



ADMINISTRATIVE OFFICE  
1021 Redmond Road  
Williston, VT 05495

EMAIL [info@cswd.net](mailto:info@cswd.net)  
TEL (802) 872-8100

[www.cswd.net](http://www.cswd.net)

#4

## MEMORANDUM

TO: Board of Commissioners  
FROM: Jon Dorwart  
DATE: October 20, 2022  
RE: 2021 Waste Diversion & Disposal Report

Attached is the 2021 Waste Diversion and Disposal Report. PowerPoint slides that summarize the report and will be presented at your October meeting are also attached. The report is produced annually to help track and evaluate how well our 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.

## 2021 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 methodology and comparison of results to the previous year are found in the next two sections. The tons of CSWD wastes disposed and diverted from disposal are displayed in the table on page 8. Notes on the lines in the table may be found on pages 9-10.

### 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
- Intervale Compost Products (2011)
- Iron Mountain (beg. 2019)
- LaPlatte River Angus (2011-11)
- 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)
- 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 are 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 are reported are included in the Diversion Table on page 8 by material.

The report includes only very limited data for salvage warehouse and other durable goods diversion through reuse and for mercury-containing and other products (e.g., fluorescent bulbs, thermostats, batteries) collected from the public by retailers. The report does not include data for commercial and institutional on-site composting.

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 wastes 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.

## Comparison of Results to Previous Year

NOTE: This report uses the US Census 2021 population estimate for Chittenden County in relevant calculations (e.g., pounds per capita disposed). The US Census will adjust population estimates for 2011-2019, 2021 and seasonal population estimates at some point. Relevant calculations for these years will be amended at that time and will appear in future reports.

### Summary

The impact of the coronavirus pandemic (COVID-19) on solid waste disposal and diversion appears to have largely abated in 2021 with nuanced affect. Overall, compared to 2020, total generation of solid waste was up 12.5%. The tons of MSW disposed increased slightly, and notably MSW tons diverted increased significantly to their highest level on record. C&D tons disposed increased to its highest level since 2013 and C&D tons diverted remained low proportionately compared to prior years but up 25% over 2020. The amount of material used for Alternative Daily Landfill Cover (ADC) increased by 28%. The MSW diversion rate remained high at 53%, slightly accelerating a long-term trend of steady growth. The C&D and the MSW and C&D combined diversion rates both increased this year helping reverse the negative trends during the first years of the pandemic. The estimated recovery rate for MSW mandatory recyclables decreased very slightly while the recovery rate for all currently divertible MSW materials increased by 3%.

### Municipal Solid Waste

The amount of MSW landfilled increased by 1.6 %, and the pounds per capita per day disposed was up slightly from 2.70 to 2.74. This is not surprising given the overall reduction of business activity in 2020. While a lot of work activity shifted to residences and consumption of certain types of products in the home increased, these actions were not enough to compensate for the commercial reduction during the early pandemic in 2020. In 2021, as hybrid work activity continued, the region experienced a robust recovery in consumption while a significant number of households continued working remotely. This was accompanied by a return in tourism and the relaxation of public health restrictions. All these factors appear to be boosting traditional business activity. Diversion has increased over prior years, led by a strong recovery of paper products, organics, and textiles.

The total of MSW materials diverted was up 14.7%. There were significant increases in the tonnages of paper, clean wood, and food residuals diverted. There was a significant rebound in the amount of electronics diverted. Scrap metal and hazardous waste were below their ten-year averages. Tires diverted remained around the ten-year average. A remarkable increase in diverted textiles can be in part attributed to increased donations during the pandemic and could also be partially a result of backed up inventory from the shutdowns of the prior year.

Quantities of clean wood have varied tremendously over the years, often due to the timing of when wood is chipped and then transferred to the McNeil Generating Station inventory from the Wood Depot in Burlington, which is when it is recorded. In 2021, McNeil received and added approximately 3,692 tons of wood to their inventory which is about 63 percent of all clean wood waste. Notably, clean wood collected by CSWD facilities is now chipped and transferred to the Organics Diversion Facility and used for feedstock in their compost products, accounting for another 28%, or 1,646 tons, of the annual total as compared to 398 tons in 2020.

