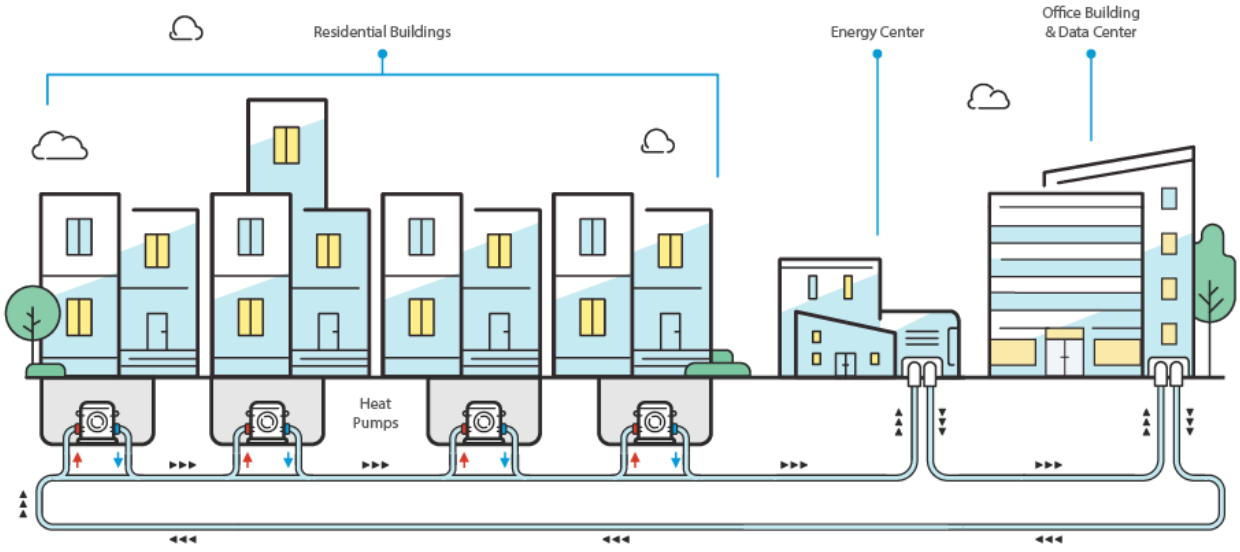
Chelsea, Manhattan
Utility Thermal Energy Network (UTEN) Pilot Project

Stage 2 Filing
Final Pilot Engineering Design and Customer Protection Plan

Case 22-M-049

July 9, 2025



List of Acronyms

ACM - Asbestos Containing Material
ASHPs – Air Source Heat Pumps
ASHRAE - American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASTM - American Society for Testing and Materials
BFE - Base Flood Elevation
BMS - Building Management System
BTC - Building and Construction Trades Council
BTU - British Thermal Unit
CAD - Computer Assisted Design
CFD - Computational Fluid Dynamics
CJWG - Climate Justice Working Group
CLCPA – Climate Leadership and Community Protection Act
DEP – Department of Environmental Protection
DHW - Domestic Hot Water
DOB- Department of Buildings
DOT - Department of Transportation
DPS- Department of Public Service
EC - Energy Center
EM&V - Evaluation, Measurement, and Verification
ETC - Emerging Technology Committee
ETS - Energy Transfer Stations
FAT - Factory Acceptance Testing
FCUs - Fan Coil Units
FEMA - Federal Emergency Management Agency
GHG - Greenhouse Gas
GPD – Gallons Per Day
GPH – Gallons Per Hour
HDPE - High-Density Polyethylene
HMI - Human Machine Interface
HVAC - Heating, Ventilation, and Air Conditioning
I/O - Inputs and Outputs
IT – Information Technology
ITC - Investment Tax Credit
KWL - Kerr Wood Leidal
MAC – Monthly Adjustment Clause
MMBtu – Million British Thermal Units
MPT - Maintenance and Protection of Traffic
NC - Noise Criteria
NYCHA - New York City Housing Authority
NYISO Zone J LBMP - New York Independent System Operator Zone J Locational Based Marginal Pricing
NYS - New York State
NYSBCTC - New York State Building and Construction Trades Council
OAT - Outdoor Air Temperature
O&M - Operations & Maintenance
PACT - Permanent Affordability Community Together
PASNY – Power Authority of the State of New York
PLA - Project Labor Agreement
PSC - Public Service Commission

RIO - Remote Input/Output
RFI - Request for Information
RFP - Request for Proposal
RTU - Remote Terminal Unit
SBA - Small Business Administration
SCADA - Supervisory Control and Data Acquisition
SEED - Supplier Enablement, Engagement and Development
T&D - Transmission & Distribution
TEN - Thermal Energy Network
TER- Thermal Energy Resource
TMY - Typical Meteorological Year
TXV - thermostatic expansion valve
UDS - Utility Distribution System
UPS - Universal Power Supply
UTEN – Utility Thermal Energy Network
UTENJA - Thermal Energy Network and Jobs Act
UWUA - Utility Workers Union of America
Vornado - Vornado Realty Trust
VRF - Variable Refrigerant Flow

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1. INTRODUCTION

The Utility Thermal Energy Network and Jobs Act has set the stage for a new model of providing customers with clean heating, cooling, and domestic hot water.[1] In response to this legislation, the Public Service Commission directed New York's seven largest utilities to propose at least one utility-owned thermal energy network (UTEN) pilot project.[2] In November 2023, Con Edison embraced the opportunity and proposed a trio of UTEN Pilots: at Rockefeller Center, Mount Vernon, and Chelsea, Manhattan. The Chelsea Pilot, which is the subject of this filing, is designed to explore the feasibility of thermal energy distribution in one of New York City's most dynamic neighborhoods. This urban UTEN proposes to recycle waste heat from a local data center to provide high efficiency heating, cooling, and domestic hot water to nearby New York City Housing Authority (NYCHA) low-income multifamily buildings, located in a disadvantaged community.

In April 2024, the Department of Public Service Staff (DPS Staff) confirmed that the Chelsea UTEN Pilot met the necessary criteria to advance to Stage 2.[3] Since then, the Company has developed a Final UTEN Pilot Engineering Design and Customer Protection Plan (Stage 2 Filing), which includes a 100% complete engineering design, customer protections, operational requirements, cost recovery, and performance metrics. While the Pilot faces a number of complexities, this Pilot's design and implementation strategy is intentionally structured serve as a replicable model for other dense urban environments, offering a blueprint for utilities and municipalities seeking to recover and exchange clean thermal energy to decarbonize legacy buildings. The Company requests the Commission to approve this Plan and authorize the Chelsea Pilot to proceed to Stage 3 to begin customer enrollment and pilot construction. This next phase is an important step to realizing the full potential of the Chelsea Pilot and providing direction for future thermal energy networks across the state, particularly in dense urban environments.

[1] Laws of 2022, Chapter 375 (enacted July 5, 2022).
[2] Case 22-M-0429, *Proceeding to Implement the Utility Thermal Energy Network and Jobs Act (UTEN Proceeding)*, Order on Developing Thermal Energy Networks Pursuant to the Utility Thermal Energy Network and Jobs Act (issued September 15, 2022) (*Thermal Energy Network Order*).
[3] *UTEN Proceeding,* UTEN Stage 1 Compliance Letter Chelsea (April 9, 2024) (*Chelsea Compliance Letter)*.

2. PILOT OVERVIEW

Con Edison is pursuing a diverse array of UTEN pilots, in both dense urban and lightly urban/suburban environments, to support the Commission's evaluation of UTENs as a future utility offering and advance New York State's (NYS) climate goals. The Chelsea Pilot is one of three UTEN pilots that Con Edison is proposing. This pilot will create a thermal energy network in Chelsea to provide fossil fuel-free heating, cooling, and/or hot water to residents of NYCHA's Fulton Houses residents while electrifying buildings more efficiently.

The Chelsea Pilot is designed to recover and repurpose thermal energy from the commercial office building housing a data center at 85 10th Avenue. Specifically, it will extract excess heat from the building's chilled water system using heat exchangers, which would otherwise be released into the environment via rooftop cooling towers. This recovered heat will be transferred into the UTEN and transported through the Utility Distribution System (UDS) along W 16th Street to the Fulton Houses campus. At Fulton Houses, the water-source heat pumps will use the network to supply domestic hot water to three of the eleven residential buildings – serving a total of 291 apartments - and to provide both heating and cooling to one of the three buildings. While electricity consumption across these buildings will increase, NYCHA's steam use will decrease significantly, resulting in a net reduction in carbon emissions.[4] The Chelsea Pilot's participants include NYCHA, which owns the Fulton Houses campus, as well as Related Companies (Related) and Essence Development (Essence), which manage the Fulton Houses campus under the Permanent Affordability Community Together (PACT) program.[5] The commercial office building with a data center in it is owned by 85 Tenth Avenue Associates, LLC – a joint undertaking by Related and Vornado Realty Trust (Vornado). On October 30, 2024, during the design stage of the Chelsea Pilot, NYCHA, Related, and Essence formally announced a proposal to demolish existing buildings and rebuild the Fulton Houses campus.[6] This demolition could happen within the 5-year pilot period. Should that occur, the Company would seek

[4] The Company notes that, independent of this filing, it has set a goal of reducing emissions of its steam system as described in its Clean Energy Commitment, and has petitioned the Commission for approval of early deployment steam decarbonization projects (Case 25-S-0350, *Petition of Consolidated Edison Company of New York, Inc. for Authorization and Cost Recovery for Early Deployment Steam Decarbonization Projects and a Low-Carbon Fuels Pilot Program* (May 21, 2025)).

[5] The PACT program is a collaborative initiative that enables NYCHA to secure funding for comprehensive repairs, while maintaining permanent affordability and preserving residents' fundamental rights equivalent to those in the public housing program. Under this program, NYCHA leases the land and buildings at the Fulton Houses campus to development partners. These partners are responsible for conducting repairs, constructing new buildings, managing the property on-site, and offering enhanced social services and community programs.

[6] *See, https://www.fultonelliottchelsea.com/.*

Commission approval to connect the UTEN to one of the new buildings created during the redevelopment.

The Chelsea Pilot's UTEN customer of record will be NYCHA. As is the case currently, NYCHA will be responsible for all energy usage (i.e., increases in electricity from heat pump use and reductions in steam consumption), and tenants will not be billed. Con Edison will bill NYCHA for the thermal energy supplied through the UTEN and charges related to the distribution of that energy. NYCHA will also be able to use the UTEN to transfer thermal energy between its three participating buildings, allowing it to reuse its own space cooling waste heat. Additionally, the Company will compensate 85 Tenth Avenue Associates, LLC for thermal energy exchange. These thermal energy exchange payments will a) cover the cost of increases in 85 10th Avenue's electricity consumption to direct its waste heat to the UTEN rather than the outside air, b) cover the costs to remove thermal energy from the UTEN when it is not needed, and c) provide them a modest, market-aligned return on the soft cost investments they have made.

Fulton Houses residents and the surrounding community are also core stakeholders critical to the success of this Pilot. The table below delineates the role of each stakeholder throughout the lifetime of the Pilot.

Table 1: Chelsea Pilot Participants

Party	Description
NYCHA/Fulton Houses	• Owner of the Fulton Houses campus.
Related	• One of two PACT partners with Fulton Houses. • Decisionmakers for when the existing Fulton Houses are demolished, when residents will be relocated to newly rebuilt buildings, and if these new buildings will be able to connect to the UTEN for heating/cooling in the future. • Majority owner of 85 10th Ave and, thus, is involved on both the Thermal Energy Resource *and* customer side of the Pilot.
Essence	• One of two PACT partners with Fulton Houses. • Leads the redevelopment efforts. • Decisionmakers for when the existing Fulton Houses are demolished, when residents will be relocated to newly rebuilt buildings, and if these new buildings will be able to connect to the UTEN for heating/cooling in the future.
Vornado	• Minority owner of 85 10th Avenue.
85 Tenth Avenue Associates, LLC	• Owner of the data center located at 85 10th Ave. • Joint undertaking by Related and Vornado.

The scope of the Chelsea Pilot includes four buildings. Three of these—401 W 16th Street, 410 W 17th Street, and 420 W 17th Street—are located on the Fulton Houses campus. Together,

these buildings comprise approximately 262,000 square feet and contain a total of 291 residential units. A summary of each building's characteristics is provided in Table 2. A map of the Pilot is located in Figure 1.

Table 2: Building Types

Address	# of Units	Square Footage	Existing heating system	Description
401 W 16th Street (Fulton Houses)	6	45,000	Low pressure steam radiators	• The Thermal Energy Resource will provide space heating and cooling, as well as domestic hot water, to this building. • Energy Center equipment will be installed in the basement of this building. • New York City Housing Authority (NYCHA) is the owner of the Fulton Houses campus, which is managed by the PACT.
410 W 17th Street (Fulton Houses)	6	45,000	Low pressure steam radiators	• The Thermal Energy Resource will provide domestic hot water to this building. • New York City Housing Authority (NYCHA) is the owner of the Fulton Houses campus, which is managed by the PACT.
420 W 17th Street (Fulton Houses)	19	172,000	Low pressure steam radiators	• The Thermal Energy Resource will provide domestic hot water to this building. • New York City Housing Authority (NYCHA) is the owner of the Fulton Houses campus, which is managed by the PACT.
85 10th Avenue (Commercial Building with Data Center)	N/A	553,000	N/A	• This building is the Thermal Energy Resource for this pilot. • Energy Center equipment will be installed in the basement of this building. • Related and Vornado are the building owners.

Construction is forecasted to take 21 months and is estimated to cost $45.53 million to complete the Pilot, excluding contingency.[7] The Company proposes to recover the costs from

[7] See Appendix for the Final Construction Project Plan.

electric ratepayers. Thermal networks in an electrified future will meaningfully reduce peak electric system demand compared to air-source heat pumps, thereby reducing the amount of electric system expansion required to meet the State's decarbonization goals. Recovery from electric customers thus properly aligns UTEN costs with the energy commodity receiving these benefits.[8]

Given the Pilot's innovative construction, operational, and business challenges, the Company is committed to implementing several strategic measures to manage additional and unforeseen Stage 3 costs. Further details are provided in the Cost Recovery and Accounting Treatment section below.

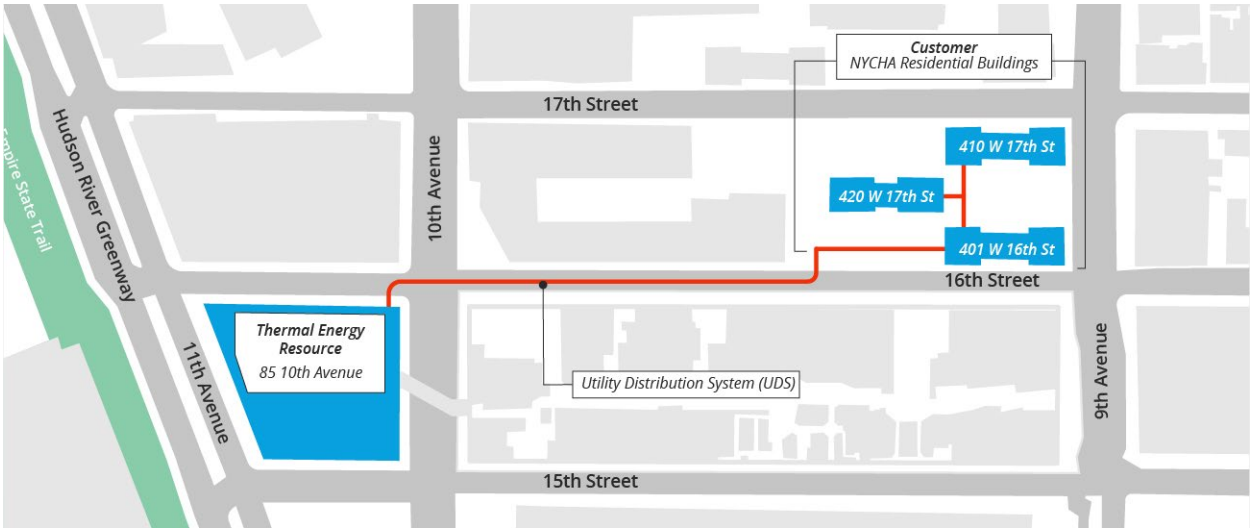

Figure 1: Chelsea Pilot Map

2.3. Disadvantaged Communities

The Utility Thermal Energy Network and Jobs Act requires that at least one proposed Pilot from each applicable utility be in a Disadvantaged Community within the utility's service territory, in alignment with New York State's Climate Leadership and Community Protection Act (CLCPA) goals. The Chelsea Pilot will provide benefits to NYCHA's Fulton Houses, which are all Low- to -Moderate-Income (LMI) and located in a Disadvantaged Community.

The Climate Justice Working Group's (CJWG) Disadvantaged Communities Criteria uses 45 different indicators, including environmental burdens and climate change risk, as well as

[8] Refer to the section titled 'Cost Recovery' for further details.

population characteristics and health vulnerabilities.[9] The pilot's census tract area has a Burden Score Percentile of 91%, which represents the combined percentile ranking for the cumulative score of all indicators within the 'Environmental Burden and Climate Change Risk' category that takes into account potential climate change risks and pollution exposures. Additionally, Fulton Houses has 80% of residents considered low- to - moderate-income or earning less than 80% of the Area Median Income. This share of low- to - moderate-income households is higher than 49% of census tracts in New York State.

The Chelsea Pilot offers promising benefits to the community by promoting energy efficiency, supporting health improvements, and advancing sustainable practices. Converting the steam system to a thermal system reduces reliance on natural gas used to generate Con Edison District Steam, which helps lower greenhouse gas emissions. Additionally, Heating, Ventilation, and Air Conditioning (HVAC) upgrades in 401 W 16th Street include air handlers with air filters that operate year-round, contributing to improved indoor air quality for tenants. Additionally, the new HVAC equipment will have temperature control capabilities, which will result in an increased level of comfort for the residents.

2.4. General Learnings from Stage 2

The Chelsea Pilot has and will continue to yield a range of detailed learnings across technical, operational, workforce, financial, and regulatory domains, offering a robust framework for future UTEN deployments in urban environments.

Technical and Design Learnings: Pilot Design further confirmed the viability of using waste heat from commercial buildings as a scalable thermal energy source, particularly in areas where geothermal systems are impractical. Key design decisions included selecting fan coil units over Variable Refrigerant Flow (VRF) systems to minimize in-unit disruption and reduce refrigerant risks, optimizing condenser water tie-in points for better thermal exchange, and transitioning to a primary-variable pumping scheme to simplify operations and reduce costs. Early coordination was found to be essential to avoid delays, and stakeholder engagement was critical in adapting designs to community concerns, such as eliminating a standalone energy center to address the needs of the rebuild plan. The project also illustrated a number of the complexities of developing a thermal resource that, like all existing buildings, has operations that evolve over time.

[9] New York State Climate Justice Working Group, *Technical Documentation on the Disadvantaged Communities Criteria – Final Version*, https://climate.ny.gov/-/media/Project/Climate/Files/Disadvantaged-Communities-Criteria/Technical-Documentation-on-the-Disadvantaged-Communities-Criteria---Final-Version.pdf (Mar. 27, 2023).

Operational and Infrastructure Considerations: Leasing space at 85 10th Avenue introduced legal and operational complexities, underscoring the importance of evaluating long-term implications of decentralized infrastructure. Flood risk assessments led to storm-hardening measures, and test pit excavations proved valuable in verifying subsurface conditions and avoiding costly utility conflicts. The Pilot also highlighted the need for frequent stakeholder engagement, especially when working with large public agencies.

Monitoring and Controls Strategy: The Supervisory Control and Data Acquisition (SCADA) system strategy evolved toward a cloud-based solution due to regulatory constraints and cost considerations. However, cybersecurity concerns necessitated disabling remote control functions, requiring local control panels for manual operations. Delays in finalizing this strategy impacted Pilot timelines, emphasizing the need for early involvement of Information Technology (IT) subject matter experts.

Workforce Development: An Emerging Technology Committee will be established early in the process to enable cross-functional alignment and proactive training. A formal skills gap analysis will inform the development of multi-modal, role-specific training programs. Specialized equipment, such as pre-insulated piping, will require targeted training that is not yet common in the local contractor market.

Pilot Rate Design Learnings: The Pilot's rate design analysis demonstrated the importance of thoroughly modeling participant costs and benefits to come to prices and rates that make Thermal Energy Resource Owner and Customer participation viable, It also highlighted the importance of a thermal rate structure that incents Thermal Customers to efficiently utilize their own waste heat to reduce demand on the Thermal Energy Resource.

3. PILOT OBJECTIVES

The Chelsea Pilot will pilot novel technical and business approaches to deliver immediate and long-term benefits and learnings to customers and the State. The Company expects that the findings from the Chelsea Pilot will create a blueprint that can inform future decarbonization work across the service territory and beyond. The Company anticipates achieving the following learning objectives:

- **Utilizing waste heat from data centers:** The number of data centers is expected to increase significantly in the coming years due to meeting the needs of artificial intelligence and other tools.[10] In the Company's service territory, customers have submitted interest to the Company to bring online more than 80 MWs worth of new load related to data centers.[11] Data centers produce significant, consistent waste heat, making them ideal sources of thermal energy in places where geothermal boreholes are not feasible. The Chelsea Pilot will provide the Company with experience in utilizing waste heat from this growing sector that can provide lessons for both the Company and other utilities that may see a growth in data centers in their service territory.
- **Testing price and rate structures for waste heat:** Developing rate models for waste heat could be crucial for utilities and non-utilities in the future, as there is potential for thermal energy to become a commodified, low-carbon resource. Additionally, the Chelsea Pilot will test the optimization of Thermal Energy Resource Owner building operations to generate waste heat while also managing increased electricity costs due to providing waste heat to the thermal energy network.
- **Electrifying large buildings in dense areas:** To reach State decarbonization goals, existing buildings – not just new construction – need to be electrified. The Chelsea Pilot explores retrofitting solutions that are minimally invasive to residents and can be integrated into existing infrastructure.
- **Validation of networked solutions a dense, urban environment:** Building and operating in New York City comes with its unique set of challenges, such as physical space density, high population density, and seamless integration with existing urban systems. The Chelsea Pilot will provide a framework for other large commercial building owners to replicate designing networked decarbonization solutions – both UTEN and privately owned- in an urban area.

[10] Con Edison estimates.
[11] As of May 1st, 2025.

3.1. Pilot Benefits

In addition to contributing to the above learning objectives, the Chelsea Pilot would provide other key benefits:

1. **Decarbonization:** Reduce emissions and achieve environmental goals, including those in the CLCPA. The Pilot will decarbonize domestic hot water sources of participating buildings from steam to thermal energy.[12] One building will also receive space heating using the waste heat. The Company expects that this Pilot will reduce over an estimated 15,000 metric tons of lifetime Greenhouse Gas (GHG) emissions equivalent (Lifetime CO2e) at the current GHG intensity of District Steam.
2. **Expanding Industry Awareness:** Collaborate with three of New York City's largest real estate entities – Related Companies, Vornado Realty Trust, and the New York City Housing Authority (NYCHA) – into direct engagement with UTENs and waste heat reuse. Related and Vornado each own dozens of properties in the Company's service territory totaling several tens of millions of square feet.[13] Likewise, NYCHA is responsible for nearly 180,000 apartments in New York City.[14] If this initial pilot is successful, it would provide a model that could be replicated at other properties that these organizations own.
3. **A Just Transition for the Workforce:** Create new job opportunities and an equitable pathway for all members of the workforce.

   It is crucial that the shift from fossil fuels to thermal energy is fair and equitable for all workers. The Company will:

   - Complete all skilled trade work for both customer- and Company-owned infrastructure with a union workforce.
   - Enter a Labor Peace agreement with Utility Workers Union of America (UWUA) Local 1-2 for the Company's internal workforce.
   - Pursue a Project Labor Agreement (PLA) for the construction of the thermal energy network.
4. **Increasing Customer Comfort:** The NYCHA tenants residing in the building that will receive heating and cooling from the UTEN will benefit from upgraded HVAC systems. These enhancements will increase customer comfort by allowing residents to control the

[12] If the steam system is able to reduce its carbon emissions and its coefficient is reduced, estimates of carbon reduction associated with this Project would also decrease.
[13] *See,* https://www.related.com/.
[14] *See,* https://www.nyc.gov/site/nycha/about/about-nycha.page.

temperature of each room individually. Additionally, the upgraded HVAC systems will include built-in air filters, providing residents with access to cleaner air in their homes.

4. FULTON HOUSE REBUILD

On October 30, 2024, NYCHA approved a plan for the rebuild of the Fulton Houses campus.[15] The rebuild, targeted to begin in late 2028, will involve increasing the number of apartments, redesigning community facilities and outdoor spaces, and adding mixed-use space by replacing all existing apartment buildings. The rebuild will commence with the northern-most block of Fulton Houses buildings (between W 18th and W 19th Streets), followed by the central block of Fulton Houses buildings (between W 17th and W 18th Streets).[16] The block of Fulton Houses buildings that will connect to the UTEN will be the last block of buildings demolished and rebuilt. There is a possibility that the demolition period could occur during the pilot period leading to the UTEN operating for less than the continuous five years as was envisioned by the Commission's September 2023 Order.[17]

Currently, NYCHA, Related, and Essence are collaborating on the redevelopment of the Fulton Houses campus. Based on the current schedule, the earliest the demolition will begin of the Fulton Houses designated for UTEN connection would occur in 2032, during the fourth year of the pilot. Following demolition, the Company may propose connecting the UTEN to the nearest newly constructed NYCHA building at the northwest corner of W 17th Street and 9th Avenue. The PACT indicated interest in connecting this newly constructed building to the UTEN for its domestic hot water system. Connecting to the new NYCHA building will not be included in the cost to build this UTEN for the pilot period, but isolation valves in the existing Fulton Houses parking lot to connect to the new future building is incorporated into the current design.

NYCHA, Related, and Essence are still in the process of finalizing the demolition timeline.[18] The PACT has also yet to finalize design for what will replace the three existing buildings participating in the Pilot. If these deciding stakeholders confirm plans to start demolishing the pilot buildings in 2032 and reach agreement with the Company to integrate the UTEN into the newly constructed NYCHA building at the corner of W 17th Street, the Company would file a new petition seeking approval to connect the UTEN and recover associated costs.

The redevelopment of the Fulton Houses campus may serve as a valuable opportunity to explore how new buildings can be designed for seamless integration with a UTEN. Integrating UTEN compatibility during the building design phase is expected to avoid the additional costs typically associated with retrofitting existing buildings for such connections. Below summarizes

[15] N.Y.C. Hous. Auth., Minutes of the Board Meeting, at 9 (Oct. 30, 2024) (NYCHA Board Minutes).
[16] *See,* https://www.fultonelliottchelsea.com/about.
[17] *UTEN Proceeding,* Order Providing Guidance on Development of Utility Thermal Energy Network Pilot Projects (issued September 14, 2023) (*UTEN Guidance Order*).
[18] Refer to section titled 'Project Execution' for further detail.

estimated highlights for incorporating the newly constructed NYCHA building at the corner of W 17th Street into the UTEN to provide domestic hot water.

- Approximate number of units: 391[19]
- Number of residents: 860[20]
- Total square feet: 357,580 square feet[21]
- Total daily load: 12,250 gallons
- Peak hourly demand: 2,450 gallons per hour (GPH)
- Peak hourly load: 1.17 MBH
- Total annual load: 2,610 MMBtu[22]
- Peak demand reduction by joining the UTEN compared to electrification with an air-source heat pump: 137 to 205 kW
- Lifetime[23] CO2e reduction by joining the UTEN: 2,725 metric tons CO2e

Should the buildings be demolished prior to the completion of the 5-year period, the Company's design would allow for the preservation of substantial portions of the UTEN infrastructure, which could be utilized to connect to the new building. This equipment eligible for reuse represents $19 million, including contingency of the Pilot estimated costs and includes:

- The Utility Distribution System pumps and their Variable Frequency Drives located in 85 10th Avenue;
- The Utility Distribution System pipe installed from 85 10th Avenue to isolation valves in the Fulton Houses parking lot; and
- Isolation valves and piping taps for future connections in the Fulton Houses parking lot.

Nonetheless, the rebuild would lead to the loss of value of the Project upgrades made in the three NYCHA customer buildings.[24] One potential approach to fully address the uncertainties

[19] N.Y.C. Hous. Auth., Rebuilding Fulton & Elliot-Chelsea Houses NYCHA Board Presentation (2024), https://www.nyc.gov/assets/nycha/downloads/pdf/fecboard.pdf.
[20] Assumed 2.2 residents per unit.
[21] N.Y.C. Hous. Auth. & N.Y.C. Dep't of Hous. Pres. & Dev., Draft Scope of Work to Prepare a Draft Environmental Impact Statement: Fulton and Elliott-Chelsea Houses Redevelopment Project (Jan. 5, 2024), https://www.nyc.gov/assets/nycha/downloads/pdf/fec_draft_scope_of_work_jan_2024.pdf.
[22] N.Y. State Energy Rsch. & Dev. Auth. (NYSERDA), Greenhouse Gas Emissions Reduction, https://www.nyserda.ny.gov/Impact-Greenhouse-Gas-Emissions-Reduction.
[23] Lifetime of the UTEN isdefined as 25 years to be consistent with DPS Lifecycle Cost Analysis guidance. Emissions factors are consistent with the LCCA guidance as well.
[24] The Company, its engineering vendors, NYCHA, Essence, and Related explored multiple options to minimize this lost value in the event of the rebuild. However, further analysis in light of the latest rebuild plans revealed each of these options to be infeasible. For instance, the group analyzed the construction of

associated with the remaining lifespan of the existing buildings and the anticipated redevelopment would be to defer implementation of the Pilot until the rebuild plans are finalized. At that stage, the Pilot design could be revised in coordination with the relevant Parties to serve the future NYCHA campus, and a UTEN design could be filed accordingly.

a standalone building to persist post-rebuild that would house equipment like heat pumps and heat exchangers. This option was eventually ruled out as updated rebuild requirements did not leave sufficient space for such a structure.

