMONT PARKWAY-FRANKLIN AVENUE		$61,639,336	$1,132,160	$85,212,624	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Decarbonization
CLAREMONT REHAB (GROUP 2)		$41,945,210	$6,929,291	$61,485,200	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
CLAREMONT REHAB (GROUP 3)		$37,804,831	$7,809,543	$58,912,657	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
CLAREMONT REHAB (GROUP 4)		$54,694,206	$7,555,660	$75,892,122	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
CLAREMONT REHAB (GROUP 5)		$40,088,113		$72,468,520	1. Apartments | Apartment Renovation 2. Roofs | Building Roof/Parapets/Misc 3. Building Exterior/Facade/Window | Building Windows
CLASON POINT GARDENS		$143,608,803	$9,673,902	$239,746,182	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Roofs | Building Roof/Parapets/Misc
CLINTON		$192,796,643	$19,143,205	$349,670,463	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
COLLEGE AVENUE-EAST 165TH STREET		$19,804,337	$916,005	$32,389,983	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
CONEY ISLAND		$115,328,268	$16,512,382	$230,442,159	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
CONEY ISLAND I (SITE 1B)		$43,830,304	$3,411,832	$83,490,335	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
CONEY ISLAND I (SITE 8)		$29,356,766	$942,525	$53,512,939	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
CONEY ISLAND I (SITES 4 & 5)		$80,545,761	$7,780,100	$146,267,384	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
CONLON LIHFE TOWER		$39,254,112		$71,920,936	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
COOPER PARK		$184,183,568	$8,106,857	$397,668,272	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
CORSI HOUSES		$48,867,669	$4,438,261	$83,343,654	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
CROWN HEIGHTS		$43,612,311	$6,985,923	$65,393,555	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
CYPRESS HILLS		$347,238,772	$51,390,919	$646,178,891	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
DAVIDSON		$46,135,114	$2,738,193	$76,404,800	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Decarbonization
DE HOSTOS APARTMENTS		$44,923,753	$739,855	$90,818,769	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
DOUGLASS ADDITION		$35,585,206	$49,000	$64,670,715	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Decarbonization
DOUGLASS I		$302,138,979	$16,389,041	$585,632,017	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
DOUGLASS II		$161,629,881	$20,741,265	$334,483,273	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
DREW-HAMILTON		$249,127,899	$3,721,419	$508,585,139	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
DYCKMAN		$250,537,733	$10,835,139	$482,365,433	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
EAGLE AVENUE-EAST 163RD STREET		$19,024,428		$28,322,838	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
EAST 152ND STREET-COURTLANDT AVENUE		$50,139,231	$3,888,875	$87,239,612	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
EAST 165TH STREET-BRYANT AVENUE		$35,556,948		$68,542,719	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Roofs | Building Roof/Parapets/Misc

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
EAST 173RD STREET-VYSE AVENUE		$40,165,351	$1,064,203	$91,008,458	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Heating | Decarbonization
EAST 180TH STREET-MONTEREY AVENUE		$62,328,995	$6,615,059	$115,671,549	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
EAST NEW YORK CITY LINE		$34,609,582	$2,365,613	$61,546,464	1. Roofs | Building Roof/Parapets/Misc 2. Heating | Hot Water System 3. Apartments | Apartment Renovation
EAST RIVER		$292,395,013	$35,704,368	$554,513,944	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
EASTCHESTER GARDENS		$226,646,026	$37,695,537	$405,977,613	1. Apartments | Apartment Renovation 2. Plumbing | Domestic Water System 3. Building Exterior/Facade/Window | Building Windows
EDENWALD		$583,728,299	$87,849,203	$1,119,314,935	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
ELLIOTT		$139,182,628	$4,270,942	$255,225,394	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
FARRAGUT		$351,525,032	$104,075,732	$506,685,219	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
FENIMORE-LEFFERTS		$20,254,732	$18,900	$32,104,110	1. Heating | Hot Water System 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Renovation
FIORENTINO PLAZA		$57,677,990	$9,056,634	$94,081,852	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Roofs | Building Roof/Parapets/Misc
FIRST HOUSES		$39,953,607		$74,263,786	1. Heating | Decarbonization 2. Roofs | Building Roof/Parapets/Misc 3. Apartments | Apartment Renovation
FOREST		$332,274,173	$30,557,758	$687,991,883	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
FORT INDEPENDENCE STREET-HEATH AVENUE		$78,583,757	$12,807,575	$146,635,782	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
FORT WASHINGTON AVENUE REHAB		$57,975,530	$4,328,240	$106,446,833	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
FRANKLIN AVENUE I CONVENTIONAL		$23,583,484		$33,854,978	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Heating | Decarbonization
FRANKLIN AVENUE II CONVENTIONAL		$19,090,565		$25,398,224	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Heating | Decarbonization

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
FRANKLIN AVENUE III CONVENTIONAL		$6,612,494		$9,123,631	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Heating | Decarbonization
FULTON		$232,126,252	$45,642,493	$445,849,334	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
GARVEY (GROUP A)		$94,280,419	$9,214,181	$169,541,080	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
GLEBE AVENUE-WESTCHESTER AVENUE		$32,582,528	$4,052,678	$49,875,111	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
GLENMORE PLAZA		$123,608,665	$6,791,198	$233,537,184	1. Heating | Building Steam Piping 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
GLENWOOD		$350,162,469	$34,261,091	$663,859,392	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
GOMPERS		$109,989,347	$11,107,911	$201,828,650	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
GOWANUS		$291,404,836	$34,079,707	$639,337,526	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Plumbing | Domestic Water System