The increase in food residual quantities diverted is likely because of the increase in generation as a result of relaxed public health measures and a slow return to more normal business patterns as the pandemic has eased and the public has adapted. Interestingly, the reported tonnage of spent grains at reporting breweries was up by 1,000 tons or 30 percent from 2020. This may have been a result of the first full-year of the Vermont's food residual ban. In addition, food preparation at home and consumption of take-out meals were likely still higher than in the past. There was also a surge in home gardening during the pandemic. These activities may have resulted in more food waste being generated and diverted from the landfill.

The decrease in glass diverted is the result of a large amount of inventory of processed glass aggregate at CSWD's Materials Recovery Facility being used in a drainage system for the new compost curing area at CSWD's Organics Diversion Facility in 2020. With that project winding up, this fraction returned to a level closer to prior years. 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 went up from 50.7% to 53.7%, and the pounds per capita per day diverted increased from 2.78 to 3.18 which is the highest in ten years. For comparison, the USEPA reported that in 2018, the most recent year for which data are available, the US diversion rate was 32%. The Vermont Agency of Natural Resources reported that in 2019, also the most recent year data are available, the Vermont diversion rate was 36%. While what is included in calculations varies to some degree, rates for communities that are considered to be high-performing include Seattle at 54% in 2019, San Francisco at 51% in FY 21, and Portland Metro in Oregon at 46% in 2019. Based on the diversion data and estimates of the components of waste disposed, the maximum MSW diversion rate achievable in CSWD is 80.6%.

Diverting the MSW recyclables and organics from landfill disposal reduced 2021 GHG emissions by an estimated 190,000 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E). This is equivalent to taking about 40,000 cars off the road or conserving over 21 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 81.4%, similar to 81.6% in 2020. For comparison, the average recovery rate for curbside recyclables for participating households across studies compiled by The Recycling Partnership is 61.5% (*2020 State of Curbside Recycling Report*). The average for all households would be lower than that in those communities since not all households participate. In addition, the average rate across all U.S. communities is much smaller since many still do not have recycling programs.

CSWD's estimated recovery rate for all MSW materials that are currently divertible is 66.7%, up significantly from 63.9% in 2020 and 64.4% in 2019 marking a sustained upward trend.

### **Construction & Demolition Debris**

The tonnage of C&D landfilled increased by 9.1%, and the amount of C&D reported recycled increased by 25.2%. The estimated C&D diversion rate increased from 69.0% to 71.9%. The maximum C&D diversion rate possible is estimated at 80.0%.

There was an increase in the amount of asphalt and concrete recycled by over 40,000 tons. Demand for these materials was down in 2020 but increased dramatically in 2021. Many towns postponed road projects due to the tax revenue uncertainties caused by COVID-19. Diversion of C&D materials appears to be on the rebound, but remains 8-10 percent below pre-pandemic peaks.

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

The combined estimated MSW and C&D diversion rate is 60.7% compared to 57.3% in 2020. The maximum combined diversion rate possible is estimated at 80.4%. The MSW and C&D combined pounds per capita disposed increased from 3.66 to 3.79, while the MSW and C&D combined pounds per capita diverted increased from 4.92 to 5.86.

### **Alternative Daily Landfill Cover**

Material used as ADC is up 4,195 tons, or 58.6%, compared to 2020. 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.

## **Historical Trends**

Diversion and disposal data for the period 2011-2021 are included in the charts below. Figure 1 shows trends over time in MSW tons diverted versus disposed and C&D tons diverted versus disposed. MSW tons disposed in 2021 is over 7,400 tons less than it was in 2011. COVID-19, for the various reasons discussed earlier, had a bigger impact on solid waste than the 2008 recession did, as it lowered employment by almost 8,000 from its peak in 2019, though many if not most of the lost jobs were likely recovered during 2021.

The sharper increase in the last few years 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 trend resumes in 2021.

