Integrated Physical Needs Assessment (IPNA)

Masaryk Tower Corporation

75-81, 91-101 Columbia Street, New York, NY 10002
61-69 Columbia Street, New York, NY 10002
83-89 Columbia Street, New York, NY 10002
71-73 Columbia Street, New York, NY 10002

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EXECUTIVE SUMMARY

Project/Building Name (if any) or Address(es)	Masaryk Tower Corporation
# of Buildings	4
# of Units	1108
Report Prepared For	Masaryk Towers Corp. Mr. Mitch Magidson - Metro Management Development, Inc.
Report prepared by	
Needs Assessor	William Struth, Jose Martinez, Ron Mangione, Darko Dimitroski
Efficiency Assessor	Faisal Taha, Parth Patel
Needs Portion Reviewed By	Ron Mangione
Energy Portion Reviewed By	Faisal Taha
Additional attendees during site visit (super, etc.)	Maximo Vazquez - Maintenance Supervisor
Date of Site Visit	4/13/2022
Date of Report	5/6/2022
Date of Revised Report	

Improvement	Estimated Implementation Cost ($)	Estimated Annual Utility Cost Savings ($/yr)	Potential Health Benefit	Urgency
Replace playgrounds	$ 160,000	$ -	None	Long Term (1 to 15 years)
Landscaping Upgrade	$ 400,000	$ -	None	Long Term (1 to 15 years)
LL11 Repairs	$ 7,600,000	$ -	None	Short Term (<12 months)
Roof Replacement	$ 6,400,000	$ -	None	Critical
Roof Railing	$ 1,600,000	$ -	None	Critical
Window Replacement	$ 14,910,000	$ -	None	Long Term (1 to 15 years)
Reapir Building Entrances	$ 900,000	$ -	None	Long Term (1 to 15 years)
Electrical panel replacements - Apts	$ 1,344,000	$ -	None	Critical
Replace Elevators	$ 6,500,000	$ -	None	Short Term (<12 months)
Waste Stack Replacement	$ 19,000,000	$ -	Low	Long Term (1 to 15 years)

EXECUTIVE SUMMARY CONTINUED

Scope (major elements per ASTM E2018)	Condition *				Notes
	Poor	Average	Good	Not Applicable	
Site (except lighting)	x				Being Repaird As part of Current Project
Structural Frame and Building Envelope (except windows and insulation)			x		
Windows and Insulation	x				
Roofing (except insulation)	x				
Plumbing (except domestic hot water)	x				
Domestic Hot Water			x		New System Installed
Heating		x			New System Installed
Air Conditioning				x	
Ventilation		x			
Electrical (except lighting)		x			Fuse Boxes - Poor
Lighting (including controls and site lighting)			x		LED Part of Current Project
Vertical Transportation	x				
Life Safety / Fire Protection		x			
Interior Elements		x			

*** Good condition**—in working condition and does not require immediate or short term repairs; **Average condition**—in working condition, but may require immediate or short term repairs; **Poor condition**—not in working condition or requires immediate or short term repairs

MAINTENANCE OVERVIEW

Maintenance and/or janitorial contracts:

The building has a maintenance personal capable of doing emergency and general daily repairs as needed. The Super and building staff maintain the building. In addition to that, outside certified contractor provide necessary needed repairs and annual maintenance for the heating plant, elevators, and on site lighting.

Maintenance issues:

The super was interviewed and general daily maintenance issues are fully handled by the building super. Major repairs are addressed by outside contractors. No issues were reported or observed during the walk-through.

ACCESSIBILITY

Existing accessibility:

The site is equipped with a ADA compliant elevator.

VIOLATIONS

Open violations:

The complex has 8 open DOB violations and 1 ECB Violation.

IMPLEMENTATION

Many resources are available to assist developers in proceeding to implement recommendations in this Integrated Physical Needs Assessment, to upgrade our low and moderate income housing stock, to reduce energy and water use, and improve health and safety in them.

Housing finance agencies provide guidance and oversight for renovation projects and can provide access to financial resources such as tax credits.

Financing can be provided through organizations that specialize in low and moderate income housing, such as CPC and NYCEEC, as well as by traditional banks.

In New York City, The NYC Retrofit Accelerator offers free, personalized advisory services that streamline the process of making energy efficiency improvements to your building that will reduce operating costs, enhance tenant comfort, and improve our environment.

Across New York State, NYSERDA provides a variety of services and support for energy projects. Electric and gas utilities are also under mandate to support energy projects with a variety of incentives.

OBJECTIVE, PROCEDURES, AND LIMITATIONS

OBJECTIVE

Background:

An **Integrated Physical Needs Assessment (IPNA)** combines the traditional PNA with an energy audit.

A **physical needs assessment (PNA)** identifies building deficiencies and makes recommendations for improvements. These recommendations are accompanied by an implementation timeline and overall cost of each improvement.

An **energy audit** is an assessment of water and energy savings improvements, their estimated cost, and annual cost savings.

In addition to combining a traditional PNA with an energy audit, the IPNA also integrates a **Solar Summary** that estimates the potential costs of and savings from installing solar panels on the roof (NYC buildings only), and a **Health Overlay** that guides building owners to making changes that will improve the health and safety of tenants. It is possible that additional parts will be added to the IPNA in the future.

Focus:

The end goals of the IPNA are to:

- Identify needed improvements for the building
- Provide expected costs of improvements, with the addition of cost savings for energy and water improvements, to allow prioritization of improvements for capital planning purposes
- Reduce overall energy and water consumption within the building with suggestions from the results of the energy audit
- Support the search for and acquisition of financing (loans) and funding (grants and tax credits)
- Identify needed improvements to the operations, energy and water efficiency of the building, including identifying components nearing the end of their useful life before they fail

PROCEDURES

1. A visual survey was conducted from basement to roof, including, but not limited to, the following: site and public elements; structural frame and building envelope; insulation and roof/wall cavities; mechanical, electrical, and plumbing systems and utilities; life safety/fire protection equipment; and interior elements. This survey included the inspection of 3 units or 10% of the total project's dwelling units, whichever is greater. Units were inspected that contain varying characteristics and conditions, including location (ground floor, top floor, basement, exposed edge and corner units) as well as type, size, and history of rehabilitation.

2. Pertinent documentation was reviewed, including violations issued, Certificate of Occupancy, architectural drawings, maintenance logs, O&M plans, and certifications of training for building maintenance staff.

3. A review of energy and water consumption was conducted, as provided in 24 months of consecutive energy and water billing statements.

4. Interviews were conducted with the property owner and management and maintenance staff, as well as a review of existing O&M logs.

5. The energy assessment sought to identify a minimum of 30% energy savings. Energy calculations were interactively calculated, to avoid the double counting of savings.

LIMITATIONS

- Evaluation of building consisted of visual inspection of readily-accessible locations
- No special testing occurred, beyond what can be measured with human faculties, and other than some defined health, water, and energy-related measurements. Examples of measurements taken include boiler efficiency, carbon monoxide levels, and gas leaks, ventilation airflow, relative humidity and indoor temperature, and water flow rates through faucets and showerheads.

- The report represents an extrapolation and is not technically exhaustive, being limited to a specific point in time; also it is not without uncertainty (per ASTM E 2018-15).

BUILDING INFORMATION

LOCATION

Project Name (if applicable)	Masaryk Tower Corporation
Address	75-81, 91-101 Columbia Street
	61-69 Columbia Street
	83-89 Columbia Street
	71-73 Columbia Street
City	New York
Zip Code	10002
Borough (NYC only)	Manhattan
Block (NYC only)	333
Lot (NYC only)	1
Year Built	1966
Owner type (rental or coop/condo)	Co-op/Condo
Non-profit owner?	Yes
Landmarked Building(s)?	No
Is project in a historic district?	No
Number of Above-Ground Floors	21
Date of Last FISP or LL 11/98 Report (NYC only)	2019
Building Gross Area (SF)	1,310,298
Construction Type	Solid Wall Masonry
Flood Zone	Partial

RESIDENTIAL UNIT COUNTS AND TENURE

	Occupied	Vacant	Total
Studio	80	0	80
1 Bedroom	228	0	228
2 Bedroom	640	0	640
3 Bedroom	160	0	160
4 Bedroom	0	0	0
5 Bedroom	0	0	0
Commercial Spaces	14	0	14
Total Units	**1122**	**0**	**1122**
Total Residential Units	**1108**	**0**	**1108**

VIOLATIONS NARRATIVE

Violation Type	Issuing agency	Date of Violation	Description of violation	Would the recommended scope address this violation?	Cost to Remediate
E - ELEVATOR	DOB	5/23/2018	Elevator Violation	Yes	
HBLVIO	DOB	5/15/2014	Fail to Certify High Pressure Boiler	Yes	