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
GRAMPION		$10,187,026	$1,389,563	$17,215,774	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
GRANT		$414,437,677	$15,886,129	$914,162,061	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
GRAVESEND	Yes	$182,945,420		$297,589,723	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
GUN HILL		$162,669,917	$10,178,811	$369,138,151	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
HABER		$77,237,817	$3,071,915	$137,671,424	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
HAMMEL		$194,196,132	$26,349,905	$370,051,664	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
HARBORVIEW TERRACE	Yes	$84,650,270		$163,262,894	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
HARLEM RIVER		$120,865,209	$42,105,461	$279,736,857	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
HARLEM RIVER II		$34,230,024	$1,822,244	$50,184,083	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
HARRISON AVENUE REHAB (GROUP A)		$11,717,988	$1,312,992	$17,527,513	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Heating | Decarbonization
HARRISON AVENUE REHAB (GROUP B)		$56,354,618	$6,267,743	$78,276,941	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
HERNANDEZ		$37,659,775	$1,931,086	$61,316,836	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
HIGHBRIDGE GARDENS	Yes	$166,589,839		$316,804,794	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
HIGHBRIDGE REHABS (ANDERSON AVENUE)		$40,778,710		$72,488,172	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
HIGHBRIDGE REHABS (NELSON AVENUE)		$27,926,071	$4,202,385	$48,663,714	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
HOE AVENUE-EAST 173RD STREET		$17,281,273	$1,708,532	$31,778,937	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
HOLMES TOWERS		$101,007,606	$7,902,548	$192,635,945	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
HOPE GARDENS		$96,090,551	$3,702,035	$156,786,142	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Elevators | Elevators
HOWARD		$195,810,663	$14,137,005	$382,399,969	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
HOWARD AVENUE		$43,255,713	$909,499	$62,290,545	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Roofs | Building Roof/Parapets/Misc
HOWARD AVENUE-PARK PLACE		$58,184,827	$169,650	$104,896,357	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Roofs | Building Roof/Parapets/Misc
HUGHES APARTMENTS		$122,166,843	$1,972,581	$236,584,942	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
HUNTS POINT AVENUE REHAB		$51,263,362		$91,231,032	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
HYLAN		$42,500,453	$1,613,703	$89,518,354	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
INDEPENDENCE		$180,764,176	$2,570,629	$323,253,236	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
INGERSOLL		$466,197,218	$46,262,442	$917,379,896	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Plumbing | Domestic Water System
INTERNATIONAL TOWER	Yes	$39,942,631		$58,145,942	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
ISAACS		$133,846,444	$14,025,462	$248,154,275	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
JACKSON		$210,141,343	$16,365,303	$396,532,298	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
JEFFERSON		$419,650,017	$88,695,495	$895,653,639	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Elevators | Elevators
JOHNSON		$334,801,333	$26,263,333	$643,158,827	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
KING TOWERS	Yes	$304,672,387		$780,168,081	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
KINGSBOROUGH		$268,473,837	$15,054,024	$565,994,350	1. Apartments | Apartment Renovation 2. Elevators | Elevators 3. Apartments | Apartment Bathroom
KINGSBOROUGH EXTENSION		$34,954,029	$1,264,324	$72,432,879	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
LA GUARDIA		$235,831,807	$21,641,320	$511,252,950	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
LA GUARDIA ADDITION		$26,945,073	$49,000	$59,336,760	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
LAFAYETTE		$226,912,112	$16,182,080	$389,352,502	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
LATIMER GARDENS		$106,123,842	$5,052,962	$171,950,642	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
LEAVITT STREET-34TH AVENUE		$20,584,789		$31,646,187	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
LEHMAN VILLAGE		$149,331,219	$2,411,366	$283,759,881	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
LENOX ROAD-ROCKAWAY PARKWAY		$32,240,798	$4,145,492	$38,432,789	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
LEXINGTON	Yes	$118,347,312		$212,552,760	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
LINCOLN		$315,254,910	$22,102,392	$621,495,493	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
LINDEN		$406,531,252	$51,173,058	$678,306,010	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
LONG ISLAND BAPTIST HOUSES		$67,687,091	$13,047,333	$97,162,569	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
LONGFELLOW AVENUE REHAB		$27,155,126		$45,612,401	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
LOW HOUSES		$135,189,440	$4,366,251	$257,605,259	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
LOWER EAST SIDE I INFILL		$48,541,716	$1,998,529	$93,188,841	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
LOWER EAST SIDE II		$48,586,348	$3,783,193	$90,740,026	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
LOWER EAST SIDE III		$22,392,884		$34,659,195	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Apartments | Apartment Bathroom
LOWER EAST SIDE REHAB (GROUP 5)		$34,236,701	$4,808,693	$28,138,309	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
MANHATTANVILLE		$281,108,482	$13,470,030	$554,583,841	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
MANHATTANVILLE REHAB (GROUP 2)		$16,916,357	$2,273,537	$28,397,312	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
MANHATTANVILLE REHAB (GROUP 3)		$19,435,024	$2,060,688	$28,139,633	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
MARBLE HILL	Yes	$335,890,474		$661,045,841	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
MARCY	Yes	$544,414,647		$1,071,881,845	1. Apartments | Apartment Renovation 2. Elevators | Elevators 3. Heating | Building Steam Piping
MARCY AVENUE-GREENE AVENUE SITE A		$14,992,889		$24,420,134	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Safety And Security | Additional Security
MARCY AVENUE-GREENE AVENUE SITE B		$7,634,852		$14,769,705	1. Apartments | Apartment Renovation 2. Safety And Security | Additional Security 3. Apartments | Apartment Bathroom
MARINER'S HARBOR		$220,301,458	$5,521,487	$384,983,887	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Building Exterior/Facade/Window | Building Windows
MARLBORO		$462,609,512	$78,829,500	$950,375,169	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Plumbing | Domestic Water System
MARSHALL PLAZA		$36,786,090	$578,972	$61,305,174	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
MCKINLEY		$159,095,826	$16,926,164	$290,131,834	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
MELROSE		$264,692,146	$21,336,861	$507,271,043	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
MELTZER TOWER		$39,863,353	$761,997	$80,174,253	1. Heating | Decarbonization 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
METRO NORTH PLAZA		$73,521,544	$2,329,520	$130,216,964	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
MIDDLETOWN PLAZA		$36,338,471	$2,346,496	$60,424,934	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
MILL BROOK		$295,694,526	$46,898,031	$529,724,713	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
MILL BROOK EXTENSION		$26,808,912		$54,874,764	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
MITCHEL		$368,381,743	$26,218,651	$725,750,131	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
MONROE		$286,746,992	$36,616,620	$512,558,473	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
MOORE		$102,795,289	$6,568,786	$189,315,266	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
MORRIS I		$269,588,395	$8,875,710	$534,566,297	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
MORRIS II		$184,384,880	$5,185,942	$350,489,466	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
MORRIS PARK SENIOR CITIZENS HOME		$23,737,063	$688,989	$39,008,764	1. Interior Electrical/Lighting | Electrical System 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
MORRISANIA		$43,532,258	$1,396,111	$94,555,453	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
MORRISANIA AIR RIGHTS		$170,578,015	$6,351,340	$332,366,978	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
MOTT HAVEN		$238,576,949	$18,435,746	$450,935,266	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
MURPHY		$71,458,491	$3,339,435	$135,627,133	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
NEW LANE AREA		$57,811,879	$7,501,884	$98,171,967	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
NOSTRAND		$330,566,549	$40,842,863	$606,873,755	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
OCEAN BAY APARTMENTS (OCEANSIDE)		$115,734,742	$8,128,993	$237,465,979	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Building Windows
OCEAN HILL APARTMENTS		$63,216,776	$2,130,049	$123,652,160	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
OCEAN HILL-BROWNSVILLE		$38,286,268	$6,942,847	$55,817,461	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Building Windows 3. Apartments | Apartment Bathroom
O'DWYER GARDENS		$126,624,092	$15,144,508	$241,402,345	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
PALMETTO GARDENS		$25,860,842	$1,059,733	$44,227,060	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
PARK AVENUE-EAST 122ND, 123RD STREETS		$29,462,251	$7,155,984	$52,176,406	1. Apartments | Apartment Renovation 2. Heating | Heating System 3. Building Exterior/Facade/Window | Local Law 11

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
PARK ROCK REHAB		$45,397,773	$8,221,242	$68,959,689	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
PARKSIDE		$200,221,859	$12,696,635	$464,010,411	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Local Law 11
PATTERSON		$402,925,142	$66,163,043	$727,512,591	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
PELHAM PARKWAY		$352,046,952	$38,890,406	$676,503,458	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Building Windows
PENNSYLVANIA AVENUE-WORTMAN AVENUE		$79,726,655	$7,463,316	$153,863,570	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
PINK		$315,222,925	$6,798,647	$694,719,727	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
POLO GROUNDS TOWERS	Yes	$346,058,023		$648,982,241	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
POMONOK		$655,819,012	$121,983,283	$1,094,732,427	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Plumbing | Domestic Water System