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. However, a significant rebound occurred in 2021 as the region emerged from the pandemic and construction activity remained strong.

**Figure 1**

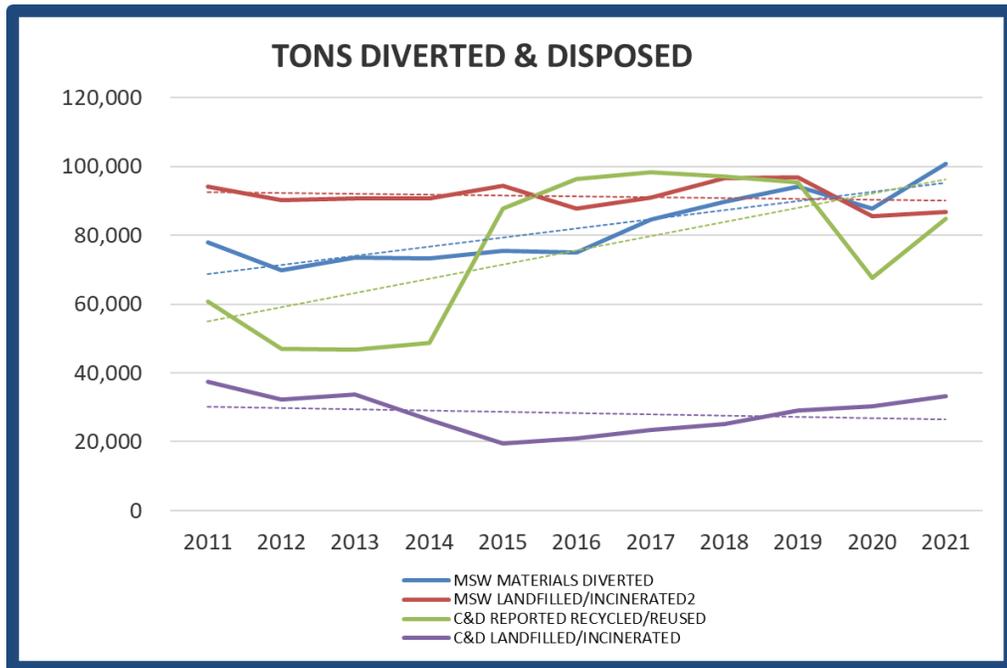


Figure 2 displays disposal rates over time. The MSW disposal rate decreased during the post 2008 recession and then increased during the last few years until COVID-19 arrived. The rate is currently 14% less than it was in 2011. The C&D disposal rate went down following the opening of C&D recycling facilities but continues to trend upward.