INSPECTION - PHYSICAL NEEDS

SITE INSPECTION

	Material	Condition
Sidewalk	Concrete	Some cracked flags / Uplifted flags. This will be repaired ☑ Uneven pavement / trip hazards
Curbs	Steel lined concrete	Some shifted curbs
Yard / Courtyard Concrete	Pavers	Some Cracked flags
Area / Yard Drains	Cast Iron	Acceptable
Ramps	Concrete	Acceptable
Stoop and Stairs	Concrete	Accpetable
Slip-resistant material used?	☐ Yes ☑ No	
Railing	☐ None ☑ Handrails on both sides of stairs ☐ Handrails on one side of stairs ☐ Handrail extension on top and bottom of stairs	
Areaway / Sidewalk Grates	Cast Iron	Acceptable
Fire Passages	N/A	
Wrought Iron Fence/Gates	Steel	Acceptable
Chain Link Fences	Steel	Acceptable
Debris	N/A	
Exterior Stairs	Concrete	Acceptable
Trash Enclosures	N/A	
Landscaping / Vegetation	Grass, shrubs and trees	Acceptable
Open Space / Playground	blacktop	needs proper surfacing

Site Inspection Narrative / Recommendations

Along the streets and interior pathways there were several uplifted and cracked concrete flags. The site repairs are being addressed under a current contract.

STRUCTURE INSPECTION

	Material	Condition
Foundation	Concrete	Foundation walls are orignialo to the building and were ingood condtion where we observed them
Typical Floor	Concrete	
	☐ Uneven tiling / pavement / trip hazards	
Roof Deck	Concrete	

Structure Narrative / Recommendations

None

ROOF INSPECTION

	Material	Condition
Exterior Walls	Concrete / Brick	Fair
Type		
Membrane	SBS Modified bitumen	Exceeded useful life
Entry Floor		
Insulation	See "Inspection - Energy and Water"	
Coatings	None	
Flashings / Pitch	Not visible	Tapered to roof drains
Chimney	Boiler	New Exterior Metal Chimney
Parapets	NA	
Roof Railings	Metal	Fair
Dumbwaiter/Shafts	None	
Bulkhead(s)	Concrete / Brick	Acceptable
Vents	Metal	Acceptable
Roof Drainage	Drains	
Bulkhead Drainage	Drains	Acceptable
Estimated Annual Solar Access		65%
Sources of Shade		Tower and Bulkhead
Estimated Usable Roof Area for Solar (sq ft)		12800

Roof Narrative / Recommendations

Worn and exposed seciton of roof some blisters and alligatoring. Replace roofs.

EXTERIOR STRUCTURE INSPECTION

Exterior Structures	Quantity	Condition
Fire Escape	None	
Metal Stairs	None	
Overhang	None	

Exterior Structure Narrative / Recommendations

N/A

EXTERIOR DOORS INSPECTION

Exterior Doors	Quantity	Hardware Type	Condition
Main Entrance	12	Lever	Aluminum and Glass automated doors
Vestibule	12		Aluminum and Glass automated doors
Basement / Cellar	12		Painted metal with knobs and panic bars
Bulkhead	12		Painted metal with knobs and panic bars
Other			

Exterior Door Narrative / Recommendations

INTERIOR COMMON AREA

Common Areas	Condition
Vestibule	Good
Lobby	Good
Stairs	Good
	☑ Handrails on both sides of stairs ☐ Handrails on one side of stairs ☐ Handrail extensions on top and bottom of stairs
Typical Floor	VCT. Lobbies are terrazo
	☐ Uneven tiling / wood / carpet / trip hazards ☑ Slip-resistant flooring
Doors	Good, except the older storage room doors that are deteriorated and need replacement.
	☐ Levers ☑ Knobs
Landing	
Other	Refurbish rental office space for building office move in.

Electrical	Fixtures (#)	Switches (#)	Outlets (#)	General Conditions / Wiring
Vestibule	2	N/A	1	Good - Typical - Per Vestibule
Lobby	12	N/A	8	Good - Typical - Per Lobby
First Floor	16	N/A	2	Good - Typical
Other Location	5	1	2	Good - Typical Compact Room
Other Location	4	1	2	Good - Typical Elevator Machine Room

Health-Related Concerns (with particular focus on basement)	
Air Quality and Ventilation	Average but acceptable based on the building age
Environmental Hazards from Outdoor Sources	N/A
Moisture	None Observed
Pests	Minor Issues - Issue is under control by building staff.
Hazardous Materials	None Observed
Active Design Opportunities	N/A
Fall/Trip/Fire Hazards	None Observed

Interior Common Area Narrative / Recommendations

Lobbies and vestibules have tile floors and plaster ceilings and brick and plaster walls and are in good condition.
Laundry Room have tile floors and plaster ceilings and walls and are in good condition.

Health-Related Concerns in Apartments	
Air Quality and Ventilation	Average but acceptable based on the building age
Environmental Hazards from Outdoor Sources	N/A
Moisture	None Observed
Pests	Minor Issues - Issue is under control by building staff.
Hazardous Materials	None Observed
Active Design Opportunities	N/A
Fall/Trip/Fire Hazards	None Observed

PLUMBING

	Description	Condition
Water Services	6" Steel Piping w/ 2 Meter	Fair - Some Condensation
Sanitary Waste	Cast Iron with 7-12" traps	Fair
Storm Waste	Combined with Sanitary	Fair
Sump Pumps	Duplex Sewage Ejector Pumps	Fair Condition - Boiler Room
House Trap(s)	7-12" Traps Below Ground	Fair
Water/Waste Leaks	Waste Leaks	Leaks in sanitary risers which serve apartments

Plumbing Narrative / Recommendations

Waate lines are in bad shape and should be replaced to avoid major leaks

ELECTRICAL

Point of Service	Columbia Street & Pitt Street
Meter Bank Location	Each Building has a Service Switachboard to feed Apartments and PL&P Loads
Service Size	3000 A Average Per Building on 3 Phase 120/208V
Main Fuse Disconnect	3P-3000A Per Building.
Distribution Panel	Multiple Distribution Panels feeding Apartments & Common Loads
Emergency Lighting	Stand alone Emergency Fixtures with Battery Backup - Fair
Wiring	Copper - Good
Intercom	Wirless Call

☑ Buzzer ☑ Audio ☐ Audio / Visual

Electrical Narrative / Recommendations

The Masaryk Tower recieve power from Con Edison through 3 services that feeds Building 1 (also feeds bldg. 3), building 2 and building 4. The complex is finishing up a project where multiple CHP units will be provinding electricity to the site. Electrical service to the residential apartments is provided by common risers. Each apartment is provided with a single phase, 120/208 volt subservice off the common riser. The typical riser cable is copper. No aluminum risers were observed on site.

Lighting throughout the indoor public areas is typically LED fixtures and some linear fluorescent fixtures and is adequate with some need of upgrading. Exterior lighting is typically hallogen and LED and is adequate with some need of upgrading at the building entrances. The apartment intercom equipment throughout the complex has been replaced within the last 10 years. The apartment interomc system is wirless based.

ELEVATOR

Quantity	16 Elevators in Total
Manufacturer	Hollister-Whitney Elevator Corp.
Cab	Metal Panels
Cab Door	Stainless Steel
Hall Door	Stainless Steel
Interlocks	N/A
Type	_____ Hydraulic X Traction
If Traction:	
Cables (Hoist)	Yes - Hollister-Whitney Gov. 205
Cables (Gov.)	350 FPM
Machine	30 HP
Controller	VFD Equipped AC Controller

Elevator Narrative / Recommendations

Each building is equipped with multiple elevators with 30 horsepower AC motor elevators. The elevators and associated VFD controllers are old and should be replaced.

FIRE PROTECTION

	Description / Location	Condition
Sprinkler	Sprinkler/Standpipe System	*Fair*
Fire alarm	No Central	*N/A*
Smoke / CO Detectors	Self-Contained Battery Operated	*Fair*
Equipment	N/A	
Other	N/A	

Fire Protection Narrative / Recommendations

The sprinkler/standpipe water is provided thru 6" cold water services. The system feeds sprinkler heads and the standpipe riser in the stairwells, compactor shaft, and the basement. The building has no central fire alarm system. the hallways are equipped with local smoke/CO detectors. The apartments are equipped with baterry operated smoke/co detectors.