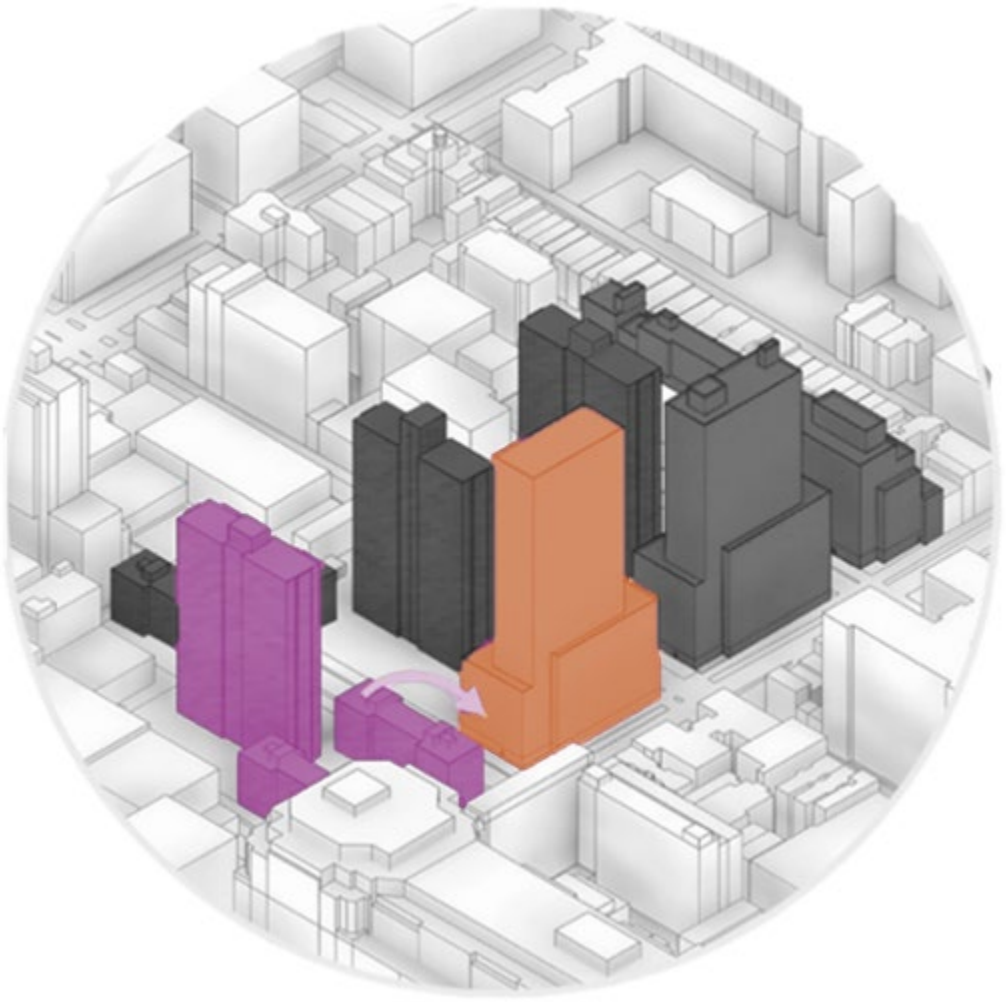

Figure 2: NYCHA Residents Relocation during Fulton House Rebuild

Legend: Purple (existing NYCHA buildings), Orange (new building to transfer existing NYCHA residents)

5. SITE SELECTION AND SCOPE

The Company solicited pilot proposals through a Request for Information (RFI) that closed on January 13, 2023. The Company received and reviewed eight unique responses in addition to two internal Pilot initiatives to replace leak-prone gas pipes. Following a comprehensive evaluation, Con Edison selected three Pilot projects that achieved the highest scores – both individually and as a portfolio – based on their potential to maximize a balanced set of learnings. Among these projects, the Chelsea Pilot stood out for its scalability to dense, multifamily buildings requiring retrofits. Additionally, the Chelsea Pilot presented many opportunities to expand post-Pilot, with large data centers, commercial buildings, and the Hudson River as potential waste heat sources that could provide additional waste heat into the system. Particularly, the area is home to Google's data center, and it has expressed interest in potentially connecting to the UTEN in the future.

6. FINAL PILOT ENGINEERING DESIGN

At the time of this filing, the Chelsea UTEN Pilot has completed 100% of its engineering design, including all associated drawing packages and technical deliverables. All design packages are finalized and ready to support the procurement process and preparation of bid packages upon approval to proceed to Stage 3.

6.1. Background

The Chelsea UTEN captures waste heat from 85 10th Avenue's chilled water plant, which uses chilled water to provide space cooling to 85 10th Avenue by absorbing excess heat from the building. Under current operations, the excess heat captured by the building's chilled water system is discharged into the atmosphere via rooftop cooling towers. This normally wasted thermal energy will be captured and repurposed by transferring it into the UTEN system by plate and frame heat exchangers, which allow heat to move from the chilled water plant's condenser water return loop into the UTEN's circulating fluid. Once the thermal energy is transferred to the UTEN, it is distributed through a two-pipe, closed-loop, ambient piping network, where it will be used to provide domestic hot water to three nearby multifamily buildings in the Fulton Houses campus. One of the buildings, 401 W 16th Street, will also receive space heating and cooling via the UTEN.

The existing chilled water plant at 85 10th Avenue has the capacity to provide approximately 5,000 MBH of low-grade thermal energy well suited for water-source heat pumps, or approximately five times the current space and water heating demand for the three multifamily buildings the UTEN will serve on the Fulton Houses campus. The chilled water plant includes a cooling tower system with a combined capacity of 4,800 tons, which serves as a backup for heat rejection during cooling operations. The Company will install approximately 2,500 linear feet of underground piping to deliver up to 1,492 MBH of domestic hot water, 1,201 MBH of heating, and 948 MBH (~79 tons) of cooling to the three buildings, respectively, depending on the time of year.

As part of the Pilot, the Company will install 192 new terminal fan coil units (FCUs) in each room inside the 36 units of 401 W 16th Street to provide space heating and cooling to residents via a 2-pipe hydronic system with a modular water-source heat pump located in the building's basement. Domestic hot water heat pumps and domestic hot water storage tanks will be installed in the basement of each of the three buildings to provide the buildings with domestic hot water.

Control valves at 85 10th Avenue and customer interfaces—integrated with Con Edison's Supervisory Control and Data Acquisition (SCADA) system—will regulate flow and temperature

to maintain optimal performance, ensure redundancy, and protect equipment from thermal extremes. Two Energy Transfer Stations located in 401 W 16th Street—one for space heating and cooling and one for domestic hot water —would ensure localized control and redundancy.

The Pilot will test the Company's hypothesis that the Chelsea UTEN design provides a scalable framework for electrification of heating and cooling and can serve as a template for citywide deployment of district-scale decarbonized energy systems. See below for an illustration of the Pilot footprint.

Figure 3: Chelsea Pilot Footprint

6.2. Design Considerations

The Company and its consultants made several initial design decisions based on key priorities such as environmental, health, and safety, reliability, future scalability, and managing cost. These priorities are as follows:

Environmental, Health, and Safety

- Leveraging Company standards and procedures related to construction, infrastructure maintenance, and leak management.
- Choosing water as the heat transfer medium within the Utility Distribution System so there are no environmental risks in the event of a leak.

- Choosing fan coil units to provide space heating and cooling to residents in 401 W 16th Street instead of variable refrigerant flow units to reduce the amount of possible refrigerant leaks within or around the building.
- Complying with applicable codes and standards for the three new electrical services required to install new equipment.
- Complying with existing standards and procedures for the new steam infrastructure and equipment required to ensure UTEN reliability during emergency and backup situations
- Designing equipment and infrastructure with appropriate heights, clearances, and shut offs for safe maintenance.
- Incorporating sensors and equipment statuses into SCADA to allow the Company to remotely monitor the operation of the UTEN to allow for early detection of potential faults or safety risks via alarms.
- Developing an Emergency Plan to safely isolate all or parts of the UTEN in the event of an emergency.

Reliability

- Incorporating sensors (flow, differential pressure, temperature, etc.) and equipment statuses into SCADA to allow the Company to remotely monitor and maintain system performance.
- Providing an "n+1 redundancy"[25] for the system by including an additional UDS distribution pump and additional Energy Transfer Station heat exchangers within the design so there is uninterrupted service in the event of an equipment failure.
- Providing backup cooling for 401 W 16th Street's cooling loads by installing a connection point to install a roll-up rental dry-cooler to maintain safe UDS temperatures if heat cannot be rejected to 85 10th Ave's cooling towers when the UDS temperature setpoint is exceeded.
- Incorporating a new steam-to-hot water heat exchanger in 401 W 16th Street, using Con Edison steam to inject emergency heat into the network when needed to ensure continuity of service if 85 10th Avenue is temporarily offline.
- Retaining the existing steam-fed radiators in each apartment within 401 W 16th Street so emergency heat can be provided for residents in the event of a UTEN failure.

[25] This design decision means that if a critical component fails the system will still be able to operate because the system includes an extra such component for that purpose.

- Installing the new domestic hot water equipment in each building in series with the existing steam-fed instantaneous water heaters so residents can be provided with hot water in the event of a UTEN failure.
- Leverage the current 24/7 heat rejection at 85 10th Avenue, which exceeds the heating load requirements of Buildings 1 – 3, providing approximately 2,000 MBH of surplus capacity to accommodate potential load fluctuations.
- Designing the UTEN equipment at 85 10th Avenue with flood protections (taller equipment pads, sump pit and sump pump, and easily replaceable UDS pumps and VFDs) to mitigate reliability concerns due to 85 10th Avenue being located in a Federal Emergency Management Agency (FEMA) flood zone.

Future Scalability

- Installing a larger UDS pipe size than what is needed to satisfy current and potential future demand at the Fulton Houses campus (10" pipe instead of 6" pipe).
- Having a greater heat rejection at 85 10th Avenue than what is needed to satisfy current demand to supply future customers with an additional ~2,000 MBH of constant heating load.
- Installing isolation valves and a tee for future connection within the parking lot of the Fulton Houses campus so the newly rebuilt Fulton Houses buildings or other future customers can connect to the UTEN.
- Having discussions with the Fulton Houses Rebuild design team about designing the newly rebuilt buildings to have the ability to connect to the UTEN for their heating and cooling needs, with an immediate focus on domestic hot water needs.

Managing Cost

- Reducing the buildings receiving HVAC conversions from two to one to reduce building conversion costs while still maintaining the learnings from converting one building.
- Minimizing the Energy Center footprint per stakeholder feedback (as discussed immediately below) also meaningfully reduced Pilot cost.
- Retention of Thermal Customer district steam services to serve as emergency backup. This avoided the substantial cost of new Company-owned emergency heating equipment such as electric boilers[26]

[26]Thermal rates and Thermal Customer Agreements have been designed to limit use of district steam to this intended use. The rates do so with a positive economic incentive, being set at levels such that the Thermal Customer saves money utilizing the Pilot for heating compared to District Steam. The Customer Agreement will require the Thermal Customers to purchase a guaranteed minimum level of heat or face penalties. See the applicable sections later in the filing for more discussion.

The following stakeholder concerns also guided the Pilot design:

Minimizing the Energy Center Footprint

The original Pilot design included constructing a new building on the Fulton Houses campus that would house all of the Company's Energy Center equipment, such as UDS pumps, Energy Transfer Station heat exchangers, a backup steam-to-hot water heat exchanger, and electrical equipment. The Company identified a location on the campus that would not be impacted by the redevelopment – an existing parking lot located just south of 420 W 17th Street. However, during Stage 2, NYCHA determined that eliminating parking spaces from the parking lot to build the new building would negatively impact residents. Decreasing the number of available parking spaces also would not have complied with the City's zoning regulations. In addition, the proposed location of the Energy Center building, although not in the direct footprint for the newly developed area, would take away green space, which would impact the allowable buildable space of the property. Therefore, the Company, 85 Tenth Ave Associates, LLC, and the PACT agreed to forego a standalone building. Instead, the UDS pumps are designed to be placed in 85 10th Avenue, and the rest of the equipment that would have resided in the Energy Center building is to be placed within the basement of 401 W 16th Street. Eliminating the Energy Center building decreased the overall Pilot cost by approximately 20% ($19.5 million). However, when 401 W 16th Street is redeveloped, the Company's equipment in that building will need to be removed or demolished. To connect the UTEN to new buildings in the future would require new equipment (e.g., heat exchangers and heat pumps) installed within the customer building.

Minimizing Resident Disturbances

Another design consideration that was essential to NYCHA was minimizing resident disturbances. In addition to eliminating the Energy Center building from the Pilot to not impact the number of available parking spaces, it was also decided to minimize the amount of work performed inside residential apartments. Rather than installing new risers through six floors of the building that will receive space heating and cooling, external risers using prefabricated piping modules were designed to run outside the building within an insulated enclosure that closely matches the existing finish of the building. In addition, the existing radiators in each unit within 401 W 16th Street will be left in place to further minimize the work needed to be performed in each unit. As a result, this change decreased the number of days estimated to perform work in each apartment to install the new fan coil units by two days. This decision also reduces the potential

exposure of residents to Asbestos Containing Material (ACM) and lead that might be present within the floor of each story.

6.3. Design Approach

6.3.4. Engineering Team and Strategy

The Chelsea UTEN Pilot was collaboratively designed by Ecosystem and WSP (formerly AKF Group), leveraging each firm's specialized expertise to deliver a high-performance district energy system for Manhattan's dense urban environment. Ecosystem brought deep experience in designing, building, and operating complex district energy and decarbonization projects, combined with extensive knowledge of New York City construction standards and regulatory frameworks. WSP contributed industry-leading technical expertise in energy simulations and engineering design, with particular strengths in compliance with New York City codes and intimate familiarity with the stakeholder buildings' existing conditions and systems.

Ecosystem served as the overall project integrator, leading system architecture, technical coordination, and integration of construction and operational requirements into the design. WSP led the discipline-specific engineering, including mechanical, electrical, plumbing, fire protection, and instrumentation and controls (I&C) design. Ecosystem structured its team around a dedicated Project Manager supported by subject matter experts in district energy systems, NYC construction logistics, systems integration, and financial optimization for decarbonization projects. WSP deployed a specialized team of discipline leads for each engineering area, including mechanical, electrical, plumbing, dynamic energy modeling, and controls engineers, to ensure full coverage of the Pilot's technical complexity.

To further enhance the quality and depth of the design, both companies strategically engaged external specialty firms. For example, Langan was retained to provide civil engineering expertise specific to New York City's urban infrastructure and permitting environment, helping to navigate subsurface utility congestion and Department of Transportation (DOT) requirements. This team-of-teams approach allowed the Chelsea UTEN Pilot to be designed by a group of best-in-class experts, purpose-built to meet the technical, logistical, and regulatory demands of an urban district energy system.

Ecosystem and WSP submitted five drawing packages and various other design deliverables at three stage gates throughout the design process: 30%, 75%, and 100%. During each stage gate, at least 17 distinct deliverables were submitted for Con Edison's review, including a Basis of Design document, construction specifications, and operating procedures. It is important to note that no permits were obtained during Stage 2 since they would have expired

before construction could start in Stage 3. [27]Five drawing packages were delivered for each address and system listed below:

- 401 W 16th Street
- 410 W 17th Street
- 420 W 17th Street
- 85 10th Avenue
- Utility Distribution System

Each drawing package included drawings from the following trades, as applicable:

- Mechanical
- Electrical
- Plumbing
- Structural
- Architectural
- Fire Alarm
- Fire Protection

The applicable drawings mentioned above generated for each drawing package were filed confidentially to protect customers' proprietary information. Other deliverables generated as part of the Pilot, like construction specifications, were also filed confidentially.

Throughout the stage gates, drawings and other relevant deliverables were reviewed by subject matter experts within Con Edison, as well as two engineering peer reviewers. The Company hired two industry experts, Kerr Wood Leidal and RCM Energy Services, to verify that all drawings comply with all industry standards and city, state, and federal laws:

- **Kerr Wood Leidal (KWL)** is a well-respected Canadian consulting engineering firm with a long history, established in 1975. They are recognized leaders in the analysis, design, and construction of district energy systems, offering expertise in both high-temperature and low-temperature networks, as well as community renewable energy resource mapping. Their team possesses a strong blend of strategic planning and technical analysis, taking a technology-neutral approach to develop effective solutions. Having KWL as a peer reviewer for the Thermal Energy Network design stage was crucial due to their extensive and specialized experience in this field, ensuring the design was robust and efficient and incorporated industry

[27] Permit applications will be submitted once construction contractors are formally engaged during Stage 3.

best practices. Their insights helped identify potential challenges and optimize the system for long-term performance and sustainability.

- **RCM Energy Services (RCM)** is a firm with a history of providing a broad spectrum of energy-related services, encompassing engineering, consulting, and project management, with a strong emphasis on energy efficiency and sustainability. While their primary focus was not solely on district energy systems, RCM Energy Services possessed significant experience in designing infrastructure projects for Con Edison in the New York City area. Their familiarity with Con Edison's infrastructure and New York City's regulations made their perspective invaluable during the Thermal Energy Network design stage, particularly in ensuring seamless integration and adherence to local utility practices. This specific expertise in navigating Con Edison's systems, combined with their broader energy efficiency focus, provided a crucial layer of review, complementing KWL's district energy proficiency.

6.3.5. Data Gathering

As with any large infrastructure project, the UTEN design process integrated the results of substantial data gathering, site verifications, and analysis. These included:

1) 3D Scanning

In order to assist with creating the drawing packages, all mechanical spaces the UTEN pipe and Customer Equipment will be installed in were scanned utilizing 3D scanning technology. The 3D scans limited the required number of mechanical surveys to be performed for the Pilot to learn information about the existing conditions of the Thermal Energy Resource and customer buildings.

2) Fan Coil Units vs. Variable Refrigerant Flow Analysis to Provide Space Heating and Cooling

The Company's design team performed a study within the first 30 days of design to determine the best HVAC method to provide space heating and cooling to all residents within 401 W 16th Street. Various factors such as cost, simplicity, redundancy, and future flexibility were examined for fan coil unit and variable refrigerant flow systems. The Company ultimately decided that installing terminal fan coil units with a modular water-source heat pump was the best HVAC method to provide space heating and cooling to 401 W 16th Street. The study supporting this decision is located in the Appendix.

3) Test Pits

To inform the final engineering design of the Pilot, Con Edison conducted seven exploratory test pits along the proposed route of the Utility Distribution System (UDS) between 85 10th Avenue and the Fulton Houses campus. These test pits were excavated in October 2024 and played a critical role in validating the feasibility of the underground piping installation.[28] Test pits are small, controlled excavations used to expose and visually inspect subsurface conditions. In dense urban environments like Manhattan, where underground infrastructure is highly congested and often undocumented or inaccurately mapped, test pits are essential for:

- **Verifying Utility Records**: While utility mark-outs and historical utility plates provide a preliminary understanding of subsurface conditions, they can be outdated or incomplete. Test pits confirm the actual location, depth, and condition of existing utilities, reducing the risk of unexpected conflicts during construction.
- **Refining Design**: The findings from the test pits allowed the engineering team to adjust the UDS routing and depth to avoid utility relocations, minimize construction delays, and reduce costs. This proactive approach ensures that the final design is both technically feasible and constructible.
- **Ensuring Safety and Compliance**: By identifying potential environmental or safety hazards—such as contaminated soil or proximity to critical infrastructure—test pits help ensure that construction activities can proceed safely and in compliance with all applicable regulations.

The seven test pits confirmed the accuracy of prior utility mark-outs and revealed no major conflicts that would require utility relocation. This validation enabled the design team to finalize the UDS alignment with confidence, ensuring that the 2,500 linear feet of piping could be installed efficiently with minimal disruption to the surrounding community. The test pits were a foundational step in de-risking the Chelsea UTEN Pilot. They exemplify the importance of thorough pre-construction investigation in complex urban infrastructure projects, where proactive planning is key to successful execution.

Figure 4 below depicts the locations the seven test pits were excavated. Each test pit is highlighted in red. A picture of one of the seven test pits that were excavated is located in Figure 5.

[28] *UTEN Proceeding,* Monthly Progress and Expenditure Report – through October 31, 2024 (November 15, 2024).

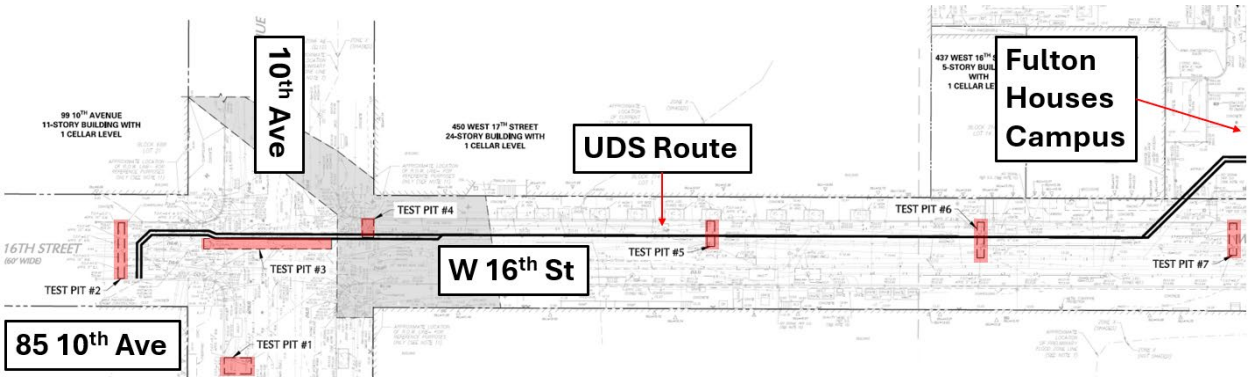

Figure 4: Chelsea Test Pit Map

Figure 5: Example of Chelsea Test Pits

4) Civil Investigative Work on the Fulton Houses Campus

To inform the final engineering design of the Pilot, Con Edison conducted investigative work on the Fulton Houses property in April 2025. 36”-deep slab corings and 8-ft deep soil probings were performed in the three Fulton Houses’ basements to verify the slab construction method for each building. A 50 ft-deep soil boring on the north side of 401 W 16th Street was also excavated to learn information about the campus’ water table and soil properties. In addition, a

small test pit was excavated on the north side of 401 W 16th Street to test for ACM within the waterproofing of the building's exterior.

The slab corings and soil probings played a critical role in validating the level of support required for the newly installed equipment in the basement of each Fulton Houses building. Since the foundation slabs in 401 W 16th Street and 410 W 17th Street were measured to be at least 36" thick, a less conservative equipment pad approach was incorporated into the design than was originally planned (saw-cutting the existing slab, backfilling and compacting new fill, and re-pouring the floor slab and equipment pads together). However, it was found that the thickness of the floor slab varied in 420 W 17th Street. The floor slab was measured to have a maximum thickness of 6" thick in the three tested locations, and a void space was discovered underneath the slab. Consequently, the building's drawings were revised to place equipment onto steel dunnage connected to the building's piles and structural columns to bear the equipment loads.

The information gathered during the soil boring was required to file the Pilot's drawing packages with the NYC Department of Buildings to perform work on the Fulton Houses campus once the Pilot is approved to proceed onto Stage 3. In addition, learning that no ACM is present within the waterproofing of 401 W 16th Street's exterior will allow a Stage 3 contractor to more accurately plan the work required to penetrate 401 W 16th Street to install the various pipes and conduit into and out of the building's basement.

Pictures of the slab coring, soil boring, and ACM test pit work that was performed are located below in Figures 6 – 8, respectively.

Figure 6: Chelsea Indoor Slab Coring and Soil Probe Boring within the Fulton Houses Campus

Figure 7: Chelsea Soil Boring at the Fulton Houses Campus

Figure 8: Chelsea Testing Waterproofing on the Foundation Exterior of 401 W 16th Street for Asbestos Containing Material (ACM)

5) Thermal Energy Resource Quantification

In February 2024, temporary flow meters and temperature sensors were installed on the condenser water loop in 85 10th Avenue's chilled water plant for two weeks to quantify the Thermal

Energy Resource capacity of the building. During three days of the two-week data collection period, the chilled water plant utilized its chillers instead of the water-side economizer to quantify the maximum amount of heat recovery that would be possible to capture via the UTEN. The measured data is located below in Figure 9.

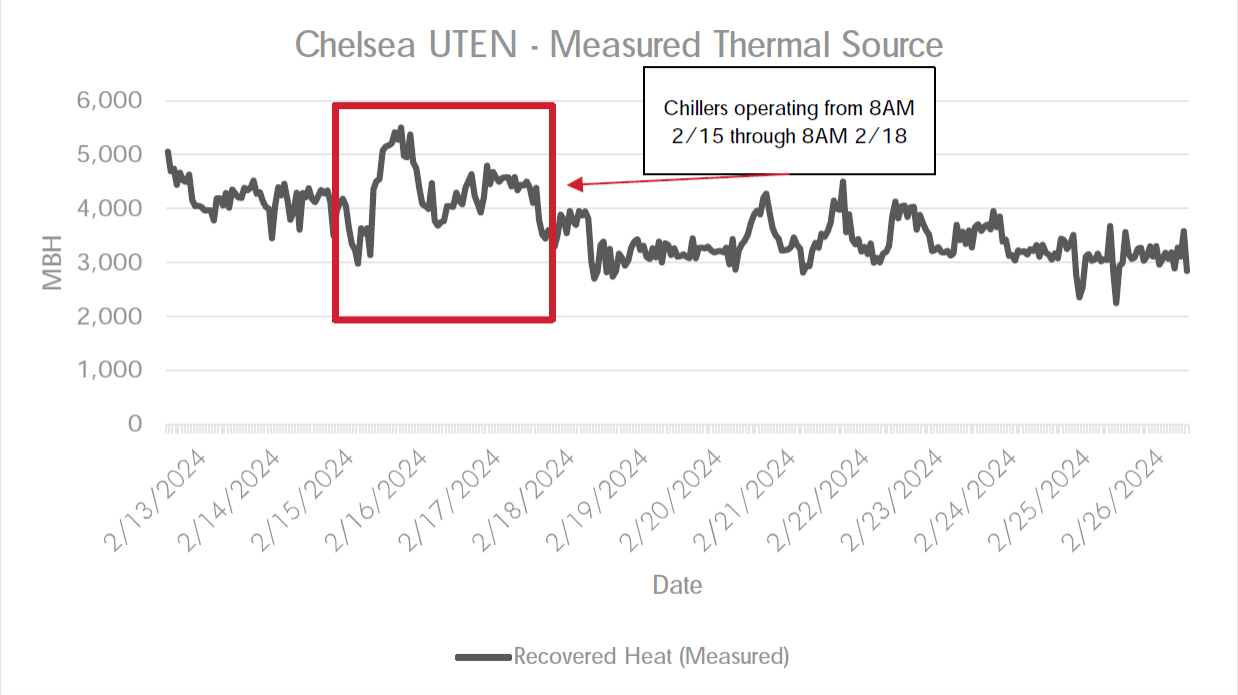

Figure 9: Measured Heat Rejection from 85 10th Avenue

The data collected from the meters allowed WSP to refine the energy model for 85 10th Avenue.

The team learned in Spring 2025 that 85 10th Avenue's building operation team has adopted a new cooling strategy for the building following recommendations from a new energy manager. It now maximizes winter use of the waterside economizer to save energy by minimizing chiller operation based on outside air temperature and humidity. Review of 2024 – 2025 winter season BMS trend data for the cooling plant confirmed this the revised mode of operation. This change minimizes the quantity of heat available from baseline building operations. Consequently, to provide heat to the UTEN, 85 10th Avenue will need to revert to mechanical cooling for many hours of the year, which will increase its electricity consumption above this newly adopted baseline. This impacts project energy consumption and economics.as discussed in the Energy Impact, Design Learnings, and Rate Design sections below.

6) Domestic Hot Water Demand Quantification

During various weeks between November 2024 and April 2025, temporary flow meters and temperature sensors were installed in each mechanical room of the three Fulton Houses buildings to quantify the DHW demand in each building. The recorded meter data was used to help size the DHW equipment in each building.

Interval data was measured on 30 second intervals during various periods. The data was analyzed and compared against American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) standard values and interval steam data for the Fulton Houses campus. It was determined that the data recorded for 410 W 17th Street was the most accurate data, as the varying flow rates each hour were consistent with ASHRAE guidelines and expectations of domestic hot water demand. Thus, the data collected at 410 W 17th Street was used as a basis for the other two buildings' domestic hot water demand.

401 W 16th Street and 410 W 17th Street are simulated as having identical domestic hot water loads since the buildings have an identical footprint with the same estimated occupancy population. 420 W 17th Street's domestic hot water loads are significantly higher due to prorating the usage values based on occupancy population.

Figure 10 below contains the average data plotted over a 24-hour period. This data was used as inputs to the Fulton Houses model. The orange line represents the observed average data for 410 W 17th Street. The red line represents the modeled average data for 420 W 17th Street.

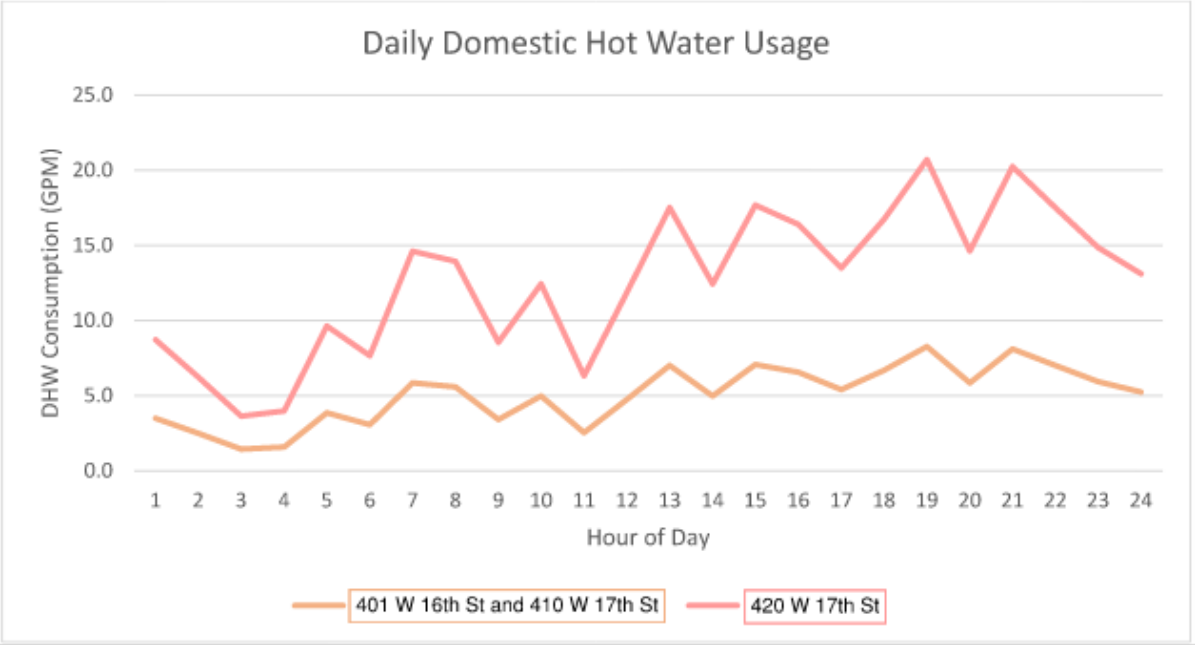

Figure 10: Measured and Modeled Domestic Hot Water Demand at the Fulton Houses Campus

7) Hydraulic Analysis

To ensure uniform thermal delivery across varied building heights and layouts, the design team utilized computational fluid dynamics (CFD) simulations software. The design team also performed a hydraulic analysis for the 100% Construction Documents to verify that the Pilot was technically feasible. A hydraulic model using Pipeflo software was developed with the proposed design intent described below. The model verified pump selections to ensure performance for current and anticipated future operational scenarios.

