

## 2024 Waste Diversion & Disposal Report

### Purpose & Overview of Report

The Chittenden Solid Waste District (CSWD) produces this annual waste diversion and disposal report to help track and evaluate how well District members are utilizing CSWD and private sector facilities, programs, and overall opportunities to reduce and divert their waste from the landfill; to fulfill State reporting requirements; and to provide information about the District's solid waste management system for communications to the general public, the media, and other communities and organizations. It includes materials generated within Chittenden County only. It is produced for each calendar year.

The comparison of results to the previous year are found in the next section. Appendix A describes the methodology and nuances of the data used in this report. The tons of CSWD waste disposed and diverted from disposal are displayed in the table on page 9. Notes on the lines in the table may be found on pages 10-11.

### Comparison of Results to Previous Year

**NOTE:** This report uses the US Census 2024 population estimate for Chittenden County in relevant calculations (e.g., pounds per capita disposed). The US Census adjusts population estimates over time. Relevant calculations for these years will be amended as this data becomes available and will appear in future reports.

#### Summary

This year's report shows some marked changes with the last two in terms of solid waste disposal and diversion. Overall, compared to 2024, total generation of solid waste rose to 317,905 tons versus 304,843 last year. The tons of MSW disposed decreased by around 3.3%, with MSW tons diverted increasing by 13.8% closer to levels seen in 2021 and 2022. C&D tons disposed increased 9.8% over 2023, which was the highest level it had been in 10 years. C&D tons diverted rose modestly by 0.6%. The amount of material used for Alternative Daily Landfill Cover (ADC) dropped by 57% due in large part to the completed demolition of Burlington High School. The MSW diversion rate remained high at 54.7%, continuing a trend of long-term steady growth. A rebound in food residuals, updates in estimated backyard composting, and improved data related to Bottle Bill recyclables contributed to improved diversion. The C&D diversion rate remained steady year-over-year and the MSW and C&D combined diversion rose slightly to 61% which is in-line with historic highs. The estimated recovery rate of 82% for MSW mandatory recyclables rebounded from last year and is the same as it was in 2022. The recovery rate for all currently divertible MSW materials rose to 67% from last year's all time high of 64%.



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### **Municipal Solid Waste**

The amount of MSW landfilled declined by 3.3%, lowering the pounds per capita per day disposed from 2.71 to 2.62. This change was driven by an increase in clean wood diverted, better reporting from TOMRA who manages Bottle Bill materials, and a general uptick in food residuals and metal and glass containers. This year marks a modest increase in the generation of MSW after the disruption of the pandemic. However, over the last ten years the increment diverted increased at an annualized rate of 3.2% versus a 0.8% decline of MSW that is disposed or incinerated. Notably, organics, which now makes up roughly 46% of total material diverted from MSW this year has grown 5.8% annually over the last decade and an 9.2% increase from 2023.

The total of MSW materials diverted was up 13.8% from last year rebounding to levels in 2022. Paper diversion was steady and there were significant increases in the tonnages of glass, clean wood, and food residuals diverted. A drop in reported yard waste may partially account for the increase in reported clean wood. The tonnage of electronics diverted declined reflecting an industry wide trend due to light-weighting of electronic products despite sustained volumes of disposal. Scrap metal diversion increased by 9.3% staying close to the ten-year average, and unregulated hazardous waste declined by 12.6%. Tires diverted increased about 39% from 2023 to its highest point since an all-time high in 2019. This increase is attributable to information provided by a major processor of tires for Chittenden County indicating that recycling rates may have been accidentally reported lower than actual in past years. The diversion of textiles increased 78.9% from 2023 reaching the highs experienced at the peak of the pandemic.

Quantities of clean wood have varied tremendously over the years. In 2024, McNeil received and added approximately 4,425 tons of wood to their inventory which is about 37 percent of all clean wood waste. As with last year, wood collected by CSWD facilities is now chipped and transferred to the Organics Recovery Facility and used for feedstock in their compost products, accounting for another 63%, or 7,542 tons of the annual total. This is much more than prior years and is accounted for by several weather events, a change to more favorable public hours, and chipping wood from the prior year. Chipping of ORF's wood follows a lagged schedule and will affect numbers reported in future years. As well, some of the material that in prior years may have been characterized as yard waste may be classified as wood due to changes in the chipping operation at ORF.

Food residuals diverted increased 2.2% from 2023. CSWD's ORF took in almost 1,815 more tons than in 2023. Spent grains from breweries remained strong, as reported by individual businesses, contributing almost 5,000 tons to organic diversion. Backyard composting estimates were improved by results from CSWD's most recent household survey Chittenden County and statewide estimates published in the Agency of Natural Resources 2023 Waste Composition Study. Using this revised methodology for the last two years a small drop in on-site management



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(3%) was estimated. Over the last ten years there has been a 5.8% annualized increase in diverted organics.

Glass diverted increased by 62% in 2024 to its highest level in ten-years with an average annual growth rate of 1.5% over that period. This includes PGA material utilized in various aggregate products by processors in the county. Materials sorted at CSWD's MRF are not considered recycled or diverted from the landfill until they are shipped from the facility.