COMPACTOR

	Description	Condition
Compactor	No Nameplate	Fair
Chute	No Nameplate	Fair
Hopper Doors	No Nameplate	Good
Sprinkler	Compactors are sprinkled	Good

Compactor Narrative / Recommendations

Each building is equipped with one (1) interior compactor. The compactor is located in the cellar levelof each building below the refuse chute. The compactors appeared to be in poor condition and will need to be replaced over the next 5 years.

SECURITY

	Description	Condition
Cameras	Digital Camera - No Nameplates	Fair
Monitors	Lobbies, Elevaotrs, Exteriors	Fair - More coverage needed
DVR	DVR Units	Good
Other	N/A	N/A

Security Narrative / Recommendations

The building has CCTV camera system the covers buildings entrances, exits, lobbies, cellars and other common areas. System expansion is required to provide more coverage. All cameras are monitored by security staff in the security office.

OTHER BUILDING SYSTEMS

	Make / Model	Condition
Mailboxes	NA	Acceptable ☐ Space to put down belongings while obtaining mail
Other		

Other Building Systems Narrative / Recommendations

N/A

SPECIAL CONSIDERATIONS

Environmental	Description	Condition
Toxic Materials		
Petroleum Storage	None	
PCBs	None	
Other	N/A	
Asbestos Suspected Materials		
Boiler	No	
DHW Heater	No	
DHW Tank	No	
Pipe Covering	Risers Insulation	
Insulation	No	
Floor tile (e.g. 9"x9")	Yes	
Plaster / gyp board	Yes	
Roof	No	
Façade	No	
Other	No	
Lead-Based Paint Suspected		
In-Unit	Testing Needed	
Common Area	Testing Needed	
Fire Escape	Testing Needed	
Entryway	Testing Needed	
Exterior	Testing Needed	
Other	No	
Other Hazardous Materials	No	

Accessibility Issues (Section 504 compliant, etc.)

N/A

Historic Preservation Issues

None

Special Flood Hazard Areas

N/A

INSPECTION - ENERGY AND WATER

BUILDING ENVELOPE

	Construction Description	Condition
Wall Insulation	Most likely none	Exterior facades require repair
Roof Insulation	tapered	Roofs need replacement

Insulation Narrative / Recommendations

Roof u value = varies u 0.1 to 0.05
Walls u value = 0

Windows	# of Panes	Quantity	Condition
In-Unit	*Alum*	*Varies*	*Fair Double Pane Double hung*
Common Area	*Alum*	*Varies*	*Fair Single Pane Fixed*
Bulkhead	*Steel*	*Varies*	*Poor Single Pane Fixed*

Window Narrative / Recommendation

All residential windows are aluminum insulated galss double hung windows with a u value of .55. Windows are old and should be replaced as they are drafty and havehardware issues.

Infiltration	Size of infiltration openings (in^2)	Description / Location
Large/measurable infiltration sites		
Open windows	0	
Broken windows	0	
Stairwell vent	32	Top of stairwell - Fair
Elevator vent	22	Elevator Machine Room - Fair
Other	0	

Basement/cellar		
Doors	8	Exit Door
Sill plates	0	0
Windows	18	
Vents	0	
Other	0	
Room air conditioners	66	
Floors of vented attics		
Uncapped chases	0	
Attic hatch / walkup stairs	0	
Pipe and wiring penetrations	0	
Around exhaust fans	20	
Around light fixtures	0	
Around chimneys and vents	0	
Around duct penetrations	0	
Along party/firewalls	0	
Other	0	
Windows		
Doors	0	
Stack effect		
Abandoned chimneys / chases	0	
Pipe penetrations into chases	0	
Duct riser leakage	0	
Floor-to-floor openings	0	
Stairwell doors	0	
Openings between building interior and mechanical room, if mechanical room has an operating chimney	0	
Other	0	

APARTMENTS

Kitchen	Make / Model	Condition
Refrigerator	Varies	*Fair - Good*
Stove / Range	Varies	*Fair - Good*
Dishwasher	N/A	N/A

Kitchen Appliances Narrative / Recommendations

Ownership changes appliances as needed. Majority of appliances found in the building are Energy Star Type.

BUILDING SYSTEMS

Heating Generation	Description
Fuel Type	Con Edison Steam and recently upgraded to gas (in operation)
Oil Storage Tanks	N/A
Gas Meter(s) Gas Piping	Gas Room is located in cellar. Gas pipes are black pipe schedule 40
Boiler/Furnace Efficiency	Rated: N/A Tested: N/A

	Make / Model	Condition
Boiler		
Burner		
Burner Controls		
Burner Control Settings		
Gauges		
Pumps		
Air Separator		
Expansion Tank		
Chimney		
Damper and controls		
Other Systems		

Heating Generation Narrative / Recommendations

Complex is heated using Con Ed steam. The complex is in the process of installing a new heating plant with boiler and CHP units (gas fired).

Heating Distribution	Description and Condition
System Distribution	Steam
Piping Design	Two Pipe Steam System
Operating Control	BMS System
Condensate Return Tanks	1-Vacuum Pump per building
Other Equipment	Vauum Pump & Boiler Feed Unit (Tank)
In-Unit Heating	Radiators/Convectors - Fair
In-Unit Heating Controls	Manual Valve - Fair
Piping	Pipe Steel - Fair
Pipe Insulation	Fiber Glass Insulation 2-3" Thick - Poor where visible
Steam systems:	
TRV's	N/A
Valve type/condition	Manual Valve - Fair
Radiator type/condition	Radiator/Convector - Fair
Steam traps	Poor
Master venting	N/A
Other	N/A

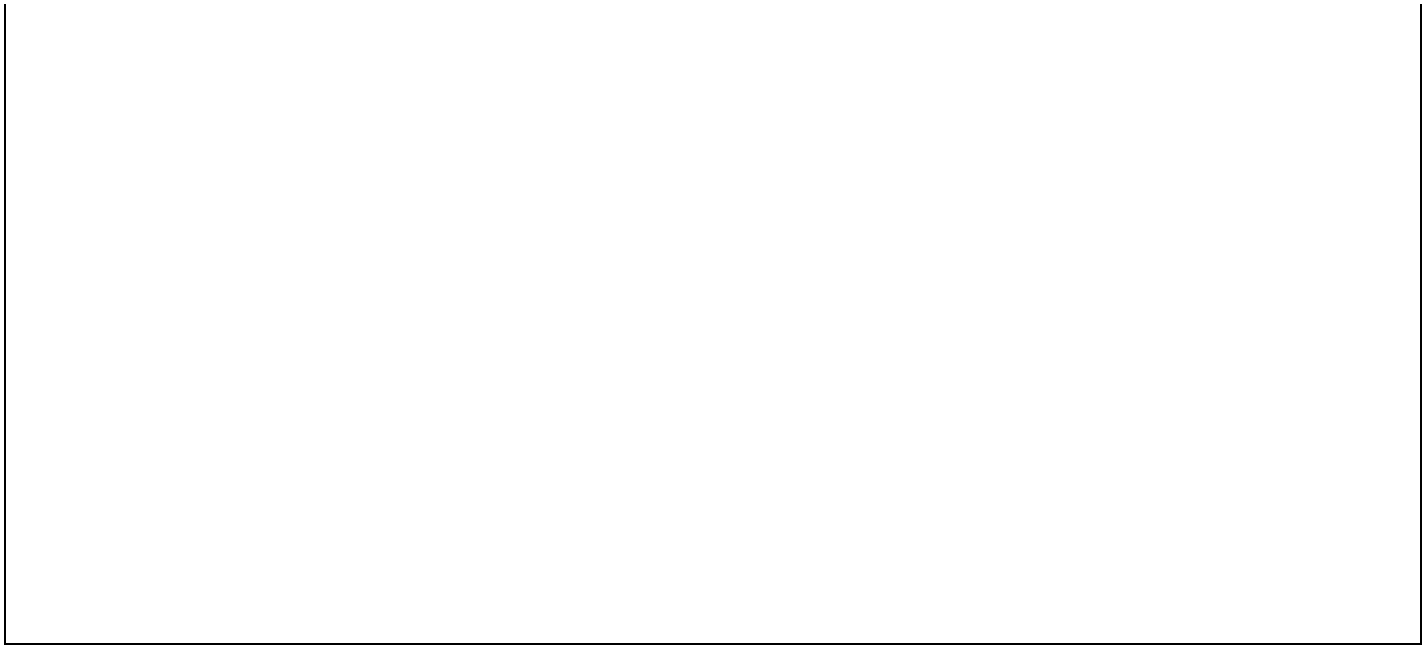
Heating Distribution Narrative / Recommendations

Heating is provided to the apartments through iron convectors via a two pipe steam system where the steam travels from the boiler room to the apartments. The convectors heating side can only be controlled by a local manual valve. Each unit has one valve and one steam trap. The apartments' temperature varies by season and floor but was found to average 70ºF during the heating season and 73ºF during the cooling season. Each lobby is heated using the building central heating system. The lobby temperature averaged 72ºF throughout the year. The NYC Housing Maintenance Code requires a minimum temperature of 68°F while the 1979 State Energy Conservation Construction Code requires a maximum temperature of 72ºF during the heating season. The steam traps condition is assumed to be poor based on signs of system overhearting in the boiler room. The traps must be replaced.

