

# GEATAIN ENGINEERING

## CASE STUDY-40 West 37<sup>th</sup> Street



### BACKGROUND

40 West 37th is located in the Garment District of Manhattan, home to the showrooms of major fashion labels and other commercial office businesses. 40 West 37th is a 13-story commercial building that boasts an elegant dark gray facade with typical Art Deco architecture. It has 62 office tenant spaces ranging in size from 300 to 1,800 square feet for a variety of startup and medium sized companies. The building contains a central core air vent, used for air circulation as the building's original purpose was manufacturing in the Roaring Twenties. The No. 2 fuel oil, one-pipe heating system featured a 100 HP boiler, which was nearly 40 years old. Window air conditioners caused excessive summer demand charges and high electric bills. Historical T12 bulbs provide lighting through manual wall switches. Almost all building equipment were aged and deteriorating significantly, requiring intensive investigation and assessment.

### HOW GEATAIN ENGINEERING HELPED

For the past five to six years, Geatain Engineering has met with the 40 West 37<sup>th</sup> manager to discuss market developments, new technology innovations and various energy savings concepts. Starting in 2017, Geatain Engineering started work on a detailed ASHRAE Level II standards to evaluate the whole building for energy improvements. Met with manager and operators to understand building history, challenges and long-term planning. Determined energy use intensities and benchmarked building using Portfolio Manager. Completed visual inspections over different seasons. Evaluated utility data to complete end-use breakdowns. Used BIN tables to evaluate benefits of different measures. Identified capital improvements, low-cost improvements and possible interactions. Determine measure capital costs, savings, payback, IRR, NPV and



### CHALLENGES

- Nearly 100 years old, 40 West 37<sup>th</sup> operated with many legacy systems, window air conditioners and a drafty envelope.

### SOLUTIONS

- Building wide electrification
- Split unit installation
- LED lighting
- Core air shaft ventilation
- Server room relocation
- Envelope tightening investigation

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related financial analysis. Recommended methods of measurement and verification. Met manager and operators to review recommendations.

Through the years, Geatain impartially kept the manager apprised of more cost-effective air conditioning alternatives, recognizing the waste from tenants' window air conditioning units and impending construction in the adjoining property lot. **The Manager eventually decided to replace the entire building heating and cooling system with split units in early 2018. In all, 24 condensers were located on the rooftop and one to four evaporators located in each tenant space.** By flexibly keeping the boiler available as a backup, the manager was able to confirm the adequacy of the split unit capacity for heating and cooling. **Afterwards, the fuel oil storage tank and boiler were disassembled then removed from service in late 2020, completing the electrification conversion.** The split units provide complete tenant control of space comfort, along with a central management system to track consumption. To complete the building-wide electrification, restrooms on each floor contain an AO Smith point of use electric DHW heater/tank.

As energy improvement discussions continued, lighting was given high priority. Through experience, Geatain always seeks to reduce the number of different types of bulbs to reduce spare bulb storage. Since late 2018, the building has only been lit with LED bulbs, saving \$10,200 annually. As an additional example of energy efficiency and cost savings, motion sensors were also installed in the common areas, hallways and restrooms to control lighting. Ongoing efforts include the analysis of various wall and ceiling occupancy sensors to decrease tenant lighting loads, based on experience gained from similar projects.

For a flexible ventilation alternative, the central core air vent was evaluated for possible energy savings, as it has traditionally ventilated the entire building. During the shoulder season, it was calculated that returning to historical ventilation design would save the building \$8,500 annually in avoided heating or cooling in moderate temperatures. The building server room was located on the second floor, with several exposed ceiling openings. By sealing these ceiling openings, conservative savings were calculated at \$400 per year and the manager eventually moved the server room to a more secure and sealed location.

Ongoing efforts involve the manager contemplating measuring all tenant energy loads to offer each tenant shared energy savings. For this endeavor, Geatain Engineering is impartially evaluating the reliability, proven performance and market acceptance of many lighting controls and plug control alternatives. The plug control measures will reduce electrical consumption approximately \$800 annually. Second, Geatain Engineering is interviewing different manufacturers and electricians to evaluate the most cost-effective means to align incoming phase voltages from the main building electric feeder. Third, Geatain Engineering is researching more than a handful of standards to determine the best means to increase the airtightness of 40 West 37<sup>th</sup> through traditional envelope sealing and ASTM standards.

### **BENEFITS**

Since 40 West 37<sup>th</sup> is already completely electrified, has removed its fuel oil burner and removed its fuel oil storage tank, the owner has successfully used energy efficiency to lower operating costs. Switching to all LED lighting furthers this successful focus on energy efficiency. The manager is continuing plans to build upon these successes. Future plans may include measuring tenant lighting and plug loads to quantify the precise amount of energy each tenant consumes each month. Further envelope investigations will drive further savings, helping to make 40 West 37<sup>th</sup> a candidate for NYSERDA case study consideration.