The minimum MSW diversion rate rose from 51% to 55%, and the pounds per capita per day diverted increased from 2.79 to 3.17. For comparison, the US EPA reported that in 2018, the most recent year for which data is available, the US diversion rate was 32%. The Vermont Agency of Natural Resources reported that in 2023, also the most recent year data are available, the Vermont diversion rate was 37%. While what is included in calculations varies to some degree, rates for communities that are considered to be high performing include Seattle at 53.4% in 2023, San Francisco at 48% in FY 2024, and Portland Metro in Oregon at 47% in CY 2021. Interestingly, an analysis from SWANA illustrates that the best performing city diversion rates, similar to Chittenden County, have remained relatively flat for several years (SWANA Applied Research Foundation, [Zero Waste Programs: An Analysis of Seattle's Performance Data](#), pp. 10). Over the past ten year's Chittenden County's rates have caught up to the 'best in class'. Based on the diversion data and estimates of the components of waste disposed, the maximum MSW diversion rate achievable by CSWD is 81.0%.

Diverting recyclables and organics from landfill disposal reduced 2022 GHG emissions by an estimated 152,000 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E). This is equivalent to taking about 32,000 cars off the road or conserving over 17 million gallons of gasoline.

Using the diversion data and CSWD's estimates of the components of what is currently disposed, the estimated recovery rate for blue bin recyclables is at 82%, slightly higher than 80% in 2023, but the same as in 2022. For comparison, the average recovery rate for curbside recyclables for participating households across studies compiled by The Recycling Partnership is 57% (*2024 State of Curbside Recycling Report*, pp. 18).

CSWD's estimated recovery rate for all MSW materials that are currently divertible is 68% higher than ten years prior.



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### **Construction & Demolition Debris**

The tonnage of C&D landfilled increased by 10%, and the amount of C&D reported recycled increased by 0.6%. The estimated C&D diversion rate remained 71.4%, same as it was last year. The maximum C&D diversion rate possible is estimated at 78.4%.

Asphalt and concrete recycled is slightly lower than last year at 91,938 tons compared to 92,297 tons in 2023. These materials make up the vast majority of recycled C&D tonnage. Building permits remained fairly high in 2024 for the county as compared to recent history, but with economic changes almost certain to affect the region, it will remain to be seen how this sector and its attendant waste will be affected during the next couple of years.

### **MSW and C&D Combined**

The combined estimated MSW and C&D diversion rate is 61% compared to 59.5% in 2022. The maximum combined diversion rate possible is estimated at 80%. The MSW and C&D combined pounds per capita disposed rose from 3.89 to 3.91, while the MSW and C&D combined pounds per capita diverted increased to 6.10 from 5.72.

### **Alternative Daily Landfill Cover**

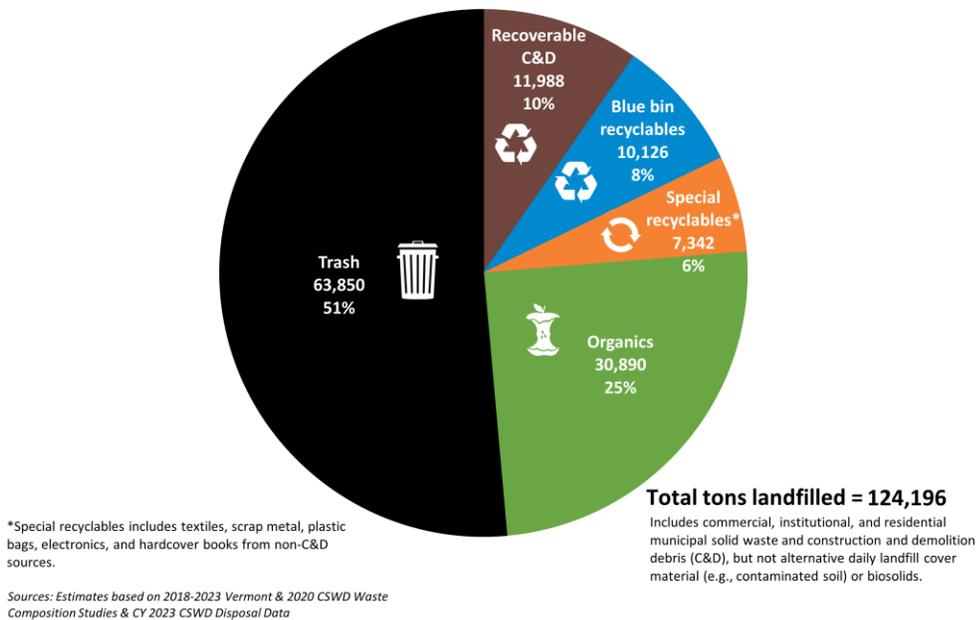
Material used as ADC is down 15,025 tons, or 57.1% less, compared to 2023. ADC consists primarily of contaminated but not hazardous soil. The number and size of projects requiring the removal of contaminated soils vary from year-to-year. Last year the demolition and beginning of reconstruction at Burlington High School was a major contributor.

### Composition of Material Sent to the Landfill

What is ultimately sent to the landfill is a mix of materials that could have been diverted and materials for which there currently are no other options for disposal. Based on waste composition studies from 2018, 2020 and 2023 it is estimated 49 percent of material sent to the landfill could be recovered. See figure 1.