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
PUBLIC SCHOOL 139 (CONVERSION)		$35,526,811		$52,432,005	1. Roofs | Building Roof/Parapets/Misc 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
QUEENSBRIDGE NORTH	Yes	$389,905,428		$793,750,572	1. Heating | Building Steam Piping 2. Apartments | Apartment Renovation 3. Plumbing | Domestic Water System
QUEENSBRIDGE SOUTH	Yes	$390,078,947		$853,597,053	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Plumbing | Domestic Water System
RALPH AVENUE REHAB		$42,000,545	$296,640	$65,377,981	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
RANDALL AVENUE-BALCOM AVENUE		$60,364,619	$5,044,998	$121,179,880	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
RANGEL		$247,694,245	$25,467,548	$552,173,421	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Building Exterior/Facade/Window | Building Windows
RAVENSWOOD		$536,366,782	$47,680,339	$1,154,963,579	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
RED HOOK EAST	Yes	$373,682,137		$718,971,688	1. Heating | Building Steam Piping 2. Apartments | Apartment Renovation 3. Plumbing | Domestic Water System

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
RED HOOK WEST	Yes	$363,345,692		$762,267,576	1. Plumbing | Domestic Water System 2. Heating | Building Steam Piping 3. Apartments | Apartment Renovation
REDFERN		$163,356,458	$21,748,008	$322,315,462	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Building Exterior/Facade/Window | Building Windows
REHAB PROGRAM (COLLEGE POINT)		$6,455,717	$46,080	$10,431,094	1. Interior Electrical/Lighting | Electrical System 2. Building Exterior/Facade/Window | Local Law 11 3. Roofs | Building Roof/Parapets/Misc
REHAB PROGRAM (DOUGLASS REHABS)		$30,425,874	$3,270,552	$61,002,255	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Heating | Decarbonization
REHAB PROGRAM (TAFT REHABS)		$55,997,905	$9,592,108	$89,172,375	1. Apartments | Apartment Renovation 2. Building Exterior/Facade/Window | Local Law 11 3. Heating | Decarbonization
REHAB PROGRAM (WISE REHAB)		$10,657,363		$21,125,588	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Local Law 11
REID APARTMENTS		$46,017,365	$1,499,711	$83,892,440	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
RICHMOND TERRACE	Yes	$134,351,817		$259,315,483	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
RIIS		$300,512,856	$33,560,560	$638,294,547	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
RIIS II		$137,742,172	$15,692,939	$302,553,248	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
ROBBINS PLAZA		$30,486,442	$1,939,644	$51,663,429	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
ROBINSON		$51,541,664	$6,299,675	$83,941,300	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
ROOSEVELT I		$193,947,406	$23,913,111	$367,751,125	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
ROOSEVELT II		$82,333,768	$2,256,342	$166,943,584	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
RUTGERS	Yes	$164,162,016		$305,333,259	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
RUTLAND TOWERS		$16,683,697	$1,479,495	$24,702,714	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
SACK WERN		$120,449,985	$18,342,976	$184,344,660	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
SAINT MARY'S PARK		$242,091,292	$2,265,541	$462,864,000	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
SAINT NICHOLAS		$352,129,369	$47,015,827	$769,725,982	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
SAMUEL (CITY)		$333,070,173	$39,144,094	$386,208,036	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
SAMUEL (MHOP) I		$31,969,092	$3,264,213	$42,153,372	1. Plumbing | Domestic Water System 2. Apartments | Apartment Renovation 3. Heating | Hot Water System
SAMUEL (MHOP) II		$6,233,923		$7,449,834	1. Roofs | Building Roof/Parapets/Misc 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Renovation
SAMUEL (MHOP) III		$6,051,159		$6,741,422	1. Roofs | Building Roof/Parapets/Misc 2. Apartments | Apartment Renovation 3. Safety And Security | Additional Security

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
SARATOGA VILLAGE		$33,424,639	$1,970,981	$56,845,015	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
SEDGWICK		$175,465,775	$13,064,693	$395,626,185	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
SEWARD PARK EXTENSION		$95,559,126	$4,234,133	$176,625,034	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
SHEEPSHEAD BAY		$298,210,840	$42,651,955	$598,037,146	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
SHELTON HOUSE		$32,508,780	$1,189,824	$56,907,239	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
SMITH		$437,945,139	$96,608,817	$804,062,823	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
SOTOMAYOR HOUSES		$441,182,559	$44,150,146	$841,624,731	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
SOUNDVIEW		$335,248,433	$3,629,144	$594,161,421	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
SOUTH BEACH		$135,574,090	$18,750,959	$283,912,773	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Elevators | Elevators
SOUTH BRONX AREA (SITE 402)		$69,991,640		$69,756,216	1. Roofs | Building Roof/Parapets/Misc 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
SOUTH JAMAICA I	Yes	$123,823,227		$234,127,675	1. Heating | Decarbonization 2. Safety And Security | CCTV 3. Plumbing | Domestic Water System
SOUTH JAMAICA II	Yes	$197,469,842		$302,674,593	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
STANTON STREET		$7,698,849		$11,481,524	1. Building Exterior/Facade/Window | Local Law 11 2. Elevators | Elevators 3. Apartments | Apartment Renovation
STAPLETON		$199,020,499	$20,179,351	$451,039,284	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
STEBBINS AVENUE-HEWITT PLACE		$32,312,366	$55,019	$61,970,353	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Roofs | Building Roof/Parapets/Misc
STERLING PLACE REHABS (SAINT JOHNS-STERLING)		$44,734,373		$56,275,061	1. Roofs | Building Roof/Parapets/Misc 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
STERLING PLACE REHABS (STERLING-BUFFALO)		$58,121,362	$9,759,903	$61,985,512	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Building Exterior/Facade/Window | Building Windows
STRAUS	Yes	$55,422,108		$129,844,997	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
STUYVESANT GARDENS I		$109,914,679	$22,832,546	$166,438,348	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
STUYVESANT GARDENS II		$30,973,713	$1,086,969	$66,531,463	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Heating | Hot Water System
SUMNER		$297,054,708	$45,907,597	$505,175,433	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
SURFSIDE GARDENS		$133,530,682	$8,121,924	$253,031,368	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
SUTTER AVENUE-UNION STREET		$39,622,047	$5,053,597	$80,890,471	1. Plumbing | Domestic Water System 2. Apartments | Apartment Renovation 3. Heating | Decarbonization
TAFT	Yes	$353,313,676		$613,212,623	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
TAPSCOTT STREET REHAB		$65,137,484	$19,568,879	$87,320,981	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
TAYLOR STREET-WYTHE AVENUE	Yes	$139,015,520		$231,330,488	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
TELLER AVENUE-EAST 166TH STREET		$26,322,529	$2,136,571	$40,910,166	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
THOMAS APARTMENTS		$19,111,944		$37,009,334	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Heating | Hot Water System
THROGGS NECK		$430,819,760	$72,566,802	$782,727,694	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
THROGGS NECK ADDITION		$81,096,855	$9,962,080	$134,151,407	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Elevators | Elevators
TILDEN		$231,340,115	$10,254,388	$454,975,558	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
TODT HILL		$144,908,506	$16,808,839	$268,985,776	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Building Exterior/Facade/Window | Building Windows

