



MASTER PLAN

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Chapter 1 - Executive Summary	1
1.1 Mission Change: From Sanitation to Resource Recovery	2
1.2 Department Vision, Mission, Values, Objectives	2
1.3 Core Services and Major Programs	3
1.4 Sustainability Goals	5
1.5 Zero Waste Goals	6
1.6 Waste Reduction	7
1.7 Reuse	9
1.8 Recycling	9
1.9 Materials Management	11
1.10 Composting Organics	12
1.11 Household Hazardous Waste Collection	14
1.12 Disposal Management	15
1.13 Other Core Business Services	17
1.14 Economic Development Opportunities	22
1.15 Public-Private Partnerships	23
1.16 Policies and Ordinances	23
1.17 Communications Plan	24
1.18 Financial Responsibility	25
1.19 Implementation Schedule and Diversion Rates	27
Chapter 2 - Introduction	29
2.1 Purpose-Why a Master Plan?	29
2.2 Planning Horizon	30
2.3 Public Input	30
2.4 Systems Overview	32
Chapter 3 - Zero Waste	34
3.1 What is Zero Waste?	34
3.2 Austin City Council Support	35
3.3 Austin Zero Waste Strategic Plan	35
3.4 Austin Zero Waste Goals	36
3.5 Highest and Best Use	38
3.6 Materials Management	40
3.7 State and National Involvement	41
Chapter 4 -Sustainability	48
4.1 Sustainability's Triple Bottom Line	49
4.2 Department Sustainability Efforts	51
4.3 Carbon Footprint Reduction Efforts	55

Chapter 5 - Departmental Structure	59
5.1 Department Vision, Mission and Objectives	59
5.2 Best Managed City Priorities	60
5.3 Management Values	61
5.4 Quality Assurance	62
5.5 Space Facility Needs and Infrastructure Development	63
Chapter 6 - Waste Reduction	68
6.1 City Department Waste Reduction	70
6.2 Residential Waste Reduction	72
6.3 Commercial and Institutional Waste Reduction	72
Chapter 7 - Reuse	74
7.1 Reuse and Resale Businesses	75
7.2 Creative Reuse Businesses	76
7.3 Repair and Remanufacturing Businesses	77
7.4 Bulk Collection, Reuse Austin	78
7.5 Eco-Depots	79
Chapter 8 - Recycling	82
8.1 Recycling Definition and Guiding Principles	82
8.2 Recycling Collection Systems	84
8.3 Department Recycling Collection Services	86
Chapter 9 - Materials Management	89
9.1 Materials Management-Highest and Best Use	89
9.2 Twelve Market Categories of Recyclable Materials	90
9.3 New Policies: Materials Management	92
9.4 New Programs: Materials Management	93
9.5 New Facility Development: Materials Management	93
9.6 Reuse Austin	94
9.7 Eco-Depots	95
9.8 Bulky Material Collection and Management	95
9.9 Storm Debris Materials Management	98
9.10 Construction Materials Management	99
9.11 Resource Recovery Center	102
9.12 Eco-Industrial Park	104
Chapter 10 - Composting Organics	107
10.1 Residential Home-based Composting and Community Gardens	111
10.2 Composting Education	113

10.3 Composting Incentives	114
10.4 Compost End-Use Classification System	115
10.5 Organics Collection Systems	116
10.6 Department Organic Collection Services	120
10.7 Food Waste Disposal Units	122
10.8 Sustainable Food Policy Board Recommendations	124
Chapter 11 - Household Hazardous Waste Collection	126
11.1 HHW Facility Operations	127
11.2 Austin ReBlend Paint	129
11.3 Door-to-Door Collection	129
11.4 Retail Take-Back Collection Program	130
11.5 Conditionally Exempt Small Quantity Generators (CESQGs)	130
11.6 North HHW Collection Center	131
11.7 Hazardous Waste Reduction	131
Chapter 12 - Disposal Management	134
12.1 City Landfill Management	134
12.2 City Landfill Repurposing	135
12.3 Disposal Capacity Needs	137
12.4 Alternative Disposal Options	137
Chapter 13 - Other Core Services	148
13.1 Litter Control	149
13.2 Alley and Street Flushing	150
13.3 Street and Boulevard Sweeping	152
13.4 Dead Animal Collection	154
13.5 Brush Collection	155
13.6 Bulk Collection	158
Chapter 14 - Special Events Diversion Opportunities	164
Chapter 15 - Economic Development Opportunities	172
15.1 Economic Growth and Redevelopment Services Office (EGRSO)	172
15.2 Brownfields Real-Estate Redevelopment Program	173
15.3 Research and Development Program	175
15.4 Market Development and City Purchasing Policies	176
Chapter 16 - Citizen Engagement & Community Partnerships	179
16.1 Citizen Engagement	179
16.2 Community Relationships & Non-Profit Partnerships	180
16.3 Regional Cooperation & Inter-local Agreements	182

Chapter 17 - Private/Public Partnerships	184
17.1 Tools to Foster Partnerships	184
17.2 Opportunities for Partnerships	186
17.3 Developing Zero Waste Infrastructure through Zero Waste Policies and Public-Private Partnerships	187
17.4 Service Provider Partnerships	188
17.5 Universal Recycling (and Composting) Ordinance	189
17.6 Education and Outreach Synergies	190
17.7 Service Opportunity Analysis	191
 Chapter 18 - City Department Partnerships	 192
18.1 Partnerships with other City Departments	192
18.2 Austin Climate Protection Plan	199
18.3 Austin Comprehensive Plan and Imagine Austin	200
18.4 Create Austin Community Cultural Plan	202
18.5 Downtown Austin Plan	202
18.6 Watershed Protection Master Plan	203
 Chapter 19 - Educational Institutions Partnerships	 205
19.1 Material Stream Analysis	206
19.2 Waste Generator Audits	207
19.3 Zero Waste Training	207
19.4 Innovation and Technologies	208
 Chapter 20 - Pilots and Demonstration Projects	 210
20.1 Pilot Programs to Improve Resource Recovery	210
20.2 Pilot Programs to Address Specific Generator Types	211
20.3 Pilot Programs to Address Specific Material Types	212
20.4 Demonstration Projects	213
 Chapter 21 - Policies and Ordinances	 215
21.1 Universal Ordinances	215
21.2 Universal Recycling and Composting Ordinance	216
21.3 Single-Use Products and Packaging Ordinances	218
21.4 Take-Back Ordinance	219
21.5 Hauler Registration Ordinance	219
21.6 Service Pricing Strategies	220
21.7 Statewide Refundable Container Deposit Legislation (Texas Bottle Bill)	222
21.8 Extended Producer Responsibility Initiatives	223

Chapter 22 - Incentives and Rewards 225

22.1 Business Technical Assistance and Recognition	225
22.2 Universal Recycling and Composting Ordinance Support	227
22.3 Rate Structure Support	228
22.4 Zero Waste Awards	229

Chapter 23 - Metrics and Measurement 230

23.1 Diversion Goals	232
23.2 Citywide Waste Stream Diversion Goals	233
23.3 Metrics of Waste Diversion: Measurement of Diversion Activity	233
23.4 Metric of Waste Reduction: Measurement of Waste Disposal Reduction	237
23.5 Metric of Material Stream: Measurement of Waste Stream Composition	238
23.6 Metric of Public Service: Measurement Service Expectations	244
23.7 Other U.S. EPA Measurement Tools	245
23.8 Diversion Calculations	247

Chapter 24 - Communications Plan 250

24.1 Situation Analysis	250
24.2 Comprehensive Communication Plan	251
24.3 Research	252
24.4 Communications Approach	254
24.5 Community Engagement	257
24.6 Public Education	258
24.7 Communications Plan-Implementation and Cost Estimates	260

Chapter 25 - Financial Responsibility 262

25.1 Accounting and Funding	262
25.2 Financial Planning and Budgeting	262
25.3 Revenue	263
25.4 Expenditures	265
25.5 Purchasing and Contract Compliance Monitoring	267
25.6 New Master Plan Expenditures	268
25.7 Future Rate Structure	270
25.8 FY2013 to FY 2020 Proposed Rates	273

Appendices

Appendix A - Acronyms and Definitions/Recycling Terminology	279
Appendix B - Council Resolution	285
Appendix C - Best Use Hierarchy	295
Appendix D - 12 Types of Materials	296
Appendix E - New Master Plan Initiatives	297

List of Tables

1. Collection Services Rates Table	16
2. City Implementation Tasks for Eco-Depot	80
3. Estimated Tonnages Diverted Through Reuse Program Implementation	80
4. Cost and Diversion Estimates for Recycling Collection Table	88
5. Estimated Tonnages Diverted Through Recycling Program Implementation	88
6. Performance Trends for HHW Program Table	133
7. Projected Diversion and Disposal Needs by Goal Year	147
8. Cost and Diversion Estimates for Disposal Management	147
9. Performance Trends for Litter Control Program	162
10. Performance Trends for Street and Blvd. Sweeping Table	162
11. Performance Trends for Dead Animal Collection Table	162
12. Performance Trends for Brush Collection Program Table	163
13. Performance Trends for Bulk Collection Program Table	163
14. Cost and Diversion Estimates for Event Recycling Ordinance Table	171
15. Brownfields Real-Estate Redevelopment Program	174
16. Cost and Diversion Estimates for Economic Development Table	178
17. Cost Estimate for Pilots and Demonstration Projects Table	214
18. Policy Implementation Schedule	224
19. Universal Recycling and Composting Ordinance Policy Implementation Schedule	224
20. Monitoring Performance by Zero Waste Initiative Table	236
21. Example: Calculated Capture Rate Table	240
22. Material Categories Addressed by Zero Waste initiatives	243
23. Diversion Initiatives-City of Austin Controlled (tons)	247
24. Diversion Initiatives-Private-Sector Controlled (tons)	248
25. Diversion Initiatives-Citywide Totals Controlled (tons)	248
26. Communications Plan Cost and Implementation Table	261
27. Employee Base by Program Area for FY12 Proposed Budget	266
28. Asset Management Table	269
29. Zero Waste Policy, Program and Facility Cost Estimates at Implementation Table	274
30. Citywide Estimated Diversion Rates and Potential Cost	

Impacts by Goal Year Table	275
31. Collection Services Rates with Included Revenue Table	276
32. Collection Services Rates with Included Revenue-With Anti-Litter Fee Table	277
33. FY13-FY20 Proposed Residential and Commercial Rate	278

List of Figures

1. Major Services Venn Diagram	4
2. Circle of Control / Influence	32
3. Circle of Control pie charts	32
4. Benchmark Goals	37
5. Highest and Best Use Hierarchy	39
6. Sustainability's Triple Bottom Line	49
7. Zero Waste Synergy	51
8. GHG Reduction Table	55
9. ARR Facilities Map	67
10. Zero Waste Loop	69
11. 12 Market Categories of Recyclable Materials Pie Chart	90
12. 12 Market Categories of Recyclable Materials Table	91
13. EPA Food Waste Hierarchy	108
14. Metric of Waste Diversion Table	231
15. Zero Waste Diversion Goals	232
16. Generation and Diversion Projections	234
17. Overview of the Diversion Model	236
18. Composition of Discarded Materials	242
19. Residential and Commercial Trash Cart Rates by Size	271
20. Proposed Fee Structure	272

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Chapter 1 / Executive Summary

The Austin Resource Recovery Master Plan (Master Plan) projects future activities and services provided by Austin Resource Recovery (ARR or Department) for the next 30 years. The Master Plan looks at the Department in its entirety, laying a framework for how the Department provides services to its customers and empowers the Austin community to achieve Zero Waste. Implementation plans for each proposed project, service or policy will be developed within the context of the Master Plan, each one in synergy with the other to ensure consistency between the service message and physical development of the service program.

The foundation for the Department's strategic and master planning efforts is the United Nations Urban Environmental Accords. The Accords are a set of 21 actions that the United Nations asked city governments to adopt and implement. In 2005, in honor of the United Nations World Environment Day, the City of Austin (City) signed the Urban Environmental Accords. The following three Accord actions are incorporated into this Master Plan:

- Implement "user-friendly" recycling and composting programs to reduce per capita solid waste sent to landfill and incineration by 20 percent by 2012;
- Adopt a citywide program that reduces the use of a disposable, toxic or nonrenewable product category by at least 50 percent by 2012; and
- Establish a policy to achieve Zero Waste going to landfills and incinerators by 2040.

1.1 / Mission Change: From Sanitation to Resource Recovery

The Department's primary role is to provide services to the citizens of Austin and other City departments, but how these services are provided and the Department's ultimate mission is evolving. Historically, the role of the Department, once named the Austin Sanitation Department, was to pick up household waste, dispose of dead animals, and sweep streets under the mission of creating a cleaner city through sanitary measures. Throughout this history, the Department treated the material collected as waste. Even recyclables and compostables were treated as diverted waste streams.

Zero Waste is a paradigm shift from waste management to materials management. This new approach treats materials collected as resources that have secondary lives, not as waste streams. Thus, Zero Waste is redirecting the Department's mission toward resource recovery. This new perspective treats the material as a resource that is recovered for a second life, rather than a waste stream destined for a landfill. With this paradigm shift, the Department name of Solid Waste Services no longer represents the Department's mission. As the Department embraces Zero Waste, the corporate name of the Department is now Austin Resource Recovery, which better reflects the Department's new vision and mission.

1.2 / Departmental Vision, Mission, Values, Objectives

The Department provides a broad range of services including curbside collection of trash, recycling, yard trimmings and bulk collection, as well as street sweeping, litter abatement, and household hazardous waste collection. To provide these services in a professional and efficient manner, the Department currently employs approximately 400 staff members and operates five different facilities throughout the city.

As the City aspires to be the Best Managed City in the country, the Department embraced the following vision and mission:

Vision

To be the national Zero Waste leader in the transformation from traditional integrated waste collection to sustainable resource recovery.

Mission

To achieve Zero Waste by providing excellent customer services that promote waste reduction, increase resource recovery, and support the City of Austin's sustainability efforts.

1.3 / Core Services and Major Programs

The Master Plan is a road map to guide the Department toward its vision of resource recovery. All future decisions about the design and development of the Department's core services, as outlined below, will be made with respect to the Master Plan.

- **Customer Services** – to provide efficient and reliable service for all customers
Customer service is not an activity; it's an attitude and a culture.
- **Employee Services** – to offer a high quality work environment for all employees
The quality of our work depends on the quality of our people.
- **Financial Responsibility** – to ensure the best value of services for the lowest cost
Fiscal integrity requires rate base equity, accountability, and balanced budgeting.
- **Quality Assurance** – to implement quality at each functional service delivery point
We deliver quality services through sustainable and innovative best practices.

Major Services and Programs

With the Master Plan as the guide, future services, programs and policies will be more coherent and mission-specific. The Department is organized into three major service areas: Diversion Services, Business Services and Support Services. The following diagram displays the inter-relationships of the Department's programs and services as outlined in the Master Plan:



FIG. 1

Even though all Departmental services, programs and policies will focus on achieving this mission and are included in this Master Plan, the following programs likely will have the greatest impact, both in terms of impact in the community and effecting the successful completion of the mission.

- Sustainability
- Zero Waste
 - Waste Reduction
 - Reuse
 - Recycling
 - Composting

- Materials Management
- Household Hazardous Waste
- Disposal Management
- Other Core Services
 - Litter Control
 - Alley/Street Flushing
 - Street/Boulevard Sweeping
 - Dead Animal Collection
 - Brush Collection
 - Bulk Collection

1.4 / Sustainability Goals

Community-Wide Focus

Sustainability efforts are intended to reduce our environmental footprint including impacts on climate change, energy, land use and environmental quality, including air and water quality.

Departmental Focus

Waste prevention, recycling and composting are activities that support sustainability and slowing climate change. The Department's Zero Waste efforts assist the City in its sustainability efforts by encouraging resource efficiency and managing materials for a second life, rather than managing waste. Implementing Zero Waste systems reduce greenhouse gases (GHGs) by:

- Reducing energy consumption associated with extracting, processing and transporting virgin raw materials;
- Utilizing recycled content products, which releases less GHGs than mining or harvesting virgin materials;
- Reducing and eventually eliminating the need for landfills, which decreases the amount of methane released into the atmosphere; and
- Reducing transportation impacts by establishing local end markets for the consumption of captured recyclables and compostable materials collected in the community.¹

Based on these sustainability concepts, Zero Waste is an integral part of the City's climate change initiatives. The Department commits to a strong partnership with the City's Office of Sustainability and its Climate Protection Program. The Department's Zero Waste and operational efficiency efforts will assist the City in its sustainability efforts through

.....
¹ *Austin Zero Waste Strategic Plan*, December 4, 2008, page 4

the following actions:

- Reducing fuel usage through vehicle routing efficiencies;
- Replacing diesel fuel with compressed natural gas (CNG), hybrids, electrics and other alternative fuels;
- Off-setting the Department carbon footprint through the establishment of a local carbon offset fund administered by the Office of Sustainability; and
- Reducing fugitive methane emissions by decreasing waste disposal in landfills and increasing composting and recycling volumes.

1.5 / Zero Waste Goals

The Austin City Council endorsed Zero Waste as a significant goal for the City and in doing so acknowledged that disposing of waste is not inevitable. By approving the Zero Waste Strategic Plan (Strategic Plan), the City Council established three major benchmark goals for achieving Zero Waste:

- Reducing by 20 percent the per capita solid waste disposed to landfills by 2012,
- Diverting 75 percent of solid waste from landfills and incinerators by 2020, and
- Diverting 90 percent of solid waste from landfills and incinerators by 2040.

To achieve these goals, this Master Plan provides a roadmap toward Zero Waste. Because it is necessary to dedicate resources each year, interim benchmarks are necessary to gauge progress toward these ambitious goals. The Master Plan establishes the following diversion goals:

- 50 percent by 2015
- 75 percent by 2020
- 85 percent by 2025
- 90 percent by 2030
- 95+ percent, working toward zero waste by 2040
- Restorative Economy by FY 2050

The City's diversion goals are based on the citywide generation of discarded materials, including materials generated by residents, businesses and visitors. The Department handles about 25 percent of discarded materials generated in the City. In FY 2010, the Department diverted about 38 percent of these City-collected materials from the landfill.

The Zero Waste policies and programs identified in the Master Plan are slated for implementation in the short-term (FY 2012 – FY 2015) and in the mid-term (FY 2016 – FY 2020). Most of the Zero Waste infrastructure will be developed within those time horizons as well. The long-term (FY 2021 – FY 2040) will involve sustaining and mainstreaming these Zero Waste programs as well as supporting product stewardship. In planning and implementing its Zero Waste policies and programs, the Department will monitor its successes and seek out new opportunities for innovation and advancement in Zero Waste policy development.

In addition to reducing the generation of discarded materials, the economic development potential of reusing valuable discarded materials locally is an important community value in Austin. The City can encourage local economic development by collaborating with businesses, institutions and the community to adopt policies and programs that incentivize, encourage or require more environmental responsibility to stimulate a sustainable green market economy.

Concept plans, diagrams, and estimates of costs and schedules in this Master Plan will demonstrate how the Strategic Plan, including the long-range goals, will be realized.

1.6 / Waste Reduction

Waste reduction refers to the process or policy of decreasing the amount of waste generated by a person, business, entity, or society.

Waste reduction is near the top of the City of Austin's Highest and Best Use Hierarchy.² As listed in the Strategic Plan, waste reduction practices include:

- Reducing consumption by purchasing and using less
- Reducing packaging
- Applying environmentally preferable purchasing standards to purchasing
- Purchasing products with less packaging
- Encouraging durable, reusable packaging

The City has direct control over its own waste reduction activities and can undertake specific initiatives to serve as an example to other residential, commercial and institutional generators. To develop the best

.....
² *Austin Zero Waste Strategic Plan*, December 4, 2008, Appendix H, page 47.

practices for waste reduction in City offices and facilities, the Department will undertake the following tasks:

- Conduct waste audits of all City department offices and facilities;
- Identify areas of City offices and facilities where discarded materials could be reduced;
- Coordinate with facilities management staff to implement ways to make recycling easier;
- Educate City employees to identify strategies for waste reduction;
- Provide a mechanism for personal responsibility and leadership within each department to focus on problem-solving and team-building;
- Convert the identified best practices into standard practices by incorporating the new strategies into citywide Standard Operating Procedures; and
- Partner with the Office of Sustainability to develop a cost-benefit analyses mechanism that incorporates the values of waste reduction, repair and reuse, and assist departments in prolonging the useful life of equipment and facilities.

For commercial properties, the Department provides commercial technical assistance through its Waste Reduction Assistance Program (WRAP), a free service that assists local businesses with their recycling and waste reduction efforts. The program motivates businesses to get involved, provides technical assistance and resources, and recognizes businesses that are making a difference. The Department will greatly expand its outreach to commercial and institutional generators to coincide with implementation of the City's Universal Recycling Ordinance (URO). The Department will conduct outreach to every business in Austin over a five year period. The program will start with businesses of more than 100,000 square feet, as the first phase, and remaining businesses will be phased in within three years. The program will include:

- Technical assistance to commercial businesses in support of the URO;
- Reward and recognition;
- Incentives and pilot projects;
- Information on recycling and reuse outlets;
- Information about rates and services available in the area; and
- Profiles and promotion of businesses transitioning to Zero Waste.

1.7 / Reuse

Reuse means using a discarded item for the same or similar function while preserving the embodied energy of its original form. Reuse is an important component in the Department's Zero Waste strategy. Austin residents are estimated to dispose of \$11 million in reusable items annually.³ Reuse businesses create jobs. For every 10,000 tons of reusable items processed, 75-250 jobs are created.⁴ Therefore, Austin residents could create an estimated 150 to 500 new green jobs by diverting all reusable items from landfills.⁵

The amount of reusable items in the waste stream is largely dependent on mechanisms in place to capture and refurbish the discarded items. Strategies the Department will explore and implement to support reuse include:

- Salvaging reusable items from the Department's bulk collection program prior to landfilling;
- Encouraging and facilitating the growth and development of repair and reuse businesses and nonprofits, including Teacher Resource/ Creative Reuse Centers;
- Providing additional opportunities for reuse through four new Eco-Depots; and
- Promoting the use of durable/reusable products.
- More information regarding the Department's reuse initiatives can be found in Chapter 7/Reuse.

1.8 / Recycling

Recyclable materials are discarded materials such as paper, metal, plastic and glass that can be reprocessed into new products or packaging.⁶ Recyclable materials are a large fraction of the discard stream, representing 43 percent of materials disposed in landfills.

The Department provides every other week collection of Single Stream Recycling in 96 gallon wheeled carts for single-family households and some small scale multifamily and commercial customers. The Department currently collects paper, boxboard, cardboard, aluminum and metal cans, glass and rigid plastic containers in the Single Stream Recycling carts.

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³ *Austin Zero Waste Strategic Plan*, December 4, 2008, Page 6.

⁴ *Waste to Wealth: Recycling Means Business*, 10 December 2008. Institute for Local Self-Reliance. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>

⁵ *Austin Zero Waste Strategic Plan*, December 4, 2008, Page 19.

The City's recycling agreements with two local recycling processors allow for the addition of recyclable materials to the City's program as markets for these products expand. In the future, the Department expects to add aseptic and gable-top containers, durable plastics (household items and engineering grade plastics), plastic wrap film, aluminum foil, and small scrap metal items to the list of accepted recyclables.

Most collection services provided to larger scale multifamily and commercial customers are provided by nonprofit and private sector service providers. Because the Department directly collects only a portion of the recyclable materials generated citywide, the City will have the most impact on increasing diversion of recyclable materials through new policy drivers. Through implementation of Zero Waste initiatives, an estimated 20 percent of recyclable materials from these large scale generators will be directly diverted by the Department and 80 percent of recyclable materials will be diverted by nonprofit and private sector service providers.

Within the URO, the City will require diversion of recyclable and eventually compostable materials by residential and commercial generators and at City offices and facilities. In the Event Recycling Ordinance, the City will require diversion of recyclable materials at all special events.

Recycling Initiatives

Many of the Department's new Zero Waste initiatives directly affect the diversion of recyclable materials. The Department will make changes to existing programs and initiate several new programs to divert recyclable materials, including:

- Continuing to contract for Single Stream Recycling processing at private sector materials recovery facilities;
- Relocating the existing Resource Recovery Center to the Department's Todd Lane facilities and rebuild to incorporate additional recyclables collection opportunities (see Chapter 9/Materials Management);
- Repurposing the City Materials Recovery/Transfer Station for bulk item diversion (see Chapter 13/Other Core Services);
- Repurposing the closed City landfill to site an Eco-Industrial Park for the location of resource-consumption industries such as a glass processor, a tire shredder, a plastics manufacturer (See Chapter 12/Disposal Management);
- Developing four Eco-Depots throughout the City to handle hard-to-recycle materials, including batteries, motor oil, paint and anti-freeze (see Chapter 7/Reuse).
- Expanding recycling collection to all of the Department's customers;

- Adding additional material types to the Single Stream Recycling Program;
- Providing a choice in the size of recycling containers (64 and 96 gallons); and
- Transitioning to weekly collection for residential customers;
- Adding recycling requirements to Limited Purpose Agreements;
- Adding an on-call collection for bulk items to increase diversion of reusable and recyclable materials; and
- Providing outreach, commercial technical assistance, and community-based social marketing initiatives.

The Department will support the work of the nonprofit and private sector service providers through:

- Outreach and commercial technical assistance;
- Pilot programs;
- Incentives; and
- Community-based social marketing initiatives, including focus groups, customer service surveys, and large-scale marketing campaigns to change public perception and behavior.

1.9 / Materials Management

Materials management uses and reuses resources at their highest and most productive level throughout the materials' life cycle. A materials management systems approach considers the life-cycle impacts of disposal and carbon footprint reductions from source reduction, reuse, remanufacturing, recycling and composting. Environmentally preferable purchasing policies, upstream redesign, extended producer responsibility systems and clean manufacturing practices are additional methods of materials management.

Materials management also provides the City with the economic development potential of reusing valuable discarded materials locally. The City can encourage local economic development by working with stakeholders to adopt policies and programs that incentivize, encourage, and even require more environmental responsibility or use of locally-produced products made of recycled content to stimulate a sustainable green market economy.

The Master Plan includes several opportunities for the development of Zero Waste infrastructure through public-private partnerships and private sector initiatives that are expected to be undertaken in response to City policies, such as:

- **Eco-Depots** – Drop-off facilities located around the City for collection of reusable items, recyclables and hard-to-recycle materials.
- **Materials Recovery Facilities (MRFs) for Recyclables** – MRFs constructed and operated by two private sector companies under contract with the Department, to support the Single Stream Recycling program and the Zero Waste initiatives of the Master Plan.
- **Resource Recovery Centers** – For the collection of hard-to-recycle materials such as appliances, tires, furniture, carpet and paint.
- **Composting Facilities for Organics** – Expanded organics processing capacity at the Hornsby Bend Biosolids Management Plant. The City may contract for additional composting services if deemed appropriate.
- **Construction and Demolition Debris Processing Facilities** – For the recovery and recycling of debris from construction sites, in response to a future Construction and Demolition (C&D) Debris Ordinance.
- **Eco-Industrial Park** – An industrial system of production facilities that conserves natural and economic resources, reduces energy and water usage, and provides opportunities for reuse or recycling of wasted materials.

1.10 / Composting Organics

Organics are discarded materials that will decompose, such as yard trimmings, food scraps, compostable food-soiled paper and untreated wood. Organic materials are the largest fraction of the discard stream, representing more than 40 percent of materials currently disposed in landfills.

Because the Department directly controls only a portion of the organic materials generated citywide, the City will have the most impact on increasing diversion of organic materials through new policy drivers. In future phases of the URO, the City shall require diversion of organic materials by residential and commercial generators and at City offices and facilities. In future phases of the Event Recycling Ordinance, the City shall require diversion of organic materials at all special events. In

addition, the City will register all organic service providers that haul within the City limits.

New Composting Initiatives

Many of the Zero Waste initiatives directly affect the diversion of organics materials. The Department will initiate several new programs to divert organic materials, including:

- Expanding its home composting incentive program to encourage the development of home and on-site composting;
- Initiating composting trainings at community gardens and implementing a junior composter and master composter training program
- Initiating a pilot program to collect yard trimmings, food scraps and compostable paper. Based on the results of this pilot, the Department will roll out the new organics collection program citywide;
- Transitioning to on-call collection of brush and large volumes of yard trimmings that are generated seasonally; and
- Providing outreach, commercial technical assistance and community-based social marketing initiatives.

Resources for Organics Collection

Existing staff resources will be used to implement an organics collection pilot. After the pilot program has been implemented, the City will conduct a routing efficiency analysis to determine the appropriate number of routes that will be needed to roll out organics collection citywide. The City will also determine whether any efficiency could be realized from reducing some of the trash collection routes and converting resources to organics collection.

Hornsby Bend Operations

Yard trimmings and brush are currently collected by City crews from various departments and delivered for co-composting with biosolids at Hornsby Bend (Hornsby Bend) Biosolids Management Plant, operated by the Austin Water Utility (AWU). Approximately 30,000 tons per year of yard trimmings and brush are currently delivered to Hornsby Bend for co-composting.

The Department's composting Zero Waste initiative will supply all collection customers with yard trimmings carts and add food scraps and compostable papers to the current yard trimmings collection program. This could increase the City's need for collection and processing of organics. The Department will compost the added food scrap materials through a two-year pilot program at either Hornsby Bend, if available, or at the FM

812 Landfill facility. In addition to Hornsby Bend, two other private sector composting facilities are currently permitted to compost food scraps. According to the facility operators, both facilities have sufficient capacity to meet Austin's short-term needs and have the capability of expanding their operations for the long-term. The City will first use existing capacity at Hornsby Bend if the pilot program for composting these materials is successful, and then will use other permitted composting facilities in the area to meet capacity needs.

It is critical for the Department to work with AWU's Hornsby Bend staff in the following areas:

- Pilot processing of yard trimmings and food scraps;
- Obtain a permit to accept food scraps and compostable paper;
- Potential full-scale processing of yard trimmings and food scraps; and
- Provide public drop-off for brush.

If food scraps processing is not feasible at Hornsby Bend, the Department will assist in:

- Transitioning the use of commercial brush and clean lumber as a bulking agent rather than residential yard trimmings;
- Using tree trimmings and other carbon sources from Austin Energy (AE) contractors and other City departments; and
- Developing a transition plan for Hornsby Bend to utilize other alternative bulking agents.

1.11 / Household Hazardous Waste Collection

Household Hazardous Waste (HHW) represents about one percent of materials disposed in landfills, yet it presents a significant risk to landfill containment and possible environmental contamination. HHW includes leftover household products that contain corrosive, toxic, ignitable or reactive ingredients, such as paints, cleaners, oils, batteries and pesticides that contain potentially hazardous ingredients and require special care when discarded. Nearly all programs for collecting and processing HHW will be provided by the Department. Some materials, including some pharmaceuticals, batteries, paint and compact fluorescent lights are collected by retailers for diversion or proper disposal.

The existing HHW Facility, located in south Austin, collected approximately

1,043,000 pounds of HHW in FY 2010. The Department also provides door-to-door collection for seniors and disabled residents and supports take-back programs offered by local businesses at 30 locations citywide. The take-back programs focus on batteries and fluorescent lamps. Additions to HHW collection will include:

- Adding two new staff to increase access to the HHW Facility;
- Expanding retail take-back partnerships;
- Providing rechargeable battery collection sites;
- Piloting a door-to-door household hazardous waste collection;
- Expansion of HHW operations into a small portion of the existing Materials Recovery Facility/Transfer Station (MRF/TS); and
- Advocating for Conditionally Exempt Small Quantity Generators (CESQG) to be included in the HHW program.

The Department will develop, finance and operate a north HHW Facility. The Department is currently exploring the siting of a North HHW Facility to increase service convenience to the residents (both from Austin and from neighboring communities) residing north of the river, and to decrease costs for transport, decrease GHGs and add needed capacity for employees and equipment. The north HHW Facility could be co-located with a north service center if the Department proceeds with plans to split a portion of its operations between south and a north service centers for routing efficiencies and decreased GHG impacts.

1.12 / Disposal Management

Acknowledging that the City's overall goal is to strive for no waste burned or buried, Austin will have disposal management needs for the foreseeable future. Although disposal will aggressively decrease as new diversion programs are deployed, there is still a need to plan for the community's needs for disposal of non-reused, non-recycled and non-composted material.

Disposal Capacity Needs

The Department, preparing for the closure of the FM 812 Landfill, foresaw the need to contract for the long-term disposal needs of city residents. The Department committed to a 30-year disposal contract from May 2000 through May 2030. As the Department deploys new diversion programs to meet the City's Zero Waste goals, a declining amount of

waste is expected to be landfilled annually. The following chart displays the disposal needs at given goal assessment dates.

City of Austin Waste Collection (includes only Department-Hauled tons)	FY 2010 (Actual)	FY 2015	FY 2020	FY 2025	FY 2030
Department-Hauled Diversion Rate	37.32%	50.00%	75.00%	85.00%	90.00%
Department-Hauled Waste Generation	221,368	250,000	275,000	300,000	325,000
Total Department-Hauled Diversion Reuse, Recycling, Composting, HHW	82,611	125,000	206,250	255,000	292,500
Department-Hauled Waste Disposal (projected)	138,757	125,000	68,750	45,000	32,500

TABLE 1

As noted in the tonnage projections, the City's need for disposal is expected to decline significantly, from 138,757 tons in FY 2010 to only 32,500 tons in FY2030. The cost savings from the reduction of trash collection and disposal is expected to offset the increased expense to support new diversion programs.

City FM 812 Landfill Management

The Department's closed FM 812 Landfill, located at 10108 FM 812 in the City of Austin's jurisdiction, is approximately 360 acres in size, and is under 30-year post-closure care within the EPA Subtitle D requirements for landfill site care and maintenance.

The closure of the FM 812 landfill presents a potential for site reuse opportunities. As the site is owned by the City, it is in the City's best interest to create a beneficial reuse of the landfill and its resources, while responsibly managing the closed waste cells in collaboration with Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ).

- **Methane Gas Capture** - Landfill gas is the natural byproduct of the decomposition of solid waste in landfills and is comprised primarily of carbon dioxide and methane, which is then combusted to generate electricity.
- **Solar Farm** - Construction of a solar farm on the capped landfill surface would be used to generate renewable solar energy and convert it into electricity. An estimated 20 mega-watts can be generated from this 160-acre proposed solar farm, equivalent to powering more than 5,500 homes each year of operation.
- **Eco-Industrial Park** - The Department is considering the redevelopment of the set-aside buildable land for an Eco-Industrial

Park. An Eco-Industrial Park is an industrial system of production facilities that conserves natural and economic resources; reduces energy and water usage, and provides opportunities for reuse or recycling of wasted materials. The Eco-Industrial Park could be powered by energy generated from the solar farm or the methane gas capturing system.

Alternative Disposal Options

New generations of high-temperature thermal combustion processing technologies are being marketed to local jurisdictions as Zero Waste alternatives to landfill disposal. Proponents of these technologies claim that they are capable of replacing fossil fuels with alternative, sustainable fuels made from waste. Based on AE's efforts to invest in sustainable energy generation options and the Department's efforts to achieve Zero Waste, both departments agreed to develop a method that would evaluate proposed technologies using the Highest and Best Use Hierarchy, impact to climate change, and cost.

While some of these waste-to-energy combustion technologies may appeal to the goals and values of some communities, they also distract communities from instituting Zero Waste systems that are highest on the Highest and Best Use Hierarchy. The Department is committed to focus on technologies that prioritize recycling and composting over combustion and landfilling. This commitment requires careful evaluation of new technologies to ensure that the technology can be ranked higher on the Highest and Best Use Hierarchy in order to obtain financial and feedstock support from the City of Austin or the Department. Alternative technologies are discussed in greater detail in Chapter 12/Disposal Management.

1.13 / Other Core Business Services

The Department provides several other core services to the Austin community: litter control, alley and street flushing, street and boulevard sweeping, dead animal collection, brush collection, and bulk collection. As the City continues to grow in population and advance technologically, there is an increased need for the Department to analyze and improve these core services to meet the needs of the community and achieve the City's Zero Waste goals. This analysis will allow the Department to:

- Enhance and improve existing customer service levels;
- Create new diversion activities to support Zero Waste goals and

initiatives;

- Implement program changes to accommodate projected city population growth;
- Incorporate program efficiencies to improve fiscal responsibility; and
- Develop Comprehensive Education and Outreach Campaigns to reduce litter City-wide.

These core services and programs provide a cleaner community for Austin residents and an improved quality of life. Most of these services are provided to the community at large seven-days-per-week, 364-days-per-year.

Litter Control

Litter control services provided by the Department's Litter Abatement Division include litter pick up, litter container management, and illegal dump cleanups. These services ensure cleaner streets, limit the amount of discarded materials that enter stormwater systems, and present a cleaner image of the City to millions of visitors annually.

The Litter Control program is inherently reactive to improperly disposed materials. The Department will explore public education campaigns with other City departments and stakeholder organizations to prevent litter. Some of the policies to be explored include stronger enforcement of anti-litter ordinances, a public education program that focuses on behavior changes of visitors and residents, and a special event ordinance that strengthens requirements of event organizers to plan for, prevent, and manage litter in and around the event area.

As a pilot in 2011, the Department purchased and installed 20 solar-powered trash compactors with recycling kiosks. If the pilot is deemed successful, the Department will invest in additional units for other high pedestrian service areas, including the downtown area and the entrance and exits to walking trails and bikeway trailheads. The Department will coordinate with other City departments to prioritize areas currently serviced by the Department and/or serve as high volume routes such as frequently used event routes. The Department will also develop criteria to determine whether or not to expand litter control services into areas that are not regularly served by the Department.

Alley and Street Flushing

The Alley and Street Flushing Program washes contaminants from downtown alleys and roadways which limits the amount of discarded materials that enter stormwater systems, reduces exposure to human excreta which can be a medium for disease transmission, helps with odor and pest issues, and provides a cleaner atmosphere for those utilizing the Central Business District (CBD). The program is funded through the use of Anti-Litter Fees charged to Austin utility customers.

Since many downtown alleys are used for deliveries and business services, the alley flushing is performed in the early morning hours before the start of the business day. The Department experiences significant challenges to provide alley and street flushing services, including blocked service areas and ever increasing demand for year round services. The Department will work with stakeholders to develop and present to City Council a new city ordinance that addresses these challenges and evaluates options to provide seven-day service. The discussion will include cost-recovery measures to ensure the program is adequately funded and staffed.

Street and Boulevard Sweeping

The Street Cleaning Program provides frequent street and boulevard sweeping throughout the entire City. The street sweeping system is designed to clean the streets and limit contaminants from polluting Austin's creeks and drainage ways. Street sweeping allows for removal of discarded materials, litter, and dirt from streets and roadways for health, safety, aesthetic and water quality reasons.

As most city streets are utilized for residential parking, street sweeping crews often encounter parked cars that block their efforts to clean the storm drainage areas near the street curb. The Department will develop and implement a public notice program to inform the residents when to clear the roadways for street sweeping. The Department will also explore better ways to route street sweepers, in an effort to reduce mileage on the road and reduce its carbon footprint.

Additionally, in response to increases in bicycle traffic, the Department is currently researching data to evaluate the feasibility of implementing a Bike Lane Sweeping Route. Currently, bike lanes are swept by the regular residential routes. However, the Department has been receiving frequent requests to sweep bike lanes between their regular schedules. The Department will coordinate with the Public Works Department's

Neighborhood Connectivity Program to evaluate options for a monthly Bike Lane Sweeping Route.

Dead Animal Collection

Dead animal collection is essential for the health, safety and welfare of the community by removing any dead and decaying animals. Dead animal collection is provided on public rights of way throughout Austin and from the City's Animal Shelter. Dead animals are collected in a hermetically-sealed vehicle and taken to an area landfill for disposal.

Sometimes in the effort to remove a dead animal, staff discovers the animal alive and in need of emergency care. Staff will take measures to seek proper care for the injured animal. However, this activity removes the staff from their assigned list of duties. This service is inconsistent with the other services provided by the Department. The Department is interested in opening a dialogue with other entities to explore transferring or removing the collection program from the Department.

Large Brush and Bulk Collection Programs

The Large Brush and the Bulk Collection programs provide customers with a convenient and cost effective ways to dispose of, recycle, and compost large limbs and trees and bulk items that do not fit in the trash carts. The programs will also serve as feedstock for reuse programs and help minimize illegal dumping. Both programs offer twice-per-year curbside collection for the Department customers. Brush that is collected is taken to Hornsby Bend to be used as a primary feedstock in Dillo Dirt™.

Changes and additions to the Large Brush and Bulk Collection programs will include three major initiatives:

- **Clean Austin** - an enhanced brush and bulk collection program for high need areas. High need areas are characterized by frequent resident turnover, high demand for bulk and/or brush collection services. To date, the Department has identified 27 areas that meet these criteria. The Clean Austin program will enhance existing brush collection cycles where needed and offer a revised on-call service, previously referred to as out-of-cycle collection. The Department will work closely with the Austin Apartment Association and the Austin Realtors Association in coordinating implementation of this new program.
- **Storm Debris Management** – a partnership with Austin Emergency Response Team to quickly respond to violent storms through Storm Debris tree and brush collection services. The Department will

explore potential contractual relationships with private companies to provide brush-shredding services in the event the collected material exceeds the capacity of City-dedicated resources.

- **Reuse Austin** - Partnering with nonprofits for repair and reuse of discard items. The Department will make a stronger effort to recycle or reuse bulk items collected. The City will team with reuse and resale organizations that are structured to collect and sell gently used furniture, building materials, and other reusable items to increase diversion of items currently landfilled.

Both the Clean Austin program and the Reuse Austin program will require infrastructure improvements. The Department's Resource Recovery Center, located at the FM 812 landfill, is intended to be a public drop-off of bulk items, including tires, large appliances, and furniture. The Department will relocate the Resource Recovery Center to the Materials Recovery Facility/Transfer Station (MRF/TS). The repurposed MRF/TS will house the public drop-off service as well as the bulk collection and reuse program.

Operational Needs

The Department's operations will continue to require basic internal services that support its fleet of vehicles and other infrastructure. In addition, the Department continues to seek a reduced carbon footprint. To purchase and maintain vehicles, the Department contracts with the City's Department of Fleet Services for repair services and fuel. The Department also utilizes Fleet Services for a rotating purchase plan of vehicles, as older vehicles are retired due to age, wear and poor condition. Future diversion programs will require a different mix of vehicles and will involve compressed natural gas (CNG), bio-diesel fuels, hybrids, and all electric vehicles where appropriate. As the CNG fleet increases, the Department anticipates the need for a north fueling station, to augment the current fueling station in Southeast Austin. These areas of expansion into greener fuels are addressed in more detail in Chapter 4 / Sustainability.

An additional effort to reduce the Department's carbon footprint includes increased route efficiencies. The Department is investing in routing and GIS upgrades to better analyze route structures and develop more efficient travel patterns for the drivers. Facility development is planned to support a split in north-south routes to reduce mileage and thereby reduce the Department's carbon footprint. Future programs intended to support diversion activities will also be analyzed for route travel efficiencies.

Another operational support activity includes cart purchases and cart repairs. The Department anticipates additional cart needs for planned annexations and new housing subdivisions, as well as for cart replacement needs. A cart storage and repair facility is currently located at the FM 812 landfill. Due to planned redevelopment of the landfill, cart repair and storage will move to the Department's MRF/TS.

1.14 / Economic Development Opportunities

A key driver in the development of the Master Plan is the opportunity to create new green jobs and site new green businesses in Austin through resource recycling economic development. The City has the ability to attract new businesses to Austin, including reuse and recycling nonprofit organizations and private sector entrepreneurs, re-processors, secondary manufacturers and other businesses that have the ability to use recovered materials in their manufacturing processes.

Providing green jobs and local economic development is a key opportunity identified in the Master Plan. The Department will provide funding for a new staff member in the Economic Growth and Redevelopment Services Office (EGRSO) who will be responsible for retaining and attracting reuse and recycling industries to Austin. Through this new position, EGRSO will create the Resource Recovery Economic Development program, which will be responsible for undertaking the following initiatives:

- Locating Resource Recovery Small Businesses;
- Supporting Byproduct Synergies;
- Promoting the Department's commercial Waste Reduction Assistance Program;
- Supporting the Development of a Green Business Leaders Advisory Council;
- Supporting Incentives to Attract Recycling Re-processors;
- Eco-Business Park & Eco-Industrial Park; and
- Brownfields Redevelopment Program.

These initiatives are described in greater detail in Chapter 15/Economic Development Opportunities.

1.15 / Public-Private Partnerships

The Department collects approximately 25 percent of municipal solid waste (MSW) generated within the City through its operations and contracts. Approximately 68 percent of materials generated in the City are collected by private sector service providers and private recyclers operating in the City. The remaining 7 percent of materials generated in the City are self-hauled to landfills and recycling centers.

Most of the reuse, recycling, composting and landfill infrastructure in the region is owned and operated by private sector service providers and other government agencies. Therefore, the City relies on partnerships with private sector service providers to provide the collection system and processing infrastructure to meet the needs of commercial generators.

There are several opportunities for the City to develop Zero Waste infrastructure through public-private partnerships. Private sector initiatives are also expected to be undertaken in response to City policies.

- Materials Recovery Facilities for Recyclables
- Composting Facilities for Organics
- Construction, Demolition and Deconstruction Debris Processing Facilities
- Eco-Depots and Private Resource Recovery Centers
- Eco-Industrial Parks

These initiatives and opportunities are described in more detail in Chapter 17/Public-Private Partnerships.

1.16 / Policies and Ordinances

Zero Waste policies, including ordinances, incentives, bans, take-backs, purchasing specifications, and advocacy, allow the City to increase diversion and decrease waste. Zero Waste policies are extremely important because they influence all the materials that are generated in the City, including waste and material streams not directly handled by the Department. Based on input received through the public input process, the Department will implement the following policies:

- Universal Recycling Ordinance to be amended as the Universal Recycling and Composting Ordinance
- Single-Use Products and Packaging Ordinance

- Take-Back Ordinance
- Extended Producer Responsibility Initiatives
- Hauler Registration Ordinance
- Refundable Deposit (Bottle Bill)

More information regarding these initiatives can be found in Chapter 21/ Policies and Ordinances.

1.17 / Communications Plan

The overarching goal of the communications plan is to raise awareness among Austinites about the City's Zero Waste goal and to motivate them to change their behavior to achieve that goal. The Department will develop a comprehensive communications plan that corresponds with the long-term Master Plan. The purpose of the plan will be to define measurable objectives and a strategic implementation approach to guide communicators and others in designing, preparing and executing strategic communications. This plan will be research-based to ensure effective targeting of audiences and development of key messages, as well as to measure a program's success over time.

The communications approach will be one that enables a forum for community engagement and education developing a catalyst for action. In particular, the Department commits itself to a robust community engagement program across initiatives that result in revisions to rules and ordinances or a cost of service increase to Department customers.

The Department will prepare an annual report to provide the Austin community with updates on programs, services and progress toward the Zero Waste goal. This document will report on how well the Department is doing in meeting the specific objectives outlined in the Master Plan and will include but not be limited to the following:

- Departmental awards and accomplishments
- Brief background and history on the Department
- Program highlights – the latest and greatest
- Community partnerships and research
- Operational and administrative overviews

The annual report will be developed and distributed widely, including other City Departments, the Mayor and Council, as well as the general

public. Detailed information regarding the Department's communication plan can be found in Chapter 24/Communications Plan.

1.18 / Financial Responsibility

The Department's Finance Division is responsible for managing the Department's finances. Financial management entails updating and maintaining the Department's business plan, generating a five-year financial forecast and producing the annual operating budget, which includes estimating expenditures, projecting revenues and developing the rate structure necessary to support the Department's operations.

The estimated expenditure, revenue needs, and proposed rates discussed in this Master Plan will be re-evaluated every year, with an annual budget proposal presented to City Council each summer. Adoption of this Master Plan does not imply the approval of the rates and expenditures presented above. The City Manager and City Council reserves the right to approve an annual budget each year reflecting current events and citizen needs. This Master Plan will be re-evaluated every five years through a public engagement process.

Cost of Service Study

In an effort to support the change in the Department's rate structure, Department staff performed a cost of service study in 2011 which segmented all revenues and expenditures between two major categories: Collection Services and Anti-Litter.

Revenues

Cart Fees for Collection Services and Anti-Litter Fees are the Department's primary sources of revenue. The Department currently assesses a base customer fee and trash cart fee for residential and commercial customer accounts serviced by the Department. The cart fees are assessed according to cart size (21 gallon, 32 gallon, 64 gallon, and 96 gallon). Rates for larger cart sizes have recently been set higher than the proportional gallon increase in order to discourage waste and increase diversion towards the City's goal of Zero Waste.

The Anti-Litter Fee covers operational costs for litter control, street sweeping and the HHW disposal facility. The residential Anti-Litter Fee is assessed to any residence that has an active utility account, including all

multifamily units. The Department also charges a commercial Anti-litter Fee to businesses within the service area with active utility accounts.

In addition to Cart Fees and the Anti-Litter Fee, the Department has other revenue components including fees charged to deliver extra carts or upsize carts, fees charged for un-stickered extra trash items collected at the curb, and pre-paid extra trash bag stickers sold at local retail stores. All fees are collected according to the Council-approved fee schedule.

Proposed New Fee Structure

The Department uses the Pay-As-You-Throw (PAYT) rate structure which charges high volume users a proportionally higher monthly charge than low end users, thus encouraging waste reduction. The current FY2012 fee structure noted above is a modified PAYT rate, as it includes a base rate in addition to a volume fee.

Beginning in FY2013, the Department will propose to City Council a pure PAYT rate structure that charges customers based upon cost per gallon. An example is 39 cents per gallon trash service, yielding a monthly fee of \$37.44 for 96 gallon trash, \$24.96 for 64 gallon trash, \$12.48 for 32 gallon, and \$8.19 for 21 gallon service. Although this is simply an example of the fee structure, it demonstrates the stratified rates paid based on the amount of trash collected at the curb. Annually, the Department will calculate all program expenditures related to household services provided and calculate a per gallon fee that is charged based on the monthly trash volume. Although the fee is based on trash service, this monthly charge provides full residential service including trash, recycling and organics collection, as well as several waste diversion programs. This proposed change in fee structure is intended to support this Master Plan by further differentiating the high volume (96 gal) monthly rate from the low volume (21 gal) monthly rate. The Department will update its cost of service study and calculate a standard per gallon fee in the Spring of 2012 for the FY2013 proposed budget process.

Likewise, the Department performed a cost of service study for the Department programs funded through the Anti-Litter Fee. This flat-rate monthly fee provides revenues for litter abatement, street sweeping, alley flushing, household hazardous waste, dead animal collection, and expanded waste diversion programs that benefit the entire community.

In the near future, the Department and the Code Compliance Department (CCD) will collaboratively pursue an ordinance amendment to clarify the

programs covered by the Anti-Litter Fee and more clearly divide the fund between the Department and CCD. This change will attempt to make the program costs more transparent between the departments while allocating a more appropriate split to fund the required activities. It is important to clarify that CCD expenditures are not reflected in any of the charts within this document because CCD is a separate department and not related to ARR's programs or services.

Details regarding the Department's financial responsibility and rate structure are located in Chapter 25/Financial Responsibility.

1.19 / Implementation Schedule and Diversion Rates

While programs, infrastructure, and policies are planned for implementation over the next decade, the Master Plan is designed to be a living document with annual updates and program assessments every five years. Annual updates will allow the Department, City Manager, City Council, and citizens to make informed decisions regarding how to proceed year to year based on economic conditions and available resources. Material diversion will also be calculated annually with available data. A full city-wide diversion assessment will be contracted every five years, to measure progress toward the five-year benchmarks as well as the City Council adopted diversion goals.

Appendix E provides a summary chart detailing an implementation schedule and projected diversion rate for each initiative.

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Chapter 2 / Introduction

2.1 / Purpose-Why a Master Plan?

Austin Resource Recovery's (Department) master planning occurred through a three-tiered process, comprised of strategic planning, master planning, and project design.

- **A strategic plan** is the first step toward distinguishing the fundamental goals and overall vision of the Department. The Austin City Council, in January 2009, adopted the Austin Zero Waste Strategic Plan (Strategic Plan). The Strategic Plan summarizes the analysis and input received from the community on Zero Waste and makes general recommendations on how to proceed toward Zero Waste. The Strategic Plan further directs the Department to incorporate the Strategic Plan into the development of the Master Plan.
- **A master plan** is a comprehensive plan of policies, programs, and implementation steps to achieve a vision. The Master Plan is a road map to guide the Department toward its vision of resource recovery and supports the City's vision to achieve Zero Waste by 2040. Having a master plan in place supports the coordinated growth of the Department's facilities and functions and helps avoid ad-hoc development of its infrastructure. If all future decisions about the design and development of the Department's services are made with respect to the Master Plan, the future programs and policies will be more coherent and mission-specific toward the Department's Zero Waste journey.
- **Project design** turns concepts and ideas from the Master Plan into real solutions. The timeline of a project design is generally 6 months to 3 years. Here, specifics such as service needs, barriers, type and size of facilities, and new policies are determined and detailed. Each project design follows closely to each fiscal budget year, and is identified in the annual business plan as a Departmental priority.

Each step of development builds on the previous. The Master Plan is derived from the objectives laid out in the Strategic Plan. Then, each project design will build off of the Master Plan. During project design, new information may suggest a re-thinking in the Master Plan.

The final publication of the Master Plan will have many uses, in addition to providing an obtainable plan for future development of programs and policies. Master planning is a process that takes stock of existing resources and asks how they can be maintained, enhanced, or developed to continue to improve our lives and the vitality, livability, and success of our community. Therefore, the Master Plan will be used to market the Department's vision and to gain financial support and grant funding.

2.2 / Planning Horizon

Although the Master Plan projects future Department activities and services for a long time period (30 years), it is intended to be a living document, with moving parts. It will be reviewed and updated every five years to keep up with the on-going challenges of providing services to the citizens of Austin. The Department will also regularly analyze its progress and update its implementation tasks, the results of pilot programs, and new research, and then provide a status report to the public and the City Council through an annual Department report.

2.3 / Public Input

To achieve Zero Waste, the Department will need to engage its stakeholders, including its residential and business generators, to embrace the culture change anticipated by the Zero Waste goal. This will require an active and on-going dialogue throughout the community.

The Master Plan builds on the work of the Strategic Plan¹, adopted by the City Council in 2009 and is a culmination of a regular dialogue with the Austin community. The Department made a significant effort to ensure that the Master Plan was driven by stakeholder input in order to reflect the vision and aspirations of the City and its community. The scope of work for the Master Plan was conceived during stakeholder workshops

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¹ Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream.* City of Austin. 4 Dec. 2008.

held in August 2009. Over an 18 month period, between April 2010 and September 2011, the Department and its consultants developed the Master Plan with significant input from stakeholders throughout the community, including Austin residents and businesses, several boards and commission, other City Departments, representatives from communities and public agencies throughout the region, non-profit and private sector service providers, academic institutions, community organizations and environmental groups.

In August 2010, staff and its consultants presented research and findings on the various scopes of work subjects and held short charrettes to identify gaps in information and focus in on high priority issues identified by stakeholders. In November 2010, staff conducted a two-day interactive charrette open to the public to discuss and evaluate 58 potential Zero Waste initiatives. The recommendations were refined, revised, updated, and prioritized based on stakeholder input from the workshops and input received online. In March 2011, staff conducted a public meeting to share additional research and present an overview of the Master Plan's proposed direction.

From April 2011 to September 2011, Staff gathered all input and related documents to finalize the Master Plan. Staff also met with several boards and commissions including the Solid Waste Advisory Commission (SWAC), Sustainable Food Policy Board (SFPB), Water/Wastewater Commission, Resource Management Commission, and Environmental Board to review and discuss sections of the Master Plan of specific interest to each advisory body. Department staff presented the final Master Plan to the Austin City Council for adoption in November 2011.

Individual policies, programs and infrastructure identified in the Master Plan will be further developed through pilot programs, additional research, and discussions at future public meetings. Several policies will require new ordinances to be considered by Council. The ordinance adoption process will include opportunities for additional public input. New proposed programs and infrastructure to be implemented by the Department will be subject to the City's annual budget approval and the associated public input process. Additionally, any revisions to the Department's rates or rate structure will be reviewed and considered during the annual budget process.

2.4 / Systems Overview

As part of the planning process to develop the Master Plan, the Department prepared a Needs Assessment Technical Memorandum² to collect, review and evaluate the Department's services, programs, and facilities; describe regional public and private infrastructure; project discarded materials generation over the planning period (through fiscal year 2050); and evaluate 58 existing and new initiatives for consideration in the Master Plan.

The Needs Assessment Technical Memorandum describes the City of Austin's Zero Waste System to include:

- **Circle of Control** – services that are directly provided by the Department or through its contractors; and
- **Circle of Influence** – services that are provided by non-profits and other private sector service providers as a result of policies, ordinances and incentives.

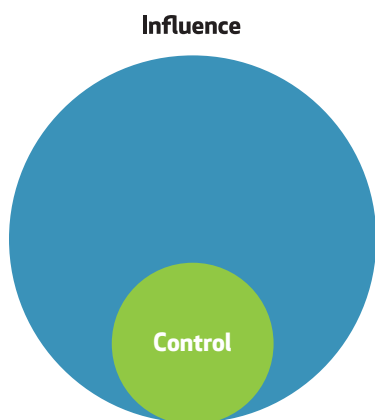
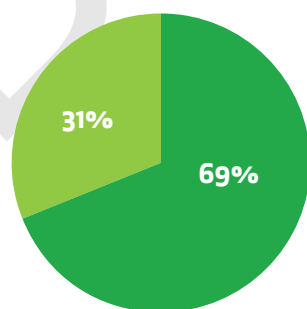


FIG. 2

Approximately 1,445,300 tons were estimated to be generated in the City of Austin jurisdiction in Fiscal Year 2009 (FY2009 -October 1, 2008 to September 30, 2009) from both residential and commercial sources. Approximately 69 percent of these materials were estimated to be disposed in landfills and 31 percent were reused, recycled or composted. Approximately 25 percent of total tons generated were controlled by the City, 68 percent were controlled by private sector service providers and 7 percent were self-hauled by residents and businesses.



*City of Austin Citywide
Generation FY 2009*

- 1,000,000 Tons Estimated
- Citywide Disposal 69%
- 445,300 Tons Estimated
- Citywide Diversion 31%

1,445,300 Tons Generated Citywide
FY2009

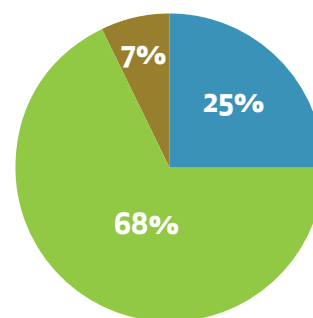


FIG. 3

Circle of Control

- 360,500 Tons Controlled by City 25%
- 976,100 Tons Controlled by Private Sector 68%
- 108,700 Self Haul Tons 7%

1,445,300 Tons Generated Citywide
FY2009

² "Austin Needs Assessment Technical Memorandum." City of Austin. November 2010. Web. 14 Sept. 2011.

The Master Plan is a comprehensive plan of policies, programs, and implementation steps to reduce and divert the total citywide disposal tons by 90% by 2030. The estimated FY2009 diversion is our starting point to build from. As new programs and policies are implemented, it is anticipated that the collective diversion will increase the City diversion rate each year. The first benchmark goal is 50% diversion in 2015. Each chapter in this Master Plan describes the major initiatives by topic, with each activity synergistically complimenting expanded programs as well as new programs and policies.

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Chapter 3 / Zero Waste

3.1 / What is Zero Waste?

Zero Waste is a paradigm shift. Recyclables are what we once kept out of the trash. With Zero Waste, trash is what is left over after we reduce, reuse, recycle and compost. As the City travels along the path toward Zero Waste, the Department is transforming from an organization focused on waste management collection to one focused on materials resource management.

The Zero Waste International Alliance (ZWIA) presents a peer-reviewed, internationally accepted definition of Zero Waste:

Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all wasted materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.¹

In this Master Plan, the term Zero Waste will mean reducing the generation of wasted materials at the source and maximizing diversion methods to avoid landfills and incinerators. The overall goal is to strive for no waste burned or buried.

3.2 /Austin City Council Support

In 2005, in honor of the United Nations World Environment Day, the City signed the Urban Environmental Accords (Accords).² The Accords are a declaration by participating city governments to build ecologically sustainable, economically dynamic, and socially equitable futures for their residents. Signatories to the Accords agree to perform the following actions:

- Implement user-friendly recycling and composting programs to reduce per capita solid waste sent to landfill and incineration by 20 percent by FY 2012;
- Adopt a citywide program that reduces the use of a disposable, toxic, or nonrenewable product category by at least 50 percent by FY 2012; and
- Establish a policy to achieve Zero Waste going to landfills and incinerators by FY 2040.³

In 2007, the City adopted the Climate Protection Plan⁴ to reduce greenhouse gas emissions, a primary contributor to climate change, and make Austin a national leader in the fight against anthropogenic global warming. Landfills are one of the largest sources of methane, a powerful greenhouse gas that is 21 to 75 times more potent than carbon dioxide.⁵ The City can significantly reduce its greenhouse gas (GHGs) emissions levels through waste reduction and recycling. Recycling can reduce GHGs both by reducing methane generation at landfills and by saving energy through recycling.⁶

3.3 /Austin Zero Waste Strategic Plan

After developing a scope of work the City then solicited a consultant to develop a Zero Waste Strategic Plan that would:

- Consider current and planned public and private solid waste infrastructure;
- Consider the City's Climate Protection Program and the United Nations Urban Environmental Accords goal to reduce by 20 percent the per capita solid waste disposal to landfills by FY 2012 and Zero Waste by FY 2040;
- Emphasize reduction, reuse and recycling of waste;
- Include a specific timetable for each priority, including actions to be

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¹ [Zero Waste International Alliance](#). "Zero Waste Definition." [Zero Waste International Alliance](#). 3 November 2010. Web. 1 Sept. 2011.

² Austin, Texas. City Council Resolution No. 20050519-4. Web. 1 Sept. 2011.

³ City & County of San Francisco. "Urban Environmental Accords." [SF Environment.org](#). 3 January 2011. Web. 1 Sept. 2011.

⁴ City of Austin. "Austin Climate Protection Plan." [CoolAustin.org](#). January 3, 2011. Web. 1 Sept. 2011.

⁵ Platt, Brenda and Eric Lombardi, and David Ciplet. "Stop Trashing the Climate." June 2008. [Institute for Local Self-Reliance](#). 3 January 2011. Web. 1 Sept. 2011.

⁶ Choate, Anne et al. "Waste Management and Energy Savings: Benefits by the Numbers." [EPA.gov](#). 4 Sept. 2005. Environmental Protection Agency. Web. 1 Sept. 2011.

taken for the greatest impact on the diversion of materials sent to landfills;

- Estimate order of magnitude costs for each priority action;
- Include public education and outreach to promote the concepts of the plan;
- Integrate the concept of Eco-Industrial Parks;
- Include effective methodologies for maximizing producer responsibility;
- Address applicable rules, regulations and policies necessary to support Zero Waste goals;
- Address rules, regulations, policies and infrastructure investments that constitute barriers to achieve these goals; and
- Obtain input from the Solid Waste Advisory Commission (SWAC), and seek input from a broad range of stakeholders, including businesses, environmental organizations and the community at large.

In November 2007, the City Council awarded the solicitation to Gary Liss & Associates to develop the Zero Waste Strategic Plan for the City. The Zero Waste Strategic Plan summarizes the analysis and input received from the community on Zero Waste and makes recommendations for the City on how to proceed toward Zero Waste.

“Although there are several recommendations included in this Plan, there is no one right way to get to Zero Waste. Many paths can be taken. Zero Waste is about the commitment and the journey. Austin has taken the first step to commit to this goal.”⁷

In January 2009, the City Council passed Resolution 20090115-050, adopting the Zero Waste Strategic Plan.

3.4 / Austin Zero Waste Goals

The City Council established three major benchmark goals for achieving Zero Waste:

- Reducing by 20 percent the per capita solid waste disposed to landfills by FY 2012,
- Diverting 75 percent of solid waste from landfills and incinerators by FY 2020, and
- Diverting 90 percent of solid waste from landfills and incinerators by FY 2040.

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⁷ Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan*. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream. City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011. Appendix H. Page 47.

