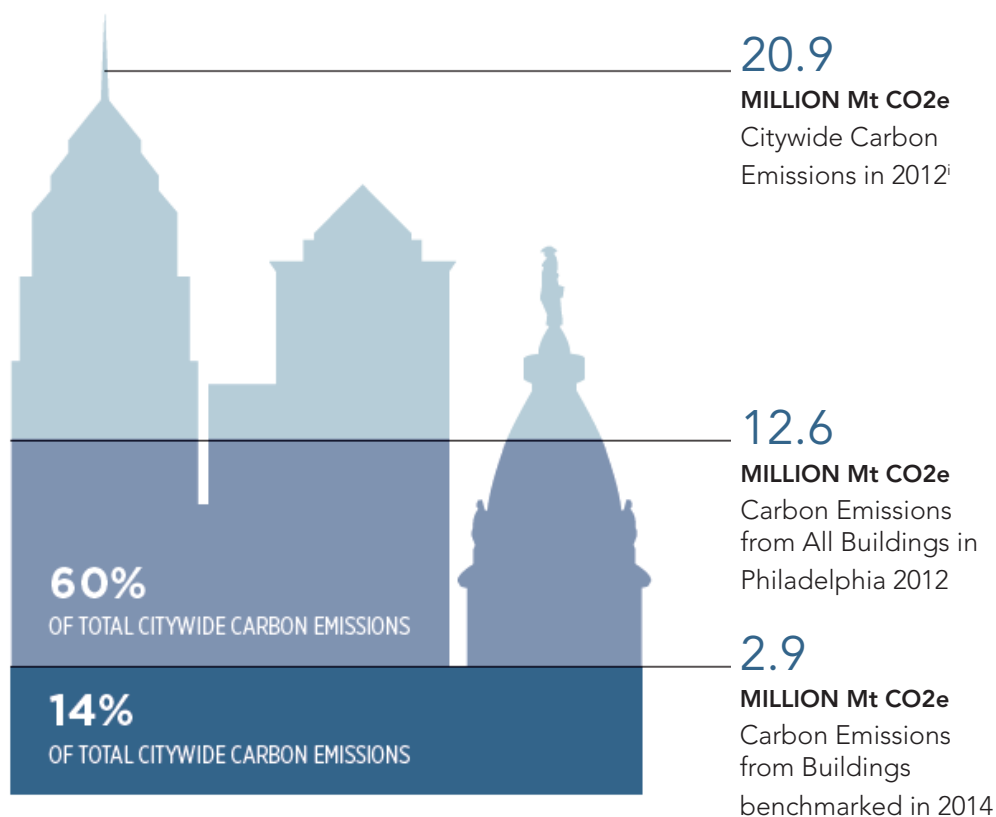




2016 ENERGY BENCHMARKING REPORT

Benchmarking in Philadelphia

Carbon Emissions of Philadelphia's Benchmarked Buildings



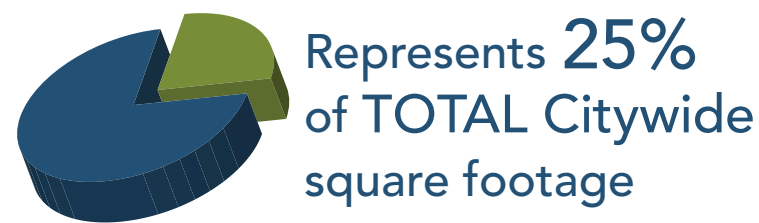
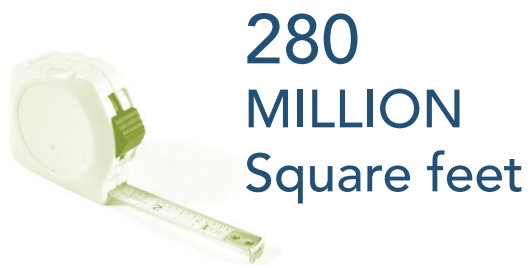
In Philadelphia, buildings are responsible for 60 percent of carbon emissions emitted. Improving building energy performance of Philadelphia's building stock is important to fulfilling Philadelphia's commitment to addressing climate change and meeting the 80 percent reduction of greenhouse gas emissions by 2050 goal set by Mayor Jim Kenney.