**Figure 2**

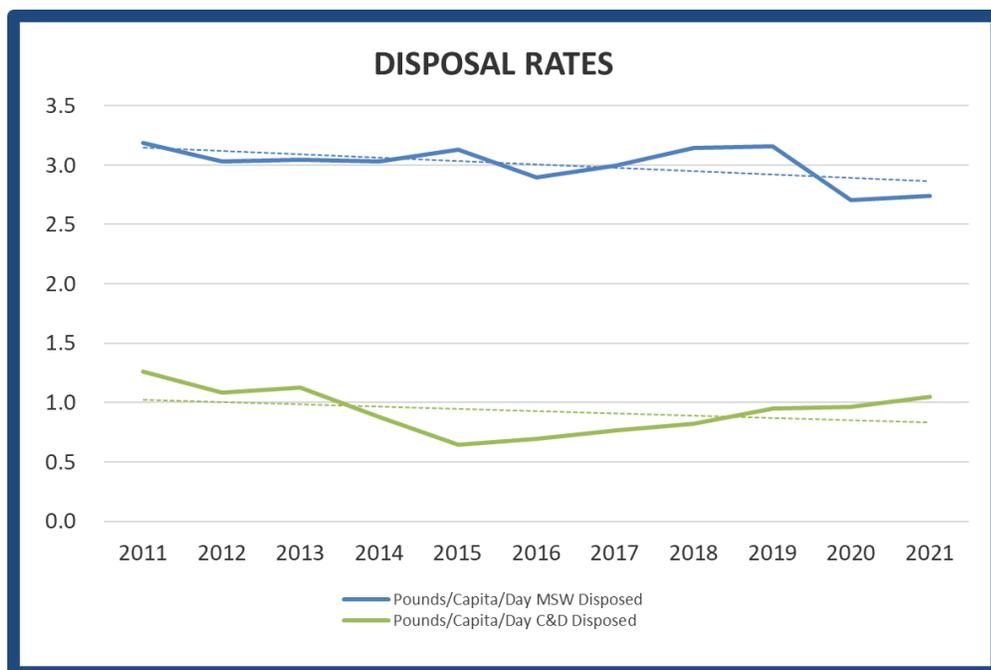
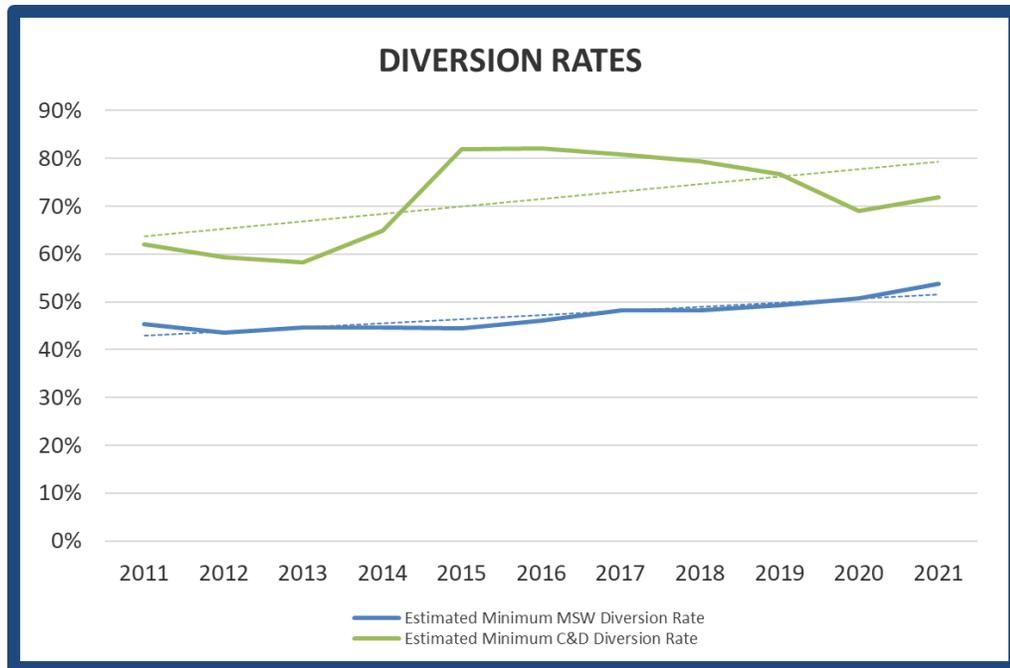


Figure 3 displays diversion rates over time. The MSW diversion rate increased over the last decade by 8.4 points, or 18.6%. The C&D diversion rate increased by over 9.9 points, or 15.9%. Prior to 2021, the C&D diversion rate had increased significantly with the opening of recycling facilities but then decreased following the closure of one the facilities and then the arrival of COVID-19. Since 2021 there appears to be a moderate rebound.

**Figure 3**



## Conclusion

As we pass the immediate impacts of COVID-19, diversion rates are increasing and the amounts of MSW and C&D materials generated - over 185,400 tons in 2021 - are close to 2018 totals. As evidenced by the recovery rates for MSW recyclables and organics, however, a large quantity of recoverable material is still being disposed, perhaps as much as 60,000 tons when recoverable C&D is also included. Without changes to the current solid waste management system, it is expected that solid waste generation and disposal will continue to increase in the post-pandemic era and likely even in the event of a moderate recession.