To achieve these goals, this Master Plan provides a roadmap toward Zero Waste. Since Zero Waste is a paradigm shift from the traditional waste management model, these major goals establish benchmarks to which the City is committed on the journey toward Zero Waste. The Master Plan establishes the following milestones to ensure the major benchmark goals are achieved:

- 50 percent by FY 2015
- 75 percent by FY 2020
- 85 percent by FY 2025
- 90 percent by FY 2030
- 95+ percent, working toward zero waste by FY 2040
- Restorative Economy by FY 2050

The City's diversion goals are based on the citywide generation of wasted materials, including materials generated by residents, businesses and visitors. The Department handles about 25 percent of wasted materials generated in the City. In FY 2010, the Department diverted about 38 percent of these materials from the landfills.

The Zero Waste policies and programs identified in the Master Plan are slated for implementation in the short-term (FY 2012 through FY2015) and in the mid-term (FY 2016 through FY 2020). Most of the Zero Waste infrastructure will be developed within those time horizons as well. In planning and implementing its Zero Waste policies and programs, the Department will monitor its successes and seek out new opportunities for innovation and advancement in Zero Waste policy development. The Master Plan is designed to be a living document with implementation steps, annual reports and program assessments every five years.

By FY 2050, the City will contribute to a restorative economy. The concept of a "restorative economy" was coined by Paul Hawken:

In a restorative, "least cost economy," we move to that system of agriculture, forestry, transportation, construction, and communication that has the least cost to the environment... In a least-cost system, those resources, our "natural capital," are valued at their true replacement cost. Instead of competing to produce the cheapest goods in terms of price, we compete to produce the goods and services we need according to which have the lowest impact on those resources, and thus the lowest cost to current and future generations.⁸

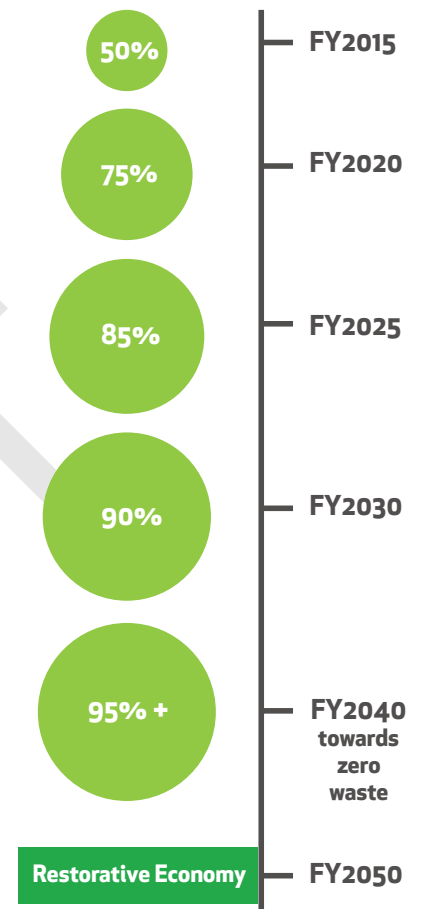


FIG.4

⁸ Hawken, Paul. "The Restorative Economy." *Sustainability Consciousness Conference*. Esalen Institute. Big Sur, California. 22 April, 1995. Web. 1 Sept. 2011.

The City's ultimate Zero Waste vision is to move beyond Zero Waste systems to an economy based on maximizing the value of goods and services while reducing the impact of our ecological footprint on the environment.

3.5 / Highest and Best Use

In addition to reducing the generation of wasted materials, the economic development potential of reusing valuable wasted materials locally is an important community value in Austin. The City can encourage local economic development by collaborating with businesses, institutions and the community to adopt policies and programs that encourage and incentivize more environmental responsibility to stimulate a sustainable green market economy.

In the Zero Waste Strategic Plan,⁹ the City established its Highest and Best Use Hierarchy.¹⁰

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⁹ City of Austin. "Austin Climate Protection Plan."

CoolAustin.org. January 3, 2011. Web. 1 Sept. 2011.

¹⁰ Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream*. City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011. Appendix H. Page 47.

Highest Use

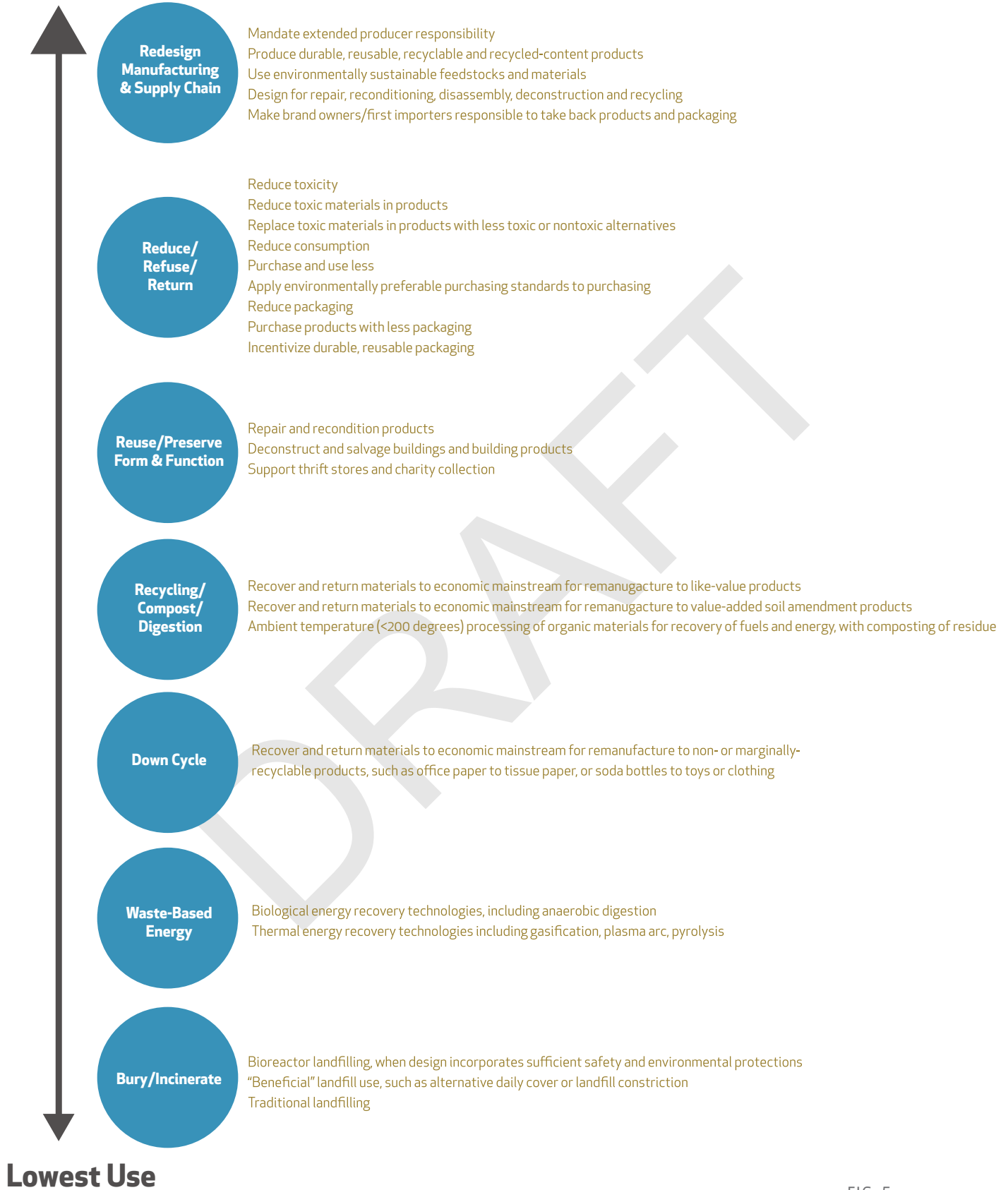


FIG. 5

3.6 / Materials Management

The Department is evolving from a waste collection service provider toward a materials management department.

“Materials management is an approach to serving human needs by using and reusing resources most productively and sustainability throughout their life cycles, minimizing the amount of materials involved and all the associated environmental impacts.”¹¹

A materials management systems approach focuses on the life cycle impacts of materials currently being disposed of in landfills and the greenhouse gas emission reductions that are possible by diverting wasted materials from landfills through source reduction, reuse, remanufacturing, recycling and composting. Additional methods of material management include environmentally preferable purchasing policies, upstream redesign, extended producer responsibility systems and clean manufacturing practices.

The success of Zero Waste requires that we redefine the concept of “disposal” in our society. In the past, waste was considered a natural by-product of our culture. Zero Waste communities recognize that proper materials management, not waste management, is at the heart of reducing waste sent to landfills.

Zero Waste is a philosophy and a design principle for the 21st Century that includes recycling but goes beyond recycling by taking a system approach to the vast flow of resources generated throughout society. It is a goal and guide for people to emulate sustainable natural cycles, where all wasted materials are resources for others to use. Zero Waste allows us to examine the materials management opportunities at three major generation sources: upstream, midstream, and downstream. These concepts are defined in the following way:

Reduce Upstream Waste

Upstream wastes are defined as materials generated from mining operations (e.g., mining gas release, clear cut deforestation, and the resulting watershed pollution issues, etc.) that create material feedstock for the products our society consumes, and the transportation waste (e.g., vehicle emissions and fluids) to deliver products to market. For every ton of product reaching our local market shelves, 71 tons of wastes were created to mine, manufacture, store, and finally transport it to market. These materials

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¹¹ United States Environmental Protection Agency. *Sustainable Materials Management: The Road Ahead*. June 2009. Web. 14 Sept 2011.

pose a challenge for local governmental control, but are created in response to consumer demand for products and services.

Reuse Midstream Waste

Midstream wastes are generated locally by every household, school, business and governmental office through material wasting inefficiencies, excess packaging and unnecessary product waste. If the wasted materials generated at this level are not addressed, they become a financial burden to local government in the form of downstream collection costs. Moving wastes into a variety of reuse options eliminates collection costs and is the heart of waste prevention.

Recycle Downstream Wastes

Downstream wastes are generated locally by every household, school, business, and governmental office, with the intent to dispose of unwanted packaging, products and other wasted materials. Wasted materials at this level must be collected, processed and sent to a final disposal facility. Downstream captured materials are a direct financial burden to the local government for collection and processing, and include landfilling, composting, recycling and disposal of household hazardous waste. If wasted materials must be handled downstream, the best options involve the support and expansion of existing recycling and composting programs, and the reduction of toxics disposal through education and reuse programs.

3.7 / State and National Involvement

To take the journey toward Zero Waste, additional available resources must be utilized to achieve the community's diversion goals. Participation in national and state efforts provides a platform to implement policies that address wasted materials generated upstream and midstream. These national organizations provide discussion forums, training, networking and public education opportunities. The Department values these educational opportunities, as innovation and cutting-edge materials management approaches are necessary to reach Zero Waste community-wide. The following state and national organizations are identified as resources for Austin's Zero Waste efforts.

International City/County Management Association

Founded in 1914, the International City/County Management Association (ICMA) is the premier local government leadership and management organization. Its mission is to create excellence in local governance by advocating and developing the professional management of local government worldwide. In addition to supporting its nearly 9,000 members, ICMA provides publications, data, information, technical assistance, and training and professional development to thousands of city, town, and county experts and other individuals throughout the world.¹²

Local Governments for Sustainability

ICLEI - Local Governments for Sustainability (ICLEI) is an association of more than 1,220 local government members who are committed to sustainable development. Members come from 70 different countries and represent more than 569 million people. ICLEI is an international association of local governments as well as national and regional local government organizations that have made a commitment to sustainable development.

ICLEI provides technical consulting, training, and information services to build capacity, share knowledge and support local government in the implementation of sustainable development at the local level.¹³

National Recycling Coalition

The National Recycling Coalition (NRC) is a nonprofit organization dedicated to increasing and improving waste reduction, recycling, composting and reuse in the United States. Founded in 1978, the NRC has more than 4,500 members, including recycling and environmental organizations, large and small businesses, individuals, and federal, state and local governments.

The NRC, provides technical information, education, training, outreach and support to its members. It also educates and informs the public on selected recycling issues, shapes public and private policy on recycling and operates programs that encourage recycling markets and economic development.

The goals of the NRC are to:

- Provide national leadership and coordination on recycling issues;

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¹² "Who We Are." International City/County Management Association. n.d. Web. 1 Sept. 2011.

¹³ "About ICLEI." ICLEI - Local Governments for Sustainability. n.d. Web. 1 Sept. 2011.

- Provide education and information on recycling;
- Promote increased collection and processing of recyclable materials; and
- Develop markets for recovered materials and products with recycled content.

Through their commitment to maximizing recycling, all NRC members are contributing to the common goal of conserving resources and energy, reducing solid waste, protecting the environment and contributing to social and economic development.¹⁴

Natural Resources Defense Council

The Natural Resources Defense Council (NRDC) is a nonprofit, tax-exempt membership organization, founded in 1970 by a group of law students and attorneys at the forefront of the environmental movement. NRDC lawyers helped write some of America's bedrock environmental laws.

NRDC's purpose is to safeguard the Earth: its people, its plants and animals and the natural systems on which all life depends. NRDC works to restore the integrity of the elements that sustain life — air, land and water — and to defend endangered natural places. NRDC seeks to establish sustainability and good stewardship of the Earth as central ethical imperatives of human society. NRDC affirms the integral place of human beings in the environment.¹⁵

North America Hazardous Materials Management Association

The North America Hazardous Materials Management Association (NAHMMA) is a professional organization established in November 1993, that is dedicated to pollution prevention and reducing the hazardous constituents entering municipal waste streams from households, small businesses and other entities that may be exempt from local, regional or national regulations.

NAHMMA strives to create a membership-based, professional organization that unites the diverse entities that influence or have an interest in hazardous components of municipal waste streams (product manufacturers, government regulators, provincial, state and local materials management programs, waste handling businesses, nonprofit environmental organizations and others) in an active, engaging association that promotes information sharing and cooperative problem solving. NAHMMA also strives to build consensus and foster public/private cooperation, and advance education, foster communication, encourage

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¹⁴ "About NRC." National Recycling Coalition, Inc. n.d. Web. 1 Sept. 2011.

¹⁵ "About NRDC: Mission Statement." National Resources Defense Council. n.d. Web. 1 Sept. 2011.

policy development, recognize exemplary programs and provide professional development opportunities.¹⁶

Product Policy Institute

Product Policy Institute (PPI) is a nonpartisan research and educational organization promoting policies that advance sustainable production and consumption, and good governance, in North America. Founded in 2003, PPI works with civic organizations, governments and business stakeholders to advocate for policies that establish cradle-to-cradle producer responsibility for products and packaging.¹⁷

Product Stewardship Institute

The Product Stewardship Institute (PSI) provides clear, factual analysis and practical recommendations to inform and shape product stewardship policy, focusing on specific products as well as framework approaches. PSI designs, implements and evaluates pilot projects, and includes recommendations for next steps and the potential for a national rollout. PSI helps groups share information, identify common interests, reach agreement, and develop and implement priority strategies to promote and implement product stewardship.

PSI develops effective local, state, and federal product stewardship legislation, and harmonizes legislative approaches and elements.

Coordinated state laws have the potential to create the foundation for future federal product stewardship legislation. Local legislation is also emerging as a potent force for change.¹⁸

Reuse Alliance

Reuse Alliance (RA) is a national nonprofit that works to increase awareness of reuse by educating the public about its social, environmental and economic benefits. RA offers a comprehensive reuse database, and a variety of project-related research. RA supports informational resources that increase public awareness and access to the reuse sector's innovative waste prevention services. RA also provides training that strengthens the capacity for individuals and organizations to reuse our material resources.¹⁹

Sierra Club – Lone Star Chapter

Sierra Club's mission is to explore, enjoy and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives.

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¹⁶ "About NAHMMMA – Overview." North American Hazardous Materials Management Association. n.d. Web. 1 Sept. 2011.

¹⁷ "Who We Are & What We Do." Product Policy Institute. n.d. Web. 1 Sept. 2011.

¹⁸ "What We Do." Product Stewardship Institute. n.d. Web. 1 Sept. 2011.

¹⁹ "Our Mission and Vision" Reuse Alliance. n.d. Web. 1 Sept. 2011.

The Sierra Club adopted a landmark policy on Zero Waste at its board meeting in Atlanta, Ga., on Feb. 23, 2008. The new Zero Waste policy provides governments at all levels with a leading-edge plan that links environmental health with economic prosperity: a win-win for business and the environment. The plan proposes specific roles for government, manufacturers, and consumers to address the waste crisis facing our country.

Governments are obligated to protect public health and the environment, but present materials management practices are not protective. In contrast, this Zero Waste policy fosters an economic system that fully values people and the environment. The Sierra Club's Zero Waste policy addresses not only the quantity of waste generated, but also its toxicity, and its important links to climate change and corporate responsibility. Most importantly it aims to prevent waste by design rather than manage it after the fact.²⁰

State of Texas Alliance of Recyclers

The mission of the State of Texas Alliance for Recycling (STAR) is to promote and enhance recycling and diversion activities in the State of Texas. STAR accomplishes its mission by fostering communication and the exchange of information regarding recycling among professionals, organizations, governmental entities, and individuals; by complementing and coordinating recycling industry initiatives; and by acting as a clearinghouse of recycling resources.

Texas Product Stewardship Council

The Texas Product Stewardship Council (TxPSC) was formed by several local governments to shift Texas' product materials management system from one focused on government funded and ratepayer financed waste diversion to one that relies on producer responsibility in order to reduce public costs and drive improvements in product design that promote environmental sustainability. TxPSC works to integrate the principles of product stewardship into the policy and economic structures of Texas.

TxPSC's vision is that producers have the primary responsibility to establish, fund and manage end of life systems for their products with State government setting the performance goals and ensuring accountability and transparency.

TxPSC is an organization of local governments that work with state government, waste and recycling companies, water quality organizations, businesses of all types, nonprofit organizations and product consumers

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²⁰ "Sierra Club Policies." Sierra Club. n.d. Web. 1 Sept. 2011.

to reduce waste and bring good public policy to the materials management industry.²¹

U.S. Conference of Mayors

The U.S. Conference of Mayors (USCM) is the official nonpartisan organization of cities with populations of 30,000 or more. There are 1,210 such cities in the country today. Each city is represented in the conference by its chief elected official, the mayor. The primary roles of the USCM are to:

- Promote the development of effective national urban/suburban policy;
- Strengthen federal-city relationships;
- Ensure that federal policy meets urban needs;
- Provide mayors with leadership and management tools; and
- Create a forum in which mayors can share ideas and information.²²

Zero Waste International Alliance

The Zero Waste International Alliance (ZWIA) was established “to promote positive alternatives to landfill and incineration and to raise community awareness of the social and economic benefits to be gained when wasted materials are regarded as a resource base upon which can be built both employment and business opportunity.”

The simple technology and methods required to achieve Zero Waste exist in every community around the world. ZWIA can connect Austin to leaders in the field who can provide the Department with access to models, projects, and other resources.

ZWIA:

- Initiates and facilitates research and information sharing for the promotion of Zero Waste
- Builds capacity to effectively implement Zero Waste
- Sets standards for the application of Zero Waste

ZWIA operates at the international, national and local level and involves all sectors of society.²³

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²¹ “Welcome.” Texas Product Stewardship Council. n.d. Web. 1 Sept. 2011.

²² “About the U.S. Conference of Mayors.” U.S. Conference of Mayors. n.d. Web. 1 Sept. 2011.

²³ Zero Waste International Alliance. “About Us.” n.d. Web. 1 Sept. 2011.

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Chapter 4 / Sustainability

Product consumption contributes directly to climate change because material supply chains require energy for mining, extracting, harvesting, processing, storing, transporting and distributing raw materials. Even more energy is required to haul products to landfills or to locations for reprocessing. Electricity production to run factories and fuel used for transportation directly contribute to GHG emissions and land pollution.

Sustainability efforts are intended to reduce our environmental footprint, including impacts on climate change, energy, water and land use, and improve environmental quality, including air and water quality. Waste prevention, recycling and composting are activities that support sustainability and slowing climate change. The Department's Zero Waste efforts assist the City in its sustainability efforts by encouraging resource efficiency and managing materials for a second life, rather than managing waste. Zero Waste ensures that products are collected to be reused, repaired or recycled back into nature or the marketplace. Implementing Zero Waste systems reduces GHGs by:

- Reducing energy consumption associated with extracting, processing and transporting virgin raw materials. Manufacturing with recycled materials uses less energy overall compared with manufacturing using virgin materials.
- Utilizing recycled content products, which releases less GHGs than mining or harvesting virgin materials. For example, using recycled paper leaves more trees standing that serve to sequester carbon. In addition, using recycled plastic reduces the reliance on petroleum and eliminates the related environmental impacts of the extraction, transportation and refinement of foreign-based oil.
- Reducing and eventually eliminating the need for landfills. Methane gas is a potent greenhouse gas, 21 times more effective at trapping heat in the atmosphere than carbon dioxide. Each ton of municipal solid waste sent to a landfill produces 123 pounds of methane.¹
- Reducing transportation impacts by establishing local end markets for the consumption of captured recyclables and compostable materials collected in the community.

Implementing the Zero Waste initiatives in Austin has the potential to:²

- Generate 1,000 to 5,000 new local, green jobs in recycling and organics collection and processing, materials reuse and repair, and remanufacturing;
- Reduce Austin's annual GHG emissions by 800,000 to 3.6 million metric tons of carbon dioxide equivalent; and
- Reduce Austin's dependence on landfills.

The Department's Zero Waste and operational efficiency efforts will assist the City in its sustainability efforts through the following actions:³

- Reducing fuel usage through vehicle routing efficiencies;
- Replacing diesel fuel with compressed natural gas (CNG), hybrids, electrics and other alternative fuels;
- Offsetting the Department's carbon footprint through the establishment of a local carbon offset fund administered by the City's Office of Sustainability; and
- Reducing fugitive methane emissions through reduced landfilling and increased composting volumes.

4.1 / Sustainability's Triple Bottom Line

Sustainability means finding a balance among three sets of goals:

- Prosperity and jobs,
- Conservation and the environment, and
- Community health, equity and cultural vitality.

It means taking positive, proactive steps to protect quality of life now and for future generations.



FIG. 6

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¹ U.S. Environmental Protection Agency. "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1997." Washington, DC. April 1999. EPA 236-R-99-003.

² Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream.* City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011. Appendix H.

³ Ibid.

Homegrown Prosperity

By investing in local people, companies and innovations, Austin can prosper in a way that reflects the community's unique character and value for environmental stewardship. Economic sustainability is based on a thriving regional economy that emphasizes green business leadership, clean technology, and expanding opportunity for all. Core concepts include:

- Promoting prosperity, job growth and affordable housing at all levels in the community;
- Supporting local businesses and buying local to keep our economy thriving; and
- Encouraging creativity, resiliency, innovation and collaboration.

Conservation & Environment

Sustainable communities “go green” by being good stewards of their natural resources. Avoiding waste and pollutants is one way that Austin can protect the Central Texas ecosystem. Austin is committed to leading the nation by example, as one of the greenest communities in the country and by protecting the City's natural beauty. Core environmental conservation concepts include:

- Meeting today's needs responsibly, without draining more than our generation's fair share of resources.
- Celebrating, protecting and restoring Austin's green infrastructure by ensuring the protection of the trees and native plants, natural lands, open spaces, habitat, parks and waterways, in and around the city.
- Conserving raw material resources by exemplifying the principle of reduce, reuse and recycle.

Health & Equity

Promoting community health, a shared sense of vitality, and bright prospects for all. Citizens will allow Austin to sustain its quality of life over time. Social equity is a core value. Austin's sustainability – and commitment to social equity – depends upon wellness, public safety, local fresh food, and active daily lifestyles. It requires compassionate help for the City's most vulnerable neighbors. Core concepts include:

- Defining sustainable progress as advancements in the health and well-being of all Austinites.
- Taking positive, proactive steps to equitably protect everyone's quality of life.
- Protecting against toxic pollution of our air, water and soil to safeguard everyone's health, including the next generation of children.

4.2 / Department Sustainability Efforts

Based on these sustainability concepts, Zero Waste is an integral part of the City's climate change initiatives. The Department commits to a strong partnership with the City's Office of Sustainability and its Climate Protection Program.⁴ In addition, all Department facilities, fleets and operations will be integrated in the City's sustainability efforts in part through Zero Waste initiatives and through Departmental operational efficiencies.

Zero Waste Synergy with Sustainability Efforts

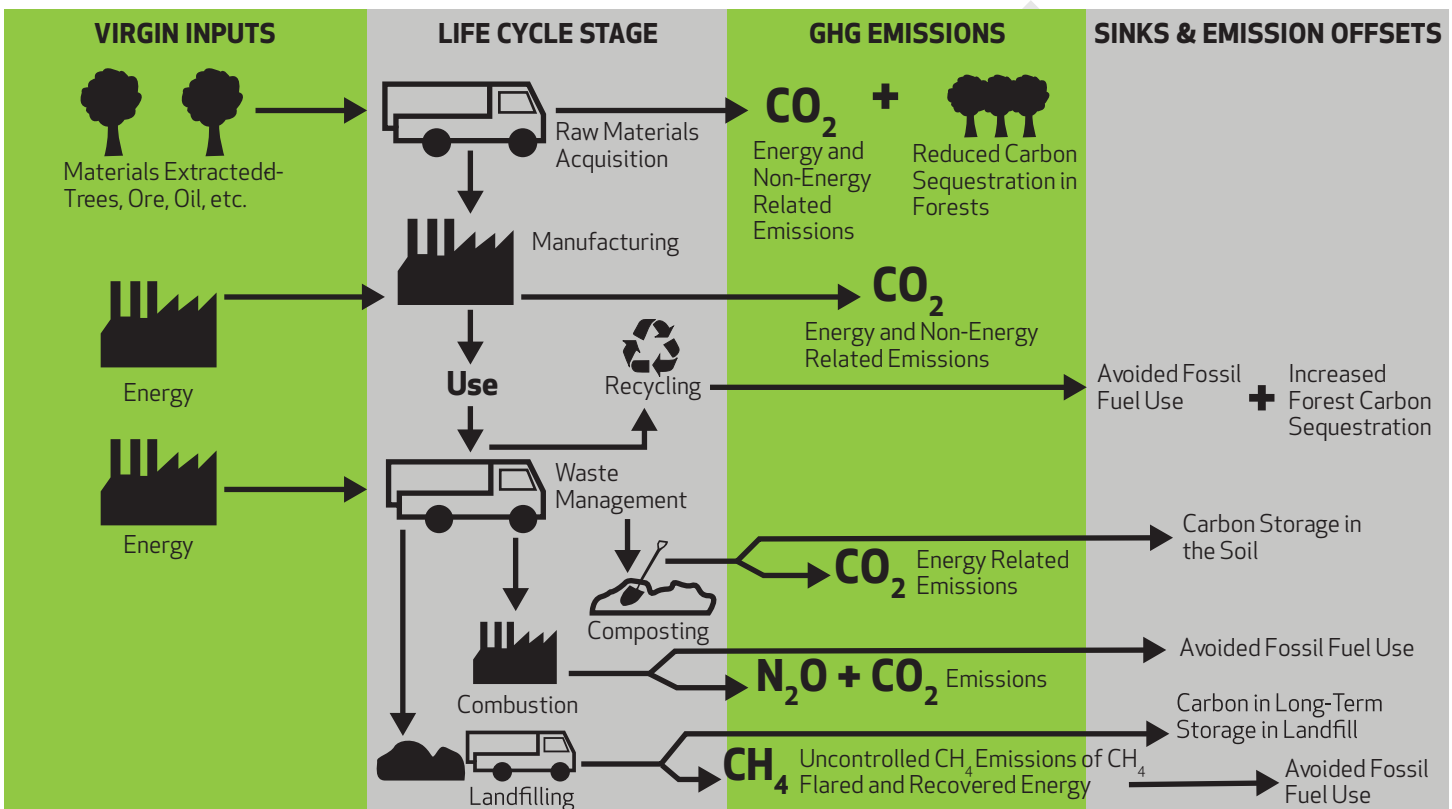


FIG. 7

The U.S. Environmental Protection Agency (EPA) has been studying the links between solid waste and climate change for over a decade. Its website contains detailed analysis and summary steps that individuals and businesses can take to reduce their carbon footprint.⁵ The EPA graphic above highlights the different sources of GHG emissions from solid waste. The disposal of solid waste produces GHGs in a number of ways. First, the anaerobic decomposition of waste in landfills produces methane, a GHG gas that is 21 times more potent than carbon dioxide.⁶ Second, the incineration of waste produces various GHGs, including nitrous oxide (NO_2) and carbon dioxide (CO_2) as an unwanted emissions. In addition, the transportation of waste to disposal sites produces GHGs from the combustion of the fuel used in the equipment. Finally, disposal of materials

⁴ For more information about the City of Austin Office of Sustainability, visit <www.austintexas.gov/sustainability>.

⁵ For more information on the EPA's emissions calculators visit: <<http://www.epa.gov/climatechange/emissions/>>.

⁶ "Greenhouse Gas Properties." EPA.gov. Climate Change-Methane-Science. US Environmental Protection Agency. n.d. Web. 14 Sept. 2011.

indicate that new products are being produced as replacements. This production often requires the use of fossil fuels to obtain raw materials and manufacture the items.

Austin Green Business Leaders Program

The Austin Green Business Leaders Program provides an integrated approach for Austin companies to participate in existing sustainability programs in order to go green. The program consists of six primary focuses: energy conservation, water conservation, waste reduction, water quality protection, transportation and social responsibility. Businesses may consider a menu of options within each focus area and adopt those initiatives that are appropriate for their situation. Many of the core sustainability initiatives are supported by the City through financial incentives, rebates and technical consulting by City staff. Each focus area contains performance measures. The program is still under development, led by the Office of Sustainability along with the participation of several key departments. Currently, the portion of the program that promotes waste reduction offers the following required activities:

1. Provide appropriately sized and labeled containers to effectively recycle at least five materials: cardboard, mixed paper, aluminum, plastics (PETE & HDPE), and glass.
2. Consider a three-bin system, including landfill trash, recycling and organic compost, to reduce the amount of materials sent to the landfill for disposal.
3. Make sure every landfill trash container has a corresponding recycling container of equal or greater size.
4. Use a networked multifunction printer that can copy and print double-sided, scan, and email so you can save money on toner, paper and staff time.

Businesses are encouraged to complete a free, on-site waste assessment through the Department's Waste Reduction Assistance Program (WRAP). Waste assessments can show businesses ways to enact or expand recycling, reduce waste, reduce costs and benefit the environment.

Austin Resource Recovery Climate Protection Plan

Concern about climate change has altered how communities handle and think about solid waste. The City signed on to the Urban Environmental Accords in 2005, committing Austin to reduce its waste per capita by 20 percent by 2012, and achieve Zero Waste by 2040. In 2007, the City adopted the Austin Climate Protection Plan, setting an ambitious goal of making Austin the leading city in the international fight against climate change.⁷

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⁷ City of Austin. "Austin Climate Protection Plan." CoolAustin.org. January 3, 2011. Web. 1 Sept. 2011.

The intent of the Climate Protection Plan is to reduce greenhouse gas emissions, the primary contributor to climate change. Elements of the plan include:

- **Municipal Plan** - Make City facilities, fleets and operations carbon-neutral by 2020.
- **Utility Plan** - Expand conservation, energy efficiency, and renewable energy programs to reduce AE's carbon footprint; cap carbon dioxide emissions from existing power plants; and make any new electricity generation carbon-neutral.
- **Homes and Buildings** - Update building codes for new buildings to be the most energy-efficient in the nation, pursue energy efficiency upgrades for existing buildings, and enhance AE's Green Building program.
- **Community-wide** - Engage Austin citizens, community groups and businesses to reduce GHG emissions throughout the community.
- **"Go Neutral" Plan** - Provide tools and resources for citizens, businesses, organizations and visitors to measure and reduce their carbon footprint.

The City's Climate Protection Program initially began at Austin Energy, and in early 2011, the program became part of the Office of Sustainability. To address elements of the Austin Climate Protection Plan (ACPP), the Department adopted its own Department Climate Protection Plan, which achieves the following four objectives:⁸

1. Establishes greenhouse gas reduction targets for the Department.
2. Identifies the measures the Department's employees will implement to attain these targets.
3. Outlines a plan to monitor and report on the Department's progress in meeting its targets.
4. Commits the Department to consider the impact climate change may have on its ability to achieve its mission or deliver its services.

Department Climate Protection Plan - Goals

The Department is committed to reducing its carbon footprint through implementing cost-effective energy, water, fuel and waste reduction measures; adopting environmentally friendly purchasing practices; and educating employees on ways to reduce their climate impact. The following goals were established:⁹

Energy

- Reduce Departmental energy use by at least 5 percent per non-field, full-time equivalent by 2012.
- Reduce Departmental energy use by at least 5 percent per square foot by 2012.

⁸ Ibid.

⁹ Ibid.

- Enroll in 100 percent GreenChoice Power by 2012.

Water

- Reduce Departmental indoor water use by at least 1 percent per FTE by 2012.

Transportation

- Reduce gas consumption by at least 1 percent per year among Department service fleet, beginning in 2012.
- Improve average miles per gallon rating of new Department service fleet by 2 percent for each new service vehicle purchased by 2012.
- Improve average miles per gallon rating of non-service fleet by at least 5 percent by 2012.

Waste

- Within the Department, reduce and/or divert office generated waste by 3 percent per year to achieve a 90 percent reduction and/or diversion of waste by 2040.
- By 2040, reduce and/or divert customer-generated waste by 90 percent.

Purchasing

- By 2012, identify the top 10 commodity families (by dollars spent) where additional environmental criteria or minimum standards would help to provide guidance to departmental buyers.
- Incorporate “Best Value” contract selection criteria into the solicitation process where appropriate.
- By 2012, eliminate all purchases of Styrofoam cups, chlorine bleach used for cleaning, virgin (no recycled content) printer/copier paper, and incandescent light bulbs where alternatives exist.

Education

- By 2013, have 100 percent of employees complete the Austin Climate Protection training seminar or a similar program approved by the City’s Climate Protection Program.
- Hold at least one climate protection-related training session semi-annually.
- Hold at least one Zero Waste-related training session semi-annually.

The Department will measure its progress on each of these goals through an annual assessment including assessing actual conditions, implementing GHG reduction measures, and appointing a responsible party to ensure adherence to reduction measures.

4.3 / Carbon Footprint Reduction Efforts

The Zero Waste initiatives outlined in the Department's Master Plan, will significantly reduce the City's GHG emissions through new material management practices and operational efficiencies.

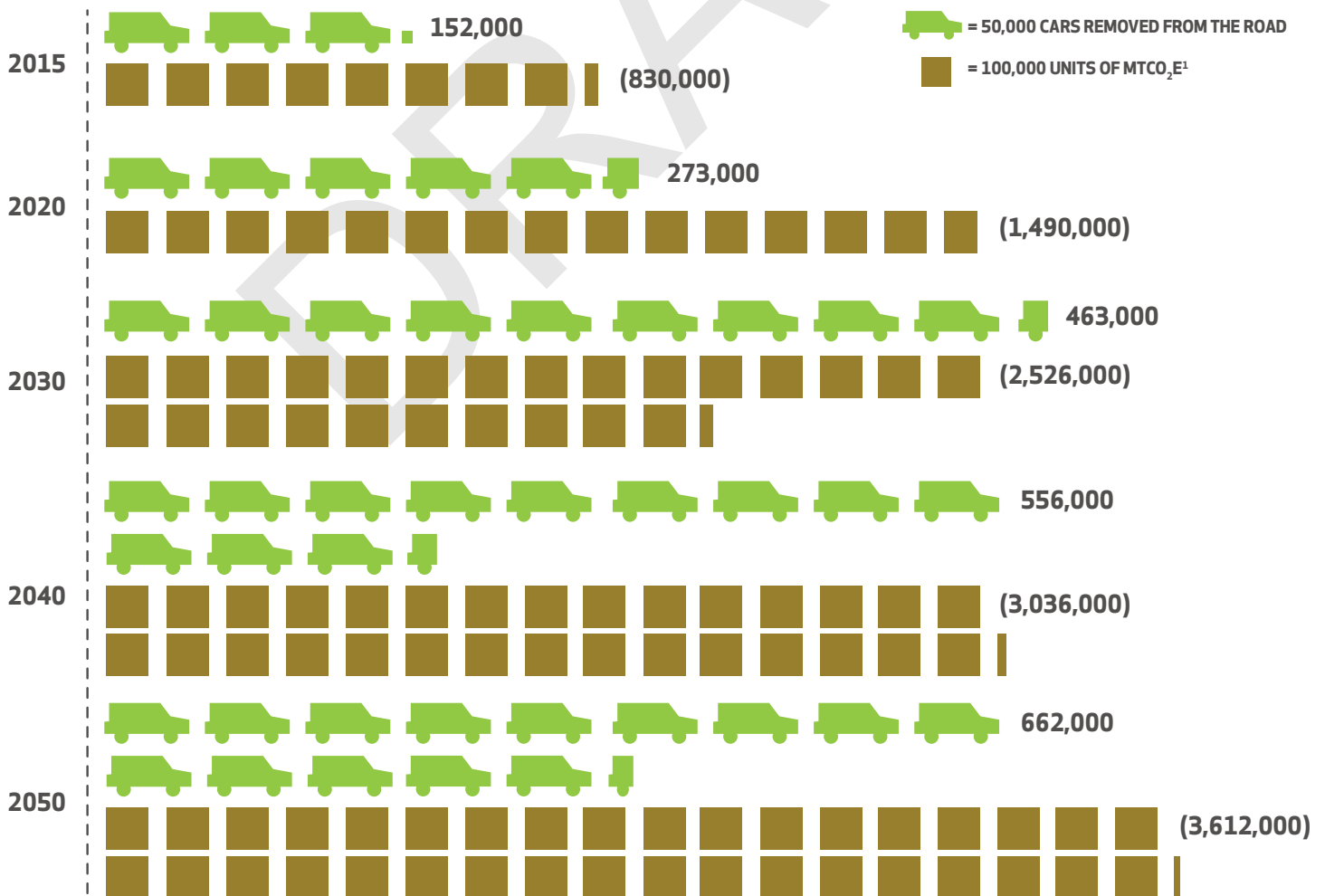
The EPA developed the Waste Reduction Model (WARM) to help planners and organizations track and voluntarily report GHG emission reductions from several different discarded materials management practices.¹⁰

WARM calculates and totals GHG emissions for baseline and alternative discarded materials management practices, including source reduction, recycling, composting and landfilling. The model calculates emissions in metric tons of carbon equivalent (MTCE), metric tons of carbon dioxide equivalent (MTCO₂E), and energy units (million BTU) across a wide range of material types commonly found in municipal discards.

Based on the estimated diversion rates in the Department Master Plan, the GHG reduction potential estimated by WARM is shown below.

.....
¹⁰ "Waste Reduction Model."
 EPA.gov. Environmental
 Protection Agency. Aug. 2010.
 Web. 14 Sept. 2011.

FIG. 8



Routing Efficiencies

Vehicle fuel usage and route efficiencies affect the Department's efforts to meet the City's sustainability objectives. The Department will invest in new routing software and upgrade its global positioning system (GPS) tracking system. Integrating GPS sensor data with the routing program will yield detailed operational reports that will assist staff in establishing fuel efficient routes for trash, recycling and organics collection routes, as well as street sweeping routes.

The Department is evaluating its routing efficiencies in nine sections of the city, based on participation and setouts. The results of this evaluation will be used to restructure vehicle routes and implement operational efficiencies in miles driven to reduce carbon footprint. The fuel efficiency and carbon footprint of the Department will be calculated and tracked to determine the success of any changes to the Department's fleet and routes.

CNG and Alternative Fuels

The Department will explore improving fuel efficiency of its fleet through the purchase of vehicles that use CNG, hybrid technology, and other alternative fuel technologies. In addition, the Department will explore alternative CNG fueling locations to increase reliance on CNG vehicles and reduce mileage traveled from the routes for fueling purposes.

The Department's fleet is composed primarily of diesel-powered vehicles. Due to the nature of the Department's business and heavy loads transported, these vehicles yield poor fuel economy and produce a significant carbon footprint. The ability to improve fuel efficiency while decreasing the amount of carbon dioxide and nitrous oxide generated will require a substantial capital investment in new equipment. The City's Department of Fleet Services acquired a federal grant to purchase 19 CNG vehicles and four hybrids in FY 2011. In addition to investing in more CNG vehicles, the Department may also choose to purchase hybrid trucks that can save an estimated 30 percent on fuel consumption per mile driven. The resulting fuel savings will produce a net decrease of carbon emissions from the Department's fleet.

As vehicles are replaced on a seven-year replacement schedule, the Department will acquire alternative fuel service vehicles. CNG, hybrids and all-electric vehicles will be purchased as replacements of retiring vehicles. The Department, with assistance from the City's Fleet Services office will explore federal grant opportunities to subsidize any added costs.

An additional challenge will be the added expense of providing multiple fueling locations. As the City invests in new alternative fuel vehicles, the Department and other internal and external partners are considering options for an alternative refueling facility site in the northern part of the City. Currently, CNG vehicles have an approximate range of 132 miles per tank, whereas diesel vehicles have an average range of 350 miles. The northern most routes are 72 miles roundtrip from the landfill, not including miles driven to service the route itself. To efficiently refuel the Department's vehicles and maintain route efficiencies, a fueling center must be located in the northern part of the City, in addition to the current fueling center at the Department's Kenneth Gardner Service Center (KGSC) in south Austin.

Carbon Offset Fund

The Department will establish a special fund in October 2012 to assist in the offset of the Department's carbon footprint. The City signed an agreement with two recycling processing facilities to begin servicing the Single Stream Recycling Program. The contractual agreements require setting aside funds through a Facility Fee. These funds will be awarded to the Department monthly and will be deposited into a carbon offset fund administered by the Office of Sustainability. Expenditures from this fund will be allocated to activities that reduce the City's carbon footprint and/or capture carbon to reduce impact on the Earth.

Sequestration Efforts

Carbon sequestration is the capture of carbon dioxide, as the major pollutant affecting climate change. Carbon dioxide is naturally captured from the atmosphere through composting processes, soil enrichment on agricultural lands, and through reforestation.

To support the City's sustainability efforts, the Department will offset its carbon footprint through efforts in the reduction of landfill waste, increased composting volumes and tree planting. The use of landfills to convert GHGs to electricity have been noted as a possible carbon sink; however, even the best managed landfills will have breeches in the protective liners, leachate collection systems and geo-membrane cap. These landfill failures can lead to land, water and air pollution and may include uncontrolled releases of carbon in the form of methane or other gases. Thus, the use of landfills is not a Department-endorsed sequestration method.

STAR Community Index

Austin has been selected as one of 10 cities nationally to help refine the State of Texas Alliance for Recycling (STAR) Community Index, a tool for measuring city sustainability being developed by ICLEI – Local Governments for Sustainability. The STAR Community Index will enable local governments to analyze, map and manage sustainability data in one place and to present that information to the public as well as internally. It is also expected to evolve into a nationally recognized rating system, allowing cities to rank themselves on sustainability using national sustainability standards.

The Department will commit resources toward this project in an effort to seek new measures for reducing the City's carbon footprint. The STAR Community Index sustainability goals that the Department will directly support include the following:

- **Waste Minimization** - Minimize waste and optimally recycle material resources to protect natural systems by reducing resource extraction, GHG emissions, and air and water pollution.
- **Ecological Literacy** - Provide residents with the informational and material resources they need to think critically about and address environmental problems and solutions, and include the environment as an important consideration in their work and daily living.
- **Toxicity Reduction** - Reduce toxic exposure and manage materials streams to minimize the use and production of toxic substances throughout product and material life cycles.



Chapter 5 / Departmental Structure

The City of Austin's vision of being the most livable city in the country means that Austin is a place where all residents participate in its opportunities, its vibrancy and its richness of culture and diversity. Austin residents share a sense of community pride. Local government plays a critical role in determining a city's quality of life.

5.1 / Department Vision, Mission and Objectives

The Department provides a broad range of services including curbside collection of trash, recycling, yard trimmings and bulk collection, as well as street sweeping, litter abatement, and household hazardous waste collection. To provide these services in a professional and efficient manner, the Department employs approximately 400 staff members and operates five different facilities throughout the City of Austin.

Department Vision and Mission Statement

As the City strives to be the Best Managed City in the country, the Department embraced the following vision, mission statement, values and objectives in 2010:

Vision:

To be the national Zero Waste leader in the transformation from traditional integrated waste collection to sustainable resource recovery.

Mission:

To achieve Zero Waste by providing excellent customer services that promote waste reduction, increase resource recovery and support the City's sustainability efforts.

Department Values:

- We deliver quality services through sustainable and innovative best practices.
- We are fiscally, socially and environmentally responsible through collaborative efforts.
- We are ethical and transparent.
- We foster a safe and healthy work environment through employee/ staff development, appreciation, recognition and respect.

Department Objectives:

- To meet community needs by providing excellent customer service and proactive education and outreach.
- To increase fiscal responsibility to our customers.
- To provide optimal resource recovery while reducing the Department's carbon footprint.
- To educate, empower and hold staff accountable to provide affordable quality services.

5.2 / Best Managed City Priorities

The City Manager challenged each City department to think about how they can contribute to being the Best Managed City. The Department's strategic planning is focused on core services to our customers, aggressive waste diversion in pursuit of Zero Waste and regional partnerships to build green jobs in our local economy.

Customer Service – to provide efficient and reliable service for all customers

Customer service is not an activity; it's an attitude and a culture.

The Department's approach to customer service is outlined in the following strategic areas of focus:

- Coordinated environmental services,
- Responsiveness and respect to customers,
- Tracking Metrics to measure effectiveness of service, and
- Systems Approach toward resolving reoccurring complaints.

Employee Service – to offer a high quality work environment for all employees

The quality of our work depends on the quality of our people.

The Department's approach to employee service is outlined in the following strategic areas of focus:

- Training and Career Development,
- Employee Safety,
- Professional Discipline, and
- Supportive response to employees in need.

Financial Responsibility – to ensure the best value of services are provided for the lowest cost

Fiscal integrity requires rate base equity, accountability and structural balance budgeting.

The Department's approach to fiscal responsibility is outlined in the following strategic areas of focus:

- Fiscal accountability and oversight,
- Accounting accuracy,
- Cost and Rate Analysis, and
- Timely and Responsive to our needs.

Department Staff Training

Every staff member in the Department directly contributes to the City's Zero Waste goals. To ensure that all staff members understand their roles and their impact on the success of the Zero Waste programs, all divisions will be involved in an internal stakeholder-driven training and development program. This is an effort to generate staff-driven solutions toward increasing efficiency and establishing productivity standards.

5.3 / Management Values

Like all organizations, the Department is responsible for ensuring equity and respect.

In light of the Department's new vision and mission, the Department will focus on improving problem resolution, increasing respect for various opinions in order to be the Best Managed Department within the City.

This management philosophy is based on the following basic principles and values:

- Regarding equity and respect:
 - **Employee Development** – provide training opportunities and employee growth tracks that encourage promotion and recognition.
 - **Respect for all Staff** – ensuring a safe and productive work environment where staff feel valued and appreciated for their hard work.
 - **Open Communications** – creating a transparent and open environment where creative ideas are openly shared, concerns and issues are honestly addressed and communications are clear and broadly based throughout the organization and to the public.
- Regarding implementation of programs and initiatives:
 - **Planning Strategically** – developing “visionary but pragmatic” long-range goals.
 - **Developing Implementation Strategies** – utilizing planning strategies such as benchmarking and milestone tracking, to guide staff efficiently and effectively to complete staff assignments.
 - **Overcoming Barriers** – through a process of barrier identification with the philosophic belief that nearly all barriers can be overcome through creative problem solving and teamwork.

5.4 / Quality Assurance

To ensure the delivery of quality services, in FY 2011, the Department created the Quality Assurance Division. The Division’s purpose is to add quality review of all functions within the Department, to deliver quality services. This new Division will be charged with implementing quality management techniques in all operations of the Department.

The Quality Assurance Division will offer recommendations for improvements to operations, administrative processes and employee practices. The functions of this division will be of a positive nature, in full collaboration with the other divisions and their staff. Initially, the Division will focus on the following processes:

- Customer Service
- Financial Integrity
- Carbon Footprint Reductions
- Employee Safety Assurance
- Performance Measures
- Employee Career Development

One main focus of this division is customer service and how the Department responds to calls from internal and external customers. This is a multifaceted division and as such the ultimate goal is to provide the highest quality service possible to our citizens.

5.5 / Space Facility Needs and Infrastructure Development

The Department is addressing future space needs for its existing facilities and developing new infrastructure to meet the planned initiatives of this Master Plan.

The Department's personnel and operations are located throughout the City of Austin at a number of City-owned facilities, including:

- FM812 Landfill
- Kenneth Gardner Service Center
- Todd Lane Materials Recovery/Transfer Station
- Rutherford Lane Campus
- Household Hazardous Waste Facility
- Hornsby Bend Brush Grinding Area

Expansions or new development will be needed at the Department's KGSC. Additionally, there is an operational need and public interest for a new North Service Center.

Space Feasibility Study

The Department will need to expand its facilities to house the expanded collection fleet to meet the anticipated housing growth of the City. Facility space needs are identified throughout this Master Plan to fulfill the service requirements of the Department as well as to implement the proposed Zero Waste programs. A Space Feasibility Study was commissioned in the summer of 2011 to explore the operational needs for

additional office space as well as expanded operational needs related to proposed programs noted in this Master Plan.

The commissioned Space Feasibility Study will explore expected expansion requirements, how best to utilize existing facility structures, and anticipated new facility needs.

The Department also invited Fleet Services to co-locate at a proposed north service center, to service the Department's vehicles on site.

Department vehicles currently travel to the KGSC for fueling needs throughout each service day. Beginning in October 2012, the northern recycling routes will deliver collected recyclables to a north recycling processing facility. To address the added carbon footprint of these excessive road miles, the Department plans to locate a North fueling center, and possibly a north service center.

Throughout the public input periods in the development of this plan, citizens have noted the extreme distances traveled to drop material off at the HHW. To address the public needs for a more convenient location for household hazardous waste drop off, the Department plans to create a north HHW Facility.

Household Hazardous Waste (HHW) Facility

The HHW Facility is located at 2514 Business Center Drive, adjacent to the Department's other facilities on Todd Lane in south Austin. The HHW Facility occupies approximately one acre and is comprised of a 2,500-square-foot office building, a 100 foot by 50 foot canopy, a small decontamination/shower building and portable storage sheds and outbuildings. Residents of the City of Austin and Travis County can drive into the facility to drop off household hazardous waste. The facility staff also provides a city-wide door-to-door pick-up program for elderly and disabled residents. Hours open to the public will be expanded in October 2011 to include every Saturday throughout the year. Additional expansion of hours will occur as resources become available.

Materials Recovery Facility/Transfer Station (MRF/TS) and Resource Recovery Center (RRC)

The MRF/TS is located at 3810 Todd Lane on a seven acre parcel. The MRF/TS was originally used as a Materials Recovery Facility (MRF) to process recyclables from a dual-stream collection system, before the Department moved to a comingled Single Stream collection system.

After the move to a Single Stream collection system, the MRF/TS was used to collect and handle the Single Stream recyclables from the route vehicles and transferred these materials to a recycling processing facility in San Antonio. Since October 2010, the Department hauls collected recyclables to a recycling processor in Creedmoor directly from the routes, eliminating the expense of transfer operations at the Transfer Station. Currently, the MRF/TS is not in use to transfer or process materials. The MRF/TS currently has approximately 9,000 square feet of usable tipping floor.

The Department's RRC, currently located at the FM 812 Landfill site, will be relocated to the MRF/TS and modified. The MRF/TS will be renamed as the RRC and will handle all bulk materials. It will also include a reuse yard for building materials; provide repair and refurbishment for reusable bulk items and other reusable materials. The repurposed facility will also accommodate the public drop-off of bulk materials. The enriched loads from the Department's On-Call Bulk Items Collection initiative will be transported to the RRC without compaction to allow for floor sorting. A floor sorting operation is a method to divert potential recyclables, reusables and repairable materials from other discarded materials. Vehicles delivering materials to the facility will be directed to separate areas to unload their materials, depending on the material or generator type. Staff will sort these materials on the floor to pull recoverable materials from the other discarded materials, and separate them into bins or debris boxes for shipment to market.

The relocated RRC will be in service by FY 2013. No additional space will be needed for this infrastructure project. The facility will require minor upgrades and routes will need reconfiguration. The facility upgrades will be made to enhance the facility for better use in receipt, unloading, sorting and consolidation of materials for markets within the existing space. Initially, a skip-loader/forklift and some additional bins would be needed to operate the facility. Staff and equipment growth will coincide with population and materials growth.

Kenneth Gardner Service Center (KGSC) and Service Center 12

The KGSC is a south service center located at 4108 Todd Lane, adjacent to both the MRF/TS and the HHW. The KGSC's primary function is to provide housing for operations staff, management and support staff, as well as provide parking and fueling for all operations vehicles. The KGSC includes Fleet Service Center 12 which provides maintenance to a portion

of the Department vehicles and equipment. Fleet staff perform various levels of service such as routine inspection, oil changes, tire rotations. More for extensive engine repair and other services the Department uses Fleet Service Center 11 on Ed Bluestein. The KGSC is currently at capacity with no land area for expansion.

Landfill Redevelopment

The Department's closed FM 812 Landfill is located at 10108 FM 812 in the City of Austin, is approximately 360 acres in size, and under 30-year post-closure care within the EPA's Subtitle D requirements for landfill site care and maintenance. The Department is considering installing a landfill-gas-to energy facility to beneficially use the methane generated for production of electricity. This project is in the initial planning stages and is planned to be operational in FY 2014. The Department is also considering two additional projects for redevelopment of this site: a solar farm development over the landfill site and the redevelopment of the set-aside buildable land as an Eco-Industrial Park.

Construction of a solar farm on the capped landfill surface would be a beneficial use of this property. The site would be used to generate renewable solar energy. The Department, working cooperatively with AE, will design and construct (consistent with post-closure maintenance requirements) a large solar-array using financial arrangement. Grants may be available to partially finance capital costs. The solar farm development will not require any new facility space needs, as it will be used to cover the existing landfill. The solar farm development is projected to be in service by FY 2015. See Chapter 12 / Disposal Management for more details regarding development of the Eco-Industrial Park.

AUSTIN RESOURCE RECOVERY FACILITIES MAP

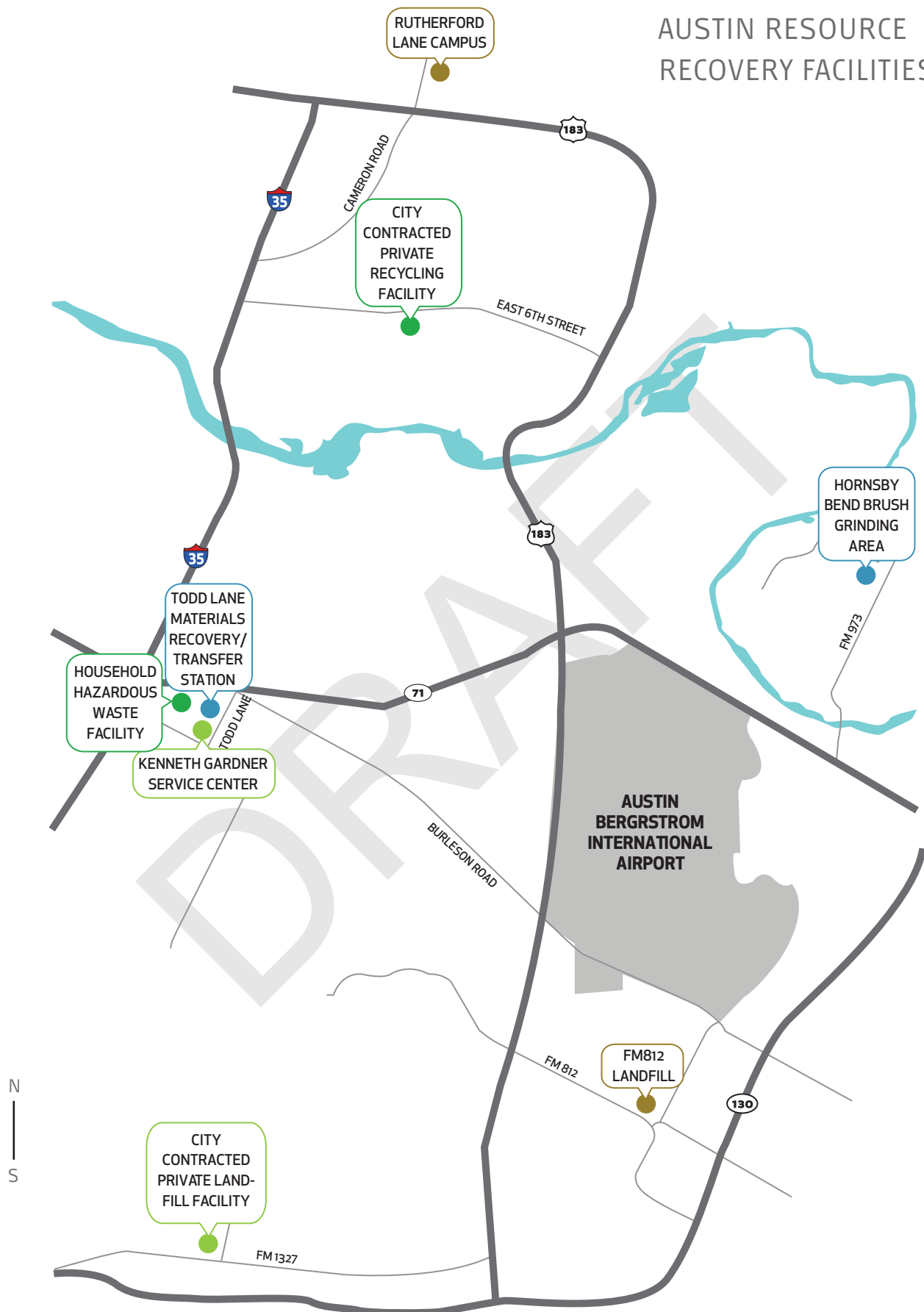


FIG. 9



Chapter 6 / Waste Reduction

Waste reduction refers to any change in the design, manufacture, purchase, or use of materials or products -- including packaging -- to reduce the amount or toxicity before the product(s) reach the end of their useful life and must then be recycled, composted or wasted through landfilling. An example of waste reduction is bringing a reusable bag to the grocery store as a replacement to single-use bags.

Waste reduction is near the top of the City's Highest and Best Use Hierarchy.¹ As listed in the City's Strategic Plan, waste reduction practices include:

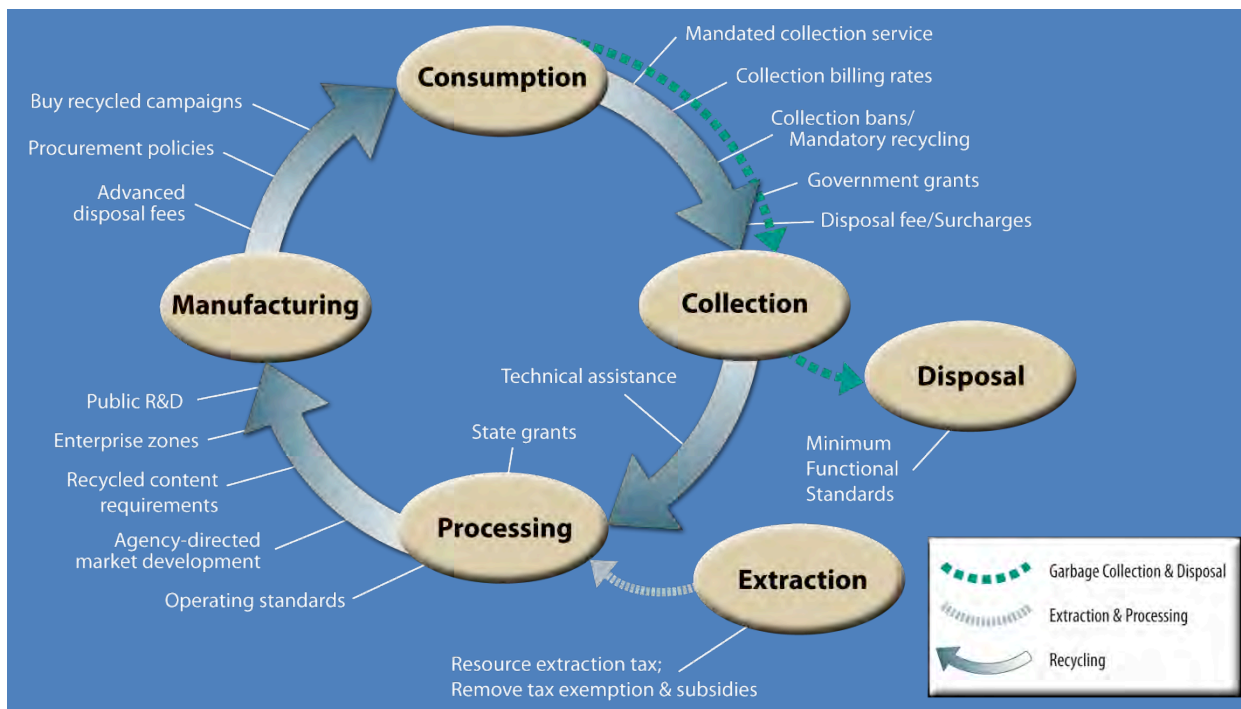
- Reduce consumption by purchasing and using less
- Reduce toxic materials in products
- Replace toxic materials in products with less toxic or non-toxic alternatives
- Reduce packaging
- Apply Environmentally Preferable Purchasing standards to purchasing
- Purchase products with less packaging
- Encourage durable, reusable packaging

Waste reduction is a very important strategy for reaching Zero Waste. According to research conducted by the Institute of Local Self-Reliance, for each ton of municipal discards² wasted through landfilling, about 71 tons on average has been created upstream from the mining, manufacturing and distribution of materials in the product lifecycle.³ By recycling one ton of municipal discards, we prevent only one ton of discarded materials from being wasted. However, by reducing municipal discards by one ton, through waste reduction or waste prevention strategies, we effectively prevent 72 tons of discarded materials from being wasted (e.g. one ton of municipal discards plus 71 tons of upstream discards). Thus, waste reduction has a significant multiplier effect in the progress towards Zero Waste.

Waste reduction can be employed at any point in materials manufacturing, distribution and consumption. The figure below illustrates the Zero Waste loop and identifies the key decision points and initiatives

that can be undertaken to reduce wasting. The Department can support residential, commercial and institutional generators in waste reduction. The Department staff can also establish waste reduction practices within its own offices and facilities and work with other City departments to ensure that City government practices service as a model for the community.

Zero Waste Loop



¹ Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream.* City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011. Appendix H, page 47.

² “Municipal discards”, also referred to as “municipal solid waste”, are those discarded materials produced by residential, commercial and institutional generators.

³ Platt, Brenda and Neil Seldman. “Wasting and Recycling in the United States 2000.” GrassRoots Recycling Network. March 2000. p. 18. Web. 19 Sept 2011.

FIG. 10

6.1 / City Department Waste Reduction

The City has direct control over its own waste reduction activities and can undertake specific initiatives to serve as an example to other residential, commercial and institutional generators.

Waste Reduction in City Offices and Facilities

The City of Austin has over 12,000 employees, including the Department's nearly 400 employees. All City of Austin employees have a profound influence on changing the culture within City government and citywide to promote waste reduction and Zero Waste. To develop the best practices for waste reduction in City offices and facilities, the Department will undertake the following tasks:

- **Conduct waste audits** – conduct waste audits of all City department offices and facilities to understand how and where discarded materials are generated as well as how they flow through offices and facilities to ultimately be recycled or wasted.
- **Implement waste reduction changes** – based on results from the audit, identify areas of City offices and facilities where discarded materials could be reduced (e.g., paper-intensive office areas, break rooms, rest rooms, maintenance facilities);
- **Make disposal more challenging and recycling easier** – coordinate with facilities management staff to implement ways to make recycling easier and disposal more difficult. For example, some Zero Waste companies locate waste containers in common areas only and place recycling containers in individual offices, thereby prioritizing recycling and making it less desirable to generate waste;
- **City staff education** – use community-based social marketing techniques within City departments to identify strategies for waste reduction (e.g., form small working groups to problem-solve and develop stakeholder-based solutions, utilize e-newsletters, case studies, posters, etc);
- **Encourage innovation** – provide a mechanism for personal responsibility and leadership within each department to focus on problem-solving and team-building. Reward innovation and celebrate success on an on-going basis. Leaders within each department, including managers, should be encouraged to step up and serve as an example to others.
- **Sustain the best practices** – convert the identified best practices into standard practices by incorporating the new strategies into citywide Standard Operating Procedures (SOPs), while encouraging each department to adopt additional waste reduction SOPs specific

to their operations. Coordinate with corporate Human Resources Department to include these practices into training modules, new employee orientation, personnel manuals, goal setting and performance reviews.

