

2019 Solid Waste Inventory – City of Cambridge, MA

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Solid Waste Disposal

Municipal Solid Waste (MSW) collected in the City of Cambridge is either incinerated to produce energy or landfilled. According to the Massachusetts 2019 Solid Waste Data Update, approximately 78 percent of MSW is incinerated, compared to 22 percent sent to landfill. However, these numbers do not account for MSW disposed of out of state, where a lot of MSW from Cambridge is sent.

As of 2022, an estimated 65 percent of resident-generated MSW in Cambridge is collected as part of municipal curbside pickup programs, while the remaining 35 percent is collected by private haulers that are contracted by larger multi-family complexes. All commercial MSW collection is performed by private haulers.

To calculate the emissions associated with solid waste disposal, the City must determine the amount of MSW (i.e., the “activity data”) collected by the municipal curbside pickup program, as well as the amount of waste collected by private haulers in the City boundary. In addition to these totals, information on where/how the MSW is disposed is also needed.

As noted, municipal curbside program data were provided through waste collection and disposal records supplied by the Cambridge DPW, which maintains detailed records on the tonnage of MSW collected by individual trucks serving the City. The DPW also collects waste data related to other municipal operations, such as street cleaning operations and catch basin debris that is collectively referred to as “mixed waste.” As such, total MSW collected by municipal services is a combination of curbside pickup and mixed waste. In 2019, 14,380 tons of MSW were collected by municipal hauling services. It is important to note that while the DPW also collects detailed information on the curbside recycling program, this data is not included in total MSW tonnage since minimal emissions are generated from the disposal of recycled materials.

Raw MSW tonnage data from private hauler collection was not able to be obtained, and was therefore estimated for the purposes of this inventory as outlined in the preceding section and described in more detail below.

Labor Force and Unemployment Data for the City of Cambridge for 2019 were obtained from EOLWD’s website¹² using the following steps.

"Select Area Type" drop-down: Select "City or Town"

"Select Specific Geographic Area" drop-down: Select your community

"Select a Year" drop-down: Select your inventory year

"Select the Time Period" drop-down: Select "Annual Report"

"Select the Ownership" drop-down: Select "All ownership types"

"Select an Industry or Industry Sector" drop-down: Select "Total, All Industries"

"Select the Category" option: Select "Category and all sub-categories"

Select the link to "Download and save the data as a Comma Separated Value (CSV) File"

To avoid double counting, only the three-digit NAICS codes were considered for this inventory (note that the data download described above initially includes multiple tiers of NAICS codes). To facilitate grouping of industries, NAICS codes and titles were then matched to "principal business activities" of buildings as defined by the U.S. Energy Information Administration (EIA). Average monthly employment per employer establishment (i.e., building) for each primary building activity was calculated using this data.

Primary Building Activities were used to group employment by sub-sector industry, including only those PBAs applicable to the City of Cambridge. This process resulted in an estimate of the number of employees in the City in 2019, divided into simplified groups. These groupings included the following:

Commercial and Institutional Buildings

- › Education
- › Food Sales
- › Food Service
- › Health Care Inpatient
- › Health Care Outpatient
- › Lodging
- › Mercantile Retail (other than mall)
- › Mercantile Enclosed and Strip Malls
- › Office
- › Public Assembly
- › Public Order And Safety
- › Religious Worship
- › Service
- › Warehouse And Storage

Manufacturing Industries & Construction

- › Food
- › Printing and Related Support
- › Chemicals
- › Machinery
- › Computer and Electronic Products
- › Electrical Equip., Appliances, Components
- › Miscellaneous

Total 2019 MSW disposal associated with commercial, institutional, and manufacturing properties and collected by private haulers (126,252 tons) was calculated by applying specific disposal rates by industry (tons per employee per year) to the estimated number of employees in the City by industry, and then summing the calculated disposal totals across industries. For example, for the Education industry, a rate of 0.38 tons/employee/year was multiplied by 30,914 (the number of persons employed by the Education industry in the City in 2019) to arrive at a total of 10,293 tons MSW disposed. **Table 4-1** and **Table 4-2** show the methodology for estimating solid waste tonnage collected by private haulers for 2019.