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
TOMPKINS	Yes	$270,422,010		$493,254,703	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
TWIN PARKS EAST (SITE 9)		$46,106,889	$5,112,097	$82,286,596	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
TWIN PARKS WEST (SITES 1 & 2)		$73,235,936	$2,351,561	$150,192,826	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
TWO BRIDGES URA (SITE 7)	Yes	$56,599,282		$97,557,015	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
UNION AVENUE-EAST 163RD STREET		$41,101,075	$2,571,403	$67,414,112	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
UNION AVENUE-EAST 166TH STREET		$41,991,114		$71,735,676	1. Apartments | Apartment Renovation 2. Roofs | Building Roof/Parapets/Misc 3. Heating | Decarbonization
UNITY PLAZA (SITES 17,24,25A)		$40,535,567	$2,385,449	$81,302,192	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
UNITY PLAZA (SITES 4-27)		$130,630,742	$19,165,409	$216,474,609	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
UNIVERSITY AVENUE REHAB		$86,058,698	$8,419,146	$136,941,622	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
UPACA (SITE 5)		$41,170,934	$857,897	$64,638,485	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
UPACA (SITE 6)		$28,674,806	$1,153,984	$54,631,269	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
VAN DYKE I		$401,793,963	$43,871,591	$730,018,491	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
VAN DYKE II		$22,815,578	$214,349	$41,896,230	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
VANDALIA AVENUE		$64,655,791	$171,000	$121,597,040	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
VLADECK		$343,501,675	$9,367,498	$747,907,578	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
VLADECK II		$66,190,163	$2,458,607	$146,036,372	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Elevators | Elevators
WAGNER		$518,968,737	$46,538,599	$1,322,965,600	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
WALD		$438,951,062	$58,650,775	$958,277,135	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
WASHINGTON		$370,117,686	$69,751,731	$726,699,886	1. Apartments | Apartment Renovation 2. Heating | Building Steam Piping 3. Apartments | Apartment Bathroom
WASHINGTON HEIGHTS REHAB (GROUPS 1&2)		$68,917,772	$8,282,412	$138,974,251	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Building Windows
WASHINGTON HEIGHTS REHAB PHASE III 329		$9,800,920	$4,256,018	$12,549,171	1. Plumbing | Domestic Water System 2. Heating | Hot Water System 3. Apartments | Apartment Renovation
WASHINGTON HEIGHTS REHAB PHASE III 523		$41,256,644		$72,644,756	1. Plumbing | Domestic Water System 2. Roofs | Building Roof/Parapets/Misc 3. Apartments | Apartment Renovation
WASHINGTON HEIGHTS REHAB PHASE IV (C)		$10,830,547		$23,523,726	1. Apartments | Apartment Renovation 2. Plumbing | Domestic Water System 3. Waste Management | Waste Infrastructure
WASHINGTON HEIGHTS REHAB PHASE IV (D)		$11,373,978		$23,607,820	1. Apartments | Apartment Renovation 2. Plumbing | Domestic Water System 3. Waste Management | Waste Infrastructure

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
WEBSTER		$147,985,677	$7,897,488	$280,764,125	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
WEEKSVILLE GARDENS		$53,267,658	$2,657,700	$94,918,304	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
WEST BRIGHTON I		$141,235,695	$13,625,963	$264,073,451	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Building Exterior/Facade/Window | Local Law 11
WEST BRIGHTON II		$31,260,344	$213,928	$73,681,459	1. Building Exterior/Facade/Window | Local Law 11 2. Heating | Decarbonization 3. Roofs | Building Roof/Parapets/Misc
WEST FARMS ROAD REHAB		$59,329,091	$9,416,271	$101,261,046	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Elevators | Elevators
WEST FARMS SQUARE CONVENTIONAL		$6,017,688		$11,078,488	1. Building Exterior/Facade/Window | Local Law 11 2. Apartments | Apartment Renovation 3. Heating | Decarbonization
WEST TREMONT AVENUE-SEDGWICK AVENUE AREA		$33,891,262	$875,116	$58,924,457	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
WHITE		$51,230,267	$9,672,649	$94,669,795	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
WHITMAN	Yes	$424,862,273		$933,916,086	1. Plumbing | Domestic Water System 2. Apartments | Apartment Renovation 3. Heating | Building Steam Piping
WILLIAMS PLAZA		$148,240,510	$4,954,042	$326,997,073	1. Heating | Building Steam Piping 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
WILLIAMSBURG		$478,048,388	$8,620,653	$975,138,117	1. Apartments | Apartment Renovation 2. Roofs | Building Roof/Parapets/Misc 3. Heating | Decarbonization
WILSON		$102,030,852	$8,440,184	$189,544,325	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Building Steam Piping
WISE TOWERS		$95,383,990	$7,843,481	$167,769,791	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Apartments | Apartment Kitchen
WOODSIDE		$381,868,862	$29,255,704	$800,405,516	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Elevators | Elevators
WOODSON		$74,782,390	$1,430,198	$163,542,238	1. Heating | Building Steam Piping 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
WSUR (BROWNSTONES)		$74,439,359	$12,615,752	$177,534,293	1. Building Exterior/Facade/Window | Local Law 11 2. Heating | Decarbonization 3. Apartments | Apartment Renovation

Development	2023 Sample Site	2017 Cost	Needs Addressed (2017 Dollar)	2023 Cost	Highest Need by Work type
WSUR (SITE A) 120 WEST 94TH STREET		$19,749,644	$117,505	$36,805,844	1. Heating | Decarbonization 2. Apartments | Apartment Renovation 3. Apartments | Apartment Bathroom
WSUR (SITE B) 74 WEST 92ND STREET		$42,599,181	$1,647,526	$71,784,484	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom
WSUR (SITE C) 589 AMSTERDAM AVENUE		$34,820,208	$893,172	$66,311,919	1. Apartments | Apartment Renovation 2. Apartments | Apartment Bathroom 3. Heating | Decarbonization
WYCKOFF GARDENS		$120,153,741	$11,651,947	$208,694,971	1. Apartments | Apartment Renovation 2. Heating | Decarbonization 3. Apartments | Apartment Bathroom

17 Appendix G: Mapping of Physical Breakdown Structure to Work Types

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Discipline	**PBS1**	**PBS2**	**PBS3**	**PBS4**	**Primary Work Type**	**Secondary Work Type**
Apartment	Architectural	Bathroom	Accessories		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Bathtub		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Door Saddle		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Exhaust / Vent		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Shower Head and Valve		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Shower Stall		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Sink		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Toilet		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Vanity		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom	Wall Finishes		Apartments	Apartment Bathroom
Apartment	Architectural	Bathroom			Apartments	Apartment Bathroom
Apartment	Architectural	Ceiling			Apartments	Apartment Renovation
Apartment	Architectural	Closet			Apartments	Apartment Renovation

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Apartment	Architectural	Doors			Apartments	Apartment Renovation
Apartment	Architectural	Floor			Apartments	Apartment Renovation
Apartment	Architectural	Kitchen	Cabinets		Apartments	Apartment Kitchen
Apartment	Architectural	Kitchen	Sink		Apartments	Apartment Kitchen
Apartment	Architectural	Kitchen			Apartments	Apartment Kitchen
Apartment	Architectural	Stairs	Handrails		Apartments	Apartment Renovation
Apartment	Architectural	Stairs	Stairs and Landings		Apartments	Apartment Renovation
Apartment	Architectural	Wall			Apartments	Apartment Renovation
Apartment	Electrical	Electrical Panel Board	Fused Toggle Switch		Apartments	Apartment Renovation
Apartment	Electrical	Electrical Panel Board	Molded Case Circuit Breakers		Apartments	Apartment Renovation
Apartment	Electrical	Emergency Call System (For Sr Citizens)	Bells / Other Audible Devices		Apartments	Apartment Renovation
Apartment	Electrical	Emergency Call System (For Sr Citizens)	Remote Annunciator		Apartments	Apartment Renovation
Apartment	Electrical	Emergency Call System (For Sr Citizens)	Strobe Light		Apartments	Apartment Renovation
Apartment	Electrical	Intercom			Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	Fluorescent	Pendant	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	Fluorescent	Recessed	Apartments	Apartment Renovation