- **Repurpose equipment and facilities** –balance the long-term effectiveness of specialized tools, equipment and vehicles with other concerns such as maintenance requirements and other cost considerations.

The Department will partner with various Departments, especially the Office of Sustainability to develop a cost-benefit analyses mechanism that incorporates the values of waste reduction, repair and reuse, and can assist departments in prolonging the useful life of equipment and facilities.

Waste Reduction in City Department Purchasing

Environmentally Preferable Purchasing (EPP) is a key strategy for waste reduction. The Department is committed to work closely with the Corporate Purchasing Office and the Office of Sustainability to support other City departments in implementing best practices for EPP. Buyers within each department can assist with this initiative by testing EPP tools and techniques prior to implementing them citywide. The Department can initiate EPP strategies in its own purchasing such as working with suppliers to provide customized online catalogs where only reusable, recyclable and recycled-content products are available for purchase. This approach can assist buyers to reduce mistakes when ordering products.

Waste Reduction in City Department Meetings and Events

Regularly practicing waste reduction techniques at all meetings and functions is critical to ensuring behavior change. In its own operations, the Department will:

- Make meetings as paperless as possible, projecting the agenda and meeting materials and providing on-line access to meeting materials that can be downloaded.
- Use reusable serving-ware and refillable beverage containers while eliminating the use of difficult to recycle products such as expanded polystyrene
- Provide visible and accessible reduction, reuse and recycling services in every meeting room and at every meeting or event.
- Communicate actions taken to reduce waste and encourage meeting participants to bring these methods back to their offices and homes.
- Encourage all Department employees to demonstrate leadership in waste reduction in their community.

6.2 / Residential Waste Reduction

The Department's outreach efforts are primarily focused on encouraging and educating residents to practice waste reduction. More detailed strategies for encouraging residents to reduce the generation of discarded materials are incorporated into the Department's Communications Plan in Chapter 24.

Methods for reducing waste at home are similar to those practiced at work and include careful purchasing of new items; repairing and repurposing old items; and donating reusable items that still have a useful life. The Department will research and publicize best practices for waste reduction at home, including methods such as those promoted by the EPA, including but not limited to:⁴

- Purchasing items in bulk or economy sizes, in reusable containers or with the least amount of packaging;
- Purchasing products which are available in concentrated form or are high-quality long-lasting products; and
- Avoiding using single use items such as disposable cups, plates and cutlery, napkins; expanded polystyrene, and plastic bags and instead reverting to reusable items such as reusable utensils, cloth towels, and canvas bags.

6.3 / Commercial and Institutional Waste Reduction

The Department provides commercial technical assistance through its Waste Reduction Assistance Program (WRAP), a free service that assists local businesses with their recycling and waste reduction efforts by motivating businesses to get involved, providing assistance and resources and recognizing businesses that are making a difference. The Department will greatly expand its outreach to commercial and institutional generators to coincide with implementation of the City's Universal Recycling Ordinance (URO).

The Department will conduct outreach to every business in Austin over a five year period. The program will start with businesses of more than 100,000 square feet, as the first phase, and remaining businesses will be phased in within three years. The program will include:

- Technical assistance to commercial businesses in support of the URO;

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⁴ United States. Environmental Protection Agency. *Waste Prevention Pays Off*. EPA/530-K-92-004. EPA: Nov 1993. Ibid. Business Guide for Reducing Solid Waste. EPA/530-K-92-004. EPA: Nov 1993.

- Reward and recognition;
- Incentives and pilot projects;
- Information on recycling and reuse outlets;
- Information about rates and services available through private sector service providers and nonprofits; and
- Profiles and promotion of businesses transitioning to Zero Waste.

The Department will research and publicize best practices for waste reduction at work, including but not limited to methods such as those promoted by the EPA:⁵

- Post a list of paper-saving tips at each copy machine and setting the copy machine to default to double-sided printing;
- Making reports and other documents available on-line;
- Requesting reduced packaging from suppliers and include requirements in bid specifications and contracts;
- Shred waste paper and use it for packing material; and
- Use rechargeable batteries wherever possible.

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⁵ Sources: U.S. EPA, Waste Prevention Pays Off, (EPA/530-K-92-004), (800) 424-9346, U.S. EPA, Business Guide for Reducing Solid Waste, (EPA/530-K-92-004), (800) 424-9346, U.S. EPA, Reusable News, quarterly newsletter, (800) 424-9346



Chapter 7 / Reuse

Reuse means using a discarded item for the same or similar function while preserving the embodied energy of its original form. The City's Highest and Best Use Hierarchy, adopted as part of the Strategic Plan, lists reuse near the top of the hierarchy, directly after redesign and reduce, and before recycling.¹

Strategies the Department will explore and implement to support reuse include:

- Salvaging reusable items from the Department's bulk collection program prior to landfilling
- Encouraging and facilitating the growth and development of repair and reuse businesses and nonprofits, including:
 - Consignment stores, thrift shops and charitable drop-off centers
 - Building materials reuse centers and tool lending libraries
 - Used equipment stores and salvage yards
 - Repair, refurbishing and remanufacturing firms
 - Creative reuse centers and artists
 - Local and regional online material exchanges
- Providing additional opportunities for reuse through the new reuse collection sites
- Promoting the use of durable, reusable products

Reuse is an important component in the City's Zero Waste strategy. Austin residents are estimated to dispose of \$11 million in reusable items annually.² The amount of reusable items in the waste stream is largely dependent on mechanisms in place to capture and refurbish the discarded items.

Reuse businesses create jobs. For every 10,000 tons of reusable items processed, 75-250 jobs are created.³ Therefore, Austin residents could create an estimated 200 to 600 new green jobs by diverting 25,000 tons of reusable items from landfills.⁴

7.1 / Reuse and Resale Businesses

The Department will encourage expansion of the reuse & resale businesses currently established within the City.

Antique Stores and Consignment/Thrift Shops

These resale shops can be for-profit or nonprofit. Unwanted household furnishings and apparel are the most commonly traded materials at antique, consignment and thrift shops; however, the range of materials accepted varies widely from stores to store. For-profits generally purchase or receive consigned materials, while nonprofits receive inventory through donation.

Building Materials Reuse Centers

Building materials reuse centers can be nonprofit or for-profit entities that sell used and surplus building materials, supplies and equipment, and are often referred to as “ReStores.”⁵

Building materials reuse centers can offer reduced prices for building materials and supplies that are still in good useable condition. These centers typically rely on three sources of materials for inventory:

1. A deconstruction entity that provides recovered building materials. Nonprofits can receive donations from builders, contractors, brokers and businesses with leftover materials from remodeling and construction projects. For-profits often pay contractors for materials.
2. Retail stores that can provide overstocked surplus or outdated but still useful products.
3. Homeowners and landlords who are remodeling and want to see their old but still useful cabinets, appliances, and flooring put to good use.
4. It is important for building materials reuse centers to establish relationships with all of these inventory sources.

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¹ Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream.* City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011. Appendix H. Page 47., Appendix H, page 47.

² *Ibid.*, page 6.

³ “Waste to Wealth: Recycling Means Business.” *ILSR.org*. Institute for Local Self-Reliance., 10 December 2008. Web. 15 Sept 2011.

⁴ Gary Liss & Assoc. *Austin, Texas Zero Waste Strategic Plan. The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream.* City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011. Appendix H. Page 47., page 19.

⁵ The term “re-store” is now used generically as denoting a used building materials resale store. Habitat for Humanity has developed several hundred Re-Stores around the country. For more information, visit: <<http://www.habitat.org/env/restores.aspx>>.

7.2 / Creative Reuse Businesses

The Department will support and/or encourage creation and expansion of new and existing creative reuse businesses:

Teacher Resource/Creative Reuse Centers

- These centers collect donated, new and gently-used materials that can be transformed into instructional aids, student projects and even works of art. The educational mission of these teacher reuse centers is to increase the awareness of reusing materials rather than purchasing new materials. Two examples are Teacher's Treasures in Indianapolis, Indiana and Treasures 4 Teachers in Tempe, Arizona.

Used Books, Media & Musical Instrument Stores

- These operations buy and sell used books, media and musical instruments. They understand the value of these resources, and make it easy for the public to buy, sell or trade used goods.

Recycled Reads

- Recycled Reads, the Austin Public Library's resale bookstore, is run primarily by volunteers with materials withdrawn from the library's collection and the community's donations. The store gives books a second chance and is an active participant in the City's Zero Waste efforts by ensuring obsolete materials are handled in an environmentally responsible way by keeping these materials out of landfills. Items that cannot be sold go to third party recyclers that fund and support literacy programs. In this way the library contributes to a socially responsible cause by ensuring that knowledge and learning are passed along to others in need. Books that are unusable as reading material are responsibly recycled for reuse.

Upcycling

- Another part of the creative reuse economy is what is known as "upcyclers." These artists and designers create fashion, jewelry, home furnishings, sculpture and more by repurposing discarded materials. Hundreds of upcycling-based artists and designers call Austin home and showcase their wares at local craft shows.

7.3 / Repair and Remanufacturing Businesses

The Department will encourage creation and expansion of new repair and remanufacturing businesses operated by local entrepreneurs.

Appliance Repair

Discarded appliances can be refurbished and made available for sale at discounted prices. This process also trains workers in mechanical and electrical skills. Appliances that are too old for meaningful repair are recycled through scrap metals yards and brokers. Appliance fix-it shops take responsibility for removing liquids such as freon from refrigerators prior to final recycling as prescribed by law. Some high schools offer appliance repair in their vocational skills training centers.

Bicycle Repair

Nonprofit bicycle repair operations focus on imparting skills and refurbished bicycles within their communities. Often these shops combine sale of refurbished bicycles with sales of new bicycles and accessories. Some college towns offer a free refurbished bicycle for on-campus residents, reducing the need to park vehicles on campus.

Computer and Electronic Refurbishing

Refurbishing computers and personal electronics is a recognized way of reducing landfill use and helping the environment. It is also a great way to decrease or eliminate the digital divide in the United States purchase reliable, high-quality refurbished products.

Clothing and Shoe Reuse

A vibrant international market exists for unwanted apparel. A clothing reuse operation can collect high-grade textile discards and segregate quality items that can be repaired and resold in local markets. Reused clothing stores throughout the nation make high quality items available at modest prices through the thrift resale market. These entities also train workers in skills associated with textile refurbishment. Clothing refurbishing enterprises and programs can link with local college design and fashion training programs.

Household Furniture Refurbishing

Furniture repair shops provide cosmetic repairs on slightly damaged items or comprehensive overhauls of wood or metal-framed furniture. These facilities train workers in upholstery skills and

woodworking. Some of these operations reuse mattresses by stripping out stuffing, sterilizing the material for reuse, and recycling the broken metal springs.

Office Furniture and Equipment Remanufacturing

A variety of businesses sell used and refurbished office equipment and furniture. Businesses and nonprofits can save money by purchasing remanufactured office furniture and equipment.⁶ Austin is home to several office furniture remanufacturing companies, as well as a toner and printer remanufacturing companies.

7.4 / Bulk Collection, Reuse Austin

Most cities have bulk items that must be collected on a regular basis, such as furniture, appliances, windows and building materials. If not collected, some bulk items are improperly discarded on streets in alleys and parks.

Reuse Partners

Collected bulk items could be made available to fix-it shops as inventory for their operations. Other entities can recycle materials that cannot be refurbished. In some cities, a nonprofit for reuse precedes the garbage company's bulk pickup truck and collects reusable items. The Department will explore utilizing existing community resources to partner in this way.

Reuse Austin

This new program, entitled Reuse Austin, will enhance the Department's bulk collection services with increased focus on diversion opportunities. The Department will make a stronger effort to reuse or recycle bulk items collected from Bulk Collection program. The Department will team with reuse and resale partners that are structured to collect and sell gently-used furniture, building materials and other reusable items to increase diversion of items currently landfilled. This added effort to reuse bulk items collected off the streets can be coordinated with the Eco-Depots noted below. Additional description of the Reuse Austin program in Chapter 13/Other Core Business Services.

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⁶ "Office Furniture and Panel Systems." *RethinkRecycling.com*. [Solid Waste Management Coordinating Board](http://SolidWasteManagement.CoordinatingBoard.org). 17 July 2008. Web. 15 Sept 2011.

7.5 / Eco-Depots

There are different approaches the Department can take to implement Eco-Depots. The proposed Zero Waste initiative for Eco-Depots is to sign a service agreement with one or more organizations to host City-sponsored Eco-Depots at a number of sites throughout the City. The Eco-Depot will collect materials that the City wishes to recover, and the organization will charge a fee to operate the Eco-Depot.

Eco-Depots can be developed in many different forms, including trailers and small sheds, to collect a variety of recyclable, reusable and repairable materials. The purpose of Eco-Depots is to provide enough facilities to ensure convenience for the public so that these materials are diverted from the waste stream.

A good way for the City to implement Eco-Depots is to partner with nonprofit organizations that already have sites citywide. The Department will place four Eco-Depots around the city to be utilized for residential drop-offs of bulk items, as well as other reusable items. This additional infrastructure will enhance and support the Reuse Austin program.

New Resources: Eco-Depots and Teacher Creative Reuse Center

The Department will support and establish four (4) Eco-Depots within Austin, as well as a teacher creative reuse center. A teacher creative reuse center will be developed in collaboration with the Austin Independent School District (AISD). Conceptually, the sites would be staffed by a nonprofit organization through a contract with the Department. Additional staff resources will be dedicated to provide planning and management of the Eco-Depot sites and teacher reuse center, and to construct and equip the sites.

The additional resources needed to implement these new collection programs include the following:

Initiative	Date of Initiation
4 Eco-Depots	FY 2014
Teachers reuse center	FY 2014

Operational Expenses	First Year Costs FY 2013
0.5 additional FTE in FY 2014 (other 0.5 FTE shared with Recycling Programs)	\$37,000
One Time Expense: Supplies and Equipment	\$100,000
Annual Recurring Expenses: Operation Contracts	\$250,000
Annual CIP Debt Payment: Construction of sites	\$117,000
Total First Year Operational Expenses⁵	\$504,000

TABLE 2

Estimated Tonnages Diverted through Reuse Program Implementation

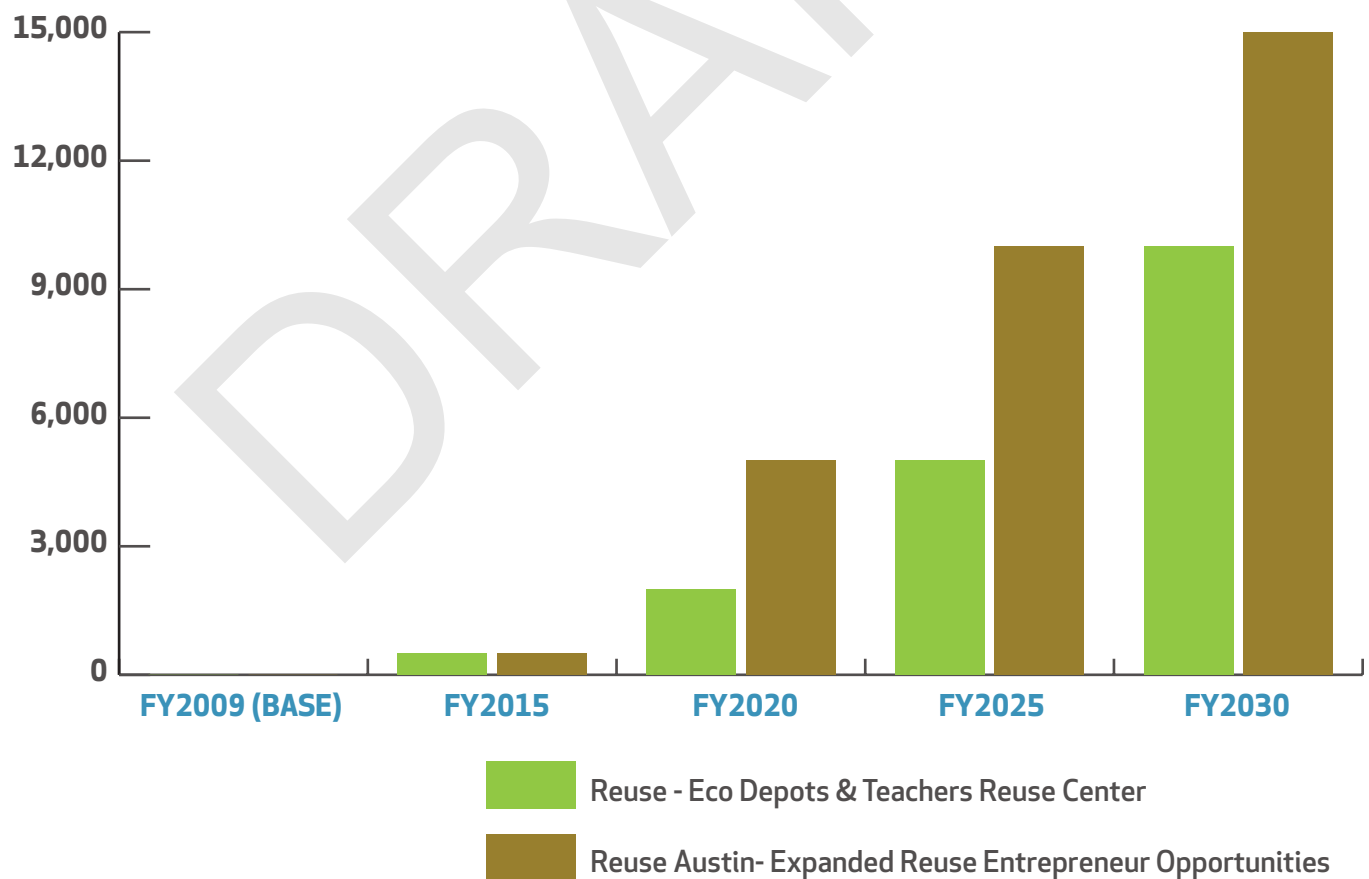


TABLE 3

DRAFT



Chapter 8 / Recycling

Recyclable materials are discarded materials such as paper, metal, plastic and glass that can be reprocessed into new products or packaging. Recyclable materials are a large fraction of the waste stream, representing 43 percent of materials disposed in landfills.

8.1 / Recycling Definition and Guiding Principles

The City of Austin is a member and sponsor of the National Recycling Coalition (NRC), a national nonprofit advocacy group and a professional membership organization. NRC members span all aspects of waste reduction, reuse and recycling, including local recycling coordinators, state and federal regulators, corporate environmental managers, environmental educators, consumers and waste management professionals. The NRC represents and advocates for every sector of the recycling industry across the country. The NRC, as a member-oriented coalition, develops meaningful partnerships with corporate, government, and nonprofit leaders to bring about important changes in the way we use, manage, and recycle natural resources.

The NRC defines recycling as “the series of activities by which materials that are no longer useful to the generator are collected, sorted, processed, and converted into raw materials and used in the production of new products.” This definition excludes the use of these materials as a fuel substitute or for energy production.¹

The NRC also developed a set of guiding principles that the Department will utilize in its development and promotion of citywide recycling diversion.² These principles are:

In conjunction with source reduction, reuse, and composting, the recycling of valuable materials is essential to a sustainable environmental, energy and economic future. Recycling is resource management, not waste management.

- Recycling is resource management, not waste management.
- Recycling is not disposal.
- Thermal combustion is not recycling.
- Recycling programs must be designed to minimize contamination in consideration of the needs of upstream users.
- Materials recovery is the preferred management option for all residential, commercial and industrial discards.
- Recyclables are substitutes for virgin materials.

Recycling is a shared responsibility and requires citizen engagement.

- Recycling requires the participation and collaboration of all stakeholders – citizens and consumers, providers and consumers of raw materials, product manufacturers, product distributors and retailers, providers of recycling infrastructure and all levels of government.
- Recycling programs must be accessible and convenient for all residential, business and institutional settings.

Recycling goals must be clear, achievable, and measurable.

- The foundation of successful recycling policy and programs is accurate and unbiased information.
- Stakeholders should develop a uniform system for measuring discards, recycling, and composting and waste disposal.
- Customized and achievable recovery goals should be established.
- Stakeholders should work to expand uses of their products, which commonly include recycled content.
- Recycling stakeholders should support development and dissemination of sound, scientifically based, and balanced educational material that informs citizens on the need for recycling and engages consumers in the recycling process.

Products and packaging should be designed to take into account and address environmental impacts.

- Products should be designed, manufactured, packaged, distributed, managed and used to optimize the continuing value and recovery of the used materials and minimize the environmental and climate impact throughout the life cycle of the product.
- Manufacturers should develop and support programs that optimize the recovery of recyclable materials.

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¹ Pillsbury, Hope. "Setting the Standard for Recycling Measurement." *Resource Recycling*. Sept 1997. Republished on EPA.gov. Sept 19 2011.

² "NRC Guiding Principles." *NRCrecycles.org*. National Recycling Coalition, Inc. 26 March 2011. Web. 15 Sept 2011.

- Product and package environmental claims and labelling programs should be standardized, accurate, enforceable and useful for consumers.

Successful recycling requires sustainable and equitable economic policies.

- The cost and value of recycling, in comparison to alternative management options and waste disposal, must be transparent to consumers and policymakers and recognize sustainable development measures for resource depreciation (land and natural resources), energy savings and environmental impact.
- Government policies and programs must not favor virgin materials use and waste disposal over materials management by source reduction, reuse, recycling and composting.
- Government tax policies must provide direct and indirect incentives for recycled materials utilization, new recycling technologies and infrastructure development.
- Recovered materials (waste materials and by-products that have been recovered or diverted from solid waste, including recyclables, reusable products and products that may be refurbished) must have access to global markets.

Think globally, act locally.

- Take into account regional and local differences, state and local collection policies and programs should utilize practices that optimize participation rates, cost-effectiveness, direct incentives and energy efficiency.
- Local governments should have the necessary authority, sufficient means and tools, to implement successful residential, commercial and institutional recycling programs.

8.2 / Recycling Collection Systems

The Department provides collection services for single-family households and some small scale multifamily and commercial customers. Most collection services provided to larger scale multifamily and commercial customers are provided by nonprofit and private sector service providers. Through implementation of the Zero Waste initiatives described in this section, 25 percent of recyclable materials will be directly diverted by the

Department and 75 percent of recyclable materials will be diverted by nonprofit and private sector service providers.

Role of the City

Because the Department directly controls only a portion of the recyclable materials generated citywide, the City will have the most impact on increasing diversion of recyclable materials through new policies. These policies are further described in Chapter 21 / Policies. Within the Universal Recycling Ordinance (URO), the City will require diversion of recyclable materials by residential and commercial generators and at City offices and facilities. In the Event Recycling Ordinance, the City will require diversion of recyclable materials at special events.

Many of the Department's new Zero Waste initiatives directly affect the diversion of recyclable materials. The Department will initiate several new programs to divert recyclable materials, including:

- Adding additional material types to the Single Stream Recycling Program;
- Transition to weekly collection for residential customers;
- Expanding recycling collection to all Austin Resource Recovery customers;
- Adding an on-call collection for bulk items to increase diversion of reusable and recyclable materials; and
- Providing outreach, commercial technical assistance, and community-based social marketing initiatives.

The Department will support the work of the nonprofit and private sector service providers through:

- Outreach and commercial technical assistance;
- Community-based social marketing initiatives, including pilot programs, focus groups, surveys (to discover barriers), commitments and feedback from generators and incentives (to change behavior); and
- Large-scale campaigns to change public perception and behavior.

Department Infrastructure

The infrastructure of the Department is primarily based on its collection activities. The Department signed long-term agreements with two local recycling processors to sort and market recyclables collected by the Department and/or via City contracts. The Department will undertake the following initiatives to expand recycling processing capacity in the City:

- Continue to contract for Single Stream processing at private sector material recovery facilities;

- Relocate the existing Resource Recovery Center to the Department's Material Recovery Facility/Transfer Station (MRF/TS) and rebuild to incorporate additional recyclables collection opportunities (See Chapter 9/Materials Management);
- Repurpose the MRF/TS for bulk item diversion (See Chapter 13/Other Core Services);
- Repurpose the closed City landfill to site an Eco-Industrial Park for the location of resource-consumption industries such as a glass processor, a tire shredder, a plastics manufacturer (See Chapter 12/Disposal Management); and
- Develop four Eco-Depots throughout the City to redistribute large bulk reusables, and hard-to-recycle materials, including batteries, motor oil, paint and anti-freeze (See Chapter 7/Reuse).

Role of Nonprofit and Private Sector Services Providers

Austin has a large and diverse recycling infrastructure with additional capacity to meet the needs of the City diversion goals. Nonprofit and private sector service providers are expected to collect and process recyclable and reusable materials generated by multifamily complexes, commercial establishments, special events, and City facilities requiring dumpster service. Service providers will also develop new processing capacity for recyclable materials generated in the City, and provide technical assistance to generators of recyclable materials.

8.3 / Department Recycling Collection Services

The Department currently provides every other week (biweekly) collection of single stream recycling in 96 gallon wheeled carts. Additions to the recycling program will include:

- Adding materials eligible for collection in the Single Stream Recycling program;
- Expanding recycling collection to all Department customers;
- Piloting several glass collection projects, given glass is a high component of Austin's recyclable stream;
- Expanding multifamily drop-off services;
- Implement several recycling policies and ordinances (See Chapter 22/Policies and Ordinances);
- Providing a choice in the size of the containers (64 and 96 gallons); and

- Transitioning for recycling from biweekly to weekly collection (2016-2017).

The Single Stream Recycling program currently includes paper, boxboard, cardboard, aluminum and metal cans, glass and rigid plastic containers #1 through #7 in Single Stream Recycling carts distributed to customers.³ Additional recyclable materials can be accommodated. This program will add in future years: aseptic and gable-top containers, durable plastics (household items and engineering grade plastics), plastic wrap film, aluminum foil and small scrap metal items. The Department will conduct annual customer surveys to assess program acceptance and identify customer concerns.

Resources for Recycling Collection

Additional staff and collection routes will be needed when recycling services are provided to all Department customers. As recycling diversion increases, trash generation will correspondingly decrease. This transition will require rebalancing routes frequently and transferring assets and personnel from trash collection to recycling collection. Increasing the number of recycling collection routes is expected to require additional staff, vehicles and equipment. Cost savings could be realized from reducing the number of trash collection routes. However, this savings has not been quantified and the program will need a significant period of piloting and refinement prior to implementation.

This initiative also includes transitioning to weekly collection of recyclable materials and every other week collection of trash. Transitioning to every other week collection for – the non-recyclable material leftover in the garbage cart will require the City to petition the Texas Commission on Environmental Quality (TCEQ) to allow for every other week collection. Texas statute states that “MSW containing putrescibles shall be collected a minimum of weekly to prevent propagation and attraction of vectors and the creation of public health nuisances.”⁴ The intention of the new collection program would be to have the putrescibles collected weekly in the yard trimmings cart. The garbage cart would be reserved for non-recyclable, non-compostable inert materials.

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³ The numbers on plastic products refer to resin codes: #1- PET or PETE (polyethylene terephthalate); #2 - HDPE (high density polyethylene); #3 - V (Vinyl) or PVC; #4 - LDPE (low density polyethylene); #5 - PP (polypropylene); #6 - PS (polystyrene); #7 - Miscellaneous.

⁴ Texas. Commission on Environmental Quality. “Subchapter C: Municipal Solid Waste Collection and Transportation.” 2003. §§330.101. 27 March 2006. Print.

Cost and Diversion Estimates for Recycling Collection

Initiative	Date of Initiation
Glass Collection Pilots for multifamily and Commercial sites	FY 2013
C&D Debris Ordinance: Development, Implementation, Enforcement	FY 2013
Public Area Recycling Containers	FY 2013 - FY 2015
Event Recycling Ordinance	FY 2013
Community & University Partnerships	FY 2013
City Purchasing Policy	FY 2013
Additional Recycling Policies and Ordinances	FY 2013 - FY 2015
Expanded multifamily Drop-off Recycling Services	FY 2014
Citywide Waste Audit (every 5 years)	FY 2016
Transition to Weekly Recycling Collection for Single-Family Homes	FY 2016 - FY 2017

Operational Expenses	First Year Costs FY 2013
3.25 additional FTE in FY 2013, 0.5 FTE in FY 2014	\$241,000
One Time Expense: Supplies and Equipment	\$100,000
Annual Recurring Expenses: Operation Contracts	\$50,000
Annual CIP Debt Payment	(\$24,000)
Total First Year Operational Expenses⁵	\$415,000

TABLE 4

Estimated Tonnages Diverted through Recycling Program Implementation

Recycling Diversion Initiatives (tons)	FY 2009 (Base)	FY 2015	FY 2020	FY 2025	FY 2030
Expanded Single-Stream Recycling-Residential	44,446	75,000	80,000	85,000	90,000
Contracted Recycling Services (plus URCO) - Commercial & Multi-Family	37,450	50,000	75,000	80,000	85,000
Contracted Recycling Services (plus URCO) - CBD & City Buildings	552	35,000	50,000	55,000	60,000
Clean Austin - Expanded Bulk Collection and Recycling	238	1,000	4,000	10,000	15,000
Public Area Recycling Containers	0	400	1,000	2,000	4,000
Event Recycling Ordinance	0	250	500	1,000	1,500
C&D Debris Ordinance: Development, Implementation, Enforcement	0	50,000	100,000	150,000	180,000
Commercial & Multi-Family Recycling (plus URCO impacts)	334,258	450,000	700,000	850,000	1,000,000
Glass Collection Pilots for Multi-Family & Commercial sites	0	5,000	10,000	20,000	30,000
Expanded Multi-Family Drop-off Recycling Services	0	30,000	100,000	140,000	150,000

TABLE 5

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⁵ Annual cost includes staffing resources.

Chapter 9 / Materials Management

Materials management uses and reuses resources at their highest and most productive level throughout the materials' life cycles. A materials management systems approach considers the life-cycle impacts of disposal and carbon footprint reductions from source reduction, reuse, remanufacturing, recycling and composting. Environmentally preferable purchasing policies, upstream redesign, extended producer responsibility systems and clean manufacturing practices are additional methods of materials management.

Materials management also provides the City with the economic development potential of reusing valuable discarded materials locally. The City can encourage local economic development by working with stakeholders to adopt policies and programs that incentivize, encourage, and even require more environmental responsibility or use of locally produced products made of recycled content to stimulate a sustainable green market economy.

Zero Waste is a goal and guide for people to emulate sustainable natural cycles, where all discarded materials are resources for others to use. This chapter describes planned materials management facility development to support the Zero Waste mission. These facilities will address the physical repurposing of residential discards. Additional resources are needed to support materials management through product redesign and product stewardship measures, which is addressed in Chapter 21/Policies.

9.1 / Materials Management - Highest and Best Use

The City's Strategic Plan utilizes the Highest and Best Use Hierarchy (see Chapter 3/Zero Waste). The general principle of Highest and Best Use applies to the Department's efforts to manage discarded materials for secondary reuse.

9.2 / Twelve Market Categories of Recyclable Materials

A materials management systems approach diverts materials currently being disposed in landfills through source reduction, reuse, remanufacturing, recycling and composting. All discards can be sorted into 12 basic categories of divertable materials, representing 90 percent of the overall waste stream. Thus, 90 percent of discarded materials are either recyclable or compostable in today's marketplace. To achieve this level of diversion requires nearly 100 percent public participation and no loss of materials in the collection, transport and processing processes. Thus, the Department will strive to develop the local infrastructure to recover, process and market the recyclable and compostable streams. However, the main key to achieving 90 percent diversion is through public participation which requires public education, collection convenience and social marketing campaigns. The remaining 10 percent will be addressed through product redesign, the elimination of single-use disposables and product stewardship.

An overview of the current national waste stream is presented in the following pie chart.¹

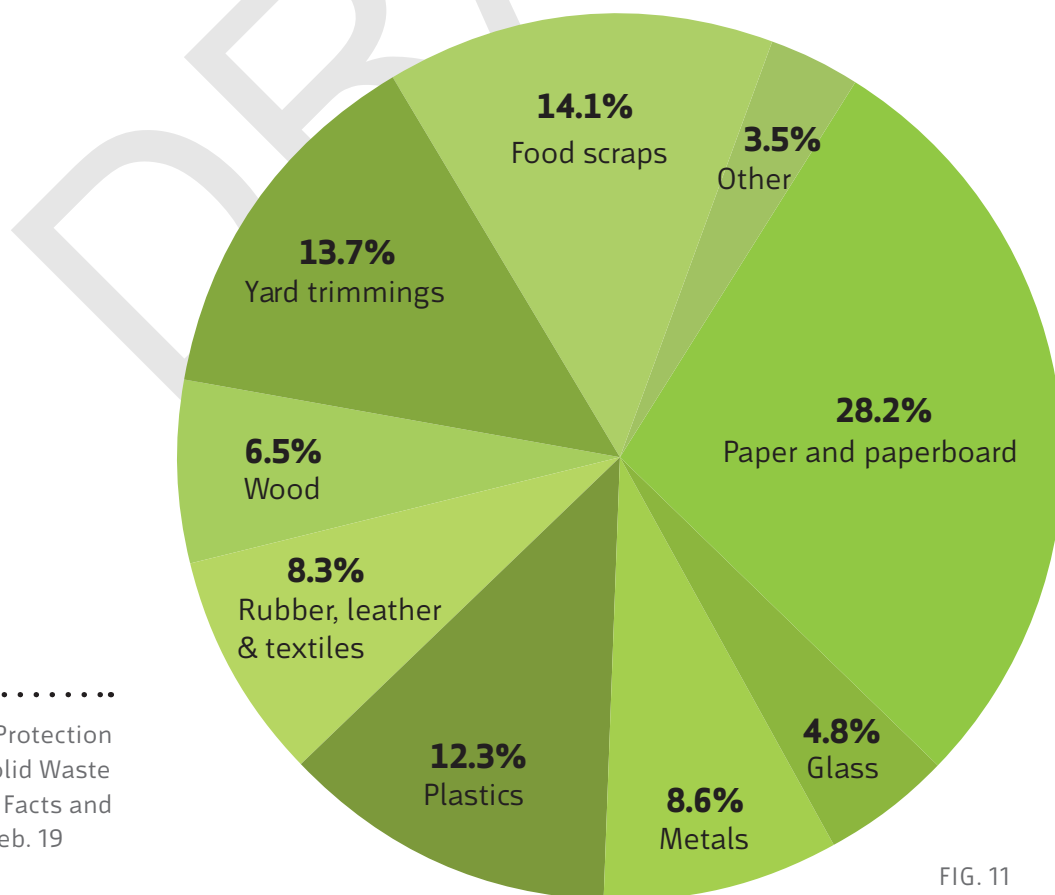


FIG. 11

¹ US Environmental Protection Agency. Municipal Solid Waste in the United States: Facts and Figures. Dec 2010. Web. 19 Sept 2011.

The pie chart represents traditional categories of recyclables and compostables. Below is a more detailed characterization of the disposed materials displayed through 12 major categories by percentage. Materials presented above the dissecting line represent recyclables and reusables, while materials presented below the line represent compostables. A more detailed analysis of these 12 categories of material is presented in the chart below.

Twelve Major Categories of Discard Material	Clusters	Processing Centers
28.2% Paper and Paperboard 8.6% Metals 4.6% Glass 12.3% Plastics	Paper and containers Paper, metals, glass, polymers	Recyclables Papers, plastic, glass and metal containers
14.1% Food Scraps 13.7% Yard Trimmings 6.5% Wood	Organics Food, vegetative debris, food, dirty paper, paper, plant debris, putrescibles, wood	Organics Food, vegetable debris, food paper, putrescibles, untreated wood and sheetrock
8.3% Rubber, Leather, & Textiles	Discarded Items Furniture, appliances, clothing, toys, tools, reusable goods, textiles	Reuse & Repair Reuse, repair, dismantling, reconditioning, remanufacturing, manufacturing and resale of furniture, large and small appliances, electronics, textiles, toys, tools, metal and ceramic plumbing, fixtures, lighting, lumber and other used building materials
3.5% Other	Special Discards Chemicals, construction and demolition materials, wood, ceramics, soils	Construction & Demolition Materials Rocks, soils, concrete, asphalt, brick, land clearing debris, mixed construction and demolition materials Regulated Materials Used motor oil, paint, pesticides, cleaners and other chemicals Product Redesign Extended producer responsibility, design for recycling

FIG. 12

The discarded materials does not directly represent the City's waste stream, the Department plans on conducting a waste characterization study of its various waste streams through an inter-local agreement with the University of Texas at Austin. This agreement will employ college interns, trained through a Zero Waste consultant, to perform a 12-market inventory of the City residential, commercial, industrial and institutional waste streams. The results of this study will enable the Department to focus on marketable materials currently disposed in local landfills.

New Resources: Waste Characterization Study

Additional staff resources and college interns will be dedicated to provide planning and management of the waste characterization study. These resources are needed to equip the interns with the proper sorting and safety equipment. The Department will contract with a Zero Waste consultant to train the interns and manage the project. Staff follow-up through planning and deployment of materials management programs will be developed upon analysis of the study results. The waste characterization study will be performed every five years to measure diversion progress and refocus diversion programming.

9.3 / New Policies: Materials Management

The materials management components of the Master Plan include several opportunities for the development of new policies that support the City's Zero Waste goal, such as:

Universal Recycling Ordinance (URO) – An ordinance designed to increase diversion through comprehensive recycling and organics collection from all sectors throughout the City. The City will propose adding composting and renaming will evolve to URCO.

Construction, Demolition and Deconstruction (C&D) Debris Ordinance – An ordinance designed to require the recycling of construction debris through a City permitting process.

Extended Producer Responsibility (EPR) Initiatives – EPR initiatives call for an active role in advocating for legislation requiring product manufacturers, retail establishments, wholesale distributors and other appropriate entities to take back certain products or packaging that

currently are difficult to recycle or harmful to dispose.

Policies to Reduce Single-Use and Non-Recyclable Products and Packaging – Initiatives to reduce single-use and non-recyclable products and packaging, such as consideration of a single use bag ordinance and a take-out container ordinance.

These new policies will support and increase new opportunities in materials management. Detailed descriptions of these proposed policies are described in Chapter 21/Policies.

9.4 / New Programs: Materials Management

The materials management components of this Master Plan include several opportunities for the development and deployment of new programs that are expected to be undertaken in response to City policies, such as:

Reuse Austin – An enhanced system of bulk collection services that diverts collected materials through local reuse opportunities, further described in this chapter and Chapter 7/Reuse.

Clean Austin – An enhanced bulk and brush collection service with increased focus on high need areas, further described in this chapter, Chapter 7/Reuse, and Chapter 10/Organics.

Storm Ready Austin – Increased responsiveness to violent storm debris clean-up needs, further described in this chapter and Chapter 10/Organics.

9.5 / New Facility Development: Materials Management

The materials management components of this Master Plan include several opportunities for the development of Zero Waste infrastructure through public-private partnerships and private sector initiatives that are expected to be undertaken in response to City policies, such as:

Eco-Depots – Drop-off facilities located around the City for collection of reusable items, recyclables and hard-to-recycle materials, further described in this chapter and Chapter 7/Reuse.

Materials Recovery Facilities (MRFs) for Recyclables – MRFs constructed and operated by two private sector companies under contract with the Department, to support the Single Stream Recycling Program and the Zero Waste initiatives of the Master Plan, further described in Chapter 8/Recycling.

Resource Recovery Centers – For the collection of hard-to-recycle materials such as appliances, tires, furniture, carpet and paint, further described in this chapter and Chapter 13/Other Core Services.

Composting Facilities for Organics – Expanded organics processing capacity at the Hornsby Bend Biosolids Management Plant. In addition, pilots are proposed in response to the Universal Recycling Ordinance and through contracts with the City. The City may contract for additional composting services if deemed appropriate, further described in Chapter 10/Composting Organics.

Construction and Demolition Debris Processing Facilities – For the recovery and recycling of debris from construction sites, in response to a future Construction and Demolition Debris Ordinance, further described in this chapter.

Eco-Industrial Park – Industrial plants constructed by the private sector to utilize discarded materials as raw materials in the production of new products, further described in this chapter and Chapter 12/Disposal Management.

9.6 / Reuse Austin

Reuse Austin will enhance current bulk collection services with increased focus on diversion opportunities. The Department will make a stronger effort to recycle or reuse bulk items collected from customers. The City will team with reuse and resale partners that are structured to collect and sell gently-used furniture, building materials, and other reusable items to increase diversion of items currently landfilled. Additional description and planning of the Reuse Austin program is noted in Chapter 7/Reuse.

New Resources: Reuse Austin

Reuse Austin will utilize existing resources dedicated to the Bulk Collection program and the RRC to be located at the Todd Lane Transfer Station. Existing staff resources will be dedicated to provide planning and management of the new Reuse Austin program. Additional resources are needed to repurpose and equip the Todd Lane Transfer Station, as noted in Chapter 13/Other Core Services.

9.7 / Eco-Depots

As discussed in Chapter 7 / Reuse, Eco-Depots are drop-off facilities for reusable items, recyclables and hard-to-recycle materials, such as carpet, electronics, batteries, motor oil, latex paint and anti-freeze materials.

The Department will place four (4) Eco-Depots around the city to be utilized for residential drop-offs of large bulky items, as well as other reusable items. This addition infrastructure will enhance and support the Reuse Austin program.

New Resources: Eco-Depots

Approximately four eco-depots are needed. Each Eco-Depot could handle up to five to ten tons per day depending on the particular location, storage space available, and location for accessibility to the public. Conceptually, the sites would be staffed by a nonprofit organization through a contract with the Department. Additional staff resources will be dedicated to provide planning and management of the Eco-Depot sites. Additional financial and contract resources are needed to construct and equip the sites. These additional resources include a 1.0 full time equivalent (FTE).

9.8 / Bulk Material Collection and Management

The Department collects items that are too large for the trash cart during specially scheduled, semi-annual bulk collections. Residents are requested to separate their materials into three piles for collection of metal items, passenger car tires, and all other non-metal items. Common bulk items

collected include:

- Appliances
- Charcoal and gas grills
- Doors
- Furniture
- Lawn mowers
- Lumber
- Mattresses and box springs
- Pallets
- Railroad ties and utility poles, no more than 6-feet-long
- Rolled fencing
- Tires

The current collection method mixes the materials for final disposal. To deploy a materials management approach, the Department plans to reorganize the bulk collection program to increase reuse and diversion of the materials collected and minimize disposal. Collection equipment will be replaced to support a new style of collection that respects the integrity of the material collected and create new diversion activity. In addition to reorganizing the existing bulk collection program, the Department will encourage new diversion through the establishment of three new collection and diversion programs: Clean Austin, Reuse Austin and Tire Recycling.

Clean Austin

The Clean Austin program will enhance bulk collection cycles where needed and offer a new on-call service. The areas selected for this enhanced service will be determined by field observations of neighborhoods experiencing heavy out-of-cycle set outs. The selected areas for the pilot will be geographically representative of all areas of the City. The Department will pilot an enhanced collection cycle that will offer residents bulk collection four times per year in high need areas. The pilot program is needed to test collection scheduling and set-out requirements, offering residents two extra scheduled collections per year.

The Department will work closely with the Austin Apartment Association and the Austin Realtors Association in coordinating the implementation of this new program. Additional description and planning of the Clean Austin program is noted in Chapter 13/Other Core Services.

Reuse Austin

This new program, entitled Reuse Austin, will enhance the bulk collection services with increased focus on diversion opportunities. The Department will make a stronger effort to recycle or reuse bulk items collected. The City will team with reuse and resale partners that are structured to collect and sell gently used furniture, building materials, and other reusable items to increase diversion of items currently landfilled. Additional description and planning of the Reuse Austin program is noted in Chapter 7/Reuse.

Tire Recycling

The City currently collects tires from residents and City operations then transports the tires to a private company that operates a tire shredder. The tire shreds are utilized as a fuel supplement for various boiler operators. As this type of end use is classified as a form of final disposal, the Department plans on upgrading this activity through new diversion options. The Department will explore various reuse and recycling options, and develop and finance a pilot demonstration project in collaboration with the Public Works Department.

New Infrastructure: Bulk Collection Services

Both the Clean Austin program and the Reuse Austin programs will require infrastructure improvements. The Austin Resource Recovery Center, located at the FM812 landfill, is intended to be a public drop-off of large bulky items, including tires, large appliances, and furniture. Through public feedback, the location was identified as a major barrier. In addition, collection and processing of these items at the landfill offers operational challenges due to weather exposure impacting employee working conditions.

In consideration of these needs, the Department will relocate the Resource Recovery Center to the Todd Lane Transfer Facility. The repurposed transfer facility will house the public drop-off service as well as the bulk collection and reuse program. Items collected, either through the drop-off or curbside collections, will be dropped off on the concrete floor of the enclosed facility, allowing for proper separation and cleaning under a protective structure roof and not exposed to weather conditions. Public access to the facility will be redesigned to encourage a safe driving loop for the public that does not cross other operational services. This redesigned facility will service the public and the bulk collections program.

9.9 / Storm Debris Materials Management

The Department collects brush and tree trimmings which are too large for the trash cart during specially-scheduled, semi-annual brush collections. Residents are requested to stack the brush and tree trimmings in one row no more than 15-feet- long by 4-feet-high. The Department hauls the brush to Hornsby Bend for grinding.

The Department also collects large brush and tree trimmings after major storm events. This special collection is periodic and requires the deployment of staff dedicated to other collection programs. This disruption to Department operations usually requires delayed services that can cause unmet service needs throughout the City. In addition, some residents have noted that the semi-annual brush collection may not coincide with the appropriate pruning season or does not equally spread out the collection cycle to allow customers to tend to their yards during varying climate changes. To address both of these service needs, the Department will deploy two new collection and diversion programs: Clean Austin and Storm Debris Management.

Clean Austin

The Clean Austin Program, as noted in Section 9.8, will keep enhancing brush collection services with increased focus on high-need areas. The Department will increase brush collection services for identified high-need pruning seasons. The Clean Austin program will enhance brush collection cycles where needed and offer a new on-call service.

The Department will pilot an enhanced collection cycle that will offer residents brush collection four times per year in high-need areas, in coordination with the bulk collection program. The pilot program is needed to test collection scheduling and set-out requirements, offering residents two extra scheduled collections per year. The areas selected for this enhanced service will be determined by field observations of neighborhoods experiencing heavy brush set-outs. The selected areas for the pilot will be geographically representative of all areas of the City.

Storm Ready Austin: Storm Debris Management

Storm Debris Management will enhance the Department's responsiveness to violent storm debris clean-up needs. The National Weather Service declared the Travis County and Austin Emergency Operations Communications Center as a Storm Ready community, prepared to respond quickly to

hurricane or tornado events striking the area, and the resulting damaging winds and flooding.¹ The Storm Debris Management team will be prepared to act on an emergency activation notice, capable of responding to and assisting residents with the removal of tree and brush debris from public rights of way, as well as other storm related debris.

The Storm Debris Management team will work in cooperation with AE response teams, as well as the Austin Emergency Operations Command Center. This response is an enhancement to the existing brush and bulk collection programs. In the event of a major damaging storm, Department collection crews will postpone existing planned services and respond immediately with storm debris collection and materials management. The Department will explore potential contractual relationships with private companies to provide brush shredding services in the event the collected material exceeds the capacity of City dedicated resources.

New Infrastructure: Brush Collection Services

The Department's brush collection services are focused primarily at Hornsby Bend in the southeastern sector of the City. There is a need for more convenient drop-off sites around the City to increase the Department's operational efficiencies and reduce its carbon footprint. In addition, there is a need for public drop-off locations of large brush, to reduce the need for city on-call services. The Department will research the use of various parks and natural settings as potential drop-off locations large brush and tree limbs, keeping in mind that many areas have environmentally sensitive concerns. The Department will seek out four emergency collection sites for brush and woody compostables, in the four quadrants of the City.

9.10 / Construction Materials Management

Construction and demolition debris (C&D) account for approximately 20 percent of citywide disposal. Through the requirements of a construction debris ordinance, most construction and demolition debris will be collected and processed private sector service providers.

Construction, Deconstruction and Demolition Debris Ordinance

The Department will significantly impact the diversion of C&D debris through development and adoption of a Construction, Deconstruction

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¹ NWS designed the Storm-Ready program to help communities better prepare for and mitigate effects of extreme weather-related events. More information can be found at the National Weather Service website: <<http://www.storm-ready.noaa.gov/index.html>>.

and Demolition Debris Recycling Ordinance. This ordinance will be developed based on stakeholder input, including the building industry and private sector service providers. Key aspects of this ordinance could include:

- Adopting policies to increase reuse, recycling and composting of products used in remodeling and new construction;
- Requiring larger project building permit holders to provide diversion plans;
- Transitioning to higher rates of diversion requirements; and
- Registering C&D debris facilities and haulers.

The Department will also provide technical assistance to C&D debris generators in support of the ordinance; including:

- Training in soft demolition, deconstruction, and building materials reuse;
- Promotion of building adaptive reuse;
- Information on recycling and reuse outlets and deconstruction services; and
- Information about rates and services available through private sector service providers and nonprofits.

Nonprofit and private sector service providers will play a significant role in collection and processing of C&D debris generated in the City. A comprehensive ordinance implemented by 2015 will provide a signal to the private sector of an investment opportunity in C&D processing capacity. The City can take several different approaches to implementing the ordinance. Requirements can be placed on C&D generators, haulers or facilities. The City will conduct a series of stakeholder meetings, targeting the building community to ensure that needs of C&D generators are taken into account and that processing capacity is available to divert construction materials from landfills.

The new ordinance will essentially expand the requirements of the URO to the building community citywide. This will be accomplished through a stand-alone ordinance or an amendment to the URO.

Resources for Construction, Deconstruction and Demolition Debris Ordinance Implementation

One additional staff member within the Strategic Initiatives Division will be needed for ordinance development, implementation, new rules development, technical assistance and training.

Construction and Demolition Debris Processing

C&D processing facilities receive and process construction and demolition debris. These types of facilities provide different levels of processing depending on accepted materials and may produce a variety of commodities at each facility. Typical C&D materials accepted include asphalt, concrete, Portland cement, brick, rocks, lumber, wallboard, roofing material, ceramic tile, plastic pipe and associated packaging. Commodities typically produced include gypsum, clean wood, ferrous metal, aluminum, inert material (including engineered fill) and alternative daily cover for landfills. Most C&D facilities are developed based upon one of three basic processes: 1) an outdoor receiving area for floor-sorting without on-site processing equipment, 2) an outdoor receiving area for floor-sorting with on-site processing equipment and 3) floor sort and processing equipment with all operations located inside a building:

The City does not operate any C&D debris processing facilities. Processing this debris into recyclable or reusable materials is provided by private contractors as most CD&D materials are generated by private entities.

There is potential for existing facilities to expand or for additional facilities to be built as Zero Waste policies and programs are implemented. The City's role will be to adopt a C&D ordinance to divert construction materials from landfills to appropriate CD&D processing facilities. These C&D facilities can charge fees based on the types and amounts of materials received, the contamination level and the current market pricing of the materials recovered.

Projected Need for Construction and Demolition Debris Processing

Based on information gathered from regional service providers, the current C&D processing capacity in the region can handle the construction debris volumes currently generated. However, when Zero Waste initiatives are implemented, expansion of existing capacity or the development of new facilities by the private sector will be needed. The new regulations and ordinances provide opportunities for the private sector to construct additional capacity. This capacity will occur through one or more facilities.

9.11 / Resource Recovery Center (RRC)

The current Resource Recovery Center located at the FM 812 Landfill site will be redeveloped at the Materials Recovery Facility/Transfer Station (MRF/TS) located at Todd Lane, as part of the expanded bulk floor-sort noted above. This new collection center is envisioned to handle batteries, motor oil, latex paint, anti-freeze, brush and numerous other recoverable materials. It will include a reuse yard for building materials and provide repair and refurbishment for reusable bulk items delivered by the Department or the public. No new space will be needed for this infrastructure project.

Materials Recovery Facility/Transfer Station (MRF/TS)

The MRF/TS is located at 3810 Todd Ln. on a 7-acre parcel. The MRF/TS was originally used as a MRF to process recyclables from a dual-stream collection system. The Department moved to a commingled Single Stream Recycling collection system, and the MRF/TS was used to collect and handle the recyclables from the route vehicles. From there, the materials were transported to a recycling processing facility in San Antonio. Since October 2010, the Department hauls collected recyclables to a recycling processor in Creedmoor, Texas, directly from its routes, eliminating the expense of transfer operations at the MRF/TS. Currently, the MRF/TS is not in use to transfer or process materials.

The approximately 9,000 square feet of unused usable tipping floor at the MRF/TS will be repurposed into a RRC. The enriched loads from the new on-call bulk item collection initiative will be brought to the facility for floor sorting. The facility also will accommodate the public drop-off of bulk materials currently collected at the FM 812 Landfill. Only minor upgrades to the facility are considered necessary. Initially, a skip-loader/forklift and some additional bins would be needed to operate the facility. Staff and equipment growth will coincide with population and materials growth.

A floor sorting operation is a simple method to divert potential recyclables, reusable items and repairable materials from other discarded materials. Vehicles delivering materials to the facility are directed to separate areas to unload their materials, depending on the material type or generator type. Staff will sort these materials on the floor to pull recoverable materials from the other discarded materials, and separate them into bins or debris boxes for shipment to market. The Master Plan intends for this operation to be in service by FY 2013.

New Resources: Resource Recovery Center

Two additional staff members within the Diversion Facilities Division will be needed for additional labor at the Department's RRC. The facility will require minor upgrades and routes will need reconfiguration. The repurposed use of the facility will not require any additional space. The physical upgrades will be made to enhance the facility for better use in receipt, unloading, sorting and consolidation of materials for markets within the existing space.

Private Sector Resource Recovery Centers

Materials collected and managed through resource recovery centers can include hard to recycle items, including mattresses, textiles, appliances, office equipment and furniture. Larger facilities can include a reuse yard for building materials and provide repair and refurbishment for reusable bulk items and other reusable materials delivered by the public. They can also handle batteries, motor oil, latex paint, anti-freeze, brush and other recoverable materials. The materials typically are brought in self-hauled loads by residents or businesses to a disposal site. Thus resource recovery centers are usually developed at landfills or disposal facilities. Local disposal sites can redesign their sites to provide for a separate drop-off and staging area where the public can drop off their recoverable materials before proceeding to the designated landfill area. At some facilities, the diversion activity takes place after the fee gate, and the public is required to separate materials for recycling and reuse. If users decide to proceed directly to the landfill area, they are required to pay an extra fee. Lessened tipping fees at resource recovery centers can provide a significant incentive to users. Some facilities provide drop-off or buy-back options for revenue-generating recyclables and charge lower rates for certain items (e.g., yard trimmings, clean fill).

Diversion levels and costs at resource recovery centers can vary widely depending on the extent and type of the diversion activities. These activities can include public area drop-off for traditional recyclables (cans, bottles and paper), salvaging materials from the tipping area at a transfer station or landfill (large pieces of metal, cardboard or wood), diverting reusable items (furniture, building materials and household goods), and providing retail sales on site. For Zero Waste communities, resource recovery centers provide ways to reuse, recycle or compost all 12 market categories of recyclable materials.² In some locations, resource recovery centers could be combined in clusters of reusables, recyclables, compostables and special discards, including regulated materials and C&D. Each of the

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² These 12 market categories, defined in section 9.2, are: Reusable goods, Paper, Metals, Glass, Polymers, Textiles, Chemicals, Putrescibles (including food scraps), Wood, Ceramics (including rock, tile, bricks, concrete and asphalt), Soils, and Plant Debris.

clusters would utilize different approaches to collecting and processing, requiring different trucks, equipment and handling. The cluster approach requires that the combined categories of materials be sorted at other locations. Some activities may be co-located at a landfill, but others may be off-site.

The Department will encourage the development of resource recovery centers at local landfill sites so users have the option of taking their source separate materials to a designated area located within the landfill gates. The landfill can charge a fee for taking these materials to their site, but this fee could be less than the landfill fee to incentivize users to reuse or recycle materials. This way the user can save money while the landfill operator can still collect a charge to cover their services. The landfill operator will benefit by maintaining its capacity and minimizing their costs. These private resource recovery centers would be developed and operated by the private landfill entity without financial support from the Department. The Department will encourage private landfill operators in the region to include resource recovery centers in their operations.

Projected Need for Resource Recovery Centers

After the recommended initiatives and ordinances are implemented, resource recovery center capacity needs could be between approximately 78,000 to 172,000 tons per year (tpy) over the planning period, or about 250 to 600 tons per day (tpd). This could be addressed by one to three facilities in the 200 tpd range but more likely in varying sizes up to 200 tpd to fit the needs of the City and the availability of sites.

9.12 / Eco-Industrial Park

The Department's closed FM 812 Landfill, located at 10108 FM 812 in the City of Austin, is approximately 360 acres in size, and under 30-year post-closure care within the EPA Subtitle D requirements for landfill site care and maintenance.³ The Department will redevelop the 80 acres of FM812 frontage as buildable land for the construction of an Eco-Industrial Park.

An Eco-Industrial Park is an industrial system of production facilities that conserves natural and economic resources, reduces energy and water usage, and provides opportunities for reuse or recycling of wasted

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³ National Resource Conservation and Recovery Act of 1976. Title 40. Subtitle D – Solid Waste (Non-Hazardous). Web. 19 Sept 2011.

materials. This Department's Eco-Industrial Park could be planned, designed and built to support businesses that can consume collected recyclables as feedstock for new product manufacturing. An example is a glass reprocessing plant that can clean and color sort single-stream mixed glass for resale to a glass manufacturer. Other examples include a tire shredding plant, a plastic extruding plant, and a reusable bag manufacturer.

The planned solar array at the closed landfill site will assist in green electric power needs of the Eco-Industrial Park. The Department will offer the buildable land area at the FM 812 closed landfill for economic redevelopment, in collaboration with the City of Austin Economic Growth and Redevelopment Services Office (EGRSO).

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Chapter 10 / Composting Organics

Organics are discarded materials that will decompose, such as yard trimmings, food scraps, compostable food-soiled paper and untreated wood. Organic materials are the largest fraction of the waste stream, representing more than 45 percent of materials currently disposed in landfills based on a national average. When buried in a landfill, organics do not break down as they would in nature or in a compost pile. They decompose anaerobically, without oxygen, and in the process become the number one source of human-caused methane released into the atmosphere.

The Department embraces and supports the efforts of the national Compostable Organics Out of Landfills (COOL) Campaign in a long-term commitment to prevent methane emissions and build healthier soils. Taking the COOL step replenishes carbon stocks and supports sustainable agriculture, yielding healthier foods for our population.¹

The desired goal for achieving significant diversion of organic materials requires many collection and processing opportunities, as opposed to a single solution. Essentially, utilizing new and old technologies with new economic development opportunities, the Department can maximize the highest and best use practices to reduce the community's carbon footprint for handling organics.

Centralized composting is a growing trend nationwide. Composting processes have evolved into different disciplines such as in-vessel composting, anaerobic composting, wind row composting and static-pile composting; all of which can handle large volumes of organics at single facilities. In addition, decentralized composting processes can reduce the carbon footprint of collection and transportation while consuming organics in more localized situations that do not require large organized collection programs.

The Department recognizes that, in addition to helping the City achieve its Zero Waste goals, composting also addresses the community's interest in enriching the region's soil, strengthening sustainable food production and completing the food cycle. These additional benefits were identified by the Sustainable

Food Policy Board's Dec. 10 letter to the Austin City Council and were considered while developing the Department's Master Plan.

EPA Food Waste Recovery Hierarchy

Food is a valuable resource that can be used to protect soil and water or grow Austin's next generation of crops. There are many higher uses to consider instead of disposing food waste in landfills or through incineration. Both the EPA and United States Department of Agriculture (USDA) recommend following the food recovery hierarchy as the preferred options to make the most of excess food. The food waste recovery hierarchy comprises the following activities, with disposal as the least preferred option:

- **Source Reduction** – Reduce the amount of food waste being generated;
- **Feed People** – Donate excess food to food banks, soup kitchens and shelters;
- **Feed Animals** – Provide food scraps to farmers;
- **Industrial Uses** – Provide fats for rendering; oil for fuel; food discards for animal feed production; or anaerobic digestion combined with soil amendment production or composting of the residuals
- **Composting** – Recycle food scraps into a nutrient rich soil amendment
- **Landfill** – Disposal options are the least preferred.²

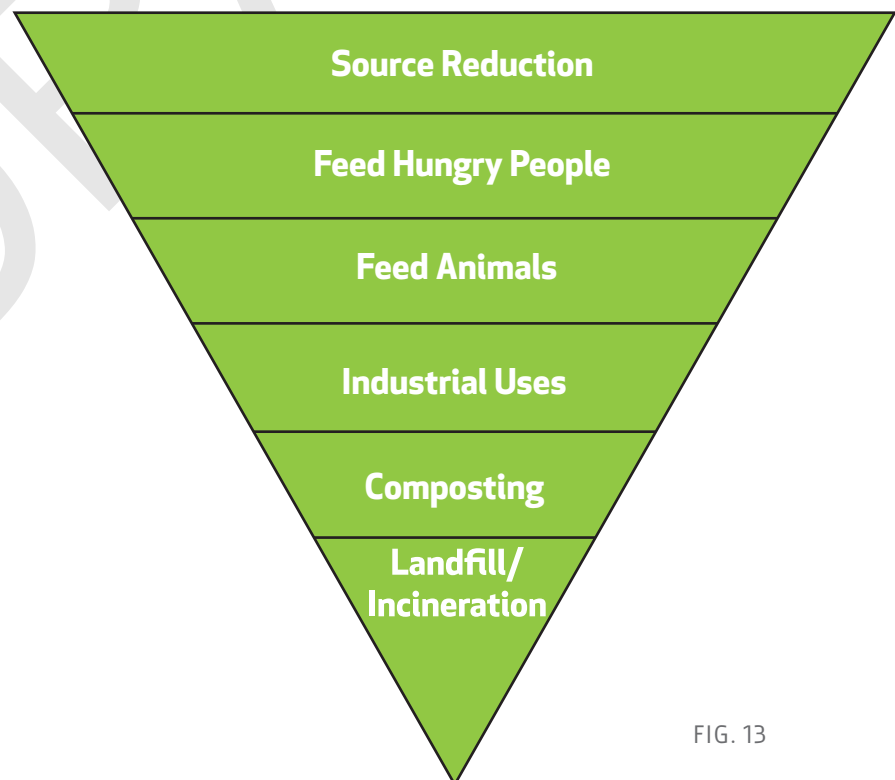


FIG. 13

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¹ The Compostable Organics Out of Landfills Campaign was created by the GrassRoots Recycling Network, BioCycle Magazine, and Eco-Cycle. It is an outreach and education campaign targeting state and local jurisdictions throughout North America.

² "Generators of Food Waste." EPA.gov. EPA. n.d. Web. 1 Jan 2011.

Highest and Best Use Food Waste Composting Hierarchy

In the collection of residential food scraps for the purpose feeding people and animals, the Department will encourage and support nonprofit agencies in an effort to redistribute safe, edible food scraps where possible. The URO will be amended to include composting and require commercial-based food generators (e.g. restaurants, grocers, food processors, cafeterias, etc.) to recover and compost their food waste. The Department's direct efforts will be focused on collection and composting of residential food waste. For purposes of this Master Plan, the Department desires to utilize collected residential food waste through a highest and best use philosophy. A modified Food Waste Composting Hierarchy is noted below for City future planning purposes:

Highest and Best Use

- **Home-based Composting** – Highest and best use of food scrap, with the lowest carbon footprint.
- **Humus & Mulch** – Second highest end-use with minimal processing requirements.
- **Vermi-compost** – Best processing of compost with the least energy requirements.
- **Aerobic Composting** – Best central processing option with the highest end-use of compost.
- **Anaerobic Digestion** – Final end-use disposal option with energy capture.
- **Landfilling** – Disposal method that often creates unmitigated methane release to the environment.

Lowest End Use

Multiple Sources of Organics

Yard trimmings and food waste organics are generated through residential settings, commercial buildings, professional gardeners, food processors, restaurants, grocers, bars, school cafeterias and landscapers. Given the large variety of sources, as well as the varied collection methods available, the Department desires to seek alternative methods to divert organics, in addition to traditional large-scale collection and processing methods. To develop and support various collection and processing needs, there is a need to explore future drivers for the collection and utilization of organics.

Nutrition

In February of 2010, the United States Presidential Cancer Panel released its final report.³ The report states that the nation's food supply

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³ United States. President's Cancer Panel. *America's Demographic and Cultural Transformation: Implications for Cancer*. Bethesda: March 2011. Print.

now contains on average, only 40 percent of the nutrient density that it did 60 to 100 years ago. According to the report, organic matter is the key to the nation's soil functionality, the long term health of plants and, thus, people. A community-based composting program can enrich local soils for proper nutrition density.

