2019 - 2028

CITY OF TROY, NEW YORK

COMPREHENSIVE RECYCLING ANALYSIS

November 2020

Contents:

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GLOSSARY OF TERMS AND ABBREVIATIONS

BUD - Beneficial Use Determination
C&D - Construction and Demolition
DEC - New York State Department of Environmental Conservation
DPW - Department of Public Works
EPR - Extended Producer Responsibility
HHW - Household hazardous waste
MRF - Materials Recovery Facility
MSW - Municipal Solid Waste
NYSAR3 - New York State Association for Reduction, Reuse and Recycling
NYSWANA - NY Solid Waste Association of North America
PAYT - Pay-As-You-Throw
RFP - Request for Proposal
SSR - Single-stream recycling

APPENDICES REFERENCES

EXECUTIVE SUMMARY

City of Troy Comprehensive Recycling Analysis Plan 2019 - 2028 (previously known to the public as Troy's Solid Waste Management Plan)

This document, covering the period of 2020-2028, is being submitted pursuant to Troy City Code Chapter 247-8 [G]. Passed in 2017, the code change calls for the development and approval of a "Comprehensive Solid Waste Plan" by December 31, 2018. The final version of this document was remitted for New York Department of Environmental Conservation (NYSDEC) approval on October 14th, 2020.

The NYSDEC (see NYCRR code 366) has guidelines and requirements for municipalities regarding solid waste management and planning. NYSDEC uses the terminology "Comprehensive Recycling Analysis" (hereafter referred to as the CRA) to describe plans which guide individual municipal solid waste practices in accordance with State Law. NYSDEC's CRAs encompass a decade-long planning period. This document adheres to that guideline with a ten-year plan for future solid waste activities. These guidelines were followed, within limitations, for this CRA.

This document and its contents cover the solid waste management period from January 1, 2019 through December 31, 2028. The jurisdiction of this document is restricted to the City of Troy, New York.

The City and its Solid Waste Advisory Board developed this CRA to support ongoing efforts to provide economically and environmentally sustainable solid waste services. This positively impacts residents, businesses and organizations in the short and long-term with a foundation in environmental justice and economic equity. The City submitted this CRA to the NYSDEC as a community invested in local stewardship for the good of the planet and to become compliant with state law. The CRA is named as such, because at this time the City does not have a planning unit it is associated with, and has never had a solid waste management plan.

The residents, businesses, industries and institutions in the City of Troy produce thousands of tons of solid waste annually. The universal crisis regarding waste generation and increasing reuse and recycling gives rise to the need for a document such as this one.

The CRA's purpose is to 1) serve as a citywide framework for the coordination of solid waste management; 2) establish solid waste goals and methods for monitoring the progress towards these goals; and 3) satisfy both the NYSDEC legal requirements for a municipality with regards to solid waste planning, comprehensive recycling analysis, and the recently-approved City of Troy requirement to develop and implement a "Comprehensive Recycling Analysis," a process which was started before the end of 2019. It should be noted that notwithstanding the order in which the objectives are listed, that at the discretion of the City, they may be implemented in a manner determined to be the most effective, efficient and fiscally responsible.

Current Solid Waste Programs

The City's current solid waste program operates out of the Department of Public Works Garage in Troy's North Central neighborhood, with a secondary location for materials management at "The Alamo" facility located adjacent to the Rensselaer County Correctional Facility, in South Troy. The City uses The Alamo site as an adjunct to handle its commodity streams, excluding municipal solid waste (MSW) and single stream recycling (SSR). All MSW and SSR is collected by the City and brought directly to a transfer station located off Route 4/Burden Avenue in South Troy, leased and operated by County Waste. All non-SSR recyclable materials are brought to The Alamo by the City, including but not limited to found electronic waste, found household hazardous waste (HHW), yard materials, scrap metal, and bulk items. The City hosts a free annual collection event – which accepts HHW, Electronic Waste and confidential paper shredding – at The Alamo for a limited number of residents advertised through a City press release.

