

City of Columbia, Missouri

Municipal Building Energy Performance Report



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Introduction & Roadmap

What is benchmarking?

Benchmarking is the process of tracking and analyzing energy consumption data and other relevant building information to assess energy performance over time. One important component of benchmarking is the utilization of building use types. Since the energy usage in a parking garage differs from that in a police station, the benchmarking process compares buildings based on their specific use. Grouping buildings into “use types” ensures a valid comparison.

Why does the City of Columbia benchmark?

Benchmarking helps track and analyze cost, energy consumption, and greenhouse gas emissions of municipal buildings, guiding future improvements. In 2023, energy consumption in the 65 active benchmarked buildings cost over \$2.2 million, and there is significant potential for reducing emissions and operational costs.

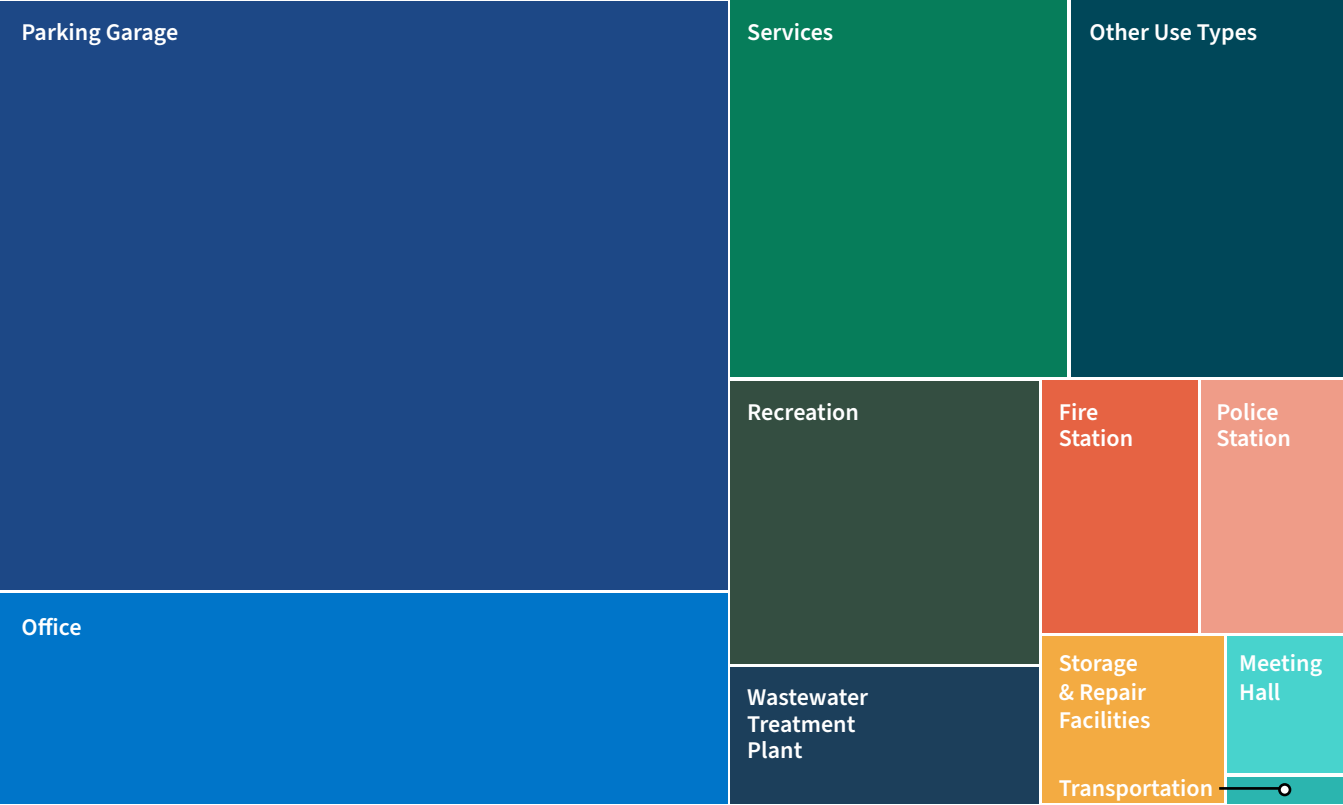
How is building energy performance evaluated?

Energy Use Intensity (EUI) is the key metric used to assess building energy efficiency. EUI compares energy consumption to building size and is measured as yearly energy consumed per square foot. This allows a meaningful comparison of energy usage across buildings of varying sizes with the same use type.

In this report, energy consumption data is adjusted by **normalizing** it with 30-year average weather values to minimize the impact of extreme weather. The goal is to evaluate and monitor building energy performance consistently over time.

To determine efficiency, the report compares each municipal building’s weather-normalized EUI to the **national median EUI** for similar buildings. This helps identify opportunities to reduce energy consumption.