Water

The Lower Colorado River Authority's Soil Depth and Soil Amendment Specifications Background guidance document stated that soil will hold about 1.5 quarts of additional water per cubic foot for every 1 percent increase in organic matter.⁴ The Central Texas region's soils are thought to hold less than one percent organic matter, implying that only 25 percent of the area's annual rainfall can be absorbed by the region's soils. The remaining 75 percent of the area's annual rainfall likely results in runoff due to insufficient organic matter in our soils. Therefore, an increase in soil organic matter of one percent has the potential to increase rain water retention, and thus reduce irrigation requirements, of 0.5 inches per rainfall event. Adding nutrient rich compost made from food scraps into the area's soils is one way to retain more water and reduce water consumption.

Carbon Footprint

Collection and landfilling organic materials is a fuel intensive process requiring a significant investment by the City in both equipment and labor. As fuel prices increase, price pressure on the cost of providing service will such as yard trimmings and food scraps can be addressed through a community-based composting program that couples centralized composting programs with on-site composting options.

Green Jobs

The diversion of organic matter into local soils creates green jobs as well as local resiliency for both individual incomes and community economic development. Food organics and yard trimmings can be used to support local agricultural operations, including community gardens. The Department will work with area composting operations to encourage and support market growth and an efficient system for distribution of these resources.

Green Barter

Green bartering provides a useful framework for the exchange of services and value among multiple parties that may not have the cash flow to support simple transactions. It increases the awareness of resources in the community. The Department may be able to play a role in a green barter

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⁴ Lower Colorado River Authority. *LCRA Soil Depth and Soil Amendment Specifications Background*. LCRA. n.d. Web 1 Sept 2011.

system by providing points, similar to frequent flier miles, along specific collection routes to residents for their aggregate collection volumes. Points could be divided among individual residents and then redeemed or donated. Using bar code and radio frequency identification (RFID) technology, systems exist to reward individuals for the diversion of food scraps to local agricultural operations. A local concept such as green bartering could create significant new opportunities for diverting organics into ecosystem services, while addressing the needs of targeted social sectors such as low income and nonprofit groups. Green bartering is further discussed in Chapter 24 / Communications Plan.

New Technologies

Numerous new composting technologies are becoming more widely available and have the potential to be used among large and small scale generators. Composting worms have long been recognized for their ability to digest food scraps on residential and commercial scales in order to produce high-value worm castings. Innovations in various composting systems make it possible to use food scraps to produce a high value protein animal feed suitable for backyard chickens and other animals. Food waste reduction machines and fermentation systems also offer promise for large and small scale generators, respectively. There are advancements in technology among on-site medium scale in-vessel compost systems that can produce quality compost from food scraps within a few days, while greatly reducing the moisture content and hauling costs.

Based on stakeholder input, the Department will explore several Zero Waste initiatives such as promoting on-site and backyard composting, developing an end-use classification system for compost products and expanding education and outreach efforts to support and expand the region's composting capacity.

10.1 / Residential Home-based Composting and Community Gardens

Wherever possible, the lowest carbon footprint option for residential organic materials is to utilize the organic materials on-site for the improvement of the property owner's soil.

Home Based On-Site Composting

The main barrier to increased adoption of composting systems in the single family segment remains education and awareness. Conventional composting systems are available at local garden centers and even some national retail home and garden stores. The next generation of composting systems has many advantages, but education and training will be required to help assist residents to have a positive experience which will endure and ensure no waste of food scraps.

The Department recognizes that some Home Owners Associations (HOAs) currently ban home-based composting. These association regulations are likely based on the false assumption that home-based composting draw unwelcomed animals or create unsanitary conditions for the neighborhood. The Department will work with HOAs through an education program to encourage proper home-based composting techniques to address these concerns. The Department will also work with applicable departments to establish proper allowances and guidance for home-based composting. If residents remain uncomfortable with composting on-site, other community-based options are available.

Community Gardens

Community gardens are playing an increasing role in the provision of locally grown, nutrient-dense foods. They can also operate as drop off points for on-site composting while at the same time improve a resident's connection to their community. Especially in multi-family settings where tenants have less personal green space for gardening and composting, community gardens provide tenants with an alternative way to manage their food scraps, grow their own vegetables, and increase their access to low cost, healthy food choices.

Several City departments are currently providing support to aide the development of community gardens. The Department will be an active participant in this inter-departmental effort.

Multifamily Residential On-Site Composting

If community gardens are not an option for a multi-family setting, there are other emerging technologies that can facilitate on-site conversion of food scraps into potting soils without the use of yard trimmings. These technologies enable people to manage their food scraps in small spaces such as under kitchen sinks, on balconies and on porches.

Additionally, the majority of multifamily and commercial locations employ

professional yard maintenance companies to maintain their properties. These companies are able to remove yard trimmings from the site. These materials provide an excellent source of high quality carbon for use in centralized composting facilities. Therefore, the Department is interested in ensuring that these materials are composted through local, privately operated composting operations. Yard trimmings from multifamily and commercial locations could also be provided to local community gardens and farmers.

Additional training and education is fundamental to ensure success of any organic collection program. These educational opportunities are described in Chapter 24 / Communications Plan.

10.2 / Composting Education

Consumer knowledge about the benefits and ease of composting is limited. Education campaigns and composting workshops will continue to be essential to the City attaining its Zero Waste goals. The Department's composting education activities will approach different segments of the Austin community and offer different solutions to divert food scraps from the landfill. For example, residents with yards will be encouraged to try backyard composting while tenants without green space will be encouraged to try smaller on-site composting systems that do not require yard trimmings. In each case, the Department will actively promote and encourage all residents to participate in local community gardens.

The Department will also continue to provide composting workshops to the community. As part of the Department's Home Composting Rebate program, current composting workshops are designed to connect education to action by rewarding the Department's customers with a rebate of 75 percent of the cost of their composting system up to \$75. In addition to the composting classes, the Department will provide easy to understand information that compares a variety of composting methods and systems in order to increase a resident's commitment level. The primary objective of the composting education and rebate program will be to educate residents on the various composting solutions available in the marketplace and further promote the benefits of composting. Educating customers about the variety of end use products that result

from composting such as the production of soil amendments and nutrient teas can increase resident enthusiasm to adopt composting.

School education is also essential to increase participation in on-site composting and eventually curbside composting. The school education program will include basic composting education and offer school-based projects to promote composting on school grounds. The Department will work in collaboration with the Austin Independent School District (AISD) to develop a curriculum-based school education program, school-based pilots and demonstrations.

10.3 / Composting Incentives

Beginning in 2010, the Department initiated a composting incentive program. The program offers customers a 75 percent rebate (up to \$75) off the cost of a home composting system if the customer purchases a home composting unit, takes a free composting class offered by the Department, and use or switches to a 32 gallon trash cart. The Department will be expanding this program and will aim to reach at least 10 percent of its customers within 10 years, adding one percent impact each year. In addition, the Department will undertake the following tasks to increase on-site and neighborhood composting:

- Develop a master composter and junior composter certification program;
- Work with area gardening and home improvement stores to offer composting classes that meet the Department's compost education standards;
- Partner with the Austin Climate Protection Program to develop a method for customers to document energy and water savings from composting;
- Partner with nonprofit organizations to support a food to humans collection and redistribution network;
- Encourage local restaurants to compost on-site where possible;
- Partner with the Planning and Development Review Department to consider tiered reduction in impervious cover on new developments in coordination with on-site composting efforts;
- Coordinate with the Watershed Protection Department to include training for xeriscaping into the composting training program;
- Partner with the Watershed Protection Department to encourage HOAs to remove limitations on home-based composting;

- Engage multi-unit complexes to encourage them to develop on-site composting efforts or adopt valet services to pickup composting in addition to trash and recycling;
- Engage in partnerships with restaurants and food processors to support increased food organics diversion; and
- Partner with AISD to support composting pilots and demonstrations on various school properties.

Resources for Composting Incentives

One additional staff position is required to coordinate, promote and market the composting organics program and provide training in neighborhood about on-site composting and xeriscaping. Program costs for this initiative are based on home-based compost bin rebates at \$75 per household and 10 percent participation of approximately 182,000 households at one percent participation growth per year for 10 years.

10.4 / Compost End-Use Classification System

The development of a stronger retail market for compost will ultimately be determined by the public's understanding of compost products and their decision to use compost produced locally. Education and awareness of the role of mulch and compost will be increased in order to support the marketplace for increased supply of compost materials.

Currently, federal and state grading standards for compost are based on contaminant tolerance measurement systems but do not necessarily provide consumers with guidance about the best use for the particular product. A new consumer-based classification system is needed to educate the public regarding best use and application of the various types of compost available.

The Department shall support research and implement an end-use classification system as an advisory to consumers on the most appropriate use for each type of compost, with a goal of increasing local sales of compost to residents. For example, compost for roadside embankments may not be appropriate for food production.

End-use classification should follow the Highest and Best Use principles of Zero Waste. There are several quality end-use classifications that can support the following consumer products:

- Sustainable organic food production
- Home-based food gardens and community gardens
- Farm soil amendments for food production
- Mulch for trail surfaces
- Non-food flower beds and community flower gardens
- Soil water retention and growing medium for landscaping
- Topsoil and turf dressing
- Roadside embankments

This system of positive controls for the quality of organics would provide significant support to compost producers and quality assurance to consumers. Such a system would also support the commercial marketplace by providing export opportunities beyond the Austin area for compost produced from local organics.

To develop and implement a consumer oriented compost end-use classification system, the Department will work closely with local stakeholders such as local farmers, environmental organizations and the City's Sustainable Food Policy Board. Members of these organizations have a wealth of knowledge and a local interest in upgrading soil quality through composting. In addition, the Department will consult with the U.S. Composting Council (USCC), a nonprofit composting organization, regarding a national end-use classification system that measures quality based on end-use and not solely on "tolerable limits" of pollutants.⁵

10.5 / Organics Collection Services

The Department provides collection services for single-family households and some multifamily and commercial customers. Most collection services provided to multifamily and commercial customers are provided by private sector service providers. Through implementation of the Zero Waste initiatives described in this section, 30 percent of organic materials will be directly diverted by the Department and 70 percent of the organic materials will be diverted by nonprofit and private sector service providers.

Role of the City

Because the Department directly controls only a portion of the organic materials generated citywide, the City will have the most impact on increasing diversion of organic materials through new policy drivers. In

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⁵ The USCC provides support for generators of organic residues, compost producers, policy-makers, regulators, professionals and product users for the purposes of advancing the industry. The USCC is involved in research, training, public education, composting and compost standards, expansion of compost markets and the enlistment of public support. More information can be found at: <www.composting-council.org>.

future phases of the URO, the City will require diversion of organic materials by residential and commercial generators and at City offices and facilities. In future phases of the Event Recycling Ordinance, the City will require diversion of organic materials at all special events. In addition, the City will register all organic service providers that haul within the City limits. These policies are further described in Chapter 21 / Policies and Ordinances.

If there is a service void and no private sector service providers are willing or able to provide the organic collection service, the Department will also provide for collection of organic materials from multifamily and commercial generators. Based on input from multifamily and commercial generators as well as private sector service providers, the Department will evaluate whether it will be necessary to expand organics collection beyond the Department's current customer base. If needed, the Department could contract for services for specific generators, such as those located in the Central Business District or for small multifamily complexes that are not able to attract a service provider on the open market. The Department could also expand its operations beyond its current customer base if deemed necessary by the City Council.

The Department will support the work of the nonprofit and private sector service providers through:

- Support a food to humans collection and redistribution network;
- Outreach and commercial technical assistance;
- Pilot programs and incentives; and
- Community-based social marketing initiatives, including, focus groups, customer service surveys, and large-scale education campaigns to change public perception and behavior.

Role of Nonprofit and Private Sector Services Providers

There is a strong and growing private sector infrastructure for organics diversion in Austin. Service providers in Austin have developed expertise in assisting organic generators to manage organic materials internally and segregate organic materials for collection.

Nonprofit and private sector service providers are expected to collect and process organic materials generated by multifamily complexes; commercial establishments such as restaurants, mobile food vendors, and food processors; special events and City facilities requiring Dumpster service.

The Department will look to service providers to:

- Develop compost capacity at large scale composting operations and community or neighborhood scale facilities;
- Provide technical assistance to organics generators; and
- Assist with on-site composting and training.

Department Organics Collection Program

The Department currently provides weekly collection of residential yard trimmings in containers and bags provided by the customers. The material is taken to Hornsby Bend to be combined with by-products from the wastewater treatment operations and composted into Dillo Dirt.™

Dillo Dirt™ is a soil amendment made by AWU since 1989. It was the first program of its kind in the state and one of the oldest in the nation to successfully integrate treated biosolids with other organics in a composting operation. The heat generated during anaerobic digestion and composting (130 to 185 degrees Fahrenheit) is sufficient to virtually eliminate human and plant pathogens. After active composting over a month, the compost is cured for several months, then screened. The finished Dillo Dirt™ meets all Texas and EPA requirements for unrestricted use.

Dillo Dirt™ is beneficial to the Austin region because it is used to enhance local soils, generate jobs, and in FY2011 diverted approximately 6,300 dry tons or 44,100 cubic yards of material that would have otherwise been landfilled. This diversion volume is expected to grow significantly as the City increases its composting operations. Additionally, most of the revenue from sales of Dillo Dirt™ are received by private vendors who sell to the public at retail prices of \$30 to \$35 per cubic yard. Dillo Dirt™ results in sales revenue of an estimated \$1.4M annually for local businesses, in addition to approximately \$400,000 in revenue to the City. Therefore, Dillo Dirt™ offers great benefits to the community and is an integral part of the City's Zero Waste efforts.

Expansion of Department Organics Collection Program

In order to achieve Zero Waste, the Department will explore increasing diversion of organic material beyond yard trimmings and brush. Additions to the yard trimmings program in FY 2015 will include:

- Providing collection carts for yard trimmings and other organics;
- Adding food scraps and compostable paper to the yard trimmings collection program;
- Providing a choice in the size of the containers (64 and 96 gallons);

and

- Expanding organics collection to all Department customers.

The Department will conduct a pilot program to ensure that yard trimmings comingled with food scraps and compostable paper can be adequately composted for end-use markets. The pilot program is needed to test collection efficiency, public acceptance and processing capabilities for the materials generated. The pilot will also gauge contamination issues, such as plastic bags, utensils and other non-organic material unintentionally collected in the carts. In addition, the pilot will include tracking and reporting of tonnages received in the pilot area to compare with the tonnage results on the regular yard trimmings routes to assess additional diversion potential of the food scraps and compostable paper fraction.

The Department will implement a two-year roll-out of the organics collection program to evaluate the staffing and routing requirements needed to fully implement the yard trimmings and food scrap diversion program. Education and outreach materials will be sent to the organic collection customers to describe the program features and the types of organic materials that can be put in the yard trimmings carts. Additional information and tips to make the program more user-friendly and effective will be included as well. For example, customers will be encouraged to keep the yard trimmings cart lid secured during the week to prevent pests, empty kitchen food scrap containers directly into carts or wrap food scraps in newspapers or place them in paper bags if they prefer. These steps help minimize odor and other related challenges. Prior to launching the program citywide, the Department will conduct customer surveys to assess program acceptance and identify customer concerns.

Resources for Organics Collection

Current yard trimmings collection routes include:

- 10 collection routes each day, 5 days per week, weekly collection
- 10 rear-loader trucks with 25 cubic yard capacity each and 2 operators per truck
- 30,000 tons of yard trimmings are collected annually
- Conversion to organics collection (mixed yard trimmings and food scraps) will require:
 - 20 collection routes each day, 5 days per week, weekly collection
 - 20 side-loader trucks with 28 cubic yard capacity each and 1 operator per truck
 - 50,000 tons of yard trimmings and food organics will be collected

in the first year and will increase by up to 80,000 tons of organics collected and processed each year.

Existing staff resources will be used to implement an organics collection pilot. New CNG fueled side-loader collection vehicles will replace retiring diesel rear-loaders. New 64 and 96 gallon wheeled green carts will be distributed to all residential customers for organics collection. The Department will transition its newer rear-loader trucks to the Clean Austin Program for brush and bulk item collection and replace them with side-loader automatic trucks suitable for servicing wheeled carts.

After the pilot program has been implemented, the City will conduct a routing efficiency analysis to determine the appropriate number of routes that will be needed to roll-out organics collection citywide. The City will also determine whether any efficiency could be realized from reducing some of the trash collection routes and converting resources to organics collection.

10.6 / Processing Options

Projected Need for Composting Capacity

Although the Department's additional need for composting capacity is approximately 50,000 to 80,000 tons per year (TPY) over the planning period, the overall citywide capacity needs after the recommended initiatives and ordinances are implemented is well above the estimated capacity needs. This is due to the potential amounts of organic materials generated by the private sector. There is a direct need for 200,000 TPY compost processing capacity to handle commercially generated organics.

Agricultural Based Composting

The goal of expanding compost processing opportunities is to divert food scraps from the landfill to achieve the City of Austin Zero Waste goals. When utilized appropriately, composting provides the added benefit of improving the quality and quantity of food produced locally. Agricultural operators control the lands that produce Austin's local food and are able to convert organics into improved soils for food production. The highest value added opportunity for organics is the production of the highest quality foods.

Traditional Facility Based Composting

The organics collection programs provided through the Department and private sector service providers will generate mixed organic materials that will need to be processed. Currently, the Department works with Hornsby Bend to process its collected yard trimmings. The Department will continue to work with Hornsby Bend for organics processing and continued operations as appropriate, based on the outcome of its pilot program and others to be conducted concurrently. The Department will provide experimental demonstrations of compost processing of food organics at the closed FM812 Landfill.

As of fall 2011, there are two other permitted private entities available to handle these organic materials and process them into a suitable compost material for marketing. According to the facility operators, both facilities have sufficient capacity to meet Austin's short-term needs and have the capability of expanding their operations for the long-term. Two additional composting facilities are being developed by nonprofit and private sector entities. The City will first use existing capacity at City facilities if they are successful in their pilot composting of these materials and use the other permitted existing composting facilities in the area to meet capacity needs.

Hornsby Bend Operations

Approximately 30,000 tons per year (TPY) of yard trimmings and brush are currently delivered for composting at Hornsby Bend. The Department's composting initiative will supply all collections customers with yard trimmings carts and will add food scraps and compostable papers to the current yard trimmings collection program. This could increase the City's program capacity need for collection and processing to over 80,000 TPY by FY 2030.

Based on the importance of the Dillo Dirt™ program to the City's overall Zero Waste goals, it is critical for the Department to work with AWU's Hornsby Bend staff in the following areas:

- Pilot processing of yard trimmings and food scraps;
- Obtain a permit to accept food scraps and compostable paper;
- Develop full-scale processing of yard trimmings and food scraps; and
- Provide public drop-off for brush.

If foods scraps processing is not feasible at Hornsby Bend, the Department will assist in:

- Transition use of commercial brush and clean lumber as a bulking

- agent at Hornsby Bend rather than residential yard trimmings;
- Encourage the use of tree trimmings and other carbon sources from AE contractors and other City departments; and
- Develop a transition plan for Hornsby Bend to utilize a different bulking agent.

10.7 / Food Waste Disposal Units

Over the past year, City staff has been approached by representatives promoting the use of sink-based food waste disposals as a means of avoiding collection of food waste. The systems instead transport food waste through the wastewater system to AWU's anaerobic digesters. The City's Office of Sustainability, in collaboration with AWU and the Department, evaluated the potential added use of food waste disposal units and their impacts on City infrastructure.

After careful study of the issue, and providing a balanced perspective that integrates multiple aspects of it specific to Austin's utility and sustainability perspectives, the City's recommendation was to maintain its existing position on food waste disposals. This means the City does not support the use of food waste disposals in its promotional or educational materials and programs, and would continue its existing ban on commercial disposals. The recommendation rationale evaluated:

- Water quality impact and nutrient loading
- Wastewater infrastructure impacts
- Waste reduction and solid waste infrastructure impacts
- Water and energy conservation impacts

The analysis regarding waste reduction and solid waste infrastructure specifically affected the Department. Proponents of food waste disposal technologies claim that point-of-use disposal units represent an easy and attractive solution to help the City reach its Zero Waste goals. However, this claim is not as simple as it may seem. Food waste that is introduced into the City's wastewater system and re-processed into Dillo Dirt™ is a better alternative compared to sending food waste to the landfill. But, other methods of food scrap management exist which may be more desirable alternatives. In evaluating support for food disposal units, the City considered the following two factors: 1) the City's future plans for food scrap management; and 2) the City's commitment to the Zero Waste

Highest and Best Use Hierarchy, as adopted in the Strategic Plan.

Future Plans for Food Scrap Management via Curbside Compostable Pickup

The Department plans to expand its education efforts to include separation of organics, such as food scraps, from the waste stream. This education effort will support the Department's goal to implement a three cart residential collection system. These carts would be used to collect non-recyclable material to be sent to the landfill (brown cart), recyclable materials (blue cart), and organic materials for composting (green cart).

Hierarchy of Best Use

Food scraps contain valuable nutrients that can be recaptured by using compost as a soil amendment. Composting, in the context of a hierarchy of best use, maximizes the value of food waste. Flushing residential food scraps through an in-sink disposal unit will diminish the value of the final product. The high-value nutrient composition of food scraps, when put into the City's wastewater system, is intermingled with the variety of contaminants and pathogens normally present in sewage. This degradation reduces the value of the organic material, requires additional processing, and truncates the potential end-use of the resulting material.

As previously discussed, the most efficient and sustainable method to manage food waste would be to compost it on the same site where the waste is generated, and then grow more food at the same location using compost as fertilizer. Unfortunately, many large generators of food waste do not have the land or expertise to grow their own food. The next best option is a centralized system of collection and composting of food waste.

In its effort to achieve Zero Waste, the Department will implement a variety of initiatives to ensure a sustainable and comprehensive waste management system for its customers. Additionally, the City is committed to supporting and investing in private sector technologies and services that preserve the value of food scraps, minimize risks to the City's infrastructure, and keep user costs low. In conclusion, the Department continues to support City policy to avoid the use of food waste in-sink disposal units.

10.8 / Sustainable Food Policy Board Recommendations

The Sustainable Food Policy Board (SFPB) provided input to the Master Plan process through a public meeting and in a letter dated December 3, 2010, as well as through a community website discussion posting in July 2011. The Board recommended that the City implement a comprehensive citywide composting program to make organic materials available to:

- Enrich the region's soil
- Strengthen sustainable food production
- Complete the food cycle; and
- Support Austin's Zero Waste initiatives.

In addition, the SFPB recommended a strong education program to support the proposed comprehensive collection program. The SFP Board stated in its letter that the Austin City Council "take action to implement a clear, detailed and timely plan for a city-wide residential, commercial, and institutional composting program that builds on research and planning underway." The SFPB recommended that the Department staff "integrate feedback from sustainable food production stakeholders specifically on the elements of the Master Plan that relate to composting."

The Department acknowledges the SFPB's contributions, and has integrated most of its recommendations into this Master Plan. The Department proposes a comprehensive organics collection program for all single-family homes, as well as offering several programs and incentives for commercial and institutional sites serviced through private sector service providers. In addition, the Department recognizes the need for continuous public education on the procedures to compost, as well as the contributions and value that compost adds to our community.

In the process of developing policies and programs to address organic composting needs, the Department consulted with several interested stakeholders, the composting staff at AW, and additional input from a composting subcommittee of the SFPB.

DRAFT



Chapter 11 / Household Hazardous Waste Collection

Household hazardous waste (HHW) represents about one percent of materials disposed in landfills, yet creates a significant risk to landfill containment and possible environmental contamination. HHW includes leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients such as paints, cleaners, oils, batteries and pesticides that contain potentially hazardous ingredients and require special care when discarded. Nearly all programs for collecting and processing HHW will be provided by (The Department). Some materials, including some pharmaceuticals, batteries, paint and compact fluorescent light bulbs are collected by retailers for diversion or proper disposal.

Hazardous materials generated by commercial businesses are regulated by the U.S. Environmental EPA.¹ Programs for proper handling and manifesting these materials are provided by private sector hazardous material handlers. Large quantities of commercially generated hazardous materials are outside of the scope of the Department's HHW Program. However, the Department would like to provide collection programs for small businesses generating small amounts of hazardous materials, also known as Conditionally Exempt Small Quantity Generators (CESQGs). However, Texas state regulations currently prohibit municipal collection of CESQGs. The Department will seek a change in state regulations to include CESQGs in the HHW program.

The Diversion Facilities Division currently operates an HHW facility and provides door-to-door collection for seniors and disabled residents. The Disposal Facilities Division also supports take-back programs offered by local businesses at 30 locations citywide. The take-back program focuses on batteries and fluorescent lamps. Additions to HHW collection will include:

- Expanding retail take-back partnerships;
 - Asking retailers that sell paint, fluorescent lamps, batteries, motor oil and other materials to voluntarily take back materials;
 - Providing collection for the voluntary program in order to identify the cost of services and transition to producer responsibility; and
 - Identifying take-back retailer partners on the Department's website.

- Providing rechargeable battery collection sites;
- Piloting a door-to-door HHW collection for all customers;
- Adding two new staff to increase hours of operation at the HHW;
- Expansion of HHW operations footprint to create more on-site capacity; and
- Advocating for CESQGs to be included in the HHW program.

11.1 / HHW Facility Operations

The Department's HHW program services residents of Austin and Travis County. The purpose of the HHW program is to provide proper disposal and technical assistance to residents in order to ensure environmentally safe removal of hazardous materials from the waste stream. Residents can bring their leftover household hazardous products to the HHW Facility and safely dispose of or recycle them. HHW programs provide an avenue for the community to reduce the environmental and health hazards associated with hazardous wastes, pollutants, and contaminants which enhance the quality of air, land and water.²

The HHW Facility is located in south Austin and occupies approximately one half acre. The HHW Facility includes a large service pad, a 2,500-square-foot office building, a 100 foot by 50 foot canopy, a small decontamination/shower building, and portable storage sheds and outbuildings. The HHW Program collected approximately 1,043,000 pounds of HHW in FY 2010.

Drop off hours at the HHW are Tuesday and Wednesday between 10 a.m. - 6 p.m. and the first Saturday of each month between 7 a.m. and noon.

Items collected at the HHW include:

- Fluorescent light bulbs
- Batteries (car and household)
- Cell Phones
- Household cleaning products
- Automotive products including oil filters
- Paint and thinners
- Pesticides and herbicides
- Photographic chemicals
- Aerosol Cans
- Pool chemicals
- Cooking Oil

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¹ National Resource Conservation and Recovery Act of 1976. Title 40. Subtitle C - Solid Waste (Non-Hazardous). Web. Sept 19 2011.

² The legal mandates for this activity are as follows: Texas Constitution Article XI, section 5; City Code Chapter 15-6-1 and 15-6-47; National Pollutant Discharge Elimination System (NPDES) and Texas Pollutant Discharge Elimination System (TPDES) permits; and Texas Administrative Code 30 TAC 335 Subchapter N.

- BBQ and camping propane cylinders

Items NOT accepted through the HHW Program include:

- Radioactive materials
- Syringes or medical waste
- Tires
- Electronics including computers or other appliances
- Compressed gas cylinders
- Explosive materials (including ammunition)
- Any waste generated by a business

Trained staff properly sort, handle and organize the materials dropped off by citizens. Latex paint is reblended and offered to the public for free. Other items such as cleaners, paint, gardening products, along with other usable household supplies are offered free to the public through the program's reuse store. Staff also provide hazardous waste technical advice and home pickup for the disabled and elderly. The HHW Program has 7.5 full time employees (FTEs) for FY 2011. Staff are required to take specialized Hazardous Waste Operations and Emergency Response (HAZWOPER) training for handling HHW, with an 8 hour annual refresher course. The current FY 2011 operating budget is approximately \$825,000 annually.

Several new Zero Waste initiatives will impact the current HHW facility. A small portion (approximately 250 square feet) of the existing Materials Recovery/Transfer Station (MRF/TS) will be used for additional storage and paint mixing with no extra expenses. Since residents identified the hours of operations as a barrier to participation, the HHW Facility will expand its operating hours to include every Saturday, beginning October 1, 2011. The program will also hire two new staff members to properly staff the facility and provide customer service. The amount of HHW collected and disposed is expected to increase by about 12.5 percent in one year due to the expansion of service days.

Projected Additional Needs for HHW Facility

Both of the HHW facility initiatives discussed above will be completed and operational by the end of FY 2011.

11.2 / Austin ReBlend Paint

Up to 55 percent of the materials collected annually by the HHW is unused paint. Approximately 60 percent of this unused paint is latex paint. HHW staff reblend the majority of the paint collected to create a product called Austin ReBlend. Austin ReBlend is a 100 percent post-consumer, low VOC, reblended latex paint made from paint collected at the HHW. The paint is inspected before it is chosen to be used in Austin ReBlend. It is then consolidated, blended, filtered and packed on-site by trained personnel to ensure a quality product.

In FY 2010 the HHW Facility collected over 300,000 pounds or about 30,000 gallons of unused latex paint. Most recently, from July 2010 through February 2011, the program reblended approximately 5,200 gallons or about 52,000 pounds of paint for reuse. About 284 participants received the paint.

Austin ReBlend paint is available in five gallon and two gallon containers and in two colors: Texas Limestone (off white) and Balcones Canyonland (dark beige). Austin ReBlend is available at no cost to other City departments and for residential and nonprofit use.

Austin ReBlend is a sustainable choice for paint for the following reasons:

- Helps keep paint out of landfills
- Conserves water used to make new paint
- Prevents pollution from the mining and extraction of raw materials
- Moves Austin further toward its Zero Waste goal

11.3 / Door-to-Door Collection

The HHW Collections program will conduct a pilot program for two years to assess whether door-to-door HHW collection is feasible for citywide application. The pilot program is needed to test collection scheduling and set-out requirements. The pilot area will be comprised of residential customers in both the southern and northern portion of the City where access to the City's HHW facility is limited by distance. Door-to-door collection of electronics will be offered through both the on-call bulk item collection pilot and the door-to-door household hazardous waste collection pilot. Costs and participation for the two approaches will be evaluated for cost-effectiveness.

11.4 / Retail Take-Back Collection Program

The HHW Collections program will expand its retail take-back collection program and request retailers that sell paint, fluorescent lamps, batteries, motor oil and other materials to take back materials for collection by City crews. Participating retailers will be identified on the City's website and other educational materials. This voluntary collection program will help identify the cost of services for a full citywide retail take-back program as a transition to producer responsibility.

The HHW Collections program will also expand its rechargeable battery collection sites, partnering with a nationally recognized organization on battery recycling for an education campaign to encourage residents to use and recycle rechargeable batteries.

11.5 / Conditionally Exempt Small Quantity Generators (CESQGs)

As mentioned above, current state regulations do not allow the City to accept hazardous waste from commercial generators. CESQGs are defined in the Code of Federal Regulations (CFR) as commercial businesses that generate less than 220 pounds per month of hazardous waste. These businesses are exempt from the reporting required of large quantity generators. However, the hazardous waste must be delivered to an offsite treatment, storage and disposal facility located in the U.S. that is "permitted, licensed, or registered by a state to manage municipal or industrial solid waste."³ Due to these expensive and cumbersome barriers, some businesses dispose of their hazardous waste in the general trash collection. To help increase environmental service to the local community, the Department will advocate for CESQGs to be included in the HHW program.

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³ 40 CFR §261.5 (f)(3). 1970.
 Web. 19 Sept 2011.

11.6 / North HHW Collection Center

The Department is exploring creating a North HHW Collection Center to increase service convenience to the residents residing north of Ladybird Lake. There is an identified need for a center in the north area to decrease costs for transport, decrease greenhouse gases and add needed capacity for its employees and equipment. The Department will develop, finance and operate its own north HHW Facility. The north HHW Facility could be co-located with a north service center if the Department proceeds with plans to split a portion of its operations between a south and a north service centers for routing efficiencies and decreased greenhouse gas impacts. An architectural feasibility study is underway to determine the cost and affordability of this service expansion. (Additional details on the space feasibility study is noted in Chapter 8)

11.7 / Hazard Waste Reduction

A cost-effective measure to reducing the impact of HHW is to promote waste avoidance within our community. The Department will engage in a community outreach campaign on methods to reduce use of unnecessary HHWs and transition to alternative, less toxic products. The goal of this education campaign is to reduce the demand for costly HHW disposal methods and reduce the potential for environmental or health hazards associated with hazardous wastes, pollutants, or contaminants. The Department will also initiate state and local legislation to reduce the volume and toxicity of discarded materials through Extended Producer Responsibility.

For HHW material collected through the program, the Department remains committed to recycling or reusing chemicals and household products as a means of supporting its diversion activities and achieving the City's Zero Waste goals.

New Policies: HHW Collection

Several of the policies included in Chapter 21 will affect the diversion and proper disposal of HHW through Product Stewardship. The City has a major opportunity to reduce the volume and toxicity of discarded materials through Extended Producer Responsibility (EPR). EPR initiatives call for the City to take an active role in advocating for legislation requiring product manufacturers, retail establishments, wholesale distributors and other

appropriate entities to take back certain products or packaging that currently are difficult to recycle or harmful to dispose. The Department is actively engaged with the Texas Product Stewardship Council (TxPSC) and will provide additional staff resources to that organization to increase its effectiveness. EPR initiatives are most effective at the state level, but the City could also initiate local legislation, if statewide efforts do not succeed.

In Chapter 21 / Policies and Ordinances of this Master Plan, EPR policies are outlined to handle HHW. These policies will shift responsibility from the City to producers, brand-owners and retailers, depending on the product, to take-back products and packaging at local stores or by sending them back to the producer.

New Programs: Household Hazardous Waste Collection

The Department will provide the following programs to divert or properly dispose of HHW:

- Expanding the HHW retail take-back program from 30 to 100 retail locations;
- Expanding door-to-door collection of HHW to all residents – currently provided only to seniors and disabled residents

New Infrastructure: Household Hazardous Waste Collection

The Department will plan, construct and operate a North Household Hazardous Waste Collection Facility in response to:

- Demand from north Austin and Travis County residents who refrain from safely or illegally disposing of their HHW due to their distance from the south HHW location;
- Interest from neighboring communities seeking partnerships with Austin to manage HHW from their residents; and
- Increased volume of HHW materials from area residents proportional to the City's population growth

Resources for Household Hazardous Waste Collection Implementation

Five new staff will be needed to implement the new HHW collection programs; two positions are needed for the retail take-back collection program and three positions are needed for the on-call door-to-door collection program. Additional equipment will be needed to expand both programs. Funding to construct and operate a North HHW Collection Facility is necessary.

Performance Trends for Household Hazardous Waste Program

Measure	FY 2008 Actual Totals	FY 2009 Actual Totals	FY 2010 Actual Totals
Total lbs. of materials received through the HHW facility	1,039,918	909,088	1,042,993
Total lbs. of materials reused or recycled through the HHW	236,161	227,047	263,689
Number of customers utilizing the HHW facility's drop off service	12,327	12,155	13,035
Average lbs. per household	84.36	74.49	80.01
Number of home pickups	New measure	New measure	67

TABLE 6



Chapter 12 / Disposal Management

The Austin City Council endorsed Zero Waste as a significant goal for the City. In doing so, the City Council acknowledged that disposing of waste is not inevitable. The term Zero Waste means reducing the generation of discarded materials at the source and maximizing diversion methods to avoid landfills and incinerators. The overall goal is to strive for no waste burned or buried.

The City Council has established three major benchmark goals for achieving Zero Waste:

- Reducing by 20 percent the per capita solid waste disposed to landfills by FY 2012,
- Diverting 75 percent of solid waste from landfills and incinerators by FY 2020, and
- Diverting 90 percent of solid waste from landfills and incinerators by FY 2040.

This timeline implies disposal management needs for the foreseeable future. Although disposal will aggressively decrease as new diversion programs are deployed, there is still a need to plan for the community's needs for disposal of non-reused, non-recycled and non-composted material.

12.1 / City Landfill Management

The City's closed landfill is located at 10108 FM 812 in the City of Austin. The landfill is approximately 360 acres in size and is under 30-year post-closure care within the EPA Subtitle D requirements for landfill site care and maintenance.¹

With the closure of the FM 812 Landfill, the TCEQ requires that specific closure requirements be maintained during the 30 year closure period. This activity helps ensure that the closed landfill remains environmentally secure and that no adverse impact occurs from municipal solid waste, methane or leachate.

The 30-year post-closure requirements include:

- Maintaining the right of entry and rights of way
- Maintaining leachate collection system
- Maintaining methane collection system
- Conducting periodic maintenance to ensure integrity and effectiveness of final cover, fill area liner, facility vegetation and drainage control systems.

The Department staff will correct issues related to settlement and subsidence, ponded water and erosion as they occur.

12.2 / City Landfill Repurposing

The closure of the FM 812 landfill presents a potential for site reuse opportunities. As the site is owned by the City, it is in the best interest of the citizens to create a beneficial reuse of the landfill and its resources, while responsibly managing the closed waste cells in collaboration with the EPA and TCEQ.

Methane Gas Capture

Landfill gas is the natural byproduct of the decomposition of solid waste in landfills and is comprised primarily of carbon dioxide and methane, which is then combusted to generate electricity or converted into a variety of green alternative fuels. By preventing emissions of methane, which is a powerful GHG, landfill gas energy projects help communities protect the environment and build a sustainable future.

The benefits of capturing fugitive gases from the closed FM 812 landfill and producing energy or green fuel include:

- **Reduced GHG Emissions from Existing Landfills** – Landfills are the second largest source of methane emissions in the nation, capturing and destroying methane with landfill gas technologies can substantially reduce the amount of methane emitted to the atmosphere. In addition, almost all the carbon dioxide will be sequestered and converted to useful green products.
- **Avoid Release of Other Harmful Pollutants from Landfills** – Emissions of pollutants such as mercury, lead, and particulate matter are reduced as the result of applying landfill gas and waste-to-energy technologies.
- **Generate Revenue for Municipality** – By converting waste and landfill gas to energy, municipalities can both save money on energy bills, and generate revenues from power sales of renewable energy certificates or potential carbon credits.

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¹ National Resource Conservation and Recovery Act of 1976. Title 40. Subtitle D. Web. Sept 19 2011.

The Department is planning to install a landfill gas-to-energy system to beneficially use the methane generated for production of electricity or vehicle fuels. Utilization of landfill-generated methane may prove to be beneficial including heating of eco-industrial park-related structures, conversion of methane gas into electricity via gas turbine or other emerging technology mechanisms.

New Resources: Methane Gas Recovery

No additional staff is needed to research and install a landfill gas recovery system. A project manager has been assigned to this project. Financial resources are needed to purchase equipment and contract for the installation and maintenance of the system. Depending on the technology chosen, the developer may provide the financing at no cost, including a revenue share back to the City.

Solar Farm

The Department's FM 812 Landfill site is now closed. One beneficial use of this property would be construction of a solar farm on the capped landfill surface after the landfill has been stabilized. The site would be used to generate renewable solar energy through a solar photovoltaic system that converts solar energy to electricity. An estimated 20 mega-watts can be generated from this proposed 160-acre solar farm.

The Department, working cooperatively with AE, will research the placement of a large solar array. Grants may be available to partially finance capital costs. The solar farm development will not require any new facility space needs, as it will be used to cover the existing landfill. The solar farm is projected to be in service by FY 2015.

Eco-Industrial Park

The Department's closed FM 812 Landfill, located at 10108 FM 812 in the City of Austin, is approximately 360 acres in size, and under 30-year post-closure care within the EPA Subtitle D requirements for landfill site care and maintenance.² The Department will redevelop the 80 acres of FM812 frontage as buildable land for the construction of an Eco-Industrial Park.

An Eco-Industrial Park is an industrial system of production facilities that conserves natural and economic resources, reduces energy and water usage, and provides opportunities for reuse or recycling of wasted materials. The Department Eco-Industrial Park is planned, designed and built to support businesses that can consume collected recyclables as feedstock

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² National Resource Conservation and Recovery Act of 1976. Title 40. Subtitle D – Solid Waste (Non-Hazardous). Web. 19 Sept 2011

for new product manufacturing. An example is a glass reprocessing plant that can clean and color sort single-stream mixed glass for resale to a glass manufacturer. Other examples include a tire shredding plant, a plastic extruding plant, and a reusable bag manufacturer. Eco-Industrial Parks are discussed more in detail in Chapter 9 / Materials Management.

The planned solar array at the closed landfill site will assist in green electric power needs of the Eco-Industrial Park. The Department will offer the buildable land area at the FM 812 closed landfill for economic redevelopment, in collaboration with the EGRSO.

12.3 / Disposal Capacity Needs

Preparing for the closure of the FM 812 Landfill, the Department foresaw the need to contract for the long-term disposal needs of city residents. The Department committed to a 30-year disposal contract from May 2000 through May 2030. As the Department deploys new diversion programs to meet the Zero Waste goals of the City, a declining amount of waste is expected to be landfilled annually.

Given that the landfiling contract expires at the 2030 goal year targeting a 90% diversion rate, there is no need to prepare for additional disposal capacity at this time. The City will re-evaluate its disposal needs beyond 2030 based on the FY 2025 citywide diversion assessments.

12.4 / Alternative Disposal Options

Almost all waste left after recycling and composting, also known as residual waste, in the U.S. has been landfilled untreated. Alternatives to landfill disposal are now available to local jurisdictions, including converting disposed waste into green energy technologies.

Based on AE's efforts to invest in sustainable energy generation options and the Department's efforts to achieve Zero Waste, the Directors from both departments discussed and agreed to develop a method that would evaluate proposed technologies using the Highest and Best Use Hierarchy, impact to climate change and cost.

Climate Impacts of Disposal Technologies

The City's goal is to pursue sustainable practices and reduce the effects of climate change. The Department manages its disposal stream through traditional landfilling. As landfills are a major source of GHG, particularly methane, it is in the best interest of the Department and the City to explore alternative measures of disposal.

Neither landfills nor combustion incinerators are an appropriate response to the challenge of implementing Zero Waste strategies. As the Department explores alternative disposal technologies, combustion is not an option. Instead, the principles of Zero Waste require reducing GHG emissions and other environmental impacts. The Department will not consider such claims of clean energy production unless the technology can provide direct evidence that it has less impact on the environment than traditional landfilling.

Alternative Disposal Technologies

The term alternative disposal technology is all-inclusive of numerous processes. A subset of these processing facility types is called "conversion technology," a term used to describe new and emerging non-combustion thermal, chemical and biological technologies.

The Department is a participant in a life-cycle analysis study through the Department of Civil Engineering, Center for Sustainable Infrastructure Systems at the University of Colorado Denver. This study will provide an environmental and economic comparison of conventional landfilling with alternative conversion technologies. The major measuring stick is GHG reductions. The study will also offer additional means to measure environmental impacts through a systems analysis of each disposal method. The University study is expected to be completed by the end of 2011.

As the University of Colorado life-cycle analysis compares alternative disposal technologies, the Department will research the need and potential for diversion from traditional landfilling. The study will also offer additional means to measure environmental impacts, through a systems analysis of each disposal method.

Conversion technologies offer a new approach in reducing the amount of solid waste disposed at landfills. Conversion technologies are a group of technologies that convert the organic or carbon-based portion of post-recycling residual solid waste into useful products. These products

in turn can be used to produce electricity, green fuels, and/or marketable chemicals and fertilizers. Specific examples of technologies that might meet the GHG reduction requirement include thermal conversion processes and biochemical conversion processes.

Thermal Conversion - Direct Combustion

Direct combustion is the complete oxidation of a fuel at high temperatures under controlled conditions yielding substantial net energy release. Temperatures in the combustion zone of the units are generally in the range of 1500° to 3000°F. The direct combustion process results in the production of hot gases, specifically, carbon dioxide, water vapor, heat and a solid residue (ash). In most modern municipal solid waste-fueled direct combustion systems, the heat energy of the combustion gases is recovered in a steam boiler. Energy in the steam is then used for heating, producing electricity using a turbine generator, or both.

The City will not classify or consider any direct thermal combustion technologies as a Zero Waste preferred method of management because the principle goal of Zero Waste is to divert material away from burying (landfilling) and burning (combustion).

Thermal Conversion – Non-Combustion

These technologies are characterized by higher temperatures (higher than 400°F) to process residual solid waste and produce energy products. The quality and quantity of these products depend on type and design of conversion systems, and feedstock composition. Primary end products include electricity, “green” synthetic fuels, and soil amendments. Other byproducts, such as carbon char, chemicals, inert material and recyclable material, may also be produced in small quantities. The type, quantity and quality of these byproducts depend on the type and design of the conversion systems, type and quality of preprocessing. Types of non-combustion thermal conversion technologies include pyrolysis, pyrolysis/gasification, pyrolysis/steam reforming, conventional gasification (fixed bed and fluid bed), plasma gasification, and thermal depolymerization.

Thermal Conversion - Pyrolysis

Pyrolysis is a process whereby organic matter is converted to gaseous, liquid, and solid fuels under high temperatures (700° to 1500°F) in the absence of oxygen. Pyrolysis can use a variety of feedstocks to produce syngas (synthetic gas or syngas? Keep consistent) or biofuels. Pyrolysis process is relatively insensitive to its input material and can accept

municipal solid waste, sludge, tires, biomass, medical waste, cow manure, sugar canes, and numerous other products. Pyrolysis is similar to the gasification process, but pyrolysis generally occurs at lower temperatures due to absence oxygen. Essentially, the feedstock materials are “cooked” in an oven, with no air or oxygen present. No direct burning takes place.

Similar to the case of thermal gasification, the pyrolysis process can be designed to optimize the production of gases or liquids. Pyrolysis produces gases, biofuel and residual solids, including ash, carbon char and activated carbon for absorption of liquid and gaseous emissions. Syngas can be used as fuel in gas turbines, if the gas is adequately cleaned. The syngas can be further processed to produce biofuel products. The liquid byproducts generated during the pyrolysis process, known as pyrolytic oils, can be refined for other uses such as in the manufacturing of lubricating oils and chemicals. Char produced as a result of pyrolysis would require further processing to meet specifications for marketable commodities.

Pyrolysis of municipal solid waste may be considered by the Department in the future, only if it is economical, and the resulting GHGs are reduced from the baseline comparison to landfilling. If pyrolysis meets these environmental standards, the Department could utilize the generated electricity to power the proposed eco-industrial park at the FM 812 Landfill.

Pyrolysis/Steam Reforming

Since pyrolysis results in the formation of char, liquids and gases, additional reactions can be initiated to further the thermal breakdown of these organic compounds. One of the common reactions to follow pyrolysis is steam reforming. The water-gas reaction is used to promote the reaction of carbon and water to form syngas. In addition, steam reforming of the methane in the syngas stream can occur, resulting in additional production of hydrogen, which in turn produces a syngas that has more BTU (British Thermal Unit; a measure of heat output). The syngas stream is then cooled, cleaned, and used for power generation or chemical production.

Pyrolysis through steam reforming may be considered by the Department in the future, only if it is economical, and the resulting GHGs are reduced from the baseline comparison to landfilling. If pyrolysis meets these environmental standards, the Department could utilize the generated electricity to power the proposed eco-industrial park at the FM 812 Landfill.

Thermal Conversion – Gasification

Gasification is thermal decomposition of material in the presence of a limited amount of air or oxygen. This process will reduce the BTU heat value of the syngas in addition to producing a considerable amount of carbon dioxide. Conventional gasification involves the partial oxidation of carbon-based feedstock to generate a syngas, which can be used as a fuel or for the production of chemicals. Feed-stocks appropriate for gasification include coal, wood and organic materials in municipal solid waste. The process has the ability to tolerate very low-quality feed-stocks.

Partial oxidation is carried out by using less air than required for complete combustion of the fuel (i.e., sub-stoichiometric air), or by indirectly heating the organic matter. Temperatures range from 1400° to 3000°F. Utilizing that heat, the organic compounds in the feedstock begin to thermally degrade, forming the pyrolysis gases, oils, liquids and char.

The gas that is produced is known as synthesis gas, syngas, or producer gas. Syngas consists primarily of carbon monoxide, hydrogen, methane and other hydrocarbons, as well as carbon dioxide and nitrogen in some gasification processes. Gasification processes may also result in the production of liquids and solids as byproducts. The gasification process can theoretically be designed to optimize the production of gases or liquids. Syngas can be used as fuel in boilers or, if cleaned up, in internal combustion units. Furthermore, gasification products theoretically can be used to produce chemicals such as methanol and liquid fuels.

Some technologies employ a pyrolysis/gasification system. The carbon char produced in the pyrolysis or “degassing” chamber is pushed through into the gasification chamber, where the char and any pyrolysis liquids are gasified by way of additional reactions in a gasification chamber. While the pyrolysis reactor operates without free oxygen, the gasification reactor may use air, oxygen, and/or steam to provide the oxygen needed for the gasification reactions. The gasification reactions are mostly exothermic, so that once the reactions initiate, they are self-sustaining. Thermal gasification of municipal solid waste may be considered by the Department in the future, only if it is economical, and the resulting GHGs are reduced from the baseline comparison to landfilling. If gasification meets these environmental standards, the Department could fuel its vehicles with liquid fuels generated from this process, creating a closed loop to further reduce GHG generation.

Thermal Conversion - Plasma Arc Gasification

Plasma arc gasification is new to the field of municipal solid waste processing as a form of thermal gasification. Plasma is a hot ionized gas resulting from an electrical discharge. Plasma technology uses an electrical discharge to heat a gas, typically air, oxygen, nitrogen, hydrogen or argon, or combinations of these gases, to temperatures above 7000°F. Plasma gasification typically occurs in a closed, pressurized reactor. The feedstock enters the reactor, where it comes into contact with the hot plasma gas.

Through plasma arc gasification, the organic materials in the waste are broken down into basic compounds, while the inorganic materials form a liquid slag. Generally, a municipal solid waste feedstock is processed prior to plasma arc gasification to remove bulky and other undesirable materials. The syngas can be combusted and the heat recovered in a waste heat boiler. After conditioning, the syngas is combusted in an engine or gas turbine producing electricity. The remaining ash material forms a brittle slag that, when cooled, is an inert (non-hazardous) granular material that may have use as a construction aggregate or road base. Plasma arc gasification of municipal solid waste may be considered by the Department in the future, only if it is economical, and the resulting GHGs are reduced from the baseline comparison to landfilling. If plasma-arc gasification meets these environmental standards, the Department could utilize the generated electricity to power the proposed eco-industrial park at the FM 812 Landfill.

Thermal Conversion - Thermal and Catalytic Depolymerization

The depolymerization, or cracking, process theoretically converts polymers in plastic and other synthetic-fiber compounds of the waste stream into products such as diesel and gasoline. Typical feedstocks mentioned for catalytic depolymerization are waste oils, grease and offal (i.e., processed animal soft tissue). Pressure and heat are used to decompose long chain polymers composed of hydrogen, oxygen and carbon into short chains of petroleum hydrocarbons. This process is somewhat similar to that used at an oil refinery to convert crude oil into usable products.

There are two depolymerization methods that can be used to convert organic materials into fuel: thermal and catalytic. In the thermal depolymerization process, high temperatures (temperature ranges from 1000° to 1400°F) and high pressures are used to crack the large hydrocarbon molecules. The catalytic depolymerization process uses lower temperatures (500° to 700°F) and lower pressures than in the case of thermal depolymerization.

Depolymerization of municipal solid waste may be considered by the Department in the future, only if it is economical, and the resulting GHGs are reduced from the baseline comparison to landfilling. If depolymerization meets these environmental standards, the Department could fuel its vehicles with liquid fuels generated from this process, creating a closed loop to further reduce GHG generation.

Biological/Chemical Conversion Technologies

Biological and chemical conversion technologies are focused on the conversion of organics in Materials Recovery Facility (MRF) residues. The MRF residue consists of dry matter and moisture. The dry matter further consists of carbon-based organics and minerals. Biological technologies can only convert biodegradables, while chemical processes can potentially convert any organics, including plastics. Types of biological and chemical conversion technologies include anaerobic digestion, aerobic digestion, catalytic cracking of plastic, and syngas to ethanol.

Biochemical Conversion - Anaerobic Digestion

Anaerobic digestion can be considered both a biological conversion technology and a composting technology because it makes use of the compostable residue. As a composting technology processing a source-separated municipal solid waste, the anaerobic digestion facility would qualify as a diversion activity.

In anaerobic digestion, biodegradable material is converted by a series of bacteria groups into methane and carbon dioxide. The typical anaerobic digestion process is one in which the organic matter found in the waste stream is converted in an aqueous environment in the absence of oxygen into a combustible gas.

Potential waste-derived organic feedstocks are municipal solid waste-derived organics, wastewater treatment plant biosolids, manure and food waste. Anaerobic digestion can take place in one or two phases. Typically, anaerobic digestion is a two-phase process in which the first phase blends into the second one without a noticeable interruption. These two phases are known as the “acid phase” and the “methane-producing phase.”

Anaerobic digestion generates a larger percentage of residue, and therefore has a lower diversion rate. The end products of anaerobic digestion are biogas, compost, and a solid or liquid residue. The biogas consists primarily of methane (60 to 70 percent by volume), carbon

dioxide (29 to 39 percent), and trace amounts of hydrogen, hydrogen sulfide and other gases.

Anaerobic digestion will not be considered by the Department as a primary means to process food-scrap, as this process is a low end-use of food scrap and other organics. Direct composting of food waste is being explored as a higher end-use than anaerobic digestion.

Chemical Conversion - Hydrolysis

Hydrolysis is a chemical reaction in which organic matter is converted to glucose or other simple sugars that can then be fermented or digested to produce other products or chemicals. Sugar and starch can be easily fermented to ethanol. Some of the products are conventional fuels (e.g., ethanol), which can be burned in energy conversion devices such as heaters and engines. Materials appropriate for chemical hydrolysis include wood and organic materials derived from municipal solid waste. In processes used to chemically hydrolyze municipal solid waste, an acid or enzyme is employed to break down the complex structures of the cellulosic materials contained in municipal solid waste, (e.g., paper, food waste, and yard waste) into simpler compounds (i.e., primarily sugars). Microorganisms can then easily ferment the sugars under appropriately controlled conditions into ethanol, or convert them in an anaerobic digestion system into methane-rich biogas.

Hydrolysis of municipal solid waste will not be considered by the Department, as there are higher end-uses of paper, food scraps and yard trimmings.

Aerobic Digestion

The aerobic digestion process applies mainly to food waste, agricultural waste and sewage biosolids. The waste material is homogenized into a slurry, which is mixed with air in a bioreactor. Aerobic microorganisms in this reactor oxidize the easily biodegradable material, just like in an aerobic compost pile, producing substantial heat. The heat and retention time are enough to pasteurize the material, which is processed into several liquid and solid fertilizers. Note that this process differs from anaerobic digestion in that no fuel is produced.

The Department will not prioritize aerobic digestion technologies for food scrap management because there are other food scrap management options that are higher on the best use hierarchy.

Steam Injection Bio Reactor

This technology is scalable from 500 to 1500+ tons per day of biomass organic materials. It utilizes a Steam Injection Biomass Reactor to process the organic waste and produce biogas. The steam injection process produces 12,000 cubic feet of biogas per ton of organic waste and usually has lower operational cost than anaerobic digestion. This gas can be used to generate electrical power, natural gas or crude oil products for resale. The technology is environmentally friendly and does not require air quality permits. It does not burn or incinerate the waste material, rather it digests the materials enhanced by the steam for increased output. Steam Injection Bio Reactor through Landfill Remediation and Landfill Gas Recovery.

The steam injection landfill gas recovery process is a new method of maintaining closed landfills. Specifically, this form of landfill remediation utilizes a method of injecting steam into a landfill to accelerate the decomposition and biodegradation of organic refuse within the trash prism. This process increases the production of methane gas and increases the rate of settlement of the landfill. Raising the steam temperature within the landfill can melt the plastic components of the refuse, further increasing the rate of settlement of the landfill.

In general, landfills are constructed using the “dry tomb” method, in which the refuse in the landfill is kept as dry as possible both during construction and when the landfill is closed and capped. This method minimizes the possibility of leachate leaking into groundwater and contaminating it. However, dry conditions are not conducive to the decomposition of the organic refuse. Instead, the organic refuse remains dormant for decades until water infiltrates the landfill in an uncontrolled process. The water infiltration may cause uncontained gas migration and can also lead to groundwater contamination.

Addition of highly-controlled steam moisture to the trash prism increases the purity of methane extracted from the landfill, because the proportion of decomposing organic refuse to decomposing inorganic refuse is higher as compared to a dry trash prism. The extracted methane is thus more useful because it has a higher BTU heat value. The steam injected bio reactor process injects steam into a landfill and collects the methane produced by the decomposition and biodegradation of the organic component of the trash prism. The temperature and pressure of the injected steam are raised to a level sufficient to melt the plastic component of the trash prism, thereby promoting further settlement of the landfill.

Steam injection landfill gas recovery may be considered by the Department in the future, only if it is economical, and the resulting methane gases are captured more efficiently than traditional landfill gas capture systems. If steam injection landfill gas recovery meets higher environmental standards, the Department could utilize the generated methane to fuel its vehicles, creating a closed loop to further reduce GHG generation.

Highest and Best Use Hierarchy

While the proposed technologies are newer forms of managing materials planned for disposal, they are also classified at the bottom of the Highest and Best Use Hierarchy, because they create a market for waste rather than attempt to reduce and recycle the material up front. The overall goal of the City is to strive for no waste burned or buried. These technologies may institutionalize waste, by making waste a “commodity” feedstock for the energy production industry. By contrast, waste reduction, traditional recycling and composting are producing known, current, quantifiable net energy savings and reductions in GHGs, at significantly lower cost and with greater local job creation.

While some of these waste-to-energy technologies may appeal to the goals and values of some communities, they also distract communities from instituting Zero Waste systems that are highest on the Highest and Best Use Hierarchy. The Department is committed to focusing on technologies that prioritize recycling and composting over combustion and landfilling. This commitment requires careful evaluation of new technologies to ensure that the technology can be ranked higher on the Highest and Best Use Hierarchy in order to obtain financial and feedstock support from the Department.

Projected Diversion and Disposal Needs by Goal Year

City of Austin Waste Collection (includes only City-hauled tons)	FY 2010 (Base)	FY 2015	FY 2020	FY 2025	FY 2030
City-Hauled Diversion Rate	36.20%	50.00%	75.00%	85.00%	90.00%
City-Hauled Waste Generation	228,117	250,000	275,000	300,000	325,000
Total City-Hauled Diversion Reuse, Recycling, Composting, HHW	82,440	125,000	206,250	255,000	292,500
City-Hauled Waste Disposal (projected)	145,677	125,000	68,750	45,000	32,500

TABLE 7

Initiative	Date of Initiation
Research and install gas recovery system	FY 2013
Research and install solar farm over landfill area	FY 2013
Design and Develop Eco-Industrial Park	FY 2013
Research Alternative Disposal Opportunities	FY 2012

Operational Expenses	First Year Costs FY 2013
1.0 FTE in FY 2013	\$86,000
One Time Expense: Self-funded through private/public partnership	\$0
Annual Recurring Expenses: Self-funded through energy sales	\$0
Annual CIP Debt Payment: None	\$0
Total First Year Operational Expenses	\$86,000

TABLE 8



Chapter 13 / Other Core Business Services

Other core services are provided by the Litter Abatement Division and include: Litter Control, Alley/Street Flushing, Street/Boulevard Sweeping, Dead Animal Collection, Brush Collection, and Bulk Collection.

These core services and programs create a cleaner community for Austin residents and an improved quality of life. Most of these services are provided to the community at large seven days per week, 364 days per year. The Department's customer base is larger than the curbside collection program due to the litter abatement services provided in Austin's jurisdiction, as well as the options provided to and chosen by annexed communities. In FY 2011, these programs operated with 93 employees, a total fleet of 104 vehicles, and an annual operating budget of \$9,200,000.

As the City of Austin grows in population, supports the development of new technologies and attracts a variety of industries, there is an increased need for the Department to analyze and improve these core services to meet the growing needs of the community and the City's Zero Waste goals. This analysis will allow the Department to:

- Enhance and improve existing customer service levels;
- Create new diversion activities to support Zero Waste goals and initiatives;
- Implement program changes to accommodate projected city population growth; and
- Incorporate program efficiencies to improve fiscal responsibility.

New Zero Waste initiatives that will be implemented by the Litter Abatement Division include:

- Exploring new proactive measures to prevent litter
- Placing and servicing recycling containers adjacent to public litter collection containers
- Exploring replacement of existing equipment with more climate-friendly equipment
- Exploring and implementing new performance measures to track customer satisfaction and fiscal responsibility
- Exploring new public/private partnerships

- Developing and implementing the Clean Austin Program
- Developing and implementing the Storm Debris Management Program
- Developing and implementing the Reuse Austin Program

Additional resources are needed to redesign and implement these programs and initiatives.

13.1 / Litter Control

Litter control services include litter pick up, litter container management and illegal dump clean ups. These services ensure cleaner streets, limits discarded materials from entering storm water systems, and presents a cleaner image of the City to millions of visitors. The legal mandates for this activity are the Texas Constitution Article XI, section 5, and the Health and Safety Code of Texas Environmental Laws Chapters 365, 342.004 and 342.021 (b).

The Litter Control program provides services in the Central Business District (CBD) from 2:30 a.m. to 6:30 a.m., 364 days per year with no activity on Christmas Day. Litter crews use backpack blowers to remove litter from sidewalks, provide trash removal from more than 250 public right-of-way trash containers and after the CBD area is serviced, the crews provide other services such as the cleanup of illegal dumps, City rights of way and special projects. The operating budget in FY 2011 for Litter Control is approximately \$2.9 million. This program is funded through the use of Anti-Litter Fees, which are charged to Austin utility customers.

New Policies: Litter Control Services

The Litter Collection program is inherently reactive to improperly disposed materials. The Department will explore new litter abatement measures with other City Departments and stakeholder organizations to develop proactive and preemptive means to prevent litter. Some of the policies to be explored include stronger enforcement of anti-litter ordinances, a public education program that focuses on behavior changes of visitors and residents and a special event ordinance that strengthens requirements of event organizers to plan for, prevent, and manage litter in and around the event area.

New Programs: Litter Control Services

The Department will continue to expand its placement of recycling con-

tainers adjacent to litter containers at all City departmental facilities and along targeted high volume public sidewalks. This will provide increased opportunities for the general public and visitors to recycle while shopping and visiting parks, public buildings and other City facilities.

As a pilot in 2011, the Department purchased and installed 20 solar powered trash compactors with recycling kiosks. If the pilot is deemed successful, the Department will invest in additional units for other high pedestrian service areas, including the downtown area and the entrance and exits to walking trails and bikeway trailheads. In coordination with other City departments to prioritize areas currently serviced by the Department and/or serve as high volume routes such as frequently used event routes. The Department will also develop criteria to determine whether or not to expand litter control services into areas that are not currently served as frequently.

The most cost-efficient means of litter control is the prevention of litter. If the litter did not exist, the resources needed to pick it up would not be necessary. The Department will explore a more extensive litter prevention campaign, in collaboration with other community stakeholders, to reach its goal of litter prevention.

New Infrastructure: Litter Control Services

Existing services require backpack blowers to remove litter from sidewalks and rear-loader trucks to provide trash removal from more than 250 public right of way trash containers. The Department will research and purchase more climate-friendly equipment to reduce its carbon footprint.

New Resources: Litter Control Services

Existing staff resources dedicated to provide litter collection programs. An additional 0.25 full time equivalent (FTE) employee is needed to redesign and implement a litter prevention program.

13.2 / Alley and Street Flushing

Alley and Street flushing washes contaminants from roadways which limits the amount of discarded materials entering storm water systems, reduces exposure to human excreta which can be a medium for disease trans-

mission, helps with odor and pest issues, and provides a cleaner atmosphere for those utilizing the CBD. The legal mandates for this activity are the Texas Constitution Article XI, section 5, and the Health and Safety Code of Texas Environmental Laws Chapters 365, 342.004 and 342.021 (b).

The Department uses a cold water flushing process applied by a water truck equipped with spray nozzles. Alleys and streets in the CBD are flushed a minimum of four times per week each morning from Friday to Monday during the hours of 2:30 a.m. and 6:30 a.m. One operator, using a flusher truck with a spray nozzle application maneuvers down the alleys and streets spraying cold water. Dumpsters, delivery trucks, pot holes, other obstacles and the presence of homeless individuals in the alleys create challenges in providing this service. Annual expenditures to provide this service are approximately \$30,000. The program is funded through the use of Anti-Litter Fees charged to Austin utility customers.