Cooling	Description and Condition
Type of System	Window Uniuts
System Efficiency	75-80%
Number of systems	N/A

Cooling Narrative / Recommendations

Space cooling in the apartments is provided with through-the-wall AC units that are owned and maintained by the tenants.



Domestic Hot Water	Make / Model / Ratings	Condition
Heater	Steam to Water Heat Exchanger	Good
Boiler with Storage Tank	N/A	N/A
Tankless Coil	N/A	N/A
Mixing Valve	Heat Timer Motorized Valves	Good
Recirculation. Pumps	1 Pump per building (B&G)	Good
Expansion Tank	N/A	N/A

Domestic Hot Water Narrative / Recommendations

The domestic hot water is generated in each building's mechanical/utility room which are equipped with steam to water heat exchangers and associated pumpss.

Gas	Description / Location	Condition
Meters	3 Meters in the cellar of each building	Good
Piping	Black steel piping distribution	Good
Gas Leaks	None Observed	

Gas Narrative / Recommendations

Gas to the apartment cooking and laundry equipment is provided by a dedicated low-pressure service located indoor in the basement mechanical/utility room in each building.

Other/Advanced Systems (e.g. Combined heat and power, solar thermal, wind power, backup generator, etc.)

Description	
Condition	

BUILDING LIGHTING

Common Areas

All Common area lighitng has been replaced recently under the existing project with LED Fixtures. That inlcudes hallways, stairwells, common area rooms in the cellar, and the newly created boiler room.

DIAGNOSTIC TESTING RESULTS

CARBON MONOXIDE TESTING

Measure carbon monoxide (CO) of undiluted flue gases for each combustion appliance, in parts per million (ppm).

Appliance	Location	CO Concentration (ppm)

NATURAL GAS LEAKS	Y/N
Tested for leaks with a gas detector along the length of visible gas pipes in all common areas.	Yes
Tested for leaks with a gas detector along the length of visible gas pipes in a sample of apartments, if apartments have gas appliances.	Yes
Leaks were detected.	No
If leaks were detected, the building owner was notified in writing.	N/A

FANS

For each system:		
System type	Exhasut	
Area served:	Hallways, Kitchen & Bathroom	
Quantity of fans	13 Per Building	
Location of fans	Roof	
Condition of fans	Fair	
Condition of ducts	Fair	
Type of ductwork	Masonry	Describe other: Could not be accessed but assumed to be Masonry
Annual hours	8760	hours/year
Controls	24/7	e.g.. Demand control, timer control, manual control, 24/7, VFD, etc.
Motor capacity	1/6 to 2	HP
Phase	Single phase	
Motor Type	Single speed	
Fan Airflow	175-525	CFM
CFM Data Source	Manufacturer Ratin	If Other, please explain:
Register Airflow	20-50	CFM
CFM Data Source	Estimated	If Other, please explain:
Fan power	124-1440	watts
Motor efficiency	80%	% (nameplate efficiency)
NEMA Premium?	No	

Additional notes: Flow is acceptable. Duct might need cleaning and system balancing.

MOISTURE TESTING

Room	Relative Humidity	Notes
N/A	N/A	No Signs of mold were observed anywhere. No Testing is needed.

INDOOR AIR TEMPERATURE

Apartment	Indoor Air Temperature	Thermostat Setpoint (If programmable, note schedule and all setpoints. If no thermostat serving this space, note that.)

No Access was granted due to COVID-19. Hallway Measured Temp. Averaged 74°F

Water Audit

RESULTS

	Measured Flows (gpm)					Rated Flow (gpf)	Water Temperature in Apartment (°F)
Apartment	Kitchen Faucet	Bathroom 1 Showerhead	Bathroom 2 Showerhead	Bathroom 1 Sink	Bathroom 2 Sink	Toilet	
No Access was granted due to COVID-19. Return DHW Temp. Averaged 130°F							

SUMMARY

Fixture	Number of fixtures	Average Flow (gpf, gpm)*		Estimated Usage (flushes/yr for toilets, hours/yr for showers and faucets)	Savings (gallons/ year)
		Existing	Proposed**		
Toilets	1280	1.60	1.28	675	276480
Showers	1120	2.50	2	25	840000
Kitchen Faucets	1120	1.80	1.80	30	0
Bathroom Faucets	1280	1.50	1.50	25	0
Total Savings per year (gallons)					**1116480**

Water temperature delivered to fixtures: 130 °F

* Gallons per flush (gpf) for toilets, gallons per minute (gpm) for showers and faucets
** See below for values corresponding to the EPA WaterSense program or suggested Better Practice.

	Guidelines		
Fixture	NYC Multifamily Conservation Program (MCP)	EPA WaterSense	Better Practice
Toilet	1.6 gpf	1.28 gpf	0.8/1.6 gpf (dual flush)
Shower	2.5 gpm	2.0 gpm	1.5 gpm
Kitchen Faucet	No requirements	No requirements	1.8 gpm (based on California requirements)
Bathroom Faucet	No requirements	1.5 gpm	.35 gpm

ENERGY AND WATER USE

Summary of Metering

APARTMENT USE	Metering Type*	Paid By	Notes
Electricity	Master Metered	Owner	Master Metered
Gas	Master Metered	Owner	Master Metered

***Direct Metered:** meter for each unit provided by the utility; **Submetered**: meter for each unit provided by the building; **Master Metered**: no unit meters, tenants charged indirectly through rent or other common charges.

OWNER-PAID COMMON AREA ELECTRICITY TARIFF: (only needed for buildings with ConEd electricity)	**EL8**

Summary of Utility Data Analysis

	Existing Annual Energy Use									Projected Annual Energy Use									
	Electricity (kwh/yr)	Natural Gas (therms/yr)	Oil #2 (gal/yr)	Oil #4 (gal/yr)	Oil #6 (gal/yr)	District Stream (Mlbs/ yr)	Water (gal/yr)	Other (note units)	Total Site Energy Use (kBtu/yr)	Electricity (kwh/yr)	Natural Gas (therms/yr)	Oil #2 (gal/yr)	Oil #4 (gal/yr)	Oil #6 (gal/yr)	District Stream (Mlbs/ yr)	Water (gal/yr)	Other (note units)	Total Site Energy Use (kBtu/yr)	% Reduction
Owner-Paid Consumption	7,985,352	60,138	0	0	0	76	0	0	124,399,035	7,985,352	60,138	0	0	0	76	0	0	124,399,035	0%
Aggregated Resident Consumption	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Whole Building Consumption	7,985,352	60,138	0	0	0	76	0	0	124,399,035	7,985,352	60,138	0	0		76	0	0	124,399,035	0%
Owner-Paid Costs	$ 1,437,363	$ 60,739	$ -	$ -	$ -	$ 2,456,332	$ -	$ -	$ 3,954,434	$ 1,437,363	$ 60,739	$ -	$ -	$ -	$ 2,456,332	$ -	$ -	$ 3,954,434	0%
Aggregated Resident Cost	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	-
Whole Building Cost	$ 1,437,363	$ 60,739	$ -	$ -	$ -	$ 2,456,332	$ -	$ -	$ 3,954,434	$ 1,437,363	$ 60,739	$ -	$ -	$ -	$ 2,456,332	$ -	$ -	$ 3,954,434	0%

Bill Start Date	1/1/2020
Bill End Date	12/31/2020

No Water Readings

Summary of Benchmarking Metrics

Year benchmarked:	N/A	
Site Energy Use Index	94.9	*kBtu/SF/year*
Source Energy Use Index	153.6	*kBtu/SF/year*
Heating Index	26.3	*Btu/SF/HDD*
Total HDD in Benchmarked Year	5839	*HDD*
Energy Cost Index	$3.02	*$/SF/year*
Water Consumption Index	0	*Gal/Bedroom/Day*

End Use Cost Allocation

Electricity		
Space Heating	2	%
Cooling	35	%
Lighting	11	%
Other	52	%
Total	100	%
Fuel		
Heating	54	%
DHW	22	%
Power Generation	0	%
Cooking	12	%
Laundry	12	%
Total	100	%