Building Square Footage by Use Type



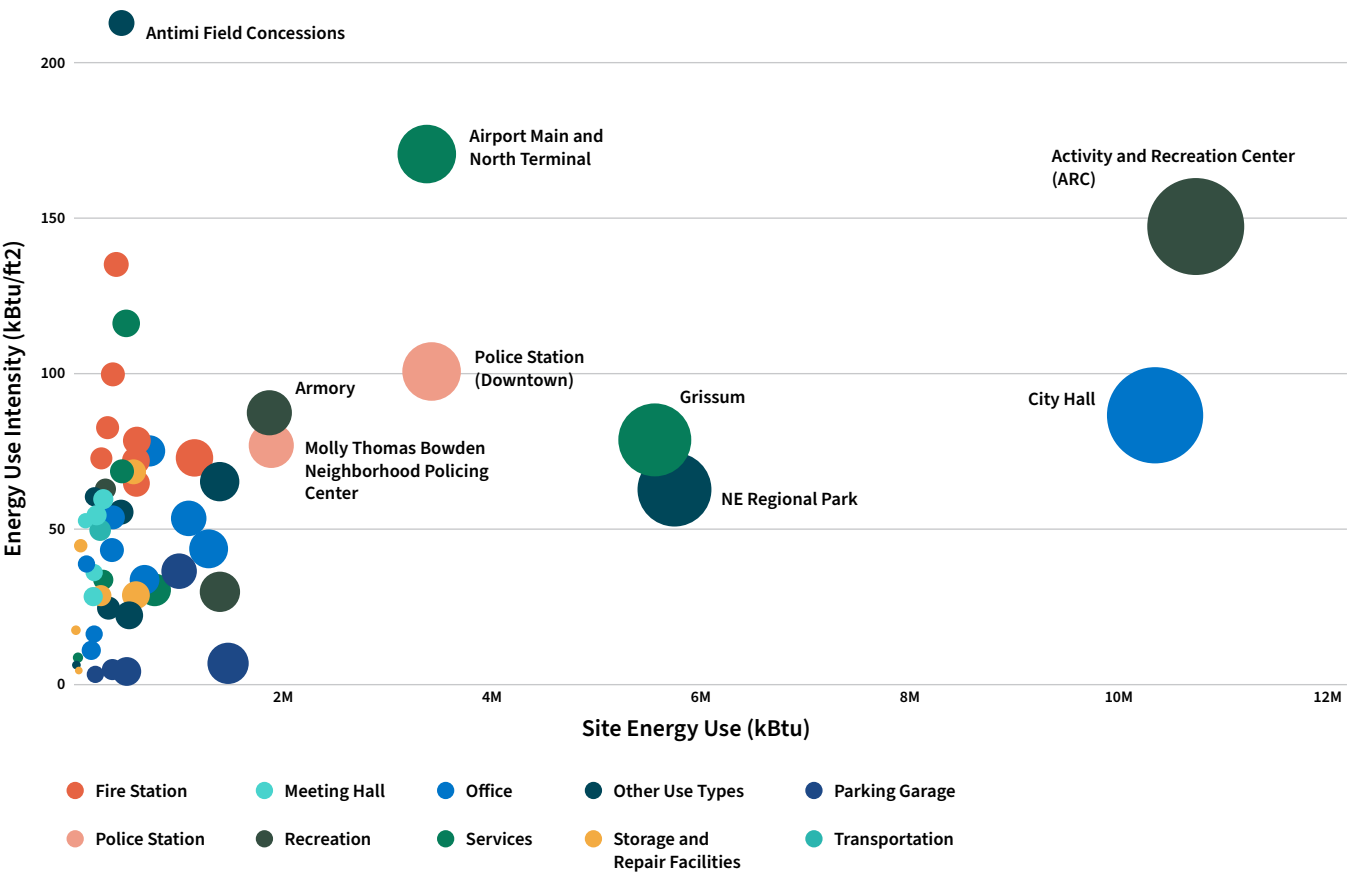
Introduction & Roadmap Continued

The Municipal Benchmarking Policy

The City of Columbia’s Building Energy and Transparency Policy, passed in 2021, requires tracking energy and water consumption in all municipal facilities. Currently, we have the most complete picture of our building portfolio to date, with the majority of City buildings benchmarked. There are approximately five remaining buildings that are still under consideration, as staff are determining how to categorize them related to benchmarking. Therefore, this report reflects the most comprehensive view of our municipal building portfolio so far.

Which Municipal Buildings Consume the Most Energy?

Buildings towards the top of the visualization below have a high energy use intensity, which means that they consume more energy per square foot than those towards the bottom. Buildings towards the right side of the chart are the largest overall energy consumers, and tend to be the largest buildings. The size of the bubble is determined by total 2023 energy consumption.



Portfolio Performance Summary

Portfolio Overview

As of 2023, 65 municipal buildings are now benchmarked, with 18 new buildings added since the last Municipal Benchmarking Report. This significant increase in overall portfolio square footage has led to a noticeable shift in the portfolio's Energy Use Intensity (EUI) compared to previous years. It is important to note that the continual addition and removal of buildings from the portfolio will impact portfolio-level data.

Year	Portfolio Square Footage	Energy Consumption (kBtu)	Energy Use Intensity (kBtu/sqft)	Greenhouse Gas Emissions (MTCO ₂ e)
2018	617.8k	48.51M	78.5	9,181
2019	617.8k	48.21M	78.0	9,177
2020	617.8k	45.27M	73.3	8,304
2021	617.8k	47.67M	77.2	8,875
2022	642.3k	49.61M	77.2	8,744
2023	957.4k	62.92M	65.7	9,944

Parking garages, the Wastewater Treatment Plant, and unoccupied buildings are not included in the EUI data, as they skew the performance results due to their different use types. Performance data on these properties can be found in Appendix A.