New Policies: Alley and Street Flushing Services

Since many downtown alleys are used for deliveries and business services, alley flushing is performed in the early morning hours before the start of the business day. Although these services are performed in the early morning hours, parts of the service area are still blocked by parked vehicles preventing the crews from effectively cleaning all alley surfaces. The Department will develop and present to City Council a new city ordinance that prohibits parking between 3 a.m. and 5 a.m. for cleaning services downtown. After adoption of the ordinance, the City will install signs posting the parking restrictions and will coordinate with the Austin Police Department to help enforce the ordinance.

New Programs: Alley and Street Flushing Services

Alley cleaning is performed four mornings per week, yet downtown businesses have identified a strong need for seven day service. The Department will meet with stakeholders to evaluate options to expand our current service to include an additional 3 days and to ensure the program is adequately funded and staffed.

New Infrastructure: Alley and Street Flushing Services

Existing services require a flusher truck with a spray nozzle application, which maneuvers down the alleys and streets spraying cold water. The Department will research and purchase more climate-friendly equipment to reduce its carbon footprint.

New Resources: Alley and Street Flushing Services

If expanded service is implemented, additional staff resources and equipment will be needed to perform the service throughout the seven day week. An additional 0.25 FTE employee will be needed to develop and implement a city ordinance addressing the parking in alleys.

13.3 / Street and Boulevard Sweeping

The Street Cleaning unit provides frequent street and boulevard sweeping throughout the entire City. The street sweeping system is designed to clean the gutters and limit contaminants from polluting Austin's creeks and drainage ways. Street sweeping allows for removal of discarded materials, litter, and dirt from streets and roadways for health, safety, aesthetic, and water quality reasons. The legal mandates for this activity are the Texas Constitution Article XI, section 5, City Code 15-6-1 and 15-6-2, and a permit from the National Pollutant Discharge Elimination System (NPDES).

Residential streets are swept six times per year, thoroughfares and boulevards are swept monthly and the CBD streets are swept nightly. Debris that is collected through street sweeping is unloaded in designated temporary locations and hauled to an area landfill. Air regenerative sweepers and dump/bucket trucks are the primary equipment used in this operation. Residential sweeping hours of operation are scheduled Monday-Friday, 6:30 a.m. to 3 p.m. CBD and Boulevards hours of operation are Sunday-Saturday, 2:30 a.m. to 1 p.m.

The City of Austin is divided into eight residential street sweeping zones that are serviced six times per year. Typically, street sweeping will not occur on the same day as collection services. On occasion an area within a zone may be blocked due to a road closure and which will determine when the area will be swept. It takes approximately one week to service an entire zone, or 48 weeks to service the entire city six times. This leaves four weeks to make up any time lost due to storms, weather, and allows some additional time during the heavy leaf season. House counts range from 14,000 to 31,000 per zone. House counts vary from zone to zone due to historical collection data, area of city, miles, length of time to sweep due to congestion, vegetation, and or dense population.

Eight Operator Specialists operate curb street sweepers with water in

residential neighborhoods throughout Austin. Once the hopper on the sweeper truck is filled, the debris is temporarily unloaded in a designated area. Two Operator Specialists operating a bucket truck will load the debris and haul to an area landfill for disposal. The operating budget for residential street cleaning activities is approximately \$1.4 million annually. The program is funded through the use of Anti-Litter Fees charged to Austin utility customers.

Designated boulevards throughout Austin are swept once per month or 12 times per year. Currently there are 115 designated boulevards that are divided into a north and south boulevard list. Four Operator Specialists per shift provide this service seven days per week using street sweepers after the CBD has been serviced. The boulevard sweeping operators are scheduled on the early morning shift from 2:30 a.m. to 1 p.m. The operating budget for FY 2011 for boulevard and CBD street cleaning activities is approximately \$1 million. The program is funded through the use of Anti-Litter Fees charged to Austin utility customers.

New Policies: Street and Boulevard Sweeping Services

To better measure the effectiveness of the brush collection services, one new performance measure will be implemented. Total miles serviced per daily route and annually will be measured to serve as a benchmark for productivity, workload distribution, and cost of service analysis.

New Programs: Street and Boulevard Sweeping Services

As most City streets are utilized for residential parking, the street sweeping services often encounter parked cars that block their efforts to clean the storm drainage areas near the street curb. The Department will develop and implement a public notice program to inform the residents when to clear the roadways for street sweeping. The Department will also explore better ways to route street sweepers, in an effort to reduce mileage on the road and reduce its carbon footprint.

Additionally, in response to increasing bicycle traffic, Litter Abatement is researching data to evaluate the feasibility of implementing a bike lane sweeping route. Currently, bike lanes are swept by the regular residential routes, however, the Department has received frequent request to sweep bike lanes between their regular schedules. Coordination with the Public Works Department's Neighborhood Connectivity Program will be utilized to evaluate options for a monthly bike lane sweeping route.

New Infrastructure: Street and Boulevard Sweeping Services

No new infrastructure is needed to implement these program enhancements.

New Resources: Street and Boulevard Sweeping Services

Existing staff resources will be dedicated to provide Street and Boulevard Sweeping services.

13.4 / Dead Animal Collection

Dead animal collection is essential for the health, safety and welfare of the community by removing any offensive dead and decaying animal. Dead animal collection is provided on public rights of way throughout Austin and from the City's Animal Shelter. Dead animals are collected in a hermetically sealed vehicle and are taken to an area landfill for disposal. The legal mandates for this activity are the Texas Constitution Article XI, section 5, and the Health and Safety Code of Texas Environmental Laws Chapters 365, 342.004 and 342.021 (b).

Any City of Austin resident may call 3-1-1 to request collection of a dead animal on an Austin public right of way. Dead animals can be placed at the curb in a bag or box for collection, but should not be placed in the trash cart. The Department cannot collect dead animals on private property in creeks, streams or waterways. Any identifying tags are removed from the animal and returned to the owner if possible. Also, a pet search is available to assist customers in locating a lost animal. Dead animal requests are received primarily from the 3-1-1 call center and other requests come from emails or drive-bys.

Two operators and two hermetically sealed vehicles are used to provide the service. This service is provided Monday through Friday between 6:30 a.m. and 3 p.m. and Saturdays between 6:30 a.m. and 11 a.m. Expenditures to provide this service for FY 2011 are approximately \$110,000. The program is funded through the use of Anti-Litter Fees charged to Austin utility customers.

New Policies: Dead Animal Collection Services

The Dead Animal Collection Services program is required to maintain a safe and healthy environment. Sometimes in the effort to remove a dead animal, staff discovers the animal is still alive and in need of emergency care. Staff will take measures to seek proper care for the injured animal,

however, this removes staff from their assigned list of duties. The department feels this service is inconsistent with the other services provided by the Department and is interested in opening a dialogue with other entities to explore transferring or removing the collection program out of the Department.

New Programs: Dead Animal Collection Services

As dead animals are removed from the public rights of way, the animals are disposed of at an area landfill. The Department has researched state and federal rules regarding the disposal of animal carcasses and is exploring opportunities to provide the dead animals to local composters that are permitted by the State.

New Infrastructure: Dead Animal Collection Services

The removal and handling of dead animals requires care for the employee as well as the animals. The Department will explore best practices in the field, including an upgrade of equipment to better handle the weight of the larger animals picked-up off the streets.

New Resources: Dead Animal Collection Services

Existing staff resources will be used to maintain this service, while the Department explores the transfer of this program.

13.5 / Brush Collection

The Brush Collection program provides customers with a convenient and cost effective way to dispose and recycle large brush, tree limbs, and trees, support environmental initiatives for green waste and prevent illegal dumping. This program offers twice a year curbside brush collection for the City of Austin residential customers as well as annexed areas. Collected items are taken to the Austin Water Utility's Hornsby Bend Facility to be used as a primary feedstock in Dillo Dirt. The legal mandates for this activity are the Texas Constitution Article XI, section 5 and City Code Chapter 15-6-2 and 15-6-5.

Out-of-cycle collection is provided as a special service for customers that may need immediate assistance. Out-of-Cycle brush collection will be renamed On-Call Services and a service fee is charged for cost recovery of personnel expenses. Actual charged fees vary depending on the amount of brush set out. The Brush Collection program also provides as-

sistance with storm removal. The hours of operation for Brush Collection are Monday through Friday between 6:30 a.m. and 3 p.m.

The City of Austin is divided into 26 curbside collection routes for brush and tree limbs too large to be collected by Yard Trimming crews. Routes are collected on a rotational basis two times per year. House counts range from 5,000 to 10,000 per week on routes depending on volume, length of time to collect, area of city, historical collection data, etc. Brush collection is cyclical and can vary from year to year, especially during a storm event or drought.

Customers are notified in advance of the scheduled collection week by direct mail and collection maps are posted on the Department's website. In addition, information about set out requirements are included on yellow postcards which are mailed to customers.

Brush Collection crews provide storm debris removal and disaster relief efforts in the Austin metropolitan areas as well as to other cities when needed. Disaster relief efforts are managed as an additional service to the regular scheduled routes. Depending on the debris size, storm damage area and amount of storm debris needing to be removed, regular collection might be suspended until the storm debris is cleared from public streets.

There are a total of 15 employees providing brush collection services. Hours of collection are Monday-Friday, 6:30 a.m. to 3 p.m. The tractor trailer and crane operations collect the majority of debris, with a rear loader crew to collect the difficult areas and smaller stops. Personnel and equipment are shared with the Bulk Collection program and shift according to route demands. The Brush Collection operating budget for FY 2011 was approximately \$1,500,000.

New Policies: Brush Collection Services

To better measure the effectiveness of the brush collection services, two new performance measures will be implemented. Adding performance measures to evaluate participation rates and cost per curbside collection setout will serve as a benchmark for productivity and cost of service analysis.

New Programs: Brush Collection Services

Changes and additions to the large brush collection program in the next few years will include two major initiatives:

- **Clean Austin** - an enhanced brush and bulk collection program for

high need areas

- **Storm Debris Management** - Partnering with Austin Emergency Response Team to quickly respond to violent storms through Storm Debris collection services.

Clean Austin

The Clean Austin program will enhance the Department's brush collection services with increased focus on high need areas. High need areas are characterized by frequent resident turnover and high demand for bulk and/or brush collection services. In particular, certain areas in Austin require frequent tree care or leaf collection due to the number of trees in the area or natural growth cycles. For example, oak wilt is a significant problem throughout Central Texas and requires careful pruning during specific time periods. To date, the Department has identified 27 areas that meet these criteria. The Clean Austin program will enhance existing brush collection cycles where needed and offer a revised On-Call Service, previously named Out-of-Cycle collection.

The Department will pilot an enhanced collection cycle that will offer residents in high need areas with brush collection four times per year, rather than two times per year. The pilot program is needed to test collection scheduling and set-out requirements. The areas selected for this enhanced service will be determined by field observations of neighborhoods experiencing high volume brush set-outs. The selected areas for the pilot will be geographically representative of all areas of the City. The Department will evaluate the On-Call brush collection service for cost effectiveness, collection scheduling and set-out requirements. Additional description and planning of the Clean Austin program is noted in Chapter 9/ Materials Management.

Storm Ready Austin: Storm Debris Management

The Storm Debris Management program will enhance the responsiveness of the Department to violent storm debris clean-up needs. The National Weather Service has declared the Travis County and Austin Emergency Operations Communications Center as a Storm Ready community, prepared to respond quickly to hurricane or tornado events and the resulting damaging winds and flooding affecting the area. The Storm Debris Management team will be prepared to act on an emergency activation notice, capable of responding to and assisting residents with the removal of tree and brush debris.

The Storm Debris Management team will work in cooperation with Aus-

tin Energy response teams, and the Austin Emergency Operations Command Center. This response is an enhancement to the existing Brush and Bulk Collection programs. In the event of a major damaging storm, the collection crews will postpone existing planned services and respond immediately with storm debris collection and material management. The Department will explore potential contractual relationships with private companies to provide brush shredding services in the event the collected material exceeds the capacity of City dedicated resources.

New Infrastructure: Brush Collection Services

The Department's brush collection services are focused primarily at the Hornsby Bend Biosolids Management Plant in the south eastern sector of the City. During stakeholder discussions, the community and other City departments expressed a need for more convenient department and public drop-off sites around the City to increase the Department's operational efficiencies, reduce the Department's carbon footprint and reduce the need for on-call services. The Department will research the use of various parks and natural settings as potential drop-off sites of large brush and tree limbs, with the caution that many areas have environmentally sensitive concerns. The Department will seek out four collection sites for brush and woody compostables, in the four quadrants of the City.

13.6 / Bulk Collection

The Bulk Collection program offers twice a year collection for Department customers and annexed areas. This is a convenient and cost effective way for participating residents to dispose of items too large for trash and recycling collection. Bulk Collection provides an opportunity to remove items likely to attract or harbor mosquitoes, rodents, vermin, or disease-carrying pests and supports environmental initiatives for recycling/diversion and illegal dumping. The legal mandates for this activity are the Texas Constitution Article XI, section 5 and City Code Chapter 15-6-2 and 15-6-5.

The City of Austin is divided into 26 curbside bulk collection routes for residents to dispose of items too large for garbage and recycling collection, such as appliances, furniture, lawn mowers, scrap metal, and tires, among other items. Bulk Collection routes are collected on a rotational basis through two citywide cycles per year. House counts per route

range from 2,400 to 15,000 depending on volume, length of time to collect, area of city and historical collection data. Customers are notified in advance of the scheduled collection week by direct mail and collection maps are posted on the Department's website. Information about the set out requirements is included on blue postcards mailed to customers.

Out-of-cycle collection is provided as a special service for customers that may need immediate assistance. Out-of-Cycle bulk collection will be renamed On-Call Services. A service fee is charged for on-call service for cost recovery of personnel expense. Actual charged fees vary depending on the amount of bulk items set out. Bulk Collection also provides assistance with storm removal.

There are a total of 22 employees providing bulk collection services. The hours of operation for the Bulk Collection program are Monday-Friday between 6:30 a.m. and 3 p.m. The tractor trailer and crane operations collect the majority of bulk material, with a rear loader crew to collect the difficult areas and smaller stops. Tires, appliances and scrap metal are collected separately and taken to the Resource Recovery Center to be recycled. Personnel and equipment are shared with the Brush Collection program and shifted according to route demands. The Bulk Collection program's operating budget for FY2011 was approximately \$2,200,000.

New Policies: Bulk Collection Services

To measure the effectiveness of the bulk collection services, two new performance measures will be implemented: participation rates and cost per collection setout will serve as benchmarks for productivity and a cost of service analysis. In addition, since many customers perform their own home remodeling, a policy to manage the recycling of construction debris from its residential customers will be established. This could involve an expansion of the bulk collection services to include construction debris recycling. This policy will be researched within development of a Construction and Demolition (C&D) Recycling Ordinance, scheduled for FY 2013 and FY 2014.

New Programs: Bulk Collection Services

Changes and additions to the bulk item collection program in the next few years will include two major initiatives:

- **Clean Austin** - an enhanced bulk and brush collection program for high need areas

- **Reuse Austin** - partnering with nonprofits for repair and reuse of discard items

Clean Austin

In addition to enhancing the Brush Collection program, the Clean Austin program will enhance the Bulk Collection program with increased focus on high need areas. The Department will increase services for identified high need service areas by enhancing bulk collection cycles where needed and offer a revised On-Call Service.

The Department will pilot an enhanced collection cycle that will offer residents in high need areas bulk collection four times per year, as opposed to two times per year. The pilot program is needed to test collection scheduling and set-out requirements. The areas selected for this enhanced service will be determined by field observations of neighborhoods experiencing heavy out-of-cycle set-outs which are often times due to high resident turnover and will be geographically representative of all areas of the City.

The Department will also evaluate the on-call brush collection service for cost effectiveness. These services are required for residents moving out of their homes and apartments, with the resulting demand for extra collection services of large bulk items. The Department will evaluate collection scheduling and set-out requirements, to continue offering residents this fee-based cost-recovery service.

The Department will work closely with the Austin Apartment Association and the Austin Realtors Association to coordinate implementation of this new program. Additional description and planning of the Clean Austin program is noted in Chapter 7/Reuse.

Reuse Austin

The Reuse Austin program will enhance the Department's bulk collection services with increased focus on diversion opportunities. The Department will make a stronger effort to recycle or reuse bulk items collected. The City will team with reuse and resale businesses that are structured to collect and sell gently used furniture, building materials and other reusable items to increase diversion of items currently landfilled. Additional description and planning of the Reuse Austin program is noted in Chapter 7/Reuse.

New Infrastructure: Bulk Collection Services

Both the Clean Austin program and the Reuse Austin programs will

require infrastructure improvements. The Austin Resource Recovery Center, located at the FM812 landfill, is intended to be a public drop-off of large bulk items, including tires, large appliances, and furniture. Based on public feedback, the facility's location was identified as a major barrier. In addition, collection and processing of these items at the landfill offers operational challenges due to weather exposure which impact employee working conditions. In consideration of these needs, the Department will relocate the Resource Recovery Center to the Todd Lane Materials Recovery Facility/Transfer Station (MRF/TS). The repurposed MRF/TS will house the public drop-off service as well as the bulk collection and reuse program. Items collected, either through drop-off or curbside collections, will be properly separated and cleaned in the enclosed facility and not exposed to weather conditions. Public access to the facility will be redesigned to encourage a safe driving loop for the public that does not cross other operational services.

In addition, the Department will place eight Eco-Depots around the City to be utilized for residential drop-off of large bulk items, as well as other reusables. This additional infrastructure will enhance and support the Reuse Austin program. Additional description and planning of eco-depots are noted in Chapter 7/Reuse.

Performance Trends for Litter Control Program

Measure	FY 2008 Actual totals	FY 2009 Actual Totals	FY 2010 Actual Totals
Litter collected annually (tons)	378 tons	320 tons	326 tons
Illegal dumpsites cleaned	439	601	778
Right of ways cleaned	779	1286	1728

TABLE 9

Performance Trends for Street and Boulevard Sweeping Program

Measure	FY 2008 Actual totals	FY 2009 Actual Totals	FY 2010 Actual Totals
Amount Material removed (tons)	7,769 tons	6,361 tons	6,252 tons
Residential Street Sweep (miles)	27,643 miles	28,159 miles	27,761 miles
Boulevards Swept (miles)	4,679 miles	5,910 miles	7,352 miles
Downtown Streets Swept (miles)	11,215 miles	12,122 miles	11,804 miles
Material removed (avg. lbs. per mile)	357 lbs./mile	275 lbs./mile	267 lbs./mile
% of Residential Miles Swept of Total Miles	63%	61%	59%
% of Blvd. Miles Swept of Total Miles	11%	13%	16%
% of DT/CBD Total Miles Swept	26%	26%	25%

TABLE 10

Performance Trends for Dead Animal Collection Program

Measure	FY 2008 Actual totals	FY 2009 Actual Totals	FY 2010 Actual Totals
Dead Animal Requests Processed	7,745	7,214	5,627
Dead Animals Collected	14,823	11,546	9,717
Dead Animals Collected (tons)	158 tons	153 tons	142 tons
Dead Animals Collected within 24 hrs	98%	94%	94%

TABLE 11

Performance Trends for Brush Collection Program

Measure	FY 2008 Actual totals	FY 2009 Actual Totals	FY 2010 Actual Totals
Total brush collected (tons)	7,380 tons	7,683 tons	7,350 tons
Total number of brush setouts	42,477	40,149	43,955
Average lbs. per set out	347 lbs.	383 lbs.	334 lbs.
% of waste stream diverted from landfills through brush collection	New measure in FY 2010	New measure in FY 2010	3.3%

TABLE 12

Performance Trends for Bulk Collection Program

Measure	FY 2008 Actual totals	FY 2009 Actual Totals	FY 2010 Actual Totals
Total bulk collected (tons)	7,792 tons	8,219 tons	7,710 tons
Total number of bulk set-outs/pickups	72,215	79,129	69,490
Average lbs. per set out	216 lbs.	208 lbs.	222 lbs.
% of waste stream diverted from landfills through bulk collection	New measure in FY 2010	New measure in FY 2010	0.1%

TABLE 13



Chapter 14 / Special Events Diversion Opportunities

Special events are primarily recognized as festivals, street fairs, concerts, races, walks and other athletic events. They also include large and small scale community clean ups. Austin Resource Recovery (the Department) provides numerous services to ensure that special events in Austin reduce waste disposal, properly manage large volumes of trash and keep Austin's streets and waterways clean and litter free.

In particular, event organizers may pay a special events services fee to contract with the Department's Litter Abatement Division for street sweeping services, litter control services, and/or collection of large or bulk items. The Special Events Services Fee is a flat rate fee of \$500 for two crew members providing four hours of service. Additionally, the Department's Strategic Initiatives Division partners with Keep Austin Beautiful (KAB) to provide complimentary waste management guidance, vendor training, volunteer recruitment and access to recycling containers. Although each special event is unique and poses different waste management challenges, they also offer the Department a tremendous opportunity to reach out to a captive audience about Zero Waste and the Department's programs and services.

Community Clean Ups

Each year, thousands of volunteers descend on Austin parks, rights of way, trails, and neglected neighborhoods to help clean up and remove debris and litter. The annual event is known as the KAB Clean Sweep. As an event sponsor, the Department provides complimentary collection of large and bulk items that are too heavy for volunteers to remove on their own. While Clean Sweep is a coordinated city wide event, KAB also frequently serves as a primary point of contact to coordinate smaller neighborhood clean ups. KAB works with the Litter Abatement Division to schedule collection services and then coordinates with the citizen organizer to recruit and manage volunteers. Recovering recyclables and reusable items from community cleanups is a significant challenge. However, as the Department increases its capacity to manage reusable items and partners effectively with organizations that repurpose used products, a higher priority will be placed on diverting material from the waste stream of future community clean ups.

City Sponsored Events

In October 2009, the Austin City Council passed Resolution 20091022-040 directing the City Manager to implement recycling at all City sponsored and City co-sponsored events, including events sponsored or organized by City departments.¹ Officially, the City does not currently have an approved definition for “city sponsored” event. Therefore, for the purpose of this report, a City sponsored event includes events that are recognized by City Council resolution or are sponsored by City departments. During 2010, the Department provided recycling collection services at 17 City sponsored special events. Despite achieving an average 44 percent diversion rate among most events, the Department was unable to obtain consistent waste management data from all events because event organizers utilized the City for recycling services but contracted with private haulers for garbage collection. In 2011, the Department streamlined services by coordinating all waste management needs for City sponsored events. The Department contracted with one private hauler for both recycling and disposal services, but only paid for costs associated with recycling services. The event organizer paid for costs associated with disposal services such as Dumpster drop off and collection as well as purchasing additional trash containers if needed. Department staff also provided complimentary event recycling containers, provided vendor training to minimize use of “undesirable” products such as Styrofoam and glass and recruited/managed volunteers – also known as Zero Waste Ambassadors – to monitor and assist with education/outreach during events.

As a City sponsored event, thousands of dollars in fees are waived. However, there are no clear sustainability standards required of event organizers or vendors to maintain their City sponsored status. With guidance from the Department and other departments related to issuing permits for special events, the City should consider establishing standard contract language to be included in agreements with event organizers of City sponsored events and any vendor choosing to vend at a City sponsored event.

Diversion at Special Events

To specifically improve diversion rates at City sponsored events, the Department will support the following activities:

Zero Waste Awareness

In partnership with event organizers, the Department will develop standard Zero Waste messaging to include in all advanced marketing,

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¹ Austin, Texas. City Council Resolution No. 20091022-040. Web. 1 Sept. 2011.

announcements at the event and promotional signage, social media and other collateral at City sponsored events.

Vendor waste minimization guidelines

Currently, each event organizer contracts with their choice of food and service vendors. Establishing minimum standards such as prohibiting distribution of expanded polystyrene (EPS), glass, informational fliers and individually wrapped condiments are proven methods to reduce waste generation, minimize litter and increase diversion rates. The Department will work with the City Purchasing Department to develop and incorporate standard guidelines for all contracts related to vending at City facilities and at City sponsored events. These guidelines will apply to anyone vending food at a City sponsored event or on City property, including any subcontractors providing services at an event.

Advanced event discard management planning

Most event organizers are focused on putting on a great event, but they often forget to plan for discard management needs during the event and clean up after the event. As part of the special event permitting process, event organizers of City sponsored events would work with the Department in advance to plan for discard management services.

Composting diversion services

Composting food scraps and food soiled paper products such as napkins and plates can help greatly increase current waste diversion rates at special events. Adding composting services could either be done through private contract, in partnership with the Austin Water Utility (AWU), or through a combination of both. The Department will explore contracting with a private hauler to provide Dumpster service to events and transport material to a pre-determined facility for processing. If AWU's Hornsby Bend site is able to take food scraps and compostables, the material could be processed by AWU. However, if Hornsby Bend is unable to process the food scraps, the Department will contract with a private hauler for both hauling and processing services until AWU is able to accept and process food scraps. Additionally, if the Department is able to provide Dumpster services, composting processing and recycling processing at any point in its future, then the Department will evaluate the option to utilize in-house staff and facilities to transport and process organics as well as recyclables from City sponsored events.

Incentives to event patrons

Incentive programs that engage and reward event patrons for recycling and composting not only increase diversion rates, they also help educate the public about the City's Zero Waste goals. Based on success of the Austin City Limits Festival's event recycling program, at Juneteenth 2011, the Department encouraged event patrons to recycle and keep the event clean by giving away free t-shirts for each bag of recycling or trash collected. To continue developing and offering incentive programs, the Department will include funding and resources to support unique recycling incentive programs at City sponsored events.

Event recycling and composting containers

Most City sponsored events occur at City Hall, outdoor parks, recreation centers and on City rights of way. The Department – either through capital investment, partnerships with private businesses, non-profits or grant funding – will ensure that there are enough temporary event recycling and composting containers for outdoor City sponsored events. Additionally, the Department will also ensure that there are enough long-term containers for indoor City event venues. Lastly, installing permanent outdoor recycling and litter control containers along targeted high traffic parks, park venues and rights of way that are frequently used as event venues or event routes would improve Department operational efficiency and safety at events. For example, to prepare for a parade along Congress Avenue, the Department must deliver and set up temporary event recycling containers to be installed next to existing public trash receptacles. Installing permanent recycling receptacles coupled with trash containers, similar to the Department's current BigBelly trash compactor pilot program along Guadalupe Street, may reduce time required to set up temporary containers, thereby allowing the Department to focus on other priorities. The Department will coordinate with KAB, the Parks Foundation, Downtown Austin Alliance (DAA) and other stakeholder departments to identify and secure funding for waste diversion infrastructure.

Appropriate staffing for events on City rights of way and parks Utilizing volunteers to help monitor containers and prevent contamination keeps costs low and improves education efforts regarding proper recycling and composting practices. However, relying on volunteers comes with challenges and risks. First, recruiting volunteers requires staff to make contact with volunteer organizations

and student groups. Once contact is made, staff must be available to respond to questions and help organize groups prior to the event. The Department may wish to modify its contract relationship with KAB to place volunteer recruitment responsibilities on them. Secondly, in order to manage volunteers, the Department will need volunteer coordinators on-site during the event and must provide incentives such as free parking, t-shirts and food vouchers that entice volunteers to participate. Even with promises of free “swag,” volunteers may choose not to arrive as planned. The Department cannot completely rely on volunteers to staff an event. Therefore, for all City sponsored events on City rights of way, the Department will establish minimum staffing levels to ensure basic levels of service such as container set up, take-down and general event management. Proper coordination among KAB for volunteer recruitment, the Litter Abatement division for minimum staffing and the Strategic Initiatives division for coordination with the event organizer and other departments will ensure appropriate staffing levels for each City sponsored event. For City sponsored events at City parks, the Department will coordinate and develop a memorandum of understanding with the Parks and Recreation Department (PARC) to identify appropriate staffing levels and resources to address discard management at the event.

Based on standard practices adopted for City sponsored events, the Department will then provide technical assistance to help other events to incorporate waste reduction and diversion measures.

Other Events in Austin

Currently, all large-scale special events in Austin held on City rights of way or park property must comply with an extensive set of policies and procedures. Although planning for discard management is one of many permitting requirements, it is often the last priority for most event organizers. To increase awareness about proper discard management planning, Department staff currently participates in regular meetings with an interdepartmental team responsible for reviewing and approving special events permits. During permit review meetings, event organizers are asked to discuss their waste management plans and include Dumpster placement in their final permit application. When asked if the event will include recycling, many event organizers state that providing recycling services would increase costs and create too many additional challenges. Therefore, the Department’s next step is to encourage event organizers to plan further in advance and include waste diversion efforts.

Generally, the Office of Special Events, housed in the City's Transportation Department, recommends that event organizers begin planning at least 180 days or approximately six months in advance. The Department experiences a specific challenge regarding materials management planning for events in the Central Business District (CBD). When an event is conducted on a public right of way, the existing litter control containers are used to capture waste generated. However, there are occasions where events either need additional litter control containers, or need to cover existing litter control containers so that attendees only use the containers provided by the event organizers, allowing the event to more accurately monitor its waste generation and diversion rates. Operationally, both scenarios pose a challenge for the Department.

All events should be required to submit a waste management plan for review and approval by the Department. The waste management plan should be submitted as part of the special events permit process and include a site plan indicating location/placement of Dumpsters and an assessment as to whether or not additional litter control containers will be necessary. For events that wish to cover existing litter control containers, the Department will evaluate methods, mechanisms and costs associated with purchasing and covering the existing litter control containers in such a way that the entire container is covered so that attendees do not "stack" waste on top of the containers. The evaluation will also include the amount of time and staff needed to install the covers as well as a determination as to whether or not the covers can be loaned and installed by non-Departmental staff. As event organizers begin planning for waste disposal needs further in advance, the possibility of incorporating waste diversion measures become more attainable.

Starting in July 2011, the Department launched a pilot Event Recycling Rebate program with the goal of providing a financial incentive to event organizers to include recycling and/or composting at events. The program is simple. Event organizers are eligible for a rebate of 100 percent of the cost for recycling and/or composting services up to a maximum of \$750. The rebate program targets events in Austin that expect at least 500 attendees and are held outdoors. To claim the rebate, the event organizer must:

1. Submit an application to confirm eligibility;
2. Consult with KAB to receive training and best practices to reduce and recycle waste at events;
3. Obtain all appropriate City event permits;
4. Contract with a private service provider;

5. Conduct the event and provide at least recycling services; and
6. Submit the rebate request form which includes providing copies of weight tickets for landfill trash, recycling and composting (if applicable) as well as copies of itemized invoices detailing the services provided. The form also asks a series of open ended questions seeking information about the challenges or ease of providing recycling services, composting services and any other sustainability initiatives that were voluntarily implemented.

The pilot event recycling rebate will help offset some of the recycling and composting costs and allow event organizers to implement the best waste reduction and diversion practices for their event. Event organizers will also become more experienced in planning and implementing diversion services and more knowledgeable about costs associated with their efforts. The data gathered from the pilot program coupled with the experience garnered by the event organizers will be essential in developing an Event Recycling Ordinance and developing citywide sustainability standards for event organizers or vendors.

Event Recycling Ordinance

Based on the information gathered from the Event Recycling Rebate, the Department will be better positioned to present an Event Recycling Ordinance for Council consideration. Adoption of an Event Recycling Ordinance will expand reuse, recycling and composting to all special events in the City that require a City permit, including festivals, parades, athletic events and street fairs, essentially expanding the Universal Recycling Ordinance to apply to large public events. Implementation of the ordinance would also allow the Department to phase-out or discontinue the Event Recycling Rebate. However, the Department would continue to partner with KAB to provide technical assistance, vendor training, and access to loan event recycling and composting containers. Additionally, if the City opts to consider a Green Events Ordinance or a Green Events Recognition Program which would include other sustainability initiatives such as air quality, water and energy conservation measures, the Event Recycling Ordinance should be incorporated or referenced.

Resources for Special Event Recycling

One additional staff member or contractor will be needed within the Strategic Initiatives Division to provide on-site waste diversion and volunteer management at City sponsored events, coordinate with KAB, provide technical assistance to private event organizers and direct them to event recycling resources.

The Department will also annually evaluate the Special Events Services Fee considering the cost to provide enhanced services for all special events, including city sponsored events.

Cost and Diversion Estimates for Event Recycling Ordinance Implementation

Initiative	Date of Initiation
Pilot Event Recycling Rebate Program	FY 2011
Event Recycling Ordinance	FY 2012
Place Permanent Containers in Event Areas	FY 2013

Operational Expenses	First Year Costs FY 2013
1.0 FTE additional FTE in FY 2013	\$86,000
One Time Expense: None	\$0
Annual Recurring Expenses: None	\$0
Annual CIP Debt Payment: None	\$0
Total First Year Operational Expenses	\$86,000

TABLE 14



Chapter 15 / Economic Development Opportunities

A key driver in the development of the Master Plan Master Plan is the opportunity to create new green jobs and site new green businesses in Austin through economic development. The City of Austin (City) has the ability to attract new businesses to Austin, including reuse and recycling nonprofit organizations and private sector entrepreneurs, re-processors, secondary manufacturers and other businesses that have the ability to use recovered materials in their manufacturing processes.

15.1 / Economic Growth and Redevelopment Services Office (EGRSO)

Providing green jobs and local economic development is a key opportunity identified in the Master Plan. The Department will provide funding for a new staff member in the Economic Growth and Redevelopment Services Office (EGRSO) who will be responsible for retaining and attracting reuse and recycling industries to Austin. Through this new position, EGRSO will create the Resource Recovery Economic Development Program, which will be responsible for undertaking the following initiatives:

- **Locating Resource Recovery Small Businesses**- assisting small businesses capable of using discarded materials in their manufacturing process to locate in Austin.
- **Supporting Byproduct Synergies** – assisting industrial businesses and manufacturers in making waste-pairings where the discarded byproducts from one company can be the feedstock for another company.
- **Implementing a Business Waste Reduction Assistance Program** - to encourage the local business community in waste reduction efforts in support of the Austin Zero Waste goals.
- **Support the Development of a Green Business Leaders Advisory Council** – to seek advice from the business community on practical implementation of waste reduction and diversion programs in the business community. The City's Office of Sustainability will take the lead with this advisory body, in partnership with the Department and the EGRSO.

- **Supporting Incentives to Attract Recycling Re-processors** - assist in attracting new secondary materials processors to Austin to provide markets for recovered materials generated in the Central Texas region.
- **Eco-Business Park & Eco-Industrial Park** – assist in the development of Eco-Business Parks and Eco-Industrial Parks capable of processing recovered materials generated in Austin. Encourage the development of Eco-Industrial Parks in Austin that would co-locate major remanufacturing activities next to processors of recycled materials. The City may support these efforts through maintaining an inventory of materials generated throughout the region, and recruiting businesses and industries to use these locally-generated resources.
- **Re-Made in Austin** – assist the EGRSO in developing existing or new business opportunities that produce new products utilizing locally generated recyclables as feedstock.
- **Brownfields Redevelopment Program** – assist in the redevelopment of land that has been environmentally remediated through the Brownfields Redevelopment Program.

Resources for Resource Recovery Economic Development Support

One additional staff member from the Department will be placed within the Economic Growth and Redevelopment Services Office. This new staff person will be responsible for retaining and attracting reuse and recycling industries to Austin, including the following activities.

15.2 / Brownfields Real-Estate Redevelopment Program

Brownfields real estate is defined as vertical and horizontal real property (structures and land), where the expansion, redevelopment or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutants, contaminants, controlled substances, petroleum products, or is mine-scarred land.¹ Examples of brownfields real estate redevelopment projects in Austin, before and after:

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¹ Small Business Liability Relief and Brownfields Revitalization Act of 2001. Pub. L. No. 107-118, 115 Stat. 2356 (2002) (amending 42 U.S.C. § 9601 (2000)).

Historical Use	Redevelopment
Illegal dumping on vacant property	Homewood Heights Community Garden
Tax Foreclosure property	Guadalupe-Saldana Affordable Housing
Vehicle & Equipment Storage & Repair Shop	African American Cultural and Heritage Facility
Service Station	Top Hat-Hamburgers
Warehouse	Commercial Multi-businesses
Industrial/Commercial Facilities	Expanded commercial businesses
Tax value: \$7,000,000	Tax value: \$57,000,000

TABLE 15

The economic benefits of reusing brownfields real estate include: reducing urban sprawl, creating new jobs, increasing the local tax base, improving the value of adjacent property, and mitigating public health and safety concerns.

The environmental benefits of reusing brownfields real estate include: preservation of open space and farmland, cleanup and sustainable solutions through state voluntary cleanup program, climate protection through convenient and diverse transportation models, addressing environmental justice through community participation, and redevelopment using green building and renewable technologies. Brownfields redevelopment can save money through reuse of existing infrastructure, utilities, roads and services.

The Brownfields Redevelopment Program provides incentives and information to brownfields property owners and other stakeholders, so they can clean up and reuse their brownfields properties. The program uses collaborative strategies, such as securing federal grant dollars from the U.S. Environmental Protection Agency, zero to low interest remediation loans, and assisting with revitalization planning. With the combined resources from various agencies, the Brownfields Redevelopment Program can help expedite the cleanup and revitalization of Brownfields properties.

Resources for Brownfields Redevelopment Program Support

Two staff members transferred from Watershed Department to Austin Resource Recovery will be responsible for implementing the mission and objectives of the Brownfields Redevelopment Program.

15.3 / Research and Development Program

Zero Waste research and development is essential to developing the City's future Zero Waste system. Currently, many products and packaging are designed for the dump and cannot be recycled or composted. Designing products and packaging with their end of life in mind will help the City work toward Zero Waste. Zero Waste practitioners around the world are focusing on these materials that cannot be recycled and composted, also known as legacy discards. They are striving to develop new designs in products and packaging that can be reduced, recycled or composted.

Areas for Zero Waste Research and Development include:

- Product Redesign
- Toxicity Reduction in Consumer Products
- Waste Reduction in Packaging

The goal of this initiative is to achieve advancements in the science of Zero Waste by ensuring that Austin is a center for Zero Waste research. As detailed in the policy descriptions in Chapter 21/Policies and Ordinances, the Strategic Initiatives Division will support the work of the City's academic partners in conducting Zero Waste research, and will support the work of its nonprofit, city and regional partners, by facilitating cooperation and assisting with grant applications.

The policies and programs identified in this Master Plan will allow the City to achieve high levels of diversion. However, research will be necessary to achieve Zero Waste. Of the materials currently disposed in landfills, 10-15 percent are materials that cannot be recycled or composted and have been designed for the dump. These materials include legacy discards that are materials and products that were placed into use before Zero Waste systems were devised, and will trickle out of homes and businesses for years to come. Research is needed to understand the composition of these materials, identify the products and packaging that require redesign, and the processes for returning potentially recyclable and compostable materials into useful products.

The City is fortunate to have access to research institutions located in Austin, including the University of Texas at Austin, Center for Maximum Potential Building Systems, and University of Arlington's Zero Waste Network at the Center for Environmental Excellence. As a result, the Department can support academic partnerships in new research and can also assist in applying for state and federal grants. The City's role will be

to support its academic partners in pursuing research initiatives, facilitate meetings, and assist in identifying research projects and funding sources, including:

- “Zero Waste Incubator” for focused Zero Waste Research at an academic institution;
- Research in designing products and packaging for recyclability;
- Research in understanding the composition of materials that cannot be recycled or composted;
- Pursuing state and federal grants on behalf of academic partner; and
- Development of an internship program for job training and community development.

Resources for Zero Waste Research & Development Support

One additional staff member within the Department will be responsible for the development of Zero Waste Research and Development, as well as supporting product stewardship initiatives, including the following activities.

15.4 / Market Development and City Purchasing Policies

The goal of this initiative is to create markets for recycled and reclaimed materials through City purchases and through the promotion of local remanufactured products.

Market development is needed for reusable, recyclable and compostable materials and products that do not have readily available markets. Intermediate and end markets return recyclable and compostable materials to manufacturing and production of new products. Traditional commodity recyclables, including paper, plastic and metals, are worldwide commodity resources that are traded internationally and therefore do not need market development assistance.

Because of their special handling requirements, materials such as organics, reusable items, and construction and demolition debris are typically marketed locally or regionally. The City has also experienced low market demand for glass cullet. Recyclable glass is currently transported outside of the region, which makes it expensive to recycle.

Local market development can provide economic development and green

jobs. Implementing an aggressive Zero Waste market development action plan has the potential to create 1,000 to 5,000 new green jobs in recycling and organics collection and processing, materials reuse and repair, and local remanufacturing.²

The City utilizes general purchasing standards that provide some guidance to buyers for each department when developing specifications for commonly purchased goods and services. However, the City is lacking a comprehensive environmental purchasing program. Therefore, departments throughout the City do not have consistent standards specifically related to purchasing environmentally preferable products and services.

To enhance local market development, the City will:

- Develop construction specifications for citywide building permits and Public Works contracts that support Zero Waste principles (e.g., for organics used in landscaping for new construction, glass, plastic and tires as recycled content construction materials);
- Work with other governmental entities, such as the Texas Department of Transportation, to clarify and adopt specifications for roadway projects that include more locally produced recycled content and materials;
- Develop a compost classification system to highlight different attributes and values of organic products;
- Specify Zero Waste vendor practices for City purchases for products and services, including green caterers and suppliers;
- Support the City's Office of Sustainability and Purchasing Office to develop environmentally preferable purchasing standards for use by all departments, including setting minimum recycled content standards and limitations on purchase of single-use products; and
- Conduct an annual "Re-Made in Austin" campaign through the Resource Recovery Development Program.

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² Calculated based on the methodology developed from research conducted by Michael Lewis for the Institute for Local Self-Reliance published in *Recycling Economic Development through Scrap-Based Manufacturing*. 1994.

Cost and Diversion Estimates for Resource Recovery Economic Development Implementation

Initiative	Date of Initiation
Electronic Clearinghouse for Byproduct Synergy	FY 2013
Establish Re-Made in Austin	FY 2013 – FY 2014
Develop Eco-Industrial Park	FY 2013 – FY 2015

Operational Expenses	First Year Costs FY 2013
1.0 FTE in FY 2013	\$86,000
One Time Expense: None	\$0
Annual Recurring Expenses: None	\$0
Annual CIP Debt Payment: Eco-Industrial Park Redevelopment	\$32,000
Total First Year Operational Expenses	\$118,000

TABLE 16



Chapter 16 / Citizen Engagement and Community Partnerships

The City of Austin has a long history of active inclusion of its citizens and the community at large in various decision making processes. The Department's is steering its operations toward Zero Waste, a high profile activity of value and interest to the community. Concerned citizens brought the Zero Waste concept to the Austin City Council, resulting in a 2005 Austin City Council resolution establishing Zero Waste goals for the City.¹ As such, the Department will engage the public in changes to Zero Waste policies.

16.1 / Citizen Engagement

The Department is committed to effectively involving the public in its planning and programming activities. Throughout 2010 and 2011, the Department was proactive in implementing a public engagement process that provided information, citizen input sessions and full public access to key decision-oriented processes. In addition, the Department is committed toward continuing the involvement of the public in rule development, topical work groups, the strategic planning processes and development of implementation plans for new programs. The Department will also publish an annual report each year to update Austin citizens on Department's activities.

The basic research and proposed programs presented in this Master Plan (Master Plan) were prepared by consultants and Department staff with significant input from stakeholders throughout the community, including Austin residents and businesses, the Solid Waste Advisory Commission (SWAC), other City Departments, representatives from communities and public agencies throughout the region, nonprofit and private sector service providers, academic institutions, community organizations and environmental

groups.

The Master Plan was developed over a 15-month period between April 2010 and June 2011. The policies, programs and infrastructure identified were developed based on research conducted and presented to stakeholder meetings and workshops held in August and November 2010. Citizens and stakeholders were invited to outreach workshops conducted in August 2009 prior to the beginning of the project to gather community values, interests and priorities. During the data gathering and research stages, public workshops were conducted in August and November 2010 to gather citizen input on the developing concepts and programs. The basic Zero Waste components were presented in a workshop in March 2011, which included substantial citizen input. In addition, the Department Director presented the draft plan to seven Boards, Commissions and Committees, incorporating their input in the final writing stage. Commissions and Boards consulted on the draft plan include the:

- Emerging Technology and Telecommunications Committee
- Environmental Board
- Planning Commission
- Resource Management Commission
- Solid Waste Advisory Commission
- Sustainable Food Policy Board
- Water and Wastewater Commission

Ensuring a robust public involvement process that includes a diversity of perspectives will help the City of Austin build a stronger regional understanding of Zero Waste implementation needs and issues. Active public involvement encourages proactive participation by citizens who will remain involved throughout the years of the Zero Waste journey.

16.2 / Community Relationships & Nonprofit Partnerships

Several community-based organizations and community leaders representing a broad spectrum of the City's diverse interests also participated in the planning process.

The Department commits resources toward engaging the whole community. It is important not to leave Zero Waste to waste experts. Many different skills need to be deployed in the journey towards Zero

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¹ Austin, Texas. City Council Resolution No. 20050519-4. Web. 20 Sept 2011.

Waste. All organizations including nongovernmental organizations, business, educational and governmental institutions that provide waste reduction, take-back, reuse, recycling and composting services should be involved in order to achieve Zero Waste. All of these groups and individuals will be challenged to pursue Zero Waste at home, at school, at university, at work and at play. The Department's communication with all sectors of the community will be ongoing, in all implementation phases of the Master Plan.

Community Culture Change

The City and its stakeholders recognize that achieving Zero Waste will require a shift in attitudes and behaviors that are practiced in everyday lives. Current rates of consumption and disposal are unsustainable.²

However, the Department is committed and to zero waste investing in:

- Community-based approaches
- Public education, outreach and social marketing
- Generator sector and demographic-specific solutions

Social marketing campaigns involve application of marketing alongside other techniques and tools to achieve specific social behavioral changes. A variation of social marketing has emerged as a systematic way to foster more sustainable behavior. Referred to as Community-Based Social Marketing by Canadian environmental psychologist Doug McKenzie-Mohr, the practice strives to change the behavior of communities to reduce their impact on the environment.³ Realizing that simply providing information is usually not sufficient to initiate behavior change, Community-Based Social Marketing uses tools and findings from social psychology to discover the perceived barriers to behavior change and ways of overcoming these barriers. Among the tools and techniques used in Community-Based Social Marketing are focus groups and surveys to discover barriers and commitments, prompts, social norms, social diffusion, feedback and incentives to change behavior. The tools of Community-Based Social Marketing have been used to foster sustainable behavior in many areas, including energy conservation, environmental regulation and recycling. Education, outreach and marketing plans are discussed in more detail in Chapter 24 / Communications Plan.

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² Gutierrez, David. "Supporting World Population at U.S. Consumption Rates Would Require Five Earths." *Natural News*. Truth Publishing International Lmted.. 26 March 2008. Web. 16 Jan 2011.

³ McKenzie-Mohr, Doug. "Fostering sustainable behavior through community-based social marketing." *American Psychologist*. May 2000: 531-537.

16.3 / Regional Cooperation & Inter-local Agreements

Regional Cooperation can create a Zero Waste culture change throughout the regional wasteshed, including the 33 counties that use Austin area landfills.

The City works closely with the Capital Area Council of Governments (CAPCOG) to research new policy and program areas and to identify the existing and planned collection and processing infrastructure. CAPCOG and the City collaborated to research regional private sector infrastructure resources. CAPCOG includes Bastrop, Blanco, Burnet, Caldwell, Fayette, Hayes, Lee, Llano, Travis and Williamson counties and is responsible for regional solid waste planning. Approximately 245 haulers, processors, and household hazardous waste (HHW) materials handlers were identified within the City and CAPCOG area and 80 of these businesses responded to the survey.⁴

Stakeholders in the City identified regional cooperation as a key strategy for achieving Zero Waste. There are several approaches to regional cooperation, including formalizing and expanding the CAPCOG role in planning for Zero Waste; and the development of inter-agency or inter-local agreements between neighboring communities.

In 2010, SWAC formed a committee to research strategies for regional coordination. The committee recommended the development of an inter-local agreement between the City of Austin and Travis County for the purpose of developing an Austin-Travis County Zero Waste Plan compatible with the Austin Zero Waste Strategic Plan. The approach would form the basis for establishing regional Zero Waste goals throughout Central Texas. As a first step in the process of establishing regional Zero Waste goals, all counties in the wasteshed would be invited to become signatories to an inter-local agreement to produce a comprehensive regional wasteshed master plan based on Zero Waste. The committee concluded that additional parties can easily become signatories to existing inter-local agreements, thereby allowing a measured, sequential process of adoption and implementation of regional goals at a pace determined by the parties involved.⁵

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⁴ "Austin Needs Assessment Technical Memorandum." City of Austin. November 2010. Web. 14 Sept. 2011.

⁵ City of Austin Solid Waste Advisory Committee. "Solid Waste Management Districts Subcommittee Final Report and Recommendations." 1 March 2010.

regional coordination and to undertake project-specific regional opportunities. The Department will explore possibilities through this process of developing regional resource recovery centers, regional reuse, recycling and composting infrastructure, and regional funding for Zero Waste. Likewise, regional planning and regional joint efforts in public education and marketing of recycling and Zero Waste initiatives are desirable. Through inter-local agreements within the framework of CAPCOG, the Department will encourage regional solid waste planning efforts.

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Chapter 17 / Private-Public Partnerships

Public-private partnerships are services funded and operated through partnerships between government and one or more private sector companies. There are several opportunities for public-private partnerships in which the Department can engage to encourage operational efficiencies and support diversion activities.

The Department collects approximately 25 percent of municipal solid waste generated within the City of Austin (City) through its operations and contracts. Approximately 68 percent of materials generated in the City are collected by private sector service providers and private recyclers operating in the City. The remaining 7 percent of materials generated in the City are self-hauled to landfills and recycling centers. Most of the reuse, recycling, composting and landfill infrastructure in the region is owned and operated by private sector service providers. Therefore, the Department relies on partnerships with private sector service providers to provide the collection system and processing infrastructure to meet the needs of commercial generators.

17.1 / Tools to Foster Partnerships

Research conducted for the Master Plan included a survey of best practices and the development of several case studies of model public-private partnerships, including those in Boulder, CO, and San Francisco, CA. The partnership surveys revealed several tools that can help foster successful partnerships. These tools or mechanisms allow members of the partnership to work with one another toward a shared goal and to foster trust and effective communication. The most effective mechanisms found in these case studies are described below:

- **Alignment of Interests** – In each of the case studies profiled, there was a mutual interest in moving toward a shared goal or an alignment of interests. This mutual interest was to increase recycling and/or reuse of materials. Governmental entities generally have an interest in expanding recycling

for the public interest, to reduce carbon emissions and to increase diversion rates. In contrast, if increased recycling would erode the client base for a partner (say of a landfill) and result in less income for a company, the two partners may not have an alignment of interests or a strong partnership.

- **Trusting Relationship** – Trust is key to developing a strong partnership. All partners must feel confident that they are getting a fair deal.
- **Frequent Contact** – Frequent contact between partners can create a positive working relationship and foster efficient communication.
- **Clearly Communicate Expectations** – Establishing goals and putting expectations in writing can keep partnerships on track. Baseline information on the amount of customers a partner is expected to service, diversion rates, and expected processed tonnages should be established at the beginning of the relationship and reviewed periodically to ensure they continue to represent a baseline for the area.
- **Utilizing the Experts** – Effectively using the skills of each partner helps foster a sound partnership. Instead of micromanaging, service providers may be able to determine the best way to handle work in a way that meets or exceeds established goals and expectations. It would be beneficial to have the most experienced partner negotiate with private vendors to get the best deal. Companies already in the business of operating a materials processing facility, landfill, composting facility or other recycling entity may have experience and expertise that the Department lacks. By using facilities already operational, the public does not have to arrange for financing for such facilities and can acquire use of those facilities through competitively awarded service contracts.
- **Innovations/Scope Modifications** – Allowing each member of a partnership to come up with new ideas and to propose scope modifications can foster success.
- **Stability** – Ensure that rates and contracts are mutually beneficial, have aligned interests, and provide stability to all partners. There is more opportunity to develop a strong, two-way working relationship when there is stability knowing that the same provider will be in place for some time.

17.2 / Opportunities for Partnerships

Fostering Partnerships with Current Service Providers

The Department contracts for services with nonprofit and private sector service providers for drop-off recycling, recyclables processing, and long-term landfill disposal. The Department also contracts with service providers for collection services at Austin facilities the Central Business District.

There is opportunity to more closely align Austin's goals with its service providers by employing some of the tools described in the case studies: alignment of interests, transparency, frequent contact, letting expectations be known, using experts, encouraging innovation and scope modifications, and stability.

Expanding Public-Private Partnerships

Research conducted for the Master Plan included surveys of several nonprofit and private sector companies operating in the City and identified several opportunities for new public-private partnerships. The results from these surveys are summarized below.

- **Partnering with Nonprofits with Specialized Expertise** – There are several organizations in the Austin area that have expressed interest in partnering with the Department to implement various Zero Waste initiatives. These organizations have access to multiple facilities, staff and other resources that minimize the need for new construction or other investments from the Department. Additionally, because many of these organizations have multiple locations, they offer increased opportunities for the public to conveniently access Zero Waste services. The Department could explore partnerships to open Eco-Depots, Resource Recovery Centers and other facilities as well as provide opportunities for job training and workforce development.
- **Partnering with Private Sector Service Providers for Processing Capacity** - The private companies surveyed all indicated that they have unused capacity at their facilities and could process additional materials for reuse, recycling and composting from City generators.

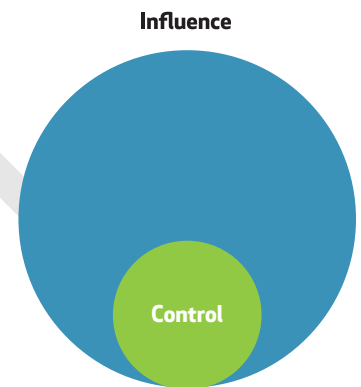
The Department conducted follow-up meetings with additional private sector service providers. Many of the private companies stressed that existing local resources are under utilized, and there is much planned additional capacity. They would like the Department to support the existing resources available in the area rather than construct new public facilities.

17.3 / Developing Zero Waste Infrastructure through Zero Waste Policies and Public-Private Partnerships

The City of Austin's Zero Waste goal is to reduce the amount of material burned or buried by 90% by 2040. The City, as an organization, looks to Austin Resource Recovery to implement Zero Waste initiatives and develop the appropriate partnerships to achieve this goal. Like the Department, the City has a circle of control and a circle of influence. The Department's responsibility is to take steps that strengthen the Department's circle of influence, thereby strengthening the City's circle of influence.

The Department's Zero Waste System includes both a:

- **Circle of Control** – services that are directly provided by the Department or through its contractors; and
- **Circle of Influence** – services that are provided by nonprofits and other private sector service providers as a result of policies, ordinances and incentives developed by the Department.



Zero Waste policies, including ordinances, incentives, bans, take-backs, purchasing specifications and advocacy, allow the Department to support new nonprofit, private sector and regional programs and facilities and expand the Department's circle of influence.

Zero Waste policies are extremely important because they influence the 75 percent of materials that are generated in the City, but not directly handled by the Department. By setting an example and by working cooperatively in public-private and regional partnerships, the Department and therefore the City can achieve Zero Waste and lead the region and the state.

There are several opportunities for the City to develop Zero Waste infrastructure through public-private partnerships. Private sector initiatives are also expected to be undertaken in response to City policies.

- **Materials Recovery Facilities for Recyclables** – Developed by the private sector in response to the Universal Recycling Ordinance and through contracts with the Department for City-collected materials. The Department recently signed long-term agreements with two recycling processors to support the Single Stream Recycling Program.
- **Composting Facilities for Organics** – Developed by the private sector in response to the Universal Recycling Ordinance and through

contracts with the Department for City-collected materials. The Austin Water Utility recently increased organics processing capacity at the Hornsby Bend Biosolids Management Plant for residential organics; however, the commercially-generated organics will continue to be collected and processed by the private sector.

- **Construction, Deconstruction, and Demolition (CD&D) debris process facilities** – Developed by the private sector in response to the Construction, Deconstruction and Demolition Debris Ordinance.
- **Eco-Depots and Private Resource Recovery Centers** – Managed by private sector or nonprofit organizations independently or through agreements with the Department for hard-to-recycle materials such as carpet and paint.
- **Eco-Industrial Parks** – Developed by the private sector independently or with support from the City's Economic Growth and Redevelopment Services Office.

17.4 / Service Provider Partnerships

The new Universal Recycling Ordinance (URO) will require all commercial and multifamily generators to have recycling services. The City is also developing a new Hauler Ordinance to modify the Department's licensing process for private sector services providers. These policies are discussed in Chapter 21/Policies and Ordinances.

The Department ensures that all generators in the City receive collection services for discarded materials through several regulatory mechanisms:

- **Single-Family Residences and Multifamily Units (with cart service)**—receive cart collection service provided by Department crews. Department crews collect trash and Single Stream Recycling in carts and yard trimmings in containers provided by residents.
- **Multifamily Units (with Dumpster service)**—receive Dumpster service provided by a private collector through a contract with the Department. No recycling or yard trimmings are collected.
- **Commercial Businesses (with cart service)**—Approximately 2,000 commercial generators in the City receive Department cart collection services.
- **Multifamily Complexes and Commercial Businesses in the**

Central Business District—In excess of 600 multifamily and commercial generators receive trash dumpster and compactor service provided by a private collector through a contract with the Department. Approximately 70 accounts also receive cardboard recycling service and about 12 accounts receive glass recycling service.

- **Multifamily Complexes and Commercial Businesses Outside of the Central Business District**— Multifamily and commercial generators outside of the Central Business District receive trash dumpster and compactor service provided by private collectors licensed by the Department. There are currently 13 licensed private solid waste collectors operating within the City. The URO requires that all businesses with 100 employees or more and multifamily properties with 100 units or more must provide on-site recycling services. Under this requirement, businesses and multifamily properties continue to choose their own waste haulers and recyclers and to negotiate prices for these services.

17.5 / Universal Recycling (and Composting) Ordinance

The City Council adopted Phase 1 of the Universal Recycling Ordinance (URO) on Nov. 4, 2010, which requires all multifamily buildings, office buildings, and institutional properties in the City to recycle.¹ Phase 1 of the URO will be phased in over four years, beginning in October 2012. The Department conducted an outreach process in 2011 to engage stakeholders on the planning and implementation of the new rules that will guide implementation of the program. The Department also conducted stakeholder meetings to discuss the implementation of Phase 2 of the ordinance to address food service establishments, retail, hospitality, manufacturing and industrial generators.

In Phase 2 of the URO, which will evolve to include composting and renamed the Universal Recycling and Composting Ordinance (URCO), compostable organics will be included among the materials targeted for diversion from landfills. Food scraps and compostable paper account for about 30 percent of citywide disposal. Organics disposed in landfills create methane, which is a powerful greenhouse gas that is at least 71 times more powerful than carbon dioxide. Phase 2 of the URCO will be fully implemented by 2016.

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¹ Austin, Texas. City Council Resolution No. 20101104-018. Web. 19 Sept 2011.

Phase 3 of the URCO will include single-family residents in the requirement to recycle and compost. Phase 3 of the URCO will be fully implemented by 2016.

17.6 / Education and Outreach Synergies

As described in Chapter 24/Communications Plan, the Department is undertaking a major outreach effort to educate both residential and commercial generators about the new Zero Waste programs and the requirements of the Universal Recycling Ordinance. There are opportunities to build on these efforts with the nonprofit and private sector service providers through:

- **Cooperative Advertising and Media Buys** – the Department can lead a regional effort to promote the Zero Waste programs and collection systems, which can be amplified by outreach and advertising conducted by nonprofit and private sector services providers.
- **Universal Signage and Terminology** – the Department can work with local service providers to come to agreement on common terms, such as “food scraps,” “organics” or “compostables” to ensure that all generators are familiar with the terms and the materials included in the program. To the extent possible, the Department will work with local service providers to find common ground on using similar images and colors for communicating what goes where (e.g., blue for recycling, green for composting, etc.).
- **Cooperative Messaging** – through the development of its Communications Plan, the Department can work closely with local service providers to streamline messaging and outreach tools. To the extent possible, the City and local service providers can agree about what kinds of materials are acceptable for recycling and composting regionally. This will help to reduce confusion between generators and increase participation in Zero Waste programs.

17.7 / Service Opportunity Analysis

Coinciding with the implementation of the URCO, the Department will evaluate the services available through private sector service providers. During 2008, an analysis was conducted to identify the service gaps or service opportunities needed in the City as part of the Zero Waste Strategic Plan. At that time, the service opportunity analysis identified food scrap collection and processing, and construction and demolition debris processing as potential service gaps. Since that time, several private sector service providers have begun to offer food scrap collection services, and two composting operations have been permitted to compost food scraps.

At stakeholder meetings conducted by the Department, some commercial generators expressed the concern that there was not sufficient, competitively priced, recycling and food scrap collection offered by the private sector. Some stakeholders expressed an interest in having collection services provided through the Department.

Nonprofit and private sector services providers operating in the City have expressed a strong interest in providing recycling and food scrap collection and processing services to commercial generators in the City. At this time, the Department has concluded that there are sufficient private sector services available to provide cost-effective solutions to the commercial generators. The Department will continue to monitor service availability and pricing to ensure that the needs of the commercial generators are met.

To monitor the effectiveness of the URCO and ensure that there are no service gaps, the Department will collaborate with nonprofit and private sector service providers, commercial generators and other stakeholders. The Department will work to ensure that the business needs of the nonprofit and private sector service providers are balanced with the needs of the generators and the City.



Chapter 18 / City Department Partnerships

There are significant opportunities to expand partnerships between Austin Resource Recovery (ARR) and other City departments. The ARR Department Director held meetings with 25 City Department Directors and with six Boards and Commissions and one Council committee, to discuss the potential Master Plan impacts on their departments and to engage in collaborative, future planning.

18.1 / Partnerships with other City Departments

Opportunities identified by the directors include the following activities:

Austin Animal Services Office

- Comprehensive Lost and Found database by providing data about companion animals picked up for disposal
- Support services for animal issues present (loose, aggressive dog, etc.).

Austin Convention Center and Palmer Events Center

- Continuation of visitor recycling opportunities through visitor recycling containers.
- Continuation and expansion of facility operations recycling.
- Continuation of food organics collection within the two facilities.
- Offering an Eco-Green Exhibit Center with Zero Waste displays.

Austin Energy

- Assisting in the deployment of a Solar Farm at the FM 812 Landfill.
- Promotion of construction and demolition diversion through the Green Building Program.
- Collection and material recovery of old energy-inefficient refrigerators.

- Promotion of the collection of energy-efficient fluorescent lamps through a retail take-back program.
- Participation in an inter-departmental School and Public Education Program, to include Sustainable/Green Gardening, Litter Prevention, Energy Conservations, Nature Conservation, Water Conservation, Zero Waste and Resource Conservation, and Community Development Initiatives.

Austin Fire Department

- Participation in a Battery Recycling Retail Take-back Program, in coordination with the bi-annual smoke alarm battery change-over program.

Austin Police Department

- Coordination of an annual Pharmaceutical Take-back Program utilizing the Drug Enforcement Agency theme of “Good Medicine – Bad Behavior.”

Austin Public Library Department

- Continuation of visitor recycling opportunities through visitor recycling containers.
- Continuation and expansion of facility operations recycling.
- Continued support of Recycled Reads, which includes the sale of expired books and electronic media.
- Continued support of the Leaf for a Leaf program which promotes borrowing library books to reduce the number of trees that are cut down to make paper and planting trees to save on the energy used to cool homes and businesses. The program celebrates trees in the late fall through the early winter because it is the best time to plant trees in Central Texas.
- House educational materials to be available to the public, such as DVDs of the Department’s Zero Waste reality TV show, Dare to Go Zero.
- Participation in an inter-departmental School and Public Education Program, to include Sustainable/Green Gardening, Litter Prevention, Energy Conservations, Nature Conservation, Water Conservation, Zero Waste and Resource Conservation and Community Development Initiatives.

Austin Water

- Continuation and expansion of the composting operations at Hornsby Bend.

- Support for the addition of an Organics Food Scrap collection and processing program, in cooperation with the TCEQ.
- Participation in an inter-departmental School and Public Education Program, to include Sustainable/Green Gardening, Litter Prevention, Energy Conservations, Nature Conservation, Water Conservation, Zero Waste and Resource Conservation and Community Development Initiatives.

Aviation Department

- Continuation of visitor recycling opportunities through visitor containers.
- Continuation and expansion of facility operations recycling.
- Offering an experimental Organics Collection Pilot with the facility food vendors.
- Offering an Eco-Green Exhibit Center (similar to Convention Center) with Zero Waste Displays.
- Offering a “pilot” In-Flight Recycling Service for airlines serviced by ABIA.

Code Compliance Department

- Assistance in enforcing illegal dumping ordinances.
- Support in enforcing diversion ordinances, including the Universal Recycling Ordinance.
- Support in public education efforts on rules and regulations regarding diversion activities.