**CSWD WASTE DIVERSION TABLE FOR CALENDAR YEARS 2011-2021**  
**Tons of CSWD Materials Disposed & Diverted from Disposal**

MATERIALS	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	% CHG 20-21	% CHG 11-21
<b>MSW Materials Diverted &amp; Disposed<sup>1</sup></b>													
1 Paper <sup>2</sup>	27,624	23,924	24,439	23,685	26,303	26,743	33,199	36,723	35,215	35,348	43,320	22.6%	56.8%
2 Plastic	1,375	1,614	1,660	1,606	1,708	1,705	1,998	2,250	2,232	2,408	2,328	-3.3%	69.3%
3 Glass	3,463	2,996	4,148	4,506	3,499	3,907	3,784	3,914	3,420	4,321	3,189	-26.2%	-7.9%
4 Metal Cans & Foil	529	514	538	623	600	694	673	662	725	784	707	-9.8%	33.6%
5 Single-Stream Recyclables/Composite Materials	985	0	0	1,951	0	0	0	26	1	36	74	106.7%	NA
6 Estimated Share of Redeemed Bottle Bill Material	4,565	4,587	4,447	4,462	4,506	4,521	4,551	4,593	4,588	4,575	4,572	-0.1%	0.2%
7 Estimated Additional Commercial	4,880	4,905	4,935	4,955	5,011	3,024	NA	NA	NA	NA	NA	NA	NA
8 <b>TOTAL PAPER, CONTAINERS, &amp; PACKAGING</b>	<b>43,421</b>	<b>38,540</b>	<b>40,167</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>47,472</b>	<b>54,189</b>	<b>14.2%</b>	<b>24.8%</b>
9 Estimated Backyard Composting/On-site Management	10,866	10,910	11,798	11,836	11,032	11,345	11,363	11,615	13,714	14,896	15,633	4.9%	43.9%
10 Wood <sup>3</sup>	9,300	6,260	7,740	5,843	7,833	5,826	9,201	7,439	9,256	3,511	5,834	66.2%	-37.3%
11 Reported & Estimated Yard Trimmings	5,347	5,219	4,390	4,574	4,835	5,151	5,379	5,155	5,663	5,124	4,360	-14.9%	-18.5%
12 Food Residuals & Non-recyclable Paper	2,400	2,623	3,302	3,870	4,474	5,684	6,934	10,811	12,118	10,775	14,091	30.8%	487.1%
13 <b>TOTAL ORGANICS</b>	<b>27,913</b>	<b>25,012</b>	<b>27,229</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>34,306</b>	<b>39,917</b>	<b>16.4%</b>	<b>43.0%</b>
14 <b>TEXTILES</b>	<b>756</b>	<b>380</b>	<b>642</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>130.0%</b>	<b>168.4%</b>
15 <b>SCRAP METAL</b>	<b>4,325</b>	<b>3,277</b>	<b>3,484</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>2,904</b>	<b>-21.4%</b>	<b>-32.9%</b>
16 <b>HAZARDOUS WASTE</b>	<b>142</b>	<b>87</b>	<b>123</b>	<b>142</b>	<b>113</b>	<b>91</b>	<b>109</b>	<b>186</b>	<b>101</b>	<b>98</b>	<b>101</b>	<b>-3.1%</b>	<b>-30.8%</b>
17 <b>ELECTRONICS</b>	<b>782</b>	<b>1,025</b>	<b>909</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>45.9%</b>	<b>-17.9%</b>
18 <b>TIRES<sup>4</sup></b>	<b>628</b>	<b>1,540</b>	<b>855</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>-1.1%</b>	<b>46.7%</b>
19 <b>MSW MATERIALS DIVERTED</b>	<b>77,968</b>	<b>69,860</b>	<b>73,366</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>87,827</b>	<b>100,702</b>	<b>14.7%</b>	<b>29.2%</b>
20 <b>MSW LANDFILLED/INCINERATED<sup>2</sup></b>	<b>94,234</b>	<b>90,173</b>	<b>90,751</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>86,807</b>	<b>1.6%</b>	<b>-7.9%</b>
21 <b>Pounds/Capita/Day MSW Diverted</b>	<b>2.64</b>	<b>2.35</b>	<b>2.46</b>	<b>2.45</b>	<b>2.50</b>	<b>2.47</b>	<b>2.79</b>	<b>2.92</b>	<b>3.07</b>	<b>2.78</b>	<b>3.18</b>	<b>14.6%</b>	<b>20.7%</b>