Ambitious GHG Reduction Goals

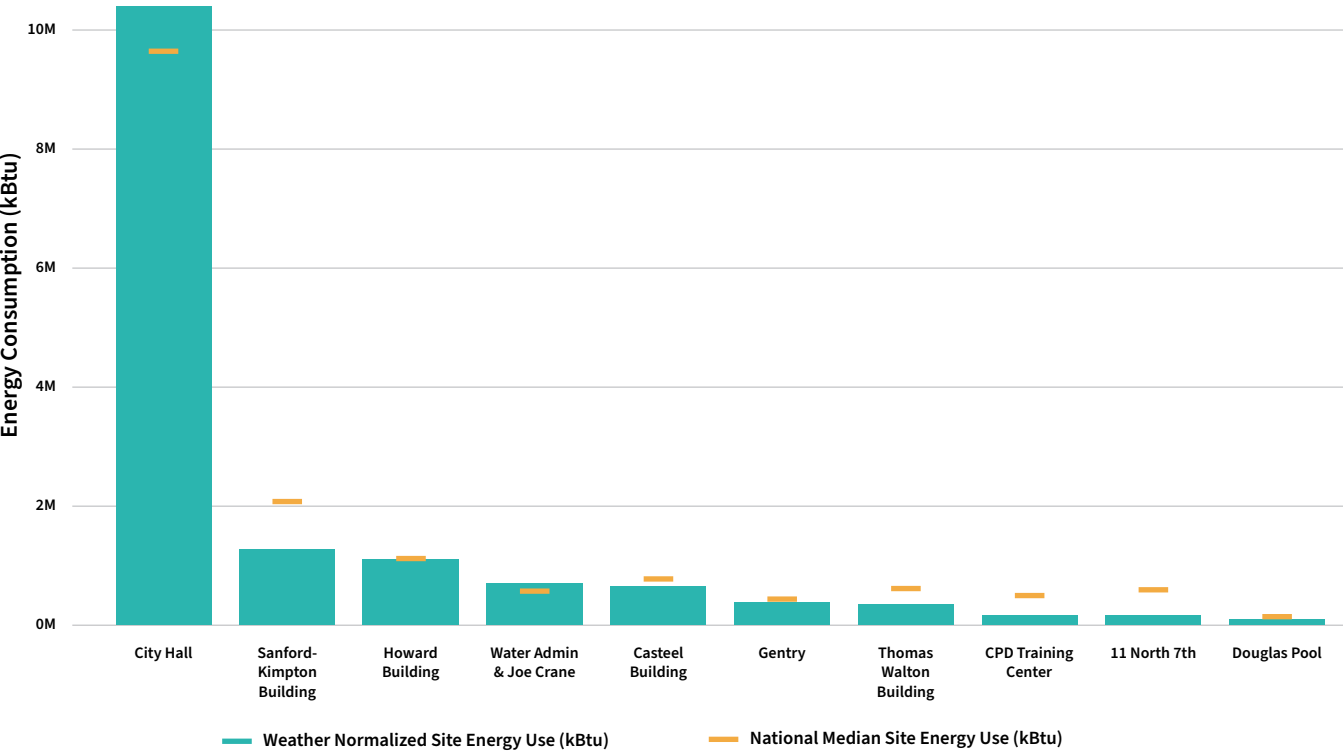
In 2023, building energy accounted for 62% of the City of Columbia's total greenhouse gas (GHG) emissions. As part of the Climate Action and Adaptation Plan, the City has committed to reducing municipal GHG emissions by 50% by 2035 and achieving net-zero emissions by 2050. Given that over half of operational emissions stem from building energy use, it is critical for the City to both improve energy efficiency and transition to low-carbon energy sources to meet these goals.

Portfolio Metrics by Use Type

Offices make up around a quarter of the square footage of benchmarked municipal buildings.

The majority of offices are performing better than their national median. City Hall however is a large building that presents an opportunity for reducing energy consumption and emissions.

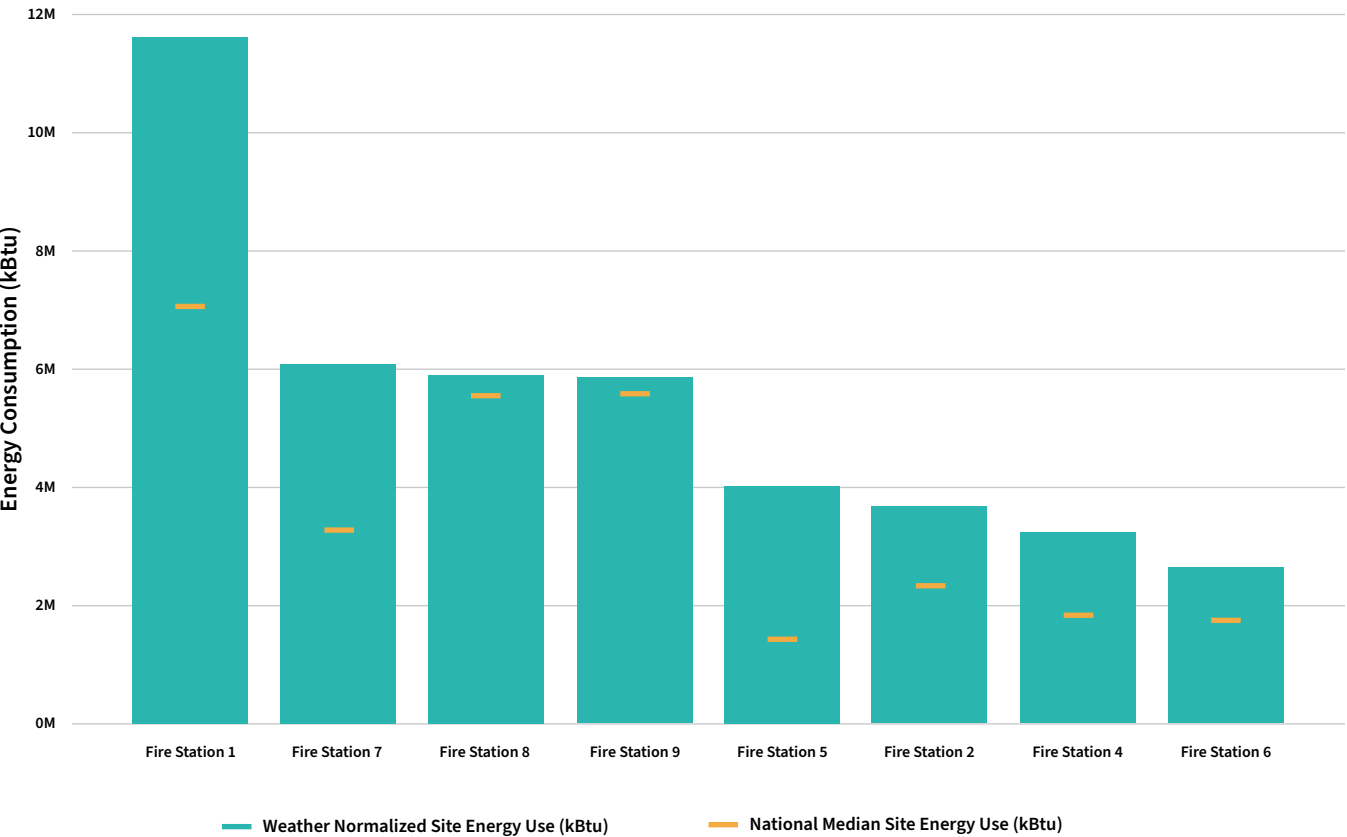
Offices



Portfolio Metrics by Use Type Continued

Fire stations offer substantial potential for energy performance improvements within the City of Columbia’s portfolio as all fire stations consume significantly more energy than their national median.