**Figure 1**

 **What Chittenden County residents & businesses sent to the landfill in 2024 (tons)**



### Historical Trends

Diversion and disposal data for the period 2014-2024 are included in the charts below. Figure 2 shows trends over time in MSW tons diverted versus disposed and C&D tons diverted versus disposed. MSW tons disposed in 2024 is 7,350 tons less than it was in 2014, despite an increase in population of 10,000 over that same period. Figure 3 shows these same trends in aggregate, illustrating increased total generation and the respective disposition of materials.



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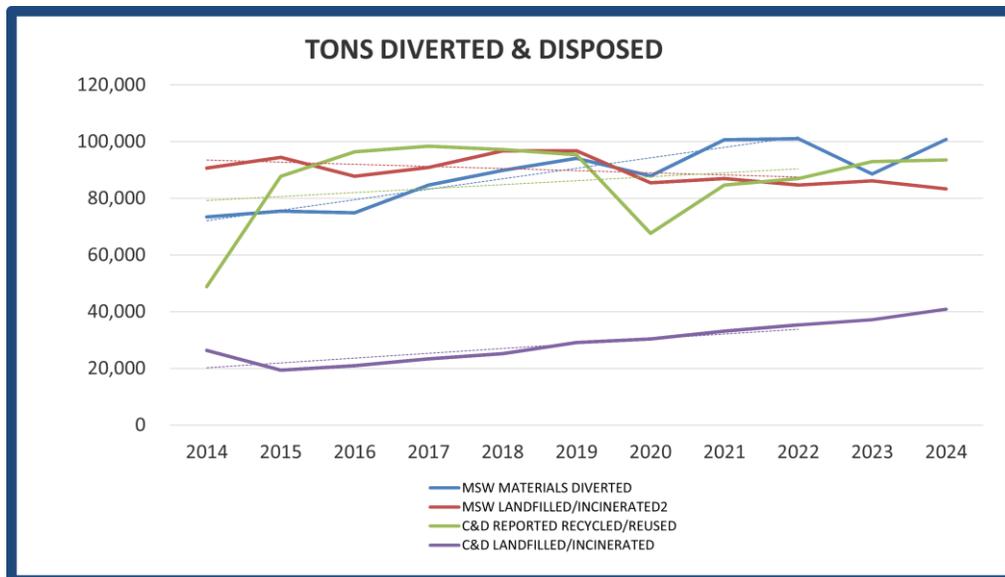
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The increase in tons of MSW diverted before 2020 is likely due to the business reporting requirement that was implemented in 2016 and the increased diversion of organics as Act 148 was implemented. This upward trend was interrupted in 2023 due to the change in organics (i.e. lower feedstocks recorded at the Organics Diversion Facility and lower estimated backyard composting).

Tons of C&D diverted experienced a significant increase during 2014-2017 when new C&D recycling facilities came online. Tons have been declining since one of the facilities closed and less materials have found viable markets. However, a significant rebound occurred since 2021 as the region emerged from the pandemic and construction activity remained strong. Aggregate used in road construction is particularly impactful. C&D disposal has increased as well, meaning that in terms of overall generation, the C&D diversion rate has remained relatively flat since 2020 (see Figure 5).

**Figure 2**



**Figure 3**

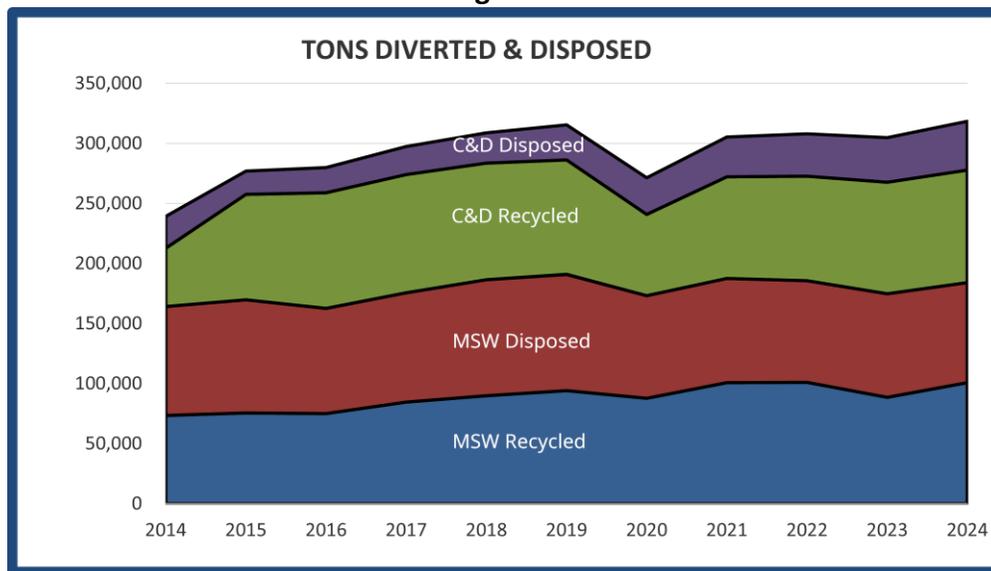


Figure 4 displays disposal rates over time. The MSW disposal rate was on an upward trend from 2016-2019 until COVID-19 arrived. The rate is currently 13.5% less than it was in 2014. The C&D disposal rate went down following the opening of C&D recycling facilities but continues to trend upward.

