Established in 1989, the Solid Waste Authority of Central Ohio (SWACO) has provided solutions for disposing solid waste in Franklin County, Ohio and neighboring areas. Over the past decade, SWACO has invested in targeted program areas including waste reduction, recycling and the mitigation of litter, household hazardous waste (HHW) and solid waste disposal. With these services and infrastructure in place, SWACO is positioned to maximize their diversion programs with having best practices in the State and beyond.

Resource Recycling Systems (RRS) performed a high-level analysis evaluating current waste consumption and potential diversion opportunities within the District. The report was designed to help evaluate larger program areas and identify opportunities to manage the waste stream to ultimately increase recovery for residential, commercial, hard-to-recycle materials and organics. Our preliminary analysis work was intended to serve as the launching pad for further evaluation and deeper analysis of SWACO’s programs as not all SWACO programs were evaluated in this report.
WASTE STREAM OVERVIEW

For the purpose of this section, RRS gathered and evaluated data from a variety of sources including SWACO’s 2014 Annual District Report (ADR), SWACO data (including ReTRAC), Ohio EPA, US Census Bureau, US Environmental Protection Agency (EPA) and RRS internal databases.

MUNICIPAL SOLID WASTE QUANTITIES AND COMPOSITION

SWACO is home to 1,231,393 residents living in 529,924 households. Using 2014 as the baseline reference year, the Authority generated 1,452,027 tons of municipal solid waste (MSW) from the residential and commercial sectors. As shown in Figure 1, SWACO managed the generated waste by, landfilling 67% (977,461 tons), recycling 16% (235,603 tons) and composting 17% (238,962 tons). SWACO’s methods of management align similarly to national MSW management methods.

FIGURE 1: 2014 AUTHORITY MANAGED MSW (TONS)

1 2014 US Census Bureau estimates
2 As identified in the revised 2014 ADR submitted to the Ohio EPA in November 2015. See Appendix for calculations.
3 Comparison graphs for SWACO and national waste management averages are located in the Appendix.
In addition to the already 235,603 tons recycled and 238,962 tons composted, there is significant potential for additional wastes that could be diverted from the landfill. Two specific areas with high diversion potential are fibers (cardboard, mixed paper) and food waste.

**FIGURE 2: AUTHORITY WASTE DIVERSION TONNAGE CATEGORIES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Tonnage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Recyclables</td>
<td>201,538</td>
<td>43%</td>
</tr>
<tr>
<td>Organics</td>
<td>238,962</td>
<td>50%</td>
</tr>
<tr>
<td>Hard-to-Recycle</td>
<td>23,284</td>
<td>5%</td>
</tr>
<tr>
<td>Wood Waste</td>
<td>8,941</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>1,840</td>
<td></td>
</tr>
</tbody>
</table>

Waste diversion materials can be categorized into the following categories: standard recyclables, organics, hard-to-recycle and wood waste materials. As shown in Figure 2, standard recyclables make up 43% (201,538 tons), organics make up 50% (238,962 tons), hard-to-recycle make up 5% (23,284 tons), wood wastes make up 2% (8,941 tons) and other materials total 1,840 tons of the waste diverted from the landfill. A total of 474,565 tons of material was diverted from the landfill in 2014, or a diversion rate of 32.7% of the total amount of municipal solid waste materials generated in the District.

In 2013, GT Environmental, Inc. (GT) performed a waste characterization study on the waste classified as MSW at the Franklin County Sanitary Landfill to determine percentages of each material in the disposed waste stream. The results of this study are depicted in Figure 3.
FIGURE 3: 2013 FRANKLIN COUNTY SANITARY LANDFILL MSW COMPOSITION

SWACO’s waste generation is in line with national municipal solid waste averages but differs in diversion averages. There is ample room to improve current and prospective diversion programs.

GT Environmental 2013 Waste Characterization Study (percentages are based on material weights from characterization study)
TABLE 1: OPPORTUNITIES FOR MATERIAL RECOVERY

<table>
<thead>
<tr>
<th>GENERAL MATERIAL CATEGORY</th>
<th>TONNAGE READILY RECOVERABLE</th>
<th>TONNAGE POTENTIALLY RECOVERABLE</th>
<th>ESTIMATES OF POTENTIAL REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MATERIALS TO RECOVER FOR VALUE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardboard/OCC</td>
<td>111,626</td>
<td></td>
<td>$8,651,019</td>
</tr>
<tr>
<td>Mixed and Other Paper</td>
<td>173,988</td>
<td></td>
<td>$7,673,069</td>
</tr>
<tr>
<td>#1 and #2 Plastics</td>
<td>47,407</td>
<td></td>
<td>$13,669,792</td>
</tr>
<tr>
<td>Other Plastics</td>
<td>121,205</td>
<td></td>
<td>$2,077,105</td>
</tr>
<tr>
<td>Metals</td>
<td>41,053</td>
<td></td>
<td>$9,046,402</td>
</tr>
<tr>
<td><strong>MATERIALS TO RECOVER FOR DIVERSION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td>26,880</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yard and Wood Waste</td>
<td>110,453</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Waste</td>
<td>124,626</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td>78,197</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>511,407</td>
<td>324,028</td>
<td>$41,117,387</td>
</tr>
</tbody>
</table>


LANDFILL DIVERSION OPPORTUNITIES

The landfill waste characterization study provides an indication of what materials are found in the Authority’s waste stream. This characterization provides an opportunity for SWACO to identify additional waste materials that could be pulled out for recycling and recovery. In Table 1, RRS has identified potential opportunities for recovery by applying the GT landfill waste characterization breakdown to the 2014 MSW landfilled (977,461 tons).

The column labeled “Tonnage Readily Recoverable” demonstrates the recyclables potentially available for diversion. These are materials that could be processed by existing infrastructure in District but are not being recovered due to gaps in program participation and a lack of collection capacity. Since the materials are currently being disposed there is room for program improvement to capitalize on the diversion.

The column labeled “Tonnage Potentially Recoverable” demonstrates potential recovery with the inclusion of additional plastic categories (i.e. PVC, LDPE, and mixed plastics), food waste and textiles. These streams are more difficult to manage and would require infrastructure changes or development.

Overall, additional recovery could result in potential revenue. In Table 1, RRS estimates the potential revenue available, at the October 2015 commodity values, by recovering additional material waste streams. If SWACO could fully maximize the diversion of waste materials, a maximum value of $41,117,387 could be captured.

The following program evaluations identify opportunities to increase material recovery volumes, outline program gaps and challenges and list best practice considerations and recommendations.

4 Full list of all landfill diversion opportunities is found in the Appendix.
In accordance with SWACO’s approved solid waste management plan’s effort to increase recycling in the Authority, SWACO offers single stream recycling drop-off collection at approximately 202 locations throughout Franklin County. SWACO recycling drop-offs are free to the public and include locations at Columbus City Elementary and Middle Schools, as well as many fire stations, super markets and Franklin County Metro Park’s. Each recycling center has between one and seven frontload dumpsters based on the center’s participation and the required frequency of service. All dumpsters are the property of SWACO and are serviced by SWACO personnel with SWACO equipment. All recyclables collected are delivered to the Rumpke Material Recovery Facility. In 2014, approximately 9,524 tons were collected through the drop-off program.

The drop-off program presents some challenges around identifying and quantifying data, usage and performance. Actual tonnage data is measured at the MRF, not at the individual dumpster (containers are graded for fullness at collection time), making it difficult to fully assess performance of specific site locations. Due to the nature of the un-monitored drop-off, there is no exact measure of the number of users who made a visit to a drop-off location. Over the past few years, recovered material tonnages have steadily been declining and contamination is increasing. A high level analysis of implementation costs shows this program is on par with other communities but the overall recovery is low.

Since curbside recycling has expanded across the Authority, this program while providing recycling access, is falling short in recovery performance due to the increasing availability of curbside programs and residential preference to use these curbside programs instead of the drop-off.
The gap is whether this program in its current method of operations is the right program to address the needs of its intended users in the most effective way. The cost of program implementation when compared to the tonnage diverted from the landfill suggests a deeper dive into this program evaluation is needed. This program has a large cost per recyclable ton.