8) Heat and Mass Flow Balance

A heat and mass flow balance test were performed for the 100% Construction Documents in order to verify that the Pilot was technically feasible. The 24/7 heat rejection loads, and seasonal heat rejection loads within 85 10th Avenue were evaluated against the design intent loads for space heating, cooling, and domestic hot water. The analysis confirmed that there is sufficient heat rejection available from 85 10th Avenue to transfer into the Utility Distribution System to satisfy the projected Fulton Houses loads.

9) Pipe Stress Analysis

A pipe stress analysis was performed on the underground pipe that will connect 85 10th Avenue to the Fulton Houses campus by both WSP and a possible pipe manufacturer (Thermacore) to refine the pipe design before the 100% Construction Documents issuance. Pipe stress refers to the internal forces experienced by a pipe due to various factors like internal pressure, temperature changes, and external loads. The collaboration on the stress analyses resulted in agreed-upon locations for anchor and expansion loop locations for the piping, which were then incorporated into the pilot's Utility Distribution System Civil drawings and specifications. Pipe stress analysis is critical for ensuring the integrity and safety of the Utility Distribution System.

6.3.3. Existing Equipment in The Properties Involved

Thermal Energy Resource

85 10th Avenue is an eleven-story office building located in Manhattan and contains approximately 63,500 ft^2 of office space, two data centers, and restaurants. Only one data center is currently in use. The facility operates 24/7, with significant data center and restaurant loads. The building's chilled water plant provides space cooling to 85 10th Avenue year-round. A chilled water system provides 48°F chilled water to the chilled water plant and has a return chilled water temperature of 60°F. The existing condenser water system consists of eight cooling towers. Currently, only four of the eight cooling towers are piped on the roof. Recovered waste heat from the condenser water return loop of the building's chilled water plant will be transferred into the UTEN to provide heating and DHW to the Fulton Houses campus.

Customer Equipment

401 W 16th Street is currently equipped with low pressure steam radiators that provide heating during the winter months for all 36 units. There are six apartments per floor, ranging from 3 – 4 bedrooms with a floor-mounted, steam-fed radiator located in front of the window of each room. Ceiling mounted steam radiators are provided in back-of-house locations. Although the apartments do not have any built-in air conditioning, some tenants opt to pay an additional fee to have window air conditioning units.

For 401 W 16th Street and 410 W 17th Street, the existing domestic hot water generation is supplied from duplex variable steam pressure water heaters, which are each rated for 60 GPM of hot water when heated from 40°F to 120°F. For 420 W 17th Street, the existing domestic hot water generation is supplied from duplex variable steam pressure water heaters, which are each rated for 120 GPM of hot water when heated from 40°F to 120°F. All three buildings utilize a shell

and tube heat exchanger for domestic water pre-heat and steam condensate cooling to reduce the overall lift of the steam water heaters.

6.3.4. Analysis

Before Stage 2 commenced, models were developed and refined to quantify the Thermal Energy Resource capacity at 85 10th Avenue and the heating and cooling demand at the three Fulton Houses customer buildings. The model simulations produced results on an hourly basis for a full year (8,760 hours) based on typical meteorological year weather data (TMY3).[29] The models were produced using eQuest, software based on the DOE-2 simulation engine.[30] Supplemental information included trend data, historic utility interval data, and existing equipment sizing. These were all compared with energy modeling results to calibrate the modeling and to confirm consistency. The modeling approaches used for 85 10th Avenue, domestic hot water design and HVAC design at the Fulton Houses campus, and the overall Pilot thermal profile are described below.

1) Domestic Hot Water Modeling for the Three Fulton Houses Buildings

The Chelsea housing steam interval data received from Con Edison was analyzed to determine the expected hourly domestic hot water load profile for all three Fulton Houses buildings. The existing domestic hot water heat exchanger sizes were utilized to determine peak loads, while considering domestic hot water storage tank capacity in each building. Temporary domestic hot water flow meters were deployed to each of the three Fulton Houses buildings to quantify existing demand to ensure proper equipment sizing for domestic hot water equipment. The expected hourly schedule was applied to the peak load to determine time-of-use domestic hot water loads. The domestic hot water temperature was designed to be 140 °F. WSP went through a number of steps to estimate steam consumption for each building on the campus and then used these estimates to calibrate modeled domestic hot water production. energyPRO, a software for modeling complex energy projects with a combined supply of electricity and thermal energy, was then used to optimize the domestic hot water model. energyPRO simulated the domestic hot water pump production in tandem with storage tank utilization to ensure domestic hot water demand is satisfied and the storage tanks remain charged with hot water.

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[29] National Renewable Energy Laboratory, *Users Manual for TMY3 Data Sets (Revised)*, at [page] (accessed July 1, 2025), https://research-hub.nrel.gov/en/publications/users-manual-for-tmy3-data-sets-revised (TMY3 Manual).

[30] Solar Energy Research Institute, *DOE-2 Solar Simulator Study*, (1982), https://www.nrel.gov/docs/legosti/old/501.pdf (DOE-2 Manual).

For each building, the actual domestic hot water heat pump output will be dependent on demand and available stored domestic hot water in storage tanks. Based on conversations with a potential domestic hot water heat pump manufacturer, the heat pump in each building is expected to operate between 16 and 20 hours per day, dependent on storage availability and actual demand. A combination of domestic hot water storage tanks and heat pumps ensure all peak demands will be satisfied.

The analysis was completed assuming the heat pumps are disabled during the following periods below. This offset of heat pump operation is included to account for expected thermal diversity from 10 PM to 6 AM when the domestic hot water demand is low, and storage capacity is nearing capacity.

- 401W 16th Street: Disabled from 10 PM – 2 AM
- 410 W 17th Street: Disabled from 2 AM – 6 AM
- 420 W 17th Street: Disabled from 12 AM – 4 AM

The heat pumps operate at full load when required to maintain sufficient storage and meet demand. The daily energy produced by the DHW pump for each building is located in Table 3 below.

Table 3: DHW Heat Pump Output for the Three Fulton Houses Buildings

Building	Daily kBTU	Operating Hours
401 W 16th Street	4,846	20
410 W 17th Street	4,846	20
420 W 17th Street	12,115	20
Total	**21,806**	**N/A**

Hourly domestic hot water loads for all three buildings were exported from eQuest; the same loads displayed above in Figure 10.

2) HVAC Modeling for 401 W 16th Street

401 W 16th Street is the only building that will receive space heating and cooling via the UTEN. To model 401 W 16th Street, space geometry and zoning were based on existing Computer Assisted Design (CAD) architectural floor plans. For internal loads, occupancy, lighting, and equipment power densities were based on ASHRAE default values and adjusted accordingly based on calibration efforts. For heating design day conditions, a dry bulb high of 17.9 °F was used. For cooling design day conditions, a dry bulb high of 89.8 °F was used. The heating and

cooling thermostat setpoints were defined as 70 °F and 75 °F, respectively. Model calibration against historic electric bills was well within industry standards, with modeled electricity consumption within 1% of annual historic, with Coefficient of the Variation of the Root Mean Square Error of 7.8%

Hourly space cooling loads were exported from eQuest and are displayed below in Figure 11. Average daily Outdoor Air Temperature (OAT) is plotted on the secondary Y-axis. The terminal fan coil units are assumed to have a changeover date of May 10th and October 10th, based on the weather profile and loads displayed below. A zoomed-in portion of 401 W 16th Street's hourly chilled water load from May 10th through October 10th is located in Figure 12.

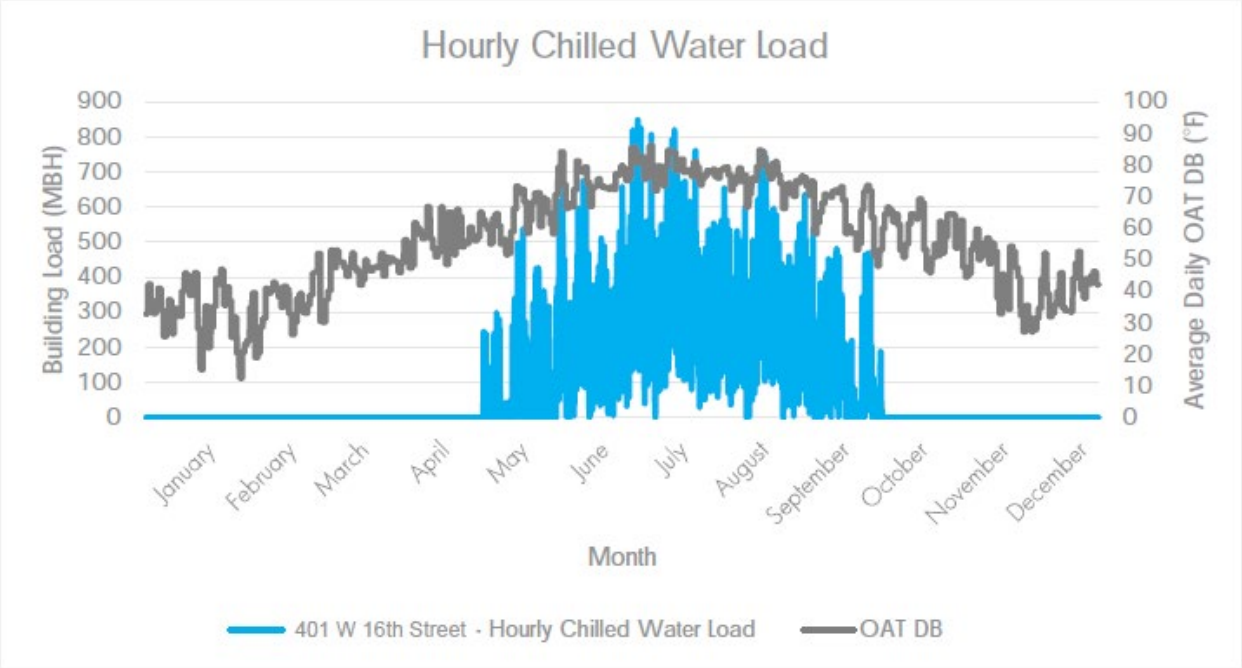

Figure 11: Hourly Chilled Water Load for 401 W 16th Street

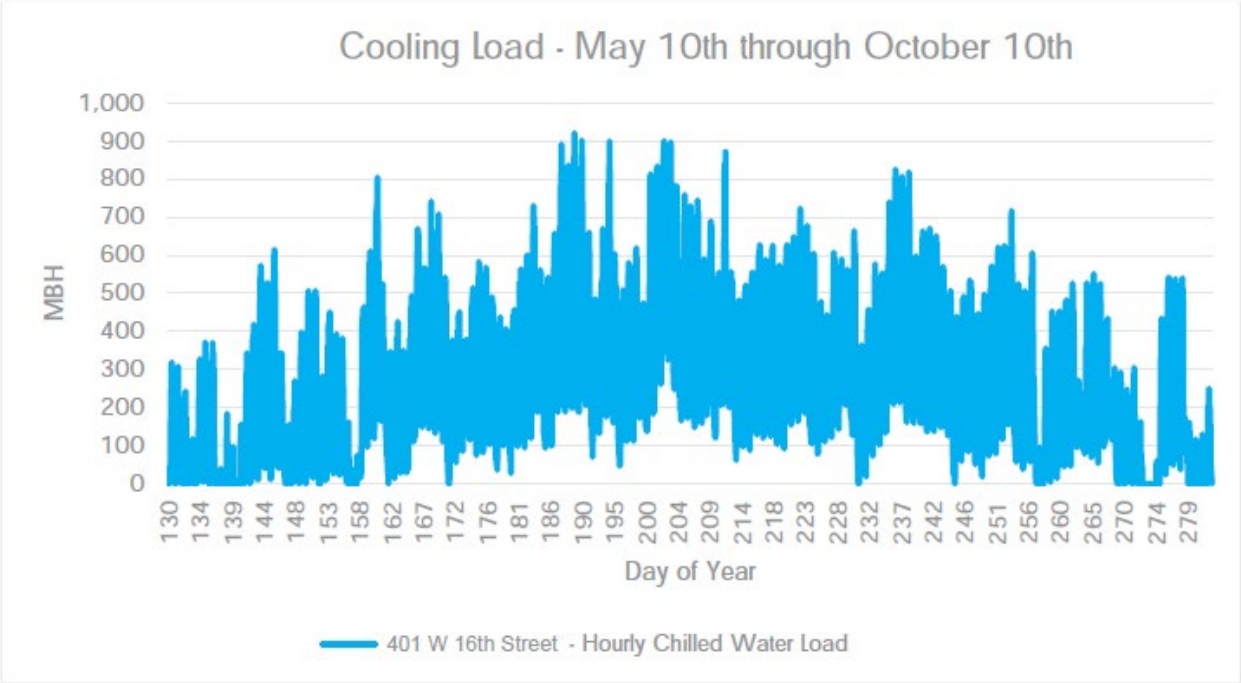

Figure 12: Hourly Chilled Water Load for 401 W 16th Street from May 10th to October 10th

To generate 401 W 16th Street's hourly hot water loads, calibration against historic steam was more challenging because all Fulton Houses campus buildings take service from a single steam account, with no submetering of each individual building. WSP did high-level modeling of modeled steam and domestic hot water consumption (also leveraging the domestic hot water modeling described above) for each building on the campus. It then used these results to calibrate modeled space heating for 401 W 16th Street. Both modeling calibration, site visits, and experience with steam radiator multifamily buildings indicated substantial inefficiency in the steam radiator heating distribution, both in terms of losses and the lack of tenant control.

Hourly space heating (hot water) loads were exported from eQuest and are displayed below in Figure 13. Average daily OAT is plotted on the secondary Y-axis. The terminal fan coil units are assumed to have a changeover date of October 10th and May 10th, based on the weather profile and loads displayed below. A zoomed-in portion of 401 W 16th Street's hourly chilled water load from January 1st through May 10th is located in Figure 14.

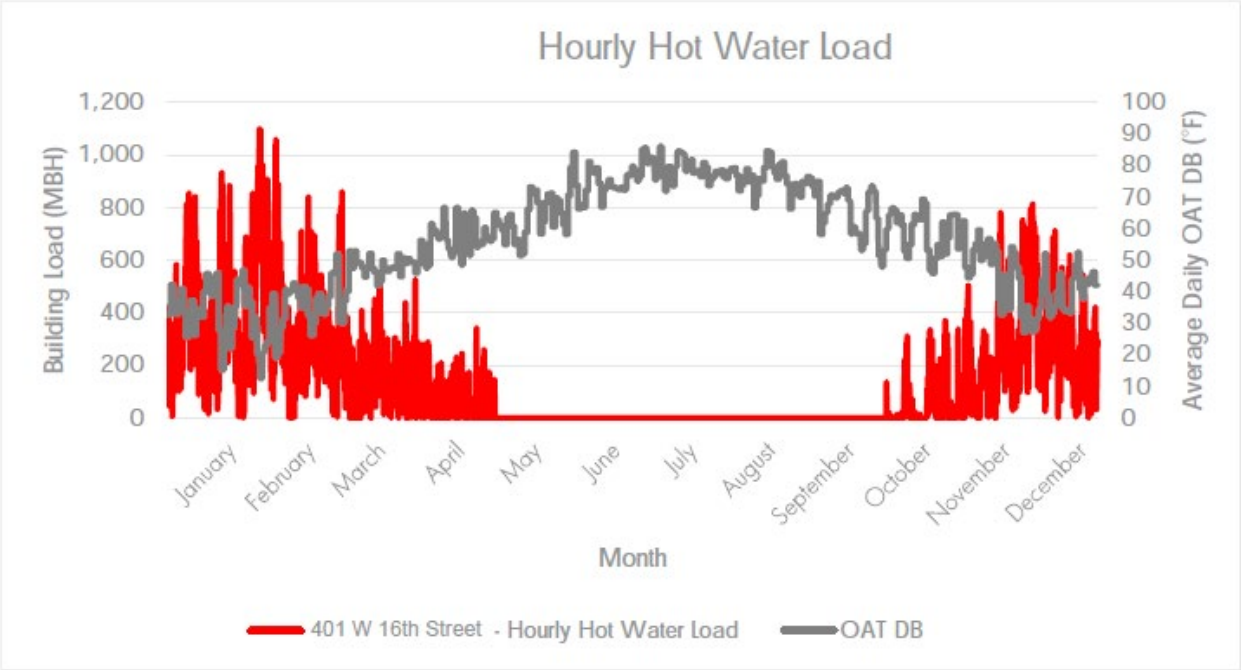

Figure 13: Hourly Hot Water Load for 401 W 16th Street

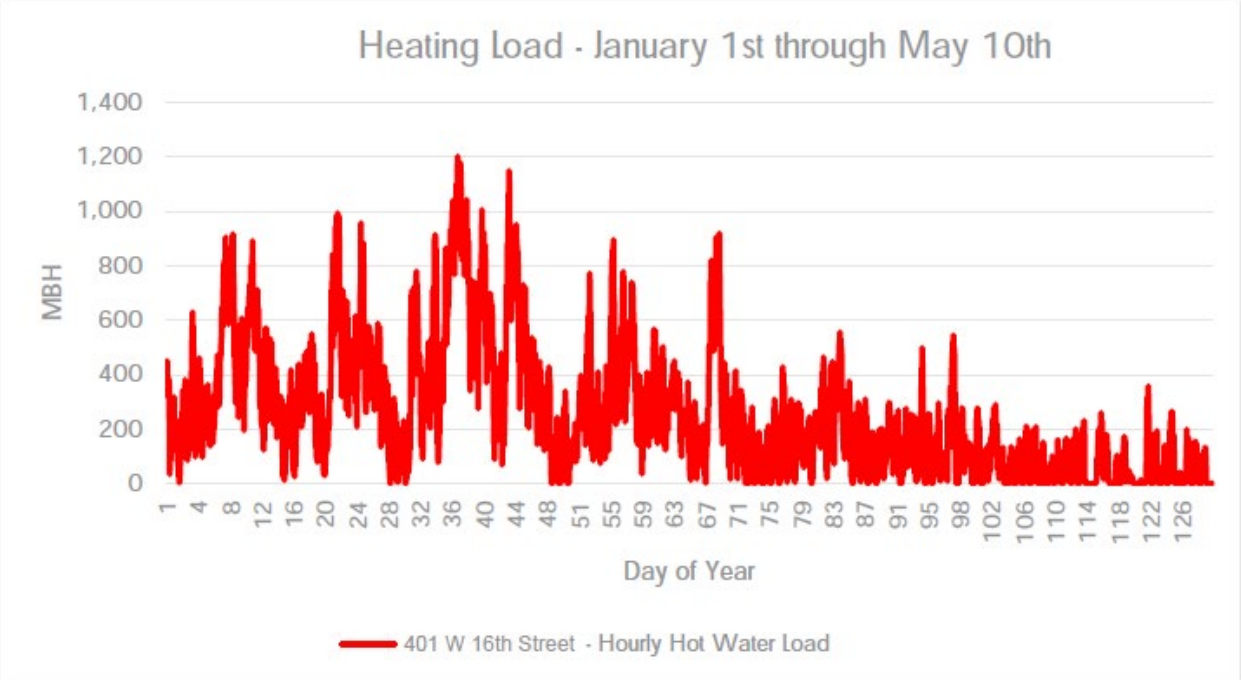

Figure 14: Hourly Hot Water Load for 401 W 16th Street from January 1st to May 10th

3) Heat Rejection Modeling for 85 10th Avenue

WSP created an energy model for 85 10th Avenue as a starting point to determine hourly heat injection loads. The model was updated to current facility operations and re-calibrated to both 2023 and 2024 utility interval data. The model was then re-run based on typical meteorological data to align with the loads from the Fulton Houses model. As discussed earlier, the 85 10th Avenue building operation team during the 2024 – 2025 winter changed building operation to enable the chilled water plant's water-side economizer nearly continuously. The load analysis for the UTEN assumes that the water-side economizer is disabled at all hours and conditions to generate the maximum amount of heat to transfer into the UTEN. As discussed later, this increases 85 10th Avenue electricity consumption above its new operating baseline.

Hourly heat rejection loads were exported from eQuest and are displayed below in Figure 15.

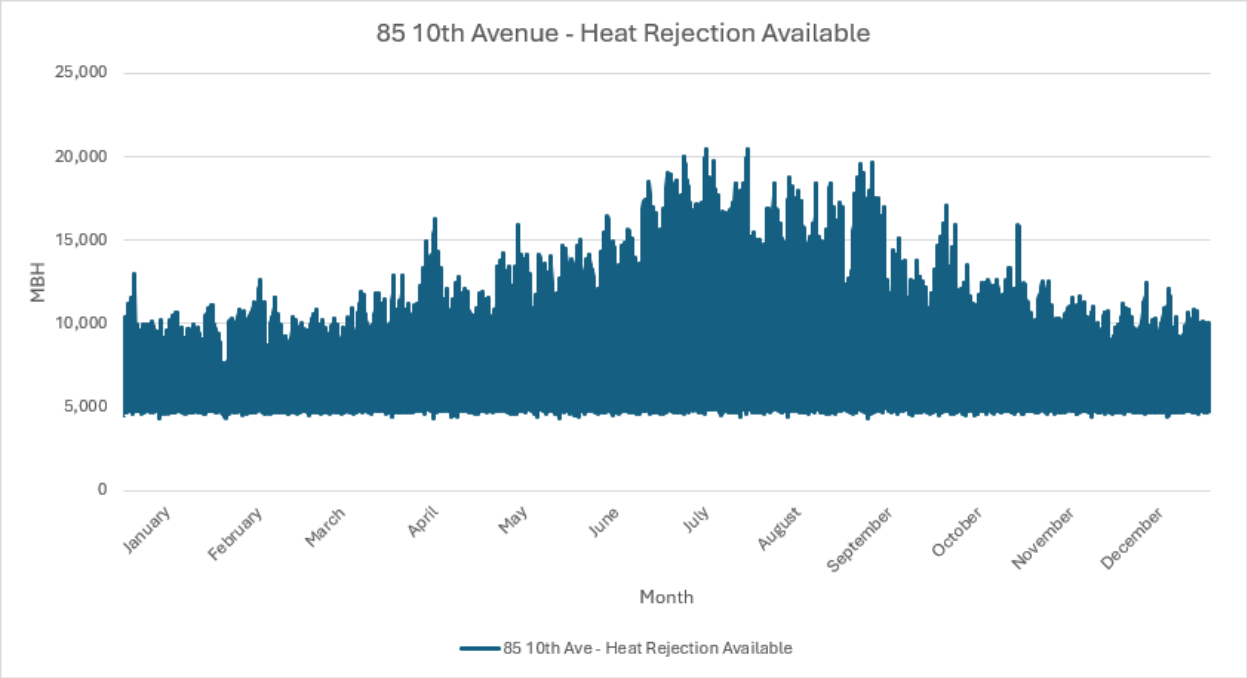

Figure 15: 85 10th Avenue's Hourly Heat Rejection Profile

The hourly heat rejection analysis revealed that peak heat rejection occurs between 8 AM and 6 PM on weekdays and between 8 AM and 12 PM on weekends. The baseload heat rejection occurs overnight when the chilled water plant's chillers are operating and is approximately 4,500 MBH. Daily weekday averages during occupied hours range from 9,000 MBH to 17,500 MBH, depending on the month.

4) Thermal Load Profiles and Peak Loads

Using the above methodology, hourly heat rejection loads from 85 10th Avenue and hourly space heating, space cooling, and domestic hot water loads from the three Fulton Houses buildings from the eQuest energy models were plotted on a thermal load profile graph, located in Figure 16 below. The blue line represents the hourly heat rejection available from 85 10th Avenue, and the orange line represents the hourly net source thermal requirement for the inlet to the customer heat pumps at the three Fulton Houses buildings. The hourly source load requirement for the heat pumps represents the amount of heat required within the UDS to satisfy the hourly projected Fulton Houses demand. A positive value represents the hourly net heating load, and a negative value represents the hourly net cooling load (when heat will be rejected to the UTEN).

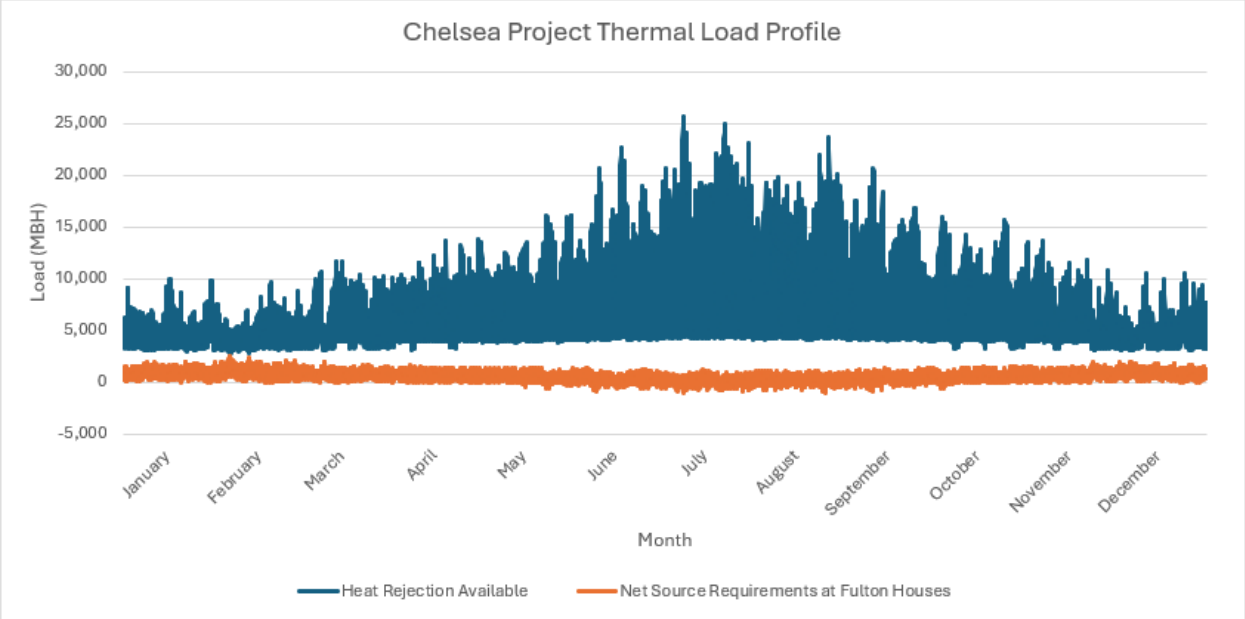

Figure 16: Chelsea Pilot Thermal Load Profile

The graph above illustrates that 85 10th Avenue is able to provide enough heat rejection 24/7 to satisfy 100% of the three Fulton Houses buildings' space heating and domestic hot water loads when the chilled water plant's water-side economizer is disabled. No back-up steam is anticipated to be required at any point throughout the year to provide the three buildings with domestic hot water and 401 W 16th Street with space heating.

When 401 W 16th Street's HVAC heat pump is in cooling mode, the Utility Distribution System operates as a thermal storage system to allow temperature fluctuations within the UTEN. The domestic hot water loads will decrease the Utility Distribution System temperature (since it will withdraw heat from the UTEN to produce domestic hot water), and the HVAC cooling loads will increase the Utility Distribution Temperature (since the HVAC heat pump will reject heat to the UTEN to provide space cooling to 401 W 16th Street). For the majority of the cooling season, the domestic hot water loads for the three Fulton Houses buildings will be greater than the HVAC cooling load for 401 W 16th Street. When the cooling load is greater than the domestic hot water loads, the Utility Distribution System temperature increases. Heat will only need to be rejected to 85 10th Avenue to decrease the Utility Distribution System temperature when the temperature is above its maximum temperature set point. Figure 17 below, which depicts the net heat transferred to the UTEN from 85 10th Avenue as a positive value or the net heat rejected from the UTEN from 85 10th Avenue as a negative value, shows that it is projected that the UTEN will only need to reject heat to 85 10th Avenue ~10 hours of the year.