**Figure 4**

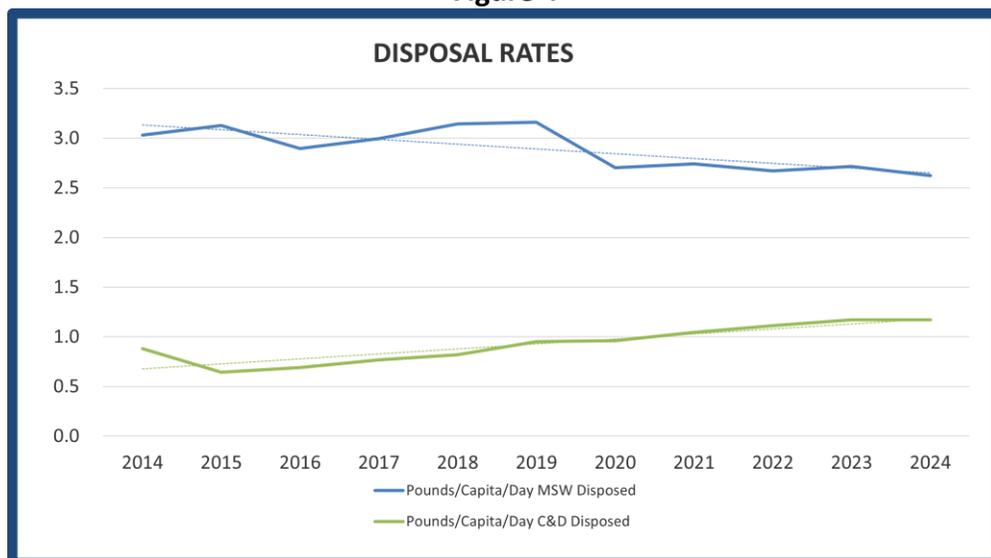
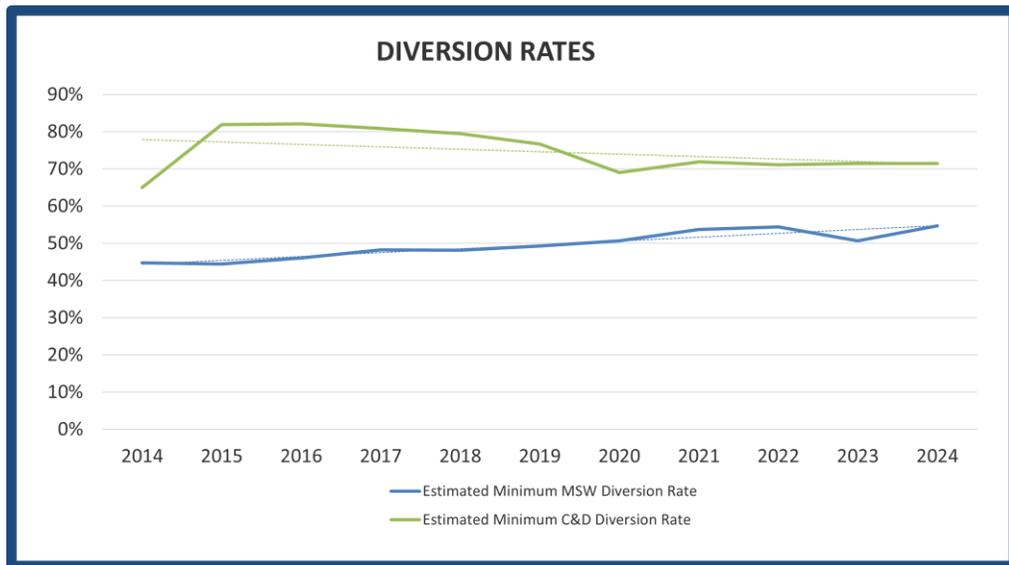


Figure 5 displays diversion rates over time. The MSW diversion rate increased over the last decade by 22%. This year the rate rebounded from a dip last year, though some of that decline was due to the aforementioned methodological change in estimating backyard organics diversion. The C&D diversion rate increased by 9.9%. Prior to 2021, the C&D diversion rate had increased significantly with the opening of recycling facilities but then decreased following the closure of one facility and the arrival of COVID-19. It has remained relatively flat since.

**Figure 5**



## Conclusion

With a strong economy, diversion rates are holding steady and the amounts of MSW and C&D materials diverted, almost 194,000 tons in 2024, is about 13,000 tons more than in 2023. As evidenced by the recovery rates for MSW recyclables and organics, however, a large quantity of recoverable material is disposed, perhaps as much as 60,000 tons when recoverable C&D is also included. Without changes to the current solid waste management system, including additional policies, education, enforcement, markets and facilities, it is expected that solid waste generation will continue to increase over the long-term, along with currently divertible waste being sent to the landfill.