OPPORTUNITIES AND BEST PRACTICE CONSIDERATIONS
The drop-off program has a solid infrastructure, but is this program still the best for recovering recyclables from its original intended users? Since the current recovery is declining it is an opportune time to evaluate if the drop-off program is the appropriate size and scale for operational efficiency. Creating program efficiencies could free up funding for the development of other program opportunities that more effectively address the needs of the users of the existing program.

Best practices include improved data gathering to fully analyze site locations identifying best performing and impactful locations.

RECOMMENDATIONS AND NEXT STEPS
- **RRS recommends a simple analysis be performed to assist in distinguishing the performance of locations.** Since the Authority already monitors and grades each container for fullness on their collection day, a review of this data to identify which locations should stay in operation and which locations could be repurposed/redirected should be conducted. This simple review could set the plan for modifications or improvements needed to increase recovery performance.
- **Perform a targeted survey to identify the types of users that use the drop-off program and gain a better understanding of their recycling program needs.** Determine if the drop-offs are meeting the needs of the users. Collect information on the types of other programs that the users would find more convenient and effective.
- **Clearly define the City of Columbus Schools drop-off needs.** In 2014, 114 schools were serviced by the drop-off program. Evaluate specific options and opportunities available to the schools that will be right-sized and sustainable, such as joining the school consortium program.
- **Work cooperatively with drop-off locations like public facilities, schools and parks to promote recycling education at each location.** The use of consistent and clear messages throughout the Authority would help to promote recycling and decrease contamination.

**Drop-Off Box Program**

**SUCCESSES:**
- 9,524 tons of waste recycled from program
- Increased recycling options for areas with and without curbside recycling

**OPPORTUNITIES**
- Analyze drop-off box performance per location
- Explore contracting service
- Cooperative outreach at drop-off box locations
- Redirect drop-off boxes for business cardboard recycling
- Clearly define City of Columbus school drop-off box needs

**CHALLENGES:**
- High program cost
- Right-size service configuration unknown

**FIGURE 4: AUTHORITY DROP-OFF PROGRAM WASTE DIVERSION AND COSTS**

![Chart showing tons recycled and cost per ton of recyclable from 2012 to 2014.](chart-image-url)
Monitor illegal dumping. SWACO should consider installing security cameras or web cams to decrease the incidences of illegal dumping. Text or SMS messaging number posted visibly on drop-off dumpster can allow users to quickly notify any site issues. The use of drop-off dumpster monitors can dedicate time to maintain sites.

Collaborate with the Environmental Crimes Task Force program to address illegal dumping at drop-off sites. Develop a targeted enforcement strategy to monitor and investigate illegal dumping that’s taking place at problematic drop-off sites.

Perform an analysis of private sector operations. SWACO should evaluate all options for future operations and management of the drop-off program. This should include SWACO’s cost for managing the program internally and the possibility of a third party operating the program.

HOUSEHOLD HAZARDOUS WASTE STREAM
Residents have the opportunity to publically drop off HHW at a year-round permanent facility or at four yearly mobile collection events. SWACO contracts with a third-party vendor, Environmental Enterprises, Inc. (EEI), to accept and process HHW from both opportunities. Authority residents are not charged user fees for materials diverted through this program.

In 2014, SWACO managed 338,800 pounds of HHW through this program. While this seems minor relative to the total volume of waste flowing through the Authority, keeping as much of this actively harmful material out of the environment through proper management is critical.

In 2014, $326,284 was spent to manage HHW at the permanent site and approximately $69,430 was spent on the four mobile sites. On a per pound basis this is close to the median costs ($0.96/lb.) for HHW collection nationwide at $0.79/lb. collected. SWACO’s program costs measure up nationally demonstrating well contracted costs for the program.

In 2014, $326,284 was spent to manage HHW at the permanent site and approximately $69,430 was spent on the four mobile sites. On a per pound basis this is close to the median costs ($0.96/lb.) for HHW collection nationwide at $0.79/lb. collected. SWACO’s program costs measure up nationally demonstrating well contracted costs for the program.

CHALLENGES AND GAPS
The past five years, shown in Figure 5, have seen a significant decrease in HHW volume managed through this program. The decline was expected as the program changed. In 2010, the number of mobile collection events were decreased. Participation (number of participating cars) declined when the program lowered the number of mobile collection events to four. Less convenience had a direct impact even though the permanent facility was available. Unfortunately the permanent facility hours of operation are available weekdays during typical work hours.

The HHW program has also offered the collection of non-hazardous materials such as latex paint and electronics. Latex paint was removed from the program in 2011 because of the expense it created for the program. EEI later established an arrangement to collect latex paint from residents at the permanent facility and mobile collection events for a user fee of $1.00 per can.

SWACO needs to define the purpose of this program; should focus be on HHW materials only or should the program include a range of hard-to-recycle materials as well. Determining the vision for this program will help evaluating best practices and opportunities for greater diversion.

**SUCCESSES:**
- Managed 338,800 pounds in 2014
- Hosted four mobile collection events
- Managed permanent drop-off site
- Worked to keep HHW out of the landfill

**OPPORTUNITIES**
- Analyze of other high performing HHW programs within similar communities
- Educate residents on product stewardship and purchasing non-hazardous materials
- Evaluate mobile vs. permanent drop off sites
- Improve data collection from alternative disposal points (i.e. take back programs)
- Assess user-fees for HHW collection
- Evaluate education strategy and messaging

**CHALLENGES:**
- Operational costs vs. volume of material collected
- Lack of streamlined data collection
- Limited hours of availability to drop-off materials

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5 “A Comparison of Household Hazardous Waste Programs”, Cascadia Consulting Group, 2005
### RECOMMENDATIONS AND NEXT STEPS

- **RRS recommends a more in-depth analysis of how other similar communities are best managing HHW materials.**

- **Educate residents on product stewardship and purchasing materials that are easier to recover rather than potential hazardous materials.**

- **Evaluate the pros and cons of both the HHW mobile and permanent site using the same scale to determine which is most successful in collection and more cost efficient.**

- **Evaluate the education strategy, message, frequency and media outlets to address management of HHW.**

- **Take advantage of commercial business take-back programs and promote residents recycling these materials where purchased. Promoting these locations could save collection costs for SWACO.**

- **Improve data collection.** There is no clear tracking or reporting of data pertaining to HHW collected through alternative disposal points, such as retailers accepting used motor oil. Increased participation in reporting would yield more comprehensive and potentially actionable data.

- **Evaluate assessing user fees for HHW.**

- **Evaluate the feasibility of managing non-hazardous materials as part of the program.** If other hard-to-recycle materials are desired as part of the program evaluate alternative program models such as ‘super drop-off’ programs.

### OPPORTUNITIES AND BEST PRACTICE CONSIDERATIONS

The state requires solid waste management districts to provide strategies to manage HHW and SWACO is in the position to look for opportunities to manage this waste stream responsibly. With SWACO offering both a permanent site and mobile HHW collection event opportunities, a user needs assessment evaluation would be best conducted. Do the programs meet user needs for the expense that is currently being paid for services? What program changes would better and more efficiently service program users? Program changes that could be considered include curbside collection of HHW materials with a contracted service vendor, outsourcing collection events to the individual communities or including a user fee for all materials collected. In addition, increased education efforts around purchasing non-toxic alternatives and product stewardship has the opportunity of preventing these HHW materials needing to be managed.
ORGANICS OVERVIEW

YARD WASTE COLLECTION PROGRAM
The District contracts with two vendors to take an unlimited quantity of yard waste from Franklin County customers, and process it into mulch and other end-use products. The majority of the communities in the District have yard waste collection as part of their curbside service. Residents in the District were initially educated on how to properly dispose of yard waste through this collection service and haulers take the material to one of the District’s contracted compost facilities. Residence and businesses are also allowed to drop-off materials at the vendors locations as long as it meets certain specifications based on the vendor requirements.