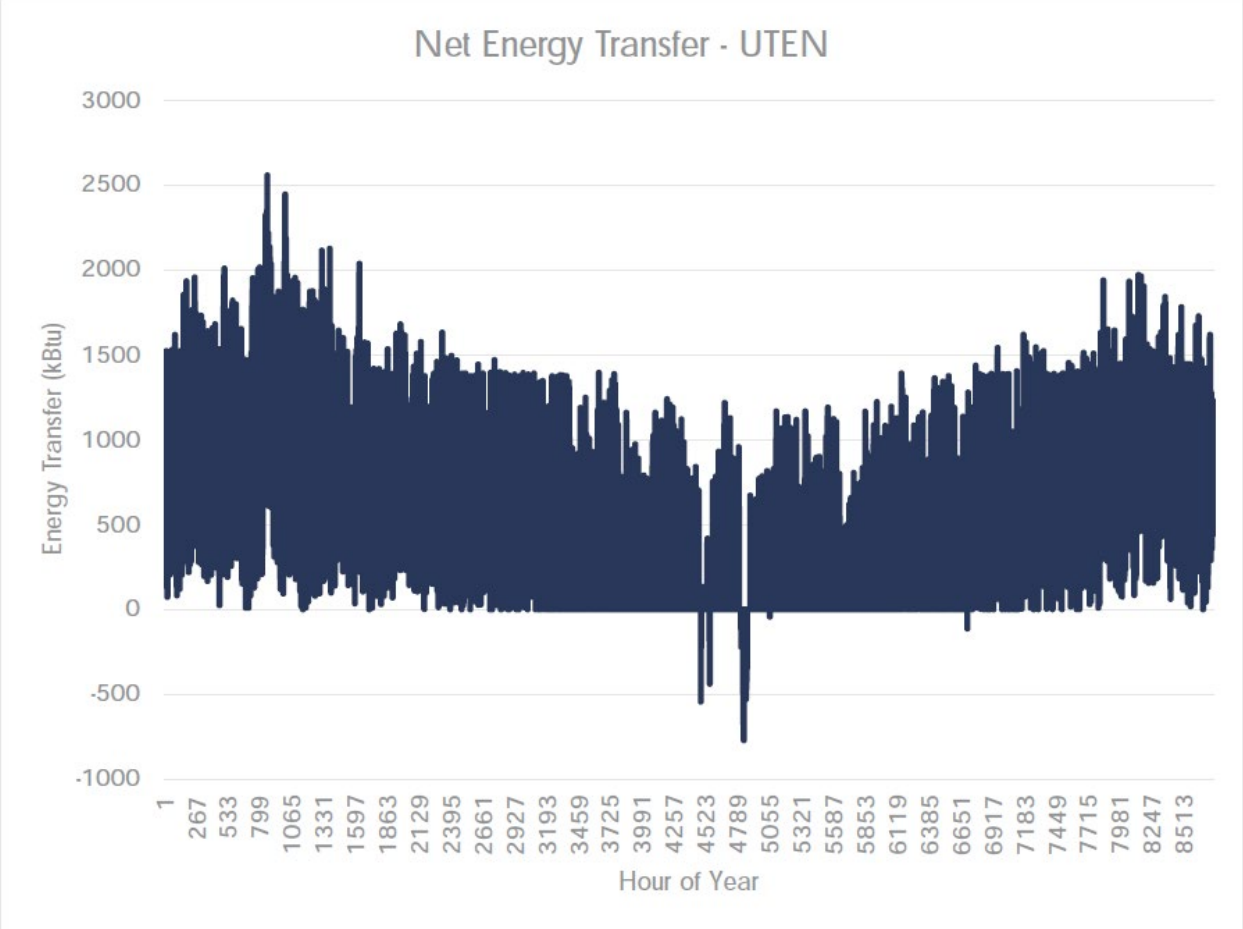

Figure 17: Net Energy Transferred to the UTEN from 85 10th Avenue

Peak loads per end use are provided for each Fulton Houses building in Table 4 below. These peak loads were taken into account when sizing the new equipment described in the "New Equipment" section below.

Table 4: Peak Loads for the Three Fulton Houses Buildings

Building	Space Heating (MBH)	Space Cooling (MBH)	Domestic Hot Water (MBH)
401 W 16th Street	1,201	948	332
410 W 17th Street	N/A	N/A	332
420 W 17th Street	N/A	N/A	828
Total	**1,201**	**948**	**1,492**

6.4. Proposed Design

The UTEN system is designed to optimize energy efficiency year-round by dynamically shifting between heating and cooling modes based on seasonal demand. Its integration with the infrastructure at 85 10th Avenue and the Fulton Houses campus enables a sustainable and resilient thermal energy exchange.

During the winter, the UTEN system operates in a heating-dominant mode, leveraging low-grade waste heat to serve the thermal needs of the Fulton Houses campus. The process is as follows:

- **Heat Source:** The condenser water return loop of the chilled water plant at 85 10th Avenue acts as the primary source of low-grade waste heat.
- **Heat Extraction:** Plate and frame heat exchangers located in the cellar of 85 10th Avenue transfer this waste heat into the UTEN loop.
- **Heat Distribution:** The recovered heat is circulated via a closed-loop, variable-flow UDS to the Fulton Houses campus.
- **Utilization:** At 401 W 16th Street, the heat supports both space heating and domestic hot water. At 410 and 420 W 17th Street, the heat is used exclusively for domestic hot water.
- **Control and Monitoring:** The system is equipped with flow meters, temperature sensors, and BTU meters to monitor thermal performance. Control valves dynamically modulate heat injection to maintain optimal loop temperatures.

In the summer, the system transitions to a cooling-dominant mode to manage excess thermal loads. The process is as follows:

- **Heat Rejection:** When the UTEN loop temperature exceeds its setpoint—typically due to cooling demands from 401 W 16th Street—excess heat is redirected to 85 10th Avenue.
- **Cooling Towers:** Four of the eight rooftop cooling towers at 85 10th Avenue are currently piped to serve as the primary heat sink, dissipating thermal energy into the atmosphere.
- **Bidirectional Heat Exchange:** The same plate and frame heat exchangers operate in reverse to extract heat from the UTEN loop and transfer it to the cooling towers.
- **Backup Measures:** In the event of a failure at 85 10th Avenue, a roll-up rental chiller can be deployed at 401 W 16th Street to maintain safe loop temperatures.

6.4.1. New Equipment

Thermal Energy Resource – 85 10th Avenue

The UTEN operating parameters and design were chosen to minimize any operating changes that would be required for 85 10th Avenue's chilled water plant; the only operational changes were limited to 85 10th Avenue enabling or disabling the chilled water plant's water-side economizer during the winter mode of operation, depending on the outside air temperature. No energy efficiency measures were implemented at 85 10th Avenue since the waste heat will be recovered within the commercial office building.

A hydraulic bridge will be installed on the chilled water plant's condenser water return line prior to the condenser water entering the building's cooling towers to provide the maximum amount of waste heat to the UTEN via modulating valves. New 10" taps will be installed for the condenser water supply prior to the chilled water plant's chillers to provide cooling to the UDS if the UDS exceeds its maximum temperature set point. A set of new 10" piping will be run from the chilled water plant to three plate and frame heat exchangers (only two are active; one is standby) installed in the cellar, the Thermal Energy Resource Energy Transfer Stations. Two new 1,200 GPM side-stream condenser water pumps (one is active; one is on standby) will draw the condenser water through the heat exchangers to inject heat into the UDS.

The three 6,000 MBH Thermal Energy Resource Energy Transfer Station heat exchangers will be designed with a 2°F approach, resulting in UDS supply temperatures ranging from 54 °F to 97 °F during heating mode and from 46 °F to 126 °F during cooling mode. The Energy Transfer Station heat exchangers will be installed in a room that the Company will lease from 85 10th Avenue to place some if its Energy Center equipment in (refer to "Energy Center Equipment" section below). An isolation valve on the 85 10th Avenue side of the Energy Transfer Station heat

exchangers is the demarcation point between 85 10th Avenue-owned and Company-owned equipment. The Company will own the Energy Transfer Station heat exchangers.

In Figure 18 below, 85 10th Avenue will own all infrastructure and equipment to the left of the dashed line. Only one new 85 10th Avenue-owned condenser water pump and one new Company-owned Energy Transfer Station heat exchanger are shown for simplicity.

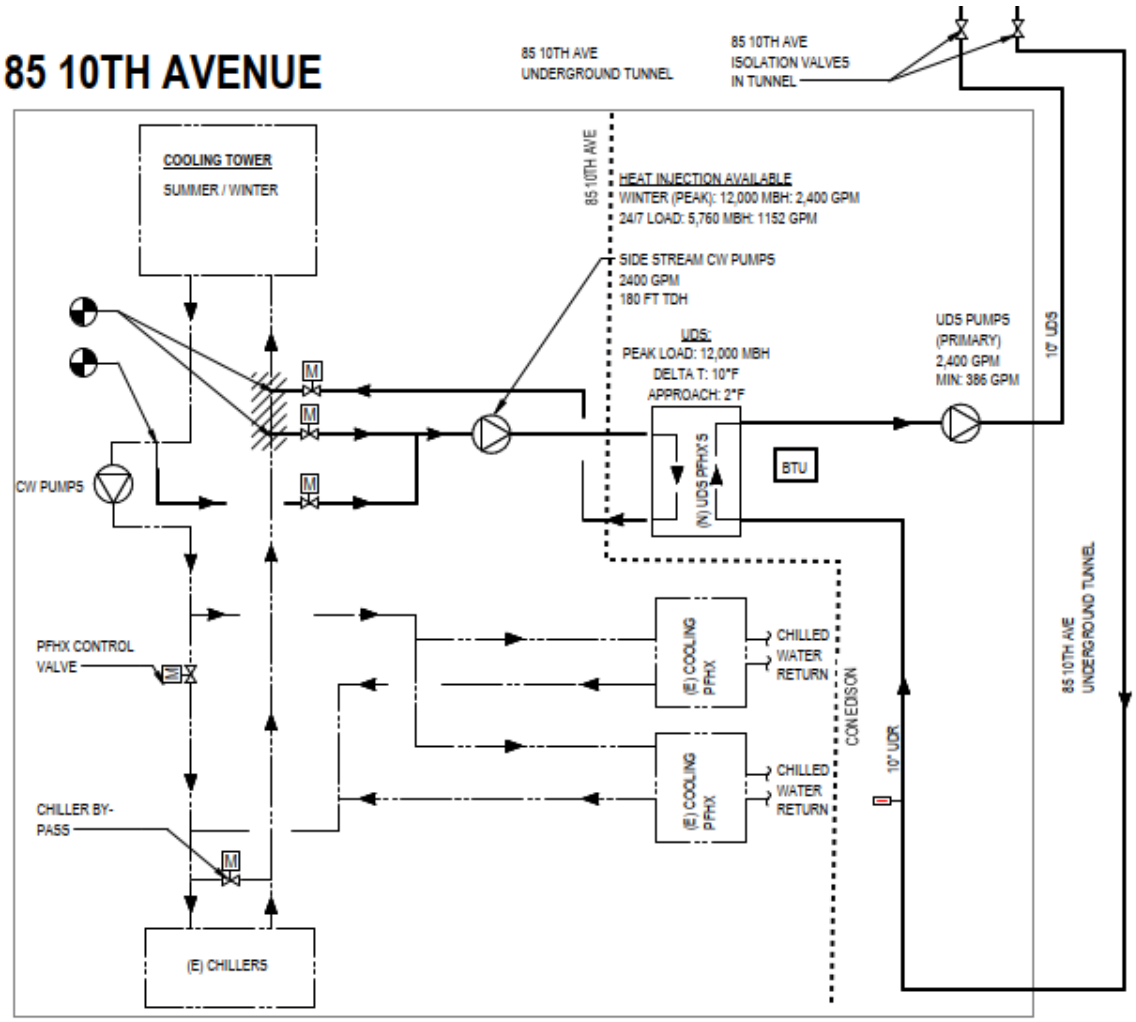

Figure 18: 85 10th Avenue Demarcation Point

The Thermal Energy Resource Energy Transfer Stations will also include valving, metering and controls equipment to monitor how much heat is transferred into the UTEN for heating or from the UTEN to 85 10th Avenue for cooling the UTEN. Flow meters, temperature sensors, and a BTU meter will measure the amount of heat transferred between 85 10th Avenue and the UTEN. Control valves on both sides of each Thermal Energy Resource Energy Transfer Station heat exchanger

will control the amount of heat transferred into the UTEN for the system to maintain its designed temperature range. The control valves will open and close accordingly when the Company chooses to accept heat from the Thermal Energy Resource Owner (i.e., the control valves will be closed when no more heat is required to reach the UTEN supply temperature set point).

The Utility Distribution System return piping will return cooled water to the Thermal Energy Resource Energy Transfer Stations at a maximum of 10 °F cooler than that of the heated water that is supplied to the UDS. The chilled water plant's condenser water used to heat the UDS will return to the chilled water plant and mix with the plant's condenser water network before it is sent to 85 10th Avenue's cooling towers on the roof. If the cooled condenser water still exceeds 85 10th Avenue's condenser water return temperature set point, 85 10th Avenue's cooling towers will cool the condenser water until its set point is reached. However, if the newly cooled condenser water possesses a temperature beneath its maximum temperature set point, the condenser water will utilize a new cooling tower bypass to circumvent the cooling towers and return to the chilled water plant.

Although the UTEN is primarily for transporting thermal energy to the Fulton Houses campus for heating and hot water systems, the cooling demand from 401 W 16th Street may outweigh the DHW demand of the three Fulton Houses buildings for a few hours of the year (~10 hours). During the rare occasion when the UTEN needs to reject heat to be below its temperature setpoint, the UTEN's Energy Transfer Station heat exchangers will send water to the condenser water return for the heat to be rejected by 85 10th Avenue's cooling towers. Isolation valves will be provided to divert water to the condenser water supply or the condenser water return, pending the mode of operation required.

Utility Distribution System

The UDS will consist of a two-pipe, closed-loop, primary-variable flow system. It will consist of two 10" supply and return pipes installed below W 16th Street from the Thermal Energy Resource Energy Transfer Station heat exchangers at 85 10th Avenue to two 6" isolation valves in the Fulton Houses parking lot just north of W 16th Street. Two 6" supply and return pipes would then run from the isolation valves to the Customer Energy Transfer Station heat exchangers located in the basement of 401 W 16th Street at the Fulton Houses campus. The supply and return UDS pipes will be approximately 1,250 feet in length, resulting in installing approximately 2,500 feet total of pipe from 85 10th Avenue to 401 W 16th Street.

The pre-insulated steel pipe with leak detection shall consist of Class 150 PSI rated Schedule 40 American Society for Testing and Materials (ASTM) A-63 seamless carbon steel

carrier pipe, with a minimum 2” thick closed-cell polyurethane foam insulation and a High-Density Polyethylene (HDPE) outer cover. An electric resistance monitoring leak detection system (two copper wire conductors embedded within the polyurethane foam insulation of the pipe) will be installed to alert the Company in the event of a UDS pipe leak. See Figure 19 for a depiction of the pre-insulated Schedule 40 UDS pipe and Figure 20 for an illustration of the UDS pipe route.

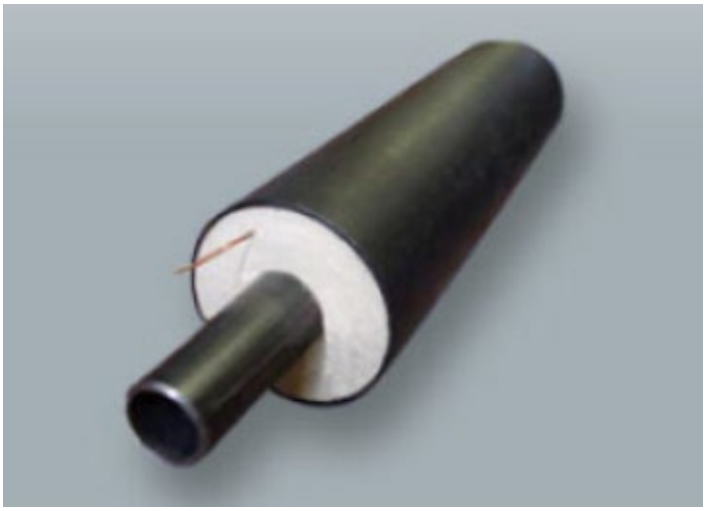

Figure 19: Pre-Insulated Steel UDS Pipe with Electric Resistance Monitoring Leak Detection

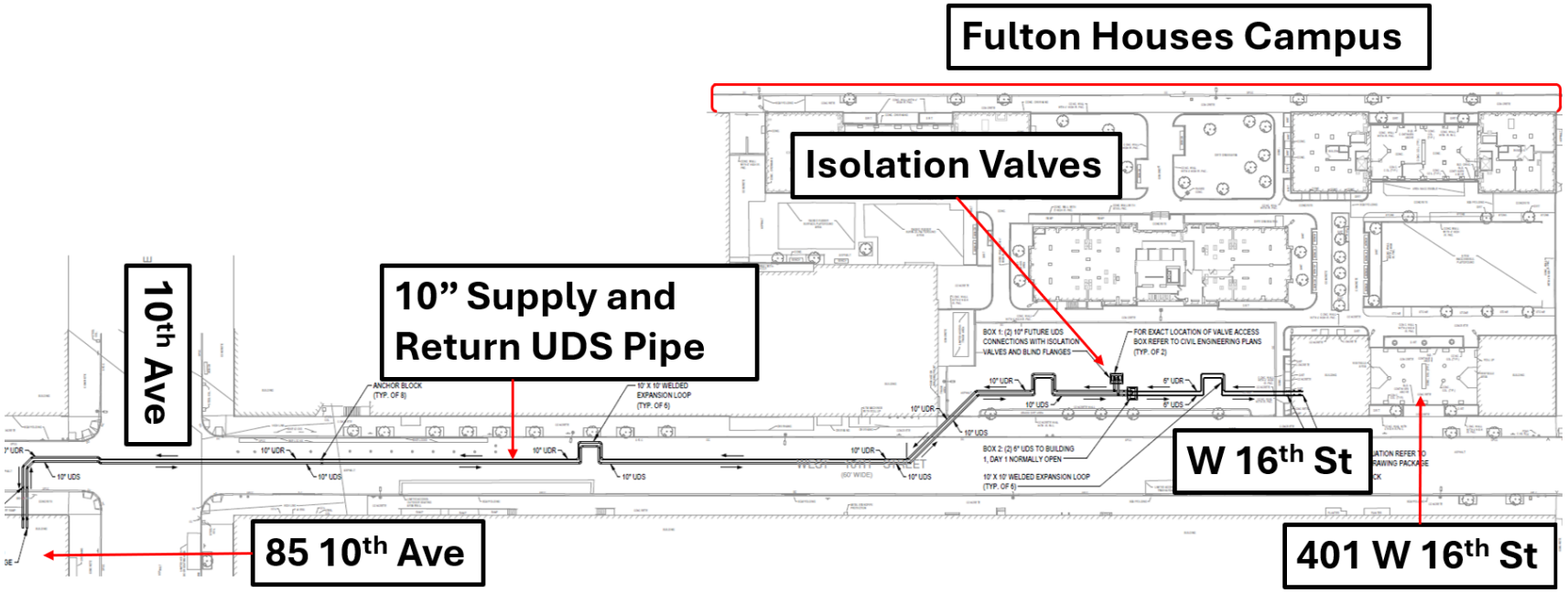

Figure 20: UDS Piping Route

The UDS will transport thermal energy between the Thermal Energy Resource Energy Transfer Station heat exchangers and the Customer Energy Transfer Station heat exchangers by using water with corrosion inhibitors as the heat transfer medium. No antifreeze was incorporated into the UDS heat transfer medium because of the temperature range (46 – 126 °F) and minimum flow (386 GPM) that will be maintained year-round, depending on the load. The UDS will be buried between 3- and 15-feet deep underground. The backfill material shall consist of a NYC DOT standard mixture of sand, gravel, and crushed stone, consistent with the applicable standards located in Section 312300 of the Pilot's construction specifications.

Aside from the isolation valves installed within the Fulton Houses parking lot, additional isolation valves are installed within 85 10th Avenue and 401 W 16th Street to isolate the UDS from either building in the event of an emergency.

Energy Center

As described above, it was decided not to construct a new building to house the Company's Energy Center equipment. Instead, the Energy Center equipment was decentralized and distributed between 85 10th Avenue and 401 W 16th Street.

85 10th Avenue

Three 125 HP Utility Distribution System pumps, an air separator, an expansion tank, electrically actuated valves, and instrumentation and controls are located in space in the cellar that the Company will lease at 85 10th Avenue. The Utility Distribution System pumps will be installed as a primary variable system, with two primary pumps running and one on standby. The pumps are sized for 2,400 GPM full load (1,200 GPM each for the two active primary pumps), and the pumps' Variable Frequency Drives will modulate flow as required based on the Fulton Houses loads. A picture showing the Utility Distribution System pump is located in Figure 21.

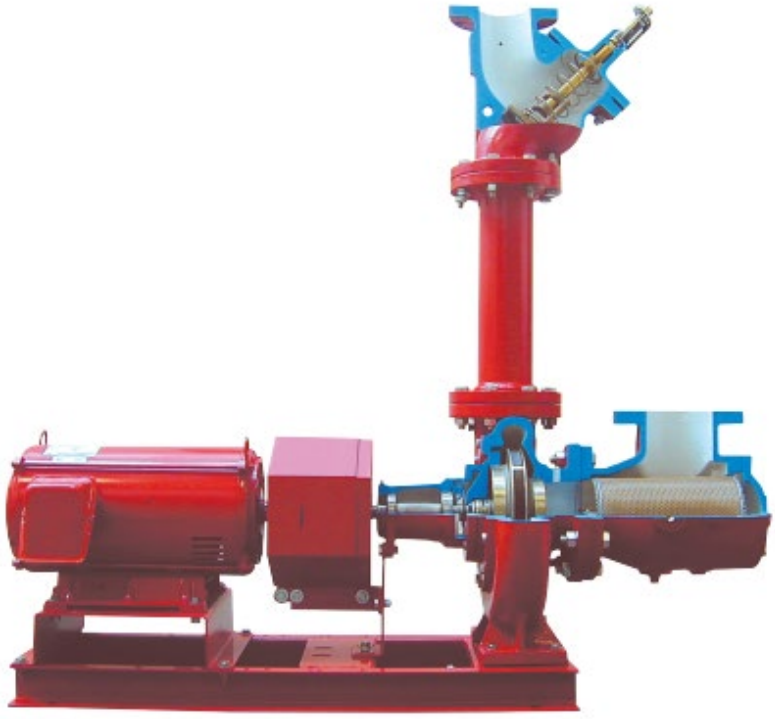

Figure 21: Utility Distribution System Pump

Although 85 10th Avenue has sufficient capacity in its existing electric services, a new electric service will be supplied to the building to meter and power the Company's Energy Center UTEN equipment at 85 10th Avenue. The local electric distribution system is adequate to serve the proposed UTEN equipment at 85 10th Avenue, and no upgrades will be needed. This service qualifies as an Excess Distribution Facility (EDF) and will be delivered at 120/208 volts, three-phase, four-wire. It will enter the building near the southeast corner at West 15th Street and 10th Avenue and will be separately metered from the building's existing infrastructure. The estimated cost of this service is approximately $97,450 and will be funded through the UTEN Pilot. The estimated total power requirement needed is 258kVA. The pumps, valves, and controls will be powered from a new 208V/120Y, 3Ø 4W 800A switchboard fed from a new electrical utility source from Con Edison. All small 120V loads will be fed from a 100A panel located next to the switchboard. The new switchboard and panel will be located in the pump room on a new 6" concrete housekeeping pad.

Critical UTEN electrical and pumping infrastructure are located in 85 10th Avenue, which is in a FEMA flood zone. Although 85 10th Avenue's cellar has not experienced significant flooding within the past 15 years, flood protection measures were incorporated into the design to ensure

reliability. A sump pump will be installed in the mechanical room with the UDS pumps in it, with an ejector pit sized for approximately 300 gallons and a duplex set of 40 GPM each. Equipment also be placed on 6" housekeeping pads for protection from a minor flood in the rented space. The UDS pumps and their VFDs will also be installed with isolation valves and detachable piping components so that they are easy to replace after a flood occurs with spare equipment that will be stored on an alternate Con Edison property.

401 W 16th Street

Two sets of Con Edison-owned Customer Energy Transfer Station plate and frame heat exchangers are located in the basement of 401 W 16th Street. Each set of Energy Transfer Station heat exchangers is comprised of one active heat exchanger and one standby heat exchanger. One set of Energy Transfer Station heat exchangers provides heated water to or allows heat to be rejected from a NYCHA-owned water-source heat pump, which will provide space heating and cooling to residents in 401 W 16th Street via terminal fan coil units installed within each room. Each Energy Transfer Station heat exchanger for the fan coil unit system will have a capacity of 1,800 MBH, with a maximum flow rate of 360 GPM. The second set of Energy Transfer Station heat exchangers provides source water to a DHW heat pump that will be installed within each Fulton Houses building that will produce DHW for the building. Each Energy Transfer Station heat exchanger for the domestic hot water system will have a capacity of 1,688 MBH, with a maximum flow rate of 375 GPM.

The demarcation points between Company-owned and NYCHA-owned equipment at 401 W 16th Street are the isolation valves on the NYCHA side of the Energy Transfer Station heat exchangers. See Figure 22 below for an illustration of the demarcation point between Company-owned and NYCHA-owned equipment.

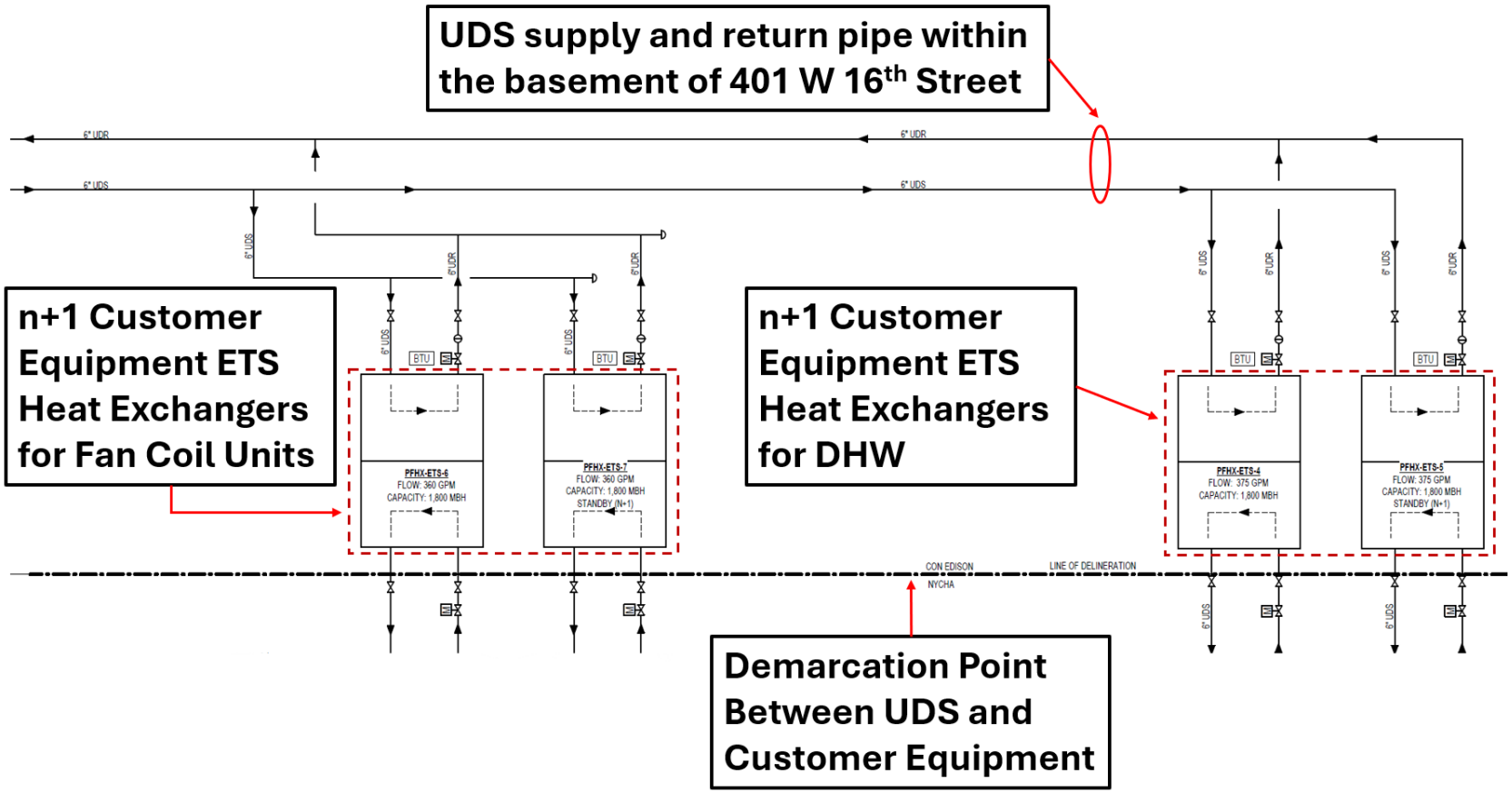

Figure 22: Fulton Houses Demarcation Point

To ensure the UTEN's reliability, a new Con Edison backup steam service was designed to feed a Company-owned shell and tube heat exchanger installed within the basement of 401 W 16th Street. The new steam service will provide emergency heat to the UDS if any issue prevents 85 10th Avenue from supplying the UTEN with enough heat. Existing steam infrastructure within 401 W 16th Street will be used to provide the new steam service; a new Point of Entry is not required. The new steam service was sized to supply 100% of the expected domestic hot water demand of all three buildings and the expected space heating demand of 401 W 16th Street. The installed shell and tube heat exchanger will have a capacity of 3,500 MBH, with a flow rate of 3,663 lbs/hr.

A connection point to install a roll-up rental chiller or cooler in the Fulton Houses parking lot was also provided on the outside of 401 W 16th Street in case the UTEN is unable to reject heat to 85 10th Avenue's cooling towers when the UDS temperature setpoint is exceeded. A new electric service will be supplied to the building to meter and power the Company's UTEN equipment and controls at 401 W 16th Street. The local electric distribution system is adequate to serve the proposed UTEN equipment at 85 10th Avenue, and no upgrades will be needed. This service will be separate from the building's existing electrical infrastructure and is being implemented under a Customer-preferred Point of Entry (POE) plan. The service qualifies as an Excess Distribution Facility (EDF), and the estimated cost of installation is approximately $93,000, which will be funded through the UTEN Pilot. The estimated total power requirement needed is 24kVA for the rental chiller and the Company's controls equipment. There will be a new separately metered electrical panel fed from the new electrical feed that will feed NYCHA's new UTEN equipment to a temporary connection box for the emergency cooling connection. This will be fed from a new 208V/120Y, 3Ø 4W 100A electrical panel.

Customer Equipment

Connection to the UTEN is achieved through dedicated Energy Transfer Station installed in the basement of 401 W 16th Street – one for HVAC for 401 W 16th Street and one for DHW for all three buildings. Each Energy Transfer Station is equipped with plate and frame heat exchangers, BTU meters, and modulating control valves. The control valves, integrated into Con Edison's SCADA system, dynamically regulate energy transfer based on real-time temperature and flow requirements. The BTU meters at each Energy Transfer Station heat exchanger will measure the heat transferred from the UTEN to the Fulton Houses campus for heating or the amount of heat transferred from the Fulton Houses campus to the UTEN for providing space cooling to 401 W 16th Street.