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**CSWD WASTE DIVERSION TABLE FOR CALENDAR YEARS 2014-2024**  
**Tons of CSWD Materials Disposed & Diverted from Disposal**

MATERIALS	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	% CHG 23-24	% CHG 14-24
<b>MSW Materials Diverted &amp; Disposed<sup>1</sup></b>													
1 Paper <sup>2</sup>	23,685	26,303	26,743	33,199	36,723	35,215	35,348	43,211	34,990	30,505	30,010	-1.6%	26.7%
2 Plastic	1,606	1,708	1,705	1,998	2,250	2,232	2,408	2,328	2,327	2,072	1,977	-4.6%	23.1%
3 Glass	4,506	3,499	3,907	3,784	3,914	3,420	4,321	3,189	4,248	3,234	5,232	61.8%	16.1%
4 Metal Cans & Foil	623	600	694	673	662	725	784	707	674	882	3,393	284.7%	444.6%
5 Single-Stream Recyclables/Composite Materials	1,951	0	0	0	26	1	36	74	43	11	16	49.1%	NA
6 Estimated Share of Redeemed Bottle Bill Material	4,462	4,506	4,521	4,551	4,593	4,588	4,577	4,583	4,574	3,605	6,212	72.3%	39.2%
7 Estimated Additional Commercial	4,955	5,011	3,024	NA	NA	NA							
8 <b>TOTAL PAPER, CONTAINERS, &amp; PACKAGING</b>	<b>41,788</b>	<b>41,626</b>	<b>40,594</b>	<b>44,206</b>	<b>48,169</b>	<b>46,180</b>	<b>47,474</b>	<b>54,092</b>	<b>46,854</b>	<b>40,309</b>	<b>46,841</b>	<b>16.2%</b>	<b>12.1%</b>
9 Estimated Backyard Composting/On-site Management	11,836	11,032	11,345	11,363	11,615	13,714	14,901	15,670	15,673	12,837	12,410	-3.3%	4.9%
10 Wood <sup>3</sup>	5,843	7,833	5,826	9,201	7,439	9,256	3,511	5,834	8,068	7,056	11,981	69.8%	105.0%
11 Reported & Estimated Yard Trimmings	4,574	4,835	5,151	5,379	5,155	5,663	5,124	4,360	3,975	4,683	3,674	-21.5%	-19.7%
12 Food Residuals & Non-recyclable Paper	3,870	4,474	5,684	6,934	10,811	12,118	10,775	14,091	19,131	17,669	18,058	2.2%	366.6%
13 <b>TOTAL ORGANICS</b>	<b>26,123</b>	<b>28,173</b>	<b>28,006</b>	<b>32,876</b>	<b>35,020</b>	<b>40,751</b>	<b>34,312</b>	<b>39,955</b>	<b>46,848</b>	<b>42,245</b>	<b>46,123</b>	<b>9.2%</b>	<b>76.6%</b>
14 <b>TEXTILES</b>	<b>677</b>	<b>1,025</b>	<b>1,102</b>	<b>1,174</b>	<b>1,309</b>	<b>1,465</b>	<b>882</b>	<b>2,029</b>	<b>1,235</b>	<b>1,344</b>	<b>2,404</b>	<b>78.9%</b>	<b>254.9%</b>
15 <b>SCRAP METAL</b>	<b>3,097</b>	<b>3,127</b>	<b>3,728</b>	<b>4,261</b>	<b>3,303</b>	<b>3,386</b>	<b>3,694</b>	<b>2,933</b>	<b>4,701</b>	<b>3,199</b>	<b>3,495</b>	<b>9.3%</b>	<b>12.9%</b>
16 <b>HAZARDOUS WASTE</b>	<b>142</b>	<b>113</b>	<b>91</b>	<b>109</b>	<b>207</b>	<b>186</b>	<b>101</b>	<b>98</b>	<b>97</b>	<b>99</b>	<b>86</b>	<b>-12.6%</b>	<b>-39.4%</b>
17 <b>ELECTRONICS</b>	<b>964</b>	<b>816</b>	<b>777</b>	<b>795</b>	<b>666</b>	<b>648</b>	<b>440</b>	<b>642</b>	<b>470</b>	<b>358</b>	<b>429</b>	<b>19.8%</b>	<b>-55.5%</b>
18 <b>TIRES</b>	<b>574</b>	<b>549</b>	<b>593</b>	<b>1,256</b>	<b>1,124</b>	<b>1,442</b>	<b>932</b>	<b>922</b>	<b>775</b>	<b>965</b>	<b>1,341</b>	<b>39.0%</b>	<b>133.7%</b>
19 <b>MSW MATERIALS DIVERTED</b>	<b>73,366</b>	<b>75,429</b>	<b>74,891</b>	<b>84,679</b>	<b>89,797</b>	<b>94,059</b>	<b>87,834</b>	<b>100,670</b>	<b>100,980</b>	<b>88,518</b>	<b>100,719</b>	<b>13.8%</b>	<b>37.3%</b>
20 <b>MSW LANDFILLED/INCINERATED<sup>2</sup></b>	<b>90,688</b>	<b>94,377</b>	<b>87,735</b>	<b>90,890</b>	<b>96,686</b>	<b>96,800</b>	<b>85,457</b>	<b>86,904</b>	<b>84,651</b>	<b>86,160</b>	<b>83,338</b>	<b>-3.3%</b>	<b>-8.1%</b>