Yard waste currently makes up the bulk of organics recycling, comprising approximately 49%, or 232,814 tons collected of SWACO’s total material recovery for 2014. While many may not think of collecting yard waste as a form of recycling, it often comprises most of a given area’s waste reduction and recycling rate. At the national level, organic matter makes up nearly 30% of all recycled material.

SWACO currently spends $1,485,000 on service contracts to accept organics at vendor facilities. This works out to be about $7 per ton diverted, which RRS believes to be a reasonable cost. The cost per ton fluctuates as shown in as a result of additional yard waste tonnages reported.

FOOD WASTE
Within the organics stream, a small percentage (3%), or approximately 6,148 tons, is attributed to food waste. At this time, SWACO does not have a program to collect and recover food waste.

FIGURE 6: 2008-2014 AUTHORITY YARD/WOOD WASTE DIVERSION (TOTAL TONS AND COST PER TON)

(SWACO Organics Program Data and 2014 ADR)
CHALLENGES AND GAPS

While the yard waste program appears to be well-functioning, it is uniquely structured relative to peer communities. Currently there is a lack of data surrounding the types of generators who are using services which is causing a lack of opportunities for recovery to be evaluated. Due to the nature of the existing contracts, the users are not clearly defined. The program expenses is roughly one-third of SWACO's expenditures. The needs of the program users should be fully evaluated to identify ways to better manage costs.

SWACO does not have specific programs to address food waste. While not evaluated in detail in this report, food waste is a large part of the waste stream and has important potential for increased recovery. A lack of infrastructure for collecting and processing food waste appears to be the main barrier for increasing its diversion. SWACO should consider developing a comprehensive approach to address food waste that includes education to reduce food waste, identify recovery options (i.e. food rescue, feeding livestock) and recycling through the use of appropriate technologies such as composting and anaerobic digestion. Next steps for food waste collection could include exploring collaborative partnerships or opening a request for proposal (RFP) opportunity where service vendors could propose a food waste collection program to individual communities and/or the entire County.

OPPORTUNITIES AND BEST PRACTICE CONSIDERATIONS

RRS expects food waste composting operations to be successful despite relatively low market value for finished compost, with an expected operational profit of $10-30 per incoming ton of food waste (assuming low cost of capital and complete sales of all finished compost). RRS research shows that it is unlikely for a food waste program to be profitable at the system level (accounting for the cost of collection as well as the facilities capital payments and operational costs) unless waste tip fees are above $60 per ton. As the Franklin County Sanitary Landfill charges $42.75 per incoming ton, subsidies or new policy will likely be necessary to keep the system profitable.

According to the 2013 GT landfill waste characterization study, approximately 12.8% of waste landfilled is food waste. Targeting large generators (such as supermarkets or distribution centers) and focusing food waste collection strategies around them can potentially guarantee a steady and clean feedstock for the Quasar’s anaerobic digestion (AD) facility. RRS would not expect a large scale AD facility to be successful in the region due to low energy costs, but it is possible that a highly efficient smaller facility could be profitable if low cost financing and capital costs are available.

In addition, there are best practice considerations around reduction strategies, donation programs, composting (back-yard, curbside, drop-off) technologies and policy which are not explored here.

RECOMMENDATIONS AND NEXT STEPS

• RRS recommends SWACO should work with their current vendors to fully take advantage of the already in place curbside yard waste collection and drop-off opportunities.

• Preliminary modeling of commercial food waste generation in the Authority, by RRS, finds that there is significant opportunity for increased diversion of commercial organics. RRS recommends further evaluating this waste stream to develop sustainable programs.

• Initiate pilot programs for commercial sector food waste collection programs.

• To reduce the amount of material needing to be handled, SWACO should develop a comprehensive strategy to reduce food waste by increasing consumer education and awareness on waste reduction opportunities, promoting existing food rescue programs and educating residents on backyard composting and mulching so the material can stay on site and reduce the need for it to be collected. SWACO could host composting workshops or webinars, possibly in conjunction with existing university and nature park programs.

• SWACO should revise their current contracting with their service vendors to require better data collection. SWACO should continue to evaluate opportunities for program efficiencies to reduce costs.
OTHER PROGRAM CONSIDERATIONS

RESIDENTIAL CURBSIDE RECYCLING
Residents within the Authority have the opportunity to recycle standard recyclable materials through single stream curbside recycling programs. The majority of standard recyclable materials recycled are from the residential sector (63%). Curbside recycling is offered in 33 of the 41 communities within SWACO. In 2014, 96% of all single family households (approximately 458,000) had curbside recycling within SWACO’s jurisdiction.

RECYCOLUMBUS CURBSIDE PROGRAM
RecyColumbus is a curbside collection program managed by the City of Columbus Department of Public Service (DPS). The City contracts with a service vendor to provide weekly waste, bi-weekly recycling and bi-weekly yard waste collection to all single family housing units and to some multifamily units that use carts (not dumpsters) for their collection. According to the City of Columbus, the recycling program services approximately 335,623 single family and multi-family households every other week. According to the RecyColumbus program, in 2014, the average participation rate was 71%, diverting approximately 33,983 tons of recyclable material from the landfill. In 2014, the City’s reduced tipping fees saved approximately $2.4 million.

As reported in the 2014 ADR, curbside recycling and drop-off boxes diverted 74,461 tons of standard recyclables.
COMMUNITY CONSORTIUM PROGRAM

The community consortiums were established to increase the negotiating power of communities contracting for solid waste, recycling and yard waste services. The consortium program is very cost effective for SWACO to operate, as the only financial impact is approximately $75,000 per consortium bid process which is approximately only 1.4% of SWACO’s total budget. The consortium bid process takes place depending on the cycle of the contract periods.

Over the past five years the program has grown to include three consortiums assisting 23 communities with approximately 118,341 single family households within the District. According to SWACO data collected, approximately 19,638 tons of recyclable material were collected from the consortiums in 2014. Additional results include a combined savings of over $3.3 million since 2010 for the communities as a result of reduced waste, recycling and yard waste collection costs.

CHALLENGES/GAPS AND OPPORTUNITIES

Any remaining communities without a curbside recycling program should be encouraged to join a consortium. High functioning curbside programs can on average divert 400 to 800 pounds per household per year. A deeper analysis of key characteristics of high recovery/low recovery communities should be identified. SWACO should focus on assisting communities with implementing best practices for curbside programs which include cart-based programs, volume-based disposal and a robust educational campaign.

Figure 7 provides a summary of challenges and opportunities for this program area. For a full overview of challenges/gaps, opportunities/best practices and recommendations, please refer to the Appendix.

COMMERCIAL SECTOR

Of the MSW, 59% (576,598 tons) is estimated to be disposed by the commercial businesses (also may include some multi-family housing and institutions).

At this time, there is no official SWACO commercial business recycling program. Commercial businesses are encouraged to contract directly with private contractors for recycling collection. Commercial businesses are also able to utilize SWACO’s drop-off program. SWACO does provide educational and waste assessment resources on their website and facilitates a Business Roundtable discussion forum for commercial businesses.

The recovery potential for this sector is significant. According to the Ohio EPA 2014 Ohio Material Resource Recovery Facilities report, 102,450 tons of waste materials were officially reported and recycled by the commercial sector within the Authority. The report only lists a handful of commercial entities that reported their data as well as Rumpke and Waste Management commercial collection data. Based on this report, cardboard, commingled recyclables and glass are the highest reported diversion categories.

FIGURE 7: RESIDENTIAL CURBSIDE RECYCLING PROGRAM

RESIDENTIAL CURBSIDE RECYCLING PROGRAM

SUCCESSES:
• 96% of single family households have curbside recycling access
• Community consortiums increased access to curbside recycling

CHALLENGES:
• Non-consortium communities access to curbside recycling opportunities
• Multi-family housing access to curbside recycling opportunities

OPPORTUNITIES:
• Emphasize value of joining community consortiums for service contracting
• Identify key characteristics of high recovery/low recovery communities
• Develop a Consortium Recovery Report Card to track and compare success among communities
• Analyze best practices within community consortiums

Residential Curbside Recycling Program

In 2014, the Community Consortium Program successfully diverted nearly 19,638 tons of material from the landfill.
CHALLENGES/GAPS AND OPPORTUNITIES
SWACO should evaluate opportunities to become a premier resource for business recycling options by enlisting best practices for commercial recycling. These could include providing free technical assistance, offering incentive or rebate programs and negotiating and acquiring recycling collection contracted services. Developing and implementing an award/recognition program that incentivizes and promotes businesses that are reducing their waste materials could also improve diversion efforts but also waste diversion data reporting.