This CRA also highlights the need for the City to acknowledge and address the significant & ongoing changes in international recycling markets. Shifts within the industry affect communities not only in the Capital District, but across the Northeast region and nationwide. These changes are new and unforeseen. Municipalities will be forced to completely overhaul their solid waste master plans in response. The City of Troy is well-positioned to prepare for these changes. It is the goal of the City to have the development of the CRA during this period of market upheaval puts our community one step ahead of this curve.

During the period in which this CRA was being developed, the single stream recycling (SSR) system began encountering significant market limitations. Long-established overseas markets for recyclable materials have either become severely limited, or no longer available due to recently enacted stricter contamination standards. Each municipality experiences the

trickle-down effect of these market changes in different ways.

Due to the arrangement with the aforementioned transfer station within the city limits, the City of Troy appears to be insulated from recycling and disposal cost increases, but these could still occur in the future. These changes have had an enormous impact on many municipalities, but with varying effects on each one, dependent on their planning, resilience and available resources. The City's Solid Waste Advisory Board utilized the changes within the global recycling market as an opportunity to make positive recommendations which account for the drastic changes which occurred in 2018, and establish a stronger municipal solid waste management system for the future.

Goals and Objectives

In 2017, the City of Troy approved the implementation of a solid waste management fee. The approval was in accordance with previous recommendations, including the Citizens' Advisory Group, "Municipal Composting in Troy" (2012) report and the "Improving Troy's Solid Waste Management Program" (2000) report by the Green City Project – a joint undertaking of the Green Education and Legal Fund, Inc., and the Ecological Economics, Values and Policy Program Department of Science and Technology Studies at Rensselaer Polytechnic Institute.

The legislation removed the cost of solid waste from the general tax bill and established a separate fee to cover the costs of municipal waste collection services. The 2000 and 2012 US EPA and NYSDEC reports recommend funding the cost of this service outside general taxes; it serves as a stepping stone towards another recommendation, a pay-as-you-throw system (PAYT) of municipal solid waste management.

Concurrently, the updated law requires the City to develop a CRA prior to the end of 2018 (the draft of which was submitted in the Fall of 2018). This CRA will guide the City in their efforts to encourage reuse, increase recycling, decrease waste output, and to manage costs incurred by the municipality.

The City utilized established NYSDEC guidelines which assist municipalities in developing waste management and comprehensive recycling analysis plans. The requirements established under the recently enacted local law require the City to have finished and adopted the document before the end of 2018. The final remittance was delayed until

October 2020, due to unforeseen circumstances including personnel transitions. This document is a guide, which can be used to achieve compliance successfully in the short and long-term. NYSDEC requires annual updates on the CRA; the first update scheduled for May of 2021. At that time, any items NYSDEC deems necessary for inclusion will be updated.

With the publication "Beyond Waste – A Sustainable Materials Management Strategy for New York State," New York State renewed its commitment to work to reduce the amount of waste destined for disposal. This publication marked a change in guidance from NYSDEC: as they put it, "…a shift from focusing on 'end-of-pipe' waste management techniques to looking 'upstream' and more comprehensively at how materials that would otherwise become waste can be more sustainability managed through the state's economy" (Beyond Waste). The City of Troy's CRA takes this state-issued guidance into account, and looks to establish many upstream improvements, while also accounting for any downstream backup.

The City identified seven objectives, all mentioned in this document. These objectives were created by considering the immediate needs of the City of Troy through a comprehensive solid waste plan, combined with New York State's "Beyond Waste" approach, and NYSDEC's updated guidelines for writing CRAs. An implementation strategy to achieve these objectives is outlined in Section 6. The objectives align with the City's goals for waste reduction, reuse and recycling enhancement programs, and creation of a financially and environmentally sustainable solid waste management strategy. They are as follows:

Objective 1: Establish a Recycling Center

The City should utilize current assets and facilities to create a recycling drop-off center open to the public which allows materials to be sorted into a variety of reuse and recycling options.