To meet this commitment, Philadelphia requires buildings over 50,000 square feet to report and disclose their energy and water usage annually. This report covers the third year of benchmarking, completed in 2015.

Benchmarking can help building owners, operators, and tenants identify opportunities to reduce energy costs. If each benchmarked building reduced 2014 electric and natural gas usage by ten percent, the total cost savings would be an estimated **\$52.4 million**.ⁱⁱ

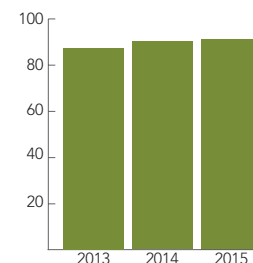
2014 Benchmarking Highlights

During the 2015 reporting period (covering 2014 data), more than 90 percent of required buildings benchmarked, providing information on more than one quarter of Philadelphia's built environment.



59
MEDIAN
ENERGY STAR
Score

91%
COMPLIANCE
Rate



The median ENERGY STAR Score fell from 64 to 59, but is still nine points higher than the national median, demonstrating a significant opportunity for energy efficiency improvements in commercial buildings citywide. Property owners and managers can use benchmarking data to measure their buildings against their peers and identify opportunities for building performance retrofits.

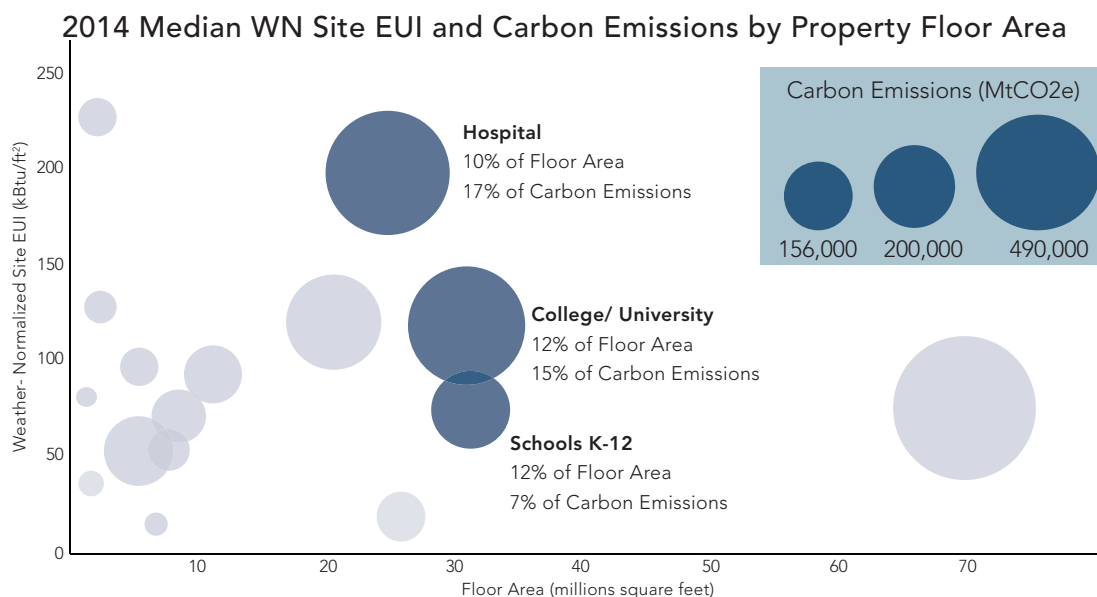
2014 Benchmarking Results

- Nearly 2,000 buildings encompassing more than 280 million square feet of floor area (roughly 25 percent of all developed space in Philadelphia) reported as part of the third year of the program. For the second straight year, more than 90 percent of buildings required to report submitted data.ⁱⁱⁱ
- Philadelphia buildings earning an ENERGY STAR score (a 1 to 100 measurement of energy efficiency) received a median of 59 in 2014, nine points higher than the national median of 50. This is down from a score of 63 in 2013, demonstrating the need for energy efficiency investment in many of Philadelphia's largest buildings.
- Raw energy usage increased in 2014, but when normalized for weather, building performance improved between 2013 and 2014.
- There was a seven percent reduction in carbon emissions from large buildings. Office buildings, hospitals, and higher education account for more than half of total carbon emissions from benchmarked buildings in 2014.