Figure 8 provides a summary of challenges and opportunities for this program area. For a full overview of challenges/gaps, opportunities/best practices and recommendations, please refer to the Appendix.

EDUCATION AND OUTREACH
For success to be achieved in any of the previously described programs, strong education and outreach efforts are key. SWACO has

FIGURE 8: COMMERCIAL SECTOR

Commercial Sector

SUCCESSES:
• 102,450 tons of waste materials reported and recycled
• Facilitation of Business Roundtable

OPPORTUNITIES:
• Provide free technical assistance
• Identify opportunities for curbside recycling services (small-to-mid size businesses)
• Enhance communication through Business Roundtable
• Become premier resource for business recycling options
• Increase business outreach and education to promote waste diversion/cost savings
• Evaluate franchising and joint purchasing opportunities
• Redirect drop-off boxes for business cardboard recycling

CHALLENGES:
• Lack of program and technical support

FIGURE 9: EDUCATION AND OUTREACH

Education and Outreach

SUCCESSES:
• Facilitate school-focused education and landfill tours
• Hired Communications Manager
• Promote general programmatic information

OPPORTUNITIES:
• Expand target audiences to include homeowners, multi-family and businesses
• Simple and consistent messaging across all multimedia platforms
• Use community-based social marketing to encourage behavior change
• Partner with local resources to increase funding availability
• Create recycling education ambassadors
• Design navigable website to serve as the premier recycling resource

CHALLENGES/GAPS AND OPPORTUNITIES
SWACO’s Communications Manager should help the Authority provide communities with consistent messaging assistance and encourage strategic communications planning.

SWACO’s current school-focused education consists of school presentations, workshops and technical assistance for educators and regular tours of the Franklin County Sanitary Landfill. SWACO has a website with resources for educators, lists acceptable recyclables, HHW information and links to collection telephone numbers in cities and communities. The website also includes a few helpful educational videos and interviews about waste reduction. Budgeted costs are $67,000 to provide education and outreach, which includes website maintenance.

Figure 9 provides a summary of challenges and opportunities for this program area. For a full overview of challenges/gaps, opportunities/best practices and recommendations, please refer to the Appendix.
ConSiderations

Other Key Considerations

Fees and Funding

SWACO receives all of its funding for programs from a $5.00 generation fee charged for every ton of waste disposed of at a landfill. Apart from the rolling stock connected with recyclables and HHW collection, minimal capital investments have been made in diversion programming and diversion growth has been modest. While significant changes in the materiality of waste (the shrinking ton, the evolving ton) provides one challenge to the funding model, SWACO must also meet community and organizational expectations for greater diversion. Appropriately planning for and developing a sustainable funding model based on dynamic diversion programming and growth will require a more holistic approach to budgeting and funding that recognizes the interplay of new programming efforts.

Throughout this report, funding efficiencies and program costs are identified, however, a complete funding analysis was not part of the Phase 1 report. Development of a robust enterprise fund approach to the entire SWACO operation, in concert with rules and fees considerations will be essential for preparation of a viable business and approvable solid waste plan for SWACO.

Regional Analysis

The regional waste shed-political and jurisdictional boundaries rarely line up exactly with the dynamics of economic and waste generation activity. SWACO’s location in the heart of a growing and vibrant metropolitan area indicate some significant and currently largely untapped opportunity for regional collaboration to enhance SWACO’s waste diversion performance.

The implementation of flow control of all wastes within SWACO to the Franklin County Sanitary Landfill provide a stable and reliable source of funding for SWACO and waste to the facility. However, emerging trends within the waste and recycling industry favor larger regional facilities, often fed by regional and extra regional sources, which support the ongoing capital and operational demands of these high performing and technically sophisticated operations. Developing inter-regional relations and accompanying import/export designations along with market sustainable pricing and contracts are essential to developing sustainable funding models.

To fully meet SWACO’s desires for greater waste diversion, significant additional capacity for recyclables and organics processing is required. If successful, this will reduce the stable flows of waste and funding currently enjoyed by the landfill from its flow controlled area, which will need to be replaced at some level for SWACO to continue to meet its facility operations and obligations. The duel
need for greater investment and continuing waste flows makes the opportunity for regional cooperation even more of a necessity if SWACO expects to meet its ambitious performance objectives.

**SWACO has a number of programs that are high performing or provide a framework that is readily exportable beyond the SWACO boundaries.** The community consortiums have provided great value to its members and could be expanded beyond SWACO’s borders to leverage existing and evolving development patterns. SWACO’s landfill and its natural affiliation around other public service needs, particularly specialties such as waste water treatment plant sludge and cake management, special waste and management of catastrophic wastes provide opportunities for regional leadership. Existing and future facilitation such as the business roundtables and efforts with the public schools, institutions, public venues or other specialty organizations would likely perform best if not bound by simple SWACO borders.

In addition to the more operational and services related opportunities described above, a few other areas are particularly ripe for regional cooperation. Data consistency and rule enforcement are two areas notorious for their failures to effectively cross borders, and **yet program performance and public service is greatly enhanced when managed effectively across jurisdictions.** As an example, the Environmental Crimes Task Force has found success in curbing illegal dumping in the Authority, but it is unclear whether the offenders have come into line and begun following the law or if they have simply moved their illegal dumping elsewhere. Data sharing with peers in the region could help to identify potential ‘spillage’ and could be supported with mutual aid enforcement agreements. Many economic development organizations have developed regional structures, capturing the full economic development benefit of the waste resource management system and accommodating its impacts are also best served when considered in the context of the entire region.

**For SWACO to achieve the full potential of its programs, developing a sophisticated sense of regional cooperation that matches the economic and community dynamism of differing resource utilizations practices is important.** Whether it be an intra-regional effort as small as neighborhood gardens and composting, or multi-county efforts designed to entice significant infrastructure investment, supporting regional collaborations can provide significant returns.
Commercial Sector: Businesses, industries, institutions and multifamily facilities with waste service either in carts or dumpsters. The commercial sector makes up 59% of SWACOs municipal solid waste with vast opportunities for diversion growth.

Consortium Communities: Consortiums communities were established by SWACO in 2003 to increase negotiating power and reduce costs when contracting for solid waste, recycling and yard waste collection services. Consortium participants provide curbside collection of single-stream recyclables to their citizens and reduce the amount of waste being discarded at the landfill.

Diversion: Finding new avenues for municipal solid waste rather than the landfill, including recycling, specialized disposal or alternative recovery.

Electronic Waste (e-waste): Refers to discarded electronic items like lead acid batteries, computer towers and monitors, office electronic equipment, televisions, mobile phones and tablets. These items cannot be recycled along with standard recyclables, there is a specialized recycling process. E-waste contains heavy metals and chemicals that are toxic if released into the air, land or water. SWACO hosts mobile collections and manages a drop-off site for e-waste.

Hard-to-Recycle Materials: Materials that require special recycling due to landfill restrictions or environmental concerns. The following items are restricted from the landfill: scrap tires, yard waste and lead acid batteries. Materials like household hazardous waste and old or obsolete electronics, while not restricted also require specialized recycling or safe disposal.

Household Hazardous Waste (HHW): Waste that is dangerous or potentially harmful to our health or the environment. Materials like flammable adhesives (oil-based paints, motor oil, propane tanks etc.), reactivities (cyanides and pool chemicals), corrosives (acids, bleach, cleaners, paint stripper etc.), toxics (fluorescent light bulbs, poisons, antifreeze, batteries) and mercury containing devices. HHW falls into the hard-to-recycle category.