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Apartment	Electrical	Light Fixtures	Fluorescent	Surface	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	Incandescent	Pendant	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	Incandescent	Recessed	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	Incandescent	Surface	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	LED	Pendant	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	LED	Recessed	Apartments	Apartment Renovation
Apartment	Electrical	Light Fixtures	LED	Surface	Apartments	Apartment Renovation
Apartment	Electrical	Smoke Detectors			Apartments	Apartment Renovation
Apartment	Mechanical	Radiator / Convector / Baseboard			Apartments	Apartment Renovation
Apartment	Mechanical	Terminal Unit Steam Trap			Apartments	Apartment Renovation
Apartment	Mechanical	Thermostat			Apartments	Apartment Renovation
Architectural	Exterior	Areaway Drains			Grounds	Building Exterior Walkways and Retaining Walls
Architectural	Exterior	Areaway Ladder			Grounds	Building Exterior Walkways and Retaining Walls

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Exterior	Areaway Slab			Grounds	Building Exterior Walkways and Retaining Walls
Architectural	Exterior	Areaway Walls			Grounds	Building Exterior Walkways and Retaining Walls
Architectural	Exterior	Areaways Grating			Grounds	Building Exterior Walkways and Retaining Walls
Architectural	Exterior	Awnings and Canopies			Building Exterior/Facade/Window	Entrances/Exits
Architectural	Exterior	Balcony / Terrace	Drainage		Building Exterior/Facade/Window	Brickwork/Cladding
Architectural	Exterior	Balcony / Terrace	Railings		Building Exterior/Facade/Window	Brickwork/Cladding
Architectural	Exterior	Chimney			Building Exterior/Facade/Window	Brickwork/Cladding
Architectural	Exterior	Coping			Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Cornice			Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Door Lintels			Building Exterior/Facade/Window	Entrances/Exits

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Exterior	Doors			Building Exterior/Facade/Window	Entrances/Exits
Architectural	Exterior	Exterior Walls	Bulkhead Walls		Building Exterior/Facade/Window	Brickwork/Cladding
Architectural	Exterior	Exterior Walls	Exterior Walls		Building Exterior/Facade/Window	Brickwork/Cladding
Architectural	Exterior	Fire Escape-Steel			Building Exterior/Facade/Window	Fire Escapes
Architectural	Exterior	Loading Dock			Building Exterior/Facade/Window	Building Loading Dock
Architectural	Exterior	Louver			Building Exterior/Facade/Window	Brickwork/Cladding
Architectural	Exterior	Main Doors	Primary	Doors and Frames	Building Exterior/Facade/Window	Entrances/Exits
Architectural	Exterior	Main Doors	Primary	Transom / Side Light	Building Exterior/Facade/Window	Entrances/Exits
Architectural	Exterior	Main Doors	Secondary	Doors and Frames	Building Exterior/Facade/Window	Entrances/Exits

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Exterior	Main Doors	Secondary	Transom / Side Light	Building Exterior/Facade/Window	Entrances/Exits
Architectural	Exterior	Parapets			Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Dunnage	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Flashing	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Hatch	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Ladder	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Leaders, Gutters, Downspouts	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Pitch Pockets	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Roof Drains	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Roof Fence	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Roofing	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Bulkhead Roof	Skylight	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Cupola	Roofs	Building Roof/Parapets/Misc

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Exterior	Roof	Low Roof	Dormer	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Dunnage	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Flashing	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Hatch	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Ladder	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Leaders, Gutters, Downspouts	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Pitch Pockets	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Roof Drains	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Roof Fence	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Roofing	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Skylight	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Water Tank Enclosure	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Low Roof	Water Tank Support Structure	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Cupola	Roofs	Building Roof/Parapets/Misc

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Exterior	Roof	Main Roof	Dormer	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Dunnage	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Flashing	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Hatch	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Ladder	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Leaders, Gutters, Downspouts	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Pitch Pockets	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Roof Drains	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Roof Fence	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Roofing	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Skylight	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Water Tank Enclosure	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Roof	Main Roof	Water Tank Support Structure	Roofs	Building Roof/Parapets/Misc
Architectural	Exterior	Stairs / Ramps	Cheek / Flank Walls		Grounds	Stairs / Ramps

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Exterior	Stairs / Ramps	Railings		Grounds	Stairs / Ramps
Architectural	Exterior	Stairs / Ramps	Stairs / Ramps		Grounds	Stairs / Ramps
Architectural	Exterior	Windows	A/C Brackets and Sleeves		Building Exterior/Facade/Window	Building Windows
Architectural	Exterior	Windows	Child Guards		Building Exterior/Facade/Window	Building Windows
Architectural	Exterior	Windows	Exterior Guards		Building Exterior/Facade/Window	Building Windows
Architectural	Exterior	Windows	Interior Guards		Building Exterior/Facade/Window	Building Windows
Architectural	Exterior	Windows	Sills		Building Exterior/Facade/Window	Building Windows
Architectural	Exterior	Windows	Windows		Building Exterior/Facade/Window	Building Windows
Architectural	Exterior	Windows Lintels			Building Exterior/Facade/Window	Building Windows
Architectural	Interior	Cabinet Work			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Closets			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Common Areas - Bathroom	Accessories		Common Areas/Lobbies	Building Common Areas - Bathroom

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Interior	Common Areas - Bathroom	Ceramic Tiles		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Door Saddle		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Exhaust / Vent		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Shower Head and Valve		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Shower Stall		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Sink		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Toilet		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom	Urinal		Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Bathroom			Common Areas/Lobbies	Building Common Areas - Bathroom
Architectural	Interior	Common Areas - Kitchen	Cabinets		Common Areas/Lobbies	Non Residential Kitchen
Architectural	Interior	Common Areas - Kitchen	Sink		Common Areas/Lobbies	Non Residential Kitchen
Architectural	Interior	Common Areas - Kitchen			Common Areas/Lobbies	Non Residential Kitchen
Architectural	Interior	Common Areas Finishes	Ceiling		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Common Areas Finishes	Floor		Common Areas/Lobbies	Building Common Area Finishes

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Interior	Common Areas Finishes	Walls		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Corridor Finishes	Ceiling		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Corridor Finishes	Floor		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Corridor Finishes	Walls		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Directories			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Display Unit			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Entry Doors			Apartments	Apartment Entrance Doors
Architectural	Interior	Fire Rated Doors			Common Areas/Lobbies	Interior Building Doors
Architectural	Interior	Gymnasium	Ceiling		Common Areas/Lobbies	Building Gymnasium
Architectural	Interior	Gymnasium	Fixed Equipment		Common Areas/Lobbies	Building Gymnasium
Architectural	Interior	Gymnasium	Floor		Common Areas/Lobbies	Building Gymnasium
Architectural	Interior	Gymnasium	Score Board		Common Areas/Lobbies	Building Gymnasium
Architectural	Interior	Gymnasium	Seating		Common Areas/Lobbies	Building Gymnasium
Architectural	Interior	Gymnasium	Stage		Common Areas/Lobbies	Building Gymnasium