22 <b>Pounds/Capita/Day MSW Disposed</b>	<b>3.19</b>	<b>3.03</b>	<b>3.04</b>	<b>3.03</b>	<b>3.13</b>	<b>2.90</b>	<b>2.99</b>	<b>3.14</b>	<b>3.16</b>	<b>2.70</b>	<b>2.74</b>	<b>1.5%</b>	<b>-13.9%</b>
23 <b>Estimated Minimum MSW Diversion Rate</b>	<b>45.3%</b>	<b>43.7%</b>	<b>44.7%</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>6.0%</b>	<b>18.6%</b>
<b>C&amp;D Materials Diverted &amp; Disposed</b>													
24 <b>C&amp;D REPORTED RECYCLED/REUSED</b>	<b>60,875</b>	<b>47,012</b>	<b>46,833</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>25.2%</b>	<b>39.1%</b>
25 <b>C&amp;D LANDFILLED/INCINERATED</b>	<b>37,307</b>	<b>32,268</b>	<b>33,639</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>33,177</b>	<b>9.1%</b>	<b>-11.1%</b>
26 <b>Pounds/Capita/Day C&amp;D Diverted</b>	<b>2.06</b>	<b>1.58</b>	<b>1.57</b>	<b>1.63</b>	<b>2.91</b>	<b>3.18</b>	<b>3.24</b>	<b>3.16</b>	<b>3.12</b>	<b>2.14</b>	<b>2.68</b>	<b>25.1%</b>	<b>30.1%</b>
27 <b>Pounds/Capita/Day C&amp;D Disposed</b>	<b>1.26</b>	<b>1.08</b>	<b>1.13</b>	<b>0.88</b>	<b>0.64</b>	<b>0.69</b>	<b>0.77</b>	<b>0.82</b>	<b>0.95</b>	<b>0.96</b>	<b>1.05</b>	<b>9.1%</b>	<b>-16.9%</b>
28 <b>Estimated Minimum C&amp;D Diversion Rate</b>	<b>62.0%</b>	<b>59.3%</b>	<b>58.2%</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>4.1%</b>	<b>15.9%</b>
<b>MSW &amp; C&amp;D Combined</b>													
29 <b>TOTAL MSW &amp; C&amp;D LANDFILLED/INCINERATED<sup>2</sup></b>	<b>131,542</b>	<b>122,442</b>	<b>124,391</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>119,984</b>	<b>3.6%</b>	<b>-8.8%</b>
30 <b>Pounds/Capita/Day MSW &amp; C&amp;D Diverted</b>	<b>4.70</b>	<b>3.93</b>	<b>4.03</b>	<b>4.08</b>	<b>5.41</b>	<b>5.65</b>	<b>6.03</b>	<b>6.08</b>	<b>6.19</b>	<b>4.92</b>	<b>5.86</b>	<b>19.2%</b>	<b>24.8%</b>
31 <b>Pounds/Capita/Day MSW &amp; C&amp;D Disposed</b>	<b>4.45</b>	<b>4.11</b>	<b>4.17</b>	<b>3.91</b>	<b>3.77</b>	<b>3.59</b>	<b>3.76</b>	<b>3.96</b>	<b>4.11</b>	<b>3.66</b>	<b>3.79</b>	<b>3.5%</b>	<b>-14.7%</b>
32 <b>Estimated Minimum MSW &amp; C&amp;D Diversion Rate</b>	<b>51.4%</b>	<b>48.8%</b>	<b>49.2%</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>6.0%</b>	<b>18.2%</b>
<b>Other Disposal</b>													
33 <b>Alternative Daily Landfill Cover</b>	<b>8,872</b>	<b>9,633</b>	<b>9,040</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>58.6%</b>	<b>28.0%</b>
<b>POPULATION ESTIMATES</b>													
CSWD Resident Population	158,033	158,673	159,432	159,945	161,382	161,531	162,372	164,572	163,774	168,323	168,865	0.3%	6.9%
CSWD Seasonal Population <sup>5</sup>	3,985	3,985	3,985	3,985	3,985	3,985	3,985	3,985	3,985	3,985	4,462	0.0%	12.0%
<b>TOTAL POPULATION</b>	<b>162,018</b>	<b>162,658</b>	<b>163,417</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>172,785</b>	<b>173,327</b>	<b>0.3%</b>	<b>7.0%</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 processed at the Burlington Electric Department Wood Depot. Wood is processed into wood chips and periodically moved to the inventory of the McNeil Generating Station. 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>In 2012, the total includes 832.9 tons of tires that were removed from a junk yard in Milton.