Solar Financial Summary		
Solar electric systems provide electricity bill savings, however they are also eligible for a number of federal, state and local incentives that can significantly improve the payback period and SIR for the building owner(s). The table below includes a summary of the estimated cost, payback period and SIR for a solar energy system on this property based on the data gathered during the IPNA.		
Estimated Maximum System Size (kW-DC)	128.0	<- Largest system that could fit on the roof
Max System Size to Offset Owner-Paid Usage (kW-DC)	**128.0**	<- Recommended system size
Year One Solar Production (kWh)	**97,760**	
Year One Solar Production Equiv (kBTU)	**333,557**	
Year One Utility Bill Savings	**$ 12,513**	
Total Cost Estimate	$ 384,026	
NYSUN Incentive	$ 61,200	
Upfront Cost Estimate	**$ 322,826**	
Payback Period (No Tax Incentives)	23 years	
Savings-Investment-Ratio (No Tax Incentives)	0.79	
Federal Tax Credit*	$ -	
NYC Property Tax Abatement	$ -	<- Tax abatement is spread over four years
Residential State Income Tax Credit	$ 30,000	<-Co-op/condo only
Residential State Historic Tax Credit	$ -	<- Historic districts only
Depreciation (Federal and State)*	$ -	
Federal Taxes on State Tax Credit(s)	$ (7,500)	
Cost After Incentives and Taxes	**$ 300,326**	
Payback Period	**22 years**	
Savings-Investment-Ratio	**0.85**	

**If building owner not able to benefit from federal tax incentives directly, third-party ownership may allow the owner to benefit from federal tax incentives indirectly.*

SCOPE AND PRELIMINARY COST ESTIMATES

							EEWC Calculations								Incentives Available		
SITE WORK	**Critical / Short Term**	**Measure Type**	**Unit Type**	**Qty**	**Cost Per Unit**	**Total Cost**	**Projected Annual Electricity Savings (kWh/yr)**	**Project Annual Fuel Savings (mmBtu/yr)**	**Projected Annual Cost Savings ($/yr)**	**SIR**	**Simple Payback**	**Savings Accrue to Tenants?**	**Projected Annual Water Savings (gal/yr)**	**Potential Health Benefit Impact**	**Incentive #1**	**Incentive #2**	**Incentive # 3**
Replace playgrounds		Capital	LS	1	$ 160,000	$ 160,000											
Landscaping Upgrade		Capital	LS	1	$ 400,000	$ 400,000											
Total - Site Work	-	-	-	-	-	**$ 560,000**	**0**	**0**	**$ -**	-		-	**0**	-	**$ -**	**$ -**	**$ -**

BUILDING ENVELOPE	**Critical / Short Term**	**Measure Type**	**Unit Type**	**Qty**	**Cost Per Unit**	**Total Cost**	**Projected Annual Electricity Savings (kWh/yr)**	**Project Annual Fuel Savings (mmBtu/yr)**	**Projected Annual Cost Savings ($/yr)**	**SIR**	**Simple Payback**	**Savings Accrue to Tenants?**	**Projected Annual Water Savings (gal/yr)**	**Potential Health Benefit Impact**	**Incentive #1**	**Incentive #2**	**Incentive # 3**
LL11 Repairs	Critical	Capital	LS	4	$ 1,900,000	$ 7,600,000											
Roof Replacement		Capital	LS	4	$ 1,600,000	$ 6,400,000											
Railing		Capital	LS	4	$ 400,000	$ 1,600,000											
Window Replacement		Capital	EA	5964	$ 2,500	$ 14,910,000											
Total - Building Envelope	-	-	-	-	-	**$ 30,510,000**	**0**	**0**	**0**	-		-	**0**	-	**$ -**	**$ -**	**$ -**

INTERIOR COMMON SPACE	**Critical / Short Term**	**Measure Type**	**Unit Type**	**Qty**	**Cost Per Unit**	**Total Cost**	**Projected Annual Electricity Savings (kWh/yr)**	**Project Annual Fuel Savings (mmBtu/yr)**	**Projected Annual Cost Savings ($/yr)**	**SIR**	**Simple Payback**	**Savings Accrue to Tenants?**	**Projected Annual Water Savings (gal/yr)**	**Potential Health Benefit Impact**	**Incentive #1**	**Incentive #2**	**Incentive # 3**
Reapir Building Entrances		Capital	EA	6	$ 150,000	$ 900,000											
Total - Interior Common Space	-	-	-	-	-	**$ 900,000**	**0**	**0**	**$ -**	-		-	**0**	-	**$ -**	**$ -**	**$ -**

APARTMENTS	**Critical / Short Term**	**Measure Type**	**Unit Type**	**Qty**	**Cost Per Unit**	**Total Cost**	**Projected Annual Electricity Savings (kWh/yr)**	**Project Annual Fuel Savings (mmBtu/yr)**	**Projected Annual Cost Savings ($/yr)**	**SIR**	**Simple Payback**	**Savings Accrue to Tenants?**	**Projected Annual Water Savings (gal/yr)**	**Potential Health Benefit Impact**	**Incentive #1**	**Incentive #2**	**Incentive # 3**
Electrical panel replacements - Apts		Capital	EA	1120	$ 1,200	$ 1,344,000											
Total - Apartments	-	-	-	-	-	**$ 1,344,000**	**0**	**0**	**$ -**	-		-	**0**	-	**$ -**	**$ -**	**$ -**

BUILDING SYSTEMS	**Critical / Short Term**	**Measure Type**	**Unit Type**	**Qty**	**Cost Per Unit**	**Total Cost**	**Projected Annual Electricity Savings (kWh/yr)**	**Project Annual Fuel Savings (mmBtu/yr)**	**Projected Annual Cost Savings ($/yr)**	**SIR**	**Simple Payback**	**Savings Accrue to Tenants?**	**Projected Annual Water Savings (gal/yr)**	**Potential Health Benefit Impact**	**Incentive #1**	**Incentive #2**	**Incentive # 3**

Replace Elevators	Critical	Capital	EA	13	$ 500,000	$ 6,500,000											
Waste Stack Replacement		Capital	LS	1	$ 19,000,000	$ 19,000,000											
Total - Building Systems	-	-	-	-	-	**$ 25,500,000**	**0**	**0**	$ -	-		-	**0**	-	$ -	$ -	$ -

ENVIRONMENTAL	Critical / Short Term	Measure Type	Unit Type	Qty	Cost Per Unit	Total Cost	Projected Annual Electricity Savings (kWh/yr)	Project Annual Fuel Savings (mmBtu/yr)	Projected Annual Cost Savings ($/yr)	SIR	Simple Payback	Savings Accrue to Tenants?	Projected Annual Water Savings (gal/yr)	Potential Health Benefit Impact	Incentive #1	Incentive #2	Incentive # 3
N/A				0	$ -	$ -											
Total - Environmental	-	-	-	-	-	**$ -**	**0**	**0**	$ -	-		-	**0**	-	$ -	$ -	$ -

SPECIAL CONSIDERATIONS *(Accessibility, Historic Pres, Flood Zones)*	Critical / Short Term	Measure Type	Unit Type	Qty	Cost Per Unit	Total Cost	Projected Annual Electricity Savings (kWh/yr)	Project Annual Fuel Savings (mmBtu/yr)	Projected Annual Cost Savings ($/yr)	SIR	Simple Payback	Savings Accrue to Tenants?	Projected Annual Water Savings (gal/yr)	Potential Health Benefit Impact	Incentive #1	Incentive #2	Incentive # 3
N/A				0	$ -	$ -											
Total - Special Considerations	-	-	-	-	-	**$ -**	**0**	**0**	$ -	-		-	**0**	-	$ -	$ -	$ -

HEALTH / PEST MANAGEMENT	Critical / Short Term	Measure Type	Unit Type	Qty	Cost Per Unit	Total Cost	Projected Annual Electricity Savings (kWh/yr)	Project Annual Fuel Savings (mmBtu/yr)	Projected Annual Cost Savings ($/yr)	SIR	Simple Payback	Savings Accrue to Tenants?	Projected Annual Water Savings (gal/yr)	Potential Health Benefit Impact	Incentive #1	Incentive #2	Incentive # 3
N/A				0	$ -	$ -											
Total - Health / Pest Management	-	-	-	-	-	**$ -**	**0**	**0**	$ -	-		-	**0**	-	$ -	$ -	$ -

SUMMARY BY SCOPE AREA	Total Cost	Projected Annual Electricity Savings (kWh/yr)	Project Annual Fuel Savings (mmBtu/yr)	Projected Annual Cost Savings ($/yr)	SIR	Simple Payback
Site Work	$ 560,000	0	0	$ -		#DIV/0!
Building Envelope	$ 30,510,000	0	0	$ -		#DIV/0!
Interior Common Space	$ 900,000	0	0	$ -		#DIV/0!
Apartments	$ 1,344,000	0	0	$ -		#DIV/0!
Building Systems	$ 25,500,000	0	0	$ -		#DIV/0!
Environmental	$ -	0	0	$ -		#DIV/0!
Special Considerations	$ -	0	0	$ -		#DIV/0!
Health/Pest Management	$ -	0	0	$ -		#DIV/0!