Communications and Technology Management

- Continuation of recycling outdated computers and electronic devices.
- Conversion of City printers and copiers to duplex capability.
- Support and leadership in green electronics purchasing policies.

Economic Growth and Redevelopment Services Office

- Locating resource consumption small businesses and encouraging their relocation to Austin
- Providing technical assistance in resource matching in cooperation with by-product synergies
- Support incentives to draw recycling re-processors to Austin, to reduce the shipping carbon footprint of local recyclers
- Support in the planning and development of an Austin Eco- Business Park and an Austin Eco- Industrial Park, drawing businesses that can reduce or consume waste generated locally, and provide a business environment that is water conservation and energy conservation oriented.

- Support brownfields real estate redevelopment incentives and marketing.

Fleet Services

- Continuation of the recycling of fleet maintenance and repair operations byproducts such as tires, batteries, used filters, scrap metals, freon, cardboard and paper products, vehicle fluids and other non-vehicle fluids such as solvents.
- Support and leadership in offering greening fuel options CNG, E-85 ethanol-based fuel, Hybrids, and Electrics to the Department's operations.
- Continued support in eco-green purchasing for Fleet operations.
- Exploration of a joint-operation North Fueling Center with ARR

Government Relations Office

- Support for state and federal legislation that support material diversion, including but not limited to container recovery, product redesign, products bans, and extended producer responsibility.
- Support brownfield real estate redevelopment incentives to include Brownfield state and federal tax incentives.

Health and Human Services Department

- Support for the development of food organic collection and storage standards.
- Support for the development of food-grade oils collection and recycling standards.
- Support for the Brownfield real estate redevelopment initiatives to ensure safety of public health, provide expertise to minimize impacts to human health and the environment.

Human Resources Department

- Develop electronic time sheets to reduce paper consumption
- Adoption and implementation of a paperless office goal through the use of available scan software.

Law Department

- Support for the development of local policies and city ordinances that support implementation of the URO and other future diversion ordinances.
- Support for local ordinances that support material diversion, including but not limited to container recovery, product redesign, products bans, and extended producer responsibility.

Neighborhood Housing & Community Development Office

- Support in the implementation of recycling opportunities at affordable housing rentals.
- Support brownfield real estate redevelopment identification of properties, incentives and marketing.
- Explore collaborative efforts to pilot program-opportunities for zero waste communities.
- Support through marketing and educational efforts the implementation of recycling opportunities at affordable housing rentals.
- Support brownfield real estate redevelopment identification of properties, incentives and marketing.
- Participation in an inter-departmental School and Public Education Program, to include Sustainable/Green Gardening, Litter Prevention, Energy Conservations, Nature Conservation, Water Conservation, Zero Waste and Resource Conservation and Community Development Initiatives.

Office of Sustainability

- Create an Existing Buildings Task Force to focus on sustainability for all City owned and leased facilities, to include integrated waste reduction and diversion.
- Continued support of the Interdepartmental Sustainability Working Group, focused on green standards for new City facilities.

Parks & Recreation Department

- Continuation of visitor recycling containers.
- Continuation and expansion of facility operations recycling.
- Development and support of the food organics collection within Parks facilities.
- Offering Eco-Green Exhibits with Zero Waste displays at the Nature Center.
- Provide recycling opportunities at senior centers and recreation centers
- Participation in an inter-departmental School and Public Education Program, to include Sustainable/Green Gardening, Litter Prevention, Energy Conservations, Nature Conservation, Water Conservation, Zero Waste and Resource Conservation and Community Development Initiatives.
- Explore potential PARD operated sites to host Eco-Depots.
- Continue support of the annual Christmas Tree Recycling Program.
- Continued use of composted mulch in operations.
- Expanded support of Community Gardens and the collection and use

of composted material.

- Use of recycled materials in PARD construction projects, including glass recycling in sidewalks and concrete surfaces.
- Support of recycled arts projects within the Artist in Residence Program, annual summer camps, and through the “Total Cool – Totally Art” Program.
- Reduce cigarette litter through a tobacco free parks policy.
- Support brownfield real estate reuses, by identifying sites, partnering to apply for green-space grant funds.
- Partner with ARR to offer recycling and composting at special events located in City PARD facilities

Planning & Development Review Department

- Promoting reduced waste generation through the Leadership in Energy and Environment Design (LEED) Program and the implementation of Green Building Standards.
- Leadership in the development and implementation of a C&D Ordinance through City permitting processes.

Public Works Department

- Continuation and expansion of facility operations recycling.
- Development and support of glass recycling pilots, including sidewalk, curbing and road bed substitutes for aggregate.
- Development and support of tire rubber recycling pilots, including asphalt and road bed substitutes for aggregate.
- Specifying engineering standards for reused and recycled materials in City construction projects.
- Support brownfield real estate redevelopment projects by soliciting and managing contracts.

Purchasing Office

- Adoption and implementation of environmentally preferable purchasing policies.

Transportation Department

- Adoption and implementation of Environmentally Preferable Purchasing policies, including recycled content road construction safety equipment/signage.

Watershed Protection Department

- Continuation and expansion of litter collection and recycling efforts on Lady Bird Lake, Austin creeks, and other WPD-maintained drainage

easements.

- Support of litter prevention and recycling education programs through Earth Camp, Earth School, and the Let's Can It! Austin campaign.
- Continued support of the Green Neighbor Program, a game to promote environmental awareness including waste reduction.
- Participation in an inter-departmental School and Public Education Program, to include Sustainable/Green Gardening, Litter Prevention, Energy Conservations, Nature Conservation, Water Conservation, Zero Waste and Resource Conservation and Community Development Initiatives.
- Support brownfield real estate reuse by assisting with the identification of properties and by providing technical assistance with the evaluation and remediation of such properties.

All City Departments

- Increased visibility and support of Office Stream Recycling.
- Document the diversion activities of each office and facility and share with ARR.
- Innovate new diversion opportunities.
- Explore and support environmentally preferable purchasing options.
- Engage the department's customer base in support of diversion activities.

Coordination through the Office of Sustainability

These efforts will be further explored and coordinated by an interdepartmental Green Team that would meet regularly and track performance and provide leadership in Zero Waste. The City's Sustainability Officer has the primary responsibility for working with other City departments to implement green initiatives. ARR will provide support to the Office of Sustainability in working with the other Departments on the implementation of Zero Waste policies and programs.

The Strategic Initiatives Division will undertake the following tasks:

- Assisting City facilities to comply with URO and
- Coordinating with the Office of Sustainability to form an inter-departmental green team to provide leadership in Zero Waste.

18.2 / Austin Climate Protection Plan

City Council adopted the Austin Climate Protection Plan (ACPP) in 2007 to build a more sustainable community.¹ The ACPP was adopted to make Austin the leading city in the nation in the fight against climate change. The broad elements of the plan to reduce greenhouse gas emissions include:

- **Municipal Plan** - Make all City of Austin facilities, vehicles, and operations carbon-neutral by 2020.
- **Utility Plan** - Expand conservation, energy efficiency, and renewable energy programs to reduce Austin Energy's carbon footprint; cap carbon dioxide emissions from existing power plants; and make any new electricity generation carbon-neutral.
- **Homes and Buildings Plan** - Update building codes for new buildings to be the most energy-efficient in the nation, pursue energy efficiency upgrades for existing buildings, and enhance Austin Energy's Green Building program.
- **Community Plan** - Engage Austin citizens, community groups, and businesses to reduce greenhouse gas emissions throughout the community.
- **"Go Neutral" Plan** - Provide tools and resources for citizens, businesses, organizations, and visitors to measure and reduce their carbon footprint.

ARR's support of the implementation of the ACPP includes the following:

- Utilize AE Green Power Options in all ARR facilities.
- Purchase alternative energy vehicles through the use of non-petroleum fuels.
- Support the Climate Action Team to inventory greenhouse gas emissions from ARR operations and support a comprehensive emission reduction plans.
- Support the community energy needs with renewable resources, including the construction of a solar power array at the City of Austin Landfill.
- Develop options to reduce the Department's carbon footprint through more efficient routing of collection vehicles.

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¹ City of Austin. "Austin Climate Protection Plan." CoolAustin.org. January 3, 2011. Web. 1 Sept. 2011.

18.3 / Austin Comprehensive Plan & Imagine Austin

The Austin Comprehensive Plan provides broad-level guidance on how Austin will grow and develop into the future. According to the City Charter, the Comprehensive Plan contains “the Council’s policies for growth, development and beautification of the land within the corporate limits and the extraterritorial jurisdiction of the city.” The Imagine Austin Comprehensive Plan is a community’s long-range guide for shaping future growth and development over ten, twenty, or more years.²

The Department’s impact on the implementation of these growth and development objectives is noted within the language of the Austin Comprehensive Plan:

Key Issues and Trends

More residents and businesses need to be encouraged to recycle to reduce the amount of solid waste deposited in regional landfills.

Key Challenges for the Future

Increasing recycling participation rates from multifamily, commercial, institutional, industrial and manufacturing waste generators.

Conservation and Environment Policies

Improve the air quality and reduce greenhouse gas emissions resulting from vehicle use, traffic and congestion, industrial sources and waste.

Reduce the overall disposal of solid waste and increase reuse/recycling to conserve environmental resources. Develop local recycling and composting facilities with capacity to handle large volumes of discarded materials.

Solid Waste Policies

Address the waste management implications of continued growth in Central Texas through a regional solid waste management plan.

Expand waste diversion rates and services:

- Require recycling at apartment complexes, retail establishments, restaurants and manufacturers
- Increase the types of materials that can be added to curbside collection
- Develop more effective recycling practices for construction and demolition debris
- Increase composting at homes and businesses
- Improve recycling of material and food scraps in public spaces, in

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² The Austin Comprehensive Plan is currently in the drafting phase. Information on stakeholder meetings and copies of plan drafts, background documents, and maps can be found at: <<http://www.ci.austin.tx.us/compplan/>>.

trash receptacles on city streets and at public events

- Divert hazardous waste from landfills and increase participation in recycling hazardous materials (e.g., develop an on-call door-to-door hazardous waste collection program).
- Divert bulk items such as furniture and other household items from landfills and consider ways to recycle or reuse these materials.
- Improve awareness and participation in the City's recycling programs through traditional and emerging methods such as a large-scale media, social marketing campaigns and presence at public events.
- Continue to work with the Texas Product Stewardship Council and others to advocate for statewide "extended producer responsibility" initiatives that require manufacturers and retailers to stop using "hard to recycle" and/or toxic products.

Conservation and Environment

Develop an educational and awards program to showcase best practices in sustainable and low impact development and achievements or innovations in waste reduction and recycling.

City Facilities and Services

Develop design standards for public buildings and spaces that promote high-quality community focal points in the areas where they are located.

These standards should address issues such as:

- Resource recovery such as recycling, composting, and reuse
- Seek opportunities to align water, energy, and waste conservation/reduction funding, education, and incentives.
- Implement the Zero Waste Strategic Plan and Austin Resource Recovery Master Plan to divert 90 percent of waste from landfills and incinerators by 2040, with particular attention to:
 - Expanding diversion opportunities such as recycling and composting for residents and businesses;
 - Supporting resale, refurbishing, and reuse opportunities throughout Austin;
 - Fostering public awareness of Zero Waste through education, recognition, and incentive programs;
 - Assessing the current capacity of waste diversion facilities to coordinate with the Growth Concept Map.³

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³ City of Austin. "Preliminary Draft Growth Concept Map." Nov 2010. *ImagineAustin.net*. March 2010. Web. 1 Sept 2011.

18.4 / Create Austin Community Cultural Plan

The Create Austin Cultural Master Plan is the result of a two year process of cultural assessment, research, and community engagement undertaken to chart a course for Austin's cultural development over the next 10 years. The Create Austin Leadership Council was appointed to develop and implement the Plan. Create Austin is a community cultural planning process that will identify Austin's creative assets and challenges, define goals, and establish recommendations to invigorate Austin's "culture of creativity" to the year 2017. This public/private collaboration will define specific strategies for community-wide implementation in order to sustain Austin as a magnet for arts, culture, and creativity.⁴

ARR's impact on the implementation of the Community Cultural Plan is in support of the Arts, Culture and Creativity objective. ARR will support and enhance its participation in the Art in Public Places Program.

18.5 / Downtown Austin Plan

To address pressing issues – and prepare for long-term growth – the City of Austin commissioned the Downtown Austin Plan. After three years of detailed development, the Downtown Austin Plan is now ready for its final community review as it heads towards City Council adoption in 2011.⁵

The drafted plan establishes action priorities for the next 10 years. It recommends steps to help Downtown become even more economically vibrant, livable, walkable, mobile, inclusive, diverse, and culturally alive – while preserving authentic Austin character. The Downtown Austin Plan offers seven transformative steps for the next 10 years. These positive steps are among those proposed in the Downtown Austin Plan to help realize the community's vision.

The Department's impact on the implementation of the Downtown Austin Plan is in support of the following objective.

Invest in Downtown infrastructure. Make utility and drainage improvements that address existing deficiencies and that support positive development in a sustainable way. Establish flexible funds and the leadership that can respond to development opportunities dynamically.

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⁴ The Metropolitan Group. "Create Austin Cultural Master Plan." City of Austin. 2009. Web. 19 Sept 2011.

⁵ City of Austin. "Downtown Austin Plan." Nov 2010. *ImagineAustin.net*. Web. 1 Sept 2011.

ARR currently administers a downtown solid waste collection contract on behalf of the Downtown Austin Alliance. To support the Downtown Austin Plan, ARR will continue this activity, and include recyclable and compostable collections throughout the service area.⁶

18.6 / Watershed Protection Master Plan

The mission of WPD is to reduce the impact of flooding, erosion and water pollution on our community in order to protect lives, property and the environment. To accomplish this mission, WPD completed Phase I of a Watershed Protection Master Plan (WPMP) to better prioritize service needs and refine program direction. The Master Plan inventories existing watershed problems and gauges the impact of future urbanization in seventeen (17) watersheds - including all of the urban watersheds and five surrounding non-urban watersheds. The WPMP identifies opportunities for optimizing existing resources through improved prioritization, mission integration and a renewed commitment to the use of environmentally responsible, cost-effective and sustainable solutions.⁷

To facilitate the solution development process, available watershed protection techniques were characterized along with their corresponding levels of effectiveness, cost and other implementation considerations. The complete inventory of watershed protection techniques contains over 130 different solution types. Watershed protection solutions, to reduce pollutant loads on local watersheds, that are supported by the Department include:

- Household Hazardous Material Collection and Water-Impact Avoidance
- Contaminated Site Cleanup, Remediation, and Redevelopment
- Litter Collection, Abatement and Prevention

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⁶ Commercial Garbage Collection - Central Business District. City of Austin. nd. Web. 28 September 2011.

⁷ City of Austin. "Watershed Protection Master Plan, Phase 1 Watersheds Report." COA-WPD: 2000-01. Web. 19 Sept 2011.

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Chapter 19 / Educational Institutions Partnerships

Planning for the future is a community value centered on our local higher education systems. It is a Departmental value to be supportive of the local educational institutions through various partnerships. Universities offer interns to engage in local implementation pilots, academic research to support new product designs and life cycle studies, and student engagement in community Zero Waste programs.

Enable, Engage, Encourage, and Exemplify¹

University leaders, civic leaders and elected officials can work together to lead by example. This requires clear and cooperative ventures and consistent messages through a unified public education effort. Strategies for changing behavior include:

- Performing a community waste assessment to determine the needs and weaknesses in local diversion efforts;
- Researching and redesigning product designs through life-cycle analysis to support waste reduction and recycling;
- Providing leadership to visibly encourage and reward successful innovation;
- Using incubator models for testing and piloting innovations; and
- Establishing institutions to link small scale enterprises to larger organizations such as business and legislative bodies.

To develop and implement these strategies, the Department plans to enter into inter-local agreements with area universities, educational institutions and research facilities.

19.1 / Material Stream Analysis

The Department is interested in entering into agreement(s) with local educational institutions to perform various waste audits to better understand current waste disposal streams. A Zero Waste consultant and interns will be hired through a cooperative agreement to perform the following services:

- Assess the information gained from any previous waste audits performed in the region;
- Expand the scope of any previous audits to include 12 Market Categories of materials that comprise the entire stream of materials discarded;
- Submit detailed reports on the amounts, types and value of materials currently being discarded;
- Recommendations on how area educational institutions and other facilities can perform future studies in-house;
- Audit citywide trash flow to 12 Market Categories of materials;
- Audit City residual trash from its Single Stream Recycling Program; and
- Submit a detailed report on the amounts, types and value of materials identified in the City's trash and recycling residual materials.

These research studies will quantify the flow of materials to evaluate how materials flow and the potential for designing wastes out of the system through Zero Waste planning. The research team will work with City sustainability offices and other stakeholders to ensure unique issues and challenges of concern are addressed in the final report.

The resulting report will provide the Department with an analysis of waste streams that can be redirected from landfilling through new diversion programs. Waste stream analyses will be performed every five years to assist the Department in strategic planning for the development of new diversion implementation strategies.

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¹ Knott, David, Stephen Muers and Stephen Aldridge. *Achieving Culture Change: A Policy Framework*. United Kingdom Cabinet Office, Strategy Unit. Jan. 2008. Web. 2 Jan 2010.

19.2 / Waste Generator Audits

To implement the Universal Recycling Ordinance and increase material diversion, the Department will pursue inter-local agreements with the Capital Area Council of Governments and one or more local educational institutions to inventory the material disposal and diversion streams of the top 100 waste generators in the City. A more intensive study of the top 10 waste generators will be performed in FY 2012, as a means to immediately impact the largest waste flows in the City. Each site audit will organize, analyze and report the solid waste flows from the facility, and recommend waste reduction and diversion activities. To assist in this project, the Department will utilize resources from the EPA's WasteWise Program and the WasteWise Re-TRAC data management and reporting system.

19.3 / Zero Waste Certification and Training

The implementation of Zero Waste presents more opportunities and challenges than simply creating an advanced recycling program. In order to reach our Zero Waste goals and reduce our impact on the environment, significant changes in the way we do business must be developed and implemented, including rethinking the design, manufacture, packaging, transporting, marketing, disposal and end-of-life disposition of materials. Change-management methodologies utilized in the implementation of Lean Enterprise, Six Sigma, and other organizational continuous improvement philosophies must be developed, communicated and implemented within the framework of Zero Waste. The transformation of a traditional "build-to-inventory" manufacturing plant into a lean and continuously improving "build-to-order" production facility is analogous in scope to the transformation from traditional trash collection to Zero Waste. In addition to continuous improvement philosophies, the International Organization for Standards (ISO) propagates operating standards to help organizations improve efficiencies by consistently documenting procedures. Recently, ISO developed a series of standards, including ISO 14001, that requires organizations to create environmental management systems to help drive the implementation of policies and objectives related to sustainability.²

Due to the scope and complexities of the tasks related to achieving Zero Waste and the opportunities for green jobs, Austin Resource Recovery

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² "ISO Standards collection on CD-ROM: ISO 14000 - Environmental Management." *International Organization for Standards*. 2007. Version 5, English. ISBN 978-92-67-10446-1.

believes that a formal Zero Waste certification and training program is needed. A certification and training framework will help integrate the Zero Waste philosophies into a methodical approach to drive meaningful improvements that lead organizations toward Zero Waste. Some of the topics covered in a Zero Waste Certification might include:

- Design for recyclability;
- Packaging redesign;
- Improving recycling and diversion programs;
- Onsite material flow assessments;
- Using local recycled material feedstock;
- Effective composting;
- Green purchasing;
- ISO 14000; and
- Changing unsustainable behaviors.

The Department will engage the educational community to develop locally administered Zero Waste Certification trainings that target entrepreneurs, private service providers, haulers, community organizations and businesses. The Department will collaborate with local colleges and universities, subject-matter experts, and nonprofits to develop the trainings and administer the Certification program including:

1. Engaging in a strategic planning process to evaluate training needs and topics;
2. Contracting with qualified organizations to develop training materials and certification criteria;
3. Entering into agreements with local colleges and universities to offer Zero Waste trainings and certification programs;
4. Working with the business community to develop consulting projects and a practicum related to Zero Waste Certifications; and
5. Measuring the benefits of a formal Zero Waste certification program, including cost savings, waste reduction and jobs creation.

19.4 / Research and Development

Implementing Zero Waste also means being innovative in turning wasted discards into wanted resources. Providing a second life to wasted materials can be challenging due to the large variety of products and packaging in our waste streams. Research is needed to provide product longevity through redesign and toxic reduction techniques.

The Department will engage in inter-local agreements with area research institutions to engage in innovative product redesign and new packaging technologies that support the City Zero Waste goals. These efforts will be designed through cooperative efforts with organizations that share the City's Zero Waste goals. The Department's affiliation with area research facilities will leverage the following resources:

- Access to university and college resources including research collaboration opportunities, student interns, MBA student support teams, etc.
- Business planning and milestone tracking
- Product, marketing and manufacturing strategy support
- Government agency navigation and grant support
- Seed funds for milestone specific projects
- Entrepreneurs in Residence
- Networking opportunities with venture capitalists and other emerging businesses



Chapter 20 / Pilots and Demonstration Projects

To reach Zero Waste, the City of Austin (City) will need to undertake new programs that have not been implemented locally or nationally. Investing in research and development is a key element of the Austin Resource Recovery Master Plan.

20.1 / Pilot Programs to Improve Resource Recovery

The Department will develop pilot programs related to its own operations to test new collection methods and approaches to providing collection services to its customers. The following pilot programs have been identified for implementation.

- **Household Organics** - Providing a wheeled cart for yard trimmings and adding food scraps and compostable paper to the yard trimmings collection program. This pilot program is described in Chapter 10/Composting Organics.
- **On-Call Bulk Item Reuse and Recycling** – Providing enhanced recycling and reuse options for materials collected through the Bulk Item collection program. Piloting on-call collection to augment or replace the semi-annual clean-up program. This pilot program is described in Chapter 13/Other Core Services.

However, to research new ways of keeping discarded materials from being wasted, the Department will need the support of other resources in the community. To develop research projects, pilot programs and demonstration projects, the Department will form partnerships with research institutions and universities, community-based nonprofits, and private sector service providers. The Department's plans for working with universities are described in Chapter 19/Educational Institution Partnerships. This chapter discusses:

- Pilot programs to address specific generator types;
- Pilot programs to address specific material types; and
- Demonstration projects.

20.2 / Pilot Programs to Address Specific Generator Types

The Department's collection programs serve all single-family customers and some multifamily and commercial customers. However, pilot programs are needed to address those affected by future implementation of the City's Universal Recycling Ordinance.

Food Services Recycling Pilot – The Department requested bids for a Food Services Recycling Pilot Program to test operational approaches, training and outreach methods, and diversion levels for restaurants and food service establishments. Restaurant stakeholders expressed concerns about how organics diversion could be accomplished in Austin.

Organics Collection Pilot – Additional organics collection pilots are needed to test collection programs for different types of generators, including those that may not have access to convenient and affordable organics collection programs. The pilots could test organics drop-off programs, neighborhood composting at community gardens, and other collection approaches for hard-to-service generators (such as those in multi-tenant office buildings).

Multifamily Collection Pilot – Multifamily recycling and organics collection is challenging. Additional collection pilots are needed to address the needs of different types of multifamily settings. Some properties experience high tenant turnover rates. Others have not been designed for recycling and may have barriers to recycling, such as garbage chutes and small garbage rooms. The pilots could test alternative methods for diverting materials from multifamily complexes, including Single Stream Recycling and/or organics collection in carts and Dumpsters, valet services, reconfiguration of trash enclosures, and Zero Waste building challenges.

20.3 / Pilot Programs to Address Specific Material Types

The Department's Single Stream Recycling Program and household organics pilot will address nearly 85 percent of materials generated at households. However, some hard-to-handle materials may require investment in alternative collection programs.

Household Hazardous Waste (HHW) Pilot – HHW materials, such as batteries and paint, pose significant environmental safety concerns if disposed improperly. However, many citizens are unaware of safe disposal options or find existing safe disposal options inconvenient. To increase participation in proper HHW disposal programs, the Department will conduct a pilot program to assess whether door-to-door HHW collection is financially feasible for citywide application.

Textiles Collection Pilot – Textiles are challenging to divert at the household level. Some communities have added textiles to their Single Stream Recycling Programs. However, these materials provide challenges at the Materials Recovery Facility, and this method of collection could degrade the textiles and render them unusable. Textiles can also be diverted through thrift store and other reuse outlets. Unsold or non-reusable items can be marketed for carpet pad and mechanic wiping cloths. However, not all textiles are suitable for these markets. This pilot program could test alternatives for textile drop-off, reuse and recycling.

Mattress Collection Pilot – Mattresses are currently collected through the Department's bulk item collection program and are disposed in landfills. There are many operations across the country for mattress reuse, refurbishment and deconstruction. The pilots could test methods of collection that preserve the reusability of the mattresses, including separate vehicle collection and drop-off alternatives. The pilots could also test local options for refurbishment and deconstruction. The Department is a contributing sponsor to the Product Stewardship Institute's Mattress Recovery Research Project. Austin is committed to being a pilot site to test a new national model for mattress recovery.

20.4 / Demonstration Projects

In addition to pilots to test methods of operation for full-scale implementation, there is a need to develop demonstration projects to enrich and inspire the community and provide a model for private sector and nonprofit development of Zero Waste demonstration projects. The Department seeks to provide the inspiration for Austin to become a magnet for Zero Waste entrepreneurs and innovators. While the City can provide some seed funding, the Department seeks to inspire others to obtain ongoing funding for continued sustainable implementation.

Regional Recycling Drop-Offs – In partnership with community-based nonprofit organizations and private sector service providers, the Department would like to implement multiple Regional Recycling Drop-Offs and Zero Waste demonstration sites. In addition to the Department's plans for Eco-Depots and Resource Recovery Centers, the Regional Recycling Drop-Offs will provide collaboration within a designated community. These drop-offs can be co-located with community gardens, in shopping and strip malls, in multifamily complexes, at schools and churches, or at the planned Eco-Depots and Resource Recovery Centers.

Recycled Art Projects – Artists in Residence – The Department wants to sponsor an annual artist in residence program in collaboration with the City's Parks and Recreation Department and EGRSO Redevelopment. The artists would be provided with access to the materials delivered to various diversion facilities for the creation of fine art. The Department would work with landfill and recycling facility operators to provide working material for the artists to utilize in their art projects. Should funding be needed, the Department could provide a modest stipend to the artists. Semi-annual recycled art receptions would be co-sponsored by the Department.

Designed for Recyclability - The Department will engage in inter-local agreements with area research institutions to engage in innovative product redesign and new packaging technologies that support the City's Zero Waste goals. These research and development efforts will be designed through cooperative efforts with area companies to assist in redesigning products so that their end-of-life may be designed for recycling or composting diversion. Possible research projects may involve non-recyclable plastics, single-use disposable products, and packaging wraps.

Cost Estimate for Pilots and Demonstration Projects

Initiative	Initial Year at Full Implementation (FY)	Annual Costs
Pilots and Demonstration Projects	FY 2013	\$100,000

TABLE 17

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Chapter 21 / Policies and Ordinances

Zero Waste policies, including ordinances, incentives, bans, take-backs, purchasing specifications, and advocacy, allow the City to increase diversion and decrease waste. Zero Waste policies are extremely important because they influence all the materials that are generated in the City, including waste and material streams not directly handled by the Department. By setting an example through consistent policy setting, the City can achieve Zero Waste citywide and lead the region and the state in diversion activity. This section describes the policies that will be implemented to achieve the City's goals, based on input received through the public outreach process.

21.1 / Universal Ordinances

Universal ordinances that apply to all waste generators including residents, visitors, institutions and businesses can be effective strategies for achieving Zero Waste. By establishing a Zero Waste framework and policy direction, private sector investment in collection systems and Zero Waste infrastructure can be made with relatively little direct cost to the City. Entrepreneurs and innovators can compete to provide services to generators based on performance and cost. The Department can support these efforts through technical assistance, outreach and education, and reinforcement of desired behaviors. The following initiatives were evaluated selected for implementation by the stakeholders.¹

- Universal Recycling and Composting Ordinance
- Single-Use Products and Packaging Ordinance
- Take-Back Ordinance
- Extended Producer Responsibility Initiatives
- Hauler Registration Ordinance
- Refundable Deposit (Bottle Bill)

The Department's Strategic Initiatives Division will have primary responsibility for developing the new ordinances and facilitating their implementation.

The Strategic Initiatives Division is responsible for:

- Zero Waste policy development;
- Zero Waste program development;
- Communications and marketing, including media relations, community-based social marketing, and public outreach and education; and
- Business outreach and economic development, including commercial technical assistance, ordinance implementation, and oversight.

The Strategic Initiatives Division will play a key role in assisting the operations divisions in planning and implementing the new Zero Waste programs and will provide marketing support and community-based social marketing for new Zero Waste programs. In addition, the Strategic Initiatives Division will manage incentive-based programs, such as the compost incentive program.

21.2 / Universal Recycling and Composting Ordinance

The goal of this initiative is to phase in universal recycling and composting requirements to all waste generators, both residential and commercial, within the City of Austin by FY 2016.

The Austin City Council adopted Phase 1 of the URO on Nov. 4, 2010, which requires all multifamily buildings, office buildings, and institutional properties in the City to recycle.² Phase 1 of the ordinance will be phased in over four years, beginning in October 2012. In FY 2011, the Department is currently engaging stakeholders to develop the rules that will guide program implementation. The Department is also conducting stakeholder meetings throughout 2011 to discuss implementation of Phase 2, which will apply to food and beverage service establishments, retail, hospitality, manufacturing and industrial generators.

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¹ "Austin Needs Assessment Technical Memorandum." City of Austin. November 2010. Web. 14 Sept. 2011.

² City of Austin. Ordinance No. 20101104-018. 4 Nov 2010. Web. 1 Sept 2011.

In Phase 2, the City will add a citywide policy for diverting compostable organics from landfills. Food scraps and compostable paper account for about 30 percent of citywide disposal. Organics disposed in landfills cre-

ate methane, which is a powerful greenhouse gas, at least 72 times more powerful than carbon dioxide. Phase 2 will evolve into the Universal Recycling and Composting Ordinance (URCO) and is anticipated to be fully implemented by FY 2016.

Phase 3 of the ordinance will include single-family residences in the requirement to recycle and compost and is anticipated to be fully implemented by FY 2016.

To ensure broad support of the ordinance, the Department will implement a community-based social marketing campaign, which could include:

- Co-hosting regional workshops with the Capital Area Council of Governments (CAPCOG);
- Piloting food scrap collection at restaurants and other commercial businesses;
- Leading by example and establishing comprehensive recycling and composting at all City facilities;
- Providing technical assistance to businesses to reduce waste, streamline processes that create unnecessary waste products, and increase diversion; and
- Educating businesses about the waste management industry and service options, including publishing the rates that service providers charge for service based on volume and frequency.

The Department currently provides commercial technical assistance through its Waste Reduction Assistance Program, a free service that assists local businesses with their recycling and waste reduction efforts by motivating businesses to get involved, providing assistance and resources, and recognizing businesses that are making a difference. The Department will greatly expand its outreach to commercial and institutional generators through a more comprehensive Commercial Technical Assistance program coinciding with the implementation of the URCO.

Through the Commercial Technical Assistance Program, the City will conduct outreach to every business in Austin over a five-year period. The program will initially focus on businesses with more than 100,000 square feet, as the first phase of implementing the URCO. Then the program will be phased in to include all businesses within four years. The Department will explain the elements of the ordinance and help businesses right-size their garbage service, reduce waste and expand reuse, recycling and composting services with the goal of reducing their overall garbage and recycling bills. The program will include:

- Technical assistance to commercial businesses in support of the URCO;
- Reward and recognition;
- Incentives, grants and pilot projects;
- Information on recycling and reuse outlets;
- Information about rates and services available through private sector service providers and nonprofits; and
- Profiles and promotion of businesses transitioning to Zero Waste.

To monitor the effectiveness of the ordinance, the Department will collaborate with nonprofit and private sector service providers. The Department will register nonprofit and private sector services providers. Registered haulers will report diversion and disposal tonnages and service levels by customer. The Department will ensure that the business needs of the nonprofit and private sector service providers are balanced with the needs of the generators and the City.

Resources for Universal Recycling and Composting Ordinance Implementation

Four new staff members or contractor resources are needed for:

- Ordinance and rules development
- Commercial recycling technical assistance
- Social marketing
- Contract development and contract management

New staff resources identified for this initiative will also support:

- Rate structure incentives
- Zero Waste research
- Regional cooperation

21.3 / Single-Use Products and Packaging Ordinances

The goal of this initiative is to reduce single-use and non-recyclable products and packaging. To reduce waste that currently has limited recycling markets or uses, the City will consider product and material bans or other requirements or incentives.

Single-use bags and expanded polystyrene are two materials that are increasingly targets of product bans around the country. These materials

are not biodegradable and have life spans of hundreds of years. These materials negatively impact the collection system and, when littered, negatively impact the natural environment and harm wildlife. The City will consider developing ordinances with the goal of reducing or eliminating consumption and generation of the following products:

- Single-use bags;
- Non-recyclable, non-compostable take-out containers; and
- Single-use beverage containers.

21.4 / Take-Back Ordinance

The goal of this initiative is to require brand owners to take back non-recyclable, non-compostable products by considering a take-back ordinance FY 2015.

Producer responsibility is a key strategy for achieving Zero Waste. Take-back requirements shift the costs of garbage from taxpayers to brand owners and producers. They also create a powerful economic incentive to redesign products and substantially reduce the use of toxic materials. Local take-back ordinances have focused on hard-to-handle materials such as pharmaceuticals and household hazardous waste. The City will pursue local initiatives if the state is unable to enact EPR framework legislation or product-specific legislation. The City will also collaborate with its regional partners to target non-recyclable, non-compostable materials or hard-to-handle materials across the region. The City will consider the following problem materials for producer take-back:

- Materials that cannot be reused, recycled or composted and single-use items; and
- Other materials (e.g., pharmaceuticals, sharps, batteries, fluorescent bulbs).

21.5 / Hauler Registration Ordinance

To monitor the effectiveness of the URCO, the City will establish an annual registration of nonprofit and private sector service providers that collect and haul trash, recyclables and compostables within the city limits. Registered haulers will report diversion and disposal tonnages

and service levels. The City will ensure that the proprietary business needs of the service providers are balanced with the Department's need to track diversion activity and progress toward the Zero Waste goals established by the City Council.

The current Hauler Ordinance requires all haulers that collect waste within the City to acquire an annual hauler license. The haulers are required to submit information on the number of trucks utilized and the number of containers deployed within the City. The hauler is assessed an annual per truck fee and an annual per container fee for doing business within the City.

The Department will evaluate an ordinance amendment that will eliminate the container fee and maintain the registration of hauling vehicles utilized within the City. In return for the reduced fees, the City will adopt reporting requirements in support of the Universal Recycling and Composting Ordinance. Annually, beginning in FY 2013, each hauler will be required to register their fleet of vehicles, pay a per vehicle fee, and submit diversion and disposal tonnages and service levels by customer. The fees collected could be utilized to support the personnel cost to process the annual license and analyze the data received.

21.6 / Service Pricing Strategies

Research conducted for this Master Plan identified some pricing strategies employed by private sector service providers that create a disincentive to recycling and composting. These practices include: charging a monthly fee to customers irrespective of the level of services provided; long-term contracts that do not allow customers to obtain recycling or composting collection services; the lack of right-sizing trash service when recycling is introduced; and rate structures that do not provide an incentive to waste reduction. The Department will carefully monitor these practices and provide technical assistance to commercial generators to assist them in making informed choices. If appropriate, the City may undertake the development of a Commercial Rate Ordinance.

Commercial Rates Offered by Service Providers

The goal of a Commercial Rate Ordinance would be to establish sufficient customer rate incentives for commercial and multifamily customers to

increase recycling and decrease trash service. This ordinance could help minimize a common industry practice of offering price incentives based on volume discounts to customers that subscribe for higher levels of trash service, thereby creating pricing incentives for customers to shift to increased recycling services. It could also require full disclosure of the cost components of rates charged and eliminate the use of flat fees for trash service. Some businesses in Austin are currently charged a flat fee for trash service, and they are not able to decrease that flat fee no matter how much they reduce waste and recycle more. The following sections describe the customer rate modifications for trash and recycling services, which the haulers could be required to implement under this ordinance:

Trash rate component

Commercial customer rates could be modified by the hauler to reflect a uniform per cubic yard rate for the whole range of bin or container sizes and collection frequency the hauler offers to its customers. The cubic yard rate could be established by the hauler to ensure that sufficient revenues are generated to cover the hauler's costs and still compete for customers.

Recycling rate component

Since commercial haulers are already assumed to be offering recycling service to their customers, they could be required to offer a discount for recycling rates compared to trash rates. For example, the recycling rate set by a hauler under this ordinance could be no higher than 75 percent of the trash rate for service, as measured by the uniform per cubic yard rate for trash service.

Right-Sizing

In addition, as recycling and composting services are introduced, trash service will be reduced. This right-sizing is required to encourage diversion activities. When trash service is not right-sized, the commercial generator is essentially over-charged for trash capacity that is no longer needed. Lowering the service frequency or reducing the bin service to match the lower trash output achieves the goal of right-sizing the service.

The trash and recycling rate modifications intended by this policy would be established through City adoption of an ordinance that would also describe the parameters of the rate modifications needed by haulers to maintain their permits for serving customers within the City of Austin. This policy would rely on the City's right to set hauler permit conditions and would not require the City to implement exclusive or non-exclusive franchises for commercial collection.

21.7 / Statewide Refundable Container Deposit Legislation (Texas Bottle Bill)

The goal of this initiative is to provide support to statewide refundable deposit legislation by 2015 with full statewide implementation by 2016.

The purpose of a statewide Refundable Container Deposit Bill will be to establish a deposit/refund program to decrease the volume of aluminum, glass and plastic beverage containers in our waterways, along our roadways and public lands. A deposit/refund system supported by the Department and City will combine financial incentives and convenient redemption centers. Along with curbside collection, this bill will ensure the maximum number of beverage containers for recycling. A Texas Bottle Bill will also establish a funding base to create jobs locally and throughout the state in the recycling industry and bring processors and manufacturers into our state. A bottle bill supported by the Department and the City will also reduce Texans' carbon footprint by increasing the supply of high quality materials for recycling to help replace the practice of using virgin material to produce new products.

There are 10 bottle bill states in the U.S., the first originating in 1971. Another 10 states currently have deposit/refund legislation pending.³ The Department will support a national bottle bill when one is proposed. To promote the City's support of container deposit legislation, the Department will become an ongoing supporting member of the Container Recycling Institute (CRI). The CRI is a nonprofit organization that studies and promotes policies and programs that increase recovery and recycling of beverage containers. Founded in 1991, CRI has become recognized as the expert source for information on container recycling and container deposit systems, and plays a vital role in educating policymakers, government officials and the general public regarding the social and environmental impacts of the production and disposal of one-way beverage containers. CRI also works to debunk myths about container recycling promoted by the beverage, retail and container manufacturing industries. CRI focuses on programs that shift the social and environmental costs associated with manufacturing, recycling and disposal of container and packaging waste from government and taxpayers to producers and consumers.

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³ In 1971, Oregon passed the first bottle bill (also known as a deposit law) in the United States, requiring refundable deposits on all beer and soft drink containers. Today the following 10 states have bottle bills: CA, CT, HA, IA, MA, ME, MI, NY, OR, VT. The Container Recycling Institute (CRI) tracks current and proposed container deposit legislation at: <www.bottlebill.org>.

21.8 / Extended Producer Responsibility Initiatives

The goal of this initiative is to provide support to statewide EPR initiatives and to consider local initiatives, including a local EPR policy in 2013 and a local producer responsibility ordinance in 2015.

EPR initiatives call for the City to take an active role in advocating for legislation requiring product manufacturers, retail establishments, wholesale distributors and other appropriate entities to take back certain products or packaging that currently are difficult to recycle or harmful to dispose. The City is actively engaged with the Texas Product Stewardship Council (TxPSC) and will provide more staff resources to that agency to increase its effectiveness. EPR initiatives are most effective at the state level, but the City could also initiate local legislation if statewide efforts do not succeed. The role of the City will be to:

- Adopt an EPR policy;
- Provide support to the TxPSC;
- Support the development of EPR framework legislation, which is a law to be established as policy by the state legislature that gives the authority to state agencies to address multiple products over time;
- Consider local producer responsibility ordinance; and
- Participate in national and international dialogues.

Resources for Extended Producer Responsibility Initiatives

Additional staff or contractor resources (1.5 full-time-equivalents) will be needed for:

- Policy and ordinance development
- Support to the Texas Product Stewardship Council
- Staff support to the product bans initiative and Take-Back Ordinance initiative

Policy Implementation Schedule

Initiative	Date of Initiation (FY)	Initial Year of Full Implementation (FY)
Universal Recycling ordinance and Composting Ordinance - 3 phases	FY 2011 - FY 2012	FY 2016
Single-Use Products and Packaging Ordinance	FY 2012 - FY 2014	FY 2013 - FY 2014
Hauler Registration Ordinance	FY 2012	FY 2013
Take-Back Ordinance	FY 2014	FY 2015
Refundable Deposit (Bottle Bill)	FY 2015	FY 2016
Extended Producer Responsibility Initiatives	FY 2017	FY 2018

TABLE 18

Universal Recycling and Composting Ordinance Implementation Schedule

Initiative	Date of Initiation (FY)	Initial Year of Full Implementation (FY)
Universal Recycling ordinance and Composting Ordinance - Phase 1	FY 2011	FY 2016
Universal Recycling ordinance and Composting Ordinance - Phase 2	FY 2012	FY 2016
Universal Recycling ordinance and Composting Ordinance - Phase 3	FY 2013	FY 2016

TABLE 19

Chapter 22 / Incentives and Rewards

Achieving the City of Austin's Zero Waste goals will require all Austin generators to assist the culture change from one based on a throw-away mindset to one based on resource management and conservation. Ultimately, Zero Waste will increase our quality of life and allow us to treasure the resources that we have and share them with the generations to come.

The Communications Plan in Chapter 24 describes the Department's plans to reach out to all residential and commercial generators in the City to inform and engage them in the Zero Waste message. Chapter 21/ Policies and Ordinances describes the new ordinances and Department policies that will require generators to participate in new programs. To be most successful in reaching all sectors of the City, the Department will need to utilize an approach that provides incentives and penalties.

22.1 / Business Technical Assistance and Recognition

The Department currently provides a business technical assistance and recognition program through its Waste Reduction Assistance Program (WRAP) and its WasteSMART Program.

Waste Reduction Assistance Program

WRAP is a free program to help businesses in Austin reduce trash and increase recycling. The City of Austin provides an on-site assessment to help businesses expand recycling, reduce waste sent to the landfill and improve the environment. The service is voluntary and confidential. The program provides two major services:

1. Conduct assessments for property owners seeking information and options to reduce and recycle discards;
2. Monitors recycling ordinance compliance and responds to inquiries or complaints from residents who inform the Department when a property may not be compliant.

The Department has developed waste reduction tip sheets that correspond to different types of businesses and material types. These tip sheets include helpful pointers on how to reduce waste. For example, hotels are urged to offer “no clean” cards for guests to indicate whether linens require changing.

WasteSMART

WasteSMART is a program that recognizes local businesses that reduce waste, recycle and buy recycled products. Several local businesses are reducing and recycling and the City of Austin provides summaries of the green and sustainable techniques these businesses have implemented. As of fall 2011, 27 local businesses were listed as WasteSMART partners.¹

The Department is undertaking the following steps to update and enhance the WRAP and WasteSMART programs:

- Fully staff the WRAP and WasteSMART programs and provide training to ensure that all staff members are fully capable of providing commercial technical assistance for all institutional, commercial and industrial generators in the City, including construction and demolition debris generators.
- Partner with the Capital Area Planning Council of Governments, Austin Energy and other related organizations to provide reuse, recycling, composting and construction and demolition diversion resources and publish an on-line commercial recycling guide listing service providers, acceptable materials and rates.
- Increase public awareness of the programs and what profiled businesses are doing to recycle and reduce.
- Provide more specific information in each case study about the costs and benefits of implementing recycling and reduction programs.
- Provide specific information about how businesses solved problems of space, potential labor costs/savings, procuring collection services, and working with building owners.
- Develop a right-sizing calculator to demonstrate how reducing trash and increasing recycling and composting can save money.
- Develop a greenhouse gas calculator to demonstrate how increasing recycling can reduce greenhouse gas emissions.
- Publish rates that businesses are paying for trash collection, recycling and composting services and service providers. Document size of containers, frequency of pickup and monthly rates. This information can be gathered during the site visits.

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¹ Case studies are available online at: <http://www.ci.austin.tx.us/sws/commercial_wastesmart.htm>.

- Provide links to resources for businesses, including: internal collection containers (sources, sizes and costs), compostable service-ware (certification, appropriate composter service, costs), recyclable service-ware (appropriate recycler service, costs) and recycled office products.
- Actively target businesses to provide comprehensive technical assistance. Beginning with the Central Business District, develop a database of business contacts and track the status of each business; prioritize businesses by size and type. Set goals of conducting sites visits and providing technical assistance to, for example, 100 commercial businesses per year per staff member. Measure progress against these goals. Celebrate accomplishments and publish results.
- Follow-up with each business regularly (at least once per year) to provide additional technical assistance and ensure businesses are following through with recycling plans.
- Establish a rating system based on reduction and recycling practices to identify how green a business is. For example, Leadership in Energy and Environmental Design (LEED) buildings are given a rating (bronze, silver, gold, platinum) based on a point scale. Implement a similar recognition program for Zero Waste businesses.
- Sponsor an annual Zero Waste business seminar to profile local and nationally recognized Zero Waste businesses.
- Sponsor an annual Zero Waste business awards program recognizing local Zero Waste businesses.
- Make presentations on the Department's technical assistance program to business meetings including, chambers of commerce, Rotary Clubs, restaurant association and other business associations.

22.2 / Universal Recycling and Composting Ordinance Support

As part of the implementation of the Universal Recycling and Composting Ordinance (URCO) described in Chapter 21 / Policies, Department staff will work with individual businesses to explain the elements of the Ordinance and help businesses right-size their trash service, reduce waste and expand reuse, recycling and composting services. The program will include:

- Technical assistance to commercial businesses in support of the URCO;
- Reward and recognition;

- Incentives and pilot projects;
- Information on recycling and reuse outlets;
- Information about rates and services available through private sector service providers and nonprofits; and
- Profiles and promotion of businesses transitioning to Zero Waste.

To monitor the effectiveness of the URCO, the Department will collaborate with and register nonprofit and private sector service providers. Registered collectors will report diversion and disposal tonnages and service levels by customer. The Department will ensure that the business needs of the nonprofit and private sector service providers are balanced with the needs of the generators and the Department.

22.3 / Rate Structure Support

The Department will also support commercial generators by carefully monitoring the pricing strategies employed by private sector service providers that create a disincentive to recycling and composting. These practices include: charging a monthly fee to customers regardless of the level of services provided; long-term contracts that do not allow customers to obtain recycling or composting collection services; the lack of right-sizing trash service when recycling is introduced; and rate structures that do not provide an incentive to waste reduction.

In addition, as recycling and composting services are introduced, trash service should be reduced. This right-sizing is required to encourage diversion activities. When trash service is not right-sized, the commercial generator is essentially over-charged for trash capacity that is no longer needed. Lowering the service frequency or reducing the bin service to match the lower trash output achieves the goal of right-sizing the service. The Department will monitor commercial generator service needs and provide commercial technical assistance to commercial generators to assist them in making informed choices. If appropriate, the Department may undertake the development of a Commercial Rate Ordinance, as described in Chapter 17 / Public-Private Partnerships.

22.4 / Zero Waste Awards

The Department's Strategic Initiatives Division produced a ground-breaking reality TV series, *Dare to Go Zero*, in 2011.² The show profiled four average Austin families and followed them on their Zero Waste journey. The purpose of the reality show was to demonstrate that going Zero Waste is not something that just extraordinary people can do. It is something that everyone can do. In order for the City to be truly successful, Zero Waste needs to be what everyone can achieve. The Communication Plan described in Chapter 24 outlines the steps that the Department will take to make Zero Waste the "new normal" in the City. These steps include:

- Producing future episodes of *Dare to Go Zero*, but broaden participant base.
- Profiling average families in different neighborhoods and different demographics who are striving for Zero Waste including single-family, multifamily (large and small buildings), mobile homes, and large institutions (including retirement facilities).
- Developing Best Practices, Frequently Asked Questions, resource lists, and solutions to common problems.
- Profiling average businesses from across the City that are Zero Waste businesses.
- Identifying common barriers (space constraints, labor issues, shared collection services) and solutions.
- Profiling City departments and employees that are striving for Zero Waste and providing recognition at City Council meetings.
- Presenting annual Zero Waste Awards to local families and local businesses that have achieved a 90 percent+ diversion rate in their work or home lives.

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² The series can be watched online through the Department's website: <www.austin-recycles.com>.

Section 23 / Metrics and Measurements

Historically, there have been inconsistencies and significant challenges when measuring waste reduction and diversion. As the Austin City Council established three diversion goals (noted below), not only are there challenges to implementing diversion programs, but there are also significant challenges in measuring progress toward those goals. No single measurement tool can accurately measure achievement toward diversion. Researching, verifying and calculating the total amount of material diverted through recycling and composting requires standardized measurement and accurate reporting from the various haulers, processors, and generators. Data gathering and analysis can be time-consuming and expensive. Inconsistencies in reporting standards, the movement of materials in and out of the regional watershed and the lack of diversion documentation can test the accuracy of measurement results.

One of the most significant challenges is the measurement of waste reduction – how do you measure something that disappears? Waste reduction is the most efficient diversion method to reduce carbon footprint and environmental impacts, simply because avoided waste does not need to be collected, transported, processed and transformed. Instead, the waste stream is simply not created. Reducing waste is a critical component toward meeting our sustainability goals and achieving Zero Waste in our community, though difficult to measure and quantify over time. The usefulness of product stewardship, purchasing preferences and product redesign should not be underestimated when developing medium- and long-term Zero Waste strategies. The Department will actively support activities including packaging redesign, Citywide purchasing preferences for products containing high levels of post-consumer recycled material and designs for ease of recyclability as strategies to rethink and reduce inefficient material over-production at the source.

The primary measure the Department will utilize to calculate progress towards Zero Waste is the direct measurement of diversion activity (See 23.3). Through a detailed waste assessment study every five years, the Department will determine our progress toward our Zero Waste goal. The base starting point is the Capital Area Council of Governments (CAPCOG) waste analysis detailing waste flows and diversion activities in 2009. This limited study was augmented by additional research and analysis by con-

sultants hired by the Department. The next juncture point for a detailed waste diversion study will be in 2015 and will occur every five years thereafter. A second measurement, displaying waste disposal per capita (See 23.4), assists in determining how effective the community is at diverting resources from the landfill. The use of both of these measures concurrently will help assure that we measure waste reduction accurately over time.

The following sections of the Master Plan, highlight several additional approaches to help calculate a more complete representation of the community's diversion efforts. Most of these tools measure recycling, composting and reuse efforts, as well as, landfill disposal through tonnage records. By utilizing several measurement tools simultaneously, and comparing those measures over time, a more accurate calculation of the effect of waste reduction efforts are realized.

These measurement issues revolve around four metrics: (1) waste diversion, (2) waste reduction, (3) recovered material streams and (4) public service effectiveness. The central measurement issues associated with each metric are diversion activity, waste disposal reduction, waste stream composition and service expectations, respectively. The Department is committed to measuring its progress toward service objectives including performance measures and waste diversion measures.

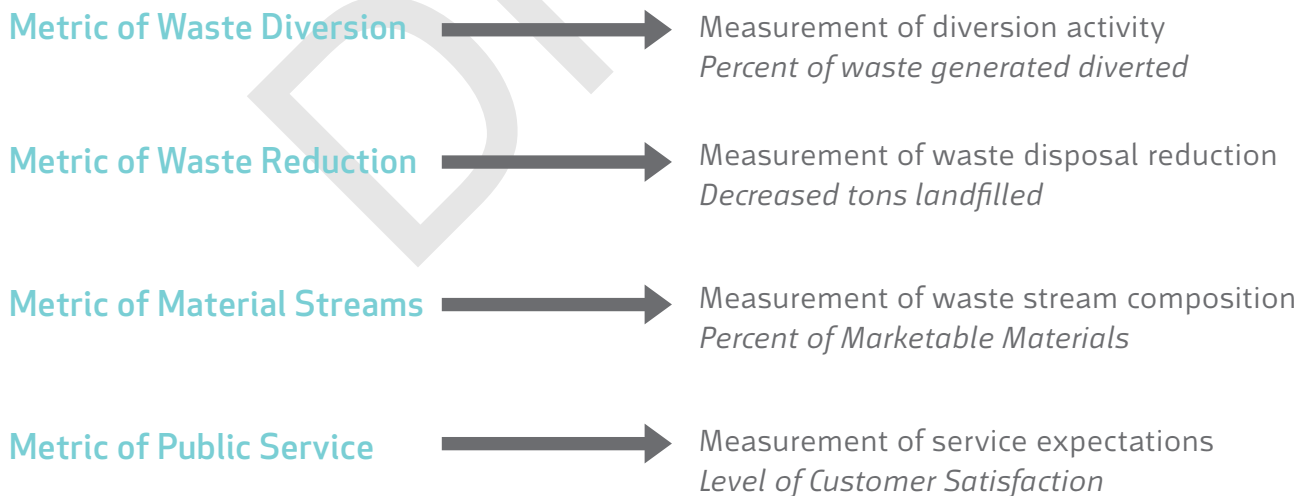


FIG. 14

23.1 / Diversion Goals

Success begins with the definition of the desirable end-state in mind – specific, actionable, measurable goals achieved within a given time span.

The City Council adopted the Zero Waste Strategic Plan and set the minimum standards for success as the following diversion goals¹:

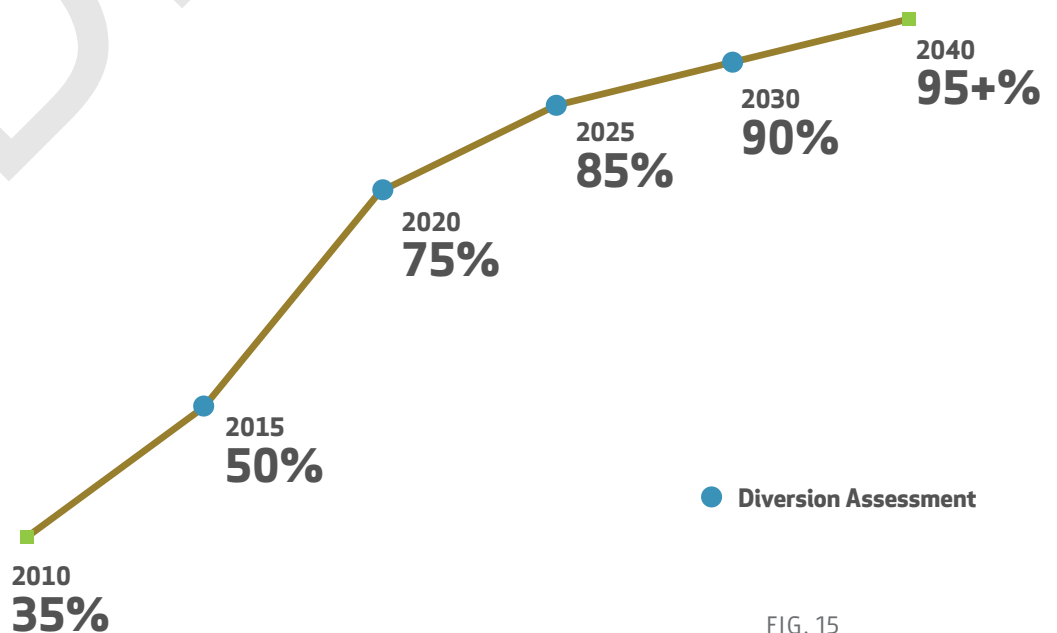
- Reduction of per capita solid waste sent to landfills and incinerators by 20 percent by 2012;
- Diversion of 75 percent of waste from landfills and incinerators by 2020; and
- Diversion of 90 percent by 2040.

The Master Plan strives to surpass those minimum standards by establishing the following diversion goals:

- 50 percent by 2015
- 75 percent by 2020
- 85 percent by 2025
- 90 percent by 2030
- 95+ percent, working towards Zero Waste by 2040
- Restorative Economy by 2050

Zero Waste Diversion Goals

Diversion Assessments of Residential Stream, Commercial Stream and Industrial Stream



¹ Gary Liss & Assoc. Austin, Texas Zero Waste Strategic Plan. *The Zero Waste Economy: Designing a Full-Cycle System – Upstream and Downstream*. City of Austin. 4 Dec. 2008. Web. 1 Sept. 2011.

FIG. 15

23.2 / Citywide Waste Stream Diversion Goals

The Department's diversion goals are based on the citywide generation of discarded materials, including materials generated by residents, commercial businesses, industries, institutions and visitors. In Fiscal Year 2010, the Department collected only approximately 25 percent of the total materials generated in the City. Of those materials handled by the Department, about 37 percent were diverted from landfills. The Zero Waste diversion goals of the City, however, involve all resource and waste streams generated from within the City boundaries, regardless of who collects and hauls the material. Thus, it is imperative that the Zero Waste goals are embraced and actions implemented throughout all sectors of the community.

The Zero Waste policies and programs identified in the Department Masters Plan are slated for implementation in the short-term (through 2015) and medium term (2015-2020). Most of the Zero Waste infrastructure will be developed within those time horizons. In the future, further research and collaboration with academic partners and other Zero Waste communities, the Department may identify alternative methods for reaching Zero Waste. While planning and implementing its Zero Waste policies and programs, the Department will monitor successes, identify challenges and seek out new opportunities to innovate, advance and further develop Zero Waste policies. The Master Plan is designed to be a living document with annual updates, program assessments every five years, and detailed implementation steps undertaken by Department staff as well as community partners.

The City's ultimate vision is to move beyond Zero Waste systems to an economy based on maximizing the value of goods and services. This is the Department's path toward sustainability and contributes to the City's efforts toward sustainability and reducing our community's impact on the environment.

23.3 / Metrics of Waste Diversion: Measurement of Diversion Activity

Ultimately, the effectiveness of Zero Waste efforts is measured by the amount of material diverted to secondary uses and the reduction of the

amount of materials sent to landfills for disposal. As the Master Plan is implemented, tracking and reporting progress toward achieving diversion targets is critical to an effective program. Investments should be based on quantifiable measures that indicate that these activities produce the most significant diversion results. Measuring results requires tools and methods to accurately estimate the diversion of materials sent to the landfill through recycling, reuse or source reduction initiatives as they relate to the total amount of municipal solid waste generated.

For the purpose of measurement, disposal includes waste sent to landfills and end-of-life disposition of materials sent to incinerators, waste-to-energy facilities and other disposal facilities. Diversion includes waste prevention activities and material sent to recyclers, composting systems, reuse facilities and other secondary use options. Waste generation is defined as disposal plus diversion. In a generation-based measurement system, disposal and diversion are measured and added together to determine generation.

When measuring the diversion rate, it is important to have adequate data to document total tons of waste generated in our community. This process will be performed every five years. A full measurement of the entire waste stream, including disposal and diversion activities, involves an inventory of all points of generation. This inventory can be systemized through cooperation of haulers, recyclers and disposal facilities. When properly conducted, a proportionately-sized statistical sample of a representative cross-section of the community can provide this five-year baseline measurement. The overall generation of wastes can be displayed in this manner:

Generation and Diversion Projections

To project amount of materials discarded through 2050, the current generation rate was estimated by adding the current disposed tons and the current diversion tons and projecting them through 2050 using estimated growth rates. The generation rate is calculated using the following formula: $\text{Generation} = \text{Disposal} + \text{Diversion}$.



FIG. 16

Fiscal Year 2009 (October 1, 2008 through September 30, 2009) tonnage estimates were used as the base year. Fiscal Year 2009 was the most recent complete year of data available at the time of the estimate. The base year generation figures for FY 2009 were projected forward to 2030 by using population growth information from the City's demographer.

The residential sector growth rate was estimated using the City's population growth rate including planned annexations. The commercial and industrial growth rate was estimated using the Travis County population growth rate to account for the daytime population in Austin.

Citywide Diversion Rate Calculation

The diversion rate is calculated using the following formula:

$$\frac{\text{Total Diverted Tons}}{\text{Total Diverted Tons} + \text{Total Disposed Tons}}$$

Total Diverted Tons includes all discarded materials that were successfully diverted from being sent to the landfill through activities including reuse, recycling and composting. Total Disposed Tons includes all discarded materials sent to landfills.

Estimated Tons of Municipal Solid Waste Collected by the Department
The overall diversion rate for Department collected and hauled tons in FY 2009 was approximately 31 percent: 111,000 tons were diverted and 249,500 tons were disposed.

Estimated Tons Collected through the Private Sector

The overall diversion rate for private sector collected tons in FY 2009 was also estimated to be 31 percent: 334,300 tons were diverted and 750,500 tons were disposed.

A more detailed description of the methodology for estimating the City's generation, diversion and disposal is included in the Needs Assessment Technical Memorandum.

Overview of the Diversion Model

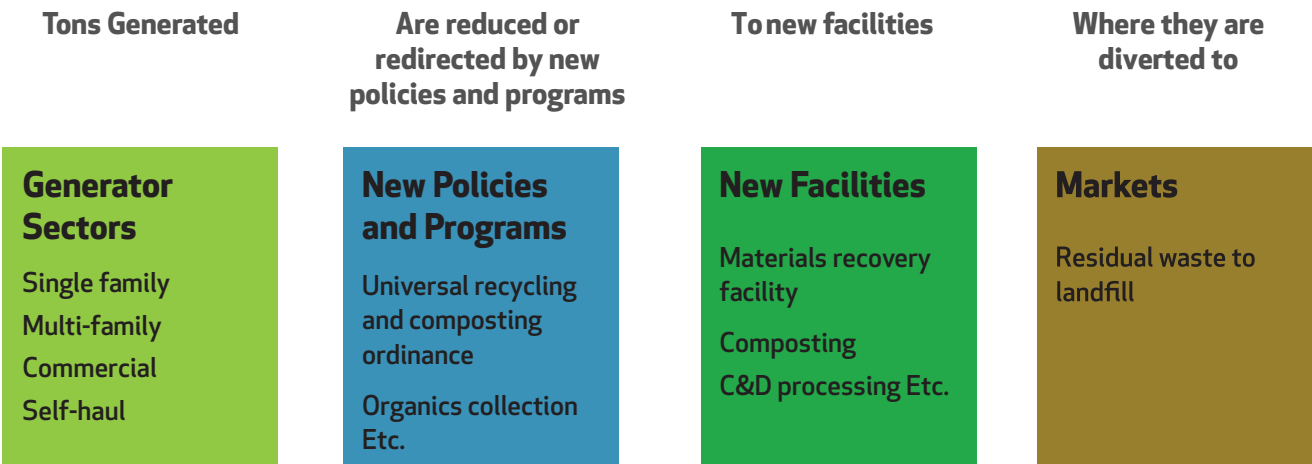


FIG. 17

Tracking Achievement of Diversion Goals

To track diversion and disposal tons, the Department will be able to monitor performance from:

- **Department programs** – where tons are tracked directly;
- **Service provider reports** – pursuant to the new Universal Recycling Ordinance (URO); and
- **Generator reports** – pursuant to the New Event Recycling Ordinance and Construction, Deconstruction & Demolition ordinance.

For some policies and programs, the Department will have to rely on diversion and disposal estimates. The direct effect of these policies and programs serve to enhance the Department and private sector programs, but cannot be quantified separately. The monitoring approach for each of the new Zero Waste initiatives is summarized below.

Monitoring Performance by Zero Waste Initiative

Department Program Reports	Service Provider Reports	Generator Reports	Estimates Only
Recycling collection	URO ordinance required reports	Events Recycling ordinance required reports	Rate structure incentives
Organics collection	City Department diversion from contract reports	Construction, Deconstruction and Demolition Debris Ordinance required reports	Extended producer responsibility initiatives
Bulk items collection	Private sector resource recovery centers		Composting incentives
HHW collection			Recycling Economic Development
Eco-Depot collection			
Resource recovery center			

TABLE 20

23.4 / Metric of Waste Reduction: Measurement of Waste Disposal Reduction

The effectiveness of Zero Waste efforts can also be measured by the amount of material disposed to landfills or other disposal facilities. As the Master Plan is implemented, waste reduction tracking can be difficult to measure. The absence of waste reduction is best measured through waste disposal. Conversely, measuring a reduction in waste disposal can measure waste reduction efforts. Measuring waste reduction requires tools and methods to accurately estimate materials management related to disposal reductions.