The HVAC and domestic hot water loops used to provide space heating and cooling to 401 W 16th and domestic hot water to all three buildings operate as secondary closed-loop systems filled with a 40% propylene glycol solution for freeze protection. Ancillary hydraulic equipment such as expansion tanks, air separators, buffer tanks, and a chemical treatment system are also installed in the basement of 401 W 16th Street for each secondary closed-loop system. All circulation pumps and heat pumps are installed in an n+1 configuration (with one pump on standby) to ensure reliability in the event of an equipment failure.

The electrical services for all three buildings are inadequate to power the new HVAC and domestic hot water equipment. Therefore, one new electrical service was designed to power the new equipment that will be installed within each building. The new electrical service for the new NYCHA-owned equipment will be provided to 401 W 16th Street. 401 W 16th Street will require power for an assortment of pumps, water source heat pumps, heaters, fan coil units, valves, and controls. The other two buildings will also require power for its new domestic hot water equipment. The local electric distribution system is adequate to serve the proposed UTEN equipment at the three Fulton Houses buildings, and no upgrades will be needed. This service is being implemented under a company-preferred Point of Entry (POE) plan, which reinforces the building's existing service rather than establishing a new POE. The estimated cost difference between the Company and Customer POE plans is approximately $77,000, and this cost will be funded through the UTEN Pilot. The estimated total power requirement needed is 646kVA for the new NYCHA-owned equipment installed in the three Fulton Houses buildings. The equipment owned by NYCHA will be powered from a new 208V/120Y, 3Ø 4W 3000A switchboard fed from the new electrical utility source from Con Edison. The switchboard will feed 410 W 17th Street and 420 W 17th Street as well via new underground conduit banks. All of 401 W 16th Street's NYCHA-owned equipment will be fed from a new 208V/120Y, 3Ø 4W 2000A switchboard fed from the 3000A switchboard.

Heating and Cooling for 401 W 16th Street

A new hatched access pit will need to be installed on the outside of 401 W 16th Street in order to install equipment into the basement of the building. No other modifications to the existing buildings are needed to connect to the UTEN, other than what is described below to provide space heating and cooling to 401 W 16th Street.

Space heating and cooling are provided to new terminal fan coil units at 401 W 16th Street via a 2-pipe hydronic system served by a water-source heat pump located in the basement. The water-source heat pump system consists of four modules, capable of delivering a peak installed

capacity of 1,600 MBH in heating mode and 1,200 MBH (≈100 tons) in cooling mode. The fan coil system operates as a dual temperature hydronic loop. The water-source heat pump has integral reversing valves and can provide either hot or chilled water to the terminal fan coil units, with a seasonal changeover between heating and cooling modes. Two circulating pumps (one is active; one is standby) circulate a conditioned 40% propylene glycol mixture from the WSHP to the terminal fan coil units. The system operates with full redundancy by having n+1 water-source heat pump modules and circulating pumps. A drawing of a water-source heat pump is located below in Figure 23.

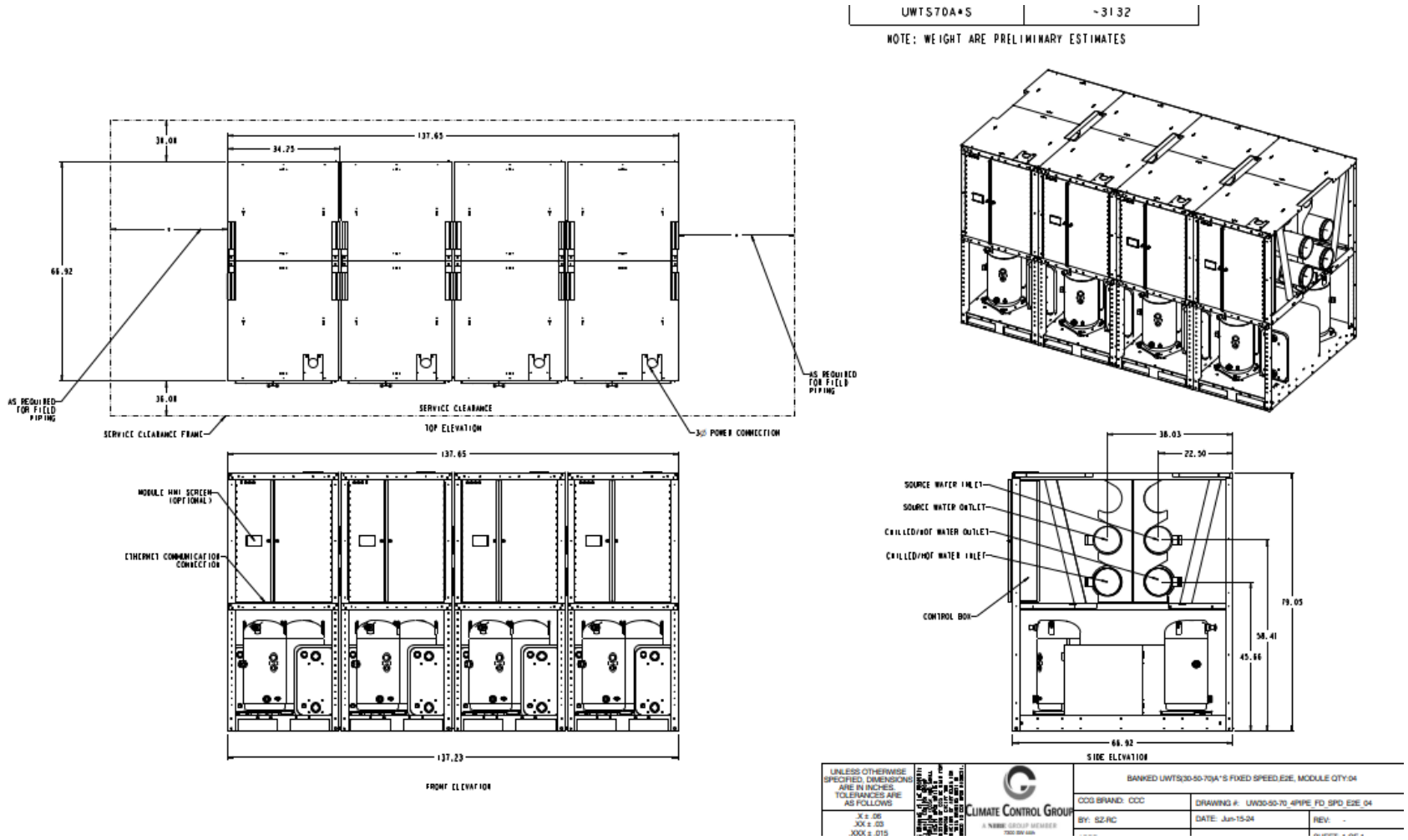

Figure 23: Modular Water-Source Heat Pump Providing Space Heating and Cooling to 401 W 16th Street

The 40% propylene glycol mixture circulates through vertical risers to approximately 192 wall-mounted terminal fan coil units installed in every room of the building's 36 apartments. The risers are located on the exterior of the building and are enclosed for weather protection and aesthetics, with localized unit penetrations into each apartment. A rendering of the enclosed vertical risers installed outside 401 W 16th Street is located in Figure 24 below.

Figure 24: Mechanical Risers Installed Outside 401 W 16th Street to Provide Residents with Space Heating and Cooling

Each apartment is equipped with multiple fan coil units (FCU) ranging in size. The approximate numbers of installed FCUs by size are located below.

- FCU-A: ~102 units sized at 5.2 MBH cooling capacity
- FCU-B: ~31 units sized at 5.9 MBH cooling capacity
- FCU-C: ~57 units sized at 9.3 MBH cooling capacity
- FCU-D: ~2 units sized at 12.8 MBH cooling capacity

Each fan coil unit in each room has a temperature sensor in it. The minimum and maximum temperature set points for the fan coil unit's heating and cooling modes are pre-defined for operational and energy efficiency. However, a resident can control the temperature set of each fan coil unit panel via a local display within the fan coil units' defined temperature range.

During heating season, if it is too cold, the fan coil unit will automatically turn on to heat a room until its temperature setpoint is reached. Currently, tenants do not have the ability to control

the temperature in their apartments. This often leads to excessive heating from steam-fed radiators and tenant discomfort. Controlling the temperature of each room's fan coil unit during the winter will lead to increased resident comfort. Likewise, during the cooling season, if a resident opts in to pay an extra fee for cooling like what is done currently for window A/C units, the fan coil unit will automatically turn on to cool a room until its temperature setpoint is reached.

The fan coil units will be designed to maintain Noise Criteria (NC) 35 levels for bedrooms, living rooms, and kitchens to minimize resident disturbances. In addition, the legacy steam radiators were retained for emergency heating in each room of every apartment in the event of a UTEN failure.

Figure 25 below shows what a fan coil unit will look like in one room.

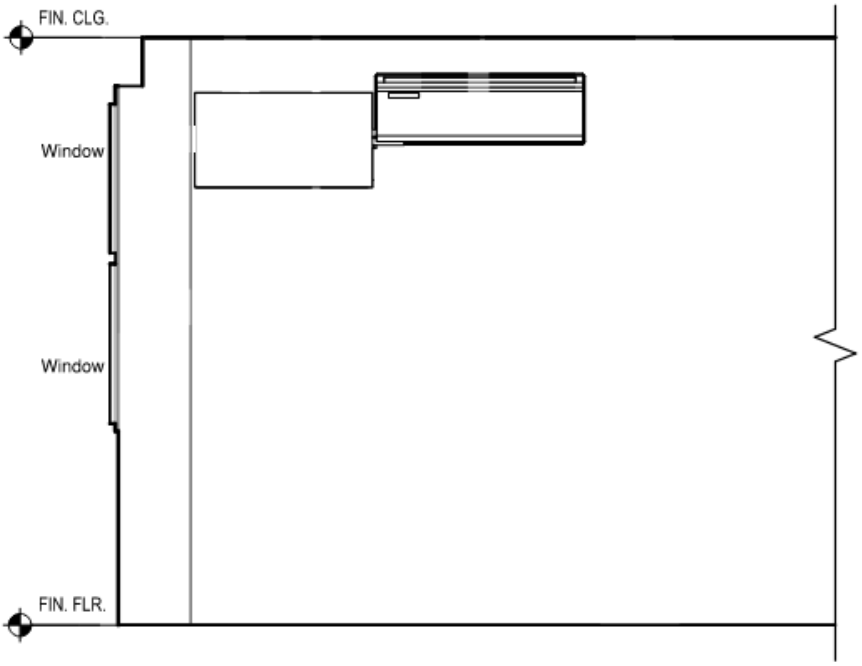

Figure 25: Fan Coil Unit Installation at 401 W 16th Street

Electric unit heaters will be installed to maintain the minimum mechanical equipment room space temperature required by code in the basement of 401 W 16th Street. In addition, the existing steam-fed unit heaters in storage and other back-of-house spaces on the ground floor of the building will be replaced with new hydronic unit heaters that will be provided heat from the same closed-loop 40% propylene glycol network that the fan coil unit network uses.

Domestic Hot Water

The secondary closed-loop domestic hot water system originates from the DHW Energy Transfer Station heat exchanger in 401 W 16th Street and provides source heat from the UDS via to each building's domestic hot water heat pump to produce domestic hot water in each building. Buried, Customer-owned piping runs from 401 W 16th Street to the other two buildings. Prefabricated and insulated steel pipe with Class 150 PSI rated Schedule 40 seamless carbon steel carrier pipe and a HDPE outer cover will be utilized. 6" pipe will be provided for 420 W 17th Street, and 3" pipe will be provided for 410 W 17th Street. An underground conduit bank will also be provided from 401 W 16th Street to the other two buildings to provide power to the new DHW equipment installed in each building from the new Customer-owned electrical service provided to 401 W 16th Street. Figure 26 below depicts the buried, Customer-owned piping that will be installed between the three Fulton Houses buildings.

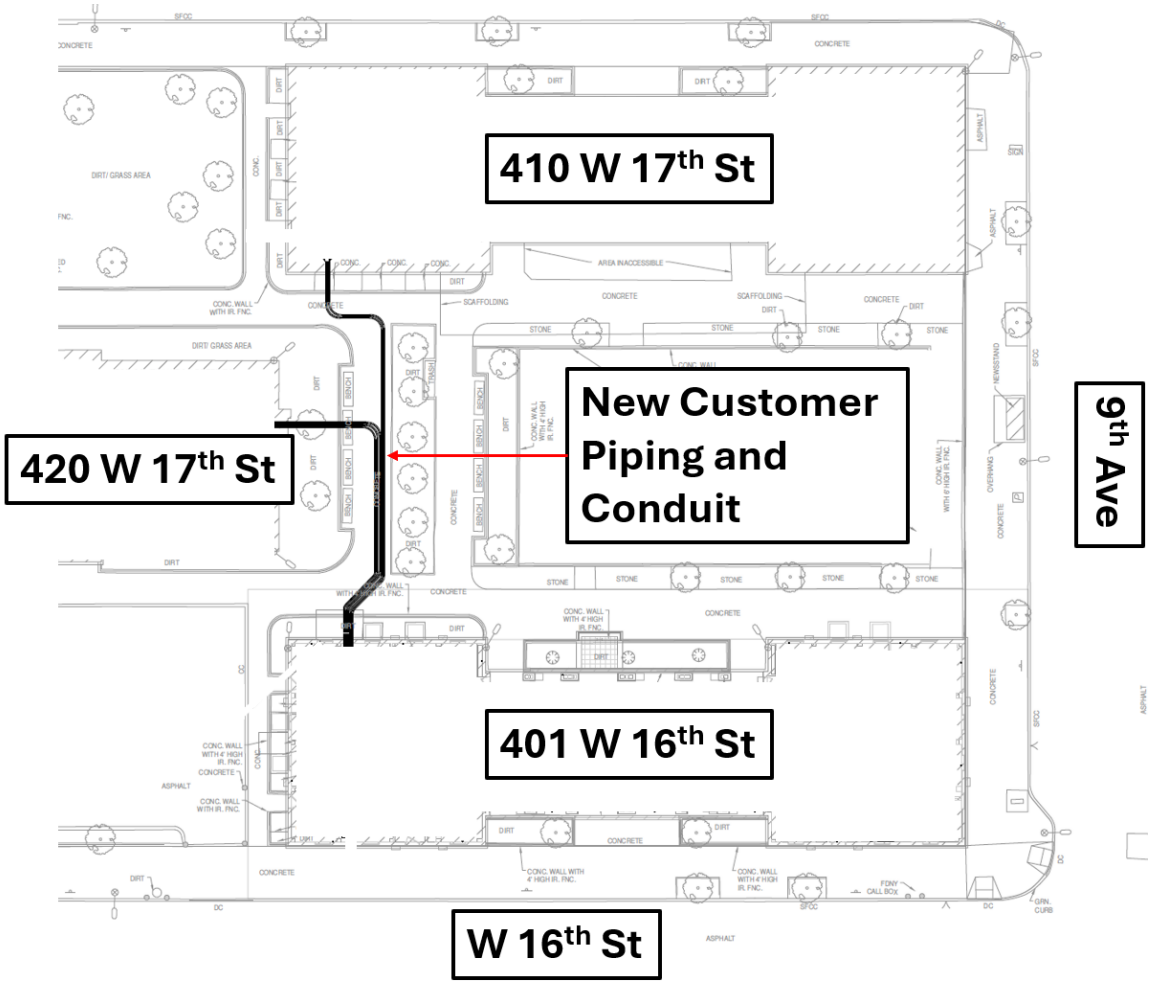

Figure 26: Customer-owned Piping Installed on the Fulton Houses Campus

Domestic hot water is provided by decentralized CO_2 domestic hot water heat pumps with dedicated storage tanks located in the basement of each Fulton Houses building. The new domestic hot water system in each building consists of domestic hot water storage tanks, a domestic hot water heat pump, circulator pumps, and mixing valves. A picture of a potential CO_2 domestic hot water heat pump is located in Figure 27.

Figure 27: CO_2 Domestic Hot Water Heat Pump or Equivalent

The heat pump and storage tank sizes were refined by measuring the current domestic hot water usage in each building. The storage tanks are sized per building (e.g., 645 – 1,505 gallons). The combined heating output of these systems totals approximately 1,090 MBH. The domestic hot water system in each building provides 170 °F water, which is then circulated to new mixing valves to deliver water to residents at 120 °F. The domestic hot water systems are designed to operate up to 20 hours per day based on thermal storage availability and occupant demand. Heat pumps are programmed to shut down briefly overnight to optimize energy use, and each is paired with appropriately sized storage tanks to ensure hot water availability during morning peak hours.

For 401 W 16th Street and 410 W 17th Street, one new domestic water heat pump, rated for 509 GPH recovery, domestic hot water storage tanks (645 gallons), and additional associated components will be provided and located within the existing mechanical equipment room in the basement of each building. Components were selected to meet a 580 GPH peak hour load and 7,418 GPD water usage. For 420 W 17th Street, three new domestic water heat pumps, each rated for 509 GPH recovery, domestic hot water storage tanks (1,505 gallons) and additional associated components are to be provided and located within the existing mechanical equipment room. Components were selected to meet a 1,910 GPH peak hour load and 36,519 GPD water usage. It is important to note that there is a suspected leak within the existing domestic hot water system for 420 W 17th Street. Although NYCHA was informed, the new domestic hot water equipment for this building was sized conservatively, to provide enough hot water if the source of the leak cannot be found and fixed. For all three buildings, the new domestic hot water heat pump system is installed in series with the existing instantaneous domestic hot water heaters, allowing for redundancy within the heating source.

Supervisory Control and Data Acquisition Strategy

To implement the Supervisory Control and Data Acquisition (SCADA) system for the UTEN in Chelsea, a qualified contractor will be retained in Stage 3 to deliver a comprehensive, cloud-based monitoring solution. Remote control functionality will be disabled since it conflicts with the Company's cybersecurity policies; instead, the contractor will provide a Company-owned Remote Terminal Unit (RTU) at 85 10th Avenue and 401 W 16th Street to perform local control functions for Company-owned equipment. The contractor will also provide a Customer-owned RTU in each Fulton Houses building to provide local control for Customer-owned equipment. Valves, pumps, meters, sensors, and other equipment will be connected to each RTU as applicable so the Utility Distribution System temperature can be controlled via local control logic, depending on the Fulton Houses campus loads and the UTEN operating mode (summer or winter). The RTU control logic will control the modulating valves across the Thermal Energy Resource and Customer Energy Transfer Station heat exchangers to control the Utility Distribution System temperature. SIM cards with LTE-enabled modem packages will be used to establish connectivity between the Company-owned RTUs and the Company's cloud-based monitoring system via a private cellular network.

Company-owned Remote Input/Output (RIO) panels will also be installed to collect monitoring data for 410 W 17th Street and 420 W 17th Street, where Company-provided local control is not required. Only Customer-owned RTUs will be located at 410 W 17th Street and 420

W 17th Street to provide local control for the Customer-owned equipment installed in the two buildings.

The cloud-based monitoring system will allow the Company to remotely monitor the UTEN's performance, receive alarms, and obtain the data needed to report all suggested technical metrics to the Commission during the 5-year pilot operation period. The Company's metrics strategy is discussed further below in the "Metrics" section.

The qualified contractor's services will encompass the design, configuration, commissioning, and long-term support of a cloud-hosted SCADA system, tailored to meet the operational and data visibility needs of the UTEN infrastructure.

Scope of Work

The qualified SCADA contractor will be responsible for the following:

- **System Design and Engineering Services**: Includes architecture review, RTU control logic development, RTU and SCADA configuration, Human Machine Interface (HMI) development for local displays and the SCADA system, and documentation development.
- **Hardware Supply and Integration**:
    - **85 10th Avenue**: One Company-owned RTU with modular Inputs and Outputs (I/O), power distribution, a Universal Power Supply (UPS), and a local display, housed in a stainless-steel enclosure.
    - **401 W 16th Street**: One Company-owned and one Customer-owned RTU, each with high I/O density and a local display.
    - **410 W 17th Street**: One Customer-owned RTU with basic I/O configuration and a local display and one Company-owned RIO panel.
    - **420 W 17th Street**: One Customer-owned RTU with moderate I/O density and a local display and one Company-owned RIO panel.
    - All RTUs include LTE-enabled modems, SIM cards, antennas, and are housed in stainless steel enclosures with full wiring and mounting hardware.
- **SCADA Platform Deployment**: The cloud-native SCADA system will provide real-time monitoring, alarm management, data trending, and mobile/web access for authorized personnel. It includes LTE-enabled modems, SIM cards, and cellular antennas for secure connectivity.
- **Testing and Commissioning**:
    - Factory Acceptance Testing (FAT) of RTU enclosures and communications.
    - On-site commissioning support for all RTUs.

- **Ongoing Support and Maintenance**:
    - 24/7 support for the SCADA platform.
    - Quarterly preventative maintenance and reporting.
    - Annual engineering service hours for system modifications, enhancements, or emergency support.
- **System Capabilities:** The SCADA system will:
    - Monitor field equipment across the Chelsea UTEN via a centralized cloud interface.
    - Provide alarm and event notifications to designated personnel.
    - Possess custom dashboards and analytics.
    - Support seamless integration with enterprise systems.
    - Maintain high system reliability.
- **Implementation Considerations**
    - The system will operate in a monitoring-only capacity, with polling rates optimized for cost and performance.
    - All RTU cabinets will be pre-wired, and final wire terminations will be provided by others.

This engagement ensures that the Chelsea UTEN deployment will be supported by a robust, scalable, and secure SCADA infrastructure, with expert engineering and technical support throughout the lifecycle of the Pilot. However, if the UTEN is expanded beyond the five-year pilot phase, the cloud-based monitoring system will be transitioned to a traditional, Company-hosted SCADA infrastructure. This transition is intended to further align with traditional utility SCADA systems and support long-term operational scalability and integration.

6.5. Possibilities for Expansion

The Chelsea UTEN has been designed with scalability in mind. The Thermal Energy Resource at 85 10th Avenue currently provides approximately 2,000 MBH of surplus capacity beyond what is needed to serve the three participating Fulton Houses buildings. This capacity could increase further if a second data center tenant is secured at 85 10th Avenue, enhancing the building's ability to supply additional waste heat to the network.

One near-term opportunity for expansion lies in the planned redevelopment of the Fulton Houses campus. As part of the PACT initiative, NYCHA and its partners plan to demolish and rebuild several buildings on the site. The current UTEN design includes isolation valves and piping taps in the Fulton Houses parking lot, enabling future connections to newly constructed buildings.

This would allow the UTEN to continue serving the community as the campus evolves, potentially providing domestic hot water—and possibly space heating and cooling—to additional NYCHA buildings.

Beyond the Fulton Houses, the UTEN could incorporate other Thermal Energy Resources. The Hudson River, located less than a block away, presents a promising opportunity to serve as a supplemental thermal source or sink. Additionally, nearby data centers—most notably one owned by Google—have expressed interest in potentially joining the UTEN, offering further opportunities for expansion and system resilience.

6.6. Permitting

The Company has not yet applied for the permits required for the Pilot and will only do so once the Pilot is approved. Permit applications will be submitted once construction contractors are formally engaged during Stage 3. A list of permits that the Company currently anticipates seeking if the Pilot moves forward can be found in the Appendix.

6.7. Energy Impact

6.7.1. Fulton Houses Loads

The Fulton Houses building loads the Pilot will serve as are outlined in Table 5 below:

Table 5: Fulton Houses Modeled Loads, MMBtu

	Total DHW	Total Space Heating	Peak Space Heating	Total Space Cooling	Peak Space Cooling
401 W 16th St.	1,769	1,186	1.20	956	0.92
410 W 17th St.	4,422	N/A	N/A	N/A	N/A
420 W 17th St.	1,769	N/A	N/A	N/A	N/A

The UTEN would fully replace both a) the steam used for DHW in all three buildings, and b) the steam used for hot space heating in 401 W 16th Street. It also provides cooling to all dwelling units in 401 W 16th St. Table 6 outlines the estimated[31] changes in energy consumption in the

[31]Energy modeling results inherently have uncertainty. Further, these results may change based on the exact makes and models of equipment selected during Stage 3, and changes in the occupancy or uses of the Thermal Energy Resource or Thermal Customer buildings.

three participating buildings. As discussed above, steam reductions for 401 W 16th Street's space heating are high relative to the heating load because of the substantial inefficiency of steam radiator distribution. The heat pumps increase net electricity consumption and winter peak.

Table 6: Participating Fulton Houses Buildings' Modeled Weather-Normalized Electricity and Steam, Before & During Project

	Total Electric Usage (kWh)	Electric Peak, Winter (kW)	Steam Usage for Space Heating and DHW (mlbs)	Steam Peak (mlbs)
Pre-UTEN	2,923,517	362	23,093	16
During UTEN	3,771,007	682	13,132	13
Delta	**847,490**	**320**	**-9,961**	**-3**

The net increase in electricity consumption is due to the switch from steam to electricity for the buildings' DHW and 401 W 16th Street's space heating. Cooling electricity consumption at 401 W 16th actually decreases from the higher efficiency of the UTEN system. These efficiency gains even outweigh the greater use of cooling at 401 W 16th where 100% of dwelling units will have space cooling compared to the estimated only 75% that do today.

Table 7: Fulton Houses Participating Buildings' Modeled Change in Weather-Normalized Electricity Consumption

	Space Heating (kWh)	Water Heating (kWh)	Space Cooling (kWh)	Total Electric Usage (kWh)
Pre-UTEN	0	0	102,849	102,849
During-UTEN	91,721	774,824	83,794	950,338
Delta	**91,721**	**774,824**	**-19,055**	**847,490**

6.7.2. 85 10th Avenue

Electricity consumption net increases at 85 10th Avenue because injecting heat into the UTEN requires increased chiller operation in place of winter free cooling. In non-winter months, there is a net reduction in electricity consumption because it is more efficient for 85 10th Avenue to reject heat to the UDS than to the atmosphere. Winter and summer peaks both decrease. Winter peak decreases because on the winter days where outside conditions prevent free cooling, it takes slightly less electricity to inject heat into the loop than reject it to the atmosphere.

Table 8: 85 10th Avenue Cooling Plant's Modeled Weather-Normalized Electricity Before and During Pilot

	Total Electric Usage (kWh)	Electric Usage Oct-April (kWh)	Electric Usage, May-Sep (kWh)	Electric Peak January (kW)	Electric Peak, July (kW)
Pre-UTEN	3,647,532	1,225,001	2,422,531	607	2062
During-UTEN	4,313,592	1,913,720	2,399,873	600	2038
Delta	666,060	688,719	-22,658	-8	-24

As discussed earlier, the change in 85 10th Avenue's building operations during the 2024 – 2025 winter season (during Stage 2 of the Pilot) substantially reduced the building's Pre-UTEN electricity use from what it had been previously by minimizing mechanical cooling. Before this change, the Pilot would have been able to take advantage increased condenser water associated with chiller operation as part of its baseline building operations; however, 85 10th Avenue will now need to modify its operation by increasing electricity consumption and operational costs to provide a sufficient quantity of waste heat. The Company estimates that this effectively increases annual electricity consumption during the Pilot by ~300,0000 kWh. This is nearly 50% of the increased electricity consumption 85 10th Avenue would experience under the Pilot

The Pilot will still provide net energy and carbon savings, but because of this during-Design change in baseline building operation, these savings will be less than what energy modeling indicated during much of the Stage 2 Design. Compared to ASHPs, the overall Pilot will use 10-15% more electricity on peak heating and cooling days but use about 40% more electricity throughout the year.

Winter Peak demand decreases slightly because mechanically cooling into the UTEN uses slightly less energy than into the air. Summer peak decreases for the same reason.

3) Thermal Energy Balance

For the majority of the year, the network will be heating load dominated: the Fulton Houses buildings will group withdraw heat from the UDS, and 85 10th Avenue will inject heat into the UDS to replenish it. During a few hours of the year, the network will be cooling load dominated: 401 W 16th Street's cooling system will reject more heat into the network than the buildings need for hot water heating. During these hours, 85 10th Avenue's chilled water plant will dissipate heat from the network.

Table 9: Modeled Annual Thermal Energy Transfers During Pilot, MMBtu

	Customer Heat Withdrawals/(Rejections)			Resource Heat Injection / (Rejection)	
	Fulton Water Heating Withdrawals	**Fulton Space Heating Withdrawals**	**Fulton Space Cooling Rejections**	**85 10th Avenue Heat Injections / (Dissipations)**	**Net**
Heating dominated	4,856	850	(536)	5,095	(74)
Cooling dominated	641	0	(723)	(7)	74
Total	**5,497**	**850**	**(1,259)**	**5,088**	**(0)**

Because the Project design permits the UDS temperature to change within a defined operating band, customer buildings can temporarily withdraw more heat than the thermal resource is providing during heating dominated hours. This temporarily lowers loop temperature. Customer buildings rejecting slightly more heat than the thermal resource dissipates during cooling dominated hours corrects this imbalance.

Note, customer buildings withdraw less thermal network heat than its heating load needs indicated above because the electricity used to run the heat pump makes up this difference.

6.8. Minimum Customer Participation

Given the limited number of customer buildings included in the Chelsea UTEN Pilot, it is essential that all identified buildings participate in the network. Full participation ensures that the thermal load is accurately represented and that UTEN system utilization is maximized. Requiring all buildings to connect is critical to achieving the intended system performance, equitable cost distribution, and comprehensive data collection for evaluating network efficiency. This approach also supports the integration of all available waste heat sources and demand-side flexibility, which are foundational to the pilot's success.

6.9. Design Learnings

The engineering design phase of this Pilot yielded several valuable insights. The following are among the most significant takeaways.

1) Fan Coil Units (FCUs) vs Variable Refrigerant Flow (VRF) Systems

The Pilot team selected Fan Coil Units (FCUs) over Variable Refrigerant Flow (VRF) systems for space conditioning in 401 W 16th Street. This decision was driven by environmental and safety considerations. FCUs significantly reduce the risk of refrigerant leaks within residential units, which is especially important in older buildings with limited ventilation. Additionally, FCUs align better with the Pilot's goal of minimizing in-unit disruption, as they allow for external riser installation and simplified maintenance. A memo from WSP located in the Appendix supported this decision, highlighting FCUs as the more resilient and tenant-friendly option.

2) Optimizing Condenser Water Tie-In Points

Thermal energy extraction from 85 10th Avenue's chilled water system is most efficient when tapping into the hottest available water. During design, the team identified that selecting tie-in points with higher condenser return water temperatures improves the thermal exchange efficiency and enhances the financial return of the system. This insight will guide future UTEN designs to prioritize Thermal Energy Resource access points that maximize usable heat recover.