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Interior	Gymnasium	Walls		Common Areas/Lobbies	Building Gymnasium
Architectural	Interior	Lobby Finishes	Ceiling		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Lobby Finishes	Floor		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Lobby Finishes	Walls		Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Locker Room and Shower	Ceiling		Common Areas/Lobbies	Building Locker Room and Shower
Architectural	Interior	Locker Room and Shower	Floor		Common Areas/Lobbies	Building Locker Room and Shower
Architectural	Interior	Locker Room and Shower	Lockers / Cabinets		Common Areas/Lobbies	Building Locker Room and Shower
Architectural	Interior	Locker Room and Shower	Walls		Common Areas/Lobbies	Building Locker Room and Shower
Architectural	Interior	Mailboxes			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Non Fire Rated Doors			Common Areas/Lobbies	Interior Building Doors
Architectural	Interior	Roll Down Gate			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Interior	Stairs: Interior	Handrails		Common Areas/Lobbies	Interior Building Stairs
Architectural	Interior	Stairs: Interior	Stairs and Landings		Common Areas/Lobbies	Interior Building Stairs
Architectural	Interior	Stairs: Interior			Common Areas/Lobbies	Interior Building Stairs

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Architectural	Interior	Storefront			Common Areas/Lobbies	Building Common Area Finishes
Architectural	Structural	Columns / Beams / Bearing Walls			Building Exterior/Facade/Window	Foundations
Architectural	Structural	Floor Structure			Building Exterior/Facade/Window	Foundations
Architectural	Structural	Foundation Walls			Building Exterior/Facade/Window	Foundations
Architectural	Structural	Roof Structure			Roofs	Building Roof/Parapets/Misc
Conveying	Elevator Recall				Elevators	Elevators
Conveying	Hydraulic Freight Elevator				Elevators	Elevators
Conveying	Hydraulic Passenger Elevator				Elevators	Elevators
Conveying	Intercom System for Elevators				Elevators	Elevators
Conveying	Traction Freight Elevator				Elevators	Elevators
Conveying	Traction Passenger Elevator				Elevators	Elevators

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Conveying	Wheelchair Lift				Common Areas/Lobbies	Wheelchair Lift
Electrical	Emergency Call System (For Sr Citizens)	Bells / Other Audible Devices			Interior Electrical/Lighting	Emergency Call System (For Sr Citizens)
Electrical	Emergency Call System (For Sr Citizens)	Remote Annunciator			Interior Electrical/Lighting	Emergency Call System (For Sr Citizens)
Electrical	Emergency Call System (For Sr Citizens)	Strobe Light			Interior Electrical/Lighting	Emergency Call System (For Sr Citizens)
Electrical	Emergency Generator Set	Automatic Transfer Switch (ATS)			Interior Electrical/Lighting	Emergency Generator Set
Electrical	Emergency Generator Set	Battery Charger			Interior Electrical/Lighting	Emergency Generator Set
Electrical	Emergency Generator Set	Diesel			Interior Electrical/Lighting	Emergency Generator Set
Electrical	Emergency Generator Set	Flue Exhaust Piping			Interior Electrical/Lighting	Emergency Generator Set
Electrical	Emergency Generator Set	Fuel Storage (Day Tank)			Interior Electrical/Lighting	Emergency Generator Set
Electrical	Emergency Generator Set	Natural Gas			Interior Electrical/Lighting	Emergency Generator Set

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Emergency Generator Set	Prime Mover / Alternator			Interior Electrical/Lighting	Emergency Generator Set
Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Fused Disconnect Switch		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Fused Knife Switch		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Fused Toggle Switch		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Emergency Light/Exit Light Panel	Molded Case Circuit Breakers		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Emergency Lighting	Battery Pack		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Emergency Lighting	Non Battery Pack		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Emergency Lighting	Relay Test Switch		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Exit Lights	Battery Pack		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Exit Lights	Non Battery Pack		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Exit/Emergency Combination	Battery Pack		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Emergency Lights	Exit/Emergency Combination	Non Battery Pack		Interior Electrical/Lighting	Emergency and Exit Lighting and Panels
Electrical	Fire Alarm System	Fire Alarm System	Bells		Fire Protection	Fire Alarm

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Fire Alarm System	Fire Alarm System	CO Detector		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Duct Smoke Detector		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Fan Shutdown Controls		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Fire Alarm Strobe		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Heat Detector		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Horns		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Magnetic Door Holder Contactors		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Manual Pull Station		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Smoke Detector		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Sprinkler Flow Switch		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System	Tamper Switch		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Alarm System			Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fire Pump Digital Alarm Communicator			Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Fused Cutout Panel			Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Main Panel	Bells at Panel		Fire Protection	Fire Alarm

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Fire Alarm System	Main Panel	F A C P (Electronic)		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Main Panel	F A C P (Standard)		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Main Panel	Remote Annunciator	Display Monitor	Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Main Panel	Remote Annunciator	Panel	Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Main Panel	Remote Annunciator	Printer	Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Sub-Panel	Bells at Panel		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Sub-Panel	Electronic		Fire Protection	Fire Alarm
Electrical	Fire Alarm System	Sub-Panel	Standard		Fire Protection	Fire Alarm
Electrical	Grounding System				Interior Electrical/Lighting	Electrical System
Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - Fluorescent	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - HID	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - Incandescent	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Corridor Lighting	Lighting Fixture - LED	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Exterior Security / Riot Lights			Grounds	Lighting - Exterior Security
Electrical	Lighting	Lighting - Exterior Security / Riot Lights			Grounds	Lighting - Exterior Security
Electrical	Lighting	Lighting - Stage Theater			Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Lighting - Theater House Lights			Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stage Theater			Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Fluorescent	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - HID	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - Incandescent	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	Pendant Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	Recessed Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Stairhall Lighting	Lighting Fixture - LED	Surface Mounted	Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting	Theater House Lights			Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Fluorescent	Pendant Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Fluorescent	Recessed Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Fluorescent	Surface Mounted		Interior Electrical/Lighting	Interior Lighting Fixture

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Lighting Fixture	HID	Pendant Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	HID	Recessed Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	HID	Surface Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Incandescent	Pendant Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Incandescent	Recessed Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Incandescent	Surface Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	LED	Pendant Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	LED	Recessed Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	LED	Surface Mounted		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures	Gas Meter Room		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures	Paint Spray Area		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lighting Fixture	Lighting Explosion Proof Fixtures	Paint Storage Area		Interior Electrical/Lighting	Interior Lighting Fixture
Electrical	Lightning Protection				Roofs	Building Roof/Parapets/Misc

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Local Sound System	Auditorium			Interior Electrical/Lighting	PA System
Electrical	Local Sound System	Cafeteria			Interior Electrical/Lighting	PA System
Electrical	Local Sound System	Community Center / Other Areas			Interior Electrical/Lighting	PA System
Electrical	Local Sound System	Gym			Interior Electrical/Lighting	PA System
Electrical	Motor Control Center	Combination - Circuit Breaker Type			Interior Electrical/Lighting	Electrical System
Electrical	Motor Control Center	Combination - Fused Type			Interior Electrical/Lighting	Electrical System
Electrical	Motor Starter / Contactor	Combination Circuit Breaker Type			Interior Electrical/Lighting	Electrical System
Electrical	Motor Starter / Contactor	Combination Fused Type			Interior Electrical/Lighting	Electrical System
Electrical	Panelboard	Fused Disconnect Switch			Interior Electrical/Lighting	Electrical System
Electrical	Panelboard	Fused Knife Switch			Interior Electrical/Lighting	Electrical System
Electrical	Panelboard	Fused Toggle Switch			Interior Electrical/Lighting	Electrical System
Electrical	Panelboard	Molded Case Circuit Breakers			Interior Electrical/Lighting	Electrical System