SUMMARY BY MEASURE TYPE	Total Cost
Total Capital Cost	**$ 58,814,000**
Total EEWC Incremental Cost	**$ -**
Total EEWC-Only Cost	**$ -**
Total Health Cost	**$ -**
TOTAL COST	**$ 58,814,000**

SUMMARY OF WHOLE-PROJECT ENERGY AND WATER SAVINGS

Utility Rates			
Electricity Rate	$	0.18	per kWh
Fuel Rate	$	0.98	per Therm
Oil Rate	$	-	per Gal
Water Rate	$	0.01	per Gal

Notes:

	OWNER PAID							
	Total Annual Consumption (use/yr)		Total Annual Cost ($/yr)	Total Annual Savings		Total Annual Cost Savings ($)	Total Annual Energy Savings %	Total Energy Cost Savings %
Electric	7,985,352	kWh/yr	$ 1,437,363.00	0	kWh/yr	$ -	0%	0.0%
Fuel	82344.8	MMBtu/yr	$ 2,517,071.00	0	MMBtu/yr	$ -	0%	0.0%
Water	0	Gal/yr	$ 184,000.00	0	Gal/yr	$ -	#DIV/0!	0.0%
TOTAL	**196,150,026**	**kBtu/yr**	**$ 4,138,434.00**	**0**	**kBtu/yr**	**$ -**	**0%**	**0.0%**

	TENANT PAID							
	Total Annual Consumption (use/yr)		Total Annual Cost ($/yr)	Total Annual Savings		Total Annual Cost Savings ($)	Total Annual Energy Savings %	Total Energy Cost Savings %
Electric	0	kWh/yr	$ -	0	kWh/yr	$ -	0%	0
Fuel	0	MMBtu/yr	$ -	0	MMBtu/yr	$ -	0%	0
TOTAL	**0**	**kBtu/yr**	**$ -**	**0**	**kBtu/yr**	**$ -**	**0%**	**0**

	PROJECT TOTAL							
	Total Annual Consumption (use/yr)		Total Annual Cost ($/yr)	Total Annual Savings		Total Annual Cost Savings ($)	Total Annual Energy Savings %	Total Energy Cost Savings %
Electric	7,985,352	kWh/yr	$ 1,437,363.00	0	kWh/yr	$ -	0%	0.0%
Fuel	82344.8	MMBtu/yr	$ 2,517,071.00	0	MMBtu/yr	$ -	0%	0.0%
Water	0	Gal/yr	$ 184,000.00	0	Gal/yr	$ -	#DIV/0!	0.0%
TOTAL	**196,150,026**	**kBtu/yr**	**$ 4,138,434.00**	**0**	**kBtu/yr**	**$ -**	**0%**	**0.0%**

REPLACEMENT COST SCHEDULE

Scope Name	Description of Work	EUL	Age	RUL	Unit Type	Qty.	Cost Per Unit	Critical Costs	Short Term Costs	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Total Long Term
Site																									
Replace playgrounds		0	0	0	LS	1	$ 160,000	No	$ 160,000	$ -	$ -	$ 160,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 160,000**
Landscaping Upgrade		0	0	0	LS	1	$ 400,000	No	$ 400,000	$ -	$ -	$ 400,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 400,000**
Building Envelope																									
LL11 Repairs		5	5	0	LS	4	$ 1,900,000	Yes	$ 7,600,000	$ 2,000,000	$ 5,600,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 7,600,000**
Roof Replacement		25	30	-5	LS	4	$ 1,600,000	No	$ 6,400,000	$ 3,200,000	$ 3,200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 6,400,000**
Railing		25	30	-5	LS	4	$ 400,000	No	$ 1,600,000	$ 800,000	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 1,600,000**
Window Replacement		25	30	-5	EA	5964	$ 2,500	No	$ 14,910,000	$ -	$ -	$ -	$ -	$ 5,000,000	$ 5,000,000	$ 4,910,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 14,910,000**
Interior Common Space																									
Reapir Building Entrances		0	0	0	EA	6	$ 150,000	No	$ 900,000	$ 900,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 900,000**
Apartments																									
Electrical panel replacements - Apts		40	40	0	EA	1120	$ 1,200	No	$ 1,344,000	$ 1,344,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 1,344,000**
Building Systems																									
Replace Elevators		30	30	0	EA	13	$ 500,000	Yes	$ 6,500,000	$ 2,500,000	$ 2,000,000	$ 2,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 6,500,000**
Waste Stack Replacement		50	60	-10	LS	1	$ 19,000,000	No	$ 19,000,000	$ -	$ -	$ 4,000,000	$ 5,000,000	$ -	$ 5,000,000	$ 5,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 19,000,000**
Environmental																									
N/A						0	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
SPECIAL CONSIDERATIONS																									
N/A						0	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
HEALTH / PEST MANAGEMENT																									
N/A						0	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ -**
							Total - Uninflated		**$ 58,814,000**	**$ 10,744,000**	**$ 11,600,000**	**$ 6,560,000**	**$ 5,000,000**	**$ 5,000,000**	**$ 10,000,000**	**$ 9,910,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 58,814,000**
							Factor			1.00	1.03	1.06	1.09	1.12	1.15	1.18	1.21	1.24	1.27	1.30	1.33	1.36	1.39	1.42	
							Total - Inflated		**$ 58,814,000**	**$ 10,744,000**	**$ 11,948,000**	**$ 6,953,600**	**$ 5,450,000**	**$ 5,600,000**	**$ 11,500,000**	**$ 11,693,800**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 63,889,400**

QUALITY ASSURANCE AND VERIFICATION

ENERGY AND WATER SAVINGS CHECK

Improvement Description	Energy or Water Cost Savings ($/year)	As % of Total Energy or Water Costs (%)	As % of Heating, Cooling, DHW, Lighting, Other Costs	Reasonable? (Yes/No)
All Energy Eff. Measures Has been Implemented as part of current project				

QUALITY DURING CONSTRUCTION

Developer should insure that all Energy compliance inspections and special inspections required by the NYC Building Dept. be implemented as required by the code.

Owner Name _____ **Owner Signature & Date** _____

Property Manager Name _____ **Property Manager Signature & Date**_____

OPERATION AND MAINTENANCE MEASURES		Owner/Manager Will Complete (Y/N)
Heating and Cooling	Repair Steam Traps	
Appliances	Encourage the use Energy Star appliances and air conditioning units in the tenants spaces.	
Lighting (e.g. missing lamps, automatic controls working correctly)	Install Motion sensors in low usage areas such as the cellar and stairwell.	
Existing Maintenance, Operating, and Janitorial Practices, Products, and Outcomes	Provide building operator with daily log to insert the heating system and other maintenance issues for continues monitoring and proper maintenance	
Water conservation - leak inspection	Encourage the use of low-flow showerheads and faucet aerators. The use of low-flow fixtures, not only reduces water consumption, but reduces	
Recycling / Waste Management	Encourage in-unit recycling and provide bins for glass, plastics, and metal	

Health

Intervention- O&M	Applies to This Building (Enter Y if Yes)	Why Do It	Frequency	Impact / Cost	Relevant NYC Code and Resources	Enterprise Green Communities Criteria	Owner/ Manager Will Complete (Y/N)
Air Quality and Ventilation							
Inspect fans, fix and clean vents/ventilation ducts, replace filters. Set regular inspection schedule.	Y	Asthma & respiratory risks	Annual, Filters every 6 mos.	High impact, low cost	§[C26-1205.1] 27-745 Occupiable rooms. All occupiable rooms shall be ventilated by natural or mechanical means, or by a combination of both. Natural ventilation may be provided except where mechanical ventilation is required by article seven or eight of this subchapter.	5.1a Building Performance Standard 5.3 Sizing of Heating and Cooling Equipment 6.10 Asthmagen-Free Materials 7.1 Ventilation 7.2 Clothes dryer exhaust 7.3 Combustion Equipment	
Educate tenants about ways to improve ventilation and about reporting fans that don't work and windows that don't open.	Y	Asthma & respiratory risks	Lease up & annual	High Impact, low cost			
Educate tenants about identifying and reporting problems with central heating/cooling.	Y	General health; energy efficiency	Lease up & annual	High Impact, Low cost			
Ensure regular cleaning of dryers to improve functionality and to reduce fire hazards.	Y	Respiratory risks & fire hazards	Annual	High Impact, low cost			