2014 Building Energy Performance by Building Sector

Consistent with prior years' data, office buildings continue to cover more than 25 percent of property floor area and emit more carbon emissions than any other sector. However, weather-normalized site energy use intensity (WN Site EUI) is lower than several other building types, including schools, colleges, and hospitals.

Those three sectors combined account for nearly half of carbon emissions among benchmarked buildings in 2014.



The Office of Sustainability is committed to working with these institutional partners to identify opportunities for greenhouse gas reduction strategies while continuing to promote the education and health sectors as areas for growth throughout Philadelphia.

The School District of Philadelphia will release its first-ever sustainability plan, GreenFutures, in May 2016.

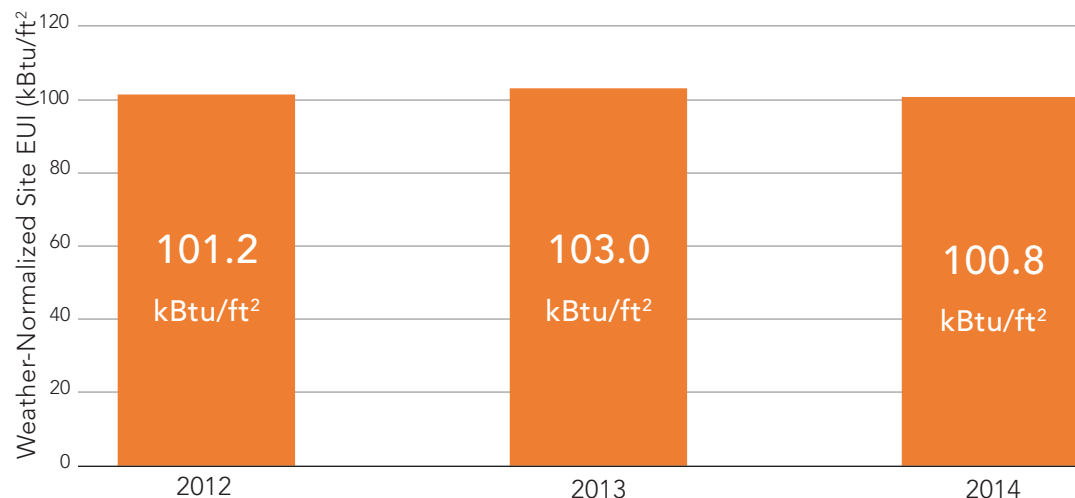
2014 Building Energy Performance By Sector

	Number of Properties Reported	Total Floor Area (square feet)	Median WN Site EUI (kBtu/ft ²)	Median ENERGY STAR Score	Total Water Use (kgal)	Carbon Emissions (MtCO ₂ e)
School (K-12)	259	31,170,072	75.2	44	868,000	195,375
Office	208	69,544,539	76.0	73	957,375	653,532
Warehouse	160	25,738,555	19.3	81	79,790	76,591
College/ University	91	30,868,344	119.1	N/A	1,137,818	441,869
Other	55	7,716,693	54.4	N/A	81,130	56,422
Retail	54	8,472,718	71.9	74	108,857	92,357
Municipal	47	20,527,598	121.1	74	1,858,835	288,377
Hotel	41	11,150,482	93.7	41	397,626	109,332
Multifamily	40	5,384,078	97.4	32	219,481	46,126
Industrial	37	5,383,699	53.7	N/A	131,191	156,115
Hospital	33	24,708,964	198.8	54	1,667,334	487,239
Parking	31	6,725,034	15.3	N/A	29,301	16,904
Supermarket	29	2,184,858	227.9	60	54,564	46,977
Worship	19	1,658,832	36.6	95	9,864	21,870
Medical Office	15	2,405,192	129.0	23	60,434	33,689
Museum	9	1,308,148	82.1	N/A	4,840	12,644