<sup>5</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.

## 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 biennial household solid waste surveys. A national study conducted in 1995 for the U.S. Environmental Protection Agency and the Composting Council by Applied Compost Consulting found an average of 650 pounds of material was diverted per household per year through backyard composting. This amount is used to calculate this line.

**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.

**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).

# 2021 Waste Diversion & Disposal Report

JON DORWART  
Board of Commissioners Meeting  
October 26, 2022



1

## Purpose of Diversion Report

- Track & evaluate programs
- Fulfill State reporting requirements
- Provide information for communications



2

## Solid Waste Metrics

- Diversion rate:  $\text{Diverted} / (\text{Diverted} + \text{Disposed})$
- Disposal rate: Lbs/Capita/Day Disposed
- Recovery rate: % of material diverted
- Environmental impacts: GHG emissions, energy savings



3

## 2021 Highlights

- Total solid waste generation up 12.5%
- MSW: tons disposed increased slightly & tons diverted increased significantly
- C&D: tons disposed increased to highest since 2013 & tons diverted remained lower than normal but 25% higher than 2020
- MSW diversion rate remained high at 53%
- Recovery rate for mandatory recyclables decreased very slightly



4

## Data & Comparisons to 2020

### MSW DISPOSED

- 2020: 85,457 tons  
2021: 86,807 tons  
Up 1.6%
- 2020: 2.70 lbs/cap/day  
2021: 2.74 lbs/cap/day



5

## Data & Comparisons to 2020

### MSW DIVERTED

- 2020: 87,827 tons  
2021: 100,702 tons  
Up 14.7%
- 2020: 2.78 lbs/cap/day  
2021: 3.18 lbs/cap/day



6

## Data & Comparisons to 2020

### MSW DIVERTED (continued)

- Significant increases in paper, clean wood, food residuals diverted
- Significant rebound in amount of electronics diverted
- Large increase in diverted textiles



7

## Data & Comparisons to 2020

### MSW DIVERTED (continued)

- McNeil Generating Station took in 63% of clean wood
- ODF now takes clean wood from CSWD facilities – about 28% of total this year
- Increases in paper and food residuals likely due to a post COVID-19 return to normalcy, and first full-year of food ban for the latter
- Increased textiles likely due to increased donations during last year and backed up inventory



8

## Data & Comparisons to 2020

### MSW DIVERSION RATE

- Diverted/(Diverted + Disposed)
- 2020: 50.7%
- 2021: 53.7%



9

## Data & Comparisons to 2020

### MSW DIVERSION RATE (continued)

- US 2018: 32%
- Vermont 2019: 36%
- Seattle 2019: 54%
- San Francisco FY21: 51%
- Portland Metro 2019: 46%



10

## Data & Comparisons to 2020

### MSW DIVERSION RATE (continued)

- Maximum diversion rate: 80.6%  
(tons diverted + tons disposed that are **currently divertible**)/(tons diverted + total tons disposed)



11

## GHG Emissions Reduction

### MSW RECYCLABLES & ORGANICS DIVERTED

- 190,000 MTCO<sub>2</sub>E reduced
- Equivalent to taking 40,000 cars off the road