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Public Address System				Interior Electrical/Lighting	Public Address System
Electrical	Security	Closed Circuit Television System			Safety And Security	CCTV
Electrical	Security	Intrusion Alarm	Central Control Panel		Safety And Security	Intrusion Alarm
Electrical	Security	Intrusion Alarm	Infrared Sensors		Safety And Security	Intrusion Alarm
Electrical	Security	Intrusion Alarm	Panic Switches		Safety And Security	Intrusion Alarm
Electrical	Security	Intrusion Alarm	Remote Annunciator		Safety And Security	Intrusion Alarm
Electrical	Security	Intrusion Alarm	Sirens / Strobe		Safety And Security	Intrusion Alarm
Electrical	Security	Intrusion Alarm	Ultra-Sonic Sensors		Safety And Security	Intrusion Alarm
Electrical	Security	Intrusion Alarm			Safety And Security	Intrusion Alarm
Electrical	Service Switch				Interior Electrical/Lighting	Electrical System
Electrical	Switchboard	Air Circuit Breaker			Interior Electrical/Lighting	Electrical System
Electrical	Switchboard	Fused Disconnect Switch			Interior Electrical/Lighting	Electrical System
Electrical	Switchboard	Fused Knife Switch			Interior Electrical/Lighting	Electrical System
Electrical	Switchboard	Molded Case Circuit Breaker			Interior Electrical/Lighting	Electrical System
Electrical	Telephone	PBX / Intercom			Interior Electrical/Lighting	Telephone/Intercom
Electrical	Telephone	Standard			Interior Electrical/Lighting	Telephone/Intercom

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Electrical	Transformer	Dry Type			Interior Electrical/Lighting	Transformer
Electrical	Transformer	Liquid Type			Interior Electrical/Lighting	Transformer
Electrical	Electro-Magnetic / Mechanical Locking System				Common Areas/Lobbies	Interior Building Doors
Mechanical	Air Compressor				Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Central Station Air Handler			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Air Cooled Condenser		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chilled Water Piping		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chilled Water Pump / Motor		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chiller - Packaged		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chiller Absorption		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chiller, Air Cooled		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chiller, Water Cooled		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Chillers, Emergency Stop Switch		Ventilation/Air Conditioning	Air Conditioning

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Air Conditioning	Chilled Water System	Cold Water Piping (Chilled Water Makeup)		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Chilled Water System	Fan Coil Unit		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Condenser Water Piping			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Cooling Tower			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Cooling Tower Pump			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Dx Split Air-Cooled System	Indoor Unit		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Dx Split Air-Cooled System	Outdoor Unit		Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Packaged / Rooftop Unit			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Packaged Terminal Air Conditioning			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Water Source Heat Pump			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Air Conditioning	Window Type A/C			Ventilation/Air Conditioning	Air Conditioning
Mechanical	Climate Control	Direct Digital Control System - DDC Computer			Heating	Heating System

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Climate Control	Electric Damper Actuator			Heating	Heating System
Mechanical	Climate Control	Heat Timer			Heating	Heating System
Mechanical	Climate Control	Temperature Control Sub-Panel			Heating	Heating System
Mechanical	Climate Control	Temperature Control Thermostat			Heating	Heating System
Mechanical	Climate Control	Temperature Control Zone Valves			Heating	Heating System
Mechanical	Domestic Water System	Backflow Preventer Assembly	Double Check Valve		Plumbing	Domestic Water System
Mechanical	Domestic Water System	Backflow Preventer Assembly	RPZ		Plumbing	Domestic Water System
Mechanical	Domestic Water System	Distribution Piping			Plumbing	Domestic Water System
Mechanical	Domestic Water System	Domestic Hot Water Circulating Pump			Plumbing	Domestic Hot Water System
Mechanical	Domestic Water System	Domestic Water Heat Exchanger - Tank Type			Plumbing	Domestic Hot Water System

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Domestic Water System	Electric Water Heater			Plumbing	Domestic Hot Water System
Mechanical	Domestic Water System	Gas Fired Water Heater			Plumbing	Domestic Hot Water System
Mechanical	Domestic Water System	Gravity System	Roof Tank		Plumbing	Roof Tank
Mechanical	Domestic Water System	Gravity System	Supply Pump		Plumbing	Roof Tank
Mechanical	Domestic Water System	In Line Pressure Booster Pump / Motor			Plumbing	Domestic Water System
Mechanical	Domestic Water System	Oil Fired Water Heater			Plumbing	Domestic Hot Water System
Mechanical	Domestic Water System	Pressure Booster System			Plumbing	Domestic Water System
Mechanical	Domestic Water System	Remote Water Heater Storage Tank			Plumbing	Domestic Hot Water System
Mechanical	Domestic Water System	Shell and Tube Heat Exchanger (Instantaneous)			Plumbing	Domestic Hot Water System
Mechanical	Drainage / Sewage System	Building Storm Piping			Plumbing	Building Drainage

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Drainage / Sewage System	Floor Drain			Plumbing	Building Drainage
Mechanical	Drainage / Sewage System	Sewage / Waste Piping			Plumbing	Building Sewage System
Mechanical	Drainage / Sewage System	Sewage Ejector Pump			Plumbing	Building Sewage System
Mechanical	Drainage / Sewage System	Sump Pump			Plumbing	Building Drainage
Mechanical	Drainage / Sewage System	Vent Piping			Plumbing	Building Sewage System
Mechanical	Forced Air Heating	Gas Fired Furnace			Heating	Gas Fired Furnace
Mechanical	Garbage Chute				Waste Management	Garbage Chute
Mechanical	Gas Service	Distribution Piping			Plumbing	Gas Risers
Mechanical	Gas Service	Gas Booster			Plumbing	Gas Risers
Mechanical	Gas Service	Gas Meter Room Vent			Plumbing	Gas Risers
Mechanical	Heating	Air Curtain			Heating	Heating System
Mechanical	Heating	Back Flow Preventer			Heating	Heating System
Mechanical	Heating	Condensate Flash Tank			Heating	Heating System
Mechanical	Heating	Condensate Quench Tank			Heating	Heating System
Mechanical	Heating	Expansion Tank			Heating	Heating System

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Heating	F/T Steam Trap			Heating	Heating System
Mechanical	Heating	Heating Surface - Heating Coils (In Ductwork)			Heating	Heating System
Mechanical	Heating	Hot Water Circulation Pump / Motor			Heating	Hot Water System
Mechanical	Heating	Hot Water Heat Exchanger			Heating	Hot Water Heat Exchanger
Mechanical	Heating	Hot Water Piping (Hydronic Return)			Heating	Hot Water System
Mechanical	Heating	Hot Water Piping (Hydronic Supply)			Heating	Hot Water System
Mechanical	Heating	Radiator / Convector / Baseboard			Heating	Common Spaces Radiator / Convector / Baseboard
Mechanical	Heating	Steam Condensate Return Gravity System			Heating	Building Steam Piping
Mechanical	Heating	Steam Condensate Return Piping			Heating	Building Steam Piping
Mechanical	Heating	Steam Condensate			Heating	Building Steam Piping