Ensure proper venting of dryers.	Y	Respiratory risks & moisture control	Annual	Medium Impact, High Cost			
Evaluate boiler to ensure proper combustion safety and to efficiently manage temperature.	Y			Low Impact, Low cost			
Assess for sufficient air conditioning during heat waves	Y	Asthma, respiratory, heat stroke and death risks	As needed; window units should be removed for winter	High Impact, Variable Cost	NYC DOHMH Extreme Heat and Your Health: www1.nyc.gov/site/doh/health/emergency-preparedness/emergencies-extreme-weather-heat.page		
Prohibit smoking within units and within 20ft of building. Incorporate no smoking provisions in lease.	Y	Asthma and cancer risks	One time change	High Impact, Low Cost	NYC DOHMH Smoke-Free Housing: https://www1.nyc.gov/site/doh/health/health-topics/smoking-smoke-free-housing.page		
Moisture							
Clean mold, eliminate water leaks, clean surfaces and replace surfaces as needed. Fix drainage as needed.	Y	Asthma & respiratory risks; moisture control	As needed	High impact, low cost	NYC DOHMH Indoor Moisture: http://www1.nyc.gov/site/doh/health/health-topics/air-quality-indoor-moisture.page	4.3 Leaks and Water Metering 6.7a,b Environmentally Preferable Flooring: 6.8 Mold Prevention: Surfaces 6.9 Mold Prevention: Tub and Shower Enclosures 7.5 Vapor Retarder Strategies 7.7 Mold Prevention: Water Heaters	
Educate tenants about importance of and ways to report leaks (running toilets, leaking radiators, dripping faucets, moisture problems, and mold issues in the building.	Y	Asthma & respiratory risks; moisture control	Lease up & annual	High Impact, Low cost			
Replace or place entry door weather-stripping and door sweeps.	Y	Moisture control; energy efficiency		Medium Impact, Low Cost			
Pests							
Seal holes and cracks, including around plumbing and utility openings and foundation. Install door sweeps to prevent pest entry. Use pest resistant materials during repairs. Accompany pest management professional during each service visit to identify areas in need or repair. Train staff to monitor pest prone places for conditions conducive to pests. Adopt the use of reduced risk pesticides building wide. Review pest proofing tips for building owners, managers and staff in NYC DOHMH IPM Toolkit.	Y	Asthma risks, pest control	Rehab, unit turnover, annual inspections	High impact, low cost	NYC Integrated Pest Management Tool Kit: https://www1.nyc.gov/assets/doh/downloads/pdf/pesticide/ipm-toolkit.pdf	7.10 Integrated Pest Management	
Educate residents on how to minimize food and water sources for pests; **identify and report openings for repair**; on the use of reduced risk pesticides (gel bait, bait stations). Educate management on implementation of a building-wide Integrated Pest Management (IPM) protocol.	Y	Asthma risks, pest control	Lease up & annual	High Impact, Low Cost	NYC Integrated Pest Management Tool Kit: https://www1.nyc.gov/assets/doh/downloads/pdf/pesticide/ipm-toolkit.pdf		

Adopt an integrated pest management scope of work with pest management professionals	Y	Asthma risks, pest control	Pest contract	High impact, Low Cost	NYC Integrated Pest Management Tool Kit: https://www1.nyc.gov/assets/doh/downloads/pdf/pestici		

Ensure garbage room is properly maintained and ensure waste storage capacity meets the needs of the building	Y	Asthma risks, pest control	6 months	Medium Impact, Low Cost	NYC Integrated Pest Management Tool Kit: https://www1.nyc.gov/assets/doh/downloads/pdf/pesticide/ipm-toolkit.pdf		
Hazardous Materials and Conditions							
Institute an off gassing period for units before occupancy after rehabilitation, especially after carpeting, painting, and floor work	Y	Respiratory and other health risks	Post rehab	High impact, low cost	NYC Local Law 2 (2012) - VOC Emissions Limits in Carpets and Carpet Cushions: https://www1.nyc.gov/site/doh/health/health-topics/air-quality-vocs-and-carpeting-what-consumers-and-the-public-should-know.page and https://www1.nyc.gov/assets/buildings/local_laws/ll2of2012.pdf Floor Refinishing and Moisture-Cure Urethanes: https://www1.nyc.gov/site/doh/health/health-topics/floor-refinishing.page	3.1 Environmental Remediation 5.4 ENERGY STAR Appliances 6.1 Low / No VOC Paints, Coatings and Primers 6.2 Low / No VOC Adhesives and Sealants 6.6 Composite Woods Products that Emit low/No Formaldehyde 6.7 Environmentally Preferable Flooring 6.10 Asthmagen-Free materials 7.1 Ventilation 7.3 Combustion Equipment 7.8 Radon Mitigation 7.15 Reduce Lead Hazards 7.16 Smoke-Free Building 8.3 Resident Manual 8.4 Resident and Property Staff Orientation	
Ensure carbon monoxide (CO) detectors are installed pursuant to code. Mitigate sources of CO build-up, i.e. back drafting, unventilated heaters, or other combustion effects. Educate tenants to report if their CO detector is going off.	Y	CO poisoning risks	Annual inspection; Lease up	Med-Hi Impact, Low Cost	http://www1.nyc.gov/site/hpd/owners/Smoke-carbon-monoxide-detectors.page		
Use green products in cleaning, rehab, repairs, painting. Use low-/no-volatile organic compounds (VOCs), low/no formaldehyde in cleaning products, paint, sealants, adhesives, building materials.	Y	Respiratory and other health risks	Ongoing	Medium Impact, Low Cost	http://programs.lisc.org/NYC/Images/Two_Shades_of_Green_-_Green_Cleaning_Toolkit.pdf; Greenseal; Greenshield; EPA Safer Choice; EPA Formaldehyde emissions standards for composite wood products: https://www.epa.gov/formaldehyde/formaldehyde-emission-standards-composite-wood-products		
Seal and clean ventilation ducts, can be HVAC or maintenance staff	Y	Respiratory and other health risks	Rehab, energy projects	Medium Impact, Medium Cost			
Use no-VOC and no-formaldehyde paint, adhesives, sealants, cleaners, and products	N			Medium Impact, Medium Cost	EPA Formaldehyde emissions standards for composite wood products: https://www.epa.gov/formaldehyde/formaldehyde-emission-standards-composite-wood-products		
Lead: In buildings constructed prior to 1978 (or 1960 in NYC), ensure that lead-safe renovation practices are utilized for any repairs that could disturb lead-based paint. Have building maintenance staff trained and certified in EPA Renovation, Repair and Painting (RRP).	Y	Neurological damage.	Rehab, annually for units occupied by young children		In NYC, Local Law 1 of 2004 (the Lead Paint Law) requires owners to annually inspect units occupied by children under the age of six, to identify and fix lead paint hazards.		
Active Design Opportunities to Encourage Physical Activity							
Ensure indoor and outdoor areas are well lit	Y	Encourage physical activity	Rehab, ongoing	Med-hi impact, low cost		3.4 Landscaping 5.5 Lighting 7.12,13 Active Design	

Ensure stairs are attractive option over elevators - located close to the entrance and well-lit (with daylight if possible); stair prompt signage	Y	Encourage physical activity	Ongoing	Low Impact, High Cost	Stair prompt sign: www1.nyc.gov/assets/doh/downloads/pdf/tcny/takethestairs.pdf or call 311 to order signs in English or Spanish NYC Active Design Guidelines - http://www1.nyc.gov/assets/doh/downloads/pdf/environmental/active-design-guidelines.pdf Center for Active Design Guidelines: https://centerforactivedesign.org/dl/guidelines.pdf	7.14 Interior and Outdoor Activity Spaces for Children and Adults 8 2.9 Improving Connectivity to the Community 8.1 Building Operations & Maintenance (O&M) Manual and Plan	
Fall/Trip/Fire Hazards							
Install hand held and adjustable shower heads	Y	Reduce trip and fall risks	Annual inspection	Medium impact, Low cost	Aging in Place Guide for Building Owners: http://www1.nyc.gov/assets/dfta/downloads/pdf/publications/AIPGuide2016.pdf	5.5 Lighting 7.11a,b Beyond ADA: Universal Design 7.12, 13 Active Design 8.1 Building Operations & Maintenance (O&M) Manual and Plan	
Install slip-resistant adhesive strips in dark or contrasting color at the edge of each stair tread	Y	Reduce trip and fall risks	Annual inspection	Medium Impact, Low Cost	Aging in Place Guide for Building Owners: http://www1.nyc.gov/assets/dfta/downloads/pdf/publications/AIPGuide2016.pdf		
Ensure flooring and walking surfaces are even and slip-resistant throughout building	Y	Reduce trip and fall risks	Annual inspection	Medium Impact, Low Cost	Aging in Place Guide for Building Owners: http://www1.nyc.gov/assets/dfta/downloads/pdf/publications/AIPGuide2016.pdf		