Table 4-1: Estimation Methodology for Commercial and Institutional Solid Waste Collected by Private Haulers

Commercial & Institutional Buildings by NAICS Code	Number of Employees in Cambridge, 2019	Curbside Disposal Rates (Tons per Employee per Year)	2019 Total Tons per Year	CalRecycle Reference
Education	30,914	0.38	11,747	Education
Food Sales	1,731	0.94	1,627	Retail Trade - Food & Beverage Stores
Food Service	8,240	1.57	12,937	Restaurants
Health Care Inpatient	3,573	0.57	2,037	Medical & Health
Health Care Outpatient	2,641	0.57	1,506	Medical & Health
Lodging	4,976	1.4	6,966	Hotels & Lodging
Mercantile Retail (other than mall)	1,812	1.74	3,153	Retail Trade - All Other
Mercantile Enclosed and Strip Malls	1,322	1.74	2,300	Retail Trade - All Other
Office	67,266	1.105	74,329	AVERAGE of <i>Services - Management, Administrative, Support & Social</i> AND <i>Services - Professional, Technical, & Financial</i>
Public Assembly	1,625	1.94	3,153	Arts, Entertainment, & Recreation
Public Order And Safety	755	0.3	227	Public Administration
Religious Worship	788	0.6	473	Services - Management, Administrative, Support & Social
Service	1,133	1.02	1,156	AVERAGE of <i>Services - Management, Administrative, Support & Social</i> AND <i>Services - Professional, Technical, & Financial</i> AND <i>Services - Repair & Personal</i>

Warehouse And Storage	3,096	0.57	1,765	Durable Wholesale & Trucking
All Commercial & Institutional Buildings	129,872		123,376	

Table 4-2: Estimation Methodology for Manufacturing Solid Waste Collected by Private Haulers

Manufacturing Industries & Construction by NAICS Code	Number of Employees in Cambridge, 2019	Curbside Disposal Rates (Tons per Employee per Year)	2019 Total Tons per Year	CalRecycle Reference
Food	770	1.23	947	Manufacturing - Food & Nondurable Wholesale
Printing and Related Support	31	1.23	38	Manufacturing - Food & Nondurable Wholesale
Chemicals	1,487	1.23	1,829	Manufacturing - Food & Nondurable Wholesale
Machinery	7	0.44	3	Manufacturing - All Other
Computer and Electronic Products	71	0.31	22	Manufacturing - Electronic Equipment
Electrical Equip., Appliances, Components	0	0.31	0.	Manufacturing - Electronic Equipment
Miscellaneous	89	0.44	39	Manufacturing - All Other
All Manufacturing Industries & Construction Buildings	2,455		2,878	

The disposal rates were obtained from CalRecycle, derived from its 2014 Waste Characterization Study. Although these disposal rates were established in 2014, they remain the best estimates in the waste industry for associating employment with waste generation. This is an area where more research and analysis are needed.

In addition to commercial facilities, private haulers are also contracted to collect MSW from large multi-family housing developments. To estimate the amount of residential MSW collected by private haulers in 2019, a disposal rate per resident was calculated by multiplying the City's total population in 2019 (116,632) by 65 percent (i.e., the percent of the population served by the municipal curbside program), and then dividing the resulting

value by the total MSW collected by the municipal curbside program in 2019 (12,938 tons). The calculated residential MSW disposal rate (0.17 tons MSW per resident per year) given municipal data was then applied to the remaining 35 percent of the City's population (40,821) to reflect residential MSW tonnage collected by private haulers (6,967 tons).

Combining the private haul MSW collection estimates for commercial properties and large multi-family housing developments, total waste collected by private haulers in 2019 was determined to be 133,219 tons.

Conclusion:

This is a brief and relatively rough estimate of total waste generated in Cambridge, however it is the best available information as of 2022. Future research should be conducted to dive a bit deeper to understand how much trash is generated that is not collected by the City.

The results of this analysis indicate the following estimates of trash generation citywide:

Sector	2022 Estimated trash (tons)
Residential (City collection)	12,938
Residential (Private collection)	6,967
Commercial (Private collection)	126,252
Total	146,157