Material Recovery Facility (MRF): Facility where recyclables are sorted by commodity, baled and shipped to end market recycler.

Municipal Solid Waste (MSW): Industry term for waste in both the commercial and residential sectors.

Municipal Solid Waste Composition by Sector: Waste that is discarded or diverted based on the sector where it originated i.e. residential versus commercial. The landfilled data needs to be clarified. There are some areas of ambiguity when separating residential landfilled data from commercial landfilled data. It would be ideal to have a definitive breakdown of municipal waste composition by sector; however, some disposal loads are a mix of commercial and residential wastes.

Residential Sector: Single or multi-family homes with curbside service for waste, recycling and yard waste. 96% of residents with curbside waste have access to curbside recycling.

ReTRAC Connect: SWACO uses an online reporting tool called ReTRAC Connect. This allows each community to report their recycling and diversion data in one centralized program. However, it is a voluntary reporting system which results in some data becoming ambiguous. For purpose of this report, an estimate was made using the ReTRAC data available.

Organics: Commonly SWACO collects yard waste, wood waste and food waste as part of their organics waste diversion program. Organics is typically refer to two primary categories: yard waste and food waste. While not evaluated in detail in this report, food waste is a management material of concern and should be considered.

Standard Recyclables: The common suite of recyclable materials diverted through curbside, dockside or drop-off collection services including cardboard, mixed paper, #1 and #2 plastic bottles, steel/tin/aluminum cans and glass. After collection, these materials are further sorted at a Material Recovery Facility (MRF).

Yard Waste: Brush, leaves, grass clippings and organic debris found when maintaining grass and trees. SWACO contracts with two private-sector companies to process yard waste for re-market use. Both contractors, Kurtz Bros. & Ohio Mulch, are required under contract to take an unlimited quantity of yard waste from residential customers, at no cost, and process it into mulch and other end-use products.
RESIDENTIAL RECYCLING INFRASTRUCTURE

City of Columbus Recycling Programs: SWACO provides technical assistance to the City of Columbus including education and awareness, contracting, greenhouse gas reporting and evaluations. City of Columbus contracts directly for services with a private hauler for non-subscription curbside recycling and yard waste collection.

Drop-off Recycling: SWACO provides containers and collection services for drop-off recycling locations throughout Authority communities. In 2014, drop-off containers were provided at 6 rural communities, 82 urban communities and at approximately 114 Columbus public schools locations. [Note: Initially 87 urban community locations were provided drop-off containers however during 2014, 5 were removed at private property owners request.]

Electronics Recycling: SWACO provides a list of organizations and businesses offering electronics collection on their website.

Household Hazardous Waste (HHW) Collection Events: SWACO contracts with a third party to accept HHW from residents at four mobile collection events a year. In 2014, one of the collection events was expanded through partnerships to accept electronics, furniture, clothing and goods, remodeling materials and bicycles/bike accessories.

Non-subscription Curbside Recycling: SWACO provides technical and contract assistance to Authority communities helping to develop non-subscription curbside programs. Non-subscription curbside recycling is offered in 33 of the 41 communities within SWACO (includes City of Columbus).

Organics Collection and Processing System: SWACO financially supported the development of the anaerobic digestion facility constructed by Kurtz Brothers, Inc., which became operational in 2011. SWACO also evaluates proposals for organic material program development.

Permanent Household Hazardous Waste (HHW) Site: SWACO contracts with a third party to accept HHW from residents at a permanent collection facility. The facility is open limited hours three business days a week.

Scrap Tire Collection: SWACO collects and charges user fees for scrap tires accepted at the landfill or any of the transfer facilities. SWACO provides dumpsters to communities hosting tire drives at no charge.

Subscription Curbside Recycling: As of 2013 all subscription curbside recycling programs are now non-subscription curbside recycling programs.

Yard Waste Management: SWACO contracts with a third party to allow Authority residents to drop-off yard waste materials.

OUTREACH, EDUCATION, AWARENESS AND TECHNICAL ASSISTANCE

Business Outreach: SWACO engages businesses via Business Round Table, in-person contacts, press releases, new articles, business seminars and specific program promotions. Specifically encourage waste assessments and development/participation to increase recycling and waste reduction efforts. In 2014 two initiative/campaigns were supported: Green Values Initiative and reusable bag campaign targeted in the North Market.

Business Round Table: Quarterly meeting forum for local businesses to discuss business related disposal issues, innovations in waste reduction, reuse, recycling and sustainability. In 2014 one meeting was organized reaching an audience of 20 attendees.

Central Ohio Emerald Awards: Program to honor businesses, institutions, communities and individuals for their waste reduction and recycling efforts. In 2014, program was suspended.

City of Columbus: SWACO provides support to City of Columbus for their curbside recycling program. In 2014, SWACO designated representatives to participate in meetings and serve on working groups under Mayors Green Team.

Classroom Presentations: SWACO is available to give presentations to classrooms on a variety of waste reduction and recycling topics.

Communications Plan: SWACO inventories communication activities and evaluates communication partnerships for both internal and external
activities. A communication assessment in 2014 resulted in decision to hire a communications manager.

Community Outreach: SWACO provides public relation activities and community event education assistance to Authority communities. Community outreach and education was provided to 27 community events and festivals in 2014.

Facility Solid Waste Management Planning: SWACO consults with large institutional facilities in Franklin County to develop solid waste reduction and recycling programs.

Landfill Tours: SWACO provides tours of the landfill to schools and the general public. In 2014, approximately 3,299 people attended 101 landfill tours.

News from SWACO: Publication produced three times a year to update community leaders, businesses, educators and others on Authority program offerings and other local waste reduction and recycling opportunities. In 2014, SWACO provided updates via their website, social media and messaging campaigns.

School District Recycling: SWACO provides technical assistance to schools to develop recycling programs.

Smart Communities: Program to educate public about litter prevention and reducing litter in communities. In 2014, SWACO facilitated a consortium for community solid waste and recycling services and provided eligible communities landfill trash waivers for special community cleanup events.

Social Media: SWACO extends their education outreach through YouTube, Facebook and Twitter. In 2014, Facebook had 123 likes and Twitter had 450 followers. SWACO uses these outreach platforms to share feature local and national waste and recycling news, event photos, information on upcoming HHW collection drives, invitations to community outreach events and more.

Solid Waste Assessments: SWACO provides an online tool for businesses to complete a self-assessment of their solid wastes.

SWACO Consortiums: SWACO provides technical assistance to political subdivisions to join in a community waste management consortium. The community waste management consortium is a group of communities that agree to contract together to increase negotiating power to reduce costs when contracting for solid waste, recycling and yard waste collection services. SWACO assisted in bringing three consortiums together.

SWACO Website: SWACO updates their website routinely to inform about recycling, composting and special event recycling opportunities as well as information on landfill disposal. Social media platforms are linked to website.

Teacher Technical Assistance: SWACO provides educational materials and resources, including brochures, information on classroom activities, downloadable posters, guides, presentations and other tools to teachers.

Teacher Workshops: SWACO provides training to teachers with approved curricula designed to meet Ohio Department of Education (ODE) academic content standards. These workshops provide continuing education units (CEU’s) and graduate credit to teachers. In 2014, three workshops were offered.

OTHER PROGRAMS

Adopt-A-Roadway: SWACO supports Adopt-A-Roadway by providing bags, gloves and vests to community groups conducting litter clean-ups. SWACO also operates a litter-removal road crew who utilized service hours from convicted polluters to remove trash from Franklin County roadways, waterways and parks.

Environmental Crimes Task Force: SWACO provides funding to the Environmental Crimes Task Force (ECTF) of Central Ohio to enforce environmental laws. ECTF also operates the Franklin County Clean-up Committee road crew. In 2014, there were 38 convictions, 400 community service hours ordered and $79,130 ordered in restitution/fines.