21 Pounds/Capita/Day MSW Diverted	2.45	2.50	2.47	2.79	2.92	3.07	2.78	3.18	3.18	2.79	3.17	13.7%	29.3%
22 Pounds/Capita/Day MSW Disposed	3.03	3.13	2.90	2.99	3.14	3.16	2.70	2.74	2.67	2.71	2.62	-3.3%	-13.5%
23 <b>Estimated Minimum MSW Diversion Rate</b>	<b>44.7%</b>	<b>44.4%</b>	<b>46.1%</b>	<b>48.2%</b>	<b>48.2%</b>	<b>49.3%</b>	<b>50.7%</b>	<b>53.7%</b>	<b>54.4%</b>	<b>50.7%</b>	<b>54.7%</b>	<b>8.0%</b>	<b>22.4%</b>
<b>C&amp;D Materials Diverted &amp; Disposed</b>													
24 <b>C&amp;D REPORTED RECYCLED/REUSED</b>	<b>48,786</b>	<b>87,799</b>	<b>96,354</b>	<b>98,404</b>	<b>97,181</b>	<b>95,404</b>	<b>67,658</b>	<b>84,703</b>	<b>86,975</b>	<b>92,965</b>	<b>93,545</b>	<b>0.6%</b>	<b>91.7%</b>
25 <b>C&amp;D LANDFILLED/INCINERATED</b>	<b>26,299</b>	<b>19,397</b>	<b>20,957</b>	<b>23,330</b>	<b>25,178</b>	<b>29,085</b>	<b>30,408</b>	<b>33,126</b>	<b>35,282</b>	<b>37,200</b>	<b>40,857</b>	<b>9.8%</b>	<b>55.4%</b>
26 Pounds/Capita/Day C&D Diverted	1.63	2.91	3.18	3.24	3.16	3.12	2.14	2.67	2.74	2.93	2.93	0.0%	79.6%
27 Pounds/Capita/Day C&D Disposed	0.88	0.64	0.69	0.77	0.82	0.95	0.96	1.04	1.11	1.17	1.17	0.0%	33.3%
28 <b>Estimated Minimum C&amp;D Diversion Rate</b>	<b>65.0%</b>	<b>81.9%</b>	<b>82.1%</b>	<b>80.8%</b>	<b>79.4%</b>	<b>76.6%</b>	<b>69.0%</b>	<b>71.9%</b>	<b>71.1%</b>	<b>71.4%</b>	<b>71.4%</b>	<b>0.0%</b>	<b>9.9%</b>
<b>MSW &amp; C&amp;D Combined</b>													
29 <b>TOTAL MSW &amp; C&amp;D LANDFILLED/INCINERATED<sup>2</sup></b>	<b>116,987</b>	<b>113,773</b>	<b>108,691</b>	<b>114,220</b>	<b>121,865</b>	<b>125,885</b>	<b>115,865</b>	<b>120,031</b>	<b>119,933</b>	<b>123,360</b>	<b>124,196</b>	<b>0.7%</b>	<b>6.2%</b>
30 Pounds/Capita/Day MSW & C&D Diverted	4.08	5.41	5.65	6.03	6.08	6.19	4.92	5.85	5.93	5.72	6.10	6.7%	49.4%
31 Pounds/Capita/Day MSW & C&D Disposed	3.91	3.77	3.59	3.76	3.96	4.11	3.66	3.79	3.78	3.89	3.91	0.6%	0.0%
32 <b>Estimated Minimum MSW &amp; C&amp;D Diversion Rate</b>	<b>51.1%</b>	<b>58.9%</b>	<b>61.2%</b>	<b>61.6%</b>	<b>60.5%</b>	<b>60.1%</b>	<b>57.3%</b>	<b>60.7%</b>	<b>61.0%</b>	<b>59.5%</b>	<b>61.0%</b>	<b>2.5%</b>	<b>19.4%</b>
<b>Other Disposal</b>													
33 <b>Alternative Daily Landfill Cover</b>	<b>7,052</b>	<b>16,927</b>	<b>12,254</b>	<b>23,815</b>	<b>7,480</b>	<b>6,318</b>	<b>7,162</b>	<b>11,357</b>	<b>15,309</b>	<b>26,301</b>	<b>11,276</b>	<b>-57.1%</b>	<b>59.9%</b>
<b>POPULATION ESTIMATES</b>													
CSWD Resident Population	159,945	161,382	161,531	162,372	164,572	163,774	168,386	169,271	169,301	169,481	169,605	0.1%	6.0%
CSWD Seasonal Population <sup>4</sup>	3,985	3,985	3,985	3,985	3,985	3,985	4,462	4,462	4,462	4,462	4,462	0.0%	12.0%
<b>TOTAL POPULATION</b>	<b>163,930</b>	<b>165,367</b>	<b>165,516</b>	<b>166,357</b>	<b>168,557</b>	<b>167,759</b>	<b>172,848</b>	<b>173,733</b>	<b>173,763</b>	<b>173,943</b>	<b>174,067</b>	<b>0.1%</b>	<b>6.2%</b>

<sup>1</sup>Under a CSWD Solid Waste Management Ordinance data reporting requirement implemented in 2016, additional quantities of materials shipped by businesses directly to markets for composting, recycling, animal feed, etc. are included beginning with that year.