3) Free Cooling Energy Impact

During the design phase of the Chelsea UTEN Pilot, the Thermal Energy Resource at 85 10th Avenue historically utilized a combination of waterside economizer and compressor-based mechanical cooling during the winter season. The Pilot was designed with this operational pattern in mind, assuming that free cooling would be used intermittently. However, since the design was finalized, the Thermal Energy Resource at 85 10th Avenue modified its operations to maximize the use of free cooling throughout the winter. While this operational change improves the building's standalone efficiency, it has implications for the Utility Thermal Energy Network (UTEN). Thermal energy networks that rely on a building's waste heat depend on the availability of high-grade thermal energy. Free cooling typically results in waste heat that is not of sufficient quality for direct use in UTENs. To serve the UTEN with waste heat at a sufficient temperature, the Thermal Energy Resource at 85 10th Avenue must revert to mechanical, compressor-based cooling. This additional compression step increases the electric consumption at the Thermal Energy Resource building, which significantly impacts the overall energy consumption of the system. As discussed, the Pilot still provides meaningful energy and carbon reductions; however, these will be lower than what energy modeling indicated during much of the Stage 2 Design.

This change illustrates one of the risks of relying on a building's cooling system as the Thermal Energy Resource. If the Thermal Energy Resource building's operations change – whether it be occupancy patterns or, in this instance, the building operation team's energy efficiency efforts – this can change the energy requirements and operating costs of the UTEN.

4) Transition to a Primary-Variable Pumping Scheme

Originally, the UDS was designed with a primary-secondary pump configuration. However, the team transitioned to a primary-variable flow scheme to reduce complexity, improve energy efficiency, and lower capital costs. This change also reduced the number of pumps required, simplified controls, and allowed for better modulation of flow based on real-time demand.

5) Early Utility Coordination for New Electrical and Steam Services

The Pilot experienced significant delays in securing new electrical and steam services due to lengthy administrative processes. These delays underscored the importance of initiating utility coordination early in the design phase. Future projects should prioritize early engagement with utility service teams to avoid bottlenecks that can impact construction timelines and commissioning.

6) Energy Center Building Constraints and Stakeholder Engagement

The original plan included a standalone Energy Center building on the Fulton Houses campus. However, NYCHA and PACT stakeholders raised concerns about the loss of parking and green space, as well as zoning limitations. These concerns led to the elimination of the Energy Center building and redistribution of equipment between 85 10th Avenue and 401 W 16th Street. This experience emphasized the need to engage stakeholders early and frequently to identify site constraints and community priorities before advancing design concepts.

7) Operational Implications of Leasing Space at 85 10th Avenue

Due to the removal of the Energy Center building, Con Edison will have to lease space at 85 10th Avenue to house critical UDS pumps and controls. This arrangement introduced new operational and legal complexities, including lease negotiations, access rights, and long-term equipment maintenance in a third-party facility. Future UTEN projects should carefully weigh the trade-offs of decentralized infrastructure and consider the long-term implications of relying on leased space for core utility operations.

8) Flood Risk and FEMA Zone Considerations

The cellar of 85 10th Avenue, where key UTEN equipment will be installed, is located 13 feet below the FEMA Base Flood Elevation (BFE). This discovery prompted the incorporation of storm-hardening measures. This experience highlighted the importance of researching FEMA

flood zones early in the design process to ensure that critical infrastructure is adequately protected and compliant with resilience standards.

9) Value of Test Pits in Urban Construction

Seven test pits were excavated along W 16th Street to verify subsurface conditions and utility locations. These exploratory excavations confirmed the accuracy of utility mark-outs and allowed the design team to adjust the UDS routing to avoid conflicts. This proactive step minimized the risk of utility relocations, reduced construction costs, and improved safety. The test pits demonstrated the value of early field verification in dense urban environments where utility congestion is common.

10) Importance of Frequent Stakeholder Engagement

The Pilot team encountered delays in securing an access agreement from NYCHA for investigative drilling. These delays revealed that monthly meetings were insufficient for coordinating with large, complex organizations. Future projects should adopt more frequent and structured engagement strategies to maintain momentum and ensure timely decision-making, especially when working with public agencies and multi-party stakeholders.

11) Domestic Hot Water Demand Quantification in New York City Housing Authority Multifamily Buildings

Temporary submeters were deployed within each of the three Fulton Houses buildings to measure the buildings' domestic hot water demand and how it varies throughout the day. The collected data ensured the newly installed domestic hot water equipment will not be oversized and thus operate more efficiently. The significant higher-than-expected measurements for 420 W 17th Street's domestic hot water consumption also led to discovering a leak in the building's existing domestic hot water system.

12) Value in Obtaining Peer Reviewers with District Energy System Expertise and Knowledge about Local Utility Practices and Regulations

Because the Company had no prior experience designing or operating Utility Thermal Energy Networks (UTENs), it retained two independent peer reviewers to ensure the design adhered to industry best practices for district energy systems and complied with New York City utility standards and regulations. These reviewers brought deep expertise in hydraulic flow design and district energy system operations. In addition to validating the technical soundness of the design, they provided critical value by identifying issues that might have otherwise been overlooked—such as the need for comprehensive stress analysis of all utility-owned underground piping, ensuring consistency across drawing packages, verifying equipment sizing, and confirming the operability of the system under real-world conditions.

13) Early Involvement with Utility Information Technology Subject Matter Experts about UTEN Monitoring and Controls Strategy

The Company learned that engaging in early conversations with the leadership of its other commodities (e.g., natural gas and steam) is critical to determine the strategy that will be used to monitor and control a UTEN. Since other commodities' Supervisory Control and Data Acquisition systems are highly regulated, they were unwilling to incorporate a pilot project's data into the Company's existing Supervisory Control and Data Acquisition systems. It took several months to receive this guidance, which delayed engagement with a potential control system integrator to obtain potential new Supervisory Control and Data Acquisition solutions that could be used to monitor the UTEN.

Due to cost considerations, the expected Pilot construction schedule, ease of maintenance, and unknown long-term future of the UTEN ownership, the recommended monitoring and controls strategy was a cloud-based solution. The cascading delay of receiving this information resulted in delayed engagement with the Company's Information Technology Subject Matter Experts about the cybersecurity risks a cloud-based Supervisory Control and Data Acquisition system could pose to the Company. The Information Technology Subject Matter Experts ultimately agreed with the cloud-based monitoring strategy for the UTEN if remote control functions were disabled. Being unable to remotely control the UTEN necessitates local control panels with Remote Terminal Units to operate the UTEN. All control changes or manual operations will be required to be performed at each location. The longer than expected timeframe to decide upon the monitoring and control strategy for the UTEN resulted in receiving an order of magnitude cost estimate for Supervisory Control and Data Acquisition implementation several months later than originally anticipated.

14) Pipe Stress Analysis Importance for Utility Distribution System Design

Two different pipe stress analyses were performed for all piping components of the Utility Distribution System under the anticipated pressures, temperature ranges, and external loads of the system. As utilizing pre-insulated piping is atypical for Con Edison, the Company wanted to ensure the integrity and safety of the Utility Distribution System design. Conducting stress analyses resulted in incorporating expansion loops to offset pipe stress at various points throughout the Utility Distribution System.

7. OUTREACH & ENGAGEMENT

The Chelsea UTEN Pilot involves a diverse group of stakeholders, including public housing residents, real estate developers, utility partners, and regulatory bodies. A comprehensive outreach and engagement strategy is essential to ensure transparency, build trust, and support successful implementation and long-term adoption.

7.1 Stakeholder Engagement Strategy

1) NYCHA and PACT Partners (Related and Essence)

To ensure the successful implementation of the Pilot, Con Edison engaged in sustained collaboration with NYCHA and its PACT partners, Related and Essence. This engagement focused on aligning construction timelines, coordinating building access, and supporting broader redevelopment planning. In parallel, Con Edison worked closely with these stakeholders to develop customer agreements, finalize equipment installation strategies, and plan for the future integration of the Utility Thermal Energy Network (UTEN) into new buildings.

These efforts were supported by a structured engagement process that included monthly coordination meetings, joint reviews of design and construction plans, and ongoing legal and financial negotiations to advance term sheets and formal agreements.

2) 85 10th Avenue Associates, LLC (Thermal Energy Resource Owner)

Con Edison partnered with 85 Tenth Avenue Associates, LLC to facilitate the thermal energy exchange necessary for the UTEN system. This engagement focused on securing agreements for the use of building space to house UTEN equipment and ensuring seamless technical integration with the building's existing chilled water infrastructure.

To support this collaboration, the Company conducted a series of technical workshops and modeling sessions to align on system design and performance expectations. The parties also worked together to develop lease and compensation agreements, while establishing ongoing performance monitoring protocols and feedback mechanisms to ensure long-term operational success.

7.2. NYCHA Resident Educational Engagement Plan

Resident engagement is a cornerstone of the Chelsea Pilot. For use if the Pilot is approved, the Company has developed a comprehensive educational strategy to inform NYCHA residents about the benefits and impacts of the UTEN system, explain how the new HVAC and domestic hot water systems operate, minimize disruption during construction, and foster long-

term community support. Key messages will highlight that the UTEN system will deliver cleaner, more efficient heating, cooling, and hot water. Residents will receive free fan coil units to improve comfort and indoor air quality and will not see changes to rent or utility billing. Additionally, construction activities will be carefully managed to reduce inconvenience for residents.

To reach residents effectively, the team will employ a multi-channel engagement approach:

- **In-person outreach** includes community meetings, town halls, on-site information booths, and apartment walkthroughs.
- **Print and digital materials** such as door hangers, flyers, postcards, infographics, and educational videos help explain the UTEN system and its benefits. A one-sheet describing the Pilot available in the Appendix.
- **Direct communication** is facilitated through personalized letters, emails, phone calls, text alerts, and a dedicated UTEN hotline and email support.
- **Online resources** include a Pilot website (https://www.coned.com/ChelseaTEN), QR codes on printed materials linking to additional resources, and updates shared through social media, virtual meetings and community partnerships.
- **Customer Metrics** to enhance customer satisfaction, education, and awareness through a comprehensive survey strategy to gather valuable feedback, measure key performance metrics, and ensure that customers are well-informed and satisfied with the UTEN service. Targeted surveys and proactive engagement efforts will involve regular monitoring and reporting to ensure compliance with regulatory requirements and continuous improvement. Key metrics will be tracked, and feedback loops will be established to refine survey design and outreach strategies based on customer feedback.
- **Customer Journey Map** is a process improvement method that delves into the entirety of a customer's experience when interacting with a company, rather than focusing solely on individual interactions or transactions, known as customer touchpoints. This comprehensive approach, referred to as a "journey," encompasses the entire process from the moment a customer initiates a transaction to its completion, ensuring that all their needs and expectations are met. The UTEN Pilot team completed a journey-mapping exercise to understand the customers' journey through the Pilot before pain points arise. This approach was also crucial while working on awareness and outreach plans. For a detailed view of the journey map, please refer to an Appendix to this filing.
- Materials will be translated into multiple languages as needed, and outreach efforts will be tailored to meet the needs of seniors and residents with disabilities. Feedback

mechanisms will be put in place to gather resident input and respond to concerns throughout the Pilot lifecycle.

Table 10: Strategic Timeline for NYCHA Resident Engagement

Timeline	Activities
Step 1	Initial outreach and awareness campaign. Distribute flyers, door hangers, and postcards. Host community meetings and town halls.
Step 2	Conduct apartment walkthroughs and assessments. Schedule site visits for FCU panel installations.
Step 3	Begin FCU panel installations. Provide educational materials and videos on new HVAC systems.
Step 4	Host follow-up meetings to address resident questions and concerns. Continue distributing educational materials.
Step 5	Monitor and evaluate resident feedback. Adjust engagement strategies as needed.
Step 6	Conduct final review and gather comprehensive feedback. Prepare a summary report and plan for ongoing engagement.

8. LABOR AND WORKFORCE DEVELOPMENT

The following labor and workforce development approach applies across all three pilot projects in Con Edison's Utility Thermal Energy Network (UTEN) portfolio. While this section is embedded within this filing, the strategies, commitments, and structures described herein—including union labor agreements, workforce training, and contractor engagement—are consistent across the Chelsea, Mount Vernon, and Rockefeller Center Pilots. This unified approach ensures alignment with the Utility Thermal Energy Network and Jobs Act and supports a scalable, equitable transition to clean thermal energy infrastructure.

8.1. Third Party Contractors

The Company will engage third-party contractors to perform work on the construction phase of the Pilot, which includes both customer-sided equipment and Company-owned Utility Thermal Energy Network (UTEN) infrastructure (the "construction phase"). Customer-sided work includes, but is not limited to, the installation of water-source heat pumps, fan coil units, domestic hot water systems, heat exchangers, and associated electrical and plumbing upgrades within residential and commercial buildings to enable connection to the UTEN. Company-owned UTEN infrastructure work encompasses the installation of distribution piping—which may be located underground, within buildings, or routed through other passageways—as well as excavation, backfilling, street restoration, bore field drilling and development, and the construction and outfitting of Energy Centers. These Energy Centers will house Utility Distribution System (UDS) pumps, Energy Transfer Stations, heat exchangers, SCADA-integrated control systems, and other critical infrastructure necessary for UTEN operation.

The Company intends to use a project labor agreement for the construction phase of the Pilot and otherwise comply with the requirements of the Utility Thermal Energy Networks and Jobs Act (the "UTENJA"). In addition, the Company will collaborate with local community organizations and trade groups to educate and share information regarding the potential UTEN work opportunities and seek vendors that will incorporate and develop local workforces. Throughout the pilot period, the Company will follow all applicable labor requirements set forth in the UTENJA. To the extent that third-party contractors are engaged to perform maintenance and operation work, the Company will require the third-party contractors to adopt and abide by the terms of a Labor Peace agreement and to satisfy applicable hiring requirements in compliance with the UTENJA.

8.2. Company Workforce

The Company has existing collective bargaining relationships with UWUA Local 1-2 (the "Union") for its existing operations and maintenance work. Should the Company decide to self-perform the operation and maintenance of a covered UTEN Pilot following the initial pilot period, the Company will satisfy the UTENJA's hiring requirements, drawing first from employees who have lost, or are at risk of losing, their employment with a utility downsizing its gas transmission and distribution system provided to the Company by the Department of Labor. The Company will negotiate and enter into a Labor Peace agreement with UWUA Local 1-2 or otherwise recognize and negotiate with the Union in a manner that meets the requirements of the UTENJA and applicable law.

The Company will also design a short-term and long-term workforce plan to train employees with the skills, knowledge, and abilities to meet the strategic objectives of the Utility Thermal Energy Networks and Jobs Act. This effort will proceed across three stages: 1) Workforce Development Plan; 2) Training and Implementation; and 3) Workforce Integration.

1. Workforce Development Plan
    - Establishing the Emerging Technology Committee
        - The Company will first establish an Emerging Technology Committee (ETC), consisting of key internal stakeholders from across the Company. The mission of the ETC will be to develop a Company workforce plan that will implement the requirements of the UTEN law through the construction and O&M phases. The ETC will consist of key stakeholders from Company organizations such as Gas Operations, Gas Engineering, Human Resources, Union Labor Representatives, and the Learning Center. The ETC will review and provide guidance on all components necessary to integrate and transition existing Company employees and displaced gas utility workers identified pursuant to the UTENJA to perform UTEN operation and maintenance functions following the expiration of the pilot period, including determining the right skill sets required, the number of individuals needed for each job category; content and schedule of training programs; and identifying other areas of the organization will be part of the mix of staffing for the Pilots.
    - Workforce Needs and Available Talent
        - The ETC will focus first on understanding all aspects of the nature and scope of the work related to operating and maintaining covered networks providing thermal energy for heating and cooling. This clarification of work objectives is

intended to aid in the development of an outline of the duties and tasks associated with the operating and maintenance needs of the networks and to provide insights into the number and types of roles needed to meet the needs of these networks.

- The ETC will identify and recommend available talent within the Company to staff covered Pilots. Based on the similarities of the infrastructure piping used for thermal energy networks and Con Edison's natural gas system, we expect that existing gas personnel within Con Edison will play a role in staffing the UTEN facilities after the expiration of the pilot period. The unique experience of current gas operations employees gained through working on the gas system over time, positions the company to upgrade the skills of this group more rapidly, and therefore quicken the learning curve required to meet any special skills associated with the UTEN systems. In addition to the gas workforce, additional employees from other departments will be evaluated for their suitability to support the needs of the UTEN Pilots , including employees in Customer Operations, Environmental Health & Safety, Construction, Call Center, the Learning Center, and the Control Centers. Con Edison will engage with union representatives to facilitate opportunities for current gas operations employees.

- Skills Assessment and Identifying Gaps
  - A skills assessment will be a necessary part of the Company workforce planning process to properly match current employees against the specific knowledge and skill requirements of UTEN. In addition to complying with any requirements to first hire from a list of employees provided to the Company by the New York State Department of Labor, pursuant to the Utility Thermal Energy Networks and Jobs Act, the ETC will identify candidates with the right knowledge and talents for the Pilot after conducting this skills assessment.
  - To staff the workforce needed to successfully operate and maintain these networks with a sufficient number of people and with the right skills and experience, the ETC must also address skill gaps. After undertaking a skills inventory, the ETC will best understand what skill gaps exists within the Company and will create a training and development plan to close those gaps. The role of the ETC will entail creating an outline of training activities to raise

the levels of skills required for maintenance and operation of the UTEN network following the completion of the pilot period.

2. Training and Implementation
    - The ETC, working closely with the Con Edison Learning Center, will create a new curriculum and/or leverage existing training and development programs to reskill and or upskill existing gas employees and other Company personnel, as needed. Training programs will consist of entry-level and career path Company-led programs and will include a variety of methods, such as classroom training of field employees to effectively operate and maintain thermal energy systems; on-the-job hands-on experience; digital learning; job aids and mentorship to support the transition to new UTEN systems. Providing retraining opportunities and support for employees is consistent with the Company's culture of building on existing technical skills and serves to motivate the workforce.
    - Throughout the transition, it is important that field operating departments and personnel establish basic work principles and procedures to be able to maintain and operate the Pilot. In addition, all other functions outside of operations will be trained and prepared to supplement the needs of the UTEN Pilot. These include but are not limited to the Billing Department, Call Center Representatives, Energy Services, and the Learning Center.
3. Workforce Integration
    - In addition to preparing internal organizations and personnel for the workforce transformation, the ETC will also partner with union leaders and representatives to facilitate a smooth transition of work activities, and where applicable, negotiate definitive agreements. This involves sharing the Company's clean energy priorities and how this transition fits into Con Edison's overall business strategy. Partnering with the union at every stage of the process will increase support for building a workforce to successfully implement this Pilot.

8.3. Small Business Plan

Supplier Enablement, Engagement and Development (SEED)

Engagement Policies and Initiatives

- Long-Standing Commitment to Small and Local Businesses: For over 45 years, Con Edison has actively built relationships with small and local businesses, including veteran-

owned, disabled-owned, HUB Zone, and local enterprises, believing that diverse suppliers promote competition, spark innovation, and reduce costs.

- SEED Program: A dedicated program to increase small and local business participation in procurement, with clear onboarding processes and support resources.
- Contact Information: Small business vendors are encouraged to reach out via 1-212-460-3076 or SEEDprogram@coned.com.
- Significant Spending: Over the past decade, Con Edison has spent more than $2.5 billion with small and local businesses. In 2023 alone, 31% of in-state contracts were awarded to these businesses.
- Certification and Registration: Con Edison aligns its consideration of small businesses, i.e. criteria, size standards, and revenue with the U.S. Small Business Administration (SBA). This enables our suppliers and the company to engage with businesses from a variety of small business classifications including those described above.
- Outreach and Training: Includes partnerships with the Regional Alliance for Small Contractors, along with various city and state agencies.
- Internal Advocacy: Leaders within Con Edison champion diversity and inclusion and serve on advisory boards and task forces.
- Unbundling Contracts: Large contracts may be broken into smaller components to allow small businesses to bid competitively.

Application to the UTEN Pilot (Stage 3 and Beyond)

- **Engagement:**
    - Actively seek small and local vendors for procurement.
    - Conduct targeted outreach and provide training on Pilot requirements.
    - Track and report small and local business participation throughout the Pilot lifecycle.
- **Local Workforce Engagement:**
    - Prioritize hiring local workers for construction, installation, and maintenance.
    - Seek out specialized training to ensure readiness for UTEN-specific roles.
    - Partner with local trade groups and nonprofits to promote job opportunities.
- **Organized Labor:**
    - The Company will strive to ensure that all skilled trade work will be completed by union labor.
    - A Labor Peace Agreement will be pursued with UWUA Local 1-2.
    - A Project Labor Agreement (PLA) will be pursued for construction.

As part of its commitment to support a just and equitable transition under the Utility Thermal Energy Network and Jobs Act (UTENJA), the Company held a strategic meeting with key labor leaders of the New York State Building and Construction Trades Council (NYSBCTC). During that meeting, the Company collaborated with the Building and Construction Trades Council of Greater New York and the New York State Building and Construction Trades Council on the execution of the construction of the UTEN Pilots.[32]

This meeting served as an important opportunity to align on the Company's labor strategy for the Chelsea UTEN Pilot and to reaffirm its commitment to full compliance with the UTENJA law. The discussion focused on the Company's intent to pursue a Project Labor Agreement (PLA) for the construction phase of the pilot, ensuring that all skilled trade work will be performed by a union workforce. The Company also emphasized its broader workforce development goals, including the integration of union labor into long-term UTEN operations and maintenance. The Company plans to continue coordinating closely with the Building and Construction Trades Council and its affiliates throughout the life of the Pilot. This collaboration will help ensure that labor standards are upheld, workforce opportunities are equitably distributed, and the UTEN pilot serves as a model for labor-inclusive clean energy infrastructure development in New York State.

8.4. Project Management Team

The Company has a dedicated UTEN project team overseeing the development, design, construction, and operation of the Pilot. The dedicated team members will specialize in specific areas, such as finance, engineering, project management, customer outreach, customer protections, and engagement. To better assist in areas that are novel to the Company, outside consultants will be added to supplement this core team. Those areas of expertise range from thermal rate design to thermal energy network system design. In addition to this team, other departments within the Company will provide support in various areas of expertise, including but not limited to: Legal, Strategic Engagement, Customer Operations, Finance, Environmental Health and Safety, Rate Engineering, Billing, Procurement, and Gas Operations.

The Chelsea Pilot will require a dedicated team to ensure the successful construction, commissioning and initial operation of the thermal energy network. Below is the proposed incremental team that would be needed, assuming only the Chelsea Pilot is approved beyond Stage 2. During Stages 1 and 2, CECONY was developing three Pilots simultaneously, which required a total incremental FTE count of 8. In the event that only the Chelsea Pilot is approved

[32] *UTEN Proceeding,* Monthly Progress and Expenditure Report – through May 31, 2025, June 16, 2024.

for Stage 3, there will be a reduction in incremental FTEs from 8 to 7. In the event multiple CECONY Pilots are approved for Stage 3 simultaneously, additional FTEs will only be needed to incorporate portions of the Pilot that do not have synergistic relationships.

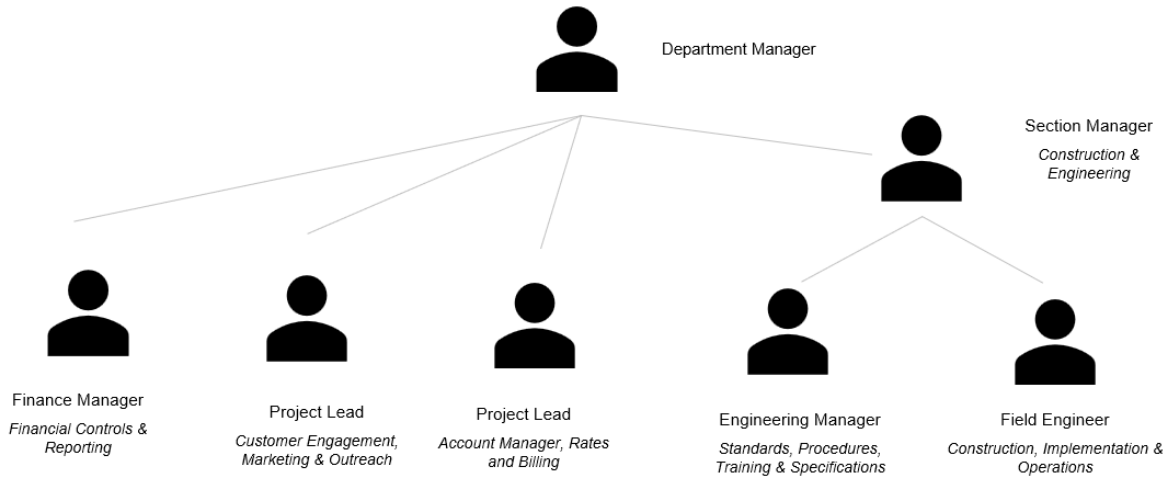

Figure 28: Example of Con Edison's UTEN Team

The Company will procure an outside project management company for the direction project management, vendor management and metrics tracking associated with Stage 3 of this Pilot. That third party PMO vendor will report directly to the UTEN Pilot team.

The UTEN Pilot Team will also directly oversee the construction of the Pilot, as well as its commissioning and operation. Below is a breakdown of the major functions of each incremental FTE:

Department Manager: Responsible for the strategic oversight and coordination of all UTEN workstreams across the full portfolio of approved Pilots. This includes leading the development and refinement of the overarching UTEN business case, ensuring alignment with long-term organizational goals, and identifying opportunities to expand the portfolio with additional high-impact projects. The Department Manager ensures cross-functional collaboration, drives performance metrics, and provides executive-level reporting on progress, risks, and outcomes.

Section Manager: Leads and manages all engineering and construction activities associated with the Chelsea Pilot, ensuring that all phases of the Pilot are executed efficiently, safely, and in compliance with applicable codes and standards. This includes

overseeing design implementation, construction progress, contractor coordination, and quality assurance. In addition to core responsibilities, the Section Manager will:

- Oversee and work directly with the project management vendor, ensuring alignment on Pilot timelines, deliverables, and reporting.
- Coordinate with engineering teams, field personnel, and external consultants to resolve technical challenges and maintain Pilot momentum.
- Monitor construction schedules, budgets, and resource allocation to ensure timely and cost-effective delivery.
- Serve as the primary point of contact for construction-related matters, providing regular updates to senior leadership and stakeholders.

Field Engineer: Provides direct, on-the-ground engineering support and technical oversight throughout all phases of the Pilot, including construction, commissioning, and operational transition. This role ensures that all work is executed in accordance with design specifications, safety standards, and Pilot timelines. In addition to core responsibilities, the Field Engineer will:

- Oversee the system commissioning vendor, ensuring all systems are tested, validated, and meet performance criteria.
- Supervise the engineer of record responsible for construction oversight, ensuring alignment with approved designs and regulatory requirements.
- Prepare and maintain as-built documentation, capturing all field modifications and final configurations.
- Sign off on final construction drawings and commissioning documents, certifying that the Pilot meets all engineering and compliance standards.
- Engage directly with all relevant regulatory agencies, managing all design and environmental filings, and ensuring full compliance with local, state, and federal requirements.
- This role is critical in bridging design intent with field execution, ensuring a seamless transition from construction to operation.

Engineering Manager: Leads the strategic development, implementation, and continuous improvement of all thermal engineering standards, procedures, and specifications across the organization. This role is also responsible for designing and managing comprehensive training programs to ensure that engineering teams are equipped with the latest technical knowledge and best practices. In addition to thermal systems leadership, the Engineering Manager will lead the design and implementation of the SCADA system and all supporting

IT infrastructure. This includes overseeing system architecture, integration with operational technologies, cybersecurity compliance, and ensuring real-time data acquisition and control capabilities are robust and scalable. The Engineering Manager collaborates closely with cross-functional teams to ensure that all engineering and IT systems are aligned with Pilot goals, regulatory requirements, and long-term operational efficiency.

Finance Manager: Oversees all financial aspects of the Pilot portfolio, including budgeting, forecasting, financial modeling, and expense tracking. This role manages vendor contracts, ensures timely and accurate financial reporting, and supports strategic decision-making through data-driven insights. The Finance Manager also ensures compliance with funding requirements and internal financial controls, playing a critical role in maintaining fiscal discipline and transparency.

Outreach, Marketing, and Engagement Manager: Develops and executes comprehensive outreach and engagement strategies to support Pilot implementation through all stages (3a, 3b, and 4). This includes creating educational materials, managing media relations, and developing marketing campaigns tailored to diverse audiences about safety, energy management, and account information. The role involves direct engagement with internal stakeholders, external partners, and NYCHA residents to build trust, encourage participation, and facilitate access for HVAC equipment installation through various outreach methods in addition to community forums. The lead also tracks and reports on Customer Metric's to ensure compliance. Surveys will be sent to the diverse segments to measure campaigns for continuous improvements and providing excellent or a +1-customer experience. Develop processes for contractors and training for UTEN customer contact employees such as Customer Experience Centers. Feedback loops with the Customer Experience Center to ensure inclusive and transparent communication for stakeholders.

Rates, Billing, and Account Management Manager: Responsible for the design and implementation of customer-facing systems and processes related to rate structures, billing, and account management. This includes finalizing rate design, ensuring seamless integration with customer information systems, and developing clear and accessible bill presentment formats. The role also oversees customer protections, manages fulfillment of customer and thermal exchanger agreements, and ensures compliance with regulatory and contractual obligations.

8.4.4. UTEN Team Transition During Stage 3 Approval Period

Following the submission of the Stage 2 filing in July 2025, the UTEN Pilot team will enter a transitional phase while awaiting approval to proceed to Stage 3. During this interim period, the team will be strategically downsized to focus on core activities essential to maintaining Pilot momentum and readiness.

Several team members will be temporarily reassigned to other initiatives across the organization. However, a dedicated core group of 3 FTEs will remain in place to manage the following critical functions:

- Responding to Information Requests from the Department of Public Service Staff to support regulatory review and approval.
- Refining engineering designs in collaboration with Ecosystem, WSP and other design partners to ensure readiness for procurement and construction.
- Maintaining stakeholder engagement, including ongoing coordination with the Pilot stakeholders including, NYCHA, Related and Essence.
- Advancing Stage 3 preparation work, including procurement planning, permit readiness, and internal alignment on construction and operations strategies.

This streamlined structure ensures that the UTEN Pilot remains responsive, technically sound, and strategically aligned while optimizing resources during the regulatory review period.