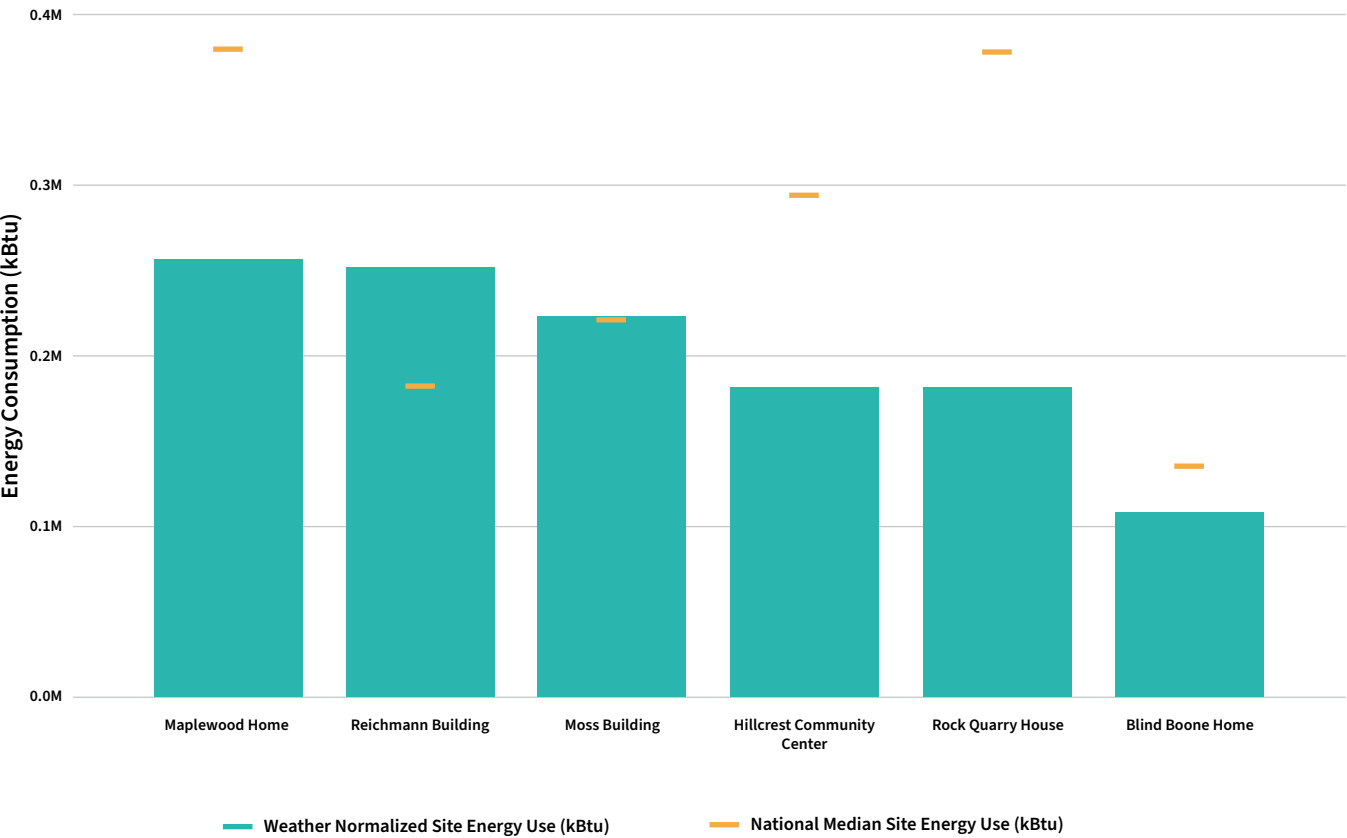
Fire Stations



Portfolio Metrics by Use Type Continued

The majority of the City of Columbia’s meeting halls use less energy than the national median.