HEALTHY REHAB INTERVENTIONS

Intervention- Rehab	Impact / Potential Cost	Relevant NYC Code and Resources	Enterprise Green Communities Criteria
Air Quality and Ventilation			
Vent gas combustion appliances (boilers, hot water heater, stove top)	High Impact, Variable Cost		5.3 Sizing of Heating and Cooling Equipment 6.1 & 6.2 Low / No VOC Adhesives and Sealants 6.7 Environmentally Preferable Flooring 6.10 Asthmagen-Free Materials 7.1 Ventilation 7.2 Clothes dryer exhaust 7.3 Combustion Equipment 7.7 Mold Prevention: Water Heaters
Remove carpet; make floors smooth and cleanable	Medium Impact, Variable cost		
Replace gas stoves with electric	Medium Impact, High Cost		
Ensure new building materials meet green and health standards (VOC, formaldehyde)	Medium Impact, Low Cost	Enterprise Green Communities Criteria, Section 6: https://www.enterprisecommunity.org/solutions-and-innovation/green-communities/criteria	
Repair/replace roof top fans, and seal duct work	Medium Impact, Med-Hi Cost		
Repair or improve ventilation systems (central roof exhausts, bath exhausts, air conditioning, other)	Medium Impact, Variable cost	AIA Extreme Heat: Hot Cities - Design for Risk and Reconstruction: http://designforrisk.com/dfrr/wp-content/uploads/2016/04/ExtremeHeatHotCities-AdaptingToAHotterWorld_AIANY-DfRR_April2016.pdf	
Install constant airflow regulators w/ continuous exhausts	Medium Impact, Variable cost	Cost decreases with scale	
Environmental Hazards from Outdoor Sources			
Install enhanced air filtration in building ventilation/HVAC	High impact, medium cost		
Locate exterior intake grilles to minimize intake of contaminants	Medium Impact, Variable Cost		
Install central air or a minimum of one air conditioner unit per apartment	Med-High Impact, Variable Cost	AIA Extreme Heat: Hot Cities - Design for Risk and Reconstruction: http://designforrisk.com/dfrr/wp-content/uploads/2016/04/ExtremeHeatHotCities-AdaptingToAHotterWorld_AIANY-DfRR_April2016.pdf	
Moisture			
Repair leaks, structural issues, water damage, radiator valves, drainage	High Impact, Variable Cost	NYC Mold Guidelines - http://www1.nyc.gov/assets/doh/downloads/pdf/epi/epi-mold-guidelines.pdf EPA Mold/Moisture Guide - https://www.epa.gov/sites/production/files/2016-10/documents/moldguide12.pdf	4.3 Leaks and Water Metering 6.7a,b Environmentally Preferable Flooring: 6.8 Mold Prevention: Surfaces 6.9 Mold Prevention: Tub and Shower Enclosures 7.1 Ventilation 7.2 Clothes Dryer Exhaust 7.5 Vapor Retarder Strategies 7.7 Mold Prevention: Water Heaters
Repair/install ventilation/fans (bathroom, kitchen, dryer)	Medium Impact, Med-Hi Cost		
Replace carpet with smooth flooring in wet areas (bath, kitchen); meet Enterprise Green Criteria standards	Medium Impact, Medium Cost		
Steam leaks elimination- change radiator valve.	Medium Impact, Med-Hi Cost		
Bath: Minimize moisture hold materials (tub surround, particle board vanity)	Medium Impact, Variable cost	NYC LL13 (2014) - Requires the use of mold-resistant materials in moisture-prone locations: https://www1.nyc.gov/assets/buildings/local_laws/ll13of2014.pdf	

Pests			
Hire a pest management professional (PMP) with integrated pest management (IPM) experience to inspect the building, review resident complaints and report pest conditions and ways to eliminate them.	High Impact, Low Cost	NYC DOHMH IPM Toolkit, Pest Prevention By Design Guidelines: www1.nyc.gov/assets/doh/downloads/pdf/pesticide/ipm-toolkit.pdf San Francisco Pest Prevention By Design Guidelines: www.sfenvironment.org/download/pest-prevention-by-design-guidelines	7.10 Integrated Pest Management
Pest proof exterior doorways. Install door sweeps and pest resistant door brushes to all exterior doors and waste storage areas. Ensure entryway thresholds are sealed properly.	High-impact, Low Cost		
Prevent pest access from sub-areas into living areas through exclusion and the use of pest resistant materials	High Impact, Low Cost		
Seal all joint penetrations with low VOC caulk.	High Impact, Low cost		
Pest proof units and common areas using guidelines presented in the NYC DOHMH IPM Toolkit “Pest Proofing Tips for Owners and Staff”	High impact, medium cost		
Properly install all unit fixtures, including kitchen cabinetry, radiators, sinks, electrical outlets, and flooring to prevent pest access and harborage into and through units. Provide QA on unit interiors to guarantee pest prevention.	High Impact, Low cost		
Seal utility lines entering apartments to prevent pest access into and through units	High Impact, Low cost		
Ensure building has enough storage capacity for waste generated by the building and the means to clean waste storage areas. Renovate waste storage areas to improve capacity and improve waste storage sanitation.	High Impact, Medium-Hi Cost		
Use durable pest resistant materials for all renovation work.	High Impact, Medium Cost		

Hazardous Materials			
Hire lead-paint professional to abate or implement lead hazard control measures. For NYC, see Local Law 1 (2004) for building owner requirements.	High Impact, Med-Hi Cost	http://www1.nyc.gov/site/hpd/owners/Lead-Based-Paint.page	7.15 Reduce Lead Hazards
Hire asbestos specialists to inspect, test and remove any asbestos in non intact condition or that may be disrupted during other rehab work.	Medium Impact, High Cost	http://www.nyc.gov/html/fdny/pdf/cda/atru_guidance_document_final.pdf	
Repair /install carbon monoxide alarms	High Impact, Low Cost per Unit	http://www1.nyc.gov/site/hpd/owners/Smoke-carbon-monoxide-detectors.page	
Active Design to Encourage Physical Activity; Healthy Living			
Stairways: improve lighting, access, appeal, safety, and signage to encourage use	Medium Impact, Low Cost	NYC Active Design Guidelines - http://www1.nyc.gov/assets/doh/downloads/pdf/environmental/active-design-guidelines.pdf Center for Active Design Guidelines: https://centerforactivedesign.org/dl/guidelines.pdf	3.4 Landscaping 5.5 Lighting 7.12,13 Active Design 7.14 Interior and Outdoor Activity Spaces for Children and Adults 8 2.9 Improving Connectivity to the Community 8.1 Building Operations & Maintenance (O&M) Manual and Plan
Create added indoor and exterior play areas, exterior gardens	Medium Impact, Med-Hi Cost		
Improve daylighting	Low impact, Variable Cost		
Add vegetation to landscaping plans	Low impact, low cost		
Provide secure, ground-floor parking areas for bicycles	Low impact, low cost		
Fall/Trip/Fire Hazards			
Install dual stairway handrails; slip resistant stairs	High impact, medium cost	NYC Aging in Place Guide for Building Owners - http://www.nyc.gov/html/dfta/downloads/pdf/publications/AIPGuide2016.pdf	5.5 Lighting 7.11a,b Beyond ADA: Universal Design 7.12, 13 Active Design 8.1 Building Operations & Maintenance (O&M) Manual and Plan
Install non-slip flooring; repair loose carpeting and/or uneven flooring	High impact; variable cost		
Incorporate age-friendly elements in ground floor units, i.e. accessible walk-in showers with no threshold or compressible rubber threshold; wider doorways; grab bars at tubs, showers and toilets	High impact, high cost		

Ensure light switches are located close to room entrances and outlets are placed at accessible height; occupancy sensor bath light	Medium impact, low cost		
Install reinforcements for potential future grab bar installation in bathroom walls. Grab bars must be securely anchored to wall studs or masonry.	Medium impact, medium cost		
Install anti-scald devices to plumbing fixtures (e.g. bathtub and kitchen faucets)	Low impact, low cost		
Repair faulty wiring	High impact, medium cost		