Disposal Index

The concept of a landfill disposal index was presented by Dr. Nicholas Themelis of Columbia University in 2009.² This index measures tons sent to area landfills per capita, inferring that fewer tons per capita creates a more sustainable solid waste system. As Zero Waste systems require a materials management approach, a modification of this measure is required. The Department proposes a new per capita measure of waste sent to landfills, incinerated, or disposed of by any other means, simply called the Disposal Index.

The disposal index is defined as the quantity of solid waste generated in a community that is disposed in landfills, incinerated, or disposed by other means, divided by the base population. The disposal index should be reported every five years, through a wasteshed analysis of tons disposed from the City, measured on a per-capita basis. A separate disposal index can be calculated for municipal solid waste, commercial solid waste, and construction-and-demolition waste. The disposal index can offer a better understanding of the effectiveness of waste reduction and recycling programs targeted toward these waste streams.

Wasteshed Analysis

A wasteshed is a designated region where a large majority of waste generated in that region is disposed at disposal facilities within that region. There are two ways to evaluate a community's disposal volumes within a regional waste-shed. The first wasteshed analysis is the tracking of all waste generated within a region and the determination of where it is disposed. A flow chart represents the direction and volume of each community's waste hauls. The resulting flow schematic displays a self-

.....
² Themelis, N. "Materials and Energy Recovery in the US: New York and California," Cispel Confservizi Toscana Symposium. Florence, Italy. 24 April 2009.

contained region of generated waste streams with designated regional disposal facilities. The TCEQ charting of waste flows indicates a 33-county wasteshed for Central Texas.

A second analysis of a wasteshed involves the specific tracking of wastes generated from within the City of Austin to disposal facilities. A thorough tracking of community-generated waste flows can offer the disposal tonnage statistics needed for calculating the disposal index. This involves the tracking of municipal, commercial and construction debris waste disposal. To accurately measure disposal tonnage, waste origin must be identified at the scales of the receiving disposal facility.

Waste origin information is essential in determining the community's disposal amounts. In some states, solid waste facility operators are required to obtain waste origin information on all loads delivered by residential and commercial haulers. Texas does not have such a requirement. Thus, the Department will conduct a wasteshed analysis every five years, including waste tracking to disposal facilities. This analysis will be coordinated with the Department's five-year diversion assessment study.

23.5 / Metric of Material Stream: Measurement of Waste Stream Composition

While estimates of waste disposal composition have been published by the EPA, information on the composition of wastes generated from within Austin and entering landfills is more diffused and uncertain. Information on the composition of waste sent to landfills is important to monitor the effectiveness of diversion programs. Waste composition studies are used to assist in planning, policy development and infrastructure sizing decisions for various facets of a Zero Waste program.

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³ This method is titled the Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste. Developed by the ASTM, the method can be used to define and report the composition of MSW through the selection and manual sorting of waste samples.

The most widely used methods for waste characterization is the site-specific sampling via sorting and weighing refuse by category. A standard method for determining waste composition by sorting has been published in ASTM D 5231-92.³ The ASTM method notes that the number of samples should be defined based on statistical criteria; load selection for sampling should be randomized and performed over a standard collection period and; the initial sample should weigh approximately four times the subsample that will be sorted.

Material Composition Studies

As a means toward better understanding the current waste disposal streams, the Department and the University of Texas at Austin (UT-Austin) may enter into an inter-local agreement to perform various waste audits. A Zero Waste consultant and campus interns may be hired through this agreement to perform the following services:

- Assess information gained from previous UT-Austin waste audit.
- Expand the scope of the UT-Austin audit to 12 Market Categories of materials that comprise the entire stream of materials discarded.
- Submit detailed report on the amounts, types, and value of materials currently being discarded on the UT-Austin campus.
- Develop recommendations on how UT-Austin can perform future studies in-house.
- Audit the City of Austin trash flow of 12 market categories of materials
- Audit the City of Austin residual trash from its Single Stream Recycling Program.
- Conduct a “Resource-shed” review of the flow of materials to disposal sites from UT-Austin and the City of Austin.
- Submit a detailed report on the amounts, types and value of materials identified in the City of Austin trash and recycling residual materials.

The purpose of this research study will be to quantify the flow of materials from its origins to common locations for purposes of evaluating how materials flow, consideration for new program development and to evaluate the potential in Zero Waste planning of designing wastes out of the system. The research team will work with campus and city sustainability offices and other stakeholders to ensure unique issues and challenges of concern to them are addressed in the final report.

The resulting report will provide the Department will analysis of waste streams that can be redirected from landfills through new diversion programs.

Diversion Composition Model

The diversion model was developed to evaluate the effects of the Zero Waste program initiatives on disposal and diversion throughout the City. The generation, diversion and disposal data for FY 2009 were used for the baseline tons and include estimates by generator type (single family, multifamily, commercial, self-haul).

The diversion model uses composition estimates from the CAPCOG

Regional Solid Waste Management Plan dated February 9, 2005. The “other” material category used by CAPCOG was divided into additional types (textiles, reusables, ceramics, soils and chemicals) based on the methodology presented in the Zero Waste Strategic Plan. The paper material category was further divided into recyclable paper and compostable paper.

The diversion potential of each Zero Waste program initiative was estimated based on data from comparable policies and programs implemented in other communities, research based on national studies, and educated estimates based on experiences with other similar programs. A participation rate and an efficiency rate were estimated for each initiative. The participation rate represents the fraction of households (for residential programs) or employees (non-residential programs) that are expected to participate in the program. The efficiency rate represents the fraction of each material that is diverted from disposal by a program participant. The product of the participation rate and the efficiency rate is the capture rate. A participation rate and an efficiency rate are specified for each initiative by material type.

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⁴ Capital Area Council of Governments Regional Solid Waste Management Plan. 9 Feb 2005. Adjustments made by City of Austin.

The program assumptions also specify whether the material is moved into recycling, organics or other discard streams. Capture rates are applied by initiative to the fraction of the discard stream addressed by a particular initiative (for example, the URO applied to the single family residential garbage tons).

Initiative	Materials	Participation Rate	Efficiency Rates	Capture Rate	Composition	Tons Disposed	Type	Tons Diverted
URO (as applied to single family tonnage)	Paper	100%	75%	75%	18%	77,887	COA Trash	10,515
	Metal, glass	100%	80%	80%	10%	67,372	COA Trash	5,390
	Other recyclable materials	75%	75%	56%	26%	61,982	COA Trash	9,065
	Food, compostable paper	90%	30%	27%	27%	52,917	COA Trash	3,858
	Yard trimmings	95%	90%	86%	20%	49,060	COA trash	8,389

TABLE 21

Diversion rates and tons were projected for each Zero Waste initiative for each goal year through 2050.

Waste Generator Audits

In order to efficiently implement the URO and increase material diversion, the Department may pursue inter-local agreements with CAPCOG and one or more local universities. The goals will include inventories of the material disposal and diversion streams of the top 100 waste generators in the City by FY 2015. To begin this evaluation of waste generators, an intensive study of the top 10 waste generators will be performed in FY 2012, as a means to immediately impact the largest waste flows in the City. Each site audit will organize, analyze and report the solid waste flows from the facility, and recommend waste reduction and diversion activities. To assist in this project, the Department will utilize resources from the U.S. EPA WasteWise Program and the WasteWise Re-TRAC data management and reporting system.

Single Stream Residential Recycling Composition Audits

To measure the effectiveness of the Single Stream residential program and to increase material diversion, the Department has required the two contracted recycling Material Recovery Facilities (MRFs) to perform quarterly composition audits. The composition study is performed by the facility operator, utilizing a reasonable sampling of delivered recyclable material and conducted in accordance with good industry practice. The composition study measures the quantities of recyclable material, residual material and trash extracted from the sample.

Each composition study presents a display of the percentage of each marketable recyclable, as well as the residual (trash) percentage. The results are utilized for the following three months to support financial calculations for market value paid to the City. The residual content is important to evaluate, as the trash content comes from two sources: mistakes of the public and residuals from the mechanical processing system. The Department utilizes the residual analysis to reshape the public education program to better inform residents on what is recyclable.

Twelve Market Categories of Recyclable Materials

The Twelve Market Categories of Recyclable Materials are also known as the Twelve Master Categories, The Clean Dozen and the Twelve Master Commodities. These are the commodity types that all discarded materials can be divided into for reuse, recycling and composting.⁵

The Market Categories are: reusable goods, paper, metals, glass, polymers, textiles, chemicals, putrescibles (including food scraps and compostable paper), wood, ceramics (including rock, tile, bricks, concrete and asphalt), soils and plant debris (also referred to as yard trimmings).

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⁵ Twelve Market Categories; 1998 Daniel Knapp and Mary Lou Van Deventer. Excerpted from *Total Recycling: Realistic Ways to Approach Ideal*, University of California Press.

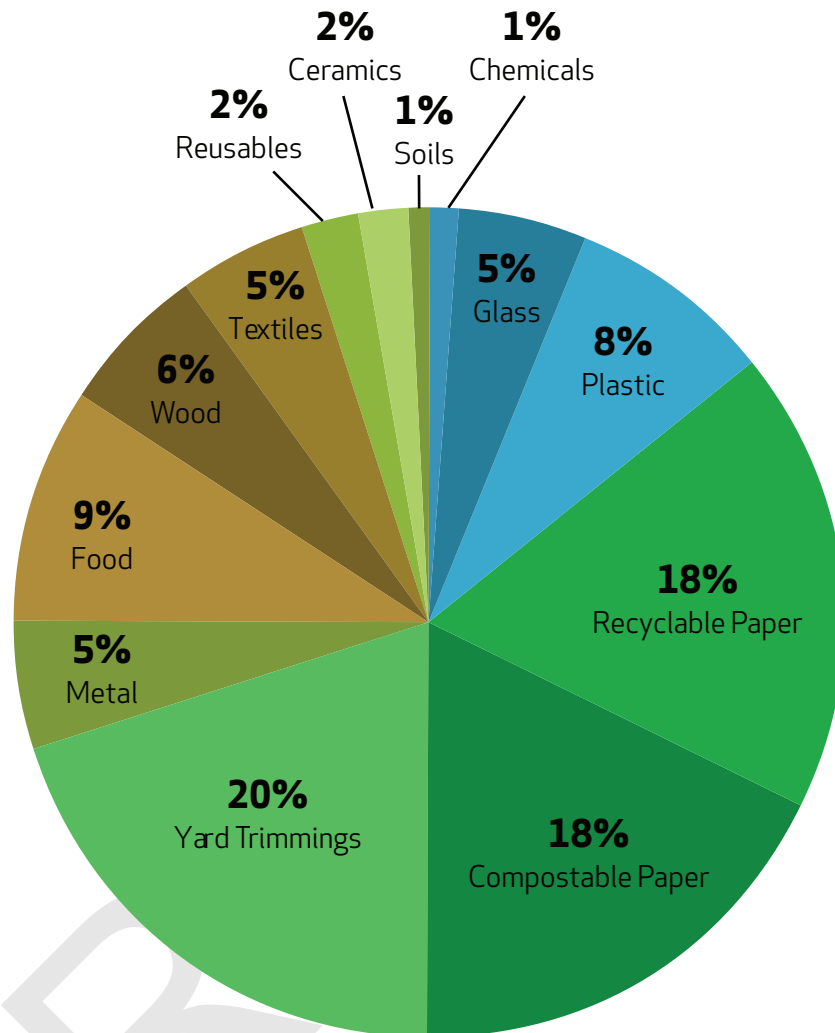
Composition of Discarded Materials⁶

FIG. 18

The Twelve Market Categories of Recyclable Materials are grouped by four major material categories:

- **Organics includes:** Putrescibles (including food scraps and compostable paper) and Plant Debris (also referred to as Yard Trimmings). Organics represents about 47 percent of discarded materials.
- **Recyclable and Reusable Materials includes:** Reusable goods, Paper, Metals, Glass, Polymers, and Textiles. Recyclable and Reusable Materials represents about 43 percent of discarded materials.
- **Construction and Demolition Debris includes:** Wood, Ceramics (including rock, tile, bricks, concrete and asphalt) and Soils. Construction and Demolition Debris represents about 9 percent of discarded materials.
- **Household Hazardous Waste includes:** Chemicals. Household Hazardous Waste represents about 1 percent of discarded materials.

⁶ Capital Area Council of Governments Regional Solid Waste Management Plan. 9 Feb 2005. Adjustments made by City of Austin.

The Market Categories are addressed through various initiatives discussed in this Master Plan:

Zero Waste Initiative	Organics	Recyclable and Reusable Materials	Construction and Demolition Debris	Household Hazardous Waste	Non-Marketable
Policies					
Universal recycling and composting ordinance	x	x			
Green Events ordinance	x	x			
Construction and Demolition Debris ordinance			x		
Rate structure incentives	x	x			x
Extended producer responsibility initiatives		x		x	x
Policies to reduce single-use and non-recyclable products and packaging		x			x
Take-back ordinance		x		x	x
Zero Waste research	x	x	x	x	x
Regional Cooperation	x	x	x	x	x
Market Development and City Purchasing	x	x	x		
Programs					
Recycling collection programs		x			
Organics collection programs	x				
Bulk item and brush collection	x	x	x		
Household Hazardous Waste collection				x	
Composting incentives	x				
Recycling Economic Development	x	x	x	x	
Facilities					
Eco-Depots and private Resource Recovery Centers	x	x	x	x	
Resource Recovery Center expansion	x	x	x	x	
North Household Hazardous Waste facility				x	

TABLE 22

23.6 / Metric of Public Service: Measurement Service Expectations

The Austin City Manager challenged each City department to think about how they can be the best in their respective fields. In the process of pursuing the Best Managed City concept, the Department's strategic planning refocused efforts to provide core business services to our customers. Two specific Department values address the focus on the delivery of services in a professional and financially responsible manner:

Customer Service – to provide efficient and reliable service for all customers.

The Department's approach to customer service is outlined in the following strategic areas of focus:

- Coordination of environmental services,
- Timely, responsive, and respectful to customers,
- Tracking Metrics to measure effectiveness of service, and
- Systems Approach toward resolving reoccurring complaints.

Financial Responsibility – to ensure the best value of services are provided for the lowest cost.

The Department's approach to fiscal service is outlined in the following strategic areas of focus:

- Fiscal accountability and oversight,
- Accounting accuracy,
- Cost and rate analysis, and
- Efficient use of City assets

City Performance Measures

The City of Austin's Managing for Results business system integrates strategic planning with budgeting, performance measurement and decision making. The Department requires the highest quality performance information available to make good business decisions based on reliable data. The use of performance measures makes it possible to identify results required to achieve the Department goals. Performance information is collected throughout the year to evaluate progress in meeting the Department goals and objectives.

Citizens are able to view the City's performance information by program and activity through the Austin City Connection internet database known as ePerf. The Department provides monthly and quarterly performance

information to the City Budget Office and the Assistant City Manager. It is challenging to determine customers' service expectations. In addition to providing performance measures, the Department analyzes the results of City's Annual Citizen Survey, to measure customer satisfaction.

As the Department explores better data collection systems, the Department will measure its customer service deficiencies. Service expectations will be measured annually through customer surveys and a contracted detailed customer survey will be conducted every five years.

23.7 / Other U.S. EPA Measurement Tools

Additional measurement tools are being developed to measure the effectiveness of waste diversion, greenhouse gas emissions, climate impacts, and material life-cycle analysis. EPA and its partners have developed several tools to help determine the GHG impact of purchasing, manufacturing, and waste management actions.⁷

Waste Reduction Model (WARM)

WARM was developed to assist solid waste managers in determining the GHG impacts of their waste management practices. WARM compares GHG and energy impacts of sending materials to landfills, recycling, incineration, composting, and source reduction. WARM calculates and totals GHG emissions of baseline and alternative waste management practices—source reduction, recycling, combustion, composting and sending materials to landfills. The model calculates emissions in metric tons of carbon equivalent (MTCE), metric tons of carbon dioxide equivalent (MTCO₂E), and energy units (million BTU) across a wide range of material types commonly found in municipal solid waste (MSW).⁸

Recycled Content (ReCon) Tool

The Recycled Content Tool was developed to assist companies and individuals in estimating the life-cycle GHG and energy impacts of purchasing or manufacturing certain materials; it also calculates the GHG and energy benefits of increasing the recycled content of specific materials. For example, the tool will allow the user to estimate the GHG emissions and energy benefits of purchasing office paper with 35 percent recycled content instead of 25 percent recycled content. Emissions and energy impacts are calculated using a life-cycle perspective (i.e., what impacts will this purchasing or manufacturing decision have on emissions and energy

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⁷ EPA Measurements tools can be found at the following website: <http://www.epa.gov/climatechange/wycd/waste/tools.html>

⁸ For information on the WARM model, visit: http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html.

use associated with the manufacture and disposal of a given material).⁹

Greenhouse Gas Equivalencies Calculator

This calculator, developed by the U.S. Climate Technology Cooperation, expresses quantities of GHGs in terms of metrics such as number of cars, gallons of gasoline, acres of forest, etc. This calculator is useful for expressing GHG reductions or emissions in a way that is easier to comprehend. The greenhouse gas equivalencies calculator can individuals translate abstract measurements into concrete terms, such as “equivalent to avoiding the carbon dioxide emissions of 183,000 cars annually.” This calculator may be useful in communicating the Department’s GHG reduction strategy, reduction targets or other initiatives aimed at reducing GHG emissions.¹⁰

NERC Environmental Benefits Calculator

The Northeast Recycling Council’s (NERC) Environmental Benefits Calculator is a free tool for states, counties, municipalities, schools, businesses and institutions to measure the environmental benefits from their recycling efforts. NERC’s calculator measures these benefits in terms of savings in air emissions, energy use, quantity of oil and gas consumed, cars off the road, household energy use, waterborne pollutants and other metrics. In addition, NERC’s calculator measures the energy savings from reusing or recycling computers. NERC’s calculator generates estimates of the environmental benefits of a study area, based on the tonnages of materials that are source reduced, reused, recycled, landfilled, or incinerated (includes waste-to-energy). The Calculator is based on per ton figures of the estimated energy use and emissions from several lifecycle analysis studies. The estimates are average figures based on typical facilities and operating characteristics existing in the United States. Factors that are not included in this calculator are landfill gas recovery and generation of electricity by waste-to-energy. The calculator incorporates EPA’s WARM calculator, as well as facts and figures for the U.S. Department of Energy, Steel Recycling Institute, Glass Packaging Institute and U.S. Climate Technology Cooperation Gateway, to name a few.¹¹

⁹ For more information on ReCon, visit: <http://www.epa.gov/climatechange/wycd/waste/calculators/ReCon_home.html>.

¹⁰ For more information on the GHG equivalencies calculator, visit: <<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>>.

¹¹ For more information on the NERC Environmental Benefits Calculator, visit: <http://www.nerc.org/documents/environmental_benefits_calculator.html>.

¹² For more information on WasteWise Re-TRAC, visit: <<http://www.epa.gov/wastes/partnerships/wastewise/retrac.htm>>.

WasteWise Re-TRAC

WasteWise Re-TRAC is a data management and reporting system to track a community’s waste generation and reduction activities. WasteWise Re-TRAC enables an organization to track and standardize waste management data for the entire operational system. Users can track activities, input data, and generate internal reports whenever the need arises. In addition, GHG emission reductions can be calculated and translated into real-life equivalents.¹²

23.8 / Diversion Calculations

Proposed programs displayed in this Master Plan are intended to increase diversion of material from landfilling. Diversion calculations are projected in tons over a period of years, assuming increasing public participation and capture effectiveness. Below is a representation of anticipated diversion through the proposed programs, policies, and infrastructure developments:

Diversion Initiatives - City of Austin Controlled (tons)	FY 2009 (Base)	FY 2015	FY 2020	FY 2025	FY 2030
Reuse Collection					
Reuse - Eco Depots & Teachers Reuse Center	0	500	2,000	5,000	10,000
Reuse Austin - Expanded Reuse Entrepreneur Opportunities	0	500	5,000	10,000	15,000
Recycling Collection					
Expanded Single Stream Recycling - Residential	44,446	75,000	80,000	85,000	90,000
Contracted Recycling Services (plus URO) - CBD & City Buildings	37,450	50,000	75,000	80,000	85,000
Contracted Recycling Services (plus URO) - CBD & City Buildings	552	35,000	50,000	55,000	60,000
Clean Austin - Expanded Bulk Collection & Recycling	238	1,000	4,000	10,000	15,000
Public Area Recycling Containers	0	400	1,000	2,000	4,000
Event Recycling Ordinance	0	250	500	1,000	1,500
Organics Collection					
On-Site Composting Incentive Program	0	1,000	2,000	3,000	4,000
Full Citywide Organics collection (Yard Trimmings, Brush, Food Scrap)	28,175	30,000	50,000	75,000	80,000
Storm-Ready Austin - Storm Debris Management Program	0	6,000	10,000	10,000	10,000
Household Hazardous Waste					
South Austin HHW Facility	114	150	200	500	1,000
North Austin HHW Facility	0	150	200	500	1,000
Expand Door-to-Door & Retail Take-back Collection	0	50	100	250	500
Producer Responsibility Initiative	0	0	50,000	75,000	100,000
Total City-Hauled Diversion - Reuse, Recycling, Composting, HHW	110,975	200,000	330,000	412,250	477,000
Projected City-Hauled Waste Disposal	249,525	200,000	110,000	72,750	53,000
Projected City-Hauled Waste Generation	360,500	400,000	440,000	485,000	530,000
City-Hauled Diversion Rate	30.8%	50.0%	75.0%	85.0%	90.0%

TABLE 23

Diversion Initiatives - Private Sector Controlled (tons)	FY 2009 (Base)	FY 2015	FY 2020	FY 2025	FY 2030
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Waste Reduction					
Waste Reduction Assistance Program (WRAP)	0	5,000	10,000	15,000	20,000
Waste Pairing (By-Product Synergies)	0	10,000	30,000	35,000	40,000

Recycling Collection					
C&D Debris Ordinance: Development, Implementation, Enforcement	0	50,000	100,000	150,000	180,000
Commercial & Multifamily Recycling (plus URO impacts)	334,258	450,000	700,000	850,000	1,000,000
Glass Collection Pilots for Multifamily and Commercial Sites	0	5,000	10,000	20,000	30,000
Expanded Multifamily Drop-off Recycling Services	0	30,000	100,000	140,000	150,000

Organics Collection					
Commercial & Multifamily Organics (plus URO impacts)	0	50,000	100,000	150,000	200,000

Total Private-Hauled Diversion - Reuse, Recycling, Composting, HHW	334,258	600,000	1,500,000	1,360,000	1,620,000
Projected Private-Hauled Waste Disposal	750,517	600,000	350,000	24,000	180,000
Projected Private-Hauled Waste Generation	1,084,775	1,200,000	1,400,000	1,600,000	1,800,000

Private-Hauled Diversion Rate	30.8%	50.0%	75.0%	85.0%	90.0%
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TABLE 24

Diversion Initiatives - Citywide Totals Controlled (tons)	FY 2009 (Base)	FY 2015	FY 2020	FY 2025	FY 2030
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Projected Total Austin Citywide Diversion	445,233	800,000	1,380,000	1,772,250	2,097,000
Projected Total Austin Citywide Waste Disposal	1,000,042	800,000	460,000	312,750	233,000
Projected Total Austin Citywide Waste Generation	1,445,275	1,600,000	1,840,000	2,085,000	2,330,000

Citywide Diversion Rate	30.8%	50.0%	75.0%	85.0%	90.0%
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TABLE 25

The Master Plan is designed to be a living document with annual updates, and program assessments every five years. Material diversion will be calculated annually with available data. A full citywide diversion assessment will be conducted every five years to measure progress toward the five-year benchmarks and the City Council adopted diversion goals.

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Chapter 24 / Communications Plan

Austin is part of a regional waste management system that continues to grow, outpacing other Texas communities. The region faces a need to expand existing landfills, open new landfills or divert a drastic amount of waste from current landfills to properly dispose of waste and ensure the health and safety of its residents. In 2009, Austin City Council adopted a Zero Waste goal to reduce the amount of waste sent to area landfills by 90 percent by 2040.

The overarching goal of the communications plan is to raise awareness among Austinites about the City's Zero Waste goal and to motivate them to change their behavior to achieve that goal. Specific, measurable objectives will be developed based on market research. By assessing the community's readiness to join the journey to Zero Waste, the Department's communications activities will provide strategies to guide Austinites through the stages of behavior change (pre-contemplation, contemplation, preparation, action and maintenance).

24.1 / Situation Analysis

In an effort to streamline messages, improve communication and build better relationships, the Department developed a communications policy. This policy tasks the Public Information/Marketing team with developing and managing departmental communications activities. This team is responsible for developing and disseminating consistent messaging and measuring effectiveness. It is important that this team is aware of Departmental issues in advance to proactively prepare for and respond to situations. This team is responsible for developing communications strategies that align with the City of Austin and the Department's mission and vision.

24.2 / Comprehensive Communications Plan

The Department will develop a comprehensive communications plan that corresponds with this Master Plan. The purpose of the plan will be to define measurable objectives and a strategic implementation approach to guide communicators and others in designing, preparing and executing strategic communications. This plan will be research-based to ensure effective targeting of audiences and development of key messages, as well as to measure success over time.

As mentioned in Chapter 16/Community Partnerships, the plan will use a community-based social marketing approach. According to the International Association of Social Marketing, social marketing increases socially beneficial behaviors within communities. Community-based social marketing is based on social psychology, “which indicates that initiatives to promote behavior change are often most effective when they are carried out at the community level and involve direct contact with people.”¹

Introduction to Community-Based Social Marketing

Education alone does not alter behavior. Conventional marketing can be effective in creating public awareness and understanding of issues, but is limited in its ability to foster behavioral changes.

Community-based social marketing is based upon research which demonstrates that behavior change is most effectively achieved through initiatives delivered at the community level. These initiatives are intended to focus on removing barriers to an activity while simultaneously enhancing the activities benefits. To be effective, programs must be carried out at the community level and involve direct contact with people.²

Community-based social marketing involves four steps:³

1. Identifying the barriers and benefits to an activity,
2. Developing a strategy that utilizes “tools” shown to be effective in changing behavior,
3. Piloting the strategy, and
4. Evaluating the strategy once it has been implemented across a community.

The communications plan will be reviewed and revised annually. It will identify:

- Desired Outcomes

¹ McKenzie-Mohr, Doug. *Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing*. Canada: New Society Publishers, 2011. Print.

² Ibid.

³ These steps were created based on the works of Doug McKenzie-Mohr.

- Measurable objectives
- Target audiences
- Key messages and persuasive strategies
- Communications tactics
- Implementation plan
- Timeline
- Staffing needs
- Budget

24.3 / Research

The Department will conduct market research to inform the development of the communications plan. To understand what target audiences want, need or believe, the Department should use both primary and secondary research methods. Once this is established, the Department can more effectively market its programs and educate the community about Zero Waste. During the annual communications planning process, the Department will determine whether additional or alternative research methods are needed.

Communications Audit

A communications audit is a systematic appraisal of all the communications between an organization and those who deal with it or who could affect it in some way. The PIO/Marketing team will conduct a communications audit to evaluate how the Department's target audiences perceive the organization, to assess the communications tools currently used to convey key messages and provide recommendations for improving communications strategy. Specifically, the communications audit will determine strengths and weaknesses and should answer the following questions:

- Do the communications support the City's Zero Waste goal?
- Do they add value? Are they effective?
- Are messages clear, consistent and reinforced?
- How are communications perceived among target audiences?
- What communications processes, support, tools and/or training does the department's staff need to be more effective?

The audit should include a review and assessment of communications tools used by the Department to include, but not be limited to:

- Collateral
- Advertising

- Media relations materials
- Social media
- Website
- Internal documents

In addition, the audit should include interviews with Department leadership and key staff members, as well as focus groups of both internal and external audiences to assess overall perceptions.

Phone Survey

The Department should conduct a telephone survey to gather qualitative data that is representative of Austin residents. The initial survey results should be used as a benchmark to gauge current levels of awareness and participation, as well as interest in potential future programs. The survey should be repeated during the implementation of the Master Plan and results will be compared to the benchmark survey results to assess the effectiveness of the public outreach and education program, as well as customer satisfaction.

Operational Data Analysis

To assist with the development of communications strategies and tactics, the Department will use operational data gathered as part of the Department's performance measures, as well as additional data collected in the field or via customer service communications. Data should include the City's diversion rate, customer set-out rates, improper set outs, requests for smaller cart sizes, etc. Geo-specific data should assist with determining target audiences for various initiatives. The Public Information/Marketing Team should be made apprised of customer issues on an ongoing basis. This will require ongoing interaction between the Public Information/Marketing Team and operations staff who interact directly with customers, such as field employees and customer service employees. This information will not only help inform messages but will also help identify opportunities for operational improvements and specific neighborhoods and areas of the City that require particular attention.

Meetings with Division Managers and Key Staff

The PIO/Marketing team will meet with each Division Manager and key staff members to discuss objectives and key messages as part of the annual communications planning process.

Best Practices Research

As new programs are developed or existing programs are modified, the

Department should conduct best practices research to learn from other cities and organizations.

24.4 / Communications Approach

As the Department continues its Zero Waste journey, the communications approach will be one that enables a forum for community engagement and education developing a catalyst for action. These efforts will be geared toward providing opportunities for residents and businesses in all parts of the City to participate. To move forward on this journey, the Department will broaden the involvement to hear from everyone, from all walks of life. The Department will foster a place for mixing ideas where people can collaborate to develop solutions that meet the needs of the whole community.

Target Audiences

With several staff locations and many employees who work in the field, Department employees interact with multiple stakeholders on a daily basis, both internally and externally. As programs and services evolve over time, conveying consistent messages to the public, as well as to City employees, is crucial in order to avoid confusion, maintain trust and build brand recognition.

To effectively reach the Zero Waste goal, the Department must effectively communicate with and influence the behavior of many audiences. Demographic and psychographic traits impact behavior change and will inform the way messages are developed and communicated. The market research studies described above should seek to answer the following questions about the Department's diverse target audiences:

- Who are they?
- Where are they?
- How do they obtain daily information?
- Who are their opinion leaders?
- What are their current perceptions, knowledge, needs, wants, preferences and behavior in relation to Zero Waste initiatives?
- What prevents them from adopting the alternative behavior promoted by Zero Waste initiatives?
- What would motivate them to adopt the promoted behavior?

To further analyze customer profiles, the Public Information/Marketing Team will work with the Department's demographers and cartographers

to collect geo-specific information based on established performance measures, such as the City's diversion rate, customer set-out rates, participation in various initiatives, and subscription services (cart sizes).

Internal audiences include:

City Employees

Employees are the face of any organization. An "Employees First" mentality is key to driving employee morale and performance, and thus the department's reputation, retention and results. Employers who recognize this concept use effective communication, training, recognition and knowledge sharing. This results in a workforce that understands where the organization is going, how they fit in and that they are important to the organization's future. Communications strategies must take into account the needs and communications preferences of staff in separate geographic office locations, as well as a large number of field employees.

Interdepartmental, Mayor and Council

Interdepartmental communication is the process through which various departments send and receive messages between themselves. For communication to be effective, one department must send a clear and comprehensive message to another department, and the message must be clearly and completely understood. Ineffective communication can lead to confusion, lack of morale and frustration among employees and departments. Austin Resource Recovery will continue to find ways to collaborate with other City departments to efficiently and effectively communicate with internal and external audiences about environmental and Zero Waste-related issues. For example, the Department will continue working with the City's Office of Sustainability and other environmental programs to streamline communications and discover new opportunities for partnership that are in line with the City's sustainability mission.

External audiences include, but are not limited to:

- ARR customers
- Multifamily community management and residents
- Opinion leaders
- Neighborhood leadership
- Minority community leadership
- Business community
- Environmental community

- Schoolchildren and youth
- University leadership and students
- Local governments and elected officials
- Industry analysts
- News media
- Social media influencers and other online audiences

Key Messages

Key messages should permeate all communications throughout implementation of Master Plan and will be crafted for each objective and target audience. Several tactics should be employed to develop these messages, including listening sessions that consider public input on messaging and approach.

Communications Strategies and Tactics

Communications tactics must be chosen strategically to achieve each communications objective. An integrated approach to disseminating key messages will be important to ensure frequency and reinforce concepts. The Department should strive for two-way communication throughout implementation of the communications plan. By listening to target audiences on an ongoing basis, the Department will have the opportunity to address issues before they occur, revise messages to make them more meaningful, and get input and ideas from target audiences. Staff should evaluate communications methods throughout implementation of the Master Plan to include new media and technologies. Communications strategies and tactics may include:

- Direct mail
- Email
- Media relations
- Advertising (newspaper, TV, radio, online, out-of-home, etc.)
- Public Service Announcements
- Videos
- Newsletters
- Brochures
- Fact sheets
- Utility bill inserts
- Website
- Social media (Facebook, Twitter, YouTube, etc.)
- Message boards
- Face-to-face/one-on-one meetings
- Group presentations, classes and workshops
- Public information and input meetings

- Outreach to schoolchildren
- Special event booths
- Memos and letters
- Annual progress report

Measurement and Evaluation

Developing measures for success are important in monitoring progress toward reaching the City's Zero Waste goal. These measurements should be staged throughout the duration of the Master Plan to allow for corrective actions if the communications activities are not getting the desired results. Measurable communications objectives should be established based on benchmarked market research results, along with a timeframe for meeting objectives. Evaluation criteria should also be established before the communications plan is implemented. Staff will work with City data analysts to define methods of relating communications activities to diversion of waste from the landfills. Ultimately, the success of the communications plan should be evaluated by the City's diversion rate, in realizable increments.

24.5 / Community Engagement

The Department commits itself to a robust community engagement program. That program will develop standards that are in line with professional associations experienced in community engagement.

Public engagement will be achieved through the many strategies and tactics outlined in Section 24.3 keeping in mind that to engage with citizens, it is important for the Department to communicate in new ways, keep the message clear and make information easy to attain. The Department must view citizens as consumers and allow citizens to become contributors in the development of Zero Waste programs and policies. The Department must ensure that communication can be translated into improved services, completion of transactions and increased satisfaction. Effective community engagement should include five elements:

1. Increase citizens' knowledge about the City's Zero Waste initiative
2. Encourage citizens to apply that knowledge
3. Use that knowledge to improve the Austin community
4. Create opportunities for citizens to engage each other
5. Ensure that these opportunities are regular and ongoing

Community engagement programs will be developed to be in line with the Department's communication plan and will include, but not be limited to:

- **Charrettes** – meetings to engage stakeholders in resolving issues with useful solutions
- **Community theatre and arts projects** – using multimedia outlets to present information and initiate discussion about the Department and how it could improve
- **Dialogues and public forums** – regular, ongoing forums for conversation between the Department and stakeholders
- **Volunteer programs** – encourage neighborhood champions through the Block Leaders program and inspire citizens to volunteer as Zero Waste ambassadors

24.6 / Public Education

According to the EPA, "a successful solid waste management program requires widespread public participation. Such participation can best be obtained through early and effective public education programs, which must continue even after the program is in full swing."⁴ Well-planned education and outreach programs will generate understanding and support for the City's Zero Waste initiatives.

Public education and outreach can take a variety of forms including written materials, visual materials and events. The Department will enhance the existing public education program to ensure a comprehensive, robust program. In developing these programs, staff will evaluate the investment of time and labor, the financial cost and the effectiveness of each strategy. These programs will become a regular part of the Austin community and will evolve to meet the needs of the City. Some examples of public education activities include youth education, speakers' bureaus and an annual report.

Youth Education

The Department currently provides two free classroom presentations for 2nd and 3rd grade students in the AISD elementary schools. These presentations introduce students to the concepts of recycling, waste reduction and Zero Waste, and correspond with the Texas Essential Knowledge and Skills requirements. Staff desires to expand the youth education program by developing a new scope of work to be competitively bid through City's process. The new scope of work will consider the following:

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⁴ United States. Environmental Protection Agency. *Decision Maker's Guide to Solid Waste Management - Vol. II*, EPA530-R-95-023. EPA, 1995.

- Expand opportunities from 2nd and 3rd grade only to other grade levels, targeting students in all levels – elementary, middle and high school
- Expand content from recycling only to a larger message of Zero Waste and sustainability
- Ensure that content is curriculum-based and that the message is cohesive throughout the various grade levels
- Partner with other City departments that have a message of sustainability to develop a unified voice from the City
- Include an on-call option to fulfill youth education requests that come from non-school groups or for large presentations
- Consider including private and charter schools
- Collaborate with other surrounding school districts through inter-local agreements having them cover the cost

Speakers Bureau

The Department provides a wide range of services to Austin residents, businesses and visitors. To better understand the City's Zero Waste programs and initiatives, the PIO/Marketing team will develop a speakers bureau, comprised of representatives from throughout the City to provide presentations on a wide range of topics free of charge.

Annual Report

SWS will prepare an annual report to provide the Austin community with updates on programs, services and progress toward the Zero Waste goal. This document will report on how well the Department is doing in meeting the specific objectives outlined in the Master Plan and will include but not be limited to the following:

- Departmental awards and accomplishments
- Brief background and history on the Department
- Program highlights – the latest and greatest
- Community partnerships and research
- Operational and administrative overviews

The annual report will be developed and distributed widely, including other City Departments, the Mayor and Council, as well as the general public. The report will be printed for distribution, posted on the City's website and content delivered at various community engagement opportunities.

24.7 / Communications Plan – Implementation and Cost Estimates

Resources

Program costs for this initiative are based on \$0.75 per household per month or about \$2.4 million per year at full implementation. Funding will be needed for media campaigns, printed materials and other outreach expenses. Some of these funds could be used for new staff or contractor resources. These allocations will be determined based on media and marketing strategies to be outlined in the comprehensive communication plan.

DRAFT

Initiative	Date of Initiation
Implement Community Engagement Plan	FY 2013
Implement Public Speakers Program	FY 2012
Publish Annual Report	FY 2012
Public Education and Marketing Campaigns	FY 2012

Operational Expenses	First Year Costs FY 2013
2.0 FTE in FY 2013	\$164,000
One Time Expense: None	\$0
Annual Recurring Expenses: Public Education & Marketing Campaigns	\$3,302,000
Annual CIP Debt Payment: None	\$0
Total First Year Operational Expenses	\$3,466,000

TABLE 26

Chapter 25 / Financial Responsibility

The Department's Finance Division is responsible for managing the Department's finances. The City Manager, the Financial and Administrative Services Department (FASD) and the Department Director provide oversight to ensure consistency in fiscal policies. Financial management entails updating and maintaining the Department's Business Plan, generating a Five-Year Financial Forecast and producing the Annual Operating Budget, which includes estimated expenditures, projected revenues and development of the rate structure necessary to support the Department's operations.¹

25.1 / Accounting and Funding

The Department's finances are managed in an enterprise fund. An enterprise fund is a type of self-supporting revenue fund used to account for fee-based services provided to the public and allows the Department to operate as a separate entity. Revenues and expenses are segregated into a fund with financial statements separate from all other governmental activities. The main advantage of an enterprise fund is that all revenues are dedicated solely toward funding all service costs of the delivered service. This ensures that revenues are not utilized for other governmental Departments. As a business enterprise of the City, the Department generates its own revenue, without support of tax revenues, and sets its budget accordingly.

25.2 / Financial Planning and Budgeting

The Department's Business Plan is used to communicate financial and operational plans to City staff, City Council and Austin residents. It is the first step in the development of the Annual Operating Budget. The Department prepares the Business Plan for each fiscal year based upon input and guidance from the

Director, executive team and managers with oversight from the Budget Office and City Manager.

The Five-Year Financial Forecast provides a basis for preparing the Annual Operating Budget. Forecast projections are used as a tool to provide the City Manager and City Council with an early financial picture of the Department's progress toward achieving its long-range goals and how that progress will affect the organization's financial structure over the next five years.

The Annual Operating Budget details the organizational, financial and performance goals for the next fiscal year as well as projections for the current fiscal year.

25.3 / Revenue

Collection Fees

Curbside collection fees, or service fees, include a base customer fee and trash cart fee for residential and commercial customer accounts serviced by the Department. The residential or commercial base customer fee is a flat fee that is charged to each cart customer. Over the last 20 years, the Department implemented a curbside collection fee structure focused on discouraging waste and encouraging diversion.

In the early 1990s, the City began phasing in the Pay-As-You-Throw program as a pilot project. This program introduced a semi-automated cart collection system designed to enhance the safety of collections personnel by minimizing lifting and maximizing the use of automated tip-pers. In 1997, the City Council adopted an ordinance establishing variable rates for residential curbside collection, replacing a flat fee which was assessed to all customers without regard to service levels. Since October 1997, cart fees have been assessed according to cart size (32-gallon, 64-gallon and 96-gallon). In FY2012 the City will add a new 21-gallon cart size as a waste diversion initiative to encourage more residential and commercial recycling.

In addition to curbside collection fees, the Department has other revenue components including fees charged to deliver extra carts or upsize carts, fees charged for un-stickered extra trash items collected at the curb, and pre-paid extra trash bag stickers sold at local retail stores. All fees are

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¹ Current and historical budget information may be viewed online at <http://www.ci.austin.tx.us/budget/default.htm>.

collected according to the Council-approved fee schedule.

Anti-Litter Fees

In September 1981, the City Council passed ordinance #031204.14 establishing the Anti-Litter Fee for community wide services such as street cleaning and litter control. The City later added dead animal collection and HHW as activities funded by the Anti-Litter Fee. In the FY2002 budget, the City Council approved an increase to the Anti-Litter Fee to fund code compliance activities such as enforcement of public nuisances on private property involving junk, litter and illegal dumping. The Code Compliance Division had previously been housed within the Health and Human Services Department, but transferred to the Solid Waste Services Department, now known as Austin Resource Recovery (ARR). Over time, demand for code compliance activities increased, resulting in a decision by the City Manager to create the Code Compliance Department. Anti-Litter Fees therefore support two departments – ARR and CCD.

The residential Anti-Litter Fee is assessed to any residence that has an active utility account and includes all multi-family units. The fee is charged to all accounts regardless of occupancy. The Department also charges a commercial Anti-litter Fee to businesses within the service area with active utility accounts. Specific to ARR, the Anti-Litter Fee continues to cover operational costs for litter control, street sweeping, and the Household Hazardous Waste (HHW) facility. New Zero Waste expenditures to be covered by the Anti-Litter Fee include business outreach to support the URCO. Based on the formation of CCD, the Department will also present the City Council with an ordinance to clarify and expand all activities covered by the Anti-Litter Fee.

Other Revenue

Other revenues include Single-Stream Revenues, New Services Fees, Interest, and Other Revenues.

- Single-Stream Recycling revenues are revenues generated by the sale of the processed Single-Stream recyclables.
- New services fees include an activation fee for new accounts that are active for 10 days or longer.
- Other fees include interest income, private waste hauler fees, sale of mulch and associated loading and revenues garnered to cover disposal of household hazardous waste items. Auction Sales include revenues from interlocal or interdepartmental agreements.

25.4 / Expenditures

The expenditure categories identified in the Annual Operating Budget are Program Requirements, Transfers Out and Other Requirements. Each of these categories is described below.

Program Requirements

This category includes expenditures, listed by major program, necessary to support the policies, plans and infrastructure required for daily operations. Current programs are described below:

- **Collection Services** – Collection Services include expenses for operations and maintenance, including employees and equipment for trash, recycling and yard trimmings collection, brush and bulk collection, including processing costs for all activities. Also included are any service contracts that the Department has with private haulers.
- **Litter Abatement** – Litter Abatement includes those expenses for litter control, street sweeping and the HHW facility.
- **Waste Diversion** – The Waste Diversion program includes expenditures for the following: Zero Waste program development, business outreach, seasonal programs (Christmas tree recycling, shred days, etc.), the Recycling Center and the Resource Recovery Center. This includes expenditures related to the Universal Recycling Ordinance and the new policies, programs and infrastructure for Zero Waste implementation as described in this Master Plan.
- **Operations Support** – Operations Support includes expenses for routing, cart and container maintenance, the service request center, billing services and the new quality control unit.
- **Brownfields Remediation** – The EPA defines Brownfields as real property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight and takes development pressures off of green spaces and working lands. Expenses for Brownfields Remediation are included in this category.
- **Support Services** – Support Services includes expenses related to purchasing, financial monitoring and budgeting, administration and management, information technology (IT) support, human resources, facility, public information and safety related items.

Transfers Out

- Transfers Out include, but are not limited to, the following:
- General Obligation Debt Service Fund
- Capital Improvement Projects Fund (includes Landfill Closure and Post-Closure)
- Communications and Technology Management Fund
- Environmental Remediation
- Code Compliance (a separate Department funded through the Anti-Litter Fee)

Other Requirements

Other Requirements include, but are not limited to, the following:

- Workers' Compensation
- Administrative Support - City
- Utility Customer Service Office (UCSO) Billing Support
- 311 System Support

Employee Base

Labor is one of the higher budget expenses for the Department. The number of FTEs is identified in the Annual Budget. Currently, the Department has 392 budgeted FTEs but is proposing to add six new FTEs in FY2012, two for the HHW Facility to handle additional hours of operation and four to assist with implementation of the new Universal Recycling Ordinance (URO) under the Waste Diversion program, for a total of 398 FTEs.

Employee Base by Program Area for FY 2012 Budget

Program Area	FY 2012 Total FTEs
Landfill Closure & Post Closure	4.25
Litter Abatement	107.3
Operations Support	33.6
Collection Services	190.7
Waste Diversion	32.35
Support Services	29.9
Transfers & Other Requirements	0
Totals	398.0

TABLE 27

25.5 / Purchasing and Contract Compliance Monitoring

The City Manager and designees are authorized to contract for the City of Austin. In cooperation with City departments, the corporate Purchasing Office of FASD, procures quality goods and services in a timely manner at the lowest possible cost and ensures that purchasing is conducted with adherence to applicable federal, state and local laws.

Laws governing municipal procurement dictate procedures to assure the public that there is a process in place guaranteeing open access, equal bidding opportunity, public scrutiny of bids, fairness in awards, minority- and women-owned business participation, bid protest procedures and adequate competition. Civil or criminal penalties could result for officials or employees who knowingly avoid competitive bidding requirements set forth in State statutes. In addition, Section 2-7-62 of the City Code sets forth standards of ethical conduct to ensure fair competitive access to governmental procurement by responsible contractors.²

The procurement process is divided into six phases: requisition, solicitation, solicitation response, evaluation, award and post-award. In the requisition phase, the Department develops in-depth scopes of work and specifications describing the services, major tasks and deliverables to be provided by contractors. During solicitation and solicitation response, Department staff review and approve bid packages for advertisement. In the evaluation phase, Department staff review bid responses for price and responsiveness to other selection criteria specified in the bid documents. If the contract amount exceeds \$53,000, the contract must be approved by the City Council. The entire process takes approximately six months.³

Contract compliance monitoring in the award and post-award phases is conducted at the department level. Throughout the term of the agreement, Department staff members continuously scrutinize the vendor's performance and work products for conformity with the contract scope of work and terms and conditions.

In order to meet the increased demands for purchasing and contract management activities required by this Master Plan, the Department will add an additional FTE in the Finance Division's Purchasing Unit.

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² Prospective vendors can view and download purchasing policies, instructions, forms and solicitation notices at the Purchasing Office's internet site at www.ci.austin.tx.us/purchase.

³ The requirement for Council approval is determined by ???

25.6 / New Master Plan Expenditures

Expenditures for New Zero Waste Initiatives

The estimated annual costs of the Zero Waste initiatives are shown in the table below, and projected through FY2020. The first full year of implementation varies for each Zero Waste policy and program with some scheduled for full implementation in FY2012 while others are not to be fully implemented until FY2020. Cost estimates through FY2020 are calculated using direct program cost estimates as well as growth and escalation factors. The Department will consider implementing new policies, programs and initiatives through future plan updates.

New Zero Waste policy, program and facility initiatives include:

- Universal Recycling and Composting Ordinance implementation;
- Events Recycling Ordinance Implementation;
- Participation in the Construction and Demolition Debris Ordinance Implementation;
- Partnerships with Other City Departments;
- Community-Based Social Marketing;
- Extended Producer Responsibility Initiatives and Product Policy Implementation;
- Eco-Depots;
- Recycling Economic Development; and
- Resource Recovery Center Expansion.

Anticipated cost for implementing these proposed programs are noted in Table 25.1 Zero Waste Policy, Program and Facility Cost Estimates.

Methodology for Modeling New Zero Waste Expenditures

This Master Plan includes a financial model projecting costs and revenues through FY2020. The financial model was developed using the approved Department budget including all existing revenues and expenses allocated for FY2012. All planning level revenues and expenses for new Zero Waste initiatives were added to the Department's base budget. Projected revenues include all service fees, recycling and other revenues. Projected expenses include capital costs, operating expenses, maintenance and upgrade expenses such as all recurring and one-time (non-recurring) expenses and revenues through FY2020.

Costs for both the new and existing programs were escalated by a population growth rate of about 2 percent to 2.5 percent annually based on data provided by the City demographer. The costs have also been esca-

lated by inflation at 0.5 percent in the first year, increasing to 2.5 percent within 5 years based on City Budget Office projections.

The financial model relied on the Department's current and historical budgets and supporting documentation as well as other financial data and discussions with the Department's finance team. The financial model ties expenses directly to revenues for the basic program areas of Anti-Litter, Pay-As-You-Throw, and the new Zero Waste initiatives. Potential future rates were built around covering expenses for these program areas. As it is critical that the City maintain a reserve for operations, the projected rates also include a year end balance that covers at least 30 days of operating expenses.

Total Cost Impacts by Goal Year

The phasing plan presents the citywide diversion goals: 50 percent diversion by FY2015, 75 percent diversion by FY2020, 85 percent diversion by FY2025 and 90 percent diversion by FY2030. Most of the initiatives identified in the Master Plan will be implemented between FY2012 and FY2020 to achieve estimated citywide diversion rates.

By FY2020 the citywide diversion rate will increase to 75 percent due to full implementation of the URCO, additional recycling/reuse services, start-up of weekly recyclables collection, community-based education and social marketing, product policies and other EPR initiatives and rate structure incentives.

Between FY2020 and FY2030 new technologies and major policy changes along with new programmatic improvements can potentially increase the diversion rate above 90 percent towards the City's goal of Zero Waste. The table below shows a summary of the total diversion and net expenses by target years (FY2012, FY2015 and FY2020). The new Zero Waste initiatives will also reduce landfill costs by diverting materials away from the landfill. These cost saving are presented below.

	FY 2012	FY 2015	FY 2020
Total New Diversion	5%	28%	44%
Total Existing Diversion	31%	31%	31%
Total Diversion	36%	50%	75%
Total New Annual Expenses	\$1,782,000	\$8,536,000	\$9,652,000
Less Disposal Reduced Expenses (saved by City)	\$817,000	\$2,364,000	\$4,210,000
Net New Annual Expenses	\$965,000	\$6,172,000	\$5,442,000

TABLE 28

25.7 / Future Rate Structure

Base Rates

Base rates are assessed for each account that has trash service. These are applied to the Collection Services Expenses. This Master Plan proposes the elimination of the Base Rate, and the full integration of all collection services collected within the variable Cart Charges. This change fully incorporates all collection services revenues within the Pay-as-You-Throw rate scheme, as previously endorsed by City Council approximately a decade ago.

Collection Services Rates (Cart Rates)

The projected Collection Services rates, or Cart Rates, are based on the need to meet annual costs for residential and commercial collection, diversion and disposal. Cart Rates are quoted as a bundled service based on the size of the trash cart and include all curbside trash, recycling, yard trimming, brush, and bulk collection services. Each service is not offered separately with separate fees.

Cart Rates vary based on the volume of the trash cart service selected. The trash cart size rates are calculated for 21-, 32-, 64- and 96-gallon carts. Rates for extra items collected curbside are charged through an extra trash charge (pre-paid sticker purchases and non-sticker charges billed) are also projected. Consistent with the goals of this Master Plan, the 96-gallon trash cart size will be phased out between FY2020 and FY2025, and these customers are assumed to migrate to 64-gallon carts.

The projected rates effective FY2013 through FY2020, are shown in the tables below. Revenues from the extra trash sticker program are projected to decline at about 24 percent per year and to be phased out by FY2020. Consistent with the goals of the Master Plan, the projected fees for pre-paid extra trash stickers and un-stickered items collected at the curb are increased every third year to encourage diversion. The FY2012 rates for trash carts included the addition of the smaller 21-gallon cart at a lower rate to incentivize diversion. The residential and commercial trash cart rates by size are:



Cart Size	21-Gal	32-Gal	64-Gal	96-Gal
Base Fee	\$8.75	\$8.75	\$8.75	\$8.75
Cart Fee	\$4.00	\$4.75	\$10.00	\$22.20
Total	\$12.75	\$13.50	\$18.75	\$30.95

FIG. 19

Rates based on cart size are intended to encourage customers to generate less waste and increase diversion. These rates are adjusted at three-year intervals to cover the costs of the existing curbside Collection Services program and to include some new Zero Waste program initiatives. The Department endorses the Pay-As-You-Throw rate structure which charges high volume users a proportionally higher monthly charge than low end users, thus encouraging waste reduction. The current FY2012 fee structure noted above is a modified Pay-As-You-Throw rate, as it includes a base rate in addition to a volume fee.

Beginning in FY2013, the Department will propose to City Council a pure Pay-As-You-Throw rate structure that charges customers based upon cost per gallon. This proposed change in fee structures is intended to support the Zero Waste goals of this Master Plan by further differentiating the high volume (96 gal) monthly rate from the low volume (21 gal) monthly rate. An example of this proposed fee structure is as follows:



Cart Size	21-Gal	32-Gal	64-Gal	96-Gal
Per Gallon Rate	\$0.39	\$0.39	\$0.39	\$0.39
Monthly Rate	\$8.19	\$12.48	\$24.96	\$37.44

FIG. 20

Note that this is simply an example for illustrative purposes. The Department will update its cost of service study and calculate a standard per gallon fee in the Spring of 2012 for the FY2013 proposed budget process.

Anti-Litter Rates

The expenses for anti-litter services are discussed in the chart below. The fees collected to cover expenses are based on rates established for all residents and businesses that have active service accounts. As previously discussed, the Anti-Litter Fee covers litter control, street sweeping, household hazardous waste disposal, and the Code Compliance Department. Future rate adjustments will include the costs of expansion of the City's existing HHW facility. The FY2012 residential rate is \$5.00 per month and the FY2012 commercial rate is \$7.50 per month.

In the near future, ARR and CCD will collaboratively pursue an ordinance amendment to clarify the programs covered by the Anti-Litter Fee and more clearly divide the fund between the two departments. This change will attempt to make the program costs more transparent between the departments while allocating a more appropriate split to fund the required activities. It is important to clarify that CCD expenditures are not reflected in any of the charts below because CCD is a separate department and not related to ARR's programs or services.

The estimated expenditures, revenue needs, and proposed rates discussed below will be reevaluated every year, with an annual budget proposal presented to the City Council each summer. Adoption of this Master Plan does not imply the approval of the rates and expenditures presented below. The City Council reserves the right to approve an annual budget each year reflecting current events and citizen needs. This Master Plan will be re-evaluated every five years through a public engagement process.

Cost of Service Study

In an effort to support the change in the Department's rate structure, Department staff performed a cost of service study in 2011 which segmented all expenditures between two major expense categories: Collection Services and Anti-Litter. The results of this Cost of Service Study are shown in Table 25.2 and Table 25.3 and were used to project the proposed rate structure for FY2013 to FY2020.

Service Contracts are utilized to cover trash and recycling collections for the Central Business District, Multi-family units and City facilities. These

private hauler contract costs were excluded from the cost of service study. Rates for these services are evaluated separately and are set at an amount that covers the cost to the City.

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Service Contracts	\$1,441,000	\$1,497,000	\$1,562,000	\$1,640,000	\$1,721,000	\$1,809,000	\$1,898,000	\$1,987,000

25.8 / FY2013 to FY2020 Proposed Rates

To pay for the Department's current programs and new Zero Waste initiatives, the financial model calculates the rates for FY2013 through the end of the mid-term planning period, FY2020. The current rate system combines all revenues to meet the Department's expenditure needs.

In the new rate system, rates were developed to meet total expenses by program area: Anti-Litter and Collection Services. Monthly rate charges are projected to cover the costs identified for each program area. Rates are escalated at affordable levels to cover the program area costs and meet the 30-day operating expense reserve requirement. These rate structures are shown from FY2013 through FY2020 for both the Residential and Commercial sectors in Table 25.4 and Table 25.5.

As noted previously, the estimated expenditure, revenue needs, and proposed rates discussed above will be reevaluated every year, with an annual budget proposal presented to City Council each summer. Adoption of this Master Plan does not imply the approval of the rates and expenditures presented above. The City Council reserves the right to approve an annual budget each year reflecting current events and citizen needs. This Master Plan will be re-evaluated every five years through a public engagement process.