<sup>2</sup>Beginning in 2015, the out-of-District portion of MSW contamination at the MRF and the out-of-District portion of MSW disposed at CSWD Drop-Off Centers are subtracted from Total MSW Landfilled/Incinerated; the out-of-District portion of non-recyclable C&D at Myers Recycling Facility and CSWD Drop-Off Centers is subtracted from Total C&D Landfilled/Incinerated; and the out-of-District portion of mandatory recyclables delivered to CSWD Drop-Off Centers is subtracted from Paper. Tires that go to waste-to-energy facilities are added to MSW Landfilled/Incinerated.

<sup>3</sup>The bulk of clean wood reported each year is wood collected and processed at CSWD's Organic Diversion Facility. Wood is processed into wood chips and utilized in the production of compost. It is on the transfer date that tons are recorded. Consequently, large quantities processed in one year may be counted in the next year.

<sup>4</sup>The seasonal population is calculated following the instructions provided by the Vermont Department of Environmental Conservation Solid Waste Program in the document titled, "Disposal Data for SWIP Reports."

Note: Some columns may not add up to totals due to rounding.



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## Diversion Table Notes by Line Item

**LINE 1:** This line includes corrugated cardboard, boxboard, paper bags, telephone directories, magazines and catalogs, newspaper, office paper, mixed paper, hardcover and paperback books, and junk mail.

**LINE 2:** This line includes polyethylene terephthalate plastic (#1 plastic), high density polyethylene plastic (#2 plastic), polyvinyl chloride plastic (#3 plastic), low density polyethylene plastic (#4 plastic), polypropylene plastic (#5 plastic), polystyrene plastic (#6 plastic), plastic labeled "other" (#7 plastic), and any mixture of plastic types.

**LINE 3:** This line includes glass from food and beverage containers and waste glass from a manufacturing process.

**LINE 4:** This line includes aluminum and tin/steel beverage and food containers, aerosol cans, and aluminum foil and pie plates.

**LINE 5:** This line includes 1) paper and container recyclables mixed together that were shipped to facilities outside of Chittenden County for sorting and marketing and 2) composite materials that were shipped for recycling.

**LINE 6:** This line is an estimate of the bottles and cans redeemed under the Bottle Bill. The estimate is based on Chittenden County's share, based on population, of estimates provided by Vermont ANR.

**LINE 7:** This line is an estimate of the quantities of materials recycled by businesses that are not reported to CSWD. The estimate is based on a study conducted by DSM Environmental Services for CSWD in 2007. Quantities for businesses in the study that began reporting directly to CSWD in 2016 or have closed are subtracted from the estimate. In 2017, the estimate was eliminated due to direct reporting by businesses.

**LINE 9:** Participation rates in on-site management of food scraps and yard trimmings are obtained from CSWD's household surveys. Vermont's Waste Composition Study (2023) most recent average of 626 pounds of material was diverted per household per year through backyard composting. This amount is used to calculate this line. Prior to 2023 an estimate of 650 pounds from the EPA was used.

**LINE 10:** This line includes tree limbs, brush, pallets, and dimensional lumber that have never been painted, stained, or treated and do not have adhesives, such as plywood or particle board.

**LINE 11:** This line includes grass clippings, leaves, weeds, flowers, pine needles, and garden plants.

**LINE 12:** This line includes discarded food, food-soiled paper, and oils from restaurants, cafeterias, grocery stores, food and beverage product manufacturers, other businesses, and residents that were composted, anaerobically digested, donated for human consumption, or used as animal feed.



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**LINE 14:** This line includes clothing and other textiles collected from Drop-Off Centers and private processors.

**LINE 15:** This line includes metal items such as car parts, furniture, batteries, sheet metal, oil filters, propane cylinders, bicycles, lawn mowers, outdoor grills, and appliances. It does not include scrap metal delivered directly to scrap metal dealers by generators except for those materials reported by businesses and recycling processors.

**LINE 16:** This line includes antifreeze; mercury-added products, including fluorescent light tubes; paint and other products redistributed through CSWD's Hazbin Reuse Program; rebled paint sold by the Environmental Depot; and paint shipped from the Depot for recycling. It also includes some of the items recycled by private businesses offering collection programs beginning in 2016.

**LINE 17:** This line includes computer and other electronic equipment shipped for processing (recycling and reuse).

**LINE 18:** This line includes tires from bicycles, motorcycles, cars, trucks, and off-road vehicles that were recycled into new products or reused.

**LINE 20:** This line includes municipal solid waste (MSW) that was disposed in landfills or incinerated including tires that went to waste-to-energy facilities.

**LINE 23:** Estimated Minimum MSW Diversion Rate = Total MSW Materials Diverted/(Total MSW Materials Diverted + Total MSW Landfilled/Incinerated).

**LINE 24:** This line includes construction materials such as asphalt, concrete, brick, drywall, wood, scrap metal, and asphalt shingles.