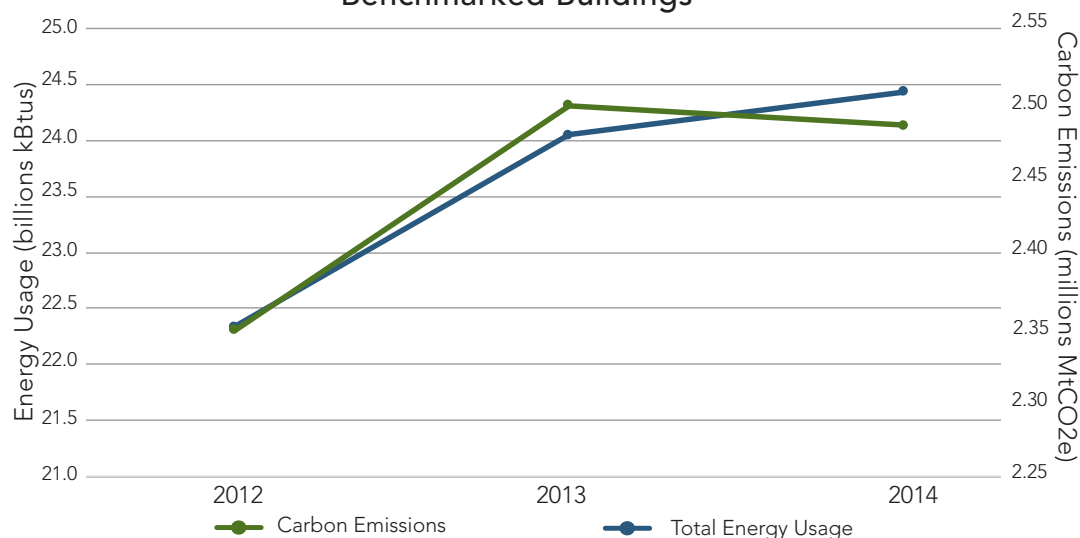
Large Building Energy Use Trends

The average weather-normalized site energy use intensity (WN Site EUI) of buildings benchmarking from 2012 to 2014 remained relatively unchanged despite an increase in total energy consumption. See pages 8 and 9 for further discussion about energy usage trends.

Average WN Site EUI for Benchmarked Buildings
2012-2014



Total Energy Usage Vs. Carbon Emissions Over Time for
Benchmarked Buildings



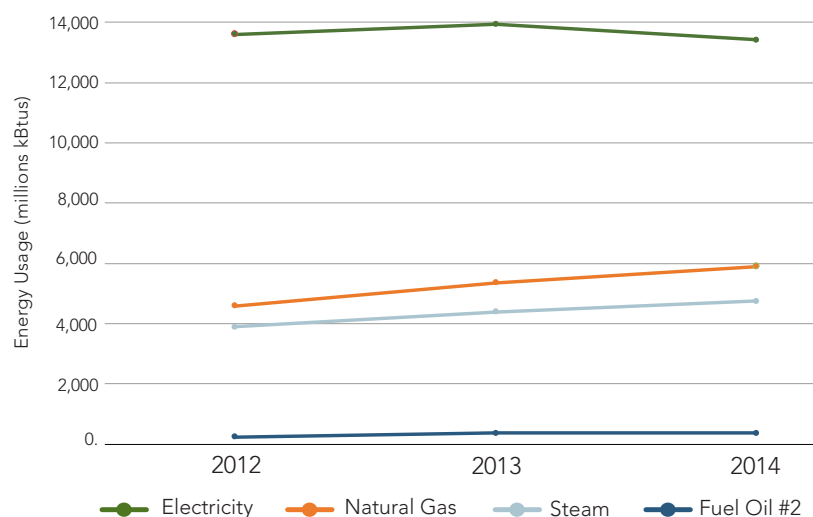
Carbon emissions decreased slightly between 2013 and 2014 even with the increase of energy usage. This downward trend suggests that benchmarked buildings are using lower-carbon energy fuel sources like natural gas and steam.