Environmental Steward Office: City of Columbus Partnership – SWACO provides an annual grant to fund an Environmental Steward position with the City of Columbus and the Get Green Initiative. The Environmental Steward reaches out to the business community to encourage specific projects including: tax incentives, Get Green Business Conference, review of zoning codes, partnership with Capital Crossroads Special Improvement District to develop recycling programs in downtown district and expansion of GreenSpot Program.
Facility Solid Waste Management Planning: SWACO establishes partnerships with large institutional facilities to develop solid waste reduction and recycling programs and plans. Technical assistance services are program costs.

Franklin County Emergency Management Agency Debris Management: SWACO reviews the Debris Management Plan and serves as the coordinator for disposal resources.

Health Department Support: SWACO provides financial assistance to the Franklin County Board of Health for testing public and private wells adjacent to the landfill.

Litter Hot-Line/Litter Crew: Phone or electronic reporting of illegal dumping and littering.

Litter Management: SWACO provides education and awareness on anti-litter, illegal dumping, recycling and waste reduction issues. In 2014, the website promoted illegal dumping reporting January through March and six ads were purchased in the City of Columbus’ bike stations.


Market Development: SWACO consults to businesses to enhance markets for recyclable materials and offers to serve as a pass-through agent for Ohio EPA’s Market Development Grants. In 2014, SWACO funded a grant for a business to enhance a recyclable market.


Political Sign Recycling: SWACO partnered with City of Columbus in 2014 to host a political sign recycling event for Franklin County.

Strategic Planning and Program Development: Annual plan with the goal of improving SWACO by incorporating all departments to outline goals, objectives, strategies, milestones and responsible entity.

Surveys: SWACO collects survey data via an online data tool, ReTRAC. Businesses voluntarily enter recycling data into the database.

SWACO Collection Operations: SWACO provides collection services for Authority provided drop-off containers.

SWACO General Grants Program: SWACO funds competitive grants to encourage re-use programs, reduction projects and the use of recycled content equipment and materials. In 2014, more than $118,000 in grants was awarded.

SWACO Waiver Program: SWACO executes Issuance of Waiver permits with identified solid waste facilities and/or haulers.

Wasteshed Planning: SWACO coordinates work with other solid waste management districts to develop operationally efficient and cost effective solutions to solid waste programs on a regional basis. Program is postponed due to HB 592 review.
**APPENDIX 3: MUNICIPAL SOLID WASTE DATA**

A. **MSW GENERATION**
   SWACO is home to 1,231,393 residents living in 529,924 households.\(^1\) To calculate the Authority’s waste generation, quantities of municipal solid waste disposed in landfills accepting the District’s wastes are added to wastes that are recycled and composted. In 2014, these Authority generated 1,452,027 tons of municipal solid waste (MSW) from the residential and commercial sectors.\(^2\)

\[
\text{Waste Generation} = \text{Wastes Disposed} + \text{Wastes Recycled} + \text{Wastes Composted}
\]

\[
1,452,027 \text{ tons} = 977,461 \text{ tons (disposed)} + 235,603 \text{ tons (recycled)} + 238,962 \text{ tons (composted)}
\]

100% of municipal solid waste (generated) = 67% (disposed) + 16% (recycled) + 17% (composted)

B. **SWACO AND NATIONAL MSW MANAGEMENT**
   SWACO’s methods of management align similarly to national MSW management methods. Nationally, in 2013, the US EPA reported 66% (166,930,000 tons) was landfilled, 25% (64,740,000) was recycled and 9% (22,440,000) was composted of the total 254,110,000 tons of municipal solid waste generated.

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1. 2014 US Census Bureau estimates
2. As identified in the revised 2014 ADR submitted to the Ohio EPA in November 2015
C. **2014 COMMUNITY LANDFILLED MSW**

The Authority’s largest municipality, City of Columbus, was responsible for 74% (295,731 tons) of the residential MSW sent to the landfill. Table 1 identifies the tons of MSW landfilled from community as reported in ReTRAC for 2014.

<table>
<thead>
<tr>
<th>COMMUNITY</th>
<th>TONS OF MSW LANDFILLED</th>
<th>COMMUNITY</th>
<th>TONS OF MSW LANDFILLED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus</td>
<td>295,731</td>
<td>Pleasant Township</td>
<td>2,194</td>
</tr>
<tr>
<td>Grove City and Jackson Township</td>
<td>14,129</td>
<td>Norwich Township</td>
<td>1,394</td>
</tr>
<tr>
<td>Dublin</td>
<td>10,912</td>
<td>Clinton</td>
<td>1,306</td>
</tr>
<tr>
<td>Westerville</td>
<td>10,007</td>
<td>Truro Township</td>
<td>465</td>
</tr>
<tr>
<td>Reynoldsburg</td>
<td>9,511</td>
<td>Valleyview</td>
<td>229</td>
</tr>
<tr>
<td>Gahanna</td>
<td>9,278</td>
<td>Riverlea Village</td>
<td>207</td>
</tr>
<tr>
<td>Hilliard</td>
<td>8,456</td>
<td>Perry Township</td>
<td>206</td>
</tr>
<tr>
<td>Upper Arlington</td>
<td>6,459</td>
<td>Urbancrest</td>
<td>173</td>
</tr>
<tr>
<td>Whitehall</td>
<td>5,884</td>
<td>Minerva Park</td>
<td>126</td>
</tr>
<tr>
<td>Madison Township</td>
<td>4,120</td>
<td>Brice</td>
<td>34</td>
</tr>
<tr>
<td>Bexley</td>
<td>4,009</td>
<td>Blendon Township</td>
<td>unreported</td>
</tr>
<tr>
<td>Groveport</td>
<td>3,686</td>
<td>Hamilton Township</td>
<td>unreported</td>
</tr>
<tr>
<td>Franklin Township</td>
<td>3,046</td>
<td>Plain Township</td>
<td>unreported</td>
</tr>
<tr>
<td>Jefferson Township</td>
<td>2,871</td>
<td>Sharon Township</td>
<td>unreported</td>
</tr>
<tr>
<td>New Albany</td>
<td>2,818</td>
<td>Washington Township</td>
<td>unreported</td>
</tr>
<tr>
<td>Grandview Heights</td>
<td>2,218</td>
<td>Worthington</td>
<td>unreported</td>
</tr>
</tbody>
</table>

(As reported in RETRAC 2014)
D. **RECYCLABLE MATERIAL VALUES**

Each recyclable material has a commodity market value based on a per ton volume. These market values fluctuate significantly and unfortunately recent market values are lower than they have been in past months/years. As of October 2015, the average commodity values for recyclable material streams in the Midwest are shown in Table 2.

<table>
<thead>
<tr>
<th>MATERIAL STREAM</th>
<th>VALUE PER TON (AS OF OCTOBER 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft Mixed Paper</td>
<td>$42.50</td>
</tr>
<tr>
<td>Special De-ink Quality News (ONP)</td>
<td>$57.50</td>
</tr>
<tr>
<td>Corrugated Containers (OCC)</td>
<td>$77.50</td>
</tr>
<tr>
<td>Aseptic Cartons</td>
<td>$113.75</td>
</tr>
<tr>
<td>Glass 3 Mix</td>
<td>-$11.50</td>
</tr>
<tr>
<td>Aluminum Cans (Sorted, Baled)</td>
<td>$1090.00</td>
</tr>
<tr>
<td>Steel Cans (Sorted, Densified)</td>
<td>$90.00</td>
</tr>
<tr>
<td>PET Plastics (Baled, picked up)</td>
<td>$210.00</td>
</tr>
<tr>
<td>Natural HDPE Plastics (Baled, picked up)</td>
<td>$520.00</td>
</tr>
<tr>
<td>Colored HDPE Plastics (Baled, picked up)</td>
<td>$360.00</td>
</tr>
<tr>
<td>Comingled Plastics (#3-7, Baled, picked up)</td>
<td>$50.00</td>
</tr>
</tbody>
</table>

*(As of October 2015 from recyclingmarkets.net)*
### E. OPPORTUNITIES FOR MATERIAL RECOVERY

RRS has identified opportunities for recovery by applying the 2013 GT landfill waste characterization breakdown to the 2014 MSW landfilled (977,461 tons). RRS has also identified the maximum revenue that could be attained with the diversion of these waste materials. The column labeled “Tonnage Readily Recoverable” demonstrates the standard recyclables potentially available for diversion. These are materials that could be processed by existing infrastructure in District but are not being recovered due to gaps in program participation and a lack of collection capacity. Since the materials are currently being disposed there is room for program improvement to capitalize on the diversion. The column labeled “Tonnage Potentially Recoverable” demonstrates potential recovery with the inclusion of additional plastic categories (i.e. PVC, LDPE, and mixed plastics) and textiles. These streams are more difficult to manage and would require infrastructure changes or development.