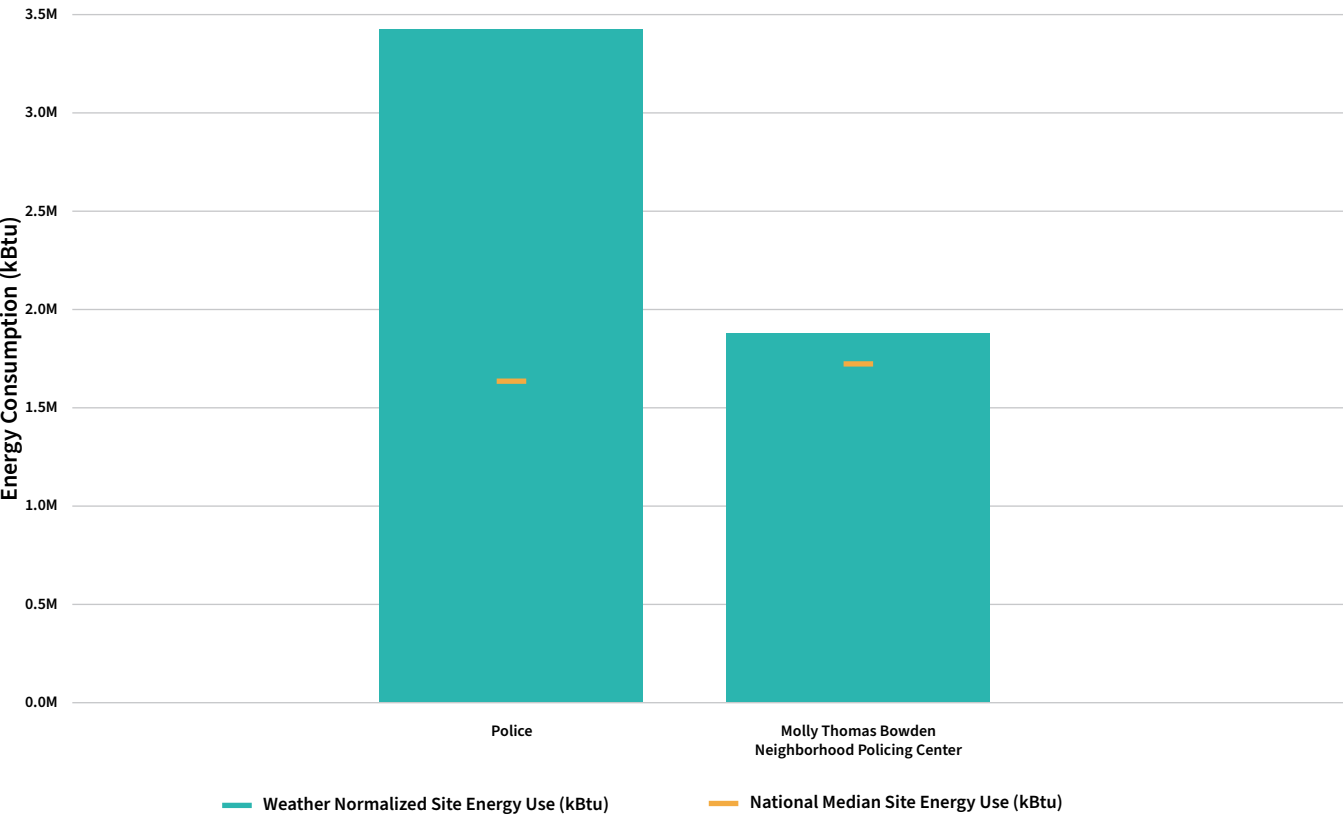
Meeting Halls



Portfolio Metrics by Use Type Continued

The City of Columbia’s police stations are large buildings with significant energy consumption. The downtown police station shows the most potential for energy reduction in comparison to its national median.

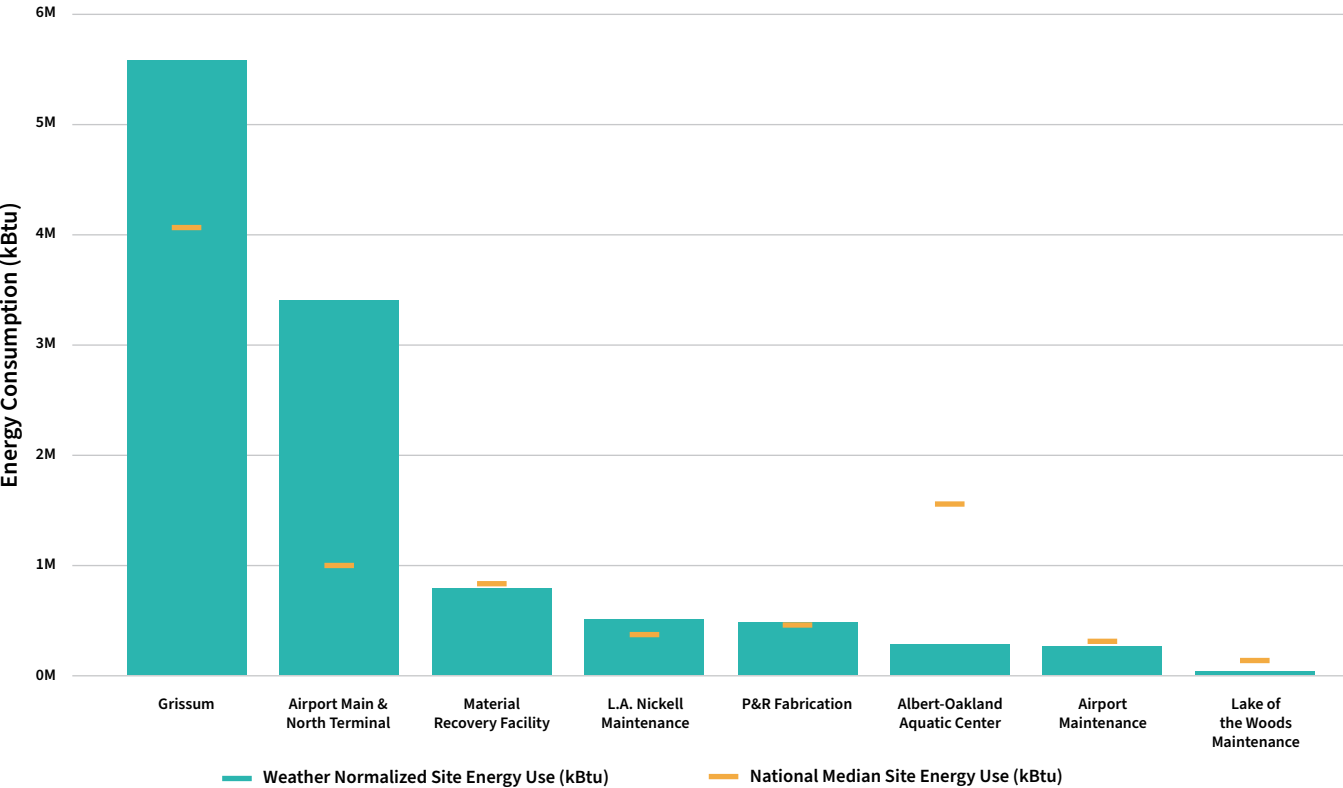
Police Stations



Portfolio Metrics by Use Type Continued

Of the seven benchmarked service facilities, the Grissum and the Airport Main and North Terminal show the most potential for improvement.