**LINE 25:** This line includes construction and demolition waste that was disposed in landfills or incinerated, including material, such as fines from C&D recycling processing and other C&D debris, used for landfill site improvements (road building).

**LINE 28:** Estimated Minimum C&D Diversion Rate = C&D Recycled/(C&D Recycled + Total C&D Landfilled/Incinerated).

**LINE 32:** Estimated Minimum MSW & C&D Diversion Rate = (Total MSW Materials Diverted + C&D Recycled)/(Total MSW Materials Diverted + C&D Recycled + Total MSW Landfilled/Incinerated + Total C&D Landfilled/Incinerated).

**LINE 33:** This line includes materials that were used as alternative daily cover at a landfill (e.g., contaminated soil, catch basin grit).



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## Appendix A: Methodology

### Data Sources

Quantities of materials recycled, composted, and disposed are reported to CSWD by facilities that manage solid waste generated in Chittenden County and by businesses that ship their materials directly to other facilities that are not required to report to CSWD. Data received directly from the following facilities are included in this report:

- A. Marcelino & Co. (2011-2017)
- American Paper Recycling Corp. (2011-2011)
- BDS Waste Disposal, Inc.
- BED Waste Wood Yard
- Bob's Tire Co. (2016-2018)
- Budzyn Tire (beg. 2016)
- Burlington Area Transfer Station
- Canusa Hershman Recycling Co.
- Casella C&D Recycling Facility (2016-2018)
- Casella Transfer Station
- CSWD facilities
- FBS Tire Recycling, Inc. (2016-2018)
- Frank W. Whitcomb Construction Corp. (beg. 2015)
- Gauthier Trucking Co.
- Good Point Recycling
- Goodwill Industries
- Iron Mountain (beg. 2019)
- Moretown Landfill (2011-13)
- Myers C&D Recycling Facility (beg. 2013)
- Pike Industries, Inc.
- Ranger Asphalt & Concrete Processing
- Salvation Army (2011-2016)
- SecurShred
- Shred-Ex
- Sleep Well Recycling (beg. 2020)
- Tomra
- Vermont Food Bank (beg. 2020)
- Waste USA Landfill

It was discovered in 2019 that many of the construction and demolition debris (C&D) loads that were delivered to one of the disposal facilities during 2015-2018 were miscoded as municipal solid waste (MSW). CSWD staff believe that most, but not all, of the errors have been corrected. The total tons of MSW landfilled or incinerated is likely lower than was reported and the total tons of C&D landfilled or incinerated is likely higher than was reported for calendar years 2015-2018. The uncorrected errors affect the accuracy of the diversion and disposal statistics used in this report for those years.

Beginning January 1, 2016, businesses that ship materials directly to brokers or markets for composting, recycling, animal feed, etc., were required to begin reporting quantities diverted to CSWD. Not all the data is being captured yet, but the total far exceeds what had been estimated for calendar years 2011-2015 based on research conducted by DSM Environmental Services for CSWD in 2007. The business data that is reported are included by material in the Diversion Table

at the end of this report. CSWD's compliance and business outreach staff actively contact businesses who lapse in reporting or who have not yet reported but potentially may direct haul recoverable material out of the county.

The report includes only very limited data for salvage warehouse and other durable goods diversion through reuse and for extended producer responsibility program materials (e.g., fluorescent bulbs, thermostats, batteries, and paint) collected from the public by retailers. The report does not include data for commercial and institutional on-site composting. As of 2023, estimates for household on-site composting has been adjusted downward due to information provided by the State of Vermont's 2023 Waste Composition Study. These estimates will be revisited once CSWD completes its own survey of residential disposal, recycling and composting behavior later in 2024.

Residue rates for recycling end markets are unknown. No adjustments for material losses have been made to tons reported recycled.

In keeping with the State of Vermont and the U.S. Environmental Protection Agency MSW diversion calculations, this report does not include regulated hazardous waste and unregulated hazardous waste disposed at out-of-state hazardous waste facilities.

### **Population Estimates**

Population estimates needed to calculate figures come from the U.S. Census ([www.census.gov](http://www.census.gov)). The seasonal population is calculated following the instructions provided by the Vermont Department of Environmental Conservation Solid Waste Program in the document titled, "Disposal Data for SWIP Reports."

### **Adjustments for Non-District Solid Waste**

Based on a 2015 survey, an estimated 4.1% of CSWD Drop-Off Center (DOC) users are non-District residents. The quantities of materials brought to CSWD facilities by these customers increase the total amount of solid waste diverted and the total amount disposed. Beginning in 2015, the estimated non-District portions of MSW and C&D landfilled and mandatory recyclables diverted from disposal were subtracted from the corresponding categories. No adjustments were made for special materials non-District users may or may not have delivered to CSWD DOCs.

Also beginning in 2015, the percentage of incoming materials at the MRF from non-District sources was applied to outbound contamination disposed as MSW. This quantity was subtracted from Total MSW Landfilled/Incinerated. Similarly, the percentage of incoming materials at Myers C&D Recycling Facility from non-District sources was applied to outbound material disposed as C&D and subtracted from Total C&D Landfilled/Incinerated.