Weather and Energy Use Trends

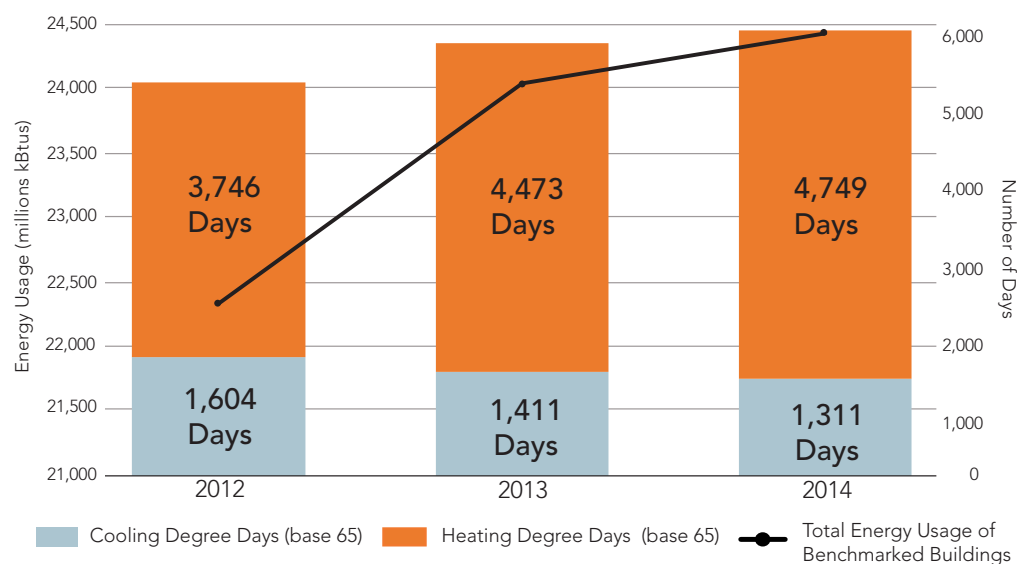
Energy usage in large non-residential buildings increased between 2012 and 2014, matching citywide energy trends that the Office of Sustainability (OOS) has tracked as part of Greenworks reporting. This trend correlates with growth in population, jobs, and development, as well as more extreme summers and winters.

Buildings reporting benchmarking data have used more natural gas, steam, and fuel oil, corresponding to an increase in heating degree days (hours requiring heating, generally colder winter days). As Philadelphia continues to face more extreme weather resulting from climate change, investments made by building owners to improve the efficiency and resiliency of their facilities' systems may become even more cost-effective.

Energy Usage by Fuel Type for Benchmarked Buildings
2012-2014



Heating and Cooling Degree Days vs Total Energy Use Over Time for
Benchmarked Buildings

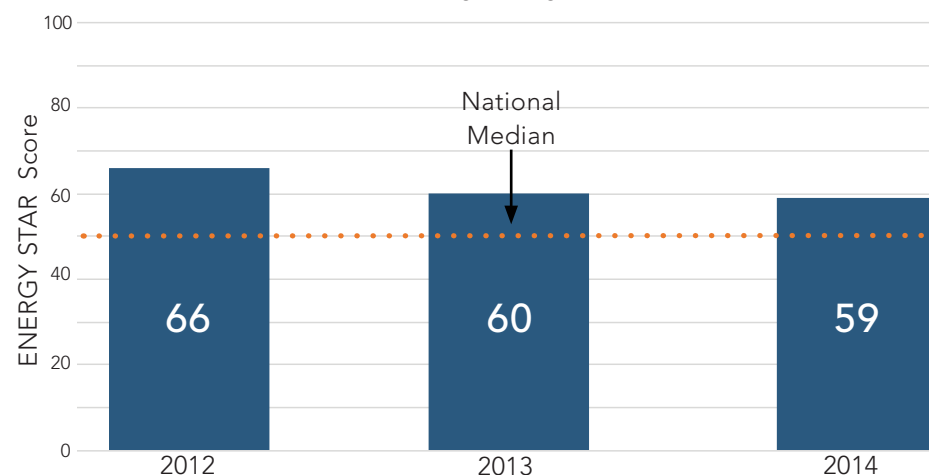


Building Energy Performance

ENERGY STAR Trends

From 2012 to 2014 the median ENERGY STAR score of eligible buildings reporting all three years decreased, but still remains nine points above the national median of 50. There has been a steady increase of the number of properties receiving scores, possibly indicating higher quality reporting by building owners and property managers.

Median ENERGY STAR Scores for Benchmarked Buildings
2012-2014



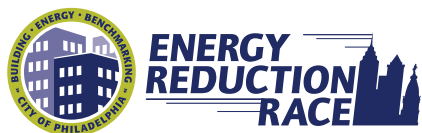
Median ENERGY STAR Score by Sector

	2012	2013	2014
Hospital	70	56	54
Hotel	43	44	46
Medical Office	20	37	35
Office	69	70	73
Retail	71	73	74
School (K-12)	65	50	46
Supermarket	60	59	61
Warehouse	83	75	79

The sector-level median ENERGY STAR scores over the three years indicate that the hotels, medical offices, and supermarkets are the lowest performing sectors, but also provide the greatest sector-wide opportunity for improving energy performance.