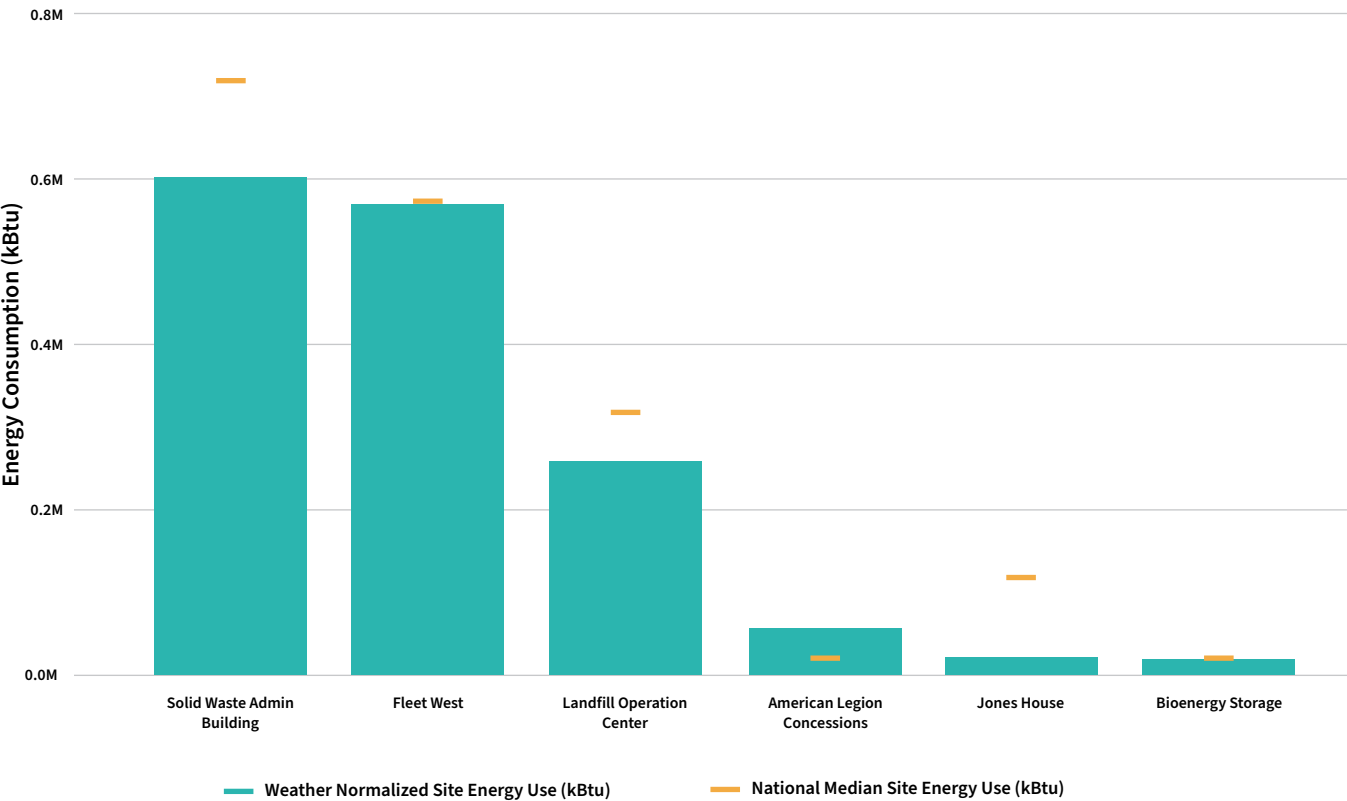
Services



Portfolio Metrics by Use Type Continued

The storage and repair facilities use group is small and efficient. The majority of the facilities in this category are performing better than or very similar to their national median. The only exception being the American Legion concessions building.