Physical Needs Assessment Physical Breakdown Structure					Work Types	
		Return Vacuum System				
Mechanical	Heating	Steam Fan Coil Unit			Heating	Steam Fan Coil Unit
Mechanical	Heating	Steam Piping			Heating	Building Steam Piping
Mechanical	Heating	Terminal Unit Steam Trap			Heating	Common Spaces Radiator / Convector / Baseboard
Mechanical	Heating	Unit Heater			Heating	Through Wall/Window Heat Pump
Mechanical	Heating Plant	Boiler Auxiliaries	Back Flow Preventer		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Breeching - Forced Draft		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Breeching - Natural Draft		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Damper (In Breeching)		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Emergency Stop Switch		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater System	Pump	Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater System	Tank	Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Feedwater Treatment		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Header Valves		Heating	Heating System

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Heating Plant	Boiler Auxiliaries	Boiler Makeup Water Piping		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Burner Control System		Heating	Heating System
Mechanical	Heating Plant	Boiler Auxiliaries	Steam and Condensate Piping In Boiler Room		Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Boiler	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Gas / Oil Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Gas Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Hot Water	Oil Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Boiler	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Gas / Oil Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Gas Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Packaged Modular	Oil Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Steam	Boiler	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Steam	Gas / Oil Burner	Heating	Heating System
Mechanical	Heating Plant	Boiler System	Boiler, Steam	Gas Burner	Heating	Heating System

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Heating Plant	Boiler System	Boiler, Steam	Oil Burner	Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	CO/Gas Leak Detection		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Combustion Air Louvers/Dampers		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Fuel Oil Level Gauge		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Fuel Oil Piping		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Fuel Oil Storage		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Fuel Transfer Pumps / Motors		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Gas Train and Vents at the Boilers		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Oil Leak Detector		Heating	Heating System
Mechanical	Heating Plant	Fuel Systems	Overfill Alarm		Heating	Heating System
Mechanical	Heating Plant	Oil / Water Separation System			Heating	Heating System
Mechanical	Interior Compactor				Waste Management	Interior Compactor
Mechanical	Non Residential Kitchen	Dishwasher			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Food Disposer			Common Areas/Lobbies	Non Residential Kitchen

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Non Residential Kitchen	Gas Service			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Grease Trap			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Kitchen Exhaust Fan			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Range			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Range Hood			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Range Hood Exhaust Fan			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Range Hood Fire Suppression System			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Refrigeration Unit			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Kitchen	Sink			Common Areas/Lobbies	Non Residential Kitchen
Mechanical	Non Residential Spaces	Plumbing Fixtures	Drinking Fountain		Plumbing	Non Residential Spaces Plumbing Fixtures

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Non Residential Spaces	Plumbing Fixtures	Utility Sink		Plumbing	Non Residential Spaces Plumbing Fixtures
Mechanical	Sprinkler System	Booster Pump Controller			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Booster Pump/Motor			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Piping			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Shut Off Valve			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Sprinkler Alarm Valve Assembly			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Sprinkler Heads			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Valve Chain			Fire Protection	Fire Sprinkler
Mechanical	Sprinkler System	Water Gong			Fire Protection	Fire Sprinkler
Mechanical	Standpipe System	Piping			Fire Protection	Standpipe System
Mechanical	Standpipe System	Shut Off Valve			Fire Protection	Standpipe System
Mechanical	Standpipe System	Siamese Connection			Fire Protection	Standpipe System
Mechanical	Standpipe System	Standpipe Cabinet			Fire Protection	Standpipe System
Mechanical	Ventilation	Air Terminal Box			Ventilation/Air Conditioning	Other Fans
Mechanical	Ventilation	Duct - Flexible Connection			Ventilation/Air Conditioning	Building Ductwork

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Mechanical	Ventilation	Duct - Register / Diffuser			Ventilation/Air Conditioning	Building Ductwork
Mechanical	Ventilation	Ductwork, Metal			Ventilation/Air Conditioning	Building Ductwork
Mechanical	Ventilation	Exhaust Fan			Ventilation/Air Conditioning	Exhaust Fan
Mechanical	Ventilation	Fire Damper			Ventilation/Air Conditioning	Building Ductwork
Mechanical	Ventilation	FSD Combination			Ventilation/Air Conditioning	Building Ductwork
Mechanical	Ventilation	HV Unit			Heating	Air Source Heat Pump
Mechanical	Ventilation	Return Fan			Ventilation/Air Conditioning	Other Fans
Mechanical	Ventilation	Smoke Damper			Ventilation/Air Conditioning	Building Ductwork
Mechanical	Ventilation	Supply Fan (Blower)			Ventilation/Air Conditioning	Other Fans
Site - Architectural	Building Signage				Grounds	Fixed Site Equipment
Site - Architectural	Fences				Grounds	Site Fences
Site - Architectural	Fixed Equipment				Grounds	Fixed Site Equipment
Site - Architectural	Landscaping				Grounds	Landscaping
Site - Architectural	Parking Lot				Grounds	Parking Lot
Site - Architectural	Paving - Non-Vehicular Area				Grounds	Paving - Non-Vehicular Area

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Site - Architectural	Paving - Vehicular Area				Grounds	Parking Lot
Site - Architectural	Playgrounds	Benches			Grounds	Playgrounds
Site - Architectural	Playgrounds	Matting			Grounds	Playgrounds
Site - Architectural	Playgrounds	Play Equipment			Grounds	Playgrounds
Site - Architectural	Playgrounds	Water Sprays			Grounds	Playgrounds
Site - Architectural	Playgrounds				Grounds	Playgrounds
Site - Architectural	Retaining Walls				Grounds	Building Exterior Walkways and Retaining Walls
Site - Architectural	Sidewalks and Curb				Grounds	Building Exterior Walkways and Retaining Walls
Site - Architectural	Site Walls (Not Retaining Walls)				Grounds	Site Walls (Not Retaining Walls)
Site - Architectural	Stairs / Ramps	Cheek / Flank Walls			Grounds	Stairs / Ramps
Site - Architectural	Stairs / Ramps	Railings			Grounds	Stairs / Ramps
Site - Architectural	Stairs / Ramps	Stairs / Ramps			Grounds	Stairs / Ramps
Site - Electrical	Lighting				Grounds	Site Lighting
Site - Mechanical	Catch Basin				Grounds	Storm Water/Runoff Piping and Drainage Structures

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Site - Mechanical	Culverts				Grounds	Storm Water/Runoff Piping and Drainage Structures
Site - Mechanical	Exterior Compactor				Waste Management	Exterior Compactor
Site - Mechanical	Storm Piping				Grounds	Storm Water/Runoff Piping and Drainage Structures
Site - Mechanical	Storm Water Dry Well				Grounds	Storm Water/Runoff Piping and Drainage Structures
Site - Mechanical	Underground Condensate Return Piping				Heating	Underground Steam and Condensate Return Piping
Site - Mechanical	Underground Hydronic Piping				Plumbing	Underground Hydronic Piping
Site - Mechanical	Underground Natural Gas Piping				Plumbing	Underground Natural Gas Piping
Site - Mechanical	Underground Steam Piping				Heating	Underground Steam and Condensate Return Piping
Site - Mechanical	Manhole Covers				Grounds	Parking Lot
Decarbonization - Domestic Hot Water					Heating	Decarbonization
Decarbonization - Space Heat					Heating	Decarbonization
Lead					Lead Based Paint	Lead Based Paint

Physical Needs Assessment Physical Breakdown Structure					Work Types	
Open Spaces					Grounds	Open Spaces
Section 504					Apartments	Apartment 504 Access
Security					Safety And Security	Additional Security
Waste Infrastructure					Waste Management	Waste Infrastructure
Façade Repair/Local Law 11					Building Exterior/Facade/Window	Façade Repair/Local Law 11