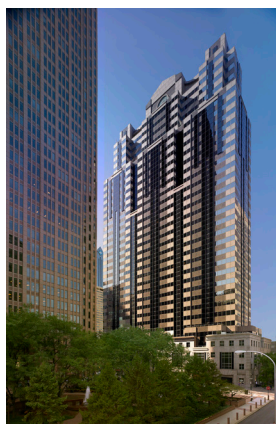
Transforming Data into Action

Philadelphia's Energy Reduction Race



In fall 2014 the Office of Sustainability (OOS), in partnership with City Energy Project and Delaware Valley Green Building Council, launched the Energy Reduction Race, a voluntary citywide challenge among the largest non-residential buildings to reduce energy consumption by five percent or more from 2014 to 2015. More than 30 buildings joined the competition, participated in a free one-day building operator training course, and committed to reducing energy usage by at least five percent. Participating buildings, including large commercial office buildings, non-profit facilities, and hotels, saved a total of more than 70 million kBtus and reduced carbon emissions by 11 percent within one year.

Biggest Percentage Reduction in Energy



↓**15.4%**

100 North 18th St^{iv}

Size: 808,040 ft² Type: Office

Biggest Energy Consumption Reduction



↓**12,031,380 kBtus**

1701 JFK Blvd^v

Size: 1,538,959 ft² Type: Office

Biggest ENERGY STAR Score Improvement



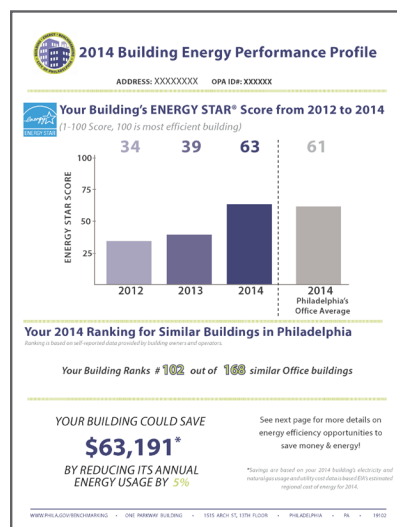
↑**11pts**

150 Rouse Blvd^{vi}

Size: 58,386 ft² Type: Office

Looking Forward

In 2015 City Council unanimously voted to require residential large buildings to benchmark and disclose energy usage. OOS, with assistance from DVGBC and EPA Region III, will hold multifamily-specific benchmarking trainings and provide phone, email and in-person support to more than 700 large residential buildings submitting benchmarking data for the first time in 2016. As a result of this change in the benchmarking law, residential property owners and managers will have new tools to analyze energy and water usage to help them make informed decisions when upgrading their buildings and increase tenant satisfaction and comfort.



To help building representatives understand their performance relative to their peers, OOS issued Energy Performance Profiles for every building that benchmarked in 2015. The profiles include details on energy efficiency programs designed to help large commercial buildings improve their energy performance. The office also maintains a data visualization tool (available at <http://visualization.phillybuildingbenchmarking.com>) to facilitate peer-to-peer comparison of building performance.

In an effort to make building energy data management and compliance more efficient, OOS joined the U.S. Department of Energy SEED Platform Collaborative, a partnership with state and local governments and efficiency program administrators, leading non-profits, and private sector companies that are committed to reshaping the data landscape in the buildings sector.

Endnotes

- i. Citywide and building carbon emissions data from Philadelphia Citywide Greenhouse Gas Inventory, 2012.
- ii. Saving estimates are based on self-reported 2014 buildings' electricity and natural gas usage and utility cost data is based on US Energy Information Administration estimate regional cost of energy for 2014.
- iii. The energy and building data used in this report is self-reported by building owners from 2012, 2013, and 2014. The trend data includes only buildings benchmarking all three years, from 2012 to 2014.
- iv. Photo provided by Brandywine Realty Trust.
- v. Photo by R. Bradley Maule.
- vi. Photo by Halkin Mason Photography.

Acknowledgments

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DELAWARE VALLEY
GREEN BUILDING
COUNCIL



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Cover photo provided by Ronald McDonald House.

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