Zero Waste Policy, Program & Facility Cost Estimates

TABLE 29

New Diversion Programs and Services	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Reuse Austin - Eco-Depots & Teacher Resource Center	\$0	\$504,000	\$411,000	\$416,000	\$421,000	\$429,000	\$434,000	\$379,000
Recycling - Multi-family expansion, glass collection, Resource Recovery Center, C&D Recycling and Pilots	\$415,000	\$561,000	\$582,000	\$528,000	\$486,000	\$495,000	\$506,000	\$490,000
Composting Organics - Food Waste Collection, Storm-Ready Austin and compost incentives	\$188,000	\$816,000	\$2,840,000	\$3,479,000	\$3,513,000	\$3,543,000	\$3,572,000	\$3,570,000
Household Hazardous Waste - New North Site, Retailer Take-Back Ordinance and On-call Services	\$0	\$756,000	\$869,000	\$922,000	\$941,000	\$961,000	\$980,000	\$1,002,000
Landfill Redevelopment - Gas Recovery and Solar Energy	\$86,000	\$89,000	\$91,000	\$94,000	\$97,000	\$100,000	\$103,000	\$106,000
Administrative Support - Contract Management	\$67,000	\$69,000	\$71,000	\$73,000	\$75,000	\$78,000	\$80,000	\$82,000
Economic Development - Re-Made in Austin, Eco-Industrial Park and Brownfields Redevelopment	\$118,000	\$121,000	\$123,000	\$126,000	\$129,000	\$132,000	\$135,000	\$138,000
Communications - Public Education and Marketing	\$3,466,000	\$3,504,000	\$3,549,000	\$3,605,000	\$3,669,000	\$3,737,000	\$3,810,000	\$3,885,000
Total Added Program Expenses	\$4,340,000	\$6,420,000	\$8,536,00	\$9,243,000	\$9,331,000	\$9,475,000	\$9,620,000	\$9,652,000

Estimated Collection Services Expenditures to be Covered by the New Variable Cart Fee

Cart Fees and Base Rate: Expenditures with Added Diversion Programs	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Trash Collection (less Extra Trash Revenue received)	\$24,752,000	\$25,114,000	\$25,673,000	\$26,829,000	\$28,404,000	\$30,072,000	\$31,764,000	\$33,462,000
Recycling Collection (less Single Stream Revenue received)	\$15,557,000	\$15,997,000	\$16,368,000	\$17,059,000	\$17,950,000	\$18,989,000	\$20,064,000	\$21,091,000
Brush Collection (includes Processing and Seasonal programs)	\$4,865,000	\$4,935,000	\$5,044,000	\$5,264,000	\$5,520,000	\$5,794,000	\$6,072,000	\$6,355,000
Bulk Collection	\$4,502,000	\$4,567,000	\$4,667,000	\$4,871,000	\$5,108,000	\$5,362,000	\$5,619,000	\$5,881,000
Organics Collection	\$6,011,000	\$7,271,000	\$11,114,000	\$12,513,000	\$12,868,000	\$13,233,000	\$13,599,000	\$13,924,000
Clean Austin (High need areas)	\$1,079,000	\$1,095,000	\$1,119,000	\$1,168,000	\$1,224,000	\$1,285,000	\$1,347,000	\$1,410,000
Reuse Austin (Eco-Depots)	\$0	\$953,000	\$761,000	\$766,000	\$774,000	\$788,000	\$796,000	\$695,000
Total Added Program Expenses	\$56,766,000	\$59,932,000	\$64,746,000	\$68,470,000	\$71,848,000	\$75,523,000	\$79,261,000	\$82,818,000

Note:
Costs do not include
Service Contract
expenditures

TABLE 30

Estimated Anti-Litter Expenditures to be Covered by the Anti-Litter Fee

Note:
Expenses above do
not include costs
associated with
Code Compliance

TABLE 31

Anti-Litter Fee: Expenditures with Added Diversion Programs	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Street Sweeping	\$4,146,000	\$4,206,000	\$4,298,000	\$4,486,000	\$4,704,000	\$4,938,000	\$5,174,000	\$5,416,000
Litter Abatement	\$1,767,000	\$1,792,000	\$1,832,000	\$1,912,000	\$2,005,00	\$2,104,000	\$2,205,000	\$2,308,000
Dead Animal Pickup	\$273,000	\$277,000	\$283,000	\$295,000	\$310,000	\$325,000	\$341,000	\$357,000
Central Business District (Litter Collection, Sweeping and Flushing)	\$2,607,000	\$2,645,000	\$2,703,00	\$2,821,000	\$2,958,000	\$3,105,000	\$3,254,000	\$3,406,000
Current HHW South Facility	\$2,308,000	\$2,646,000	\$2,861,000	\$3,044,000	\$3,189,000	\$3,333,000	\$3,478,000	\$3,629,000
New HHW North Facility	\$0	\$1,125,000	\$1,141,000	\$1,150,000	\$1,160,000	\$1,181,000	\$1,199,000	\$1,223,000
Resource Recovery and Recycling Centers	\$985,000	\$1,000,000	\$1,021,000	\$1,066,000	\$1,118,000	\$1,174,000	\$1,230,000	\$1,287,000
Business Outreach (URO)	\$2,773,000	\$2,813,000	\$2,875,000	\$3,000,000	\$3,146,000	\$3,303,000	\$3,461,000	\$3,622,000
Brownfields Remediation & Economic Development	\$655,000	\$662,000	\$670,000	\$694,000	\$722,000	\$751,000	\$780,000	\$811,000
Landfill Redevelopment	\$166,000	\$168,000	\$169,000	\$173,000	\$178,000	\$184,000	\$189,000	\$194,000
Total Proposed Costs for ARR Anti-Litter Programs	\$15,680,000	\$17,333,000	\$17,853,000	\$18,642,000	\$19,490,000	\$20,397,000	\$21,312,000	\$22,253,000
Less: Revenue Received from Other Sources	\$1,387,000	1,417,000	\$1,449,000	\$1,483,000	\$1,512,000	\$1,541,000	\$1,571,000	\$1,600,000
Total Added Program Expenses	\$14,293,000	\$15,917,000	\$16,404,000	\$17,158,000	\$17,978,000	\$18,857,000	\$19,740,000	\$20,653,000

FY 2013 – FY 2020 Estimated Impacts to the Residential Rates

	Cart Size	Monthly Rate	Anti-Litter Fee	Total
FY 2013	21 Gallon	\$8.19	\$6.00	\$14.19
	32 Gallon	\$12.48	\$6.00	\$18.48
	64 Gallon	\$24.96	\$6.00	\$30.96
	96 Gallon	\$37.44	\$6.00	\$43.44
FY 2014	21 Gallon	\$9.04	\$6.00	\$15.04
	32 Gallon	\$13.77	\$6.00	\$19.77
	64 Gallon	\$27.54	\$6.00	\$33.54
	96 Gallon	\$41.31	\$6.00	\$47.31
FY 2015	21 Gallon	\$9.73	\$6.00	\$15.73
	32 Gallon	\$14.82	\$6.00	\$20.82
	64 Gallon	\$29.65	\$6.00	\$35.65
	96 Gallon	\$44.47	\$6.00	\$50.47
FY 2016	21 Gallon	\$10.25	\$6.00	\$16.25
	32 Gallon	\$15.62	\$6.00	\$21.62
	64 Gallon	\$31.24	\$6.00	\$37.24
	96 Gallon	\$46.86	\$6.00	\$52.86
FY 2017	21 Gallon	\$10.72	\$6.00	\$16.72
	32 Gallon	\$16.33	\$6.00	\$22.33
	64 Gallon	\$32.66	\$6.00	\$38.66
	96 Gallon	\$48.99	\$6.00	\$54.99
FY 2018	21 Gallon	\$11.22	\$6.25	\$17.47
	32 Gallon	\$17.10	\$6.25	\$23.35
	64 Gallon	\$34.19	\$6.25	\$40.44
	96 Gallon	\$51.29	\$6.25	\$57.54
FY 2019	21 Gallon	\$11.72	\$6.50	\$18.22
	32 Gallon	\$17.87	\$6.50	\$24.37
	64 Gallon	\$35.73	\$6.50	\$42.23
	96 Gallon	\$53.60	\$6.50	\$60.10
FY 2020	21 Gallon	\$12.20	\$6.50	\$18.70
	32 Gallon	\$18.58	\$6.50	\$25.08
	64 Gallon	\$37.17	\$6.50	\$43.67
	96 Gallon	\$55.75	\$6.50	\$62.25

TABLE 32

FY 2013 – FY 2020 Estimated Impacts to the Commercial Rates

	Cart Size	Monthly Rate	Anti-Litter Fee	Total
FY 2013	21 Gallon	\$8.19	\$8.00	\$16.19
	32 Gallon	\$12.48	\$8.00	\$20.48
	64 Gallon	\$24.96	\$8.00	\$32.96
	96 Gallon	\$37.44	\$8.00	\$45.44
FY 2014	21 Gallon	\$9.04	\$8.00	\$17.04
	32 Gallon	\$13.77	\$8.00	\$21.77
	64 Gallon	\$27.54	\$8.00	\$35.54
	96 Gallon	\$41.31	\$8.00	\$49.31
FY 2015	21 Gallon	\$9.73	\$8.00	\$17.73
	32 Gallon	\$14.82	\$8.00	\$22.82
	64 Gallon	\$29.65	\$8.00	\$37.65
	96 Gallon	\$44.47	\$8.00	\$52.47
FY 2016	21 Gallon	\$10.25	\$8.00	\$18.25
	32 Gallon	\$15.62	\$8.00	\$23.62
	64 Gallon	\$31.24	\$8.00	\$39.24
	96 Gallon	\$46.86	\$8.00	\$54.86
FY 2017	21 Gallon	\$10.72	\$8.50	\$19.22
	32 Gallon	\$16.33	\$8.50	\$24.83
	64 Gallon	\$32.66	\$8.50	\$41.16
	96 Gallon	\$48.99	\$8.50	\$57.49
FY 2018	21 Gallon	\$11.22	\$8.50	\$19.72
	32 Gallon	\$17.10	\$8.50	\$25.60
	64 Gallon	\$34.19	\$8.50	\$42.69
	96 Gallon	\$51.29	\$8.50	\$59.79
FY 2019	21 Gallon	\$11.72	\$9.00	\$20.72
	32 Gallon	\$17.87	\$9.00	\$26.87
	64 Gallon	\$35.73	\$9.00	\$44.73
	96 Gallon	\$53.60	\$9.00	\$62.60
FY 2020	21 Gallon	\$12.20	\$9.25	\$21.45
	32 Gallon	\$18.58	\$9.25	\$27.83
	64 Gallon	\$37.17	\$9.25	\$46.42
	96 Gallon	\$55.75	\$9.25	\$65.00

TABLE 33

Acronyms and Definitions/Recycling Terminology

12 Market Categories	<ol style="list-style-type: none">1. Reusable goods, including intact or repairable home or industrial appliances; household2. Paper, including newsprint; ledger paper; computer paper; corrugated cardboard; and mixed paper.3. Metals, both ferrous and nonferrous, including cans; parts from abandoned vehicles; plumbing; fences; metal doors and screens; tools; machinery; and any other discarded metal objects.4. Glass, including glass containers and window glass.5. Textiles, including nonreusable clothing; upholstery; and pieces of fabric.6. Plastics, including beverage containers; plastic packaging; plastic cases of consumer goods such as telephones or electronic equipment; films and tires7. Plant debris, including leaves and cuttings; trimmings from trees, shrubs, and grass; whole plants, and sawdust.8. Putrescibles, including animal, fruit, and vegetable debris; cooked food; manures; offal; and sewage sludge.9. Wood, including un reusable lumber; tree rounds; and pallets.10. Ceramics, including rock; tile; china; brick; concrete; plaster; and asphalt.11. Soils, including excavation soils from barren or developed land; and excess soils from people's yards.12. Chemicals, including acids; bases; solvents; fuels; lubricating oils; and medicines.
Carbon Sink	Terrestrial carbon sequestration is the process through which carbon dioxide (CO ₂) from the atmosphere is absorbed by trees, plants and crops through photosynthesis, and stored as carbon in biomass (tree trunks, branches, foliage and roots) and soils. The term "sinks" is also used to refer to forests, croplands, and grazing lands, and their ability to sequester carbon. Agriculture and forestry activities can also release CO ₂ to the atmosphere. Therefore, a carbon sink occurs when carbon sequestration is greater than carbon releases over some time period. (as defined by the EPA)
City of Austin	Home-rule city in Texas; practices a Council-Manager form of government.
City Manager	Appointed by the City Council; serves as the Chief Administrator of the City organization.
Co-mingled	Refers to recyclable materials which are not separated by commodity (newspaper, plastic, glass, etc.)
Community Gardens	A piece of land that is gardened collectively by a group of people.
Composting	The process of converting difficult to handle organic materials resulting in a mixture of decayed organic matter used for fertilizing and agriculture
Compostables	ASTMD 6002 defines compostable as: able of undergoing biological decomposition in a compost site as part of an available program, such that the material is not visually distinguishable and breaks down into carbon dioxide, water, inorganic compounds, and biomass, at a rate consistent with known compostable materials.
Construction, demolition, and deconstruction	<p>Construction and demolition (C&D) materials consist of the debris generated during the construction, renovation, and demolition of buildings, roads, and bridges. C&D materials often contain bulky, heavy materials, such as concrete, wood, metals, glass, and salvaged building components.</p> <p>Construction refers to the creation of a building, road, or bridge; Demolition refers to the destruction of a structure resulting in the material debris being sent to the landfill.</p> <p>Deconstruction is the dismantling and extracting of reusable materials from a project before or instead of traditional demolition.</p>
Curbside collection fees	City of Austin customers pay a monthly rate which depends upon the size of garbage cart chosen. Their rate pays for the collection of: A set volume of garbage, Unlimited volume of recycling, Unlimited volume of yard trimmings

Dillo Dirt	Dillo Dirt is a compost made by the City of Austin since 1989. It was the first program of its kind in the state and one of the oldest in the nation. All yard trimmings collected curbside across the City as well as some of our treated sewage sludge are combined and composted to create Dillo Dirt. The heat generated in composting (130 to 170 degrees Fahrenheit) is sufficient to virtually eliminate human and plant pathogens. After active composting for over a month, our compost is "cured" for several months, then screened to produce the finished product. The product easily meets all Texas and EPA requirements for "unrestricted" use, which even includes vegetable gardens. It is sold to registered area vendors for landscaping, gardening, and agricultural uses.
Disposal	Final placement of wastes under proper process and authority with no intention to retrieve or reuse. This includes waste sent to landfills and end-of-life disposition of materials sent to incinerators, waste-to-energy facilities and other disposal facilities.
Diversion	The combination of reusing, reducing, and recycling in order to keep materials from being disposed of in landfills. Diversion includes waste prevention activities and material sent to recyclers, composting systems, reuse facilities and other secondary use options.
Diversion Rate	Total Diverted Tons divided by (Total Diverted Tons + Total Disposed Tons)
Drop-offs	Locations at which customers can bring items they wish to hand over for other uses. This can include a place to bring bulky items, a location for turning over household hazardous waste items, a location for donating items to be reused, etc.
Eco-Depot	Drop-off facilities for bulk reusable items, recyclables and hard-to-recycle materials, such as carpet, electronics, batteries, oil, paint and anti-freeze. The concept of an Eco-Depot is to collect reusable items and recyclables that cannot fit in residential curbside recycling carts.
Eco-Industrial Park	These facilities locate reuse, recycling and composting businesses close together and can be the core of a comprehensive strategy for local resource management.
Environmental Board	Established by City ordinance, the purpose of the Environmental Board is "To act in an advisory capacity on all projects and programs which affect the quality of life for the citizens of Austin and to make recommendations for standards and recommend and initiate specific studies." (Section 2-4-260 of the Austin City Code)
Fiscal year	A fiscal year (or sometimes called budget year) is a period used for calculating annual financial statements. The City of Austin fiscal year begins on October 1.
Greenhouse gases	Gases that trap heat in the atmosphere are often called greenhouse gases. According to the EPA, some greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are: Carbon Dioxide (CO ₂); Methane (CH ₄); Nitrous Oxide (N ₂ O); Fluorinated Gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
Hornsby Bend	A biosolids management plant which operates under the authority of Austin Water Utility. All of Austin's sewage solids are pumped to Hornsby Bend where they are treated to kill pathogens and the resulting "biosolids" are recycled. Hornsby Bend produces the product, Dillo Dirt™.
Household hazardous waste	Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW."
Landfill	A location at which the final placement of waste occurs in or on designated land according to sanitary, environmental protection and other safety requirements.
Large Brush	Branches over 3 inches in diameter and up to 15 feet long are collected during specially-scheduled large brush collections.

Materials Management	A materials management systems approach considers the life-cycle impacts of disposal and carbon footprint reductions from source reduction, reuse, remanufacturing, recycling and composting. Environmentally preferable purchasing policies, upstream redesign, extended producer responsibility systems and clean manufacturing practices are additional methods of materials management.
Organics/Organic Material	According to Merriam Webster, organic material is of, relating to, or derived from living organisms. Organic materials—comprised of yard trimmings, food scraps, wood waste, and paper and paperboard products—are the largest component of our trash and make up more than two-thirds of the solid waste stream.
Pay-as-you-Throw	A fee system based on variable rates for residential curbside collection, replacing a flat fee which was assessed to all customers without regard to service levels. In this system, cart fees are assessed according to cart size.
Polystyrene	Expanded polystyrene (EPS) is a rigid, closed-cell foam. It is usually white and made of pre-expanded polystyrene beads. Familiar uses include molded sheets for building insulation and packing material ("packing peanuts"). Sheets are commonly packaged as rigid panels, which are also commonly known as "bead-board".
Putrescibles	Items liable to become putrid including: animal, fruit, and vegetable debris; cooked food; manures; offal; and sewage sludge.
Recycling	The series of activities by which materials that are no longer useful to the generator are collected, sorted, processed, and converted into raw materials and used in the production of new products.
Recyclables	Discarded materials such as paper, metal, plastic and glass that can be reprocessed into new products or packaging. Recyclable materials represent 43 percent of materials disposed in landfills.
Resource Management Commission	Members advise the city council in developing and reviewing city plans and programs in the area of alternative energy technologies, renewable energy sources and on energy and water conservation. See Section2-1-168 of the City Code for additional duties.
Restorative Economy	In a restorative, "least cost economy," we move to that system of agriculture, forestry, transportation, construction, and communication that has the least cost to the environment... In a least-cost system, those resources, our "natural capital," are valued at their true replacement cost.
Reuse	Using a discarded item for the same or similar function while preserving the embodied energy of its original form
Right of Way	The legal definition of "right of way" is an easement, a privilege to pass over the land of another, whereby the holder of the easement acquires only a reasonable and usual enjoyment of the property, and the owner of the land retains the benefits and privileges of ownership consistent with the easement. In the case of the City of Austin, right of way refers to land owned by the City which is used
Single Stream Recycling	A system in which all recyclable materials are collected from a single container, instead of being sorted into separate commodities (newspaper, plastic, glass, etc.) by the resident and handled separately throughout the collection process. Materials are then separated at a materials recovery facility.
Solid Waste Advisory Commission	This purpose of this commission is to review and analyze the policies and resources relating to solid waste management in the city and advise council on solid waste management policies and resources. Members provide assistance to council to ensure its citizens that the City provides an economical and environmentally safe system of waste reduction, recovery and disposal.

Solid Waste Services Department	The Solid Waste Services Department (SWS) was rebranded in September 2011 as Austin Resource Recovery. This new department name more accurately reflects the department's evolving mission - to achieve Zero Waste by providing excellent customer services that promote waste reduction, increase resource recovery, and support the City of Austin's sustainability goals.
Source Separation	Source separation, also called curbside separation, is a process whereby citizens collect recyclable materials and garbage separately and place them at the curb for collection.
Sustainable Food Policy Board	This board direct advises both the Austin City Council and the Travis County Commissioners' Court to improve the availability of safe, nutritious, locally, and sustainably-grown food at reasonable prices for all residents, particularly those in need. The board was officially established with Ordinance 20081120-058. The Travis County Commissioners Court approved a similar ordinance soon after and the board was seated and began meeting in the Spring of 2009.
Trash	A term used to describe waste which is destined for the landfill. These are items cannot be recycled or reused.
Waste generation	Disposal and diversion are measured and added together to determine generation.
Waste Reduction Assistance Program	Austin Resource Recovery's commercial technical assistance program.
Wasteshed	Designated region where a large majority of waste generated in that region is disposed at disposal facilities within that region
WasteSMART	Austin Resource Recovery's program that recognizes local businesses that reduce and recycle waste and buy recycled products.
Xeriscaping	Waste-efficient landscaping techniques which focus on water conservation.
Zero Waste	Zero Waste is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all wasted materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury
zero waste	When written in lower case, zero waste means no waste burned or buried.
Zero Waste Strategic Plan	This document, adopted by Austin City Council in January 2009, summarizes the analysis and input received from the community on Zero Waste and makes general recommendations on how to proceed toward Zero Waste.

ACCD	Austin Convention Center Department
ACCP	Austin Climate Protection Program
AE	Austin Energy
AISD	Austin Independent School District
ARR	Austin Resource Recovery, formerly Solid Waste Services
AWU	Austin Water Utility
BOPA	Batteries, Oil, Paint, and Anti-freeze
BTU	British Thermal Unit
C&D	Construction and Demolition, includes deconstruction
CAPCOG	Capital Area Council of Governments
CBD	Central Business District
CCD	Code Compliance Department
CESQG	Conditionally Exempt Small Quantity Generators
CFR	Code of Federal Regulations
CO2	Carbon Dioxide
COA	City of Austin
COOL	Compostable Organics Out of Landfills
CPIO	Corporate Public Information Office
EGRSO	Economic Growth and Redevelopment Services Office
EPA	Environmental Protection Agency
EPP	Environmentally Preferable Purchasing
EPR	Extended Producer Responsibility
FASD	Financial and Administrative Services Department
FMLER	Flexible Membrane Liner Evaluation Report
FTE	Full-time equivalents or full time employees
FY	Fiscal Year
GAL	Gallon
GHG	Greenhouse Gas
GPS	Global positioning system
HAZWOPER	Hazardous Waste Operations and Emergency Response
HHSD	Health and Human Services Department
HHW	Household Hazardous Waste
HOA	Home Owners Association
ICLEI	International Council for Local Environmental Initiatives
ICMA	International City/County Management Association
KGSC	Kenneth Gardner Service Center, also known as the South Service Center
LEED	Leadership in Energy and Environmental Design
MRF	Material Recovery Facility
MRF/TS	Material Recovery Facility/Transfer Station
MSW	Municipal Solid Waste
MTCE	Metric Tonnes of Carbon Equivalent
NAHMMA	National Hazardous Materials Management Association
NRC	National Recycling Council
NRDC	National Resource Defense Council
PARD	Parks and Recreation Department
PAYT	Pay-As-You-Throw
PDRD	Planning and Development Review Department
PIO	Public Information Officer
PPI	Product Policy Institute
PSI	Product Stewardship Institute
RA	Reuse Alliance
RFID	Radio Frequency Identification Device

RLC	Rutherford Lane Center, also known as the Department's Administration Office
ROW	Right of Way
RRC	Resource Recovery Center
SFPB	Sustainable Food Policy Board
SOPs	Standard Operating Procedures
STAR	State of Texas Alliance for Recycling
SWAC	Solid Waste Advisory Commission
SWS	Solid Waste Services
TCEQ	Texas Commission on Environmental Quality
TPY	Tons Per Yard
TxPSC	Texas Product Stewardship Council
URCO	Universal Recycling and Composting Ordinance
URO	Universal Recycling Ordinance
USCC	United States Composting Council
USCM	United States Conference of Mayors
USDA	United States Department of Agriculture
UT-Austin	University of Texas at Austin
WARM	Waste Reduction Model
WPD	Watershed Protection
WRAP	Waste Reduction Assistance Program
ZWIA	Zero Waste International Alliance

DRAFT

RESOLUTION NO. 20050519-44

WHEREAS, the City of Austin's mission is to make Austin the most livable city in the country; and

WHEREAS, as members of the Austin City Council we have a unique opportunity to provide leadership to develop a sustainable urban community based on culturally and economically appropriate local actions; and

WHEREAS, the City of Austin has been invited to be a signatory of the United Nations Environmental Accords in an effort to advance sustainability, foster vibrant economies, promote social equity, and protect the planet's natural systems; and

WHEREAS, between now and World Environment Day 2012, cities that implement 19 to 21 actions shall be recognized as a Global Sustainable City, cities that implement 15 to 18 actions shall be recognized as a Regional Sustainable City, cities that implement 12 to 17 actions shall be recognized as a National Sustainable City, and cities that implement 8 to 11 actions shall be recognized as a Local Sustainable City;
NOW, THEREFORE,

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

That the City Council authorizes the Mayor to commit our city to move vital issues of sustainability to the top of our legislative agenda by

signing the United Nations Urban Environmental Accords; and directs the City Manager to develop the strategy of their implementation

BE IT FURTHER RESOLVED:

That the City of Austin will set a goal to implement many of the following 21 actions contained in these Accords over the next seven years:

Energy

Action 1: Adopt and implement a policy to increase the use of renewable energy to meet 10 percent of my city's peak load within seven years.

Action 2: Adopt and implement a policy to reduce my city's peak load by 10 percent through energy efficiency, shifting the timing of energy demands, and conservation measures within seven years.

Action 3: Adopt a citywide greenhouse gas reduction plan that reduces the jurisdiction's emissions 25 percent by 2030 and which includes a system for accounting and auditing greenhouse gas emissions.

Waste Reduction

Action 4: Establish a policy to achieve zero waste to landfills and incinerators by 2040.

Action 5: Adopt a citywide law that reduces the use of a disposable, toxic, or non-renewable product category by at least fifty percent in seven years.

Action 6: Implement "user-friendly" recycling and composting programs, with the goal of reducing per capita solid waste disposal to

landfill and incineration by 20 percent in seven years.

Urban Design

Action 7: Adopt a policy that mandates a green building rating system standard that applies to all new municipal buildings.

Action 8: Adopt urban planning principles that advance higher density, mixed use, walkable, bikeable and disabled-accessible neighborhoods which coordinate land use and transportation with open space systems for recreation and ecological reconstruction.

Action 9: Adopt a policy or implement a program that creates environmentally beneficial jobs in slums and/or low-income neighborhoods.

Urban Nature

Action 10: Ensure that there is an accessible park or recreational open space featuring environmental education, arts, or organic community gardens (particularly in lower income neighborhoods) within half a kilometer of every city resident by 2015.

Action 11: Conduct an inventory of existing canopy coverage in your city; and, then establish a goal based on ecological and community considerations to plant and maintain canopy coverage in not less than 50 percent of all available sidewalk planting sites.

Action 12: Pass legislation that protects critical habitat corridors and other key habitat characteristics (e.g. water features, food-bearing plants, shelter for wildlife, use of native species, etc.) from unsustainable development.

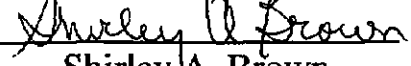
Water

Action 19: Cities should develop policies to increase access to adequate and safe drinking water for all by 2015. Cities with potable water consumption greater than 10 liters per capita per day will adopt and implement policies to reduce consumption by 10 percent by 2015.

Action 20: Protect the ecological integrity of the city's primary drinking water source (i.e., groundwater, rivers, lakes, wetlands and associated ecosystems).

Action 21: Address storm water pollution and reduce the volume of wastewater discharge by 10 percent in seven years through the expanded use of recycled water and the implementation of a sustainable urban watershed planning process that includes participants of all affected communities and is based on sound economic, social, and environmental principles.

ADOPTED: May 19, 2005

ATTEST: 
Shirley A. Brown
City Clerk

RESOLUTION NO. 20090115-050

WHEREAS, consistent with its goal to make Austin the most livable city in the country, the Austin City Council adopted Resolution No. 20050519-44 in May 2005 supporting the United Nations Environmental Accord and committed the City to achieving a 20 percent reduction in per capita solid waste disposal to landfills and incinerators by 2012, and Zero Waste to landfills and incinerators by 2040; and

WHEREAS, Zero Waste is an ambitious goal to divert 90% of waste from landfills and incinerators by 2040 using a “whole system” approach to evaluate and manage the flow of resources and waste created by our communities; and

WHEREAS, Austin is part of a regional waste management system within the Capital Area Planning Council of Governments (CAPCOG) region; and

WHEREAS, as the Capital Area continually grows, outpacing other Texas communities, the region will be faced with a need to expand existing landfills, open new landfills, or divert a drastic amount of waste from current landfills to properly ensure the health and safety of the region. Austin’s Zero Waste Plan seeks to extend the life of existing landfills while acknowledging that a certain amount of residual waste is inevitable; and

WHEREAS, the City Council adopts the Zero Waste Strategic Plan, attached hereto as Exhibit A and hereafter referenced as the “Plan,” as a long term planning vehicle and further directs the City Manager to incorporate the

Plan into the development of a Solid Waste Services Master Plan. City Council recognizes that the policy and program recommendations in Section C of the Plan may necessitate changes to rules, ordinances, and/or policies, and will require on-going collaboration with key stakeholders, public private partnerships, and close coordination with public and privately owned regional waste disposal facilities and recycling and compost operations; and

WHEREAS, Austin recognizes the need to encourage and assist in the development of one or more public and/or public/private material recovery facilities which can respond to the solid waste and recyclables markets through composting, recycling, landfilling and other appropriate means of solid waste management; and

WHEREAS, in 2007, the City hired Gary Liss and Associates to work with community members and develop a Zero Waste Strategic Plan; **NOW, THEREFORE**,

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

The City Council adopts the *Zero Waste Strategic Plan*, attached hereto as Exhibit A and hereafter referenced as the “Plan”, as a long term planning vehicle. City Council recognizes that the policy and program recommendations in Section C of the Plan may necessitate changes to rules, ordinances, and/or policies, and will require on-going collaboration with key stakeholders, public private partnerships, and close coordination with public and privately owned regional waste disposal facilities.

City Council approval is required for any changes to existing policies in effect as of January 14, 2009 with regard to control over pricing, collection and disposition of commercial solid waste and commercial recyclable materials, or to impose surcharges to, or limit the rights of, area landfill operators to receive waste.

City Council recognizes that the successful implementation of the Plan and achievement of Zero Waste will require the adoption of policies and procedures designed to encourage all stakeholders to work cooperatively toward this ambitious goal.

The City Manager is directed to continue to inform and involve the City Council, the Solid Waste Advisory Commission, and other stakeholders as work progresses on specific programs, and to seek City Council approval on changes to policy and ordinances.

BE IT FURTHER RESOLVED:

The City Council directs the City Manager to develop an interim Zero Waste infrastructure transition plan to manage and implement the following four Zero Waste policy priorities pending completion of the Solid Waste Master Plan:

1. *Lead by example.* Evaluate departmental waste streams for baseline data and future monitoring within one year of adoption of the Plan. Within three years of adoption of the Plan, frame, develop and implement, where appropriate and feasible, waste diversion programs with input from City Departments.

City Council approval is required for any changes to existing policies in effect as of January 14, 2009 with regard to control over pricing, collection and disposition of commercial solid waste and commercial recyclable materials, or to impose surcharges to, or limit the rights of, area landfill operators to receive waste.

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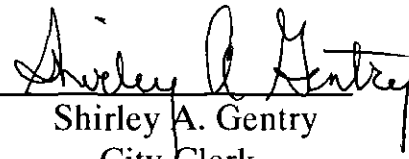
1. Lead by example. Evaluate departmental waste streams for baseline data and future monitoring within one year of adoption of the Plan. Within three years of adoption of the Plan, frame, develop and implement, where appropriate and feasible, waste diversion programs with input from City Departments.

- Develop and present to City Council City Code amendments or implement rule changes as necessary to encourage sustainable practices, including recycling and other zero waste practices, at events that require the use of public facilities and rights of way, starting with large events.
- Develop an education program for Appendix D of the Plan, identifying the various resources available to the community.
- Allocate staff time and resources to work with local government officials across Texas to launch a Texas Product Stewardship Council.
- Evaluate and develop a public and private partnership for neighborhood reuse center (possibly a pilot program).
- Play an active role in lobbying the state legislature to improve the Texas Computer Take Back Law and expand producer take back to other products such as TVs, fluorescent lighting, pharmaceuticals, non-rechargeable batteries, etc.
- Recognizing the legislative limits of flow control over landfills, begin a dialogue with regional partners to evaluate ways to influence flow control and enhance Zero Waste in the CAPCOG region.
- Evaluate advancements in technology and facilities that help the city/region achieve zero waste with an emphasis on the economic and environmental impact.

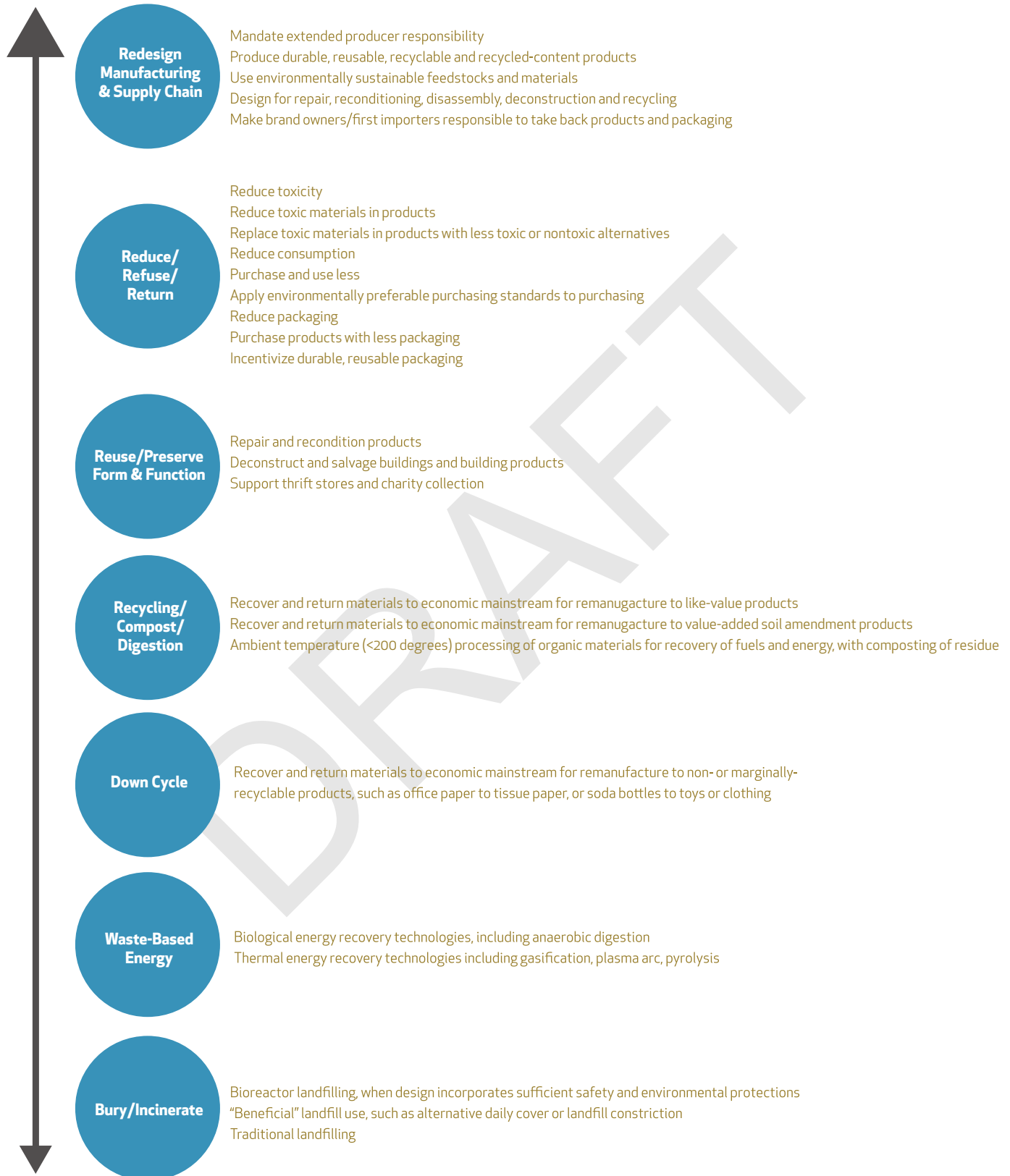
- Encourage existing landfill operators to collect methane gas, and initiate a study of issues surrounding the use of landfill methane as an energy resource and its implications for the City's goals regarding zero waste and climate protection.

ADOPTED: January 15, 2009

ATTEST:

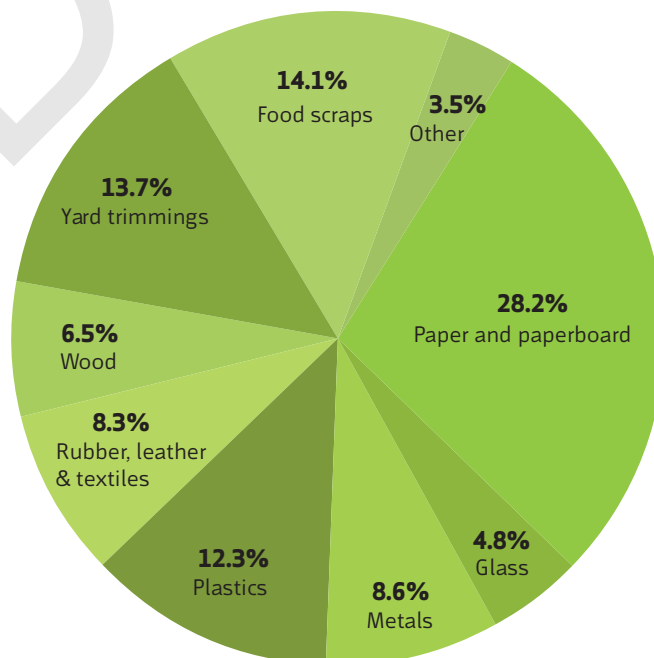

Shirley A. Gentry
City Clerk

Highest Use



Lowest Use

Twelve Major Categories of Discard Material	Clusters	Processing Centers
28.2% Paper and Paperboard 8.6% Metals 4.6% Glass 12.3% Plastics 14.1% Food Scraps 13.7% Yard Trimmings 6.5% Wood 8.3% Rubber, Leather, & Textiles 3.5% Other	<p>Paper and containers Paper, metals, glass, polymers</p> <p>Organics Food, vegetative debris, food, dirty paper, paper, plant debris, putrescibles, wood</p> <p>Discarded Items Furniture, appliances, clothing, toys, tools, reusable goods, textiles</p> <p>Special Discards Chemicals, construction and demolition materials, wood, ceramics, soils</p>	<p>Recyclables Papers, plastic, glass and metal containers</p> <p>Organics Food, vegetable debris, food paper, putrescibles, untreated wood and sheetrock</p> <p>Reuse & Repair Reuse, repair, dismantling, reconditioning, remanufacturing, manufacturing and resale of furniture, large and small appliances, electronics, textiles, toys, tools, metal and ceramic plumbing, fixtures, lighting, lumber and other used building materials</p> <p>Construction & Demolition Materials Rocks, soils, concrete, asphalt, brick, land clearing debris, mixed construction and demolition materials</p> <p>Regulated Materials Used motor oil, paint, pesticides, cleaners and other chemicals</p> <p>Product Redesign Extended producer responsibility, design for recycling</p>



Program / Ordinance	Schedule	Tasks	Lead Division	Participants	Chapter Location
City Implementation Tasks for Eco-Depot Development	FY2012	Site four locations for Eco-Depot operations	Diversion Facilities Division	Director	7
	FY2013	Bid out service contract for four Eco-Depots	Diversion Facilities Division	Purchasing Office	
	Ongoing	Manage and monitor Eco-Depot contract (s) to ensure optimal performance	Diversion Facilities Division	Finance Division	
	FY2012	Work with Austin Independent School District in establishing a site for a Teacher Creative Reuse Center	Diversion Facilities Division	Strategic Initiatives and AISD	
	FY2013	Bid out service contract for Teacher Creative Reuse Center	Diversion Facilities Division	Purchasing Office	
	Ongoing	Manage and monitor Teacher Creative Reuse Center contract to ensure optimal performance	Diversion Facilities Division	Finance Division	
Recycling Collection	FY13	Add aseptic and gable-top containers to the single stream recycling program	Collection Services Division	Strategic Initiatives Division	8
	FY14	Add aluminum foil and scrap metal to the single stream recycling program	Collection Services Division	Strategic Initiatives Division	
	FY15	Add durable plastic and plastic wrap to the single stream recycling program	Collection Services Division	Strategic Initiatives Division	
	FY13-FY14	Conduct glass collection pilot for multifamily and commercial customers	Contract with nonprofit service provider	Finance Division	
	FY12 and ongoing	Provide information to Austin Resource Recovery customers on new materials to be collected through the Single Stream recycling program.	Customer Service Division	Strategic Initiatives Division	
	FY15-FY16	Conduct pilot program on weekly recycling collection and biweekly trash collection; conduct follow-up stakeholder marketing; evaluate results; assess and refine program	Collection Services Division	Strategic Initiatives Division, Operations Support Division, Finance Division, Customer Service Division	
	Estimated to be FY17	As appropriate, implement weekly recycling and biweekly trash collection citywide when residential diversion reaches 60%	Collection Services Division	Strategic Initiatives Division, Operations Support Division, Finance Division, Customer Service Division	
	Every 5 years ongoing	Assess and refine recycling and trash collection program	Collection Services Division	Strategic Initiatives Division, Operations Support Division, Finance Division, Customer Service Division	
City Implementation Tasks for Waste Characterization Study	FY12	Establish an inter-local agreement with UT-Austin	Strategic Initiatives Division	UT-Austin	9
	FY12	Conduct study through college interns and analyze results	Strategic Initiatives Division	UT-Austin	
	FY13 and ongoing	Adjust diversion programs based on results on study	Strategic Initiatives Division	UT-Austin	
	FY16 and every five years	Conduct waste composition studies every five years and readjust diversion programming	Strategic Initiatives Division	UT-Austin	
C&D Ordinance	FY13	Co-host regional workshop on best practices in C&D diversion; invite local and national experts	Strategic Initiatives Division	Austin Energy, CAPCOG, C&D generators, private sectors service providers	9
	FY13	Conduct stakeholder workshops on a comprehensive C&D Ordinance	Strategic Initiatives Division	C&D generators, building community, private sector service providers	
	FY13	Present C&D Ordinance to City Council	Strategic Initiatives Division		
	FY14	Develop agreements with registered service providers	Strategic Initiatives Division	Private sector services providers	
	FY14	Conduct stakeholder workshops on New Rules for the C&D Ordinance	Strategic Initiatives Division	C&D generators, private sector providers	
	FY15-ongoing	Provide C&D technical assistance and community-based social marketing to C&D generators	Strategic Initiatives Division	C&D generators	
	FY20 and every 5 years	Assess and refine C&D Ordinance	Strategic Initiatives Division	All stakeholders	
City Implementation Tasks for Construction and Demolition Debris Processing	FY15 and ongoing	After C&D program Initiatives take effect, encourage the private sector operators to develop more capacity to meet the increased C&D debris stream	Diversion Facilities Division	Private Sector Operators	9
Resource Recovery Center Development	FY12-FY13	City to re-purpose the Transfer Facility into a Resource Recovery Center	Diversion Facilities Division	Diversion Facilities Division	9
Eco-Industrial Park Development	FY13	Hire staff to design and implement Eco-Industrial Park	Strategic Initiatives Division	Economic Growth and Redevelopment Services Office	9
	FY13-FY20	Solicit industries to locate at Eco-Industrial Park.	Economic Development and Growth Office	Private sector companies	
Composting Incentives	FY12	Assess and refine new composting incentives program; expand program	Strategic Initiatives Division	Compost incentive participants	10
	FY12	Develop compost program outreach materials; present new public education on household and community garden on-site composting	Strategic Initiatives Division	Residential and commercial generators	
	FY13 and ongoing	Increase training sessions to include community gardens and garden stores on on-site composting.	Strategic Initiatives Division	Community and neighborhood groups, residential and commercial generators	
	FY14 and every 6 months ongoing	Initiate Master Composter and Junior Composter certification program.	Strategic Initiatives Division	Parks and Recreation	
	FY13	Develop End-Use Classification System	Strategic Initiatives Division	US Composting Council	
	FY13-FY14	Initiate Composting Pilots and Demonstration Projects	Strategic Initiatives Division	Residential and commercial generators	
	Every 5 years	Reassess and refine compost incentives program	Strategic Initiatives Division	Generators, composting facilities, and compost end-users	
Organics Collection	FY12	Conduct research on adding food scraps and compostable paper to yard trimmings collection program; identify neighborhoods for pilot program	Strategic Initiatives Division	Stakeholders and citizens	10
	FY13-FY14	Conduct pilot program on adding food scraps and compostable paper to yard trimmings collection program; conduct follow-up stakeholder education; evaluate results; assess and refine program	Collection Services Division, Strategic Initiatives Division	Operations Support Division, Finance Division, Customer Service Division	
	FY15-FY16	Acquire equipment and implement adding food scraps and compostable paper to yard trimmings collection program citywide	Collection Services Division	Strategic Initiatives Division, Operations Support Division, Finance Division, Customer Service Division	
	every 5 years ongoing	Assess and refine food scraps and compostable paper collection program	Collection Services Division	Strategic Initiatives Division	
Composting Capacity	FY12-FY14	Conduct pilot program of commingled yard trimmings and food scraps.	Collection Services Division	Hornsby Bend	10
	FY13	Enter into a service agreement with A/W - Hornsby Bend to compost commingled organics collected by City crews.	Collection Services Division	Hornsby Bend	
	FY13-ongoing	Encourage the private operators to increase infrastructure to handle the added estimated organic volumes required for collection from new ordinances to meet the City-wide Zero Waste needs.	Strategic Initiatives Division	Collection Services Division	
	every 5 years ongoing	Assess and refine composting collection programs.	Collection Services Division	Strategic Initiatives Division	
City Implementation Tasks for HHW Facilities	FY12	Expand hours of operation at the HHW Collection Facility	Diversion Facilities Division	Disposal Facilities Division	11
	FY12	Add two new employees to staff the HHW Collection Facility	Diversion Facilities Division	Disposal Facilities Division	
	FY12	Expand into a portion of the Materials Recovery/Transfer Facilities	Diversion Facilities Division	Disposal Facilities Division	
Household Hazardous Waste Collection	FY12	Solicit additional retail businesses to participate in the household hazardous waste take-back program	Diversion Facilities Division	Strategic Initiatives Division	11
	FY13	Expand take-back program	Diversion Facilities Division	Strategic Initiatives Division	
	FY12-ongoing	Promote participating retail businesses in the City's website and other publications	Diversion Facilities Division	Strategic Initiatives Division	
	every 5 years ongoing	Assess and refine household hazardous waste take-back program	Diversion Facilities Division	Strategic Initiatives Division	
	FY13-FY14	Conduct pilot program on door-to-door household hazardous waste collection; conduct follow-up stakeholder meetings; evaluate results; assess and refine program	Diversion Facilities Division	Strategic Initiatives Division	
	FY15-ongoing	As appropriate, implement door-to-door household hazardous waste collection citywide; promote door-to-door household hazardous waste collection program	Diversion Facilities Division	Strategic Initiatives Division	
	every 5 years ongoing	Assess and refine door-to-door household hazardous waste collection program	Diversion Facilities Division	Strategic Initiatives Division	
	FY13-FY15	Advocate for inclusion of CESQGs in the household hazardous waste program	Diversion Facilities Division	Strategic Initiatives Division	
	FY16-ongoing	As appropriate, expand household hazardous waste program for CESQGs; identify cost-recovery fees for commercial generators; promote household hazardous waste program to CESQGs	Disposal Facilities Division	Strategic Initiatives Division	
	every 5 years ongoing	Assess and refine CESQGs program	Disposal Facilities Division	Strategic Initiatives Division	
	FY12-FY14	Evaluate sites and cost involved in constructing and operating a North HHW Collection Facility	Austin Resource Recovery	Disposal Facilities Division	
	FY14-ongoing	If approved, Construct and Operate a North HHW Collection Facility.	Austin Resource Recovery	Disposal Facilities Division	
Methane Gas-to-Energy System	FY12	Research methane gas recovery systems	Diversion Facilities Division	Austin Energy	12
	FY13	Install gas recovery system	Diversion Facilities Division	Austin Energy	

Solar Farm Development	FY12	Coordinate with Austin Energy to develop the solar project at the landfill.	Diversion Facilities Division	Austin Energy	12
	FY14	Developer to permit, design and construct the solar project.	Austin Energy	Private Developer	
	FY15-ongoing	Commence operations of the solar project.	Austin Energy	Private Developer	
	FY15-ongoing	Monitor the solar project in association with the required landfill post-closure maintenance required.	Diversion Facilities Division	Austin Energy	
Development of Eco-Industrial Park	FY13	Hire staff to design and implement Eco-Industrial Park	Strategic Initiatives Division	Economic Growth & Redevelopment Services Office	12
	FY13-FY15	Solicit industries to locate at Eco-Industrial Park.	Economic Growth & Redevelopment Services Office	Private sector companies	
Litter Control Services	FY12-FY15	Identify appropriate recycling container placement for the public area recycling program; procure containers; design and place appropriate signage and messaging for recycling containers.	Litter Abatement Division	Strategic Initiatives Division, Finance Division	13
	FY12-FY13	Research and purchase more climate-friendly equipment.	Litter Abatement Division	Strategic Initiatives Division, Finance Division	
	FY12-FY13	Explore new Litter Abatement measures, as a means to prevent litter.	Strategic Initiatives Division	Litter Abatement Division	
	FY15 and every 5 years ongoing	Assess and Redefine Litter Control Services every 5 Years.	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
Alley and Street Flushing Services	FY12-FY13	Develop and present to City Council a new city ordinance that prohibits parking between 3:00am and 5:00am for cleaning services downtown	Strategic Initiatives Division	Litter Abatement Division, Downtown Austin Alliance	13
	FY12-FY13	Install signs posting the parking restrictions.	Public Works Department	Strategic Initiatives Division	
	FY12-FY13	Meet with stakeholders to develop a seven day service.	Litter Abatement Division	Strategic Initiatives Division	
	FY12-FY13	If adopted, implement seven day alley service.	Litter Abatement Division	Finance Division	
	FY12-FY13	Research and purchase more climate-friendly equipment.	Litter Abatement Division	Fleet Department	
	FY15 and every 5 years ongoing	Assess and Redefine Alley and Street Flushing Services every 5 Years	Litter Abatement Division	Strategic Initiatives Division, Finance Division	
Street and Boulevard Sweeping Services	FY12-FY13	Develop a public notice program to inform residents when to clear roadways for street sweeping.	Strategic Initiatives Division	Litter Abatement Division	13
	FY12-FY13	Research and implement more climate-friendly sweeper routes.	Litter Abatement Division	Operations Routing staff	
	Every 5 years ongoing	Assess and Redefine Street and Boulevard Sweeping Services every 5 Years.	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
Dead Animal Collection Services	FY11-FY12	Explore the possibility of transferring the program to another more capable service provider familiar with the care of animals.	Austin Resource Recovery Director	Litter Abatement, Finance Divisions	13
	FY12	If the program is maintained by the Department, research and purchase new equipment to better handle the larger dead animals.	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
	FY15 and every 5 years ongoing	Assess and Redefine Dead Animal Collection Services every 5 Years.	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
Brush Collection Services	FY12	Pilot Clean Austin: Conduct pilot program on enhanced cycles of curbside brush collection; conduct follow-up stakeholder meetings; evaluate results; assess and refine program	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	13
	FY12	Conduct pilot program on seasonal pruning cycles and out-of-cycle curbside brush collection; conduct follow-up stakeholder meeting; evaluate results; assess and refine program	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
	FY13	Implement Clean Austin collection program citywide	Litter Abatement Division	Strategic Initiatives Division, Customer Service Division	
	FY12	Explore the operational efficiencies and cost savings of combining the Brush Collection program with the weekly yard trimmings program.	Austin Resource Recovery	Finance Division	
	FY11-FY12	Assign a Storm Debris Management response team; Plan and Develop resources necessary to implement a Storm Debris Management Action Plan	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
	FY12	Implement the Storm Debris Management Action Plan.	Litter Abatement Division	Strategic Initiatives Division, Customer Service Division	
	FY13	Explore Public/Private partnerships for storm debris management.	Litter Abatement Division	Strategic Initiatives Division, Finance Division	
	FY13	Explore and site four regional organics public drop-off sites.	Litter Abatement Division	Strategic Initiatives Division, Finance Division	
	Every 5 years ongoing	Assess and Redefine Bulk Collection Services every 5 Years.	Litter Abatement Division	Strategic Initiatives Division, Finance Division	
Bulk Collection Services	FY12	Pilot Clean Austin; Conduct pilot program on enhanced cycles of curbside bulk item collection; conduct follow-up stakeholder marketing; evaluate results; assess and refine program	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	13
	FY12	Conduct pilot program on move-out and out-of-cycle curbside bulk item collection; conduct follow-up stakeholder marketing; evaluate results; assess and refine program	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
	FY12	Implement Clean Austin collection program citywide	Litter Abatement Division	Strategic Initiatives Division, Customer Service Division	
	FY12	Prepare Todd Lane Transfer Facility for bulk collection and drop-off; transfer Resource Recovery program to Todd Lane.	Austin Resource Recovery	Finance Division	
	FY13	Conduct pilot program with non-profits to increase reuse diversion; evaluate cost and assess expansion.	Litter Abatement Division	Strategic Initiatives Division, Finance Division, Customer Service Division	
	FY14	Implement Reuse Austin collection program	Litter Abatement Division	Strategic Initiatives Division, Customer Service Division	
	Every 5 years ongoing	Assess and Redefine Bulk Collection Services every 5 Years.	Litter Abatement Division	Strategic Initiatives Division, Finance Division	
Special Event Recycling	FY11-FY12	Conduct a pilot event recycling rebate program	Strategic Initiatives Division	Event organizers, Keep Austin Beautiful, and service providers	14
	FY12	Conduct stakeholder meetings on draft Event Recycling ordinance	Strategic Initiatives Division	Event organizers, Special Events Permitting Staff, service providers	
	FY12	Present new Event Recycling ordinance to City Council	Strategic Initiatives Division	SWAC, City Council, private haulers, event organizers, Keep Austin Beautiful	
	FY12	Increase Event Recycling and Composting Container inventory for container loan program	Strategic Initiatives Division	Keep Austin Beautiful	
	FY13-FY14	Provide technical assistance and community-based social marketing to private event organizers	Strategic Initiatives Division	Private event organizers, non-profit and private sector service providers	
	FY13-FY14	Increase permanent Event Recycling and Composting Container inventory among outdoor parks and streets	Litter Abatement Division	Keep Austin Beautiful, Parks Department, Parks Foundation	
	Every 5 years	Assess and refine Event Recycling Ordinance			
Recycling Economic Development	FY13	Hire a staff person to support the Recycling Economic Development Program	Austin Resource Recovery	Recycling Economic Development Program	15
	FY13 and ongoing	Identify sources of materials that could be made available to secondary materials processors willing to locate in Austin	Recycling Economic Development Program	Austin Resource Recovery	
	FY13 and ongoing	Identify the companies, locally and nationally, that use the materials produced by Austin generators. Recruit these businesses to locate in the region.	Recycling Economic Development Program	Economic Growth and Redevelopment Services Office	
	FY13 and ongoing	Provide an information clearing house for Austin businesses to support "waste pairings"	Byproduct Synergy	Recycling Economic Development Program	
	FY13 and ongoing	Development of a Business Waste Reduction Assistance Program and participation in a Green Business Leaders Advisory Council	Austin Resource Recovery, Recycling Economic Development Program	Recycling Economic Development Program, Office of Sustainability	
	FY14 and ongoing	Support the development of a "Re-Made in Austin" alliance of manufacturers that use recycled feed-stocks to share resources and promote the recycling and recycled content product manufacturing industries	Recycling Economic Development Program	Economic Growth and Redevelopment Services Office	
	FY14 and ongoing	Co-host regional workshops for economic developers and financiers, manufacturers, purchasing agents, researchers, government officials, consultants, and other interested parties	Recycling Economic Development Program	CAPCOG and Economic Growth and Redevelopment Services Office	
	FY15 and ongoing	Facilitate the development of Eco-Business Parks and Eco-Industrial Parks by networking potential developers to reuse and recycling-based processors and manufacturers	Recycling Economic Development Program	Byproduct Synergy	
Brownfields Redevelopment Program	FY11	Transfer Program and staff to Austin Resource Recovery	Austin Resource Recovery	Brownfields Redevelopment Program	15
	FY12 and ongoing	Research potential Brownfield sites within Austin.	Brownfields Redevelopment Program	Austin Resource Recovery	
	FY12 and ongoing	Provide environmental site assessments to eligible property owners.	Brownfields Redevelopment Program	Austin Resource Recovery	
	FY12 and ongoing	Seek additional program support from State and Federal funding sources.	Brownfields Redevelopment Program	Austin Resource Recovery	
	FY12 and ongoing	Manage the Brownfield Cleanup Revolving Loan Fund.	Brownfields Redevelopment Program	Austin Resource Recovery	
	FY12 and ongoing	Provide Brownfield forums to educate developers and Brownfield property owners about potential land reuse opportunities.	Brownfields Redevelopment Program	Economic Growth and Redevelopment Services Office	
	FY12 and ongoing	Facilitate land reuse and redevelopment discussions with economic developers, financiers, manufacturers, government officials, consultants, and other interested parties	Brownfields Redevelopment Program	Economic Growth and Redevelopment Services Office	
	FY13 and ongoing	Form Brownfield Coalition (3+ entities), develop MOA and apply for US EPA Cleanup loan.	Brownfields Redevelopment Program	Austin Resource Recovery	

	FY14 and ongoing	Form Regional Brownfield Forum representatives to educate, strategize solutions, resources, & partnerships	Brownfields Redevelopment Program	Austin Resource Recovery	
	FY14 and ongoing	Establish Texas Chapter of National Brownfield Association	Brownfields Redevelopment Program	Austin Resource Recovery	
Zero Waste Research Support	FY12 and ongoing	Identify potential Zero Waste research projects and funding sources	Strategic Initiatives Division	Zero Waste Network	15
	FY12 and ongoing	Support University of Texas at Austin in their Zero Waste efforts; identify potential faculty and students interested in Zero Waste research	Strategic Initiatives Division	University of Texas at Austin	
	FY12 and ongoing	Participate in national and international dialogues on Zero Waste	Strategic Initiatives Division	All academic partners	
	FY12 and ongoing	Network academic partners to national and international colleagues and research studies	Strategic Initiatives Division	All academic partners	
	Annually	Assess and refine Zero Waste research opportunities	Strategic Initiatives Division	All academic partners	
Market Development and City Purchasing Support	FY12	Review transportation road construction specifications for reclaimed and recycled materials, including recycled glass asphalt, recycled rubberized asphalt and recycled tires; modify City specifications to maximize reuse and recycling	Public Works Department	Strategic Initiatives Division, Office of Sustainability	15
	FY13 and ongoing	Inform residents and businesses about the quality of compost products; provide a composting grading system to encourage "highest and best" use of compost products	Strategic Initiatives Division	Austin Water Utility, Office of Sustainability	
	FY13 and annually	Prepare list of local Zero Waste businesses and amend the purchasing policy to provide preference for Zero Waste businesses, including green caterers and suppliers	Strategic Initiatives Division	Purchasing Office, Office of Sustainability	
	FY13 and annually	Prepare list of local reuse operations, manufacturers and composters using reclaimed and recycled materials; conduct media outreach and develop publications to encourage residents and businesses in Austin to embrace the "Re-Made in Austin" brand	Recycling Economic Development Program	Strategic Initiatives Division, Office of Sustainability	
	FY15 and ongoing	Assess and refine opportunities for local market development	Recycling Economic Development Program	Strategic Initiatives Division	
Regional Cooperation	FY11 and ongoing	Collaborate with CAPCOG on regional plans and research; co-sponsor annual workshops on Zero Waste topics	Strategic Initiatives Division	CAPCOG	16
	FY11 and ongoing	Collaborate with representatives from Travis and Williamson counties to identify specific projects for regional cooperation, including media outreach and messaging; support the development of regional plans	Strategic Initiatives Division	Travis and Williamson counties	
	FY11 and ongoing	Support the Central Texas Zero Waste Alliance in promoting Zero Waste planning and initiatives throughout Central Texas	Strategic Initiatives Division	Central Texas Zero Waste Alliance	
	every 5 years and ongoing	Assess and refine opportunities for regional coordination	Strategic Initiatives Division	All regional partners	
Partnerships with Other City Departments	FY12 and ongoing	Conduct community-based education about City Facility reuse, recycling and composting programs; provide technical assistance to City Departments and City Facilities; ensure City Facility compliance with Universal Recycling and Composting Ordinance	Strategic Initiatives Division	All City Departments and City facilities	18
	FY12 and ongoing	Coordinate with Sustainability Office to form an Inter-Departmental Green Team; meet to identify opportunities for partnerships and provide leadership in Zero Waste	Strategic Initiatives Division	Office of Sustainability, All City Departments	
	FY13 and ongoing	Establish a Zero Waste training program; conduct trainings for new city hires	Strategic Initiatives Division	All city staff	
	Annually	Assess and refine City Department and Facilities Zero Waste programs	Strategic Initiatives Division	All City Departments and City facilities	
Education Institution Partnerships	FY12	Develop and sign an agreement(s) with area educational institutions for a Material Stream Analysis	Strategic Initiatives Division	Educational Institutions and Zero Waste Consultant(s)	19
	FY12	Contract with a consultant to provide Material Stream Analysis through inter-local agreement	Strategic Initiatives Division	Educational Institutions and Zero Waste Consultant(s)	
	FY12	Develop and sign an agreement with area educational institutions for Waste Generator Audits	Strategic Initiatives Division	Educational Institutions and Zero Waste Consultant(s)	
	FY12	Work with local colleges and universities to develop a Zero Waste Certification Training Program	Strategic Initiatives Division	Academic partners	
	FY13 and ongoing	Work with local colleges and universities to develop diversion and disposal alternative technologies	Strategic Initiatives Division	Academic partners	
	FY16 and every 5 years	Reassess waste stream analysis and zero waste training every 5 years	Employee Services Division	Academic partners	
Pilots and Demonstration Projects	FY11-FY12	Implement the Food Services Collection Pilot	Strategic Initiatives Division		20
	FY12	Conduct stakeholder meetings with community-based non-profits and private sector service providers to prioritize the potential pilots and demonstration projects. Adjust implementation schedule, as appropriate	Strategic Initiatives Division	Community-based nonprofits, Private sector service providers	
	FY12	Design an annual program to solicit competitive proposals for priority pilots and demonstration projects	Strategic Initiatives Division		
	FY12	Implement the Organics Collection Pilot	Strategic Initiatives Division		
	FY13	Implement the Multi-family Collection Pilot	Strategic Initiatives Division		
	FY14	Implement Textiles Collection Pilot	Strategic Initiatives Division		
	FY13	Implement Mattress Collection Pilot	Strategic Initiatives Division		
	FY15	Implement Regional Recycling Drop-offs	Strategic Initiatives Division		
	FY13	Implement Recycled Art Projects	Strategic Initiatives Division		
	FY20 and every 5 years ongoing	Assess and refine annual pilot program	Strategic Initiatives Division		
Universal Recycling and Composting Ordinance	FY11	Conduct public workshops on New Rules for Phase 1 of the ordinance	Strategic Initiatives Division	Commercial generators, property managers, nonprofit and private sector service providers	21
	FY11	Undertake pilot program for food scrap collection at restaurants	Strategic Initiatives Division	Targeted restaurants, nonprofit and private sector service providers	
	FY11-FY12	Conduct stakeholder meetings on Phase 2 of the ordinance	Strategic Initiatives Division	Commercial generators, property managers, nonprofit and private sector service providers	
	FY12 and ongoing	Conduct outreach to property managers to inform them of the ordinance requirements and timing; provide training	Strategic Initiatives Division	Building owners and managers	
	FY12 annually	Co-host regional workshop on best practices in food scrap diversion; invite local and national experts	Strategic Initiatives Division	CAPCOG, nonprofit and private sectors service providers	
	FY12	Present Phase 2 of ordinance to City Council	Strategic Initiatives Division	City Council	
	FY13	Hire and train Austin Recycling Ambassadors to provide on-going technical assistance to commercial businesses	Strategic Initiatives Division	Nonprofit organizations	
	FY13	Provide community-based social marketing to residential and commercial generators; provide support to operations divisions	Strategic Initiatives Division	Disposal Facilities Division, Litter Abatement Division, Collection Services Division	
	FY13	Conduct public workshops on New Rules for Phase 2 of the ordinance	Strategic Initiatives Division	Commercial generators, property managers, nonprofit and private sector service providers	
	FY12 and ongoing	Provide commercial technical assistance and marketing to commercial generators	Strategic Initiatives Division	Commercial generators	
	FY13	Conduct stakeholder meetings on Phase 3 of the ordinance	Strategic Initiatives Division	Residential generators, nonprofit and private sector service providers	
	FY14	Present Phase 3 of ordinance to City Council	Strategic Initiatives Division	City Council	
	FY15	Conduct public workshops on New Rules for Phase 3 of the ordinance	Strategic Initiatives Division	Residential generators, nonprofit and private sector service providers	
	FY15 and ongoing	Provide technical assistance and education to residential generators	Strategic Initiatives Division	Residential generators	
	Every 5 years ongoing	Assess and refine Universal Recycling and Composting Ordinance	Strategic Initiatives Division	All stakeholders	
Product and Packaging Policy	FY11	Present single-use bags research to City Council	Strategic Initiatives Division	City Council	21
	FY11	Conduct stakeholder workshops on the Single-use bags Ordinance	Strategic Initiatives Division	Retail establishments and customers	
	Early FY12	Present Single-use bags Ordinance to City Council	Strategic Initiatives Division	City Council	
	FY12 and ongoing	Provide technical assistance and community-based social marketing to retail establishments and customers	Strategic Initiatives Division	Retail establishments and customers	
	FY13	Present take-out container research to City Council	Strategic Initiatives Division	City Council	
	FY13	Conduct stakeholder workshops on the Take-Out Container Ordinance	Strategic Initiatives Division	Restaurant stakeholders and customers	
	FY13	Present Take-Out Container Ordinance to City Council	Strategic Initiatives Division	City Council	
	FY13 and ongoing	Provide technical assistance and community-based social marketing to retail establishments and customers	Strategic Initiatives Division	Restaurant stakeholders and customers	
	FY14	Present single-use beverage container research to City Council	Strategic Initiatives Division	City Council	
	FY14	Conduct stakeholder workshops on the Single-Use Beverage Container Ordinance	Strategic Initiatives Division	Building community	
	FY14	Present Single-Use Beverage Container Ordinance to City Council	Strategic Initiatives Division	City Council	
	FY14 and ongoing	Provide technical assistance and community-based social marketing to building community	Strategic Initiatives Division	Building community	
	Every 5 years ongoing	Assess and refine Single-Use Product Ordinances	Strategic Initiatives Division	All stakeholders	

Take-Back Ordinance	FY13	Present producer take-back research to City Council	Strategic Initiatives Division	City Council	21
	FY13-FY14	Conduct stakeholder workshops on the Take-Back Ordinance	Strategic Initiatives Division	Brand owners, retailers, and customers	
	FY14	Present Take-Back Ordinance to City Council	Strategic Initiatives Division	City Council	
	FY15 and ongoing	Provide technical assistance and community-based social marketing to brand owners, retailers, and customers	Strategic Initiatives Division	Brand owners, retailers, and customers	
	Every 5 years and ongoing	Assess and refine Take-Back Ordinance	Strategic Initiatives Division	All stakeholders	
Hauler Registration Ordinance	FY10-FY11	Conduct stakeholder meetings on the Hauler Registration Ordinance	Solid Waste Advisory Commission	Haulers and other service providers	21
	FY10-FY12	Develop reporting requirements and information safeguards	Strategic Initiatives Division	Haulers and other service providers	
	Early FY12	Present Hauler Registration Ordinance to City Council	Austin Resource Recovery	City Law Office	
	FY12-FY13	Provide registration forms and technical assistance to haulers	Strategic Initiatives Division	Haulers and other service providers	
	FY13	Initiate Hauler Registration Process and Requirements	Finance Division	Haulers and other service providers	
	Every 5 years and ongoing	Assess and refine Hauler Registration Ordinance	Strategic Initiatives Division	All stakeholders	
Commercial Rate Ordinance	FY18	Conduct stakeholder workshops on the Commercial Rate Ordinance	Strategic Initiatives Division	Commercial generators, nonprofit and private sector service providers	21
	FY19	Present Commercial Rate Ordinance to City Council	Strategic Initiatives Division	Finance Division	
	FY19	Develop memoranda of understanding or non-exclusive franchise agreements with registered service providers	Strategic Initiatives Division	Nonprofit and private sector service providers	
	FY19	Conduct stakeholder workshops on New Rules for the Commercial Rate Ordinance	Strategic Initiatives Division	Commercial generators, private sector service providers	
	FY19 and ongoing	Provide technical assistance and community-based social marketing to commercial generators	Strategic Initiatives Division	Commercial generators	
	Every 5 years and ongoing	Assess and refine Commercial Rate Ordinance	Strategic Initiatives Division	All stakeholders	
State-wide Refundable Deposit Ordinance	FY12-FY13	Conduct stakeholder meetings on Statewide Refundable Deposit Legislation	Solid Waste Advisory Commission	Department staff	21
	FY12 and ongoing	Support Container Recycling Institute and the Texas Bottle Bill organization	Austin Resource Recovery	Department staff	
	FY13 (when established)	Support Statewide Refundable Deposit Committee	Strategic Initiatives Division	Statewide Committee	
	FY13-FY15 (when needed)	Present Resolution of Support to City Council	Austin Resource Recovery	City Law Office	
	FY13-FY15 (when proposed)	Support state legislation	City of Austin	Governmental Affairs Office	
	FY14-FY16 (after bill passage)	Assist in establishment of bottle collection convenience centers	Strategic Initiatives Division	Service Providers	
Extended Producer Responsibility Initiative	FY12 and ongoing	Provide staff support to Texas Product Stewardship Council	Strategic Initiatives Division	Texas Product Stewardship Council	21
	FY12 and ongoing	Participate in national and international EPR policy development	Strategic Initiatives Division	Texas Product Stewardship Council	
	FY15	Present EPR policy to City Council	Strategic Initiatives Division	Texas Product Stewardship Council	
	FY16	Present local producer responsibility research to City Council	Strategic Initiatives Division	Texas Product Stewardship Council	
	FY16	Conduct stakeholder workshops on the Local Producer Responsibility Ordinance	Strategic Initiatives Division	Retail establishments, manufacturers, distributors, and customers	
	FY17	Present Local Producer Responsibility Ordinance to City Council	Strategic Initiatives Division	Texas Product Stewardship Council	
	FY18 and ongoing	Provide technical assistance and community-based social marketing to retail establishments, manufacturers, distributors, and customers	Strategic Initiatives Division	Retail establishments, manufacturers, distributors, and customers	
	Every 5 years and ongoing	Assess and refine EPR initiatives	Strategic Initiatives Division	All stakeholders	
Community-Based Social Marketing	FY12	Prepare media and marketing strategy; design Social Marketing Campaigns to reach targeted populations.	Strategic Initiatives Division		24
	FY12 and ongoing	Support operations divisions in social marketing tasks (as listed within each program description and provided below)	Strategic Initiatives Division	Collection Services Division, Litter Abatement Division, Diversion Facilities Division	
	FY13	Conduct community-based social marketing on adding food scraps and compostable paper to yard trimmings collection program; identify neighborhoods for pilot program	Collection Services Division	Strategic Initiatives Division	
	FY13	Conduct community-based social marketing on transition to on-call bulk item and brush collection; identify neighborhoods for pilot program	Litter Abatement Division	Strategic Initiatives Division	
	Spring 2012	Contract Youth Education program	Strategic Initiatives Division	Austin area schools	
	FY12-FY15	Conduct community-based social marketing on weekly recycling collection and biweekly trash collection; identify neighborhoods for pilot program	Collection Services Division	Strategic Initiatives Division	
	FY15 and every 3 years	Assess and refine community-based social marketing program	Strategic Initiatives Division	Collection Services Division, Litter Abatement Division, Diversion Facilities Division	