8.5. Labor and Workforce Learnings

1) Early and Inclusive Workforce Planning Is Essential

Establishing a dedicated Workforce Development Committee (WDC) early in the process enabled Con Edison to align internal stakeholders across all Company departments. This cross-functional collaboration helped define the scope of work, identify required skill sets, and begin planning for training and staffing well in advance of construction.

2) Skills Gap Assessment Is Critical

A formal skills inventory and gap analysis helped the WDC determine where additional training was needed. This process informed the development of targeted training programs, ensuring that employees are equipped with the technical and safety competencies required for UTEN operations.

3) Training Must Be Multi-Modal and Role-Specific

Training programs must include classroom instruction, hands-on field experience, digital learning, and mentorship. Different roles—field technicians, control center operators, customer

service representatives—require tailored curricula to ensure operational excellence and customer satisfaction.

4) Specialized Equipment Requires Specialized Training

The use of pre-insulated steel piping and other UTEN-specific technologies requires training that is not yet widespread in the local contractor market. Con Edison has identified the need to work with vendors and training institutions to build this capacity in advance of large-scale UTEN deployment.

9. COST ESTIMATES

9.1. Overview

The estimated construction cost for the Chelsea Utility Thermal Energy Network (UTEN) Pilot, excluding contingency, is $45.53 million, reflecting a refined and fully engineering design. This revised estimate reflects a more accurate and comprehensive understanding of project costs compared to the previous filing. During Stage 2, the Company undertook a rigorous design and planning process that enabled the identification and refinement of the necessary cost categories. The Company describes its process to refine cost estimates and design the Pilot in a cost-effective way but continues to highlight that UTEN projects are extremely innovative, and it remains possible for costs to shift or change. Once constructed, the continuation of the pilot will incur ongoing operational expenses including energy consumption, maintenance, emergency response, data collection, and analysis.

In addition to startup construction costs, back-end systems such as SCADA and billing contribute to the overall cost profile and must be accounted for in long-term planning. A unique aspect of this Pilot is its implementation by a regulated utility, which introduces specific regulatory and compliance-related costs.

To optimize the Pilot and reduce total costs, the Company implemented several strategic measures. Notably, the original plan to construct a standalone Energy Center building was eliminated in favor of decentralizing equipment across existing facilities at 85 10th Avenue and 401 W 16th Street. This decision alone reduced the overall Pilot cost by approximately 20%, or $19.5 million. Additionally, the Company removed 434 W 17th Street from the Pilot scope after determining that the incremental learning value did not justify the added expense. The Company also went from providing two buildings with HVAC to only one building, in order to optimize learnings while keeping total Pilot costs as low as possible.

The Company also placed significant emphasis on refining cost estimates through detailed engineering and energy modeling. To support this effort, the Company hired a professional construction estimating firm to develop more precise and realistic cost estimates based on the finalized design. This allowed for more accurate sizing of equipment and infrastructure, which in turn minimized overdesign and avoided unnecessary capital expenditures. A 10% tariff on all material related to construction costs and 3% annual inflation were also factored into the updated estimates to improve financial accuracy for Stage 3.

These efforts collectively demonstrate the Company's commitment to delivering a cost-effective pilot while preserving the integrity and learning value of the Pilot. The updated cost

estimates reflect a deliberate balance between cost containment and the inclusion of all essential elements required for successful implementation and evaluation.

Table 11 shows the updated cost estimates organized by the various stages of the UTEN Pilot. To support this effort, the Company retained the services of a professional construction estimating firm. With these services and the completion of 100% design, the Company was able to provide more accurate estimates for cost categories than it could in Stage 1. The Company also reassessed the impact of inflation on construction costs for Stage 3 of the pilot. Contingency levels were reduced from 30% to 15% to match standard Company procedure.[22] Our cost estimates also assume a 10% tariff on all material related to construction costs and 3% annual inflation. These efforts ensured that all necessary costs were identified and refined, while unnecessary expenditures were avoided. The result is a more realistic, optimized cost estimate that supports a scalable and resilient thermal energy network.

Some other important updates include:

- Previously, the Company estimated a total Pilot cost of **$88.99 million** for all stages of the Chelsea Pilot, inclusive of a 30% contingency cost. The Company is now estimating a total cost of **$95.53 million** for all stages of the Chelsea Pilot. This includes a 15% contingency. In light of the cost reporting and governance framework described in the Cost Recovery section below, the Company reduced the contingency to align with typical capital project contingency levels.
- Throughout the design process, the Company actively tried to determine the minimal scope necessary to have a pilot that provided replicable learnings as well as respond to the Commission's desire to limit the portion of the Pilot equipment and infrastructure that are at risk of being retired prior to the end of their useful life.[33] In doing so, the Company descoped the scale of the Pilot in three ways:
    - **Decentralizing the Energy Center:** Originally, the Company intended to build a standalone Energy Center building to house the equipment necessary to operate the UDS. The Company now proposes to decentralize the Energy Center and instead place the equipment in 85 10th Avenue's cellar and 401 W 16th Street's basement.
    - **Removing 434 W 17th Street from Pilot scope:** The Company determined that the incremental learning of including 434 W 17th Street to receive UTEN services did not outweigh the cost to connect.

[33] *UTEN Proceeding, Chelsea Compliance Letter.*

- **Removing one building's HVAC design from Pilot scope:** Originally, the Company intended to provide space heating and cooling to two Fulton Houses buildings. However, the Company determined that the incremental learning of including a second Fulton Houses building to receive space heating and cooling did not outweigh the cost of retrofitting the second building with a hydronic heating and cooling system, which reduced the overall project cost by about $7M.

Table 11: Cost Estimates for Chelsea Pilot in Stages ($$M)

Category	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Total
UDS Construction	-	-	11.17	-	-	11.17
Thermal Resource Construction	-	-	2.56	-	-	2.56
Energy Center Construction	-	-	2.69	-	-	2.69
Customer Building Construction	-	-	18.57	-	-	18.57
Administrative	0.35	0.89	4.92	10.00	0.10	16.26
Design	0.13	6.66	3.19	0.10	-	10.08
Outreach & Education	-	-	0.73	0.05	-	0.78
Operational	-	-	-	18.37	-	18.37
SCADA and Data Collection	-	-	1.70	1.93	-	3.64
Total	**0.48**	**7.55**	**45.53**	**30.45**	**0.10**	**84.12**
Contingency	-	-	6.83	4.57	0.02	11.41
Total w/ Contingency	**0.48**	**7.55**	**52.36**	**35.02**	**0.12**	**95.53**

9.2. Cost Categories

The following outlines the primary cost categories associated with the implementation of the Chelsea Pilot. These categories reflect the major components of the Pilot's infrastructure, operations, and customer integration strategy. Each investment supports the deployment of a scalable, resilient, and community-aligned thermal energy network in a dense urban environment.

Customer Building Construction – $ 18.57 million

Covers the installation of new HVAC and domestic hot water systems in three NYCHA buildings, including fan coil units, heat pumps, and the cost of associated electrical upgrades for which the

Customer is responsible. This category also includes the cost of retrofitting 401 W 16th Street for space heating and cooling and installing domestic hot water systems in all three buildings.

Energy Center Construction – $ 2.69 million

Reflects the cost of decentralizing the Energy Center across 85 10th Avenue and 401 W 16th Street. Includes installation of UDS pumps, heat exchangers, backup steam systems, and electrical infrastructure in leased and existing spaces.

Thermal Energy Resource Conversion – $ 2.56 million

Includes modifications to 85 10th Avenue's chilled water plant to enable waste heat recovery, installation of heat exchangers, and condenser water pumps to inject thermal energy into the UTEN.

Utility Distribution System Construction – $ 11.17 million

Encompasses the installation of approximately 2,500 linear feet of underground piping between 85 10th Avenue and the Fulton Houses campus, including isolation valves, leak detection systems, and civil restoration.

SCADA and Data Collection – $ 3.64 million

Funds the Supervisory Control and Data Acquisition (SCADA) system for real-time monitoring and performance tracking. Includes RTUs, sensors, BTU meters, and cloud-based infrastructure for remote diagnostics.

Customer Outreach and Acquisition – $ 0.78 million

Supports community engagement, educational materials, and resident outreach. Includes multilingual communications, town halls, and apartment walkthroughs to facilitate participation and awareness.

Pilot Operational – $ 12.27 million

Covers operational costs during the 5-year pilot, including maintenance, emergency response, customer support, and performance monitoring.

Administrative – $ 16.26 million

Includes project management, engineering design, legal, permitting, regulatory compliance, and third-party peer review. Also covers internal labor and vendor coordination.

Property Tax – $ 6.10M

This cost category reflects anticipated property tax obligations associated with utility-owned infrastructure deployed during the pilot. These costs represent estimated assessments levied by New York City on utility property over the 5-year pilot period.

These categories collectively support the Chelsea UTEN's goal of delivering equitable, low-carbon thermal energy service to a disadvantaged community while generating replicable learnings for future utility-scale deployments.

9.3. Cost Drivers

The cost structure for this Pilot is shaped by several key drivers. Capital costs, such as construction, are fixed and primarily associated with the initial build-out. This includes costs to provide three new electrical services. Although 85 10th Avenue possesses sufficient electrical capacity, a new electrical service is being provided to the building so the Company can pay to power its new UTEN equipment that will be placed in the building. The Fulton Houses campus does not possess sufficient electrical capacity to power the new UTEN equipment. To keep the UTEN electrical feeds separate from the rest of the Fulton Houses load, a new, separate electrical service with a new Point of Entry in 401 W 16th Street is being provided for the new NYCHA equipment installed in the three Fulton Houses buildings. A new electrical service is also being provided to 401 W 16th Street for the new Con Edison-owned UTEN equipment installed in the three Fulton Houses buildings.

In contrast, operational costs are ongoing and include energy consumption, maintenance, emergency response, data collection and analysis, and billing management. Additionally, as the Pilot scales from serving a single customer to potentially hundreds the total cost to connect each new customer will likely be less than the cost to connect the buildings participating in the pilot as the startup costs will not be reoccurring. Once constructed, the continuation of the pilot will incur recurring operational expenses.

In addition to startup construction costs, back-end systems such as SCADA and rate design contribute to the cost profile and must be accounted for in long-term planning. It is important to note that the infrastructure being developed is designed to be reusable, supporting

future expansion and cost efficiency. However, any increase in customer participation will require proportional enhancements to system capacity and infrastructure.

A unique aspect of this Pilot is its implementation by a regulated utility, which introduces specific regulatory and compliance-related costs. For example, the Company estimates ~$1M for metrics collection and analysis. Additionally, the Pilot budget includes the cost of customer equipment to encourage participation.

9.4. Decommissioning

If the Company needed to decommission the pilot and restore Participants to their original service conditions, the Company at this point estimates the cost of decommissioning effort would be approximately $13.3 million. Of this, $6 million would be allocated to restore the NYCHA buildings, and $7.3 million to decommission the UDS and Energy Center. The Company anticipates incurring $9.97 million of these costs in 2032 and the remaining $3.32 million in 2033.

9.5. Cost Estimates Learnings

The cost estimating and financial planning phase of the UTEN Pilot yielded several valuable insights. The following are among the most significant takeaways.

1) Limitations of the Investment Tax Credit (ITC)

The team confirmed that the ITC does not apply to non-geothermal projects. This limits the availability of federal financial incentives for waste heat recovery systems and underscores the need to explore alternative funding mechanisms.

2) Urban Construction and Leasing Cost

Leasing space within the Energy Center added to the Pilot's capital expenses. Additionally, construction in a dense urban environment—especially test pit excavation on Manhattan streets—proved to be significantly more costly than anticipated.

3) Stakeholder Compensation for Design Review

It was necessary to compensate personnel from target buildings' management teams for their time and expertise in reviewing system designs and commercial agreements. This cost should be anticipated in future stakeholder engagement strategies.

4) Contingency Planning for Operational Uncertainty

Due to the lack of historical operational data, the team recognized the potential for unforeseen costs as the system matures. These may include variability in energy transfer efficiency, unexpected maintenance, or seasonal control adjustments. To mitigate financial risk,

the Company justified a contingency buffer—particularly around operational costs—to support adaptive management and long-term system resilience.

10. COST RECOVERY AND ACCOUNTING TREATMENT

10.1. Overview

Related to cost recovery, the Company requests the following:

- All UTEN costs be recovered from Electric customers;
- All UTEN costs be recovered as a surcharge as an element of the Monthly Adjustment Clause (MAC)/ Power Authority of the State of New York (PASNY).
- Company capital costs be recovered per standard ratemaking practice;
- All other costs, including O&M and Customer equipment upgrades be recovered as regulatory assets receiving rate of return of the current rate plan;
    - The share of Customer equipment upgrades the Company covers be amortized over 15 years;
    - Any Company infrastructure that does not go into service or leaves service early (including removal costs), be amortized over 15 years;
    - All other regulatory assets be amortized over 5 years; and

The Company further requests that all UTEN revenues flow back to Electric customers as credits via these same surcharges on an annual basis.

The Company proposes cost recovery from Electric customers because UTEN systems, like the Chelsea Pilot, have the potential to help achieve CLCPA goals with exceptional efficiency and correspondingly lower electric system expansion costs. Thus, recovery from electric customers properly aligns UTEN costs with the energy commodity associated with these benefits. Recovery from electric customers will result in lower bill impacts compared to recovery from gas customers due to the greater number of electric customers and the larger size of the electric business. The estimated revenue requirement impacts for electric versus gas customers for Stages 1-4 are as follows:

Table 12: Estimated Customer Bill Impact

If UTEN Recovered Exclusively From:	Average Bill Impact (%)	Residential Bill Impact (%)
Electric Customers	0.06%	0.05%
Gas Customers	0.23%	0.22%

10.2. Stage 1-2 Costs

The Company requests approval to begin surcharge recovery of the revenue requirement associated with costs incurred for Stages 1-2 subject to the $8.3MM cap set by the Commission in its September 2023 Order and updated in its December 2024 Order.[34] . If the Pilot is approved to move to Stage 3, the Company proposes to recover Stages 1-2 costs as detailed above. If the Pilot is not approved to move to Stage 3, the Company proposes to recover all costs incurred through the end of Stage 2 as a regulatory asset amortized over 5 years from the date of the Commission's Order not approving progression to Stage 3.

10.3. Stage 3 Costs

The Company requests surcharge recovery during Stage 3 of the revenue requirement for approved Stage 3 costs as capital is put in service or expenses are incurred. See the Cost Estimates section for the values and discussion of these costs.

The proposed Pilots are the first of their kind in the Company's service territory, NYS and to the Company's knowledge, for the United States. As such, there is an increased risk that the Company will encounter novel construction, operational and business challenges that are outside of its experience and expertise managing electric, gas, and steam projects. Novel areas where the risk of encountering such challenges is elevated include installation of UDS heat exchangers, upgrades to customer buildings needed to connect to the network, Thermal Energy Resource Owner and Commercial Customer Agreements, and most aspects of low-temperature network operation and maintenance. These novel construction challenges could result in costs that exceed the standard contingency of 15 percent the Company uses for standard capital projects. Additionally, there remains significant uncertainty related to inflation and tariffs on imported goods or goods that include imported components, such as water source heat pumps or customer heat exchangers.

To address these challenges, the Company proposes several steps to manage additional, unexpected costs.

First, the Company requests the flexibility to move approved spending among approved Pilots and among Pilot categories. This flexibility would allow the Company to apply underruns in one area to manage additional, unexpected costs in another area.

[34] *UTEN Proceeding*, Order Addressing Petitions of Con Edison and National Grid for Relief of Cost Cap Through Stage 2 (December 20, 2024) (*December 2024 Order)*.

Second, the Company proposes a reporting and governance framework that provides the Commission and DPS Staff transparency and oversight into Pilot costs and cost forecasts. As Stage 3 progresses, the Company proposes to file monthly expenditure reports and quarterly (or more frequently at the Company's discretion) cost forecast reports. If a cost forecast filing exceeds the PSC-approved Stage 3 cost estimates (inclusive of contingency), then the Company would accompany the Report with either an informational filing or a petition, as proposed below.

- **Informational filing for costs less than 20 percent of the Stage 3 cost estimates (Threshold)**. If additional Stage 3 costs are forecast to be less than the Threshold, then the Company would accompany its Cost Report with an informational filing that details the increased costs and their causes. If DPS Staff approves or does not object in writing within 30 days of this informational filing, the Company would be authorized to begin recovery of the additional revenue through the surcharge. However, if within 30 days of the informational filing DPS Staff objects to the revised cost estimate, the Company would, after protecting customer and/or public safety and ensuring that customers have adequate access to heating and/or cooling and full use of their buildings, pause work on the Pilot.[35] It would then petition the Commission for recovery of the revenue requirement of the additional costs along with the costs required to remobilize its construction vendors to resume work or other relief.
- **Filing for costs above the Threshold.** If Pilot costs are forecast to exceed the Threshold, then the Company would pause work as described above and petition the Commission for recovery of these additional costs and/or seek other relief.

10.4. Stage 4 Costs

The Company has included in this filing estimates for Stage 4 costs to operate the Pilot. During Stage 3, the Company will provide updates to these cost estimates and file with the Commission for approval of surcharge recovery of the revenue requirement during Stage 4.

10.5. Recovery of Costs to Remove Participants from or Decommission the Pilot

Participating in this Pilot will require substantial modifications to participants' buildings to connect to the UTEN. Thus, participants require assurance that they will be made whole if they

[35] To the extent these costs necessary to pause the pilot were to lead Pilot costs to exceed the PSC-approved Stage 3 cost estimates, the Company requests it would recover this excess, in the same manner as other costs detailed above.

elect to leave under the allowed circumstances in the Customer and/or Thermal Agreement, or if the Company shuts down the Pilot.

Directional estimates of these costs are included in the Cost Section of this filing. However, accurately forecasting such costs is complex and difficult as the equipment will be in customer building spaces that the Company does not control and the act of decommissioning or removal would not incur until six or eight years from this filing. Over time, we anticipate there will be changes to materials and equipment pricing and availability, building codes, and the condition of participating buildings (such as from renovations, improvements, repairs, or damage). Thus, the Company requests the Commission approve recovery of the revenue requirement of prudently incurred costs associated with restoring participant building spaces and heating and cooling systems during Stages 3, 4, or 5. It will be a struggle to enroll participants without this approval or an alternative framework that allows the Company to make these commitments, which participants have expressed they need to enroll in the Pilot.

The Company requests similar approval of cost recovery of costs required to protect public safety and right of way if the Pilot needs to be decommissioned. These costs face similar levels and causes of uncertainty. Directional estimates of these costs are also included in the Cost Estimates section of this filing.

10.6. Stage 5 Costs

The Company proposes in Year three of the Pilot, to file a petition in this proceeding with its proposal for a "Post Pilot Period." This will include a proposal for recovery of and estimates for all costs to continue to operate and/or expand the network as well as proposals on post-pilot thermal rates and prices.

10.7. Cost Treatment in Event Commission Orders Sale of Pilot

If the Commission at any time Orders the sale of the UTEN to a third party, the Company proposes to use those sales proceeds to offset ratably its remaining undepreciated capital assets and/or unamortized regulatory assets, with any remaining proceeds accruing to the benefit of Electric customers.

11. RATE DESIGN

11.1 Overview

The Pilot pricing and rate structure is comprised of two components: 1) the Company purchases thermal energy from the Thermal Energy Resource Owner and sells it at cost to the Thermal Customers; and 2) the Company charges the Thermal Customers a network connection charge proportional to their connected heat pump capacity.

This structure accomplishes several objectives. First, it tests a pricing and rate structure that would incent efficient use of the thermal network not only for the Pilot but also at larger scale with additional and larger Thermal Energy Resource Owners and Thermal Customers. Second, the rates also remain consistent with the Electric and Gas distribution utility framework of passing through the cost of procured energy and having the distribution rate recover the network costs. Third, this structure reflects cost to serve: thermal energy consumption costs change based on volume, and the costs to build out and maintain the thermal network generally vary based on the capacity of the connected heat pumps. Fourth, this minimizes complexity for the Pilot participants. While achieving this last goal entailed omitting or simplifying elements of pricing or rate design that may be warranted for operation of a UTEN at larger scale, it was important for participants in a novel pilot to be able to easily understand and project out the rates and pricing.

The Company has identified draft values for Pilot Period prices and/or rates that it estimates provide Participants the opportunity to earn a fair return on the soft costs (like legal costs) they invest to enter into the Pilot during the Pilot period. The Company has taken this approach with the objective of obtaining Thermal Energy Resource Owner and Thermal Customer participation are necessary for the Pilot to succeed. The Company conducted extensive financial and estimated energy bill modeling (which in turn incorporated the extensive energy modeling described earlier) to determine thermal prices and rates. Participants have not yet agreed to these rates and prices. (See the Customer Agreement section for more detail).

The draft rates are at subsidized levels for the course of the Pilot period. These levels are, as discussed, necessary to obtain the participation required for the Pilot to operate and generate learnings. Additionally, it reflects the reality of a smaller scale Pilot project where fixed costs are spread across only a limited number of participants.

These draft prices and rates will be for purposes of the Pilot period only. Additional analysis, leveraging the learnings from Stage 4 of this Pilot, will be needed for prices and rates for continuation of the Pilot or development of new projects in the future.

11.2. Analysis Approach

In determining the thermal rates discussed below, the Company utilized the detailed hourly energy modeling described earlier to model the revenues, steam bill savings, cooling bill savings, and changes in electricity costs for each of the Pilot participants. The Company utilized the service class rate structure of each participant's affected steam and electric account to estimate these dollar impacts.[36] In instances where an electric account triggered mandatory hourly supply pricing, the Company utilized NYISO Zone J LBMP price forecasts, the NYS Department of Public Service ICAP price forecast, historic ancillary services and transmission charges, and Zone J distribution losses. In estimating the levels of electric and steam distribution rates beyond the Company's current rate plans, the Company aimed to align with the participants on negotiated escalation assumptions.

11.3. Thermal Energy Resource Owner Pricing

The Thermal Energy Resource Owner, 85 10th Avenue, LLC, will not incur a distribution connection charge and will be compensated for thermal exchange based on a per-MMBTtu payment structure. This model is designed to incentivize consistent heat provision and/or rejection across all seasons, ensuring reliable service, fair compensation for energy providers, and an incentive for 85 10th Avenue to continually optimize its building operations to provide the necessary thermal exchange as cost-effectively as possible.

The omission of a distribution connection charge simplifies the rate structure for the Thermal Energy Resource Owner for the purposes of the Pilot. It also keeps participation in the Pilot financially beneficial for the Thermal Energy Resource Owner.

The per-MMBtu thermal energy price will incent the Thermal Energy Resource Owner to inject heat into or reject heat from the loop as needed. The Company has developed the price level to both cover the Thermal Energy Resource Owner's additional electric and maintenance costs to operate their building in conjunction with the UTEN, and to provide the Thermal Energy Resource Owner a fair, market-rate return on the soft costs it will have invested into the Pilot through Stage 2 and 3. (These costs are estimated to be in the hundreds of thousands of dollars). Additionally, as discussed below, the thermal price had to be low enough that Fulton Houses, the thermal customer, would see net reductions in energy heating bills while on the Pilot.

[36] Because Fulton Houses is a NYPA electric customer, the Company used a Service Class 9 rate to provide an approximation.

The Company will pay 85 10th Avenue for two thermal services over the course of the year. First, during heating hours– when the Thermal Customer has a need to withdraw heat – the Company will pay 85 10th Avenue for the heat it injects into the system. Second, during cooling hours – when the Thermal Customer has a need to reject heat – the Company will pay 85 10th Avenue for the heat it dissipates with its cooling equipment.[37] The draft $/MMBtu price for heat injection and heat dissipation are $26/MMBtu.

The Company estimates that these prices in Year 1 of the Pilot will provide the following net revenues to 85 10th Avenue:

Table 13: Thermal Energy Resource Estimated Net Annual Thermal Revenues, $000s

Category	Values
Thermal Revenues ($ 000s)	$132
Incremental Electricity Cost	($97)
Incremental O&M Costs	($30)
Net Thermal Revenues	**$5**[38]

As discussed in earlier sections, during Stage 2, 85 10th Avenue's building operation team modified building operations to minimize mechanical cooling. This reduced the availability of sufficiently hot waste heat for the Pilot from baseline building operation. As a result, 85 10th Avenue will now need to increase its electricity consumption meaningfully above its baseline levels to sell thermal energy to the Project. This has increased the price of thermal energy the Company will need to pay to 85 10th Avenue. The Company estimates that the thermal price needed to cover 85 10th Avenue's costs and provide a modest return would have been approximately 25% lower under the Company's previous baseline building operations.

11.4. Thermal Customer Rates

The Customer, Fulton Houses, will be billed under a dual-rate structure, consisting of a per-MMBtu usage fee for thermal energy and a flat fixed contract demand charge. The draft per-

[37] As discussed in the Design section, the Con Edison will have control over when the UDS accepts thermal energy from the Thermal Energy Resource and when it does not. Con Edison will only purchase thermal energy when needed to meet anticipated or actual Thermal Customer demand.
[38] This excludes rental revenue that Con Edison would negotiate with 85 10th Avenue for space to house UDS equipment.

MMBtu will be $26.63 for thermal heating and cooling, approximately a pass-through of the cost Con Edison will pay 85 10th Avenue to purchase the thermal energy plus fees.[39] The estimated The draft value of the fixed connection charge is set at $5,000 a year, a subsidized level that allows Fulton Houses to save money on the space and water heating that they currently do with District Steam.[40] Analysis confirmed that rates would be low enough for Fulton Houses to see estimated net operating cost savings by participating.

During cooling hours, Fulton Houses will only be charged for the net thermal heat it rejects into the system—that is, the difference between the heat it withdraws for domestic hot water and the heat it rejects from its cooling system. This incents Fulton Houses to operate its buildings such that their heating and cooling loads partially offset one another, thereby reducing the net heat rejections into the UDS that the Company will need to pay 85 10th Avenue to dissipate. While a scaled network with multiple participants might require a more complex structure the Company has adopted a simplified model for this single-customer Pilot to streamline administration and enhance clarity for Participants.

The Company estimates that these rates in Year 1 of the pilot will provide the following net bill savings to Fulton Houses:

Table 14: Estimated Thermal Customer Savings under Draft Thermal Rate Levels, $000s:

Category	Value
Steam Savings	$375
Thermal Usage Cost	($146)
Thermal Connection Cost	($5)
Incremental Electricity Costs	($193)
Incremental O&M Costs	($30)
Net Annual Savings	**$1**

[39] Engineering analysis showed that the net thermal energy losses for the Project would be minimal. Heat losses would be low; and they would be beneficial during the cooling hours when the system needs to dissipate heat.

[40] NYC Local Law 97 fines did not figure into this analysis because NYCHA is not subject to them.

11.5. Unsubsidized Rate & Pricing Analysis

A detailed Rate and Pricing Analysis compared these pilot rates with what a fully cost-reflective rate structure of the Company's costs to build and operate the utility-owned infrastructure[41] would entail. This included comparing the subsidized pilot rate structure to the cost-based rate structure ($0.12 per MBH of heat exchanger capacity vs. $151.93 per MBH heat exchanger capacity).

For a future Pilot done after the current Pilot at full scale, this cost-based rate would be expected to be much lower because the Company would have the experience needed to optimize construction and operation costs, and the costs would be spread across a larger participating Customer base. The Company would also expect to charge Thermal Energy Resource Owner a connection charge based on their heat exchanger capacity.

Throughout the Pilot, the Company will continue to analyze the rate and pricing structures. The pilot rates will be evaluated against what a true cost-based rate would be ("shadow billing"), which will help the utility identify the pilot costs that will not be recovered by the pilot participants and must be covered by electric customers Comparing subsidized rates to cost-based rates will inform future rate design or thermal energy fees.

11.6. Request for Pilot Exemption from Mandatory Steam Service Class (SC) No. 4

Because the UTEN is a Pilot, with the uncertainty and smaller scale that accompanies pilots, the Thermal Customers will be maintaining their existing steam services. These will continue to serve the building systems not connected to the Pilot, be back-up heat in emergencies, and provide supplemental heating to the building systems connected to the Pilot during a few hours of the year. Under the Company's Steam Tariff, these customers would be required to move to Service Class No. 4 which is a contract demand charge-based rate. The Company is proposing to modify the Steam tariff to exempt the Pilot Thermal Customers from the mandatory SC Rate 4 requirement under its steam tariff during the Pilot period. This action is necessary for Pilot Thermal Customers to sign customer agreements because otherwise they would face the risk of a sharp increase in steam bills if the thermal network were ever to have an outage during the Pilot period. Upon the Commission's approval of this Pilot to move to Stage 4, the Company will file amendments to the steam tariff to implement such exemption.

[41] This section excludes Company-covered customer building upgrade costs because in the future the Customers and/or the NYS building electrification incentive programs would most likely pay for these costs, not the Thermal network.

11.7. Rate Design Learnings

Analysis and participant engagement in the Stage 2 pricing and rate design revealed a complex set of factors that TEN rates need to consider and manage.

1) Incremental Winter Operating Costs

In the New York climate, Thermal Energy Resource Owners incur meaningful incremental winter operating costs to capture and inject waste heat. These include both added personnel to change the operation of their building, and increased electricity consumption on days during which the building's HVAC system would normally be utilizing free cooling (See the Energy Modeling discussion above.) Thermal rates must compensate them for this cost.

2) Recovering Utility Network Costs

Recovering utility network costs with a capacity-based connection charge and "passing through" thermal energy costs from the Thermal Energy Resource Owner to the Thermal Customer appears likely to maximize network utilization. By not marking up the cost of the thermal energy they purchase, utilities minimize their customers' variable costs. This helps maintain the competitiveness of thermal network –distributed energy versus alternative heating sources (e.g., District Steam) for more hours throughout the year.

3) Facilitating Efficient Building Operation

Thermal prices and rates should facilitate Customers, not just Thermal Energy Resource Owners, to operate their buildings in a manner that benefits the network.

- Building campuses will often have simultaneous heating and cooling loads, and the UTEN can efficiently facilitate the use of one to help balance out the other, yielding maximum heat pump efficiency. For instance, the Company estimates that in the summer when the Network is cooling-dominated that Fulton Houses will effectively utilize 99% of the waste heat from its cooling system by reusing it for domestic hot water heating
- A rate structure should not inhibit this. For instance, during the hours the network is cooling dominated (i.e., Con Edison is paying the Thermal Resource to dissipate heat) Fulton Houses can help reduce system costs by using the excess heat for its water heating. Charging Fulton Houses a thermal rate to provide this service would be counterproductive, potentially incenting them to heat their hot water with District Steam instead.