<table>
<thead>
<tr>
<th>GENERAL MATERIAL CATEGORY</th>
<th>TONNAGE READILY RECOVERABLE</th>
<th>TONNAGE POTENTIALLY RECOVERABLE</th>
<th>ESTIMATES OF POTENTIAL REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIBERS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardboard/OCC</td>
<td>111,626</td>
<td></td>
<td>$8,651,019</td>
</tr>
<tr>
<td>Newspaper</td>
<td>18,572</td>
<td></td>
<td>$1,067,876</td>
</tr>
<tr>
<td>Office Paper</td>
<td>27,369</td>
<td></td>
<td>$1,163,179</td>
</tr>
<tr>
<td>Other Mixed Paper</td>
<td>128,047</td>
<td></td>
<td>$5,442,014</td>
</tr>
<tr>
<td><strong>PLASTICS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PET #1</td>
<td>27,858</td>
<td></td>
<td>$5,850,104</td>
</tr>
<tr>
<td>HDPE #2 - Natural</td>
<td>4,887</td>
<td></td>
<td>$2,541,399</td>
</tr>
<tr>
<td>HDPE #2 - Colored</td>
<td>14,662</td>
<td></td>
<td>$5,278,289</td>
</tr>
<tr>
<td>PVC #3</td>
<td>2,932</td>
<td></td>
<td>$146,619</td>
</tr>
<tr>
<td>LDPE #4</td>
<td>38,610</td>
<td></td>
<td>$1,930,485</td>
</tr>
<tr>
<td>Other Plastics</td>
<td>79,663</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>METALS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum Cans</td>
<td>7,331</td>
<td></td>
<td>$7,990,744</td>
</tr>
<tr>
<td>Steel/Tin Cans</td>
<td>11,730</td>
<td></td>
<td>$1,055,658</td>
</tr>
<tr>
<td>Other Ferrous Metals</td>
<td>15,639</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Non-Ferrous Metals</td>
<td>6,353</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>UNCATEGORIZED MATERIALS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container Glass</td>
<td>26,880</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yard and Pet Waste</td>
<td>57,670</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textiles</td>
<td></td>
<td>78,197</td>
<td></td>
</tr>
<tr>
<td>Food Waste</td>
<td></td>
<td>124,626</td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>52,783</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>511,407</td>
<td>324,028</td>
<td>$41,117,387</td>
</tr>
</tbody>
</table>

(Data analysis based on GT Environmental 2013 Waste Characterization Study and 2014 MSW landfilled)
F. **STANDARD RECYCLABLES DIVERSION**
Of the standard recyclable materials collected, corrugated cardboard is the material that is the most diverted, followed by mixed paper and glass. Figure 3 represents the standard recyclable materials diverted by the Authority in 2014 as reported in the 2014 ADR.

G. **ORGANICS DIVERSION**
Yard waste, wood waste and food waste are collected from efforts to divert organics from the landfill. In 2014, 94% of the organics collected for diversion were comprised of yard wastes, 4% was wood waste and 2% was food waste. Figure 4 represents organic materials diverted by the Authority in 2014 as reported in the 2014 ADR.
APPENDIX 3: MUNICIPAL SOLID WASTE DATA

H. HARD-TO-RECYCLE DIVERSION

A total of 23,284 tons of rubber/scrap tires, textiles, appliances, ash, electronic waste, household hazardous waste and lead-acid/dry-cell batteries were collected as part of the hard-to-recycle waste diversion program. Rubber and scrap tires represented 76% (18,833 tons) of materials diverted in this material category. Figure 5 represents hard-to-recycle materials diverted by the Authority in 2014 as reported in the 2014 ADR.
APPENDIX 4: OTHER PROGRAM CONSIDERATIONS

RESIDENTIAL CURBSIDE RECYCLING

COMMUNITY CONSORTIUM PROGRAM

CHALLENGES AND GAPS
Non-subscription curbside recycling has expanded through the majority of the Authority, though there are a handful of communities not participating. In order to meet access needs of all communities, the remaining eight communities should be included in the consortium program including City of Canal Winchester, Townships of Brown, Hamilton, Prairie, and Sharon, and Villages of Harrisburg, Lockbourne, and Obetz.

Although most single-family households seem well serviced by curbside recycling programs, there is a gap of recycling access for multi-family units. According to census data, 35% of households (146,092 households) are multi-family units within the Authority. While most of these are likely located in and around Columbus, there remains a gap within the consortium communities that are not being given access to curbside recycling services.

OPPORTUNITIES AND BEST PRACTICE CONSIDERATIONS
RRS finds the consortium programs to be a very efficient means of expanding recycling services while reducing costs to residential communities. Those participating in the program receive all legal and technical assistance at no cost, and by participating in the program the aggregated cost for services generates the lowest and best bids possible.

### TABLE 1: PARTICIPATING CONSORTIUM COMMUNITIES

<table>
<thead>
<tr>
<th>CONSORTIUM I</th>
<th>NUMBER OF HOUSEHOLDS</th>
<th>RECYCLING POUNDS PER HOUSEHOLD</th>
<th>CURRENT TOTAL TONNAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Bexley</td>
<td>4,300</td>
<td>615</td>
<td>1,322</td>
</tr>
<tr>
<td>City of Dublin</td>
<td>13,000</td>
<td>795</td>
<td>5,165</td>
</tr>
<tr>
<td>City of Gahanna</td>
<td>9,850</td>
<td>521</td>
<td>2,568</td>
</tr>
<tr>
<td>Mifflin Township</td>
<td>1,000</td>
<td>DNR</td>
<td>DNR</td>
</tr>
<tr>
<td>City of New Albany</td>
<td>2,600</td>
<td>806</td>
<td>1,048</td>
</tr>
<tr>
<td>Plain Township</td>
<td>800</td>
<td>607</td>
<td>243</td>
</tr>
<tr>
<td>Washington Township</td>
<td>650</td>
<td>830</td>
<td>270</td>
</tr>
<tr>
<td>City of Westerville</td>
<td>11,250</td>
<td>557</td>
<td>3,137</td>
</tr>
<tr>
<td>Blendon Township</td>
<td>2,450</td>
<td>83.8</td>
<td>336</td>
</tr>
<tr>
<td>City of Reynoldsburg</td>
<td>9,900</td>
<td>406</td>
<td>2,010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSORTIUM II</th>
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<tr>
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<table>
<thead>
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<th>CONSORTIUM III</th>
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<tbody>
<tr>
<td>City of Grove City/Jackson Township</td>
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<td>Village of Urbancrest</td>
<td>200</td>
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(All recycling tonnage is based on 2014 RETRAC data provided by SWACO. City of Grove City and Jackson Township are combined because of recycling tonnage provided together via RETRAC)
APPENDIX 4: OTHER PROGRAM CONSIDERATIONS

In addition, RRS finds that the original participants of Consortium I have good recovery rates – an average of 601 lbs. of recycling per household per year.

Figure 1 shows the material recovery (pounds per household per year – lbs/HH/yr) for all consortium communities and the City of Columbus. The red line represents a well-functioning recovery program mark of 400 lbs/HH/yr; in 2014 only 8 of the 21 communities within the Authority were meeting that criteria.