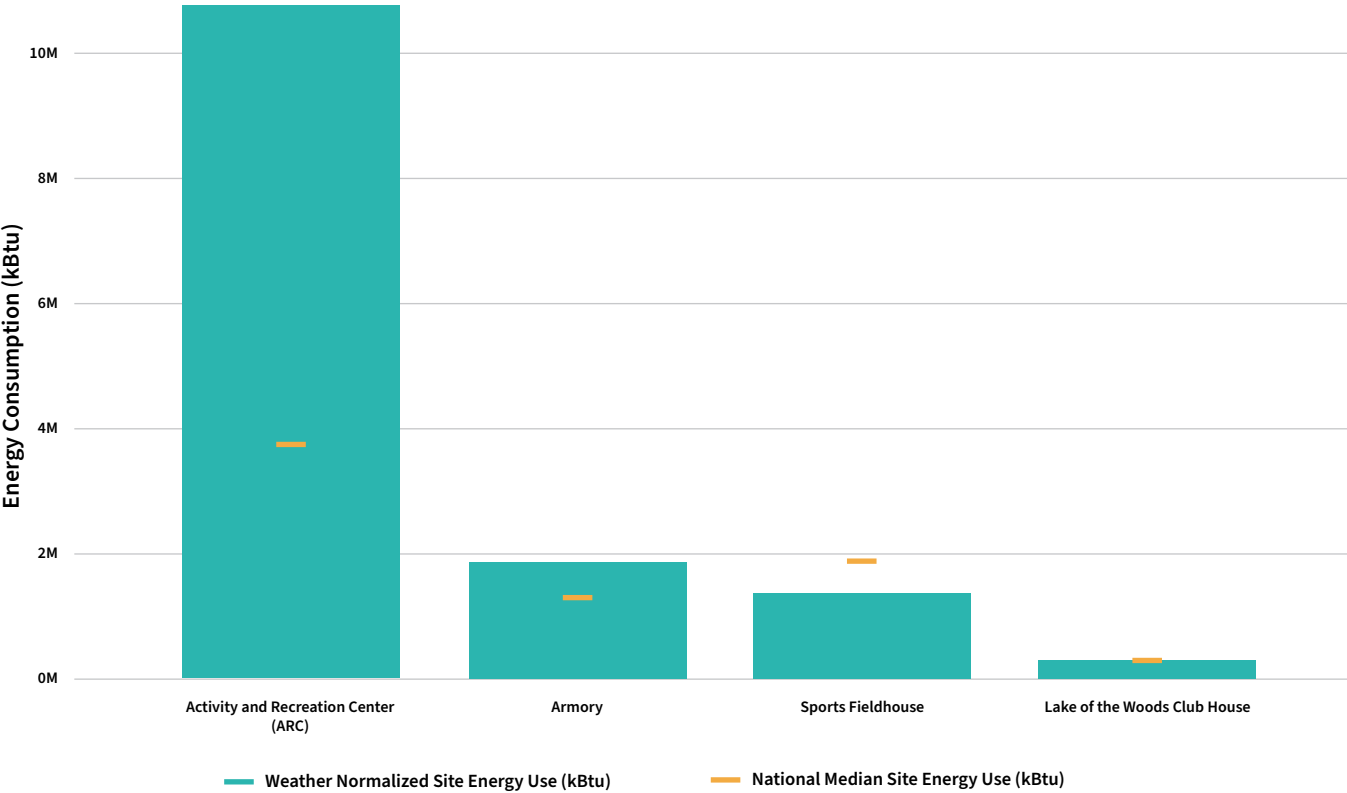
Storage and Repair Facilities



Portfolio Metrics by Use Type Continued

The Activity and Recreation Center (ARC) shows the most potential for energy reductions of any single building in the portfolio.

Recreation Facilities



Success Spotlight



Fire Station 11

6909 Scott Blvd., Columbia

Fire Station 11, completed in September 2023, marks a significant milestone for the City of Columbia as it represents our largest solar installation on any municipal building to date. Built to serve the expanding needs of the community, Fire Station 11 stands as a testament to the City's commitment to sustainability, energy efficiency and renewable energy integration.

Sustainable Design Features:

- Ground-source heating and cooling system for enhanced energy efficiency.
- Roof-mounted solar panels to reduce reliance on non-renewable energy sources.
- Daylight dimming controls and lighting occupancy sensors to minimize unnecessary lighting usage.
- Controls added to prevent apparatus bay unit heaters from running when garage doors are open, ensuring further energy savings.

Appendix A

* Not Weather Normalized

More Energy Consumption Than the National Median

Less Energy Consumption Than the National Median

Property Name	Property Type	Square Footage	Site Energy Consumption kbtu, Weather Normalized	Electricity % of Total kbtu	Natural Gas % of Total kbtu	Site Energy Use Intensity Weather Normalized	National Median Site Energy Use Intensity kbtu/Sq. Ft.	Greenhouse Gas Emissions Metric Tons of CO ₂ e	Greenhouse Gas Intensity Metric Tons of CO ₂ e/1,000 Sq. Ft.	Water Use kgal	Water Use Intensity gal/ft ²	Energy Performance Indicator*
11 North 7th	Office	15,460	173,342.20	100%	0%	11.2	38.7	40	2.6	27.6	1.78	
Activity and Recreation Center (ARC)	Fitness Center/Health Club/Gym	73,000	10,751,853	62%	34%	147.3	51.3	1,675	22.9	591.7	8.11	
Airport Main and North Terminal	Other-Services	19,830	3,381,183.80	48%	46%	170.5*	49.8	386	19.4	N/A	N/A	
Airport Maintenance	Other-Services	8,500	261,737.10	100%	0%	30.8	34.6	43	5	N/A	N/A	
Albert-Oakland Aquatic Center	Food Service	8,205	273,142.90	100%	0%	33.3	188.5	75	9.2	N/A	N/A	
American Legion Concessions	Self-Storage Facility	1,296	57,500.70	100%	0%	44.4	17.1	14	10.4	N/A	N/A	
Antimi Field Concessions	Other-Entertainment/Public Assembly	2,150	457,245.50	100%	0%	212.7	40	101	47	164.7	76.61	
Armory	Other-Recreation	21,468	1,869,745.60	42%	48%	87.1	59.8	222	10.3	126.7	5.9	
Bioenergy Storage	Non-Refrigerated Warehouse	1,200	20,467.80	100%	0%	17.1	18.9	5	3.8	N/A	N/A	
Blind Boone Home	Social/Meeting Hall	2,080	108,987.80	36%	64%	52.4	65.2	12	6	N/A	N/A	
Casteel Building	Office	20,000	670,916.00	62%	29%	33.5	38.5	102	5.1	220	11	
CFD Training Center	Other	8,060	444,382.40	100%	0%	55.1	31.9	89	11	32.2	3.99	
City Hall	Office	120,000	10,363,646.30	80%	18%	86.4	80.1	1,925	16	1,793.10	14.94	

Appendix A continued

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Cosmo Park Concessions	Other-Entertainment/ Public Assembly	1,036	6,553.90	100%	0%	6.3	40	310	6.5	N/A	N/A	
CPD Training Center	Police Station	11,890	185,370.70	100%	0%	15.6	41.6	35	2.9	N/A	N/A	
Douglass Pool	Office	3,024	117,077.00	100%	0%	38.7	41.6	28	9.3	N/A	N/A	
Fire Station 1	Fire Station	16,050	1,161,601.90	52%	41%	72.4	44	158	9.8	280	17.45	
Fire Station 11	Fire Station	9,200	N/A	N/A	N/A	N/A	63.5	0	0	N/A	N/A	
Fire Station 2	Fire Station	3,696	368,861.80	48%	42%	99.8	63.1	47	12.7	152.3	41.21	
Fire Station 4	Other-Public Services	3,938	325,410.80	44%	45%	82.6	46.7	39	9.9	101.2	25.7	
Fire Station 5	Other-Public Services	2,980	402,941.90	42%	48%	135.2	47.9	48	16	96.6	32.43	
Fire Station 6	Other-Public Services	3,692	267,294.30	42%	44%	72.4	46.9	31	8.4	89.2	10.78	
Fire Station 7	Other-Public Services	7,791	606,758.40	56%	36%	77.9	42.2	86	11	134.4	17.25	
Fire Station 8	Fire Station	8,272	590,740.60	42%	48%	71.4	67.2	69	8.4	89.2	10.78	
Fire Station 9	Fire Station	9,038	586,424.50	51%	41%	64.9	61.7	79	8.7	129	14.28	
Fleet West	Vehicle Repair Services	8,450	570,756.10	19%	68%	67.5	67.9	44	5.2	12.7	1.51	
Gentry	Office	7,240	392,573.00	42%	47%	54.2	61.9	46	6.4	26.3	3.63	