4) Simple Pricing Structure to Facilitate Participation

Simple pricing appears preferable at a Pilot stage. Set supplier energy injection and rejection prices (rather than prices that vary by month, day, or hour) are easier for pilot participants to financially model and plan their operations around. If the Pilot is built, it will be important to analyze whether a more complex thermal pricing structure might incentivize more efficient behavior or be preferable for network participants in a post-pilot period. Such structures could include:

- Varying the price and rate of thermal energy based in part on the price of electricity faced by the Thermal Energy Resource Owner.
- A monthly capacity payment to Thermal Energy Resource Owners willing to commit to providing thermal energy capacity when needed. This payment could help the Thermal Energy Resource Owner manage its anticipated provider's NYISO capacity and T&D demand costs.

12. CUSTOMER PROTECTION PLAN

12.1. Overview

Establishing legally binding Customer Agreements between the Company and Thermal Energy Resource Owner and Commercial Customers is a complex process. Both the Thermal Energy Resource Owner and Customer requested the Pilot finance their legal counsel/s review and negotiation of the Customer Agreements considering the possibility that the Pilot may not receive approval to move to Stage 3. To avoid the need for the Thermal Energy Resource Owner and Commercial Customer to incur legal costs at this stage, the Company has instead developed draft term sheets that outline the key principles it will seek to negotiate with Participants for the future Agreements. If the Pilot is approved, Participants will engage in finalizing these terms (including final thermal rates and pricing as described above). The Company and Participants will then move to the drafting of comprehensive, legally binding Thermal Energy Resource Owner and Customer Agreements that will govern operations throughout the pilot period.

12.2. Thermal Energy Resource Owner Term Sheet

This document outlines the key terms and conditions the Company has proposed to 85 10th Avenue Associates, L.L.C. for the purchase of thermal energy. .

- **Parties Involved:** Con Edison acts as the purchaser of thermal energy.
- **Agreement Duration:** The Pilot Period for the thermal energy exchange is set for five years, with provisions for an Interim Period and a Post-Pilot Period depending on Public Service Commission (PSC) orders.
- **Thermal Energy Exchange:** The Thermal Energy Resource agrees to sell thermal energy to Con Edison, which will be transferred to the Chelsea-UTEN Utility Distribution System as needed.
- **Pricing Structure:** Con Edison will pay a negotiated price for thermal energy that aims to cover the Thermal Energy Resource Owner's production costs while meeting Pilot needs.
- **Measurement and Quality Control:** A metering system will be installed by Con Edison to accurately measure thermal energy quantity and ensure compliance with quality standards, including temperature and pressure ranges.
- **Maintenance Responsibilities:** Con Edison is responsible for the maintenance, repairs, and upgrades of its owned equipment.
- **Safety Protocols:** Both parties must implement safety protocols to ensure the safe transfer and use of thermal energy.

12.3. Commercial Customer Agreement Term Sheet

This term sheet outlines the key terms and provisions the Company has proposed to NYCHA, Related & Essences as the Customer related to the sale of thermal energy for the Chelsea Pilot. It details the responsibilities of both Con Edison as the seller and NYCHA, Related & Essence as the Customer, including eligibility for service, standards of service, and pricing terms.

- **Eligibility for Service:** Con Edison reserves the right to inspect the Customer's premises before service connection, ensuring compliance and safety. The Customer must allow reasonable access for inspections.
- **Standard of Service**: Con Edison will provide heating, cooling and domestic hot water service through the Utility Thermal Energy Network (UTEN) and will own and maintain the equipment on its side of the demarcation point. The Customer is responsible for equipment beyond this point.
- **Change of Service**: The agreement binds successor owners in case of any sale or lease of the site, and the Customer must notify Con Edison of any changes impacting thermal energy requirements.
- **Pricing and Payment Terms:** Thermal energy will be sold at agreed-upon rates, with monthly billing based on meter readings. Bills are due within 30 days of receipt.
- **Pilot Participation:** The Customer agrees to participate in the Pilot for a minimum of five years, providing access for installation and maintenance.
- **Customer Responsibilities:** The Customer must use the UTEN system as the primary source of domestic hot water source for Buildings 1-3 and primary heating and cooling source for Building 1 and report any issues promptly.
- **Early Exit:** If the Customer exits the Pilot early without cause, they will incur fees to cover an agreed upon portion of Con Edison's investment the cost of removing equipment and restoring the Customer to their previous configuration. If the pilot ends early either by the Public Service Commission, the entity providing the thermal energy, Con Edison, or any reason other than as a result of a material breach, the Company will cover the cost of removing (or abandoning in place) equipment and restoring the customer to their previous configuration. This covering of costs will be up to a level that will provide the Customer assurance that these costs would be covered and will be determined in the finalizing of the Customer Agreements.

In order to help ensure that the Pilot operates as planned to generate the necessary learnings, 85 10th Avenue will need to commit to providing each month a to be negotiated minimum amount of thermal energy. If it falls below this minimum, its thermal revenues will be reduced based on the shortfall and a to be negotiated $/MMBtu price. Con Ed will commit to purchasing a to be negotiated minimum amount of thermal energy each month, and if Con Ed falls short, it will compensate 85 10th Avenue at a to be negotiated price.

The Company will enter into a similar agreement with Fulton Houses. Each month, if the Company does not have available a minimum amount of thermal energy to Fulton Houses, it will compensate Fulton Houses at a set price up to a set cap. If Fulton Houses does not purchase a minimum amount of thermal energy, they will pay compensation to the Company for this shortfall up to a set cap. These values will also be finalized in Stage 3A.

The intent of this structure is for Con Edison to be able to use any reductions in 85 10th Avenue revenue to compensate Fulton Houses if not enough thermal energy is being provided to the network; and conversely, to use any fees assessed to Fulton Houses to compensate 85 10th Avenue if not enough thermal energy is being used. As part of the Pilot, the Company will be responsible for providing compensation (up to the cap) if thermal energy purchases and sales fall short of the agreed monthly levels because of problems with the network.

12.4. Post Pilot

By the fourth year of the pilot term, all parties involved in the Chelsea Pilot will evaluate whether to continue operations beyond the designated pilot period. If any party chooses not to proceed post-pilot, Con Edison will be responsible for covering the costs associated with either removing or abandoning equipment in place, as well as restoring and reinstalling all Customer equipment back to the original configuration prior to the commencement of the Pilot. This covering of costs will be up to a level that will provide the Customer assurance that these costs would be covered and will be determined in the finalizing of the Customer Agreements.

Importantly, Con Edison may not terminate service from the UTEN until it has worked with the Customer to restore its equipment. Conversely, if all parties agree to continue, they may renegotiate the terms of any existing agreement, and Con Edison will submit the updated terms to the Public Service Commission (PSC) for approval. Until the PSC issues an order approving the continuation and updated terms, both parties will operate under the current agreement, excluding any provisions related to early pilot exit or closure.

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12.5. Customer Protection Plan Learnings

Customer Protections for the Chelsea UTEN Pilot yielded several key insights.

1) Willingness for Customers to Invest in Negotiating Agreements (Soft Costs)

Both the Customer and Thermal Energy Resource Owner have exhibited hesitance in investing in soft costs such as legal reviews, administrative fees, etc. prior to having certainty that the Pilot has the regulatory approval needed to move forward. Without the guarantee of moving forward or seeing positive economic benefits, stakeholders may perceive upfront expenses as risky.

2) Benefits and Challenges of the 5 Year Pilot Term

Limiting Customer Agreements to the duration of the 5-year Pilot period is necessary to protect ratepayers because of the newness of these Pilots. A 5-year period provides all Parties and the PSC the opportunity to reevaluate the agreement terms based on the pilot learnings. However, the pilot length also brings challenges. First, it has the downside of limiting the Participant's evaluation of the business case of a system design to run for decades to just 5 years. Second, the uncertainty of what happens with the Pilot after the fifth year led Participants to require financial protections to be willing to participate. They need assurance that their costs to leave the Pilot will be covered if they find post-pilot prices and rates uneconomic.

13. RISKS AND MITIGATION STRATEGIES

Identifying and proactively addressing potential risks is critical to the success of the Chelsea UTEN Pilot. The following table outlines key barriers, their associated risks, and the mitigation strategies Con Edison will throughout the life of the Pilot.

Table 15: Chelsea UTEN Risk Matrix

Barrier	Mitigation Strategy	Relevant Stage(s)
Pilot Length Guaranteed to Participants for Only 5 years Participants making extensive modifications to their buildings that would be expensive to remove, but only have assurance of thermal pricing / rates during 5 years of Pilot Operation	- Provide protection in Agreements that allow each Participant option to leave at end of 5 years of Pilot Operation, with Pilot paying for their building conversion costs (up to an agreed-upon amount)	• Stage 3A – Customer Enrollment
Execution of Final Agreements with 85 Tenth Avenue Associates LLC The Pilot could be jeopardized post-PSC approval if final agreements for thermal energy exchange and space use are not executed. As of this filing, 85 Tenth Avenue has not provided feedback on the draft term sheet shared by the Company.	- Ongoing collaborative discussions on energy modeling, financial terms, and lease agreements. - Finalization and PSC submittal of agreements to occur in Stage 3A.	Stage 3A Customer Enrollment
Construction Delays Complex construction scope includes UDS installation, building retrofits, and commissioning. Delays could impact timeline and budget.	- Proactive construction schedule management. - Early permit acquisition. - Lessons from Stage 2 test pits used to avoid utility conflicts.	Stage 3B Construction

	- EH&S mitigation plans for NYCHA buildings.	
Supply Chain Disruptions Delays in procuring UDS piping and FCU equipment could stall construction.	- Include availability requirements in RFPs. - Source from multiple vendors. - Advance procurement of long-lead items.	Stage 3B Construction
Novel or Unexpected Costs Costs not encountered in typical capital projects arise, leading to Pilot costs exceeding cost estimates	-Cost governance and oversight framework (discussed in Cost Recovery & Accounting)	Stage 3B Construction
Loss of Thermal Energy Resource Owner If 85 Tenth Avenue exits the Pilot, there is no permanent backup.	- Thermal Energy Resource Owner Agreement includes financial responsibility for early exit. - Backup heating is available via Con Edison steam system. - Emergency cooling via portable chiller connection at Building 1.	Stage 3B Construction, Stage 4 O&M
Early Exit by NYCHA No alternate customer to absorb thermal energy if NYCHA withdraws.	- Customer agreement includes financial penalties and restoration obligations for early exit. - Con Edison retains right to remove or abandon equipment in place.	Stage 3B Construction, Stage 4 O&M
Fulton Houses Rebuild Timeline Uncertainty Redevelopment could begin before pilot ends, stranding UTEN infrastructure.	- Engage PACT partners in 2026 to align demolition with pilot timeline. - Design includes taps for future connection to new buildings. - If rebuild timing is incompatible, Con Edison may propose a new UTEN design for the future campus.	Stage 3A Customer Enrollment, Stage 3B Construction, Stage 4 O&M
Cancellation or Delay of Rebuild North of 17th Street Could affect pilot viability or	- If cancelled before construction: Con Edison will file to halt Pilot and recover costs. - If cancelled after construction:	Stage 3A Customer Enrollment, Stage 3B

extend UTEN service to existing buildings.	UTEN will continue serving existing buildings. - Contractual exit clauses in place.	Construction, Stage 4 O&M
Extreme Weather and Flooding 85 10th Avenue's cellar is 13 feet below FEMA Base Flood Elevation.	- Develop emergency flood response plan. - Identify equipment to shut down or remove. - Include procedures for drying and restarting UDS.	End of Stage 3B Construction, Stage 4 Pilot

14. PILOT EXECUTION

The following summarizes the Company's proposed workplan for the Chelsea Pilot, including key stages, activities, deliverables, and milestones:

14.1. Stage 3A: Commercial Customer Enrollment and Thermal Energy Resource Owner Agreement

Following approval of the Stage 2 filing, Con Edison will initiate Stage 3A activities to finalize all necessary agreements and prepare for construction. This phase is critical to securing the participation of both the Customer and Thermal Energy Resource Owner, and to laying the groundwork for successful Pilot execution in Stage 3B.

Key Objectives

- Finalize and execute the UTEN Commercial Customer Agreement with NYCHA and its PACT partners (Related and Essence)
- Finalize and execute the Thermal Energy Resource Owner Agreement and space use agreement with 85 Tenth Avenue Associates LLC
- Prepare for construction and operations by developing procurement documents, workforce plans, and community engagement strategies

Planned Activities

- *Agreement Execution:*
    - Finalize and execute the UTEN Commercial Customer Agreement with NYCHA, Related, and Essence
    - Finalize and execute the Thermal Energy Resource Owner Agreement and space lease with 85 Tenth Avenue Associates LLC for access to the Thermal Energy Resource and installation of UTEN equipment
- *Procurement Preparation:*
    - Develop and issue the Construction Request for Proposal (RFP)
        - UTEN infrastructure and customer-side equipment
        - Engineering support during construction
        - Commissioning and start-up vendors
        - System Operations including Control Center Support
        - SCADA and IT systems
        - Operations & Maintenance (O&M) system support
- *Project Management Planning:*

- Finalize the Stage 3B Pilot and Construction Management Plan, including timelines, milestones, and contractor oversight protocols
- Initiate SCADA system development and integration planning to ensure real-time monitoring and control of the UTEN

- *Labor and Workforce Development:*
  - Engage with internal stakeholders and external partners such as the NYC Building and Construction Trades Council (BTC) and UWUA Local 1-2 to finalize labor agreements
  - Launch internal workforce development activities, including training plans and skills assessments for UTEN-related roles.
- *Community Engagement:*
  - Conduct targeted outreach to NYCHA residents impacted by the Pilot, including informational sessions, apartment walkthroughs, and scheduling of retrofit assessments

Deliverable

- Submission of the Commercial Customer Enrollment Letter to the Public Service Commission, confirming execution of all required agreements and readiness to proceed to Stage 3B construction[42]

Milestone

- Approval of the Commercial Customer Enrollment Letter, authorizing the transition to Stage 3B construction and implementation[43]

14.2. Stage 3B: Pilot Construction and Commissioning

Upon approval of the Commercial Customer Enrollment Letter, Con Edison will initiate Stage 3B, which encompasses the full construction and commissioning of the Chelsea UTEN system. This phase includes the installation of all utility-owned and customer-side infrastructure, integration of thermal energy systems, and preparation for operational launch.

Key Objectives

- Execute all construction activities required to build and connect the Utility Thermal Energy Network (UTEN)

[42] See Appendix.
[43] See Appendix.

- Install and commission thermal energy infrastructure at 85 Tenth Avenue and the NYCHA Fulton Houses campus
- Finalize operational systems including SCADA, customer billing, and safety protocols

Planned Activities

Procurement and Pre-Construction

- UTEN infrastructure and customer-side equipment
- Engineering support during construction
- Commissioning and start-up vendors
- System Operations including Control Center Support
- SCADA and IT systems
- Operations & Maintenance (O&M) system support

Construction and Installation

- Thermal Energy Resource at 85 10th Avenue
  - Install equipment pads, heat exchangers, UDS pumps, and electrical service
  - Complete internal piping, chiller re-piping, and point-of-entry work
- Utility Distribution System
  - Excavate and install 2 x 10” UDS pipes along W 16th Street (approx. 1,250 ft)
  - Install valve boxes and 6” service lines to NYCHA at 401 W 16th Street.
  - Perform pressure testing, backfilling, and street restoration
- NYCHA Campus Work
  - Install point-of-entry piping and campus-wide conduit and piping
  - Construct and install Energy Center (EC) equipment at 401 W 16th Street.
  - Modify Con Edison steam service for backup heating
- Customer-Side Equipment
  - Install HVAC and DHW heat exchangers at 401 W 16th Street.
  - Install water-source heat pumps and DHW heat pumps at 401 W 16th Street, 410 W 17th Street, and 420 W 17th Street.
  - Install internal and external HVAC piping, including 192 FCUs at 401 W 16th Street apartments.
- SCADA and Controls
  - Finalize design and install SCADA communication systems
  - Integrate sensors, meters, and control panels for remote monitoring

Commissioning

- Commission the TER, EC, and UDS systems

- Fill and test the UDS, FCU, and DHW systems
- Prepare for operational handoff and performance monitoring

Workforce and Community Engagement

- Continue coordination with labor partners and monitor adherence to the Pilot Labor Agreement
- Maintain workforce development activities and training
- Implement customer billing, care, and safety/reliability programs

Table 16 below delineates a hypothetical construction timeline for illustrative purposes only. The timeline is based on the assumption that Week 1 begins on the date the Customer Enrollment letter is approved.

Table 16: Hypothetical Construction Timeline

New Task	Key Aspects	Start Week	End Week	Duration of Task
Acquire Permits	Acquire DOB, DOT, and DEP permits, and establish access agreements with 85 10th Avenue and NYCHA to perform construction activities on site	1	23	23 weeks
Procurement	Award contracts, obtain contractor submittals, and mobilize contractors	1	23	23 weeks
Thermal Energy Resource Construction	Install new equipment, electrical service, UDS pumps, piping, and valves at 85 10th Avenue to provide waste heat to the UTEN	18	75	57 weeks
FCU Installation	Build external risers, install 192 FCUs, and obtain a new electrical service for customer equipment in 401 W 16th Street	18	89	71 weeks
Energy Center Equipment Construction	Install all new Energy Center equipment and piping and obtain two new electrical services in 401 W 16th Street	24	77	53 weeks
Civil Right of Way Preparation	Create and execute Maintenance and Protection of Traffic (MPT) plans, finalize excavation design, and perform utility mark-outs	28	37	9 weeks
NYCHA Property Work	Install piping and conduit between 401 W 16th Street, 410 W 17th Street, and 420 W	28	49	21 weeks

	17th Street to supply heated water from 401 W 16th Street to the other two buildings as an input to the buildings' DHW heat pumps			
DHW Installation	Install DHW heat pumps and DHW storage tanks in all three Fulton Houses buildings	28	76	48 weeks
Utility Distribution System Construction	Install UDS pipe, perform pressure testing, and restore construction sites	38	85	47 weeks
Startup and Commissioning	Fill the UDS with water, conduct site acceptance testing for all equipment, and commission the UTEN system	82	92	10 weeks

Deliverables

- Complete construction of UTEN system and customer side equipment and commission the UTEN system.

Milestones

- Begin construction procurement immediately following PSC approval of the Customer Enrollment Letter.
- Complete all construction and commissioning activities within 12 to 18 months of procurement launch.

14.3. Stage 4: Pilot Operation and Management

Following the successful construction and commissioning of the Chelsea UTEN system in Stage 3B, Stage 4 marks the beginning of full pilot operations. This phase includes the conversion and activation of thermal energy services to NYCHA buildings, ongoing system monitoring, customer engagement, and performance evaluation. It is designed to validate the UTEN's technical, economic, and social benefits over a five-year period.

Key Objectives

- Complete the conversion of NYCHA buildings to UTEN service
- Monitor and optimize system performance using real-time data and standardized metrics
- Implement customer-facing programs including billing, care, and safety
- Maintain strong labor, workforce, and community engagement throughout the pilot

Planned Activities

Customer Conversion and System Activation

- Convert 36 apartments in NYCHA building at 401 W 16th Street to UTEN HVAC using fan coil units (FCUs)
- Activate domestic hot water (DHW) systems at 401 W 16th Street, 410 W 17th Street, and 420 W 17th Street using CO_2 heat pumps
- Ensure all conversions are completed in accordance with the Basis of Design and with minimal disruption to residents

Operations and Maintenance

- Implement the Stage 4 O&M Oversight Plan for both utility-owned and customer-owned equipment
- Monitor system performance through SCADA integration, including flow, temperature, and pressure data
- Conduct preventive maintenance and respond to operational issues as needed

Data Collection and Optimization

- Begin collecting operational data and reporting standardized metrics as required by the Public Service Commission (PSC)
- Use data to optimize system performance, energy efficiency, and thermal balancing across the network

Customer and Community Engagement

- Provide ongoing communication to NYCHA about system benefits, energy usage, and support resources
- Continue outreach and education efforts, including infographics, hotline support, and community meetings

Thermal Energy Exchange and Financial Operations

- Implement the payment structure for thermal energy exchange with 85 Tenth Avenue Associates LLC, based on the executed Thermal Energy Resource Owner Agreement
- Track and reconcile thermal energy flows and associated costs

Workforce Development and Labor Coordination

- Monitor workforce development outcomes and ensure ongoing training and support for UTEN-related roles

Deliverables

- Full conversion of NYCHA Buildings at 401 W 16th Street, 410 W 17th Street, and 420 W 17th Street to UTEN HVAC and DHW service
- Regular reporting of operational metrics to the PSC

- Implementation of customer-facing programs and workforce development tracking

Milestones

- First NYCHA building successfully converted and operational on UTEN
- Completion of the 5-year pilot period with comprehensive data and performance evaluation

14.4. Stage 5: Pilot Review, Recommendations, and Conclusion

Stage 5 represents the final phase of the Chelsea UTEN Pilot and focuses on evaluating the Pilot's performance, documenting key findings, and providing recommendations for future UTEN development. This stage is essential for informing the PSC, stakeholders, and the broader utility community about the viability, scalability, and regulatory needs of UTENs. In accordance with the PSC's September 2023 Guidance Order (Case 22-M-0429), this stage will culminate in two major deliverables: a comprehensive Pilot Review and Recommendations Report and a Pilot Close-Out Report.

Key Objectives

- Conduct a full evaluation of the Chelsea UTEN Pilot's technical, financial, customer, and workforce outcomes.
- Document lessons learned across all five stages of the pilot, including system design, construction, operations, and customer engagement.
- Provide actionable recommendations for future UTEN pilots, full-scale deployments, and regulatory frameworks.
- Ensure transparency and accountability through public reporting and stakeholder engagement.

Planned Activities

Evaluation and Verification

- Analyze operational data collected throughout Stage 4, including SCADA metrics, customer feedback, and system performance.
- Perform Evaluation, Measurement, and Verification (EM&V) to assess energy savings, emissions reductions, and peak load impacts.
- Compare UTEN performance against baseline conditions and alternative electrification pathways such as air-source heat pumps (ASHPs) and variable refrigerant flow (VRF) systems.

Documentation and Reporting

- Compile key findings related to:

- Thermal energy balancing and optimization.
- Safety, reliability, and resiliency.
- Customer satisfaction and comfort.
- Workforce development and labor outcomes.
- Cost-effectiveness and lifecycle economics.

- Summarize the effectiveness of customer protection measures and billing programs.
- Assess the impact of the UTEN on disadvantaged communities, consistent with the Climate Leadership and CLCPA and PSC directives.

Recommendations to the Commission

- Propose next steps for:
  - Scaling UTENs in dense urban environments.
  - Integrating UTENs into new construction and redevelopment projects, such as the NYCHA rebuild.
  - Enhancing regulatory frameworks for rate design, cost recovery, and performance metrics.
  - Expanding workforce training and MWBE participation.

Close-Out Planning

- Develop a Pilot Close-Out Report detailing:
  - Final system status and customer transition plans.
  - Any decommissioning or equipment repurposing strategies.
  - Recommendations for continued service or integration into future UTENs.

Deliverables

- Pilot Review and Recommendations Report: A comprehensive summary of pilot outcomes, learnings, and policy recommendations
- Pilot Close-Out Report: A formal record of Pilot completion, including final system disposition and customer transition plans

Milestones

- Submission of the Pilot Review and Recommendations Report to the PSC
- Submission of the Pilot Close-Out Report to the PSC

14.5. Pilot Timeline

The figure below details the hypothetical Chelsea Pilot timeline broken out by stage.

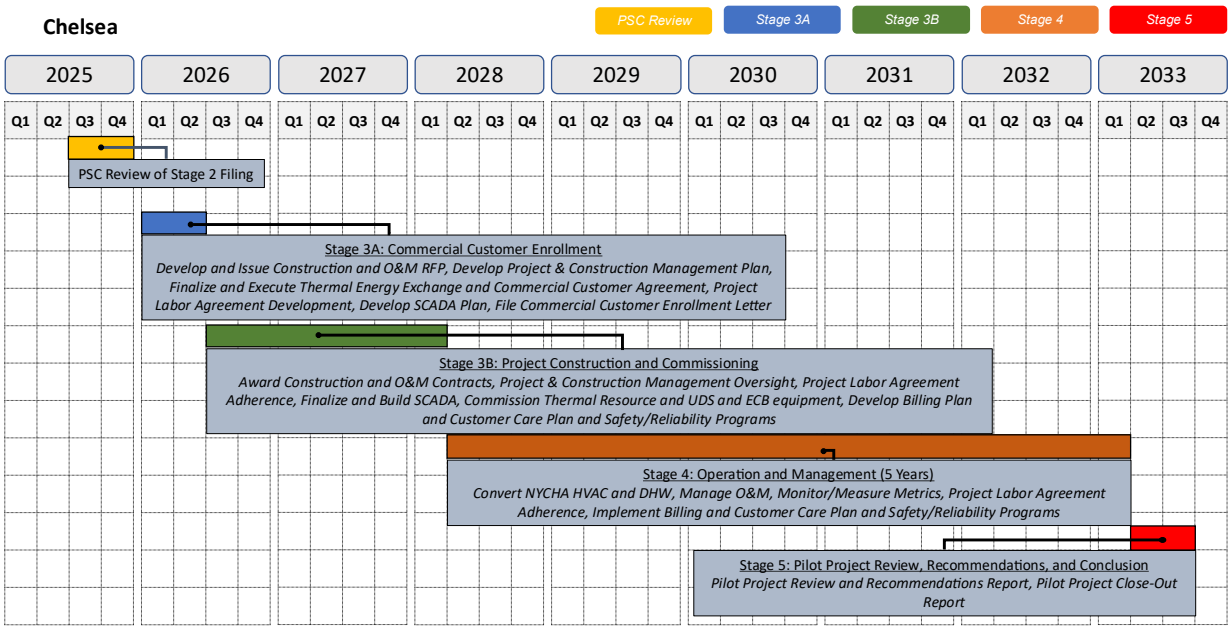

Figure 29: Pilot Timeline in Stages

15. METRICS

The September Guidance Order emphasized the importance of establishing clear and uniform metrics to ensure that pilots yield meaningful insights. Applying a minimum set of standardized metrics across all pilot initiatives is expected to support the identification of best practices and inform future recommendations for system requirements. These standardized metrics will provide essential data to assist the Commission in developing rules that promote the adoption of thermal energy networks and ensure that ratepayer investments in these pilots generate maximum learning value.

The Order requires that metrics for these pilots be categorized into four areas: (1) technical, (2) financial, (3) customer/societal, and (4) safety/reliability. In response, the Joint Utilities and Department of Public Service (DPS) Staff engaged in a series of technical conferences to collaboratively assess which metrics would be most effective in capturing insights from the pilots.[44]

The design team provided a matrix as a final deliverable listing the specific sensors implemented in the Pilot design or other strategies to satisfy all technical metrics. This can be found in the Appendix of the filing.

15.1. Metrics Learnings

1) Clarified Metric Ownership and Scope

The team learned the importance of clearly distinguishing between utility-side and customer-side responsibilities for each metric. Early ambiguity led to confusion about data ownership and reporting obligations.

2) Integrated Metrics into Early Design

It became evident that metrics requirements needed to be embedded into the design from the outset. Several PSC metrics required specific sensors, meters, and data points that were not initially accounted for, prompting late-stage design adjustments.

3) Technical Metrics Matrix Development

The team learned that compiling a detailed matrix assigning specific sensor names and the specific drawing the sensor is present into each technical metric ensures a strategy to capture each metric during pilot operation is accounted for. If the team did not compile a matrix, some meters would have been missing from the final design drawings.

[44] *UTEN Proceeding,* Order Providing Guidance on Development of Utility Thermal Energy Network Pilot Projects (issued September 14, 2023) p. 47.

4) Strengthened Stakeholder Coordination

The Pilot underscored the need for early and clear communication with third-party stakeholders, such as 85 10th Avenue's Building Management System (BMS) team. Several metrics depended on or required collaborative data from systems outside Con Edison's direct control.

5) Anticipated Data Processing Requirements

The team learned that some metrics, such as heat pump startups and thermal energy delivery hours, required post-processing of SCADA trend logs. This insight emphasized the need to plan for data analytics capabilities during system design.

16. CONCLUSION

UTENs offer a transformative opportunity for New York State to reduce its reliance on fossil fuels, advance the goals of the CLCPA, and support the creation of clean energy jobs. The Chelsea Pilot exemplifies this potential by demonstrating how waste heat can be repurposed to provide efficient, low-carbon heating, cooling, and domestic hot water to New Yorkers. The Chelsea Pilot is firmly in the public interest. It will provide the Company with critical, first-of-its-kind experience in the design, construction, and operation of a UTEN in a dense, urban environment. The Pilot will also generate valuable insights into rate design, customer protections, stakeholder engagement, and regulatory considerations. These learnings will directly inform the Commission's development of a workable regulatory framework for UTENs and help shape the future of thermal energy infrastructure in New York State.

17. APPENDIX

1. Fulton Houses Investigative Work Memo
2. Phase 1 Environmental Site Assessment
3. Modeling
4. Exploratory Test Pit Plan
5. Initial 85 10th Ave Electrical Service Review
6. Basis of Design
7. Building Specific Data and Calculations
8. Component Proposal Forms
9. Drawing Packages
10. Long Lead Time Register
11. Steam Service Load Letters
12. Construction Specifications
13. Construction Project Plan
14. Commissioning Procedures
15. Operating Procedures
16. Load Letters and Determinations for New Electrical Services
17. Note: This item is intentionally blank
18. Civil Damage Prevention
19. Construction Permit List
20. Stakeholder Engagement Plan
21. FCU vs VRF Study
22. Pre-Design Site Survey Plan
23. Decommissioning Procedures
24. Emergency Plan
25. Energy Model Outputs
26. One-sheet for Chelsea
27. UTEN Vehicle Magnet
28. Website
29. Customer Journey Mapping
30. Training and Qualification Program Outline
31. Full Financial Model/Subsidized Rate
32. Detailed Cost Estimate Breakdown
33. Note: This item is intentionally blank
34. UTEN Rate Design – Cost Based Rates
35. Term Sheets - Thermal Energy Resource
36. Term Sheets - Commercial Customer
37. Life Cycle Cost Analysis
38. PSC Metrics
39. UTEN Monthly Reports Combined
40. Response to PSC Compliance Letter
41. Letters of Support