Best practices examples such as weekly collection, switching from bins to roll carts and increased education and outreach are proven ways to increase tonnage in a community. In communities like Upper Arlington that recycle approximately 692 lbs/HH/yr, utilization of volume-based billing (pay-as-you-throw or PAYT) best practices increases their recycling rates. Incorporating volume-based billing language into contracts negotiated through the consortium program could incentivize residents to direct a larger portion of their household waste stream from the landfill to the recycling program. Reward programs that issue coupons or vouchers for consumer packaged goods to residents have been shown to be effective in some communities, but have also faded from the program schedules of others who were early champions.

(SWACO Consortium Program Data via ReTRAC 2014)
APPENDIX 4: OTHER PROGRAM CONSIDERATIONS

RECOMMENDATIONS AND NEXT STEPS

- **RRS recommends SWACO engage all communities currently without curbside recycling service within the Authority to join a consortium to optimize performance, financials and collection.** Individual community meetings should take place to talk about contracting and performance, and discuss best practices and how SWACO can assist each community with improving their diversion. Different communities may vary in their enthusiasm, and SWACO should make informed decisions about how to best provide efficient services that are actively used.

- **Identifying key characteristics in the high recovery and low recovery curbside communities and use these identified characteristics to get all communities to higher recovery.** In addition, a more focused approach in high population centers, such as City of Columbus, through increased education and outreach will also improve recovery in those locations.

- **Develop a Consortium Recovery report card to show the current recovery rates of each of the participating communities.** Creating a competition among the consortiums using the data tracked is a positive way to increase recovery.

- **Identify best practices and next steps for each of the consortium communities.** Addressing the underperforming communities, or focusing on higher population or household communities that are underperforming should be a first priority.

OPPORTUNITIES AND BEST PRACTICE CONSIDERATIONS

SWACO has already opened doors for dialogue with the business community by hosting the Business Roundtable (BRT) for key companies, schools and organizations with 20 or more employees in Franklin County. An expansion of the BRT would help to bring about new ideas for green strategies for the commercial sector.

**Best practices in commercial recycling include providing free technical assistance to the commercial and multi-family sector for negotiating and acquiring recycling collection contracted services.** SWACO could provide an overview of recycling collection service contracting, available services and contractors as well as pricing information.

**SWACO’s website could be an all-in-one resource for businesses that seek recycling and waste diversion opportunities.** The current website provides links to outside resources waste audit tool kit and directs visitors to a handful of private companies that perform waste audits. **SWACO seeks to pragmatically explore the commercial sector waste diversion.** Providing more free technical assistance and comprehensive information on their website could help close that gap.

Best practice programs also **develop and implement an award/recognition program** that incentivizes and promotes businesses that are reducing their waste materials. These type of programs will also incentivize businesses to report that waste diversion data to SWACO. These recognition programs also help to create a positive relationship with communities and confirm SWACO’s role as the lead in waste diversion collaboration.

**Successful commercial recycling programs often develop public-private partnerships for funding and technical support.** This involves a public sector and a private party working together, where the public party can provide a public service or project and assumes substantial financial, technical, and/or operational backing of the project. Through a contractual agreement between public agencies and the private sector, recycling systems can be developed collaboratively, so each stakeholder shares in the risk and rewards. Public agencies benefit from having significant costs funded by the private sector, while the private sector partners have opportunities to expand their reach as a service provider and potentially generate more revenue from material collection.

COMMERCIAL SECTOR

CHALLENGES AND GAPS

The biggest challenge that recovery in the commercial sector endures is lack of programming support and technical assistance directed toward this sector. At this time, the commercial sector does not have a strong targeted program focus directed toward them to assist with waste reduction and recycling.
APPENDIX 4: OTHER PROGRAM CONSIDERATIONS

RECOMMENDATIONS AND NEXT STEPS

• RRS recommends further evaluation of the commercial sector to develop a sustainable and thriving commercial recycling program.

• To evaluate franchising and joint purchasing opportunities for County businesses, multi-family and institutional. Group purchasing power and contracting would make it easier for these entities to join an established program.

• To identify opportunities with current curbside recycling collection haulers to expand cart recycling to small-to-mid size businesses.

• To increase education and outreach efforts targeted to businesses. Promote more waste reduction activities and information to the business sector.

EDUCATION AND OUTREACH

CHALLENGES AND GAPS
Education is heavily focused on landfill tours for school-age audiences. While students are at the landfill there are currently some missed opportunities to educate students on diversion methods at home: recycling, composting and reducing their consumption. Tours can provide a unique opportunity to continue the relationship with the schools by appointing student and teacher ambassadors. SWACO could create a database of these ambassadors to help spread diversion messaging in schools and their communities through regular diversion correspondence from SWACO. This creates and builds sustainable relationships between the schools and SWACO beyond a one-time tour.

SWACOs website has potential to be an all-in-one source of information for the District. The current website contains education gaps such as lack of easily understandable and visually stimulating waste reduction information, out-of-date information in the current events feeds on the homepage and an accurate abbreviated list of curbside communities.

An educational outreach program could include working with each community to design specific educational materials to promote and enhance recycling information, outreach and tracking collected volume within each community. All information produced and provided to communities can be available via their website which could include recycling information for each community, additional avenues for waste reduction and recycling and links to sites with supplemental information. An outreach program should help SWACO build a working database of recycling communicators, residents, and public and private sector constituents to promote services, keep them up-to-date with Authority program information and additional outreach avenues.

OPPORTUNITIES AND BEST PRACTICE CONSIDERATIONS
Community outreach and education are critical to a diversion program's success. Target audiences should include single-family homeowners, multi-family residents, commercial and institutional businesses, public and private waste reduction specialists and elected officials. The highest participation programs have a strong targeted communications campaign focused on diversion and reducing contamination.

Best practices include education campaigns that are simple and engaging with regular consistent messaging across multimedia platforms. Investments are made in expanded communication programs to target groups to ensure diversion efforts succeed. All education uses a common suite of materials and messaging. Websites and social media platforms contain accurate and up-to-date information at all times. Education also includes a heavy reliance on technical and facilitation assistance to improve programs.

Community-based social marketing had been shown to be very effective at bringing about behavior change. It’s a pragmatic approach that carefully selects the behavior to be promoted, identifies barriers and benefits and designs a strategy that utilizes behavior change tools to address these barriers and benefits. Since waste reduction and diversion require behavior change, the best diversion education strategies utilize this approach. The first step in community-based social marketing is gathering qualitative input from your target audience. It is recommended to gather survey data from SWACO communities to examine each community’s needs and potential collaboration areas.

On average, a successful education and outreach campaign requires approximately a budget of $1 a household. Using this guideline, SWACO would have an education and outreach budget of approximately $477,000 based on their household count. In comparison to their current budget,
APPENDIX 4: OTHER PROGRAM CONSIDERATIONS

this is a significant increase however funds do not have to come solely from the Authority. Best practices include use of public partnerships such as communities and local universities. **SWACO has the opportunity to partner with local resources to better utilize funds and share materials to reach all targeted audiences within the authority.** There are also several opportunities to seek grant funding.

**RECOMMENDATIONS AND NEXT STEPS**

- RRS recommends beginning with a survey of public and private sector constituents to discover their community-specific needs. Based on this data, create a template for education/outreach materials that can be easily personalized for all communities.

- To work with each community to tie all website information back to SWACO’s website and create direct links to each community’s webpages. This will increase Search Engine Optimization (SEO) to allow SWACO’s website to be among top area web searches.

- **Build on the current communications and outreach plan detailing how current diversion programs can be supported and promoted** with consistent education materials, media strategies and resident and business engagement.

- **Create an engaging social media strategy** which builds SWACOs list of contacts through regular e-mail and social media correspondence. A social media strategy should include measurable data goals for audience engagement.

- **Simplify current website to communicate easily understandable, strategic and cohesive messaging** across communication outlets. Continue to produce short educational videos for website and social media use.

- **Commercial recycling promotion utilizing Chamber of Commerce partners, current recycling education partners and pinpointing companies** that would financially benefit from a diversion program would be an effective way to initiate a successful program. Other solutions could include a business waste audit toolkit and resources for easy business recycling.