12

## Data & Comparisons to 2020

### C&D DISPOSED

- 2020: 30,408 tons  
2021: 33,177 tons  
Up 9.1%
- 2020: 0.96 lbs/cap/day  
2021: 1.05 lbs/cap/day



13

## Data & Comparisons to 2020

### C&D DIVERTED

- 2020: 67,658 tons  
2021: 84,703 tons  
Up 25.2%
- 2020: 2.14 lbs/cap/day  
2021: 2.68 lbs/cap/day



14

## Data & Comparisons to 2020

### C&D DIVERTED (continued)

- Asphalt and concrete recycling up 40,000 tons – Road building back
- Diversion increasing, but still 8-10% below pre-Covid period
- Labor shortage



15

## Data & Comparisons to 2020

### C&D DIVERSION RATE

- 2020: 69%  
2021: 71.9%
- Maximum 2021 diversion rate: 80.0%



16

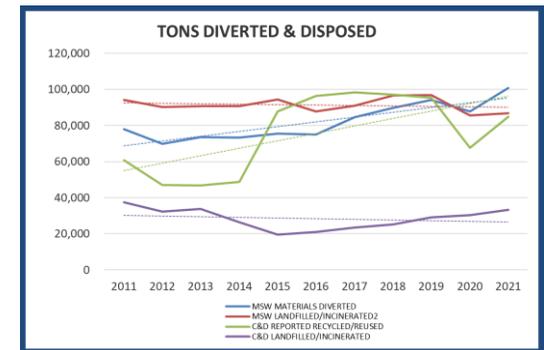
## Data & Comparisons to 2020

### ALTERNATIVE DAILY LANDFILL COVER

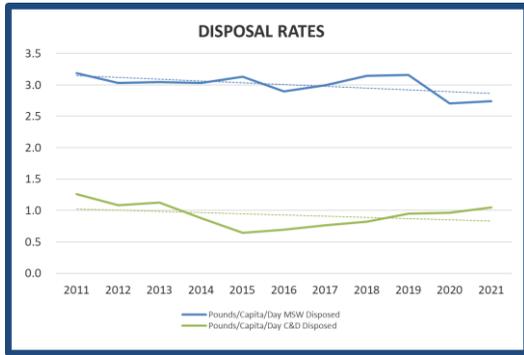
- 2020: 7,162 tons  
2021: 11,357 tons  
Up 58.6%



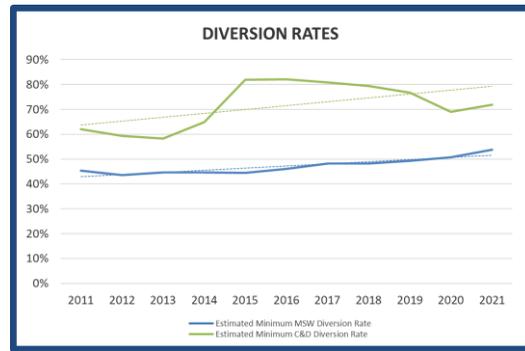
17



18



19

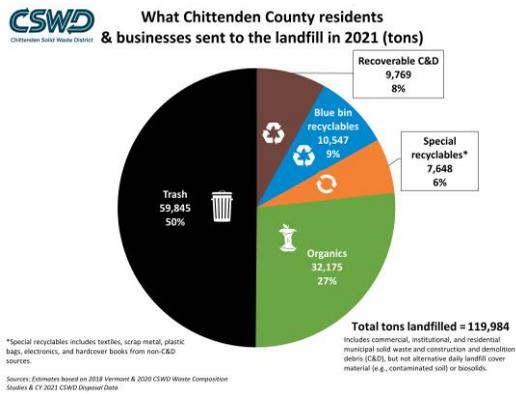


20

### Recovery Rates

- BLUE BIN RECYCLABLES**
  - 2020: 81.5%
  - 2021: 81.6%
- MSW RECYCLABLES & ORGANICS**
  - 2020: 63.6%
  - 2021: 66.7%

21



22