Appendix A continued

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Grissum	Vehicle Repair Services	71,000	5,565,292.40	32%	54%	78.4	57	552	7.8	585.6	8.25	
Heuchan	Office	21,270	1,388,518.40	100%	0%	65.3	31.9	291	13.7	350.9	16.5	
Hillcrest Community Center	Social/Meeting Hall	5,090	182,219.90	46%	49%	35.8	57.8	21	4	14.3	2.81	
Howard Building	Office	20,620	1,099,731.80	83%	11%	53.3	55.5	208	10.1	255.2	12.38	
Jones House	Non-Refridgerated Warehouse	4,390	21,778.00	48%	43%	5	26.9	2	0.6	979	223.01	
L.A. Nickell Clubhouse	Other-Recreation	4,650	195,972.90	100%	0%	42.1	40	41	8.8	N/A	N/A	
L.A. Nickell Maintenance	Other-Services	4,309	500,131.90	5%	78%	116.1	84.3	26	6	N/A	N/A	
Lake of the Woods Club House and Maintenance **	Other-Recreation	4,709	294,700.10	37%	50%	62.6	62.4	29	6.1	8.2	1.75	
Landfill Operation Center	Vehicle Repair Services	9,135	259,570.30	100%	0%	28.4	34.6	59	6.4	355.7	38.93	
Maplewood Home	Museum	4,350	257,682.00	11%	73%	59.2	87.2	17	3.8	N/A	N/A	
Material Recovery Facility	Other-Public Services	25,800	780,295.00	100%	0%	30.2	31.9	173	6.7	88.5	3.43	
Molly Thomas Bowden Neighborhood Policing Center	Police Station	24,539	1,888,242.20	38%	54%	76.9	70.4	188	7.7	N/A	N/A	
Moss Building	Social/Meeting Hall	4,125	224,301.70	54%	41%	54.4	53.6	27	6.7	16.5	3.99	

** Data is Combined Due to a Shared Meter

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NE Regional Park	Other-Entertainment/ Public Assembly	91,700	5,753,054.90	100%	0%	62.7	40	1,083	11.8	N/A	N/A	
New Airport Terminal	Other-Services	53,977	N/A	N/A	N/A	N/A	39.2	27	0.5	N/A	N/A	
P&R Fabrication	Other-Services	6,973	475,458.40	21%	60%	68.2	64.3	38	5.4	143.3	20.54	
Parking Garage 10th & Cherry	Parking	93,830	389,796.50	100%	0%	4.2	N/A	81	0.9	57.6	0.61	
Parking Garage 5th & Walnut	Parking	225,600	1,476,600.00	95%	2%	6.5	N/A	311	1.4	N/A	N/A	
Parking Garage 6th & Cherry	Parking	142,848	512,630.00	100%	0%	3.6	N/A	106	0.7	N/A	N/A	
Parking Garage 8th & Cherry	Parking	77,526	210,772.40	100%	0%	2.7	N/A	46	0.6	N/A	N/A	
Parking Plaza 7th & Walnut	Parking	113,288	483,317.50	100%	0%	4.3	N/A	98	0.9	57.6	0.61	
Parks Management Center	Self-Storage Facility	23,640	524,983.10	75%	16%	22.2	35.7	92	3.9	N/A	N/A	
Police	Police Station	34,100	3,429,793.70	87%	11%	100.6	47.8	682	20	233.7	6.85	
Reichmann Building	Social/Meeting Hall	4,673	251,925.50	100%	0%	53.9	39.1	51	11	194.7	41.67	
Rock Quarry House	Social/Meeting Hall	6,484	181,787.60	44%	48%	28	58.3	22	3.4	23.3	3.6	
Sanford-Kimpton Building	Office	29,740	1,290,349.80	84%	12%	43.4	69.9	249	8.4	234.5	7.89	

Appendix A continued

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Scale House	Office	144	35,798.10	100%	0%	248.6	41.6	7	51.2	3.8	26.12	
Short Street Garage	Parking	27,776	1,018,791.30	100%	0%	36.7	N/A	211	7.6	13.5	0.49	
Solid Waste Admin Building	Vehicle Repair Services	20,800	601,419.20	100%	0%	28.9	34.6	125	6	184.2	8.86	
Solid Waste Storage 5590	Self-Storage Facility	4,080	81.10	100%	0%	0	17.1	0	0	N/A	N/A	
Sports Fieldhouse	Other-Entertainment/ Public Assembly	47,400	1,397,324.10	100%	0%	29.5	40	310	6.5	N/A	N/A	
Thomas Walton Building	Office	8,400	363,124.10	51%	42%	43.2	72.8	49	5.8	355.4	42.31	
VFW Ashley Street Center	Other-Lodging/ Residential	13,800	338,581.00	63%	32%	24.5	65	53	3.8	123.7	8.97	
Wabash Transit Station	Transportation Terminal/ Station	5,158	255,870.70	100%	0%	49.6	40	59	11.2	40.5	7.85	
Wastewater Treatment Plant	Wastewater Treatment Plant	67,920	42,485,520.40	80%	17%	625.5	N/A	7,953	117.1	337.6	4.97	
Water Admin & Joe Crane	Office	9,600	719,829.50	42%	46%	75	61.8	84	8.7	N/A	N/A	
Waters House	Mixed Use Property	3,240	195,643.20	28%	61%	60.4	55.5	17	5.2	979	302.16	