Objective 2: Provide Guidance for Diversion/Gleaning of Consumable Foods and Operate a Mulch and Compost Facility

The City should work with local organizations and agencies to develop a food gleaning program to divert consumable foods for human consumption. Additionally, they should create a composting program to process food scraps within NYSDEC registration volumes.

The purpose of a food gleaning program would be to provide viable food to those facing food insecurity, while simultaneously reducing the amount of food being composted or landfilled.

A mulch facility will handle all yard materials generated by the City. A portion of the municipality's organic waste will be handled in a pilot program through a partnership with a composting specialist. The goal of these programs will be to develop a robust organics-processing initiative.

Objective 3: Develop a Plan for a Reuse Center

The City should explore options for establishing a reuse center in Troy. The City should also partner with existing organizations to temporarily increase reuse options prior to further exploration of establishing full scale reuse center.

Objective 4: Establish Clear Waste Collection Procedures & Increase Collection Participation

The City should enact incentive-based pricing and update the City Code to reflect actual disposal costs to the City. These changes will provide a clear process for how each type of material can be reused, recycled or disposed of. Violations should be structured to incentivize compliance from chronic violators.

The City should establish a separate sanitation budget fund, which will establish a funding-stream for a PAYT disposal system. This will help clarify and properly allocate the expenses of waste costs, ensure the sanitation bureau is properly funded, and create a fair pricing structure.

Objective 5: Increase Education and Outreach

The City should maintain the Recycling Coordinator position to ensure continued compliance with state and local regulations, increase education opportunities, and promote solid waste and recycling public outreach. The City should create an online clearinghouse, updated regularly, of all recycling and reuse services available to the community. Lastly, the City should offer additional public recycling and reuse events for the community to increase proper disposal and education opportunities.

Objective 6: Increase Accurate Data Collection and Reporting

The City should adjust hauler-permit laws to collect more data concerning waste generated. This data will help populate annual waste reports and identify trends within the City's municipal solid waste and recycling stream, information which can be utilized to improve collection services and development of future policies and procedures.

In addition, the City should establish a permanent Solid Waste Advisory Committee to advise the City on use of data and reports to implement this document, and assist in NYSDEC annual updates and development of the next CRA in 2028.

Objective 7: Create Deconstruction Permitting and Education

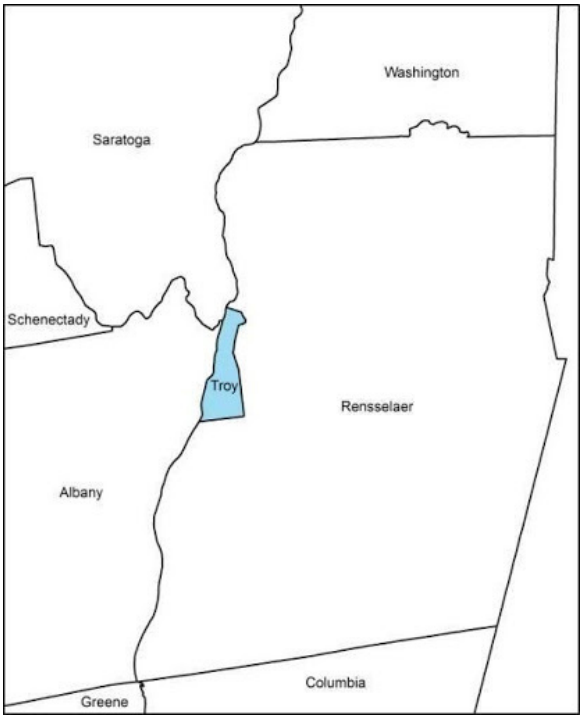
The City should create a permit outlining deconstruction options. The program should structure permit costs to incentivize deconstruction, instead of demolition. The City should also increase home & property owner education about deconstruction versus demolition.

These objectives aim to make the public aware of the City's solid waste options and costs in order to reduce solid waste at the source, enhance reuse and recycling of materials generated by the City, and establish the groundwork for the City's next CRA. While these objectives are ambitious, each will be financially and environmentally sustainable for the City of Troy in the short and long-term.

SECTION 1: DESCRIPTION OF MUNICIPALITY

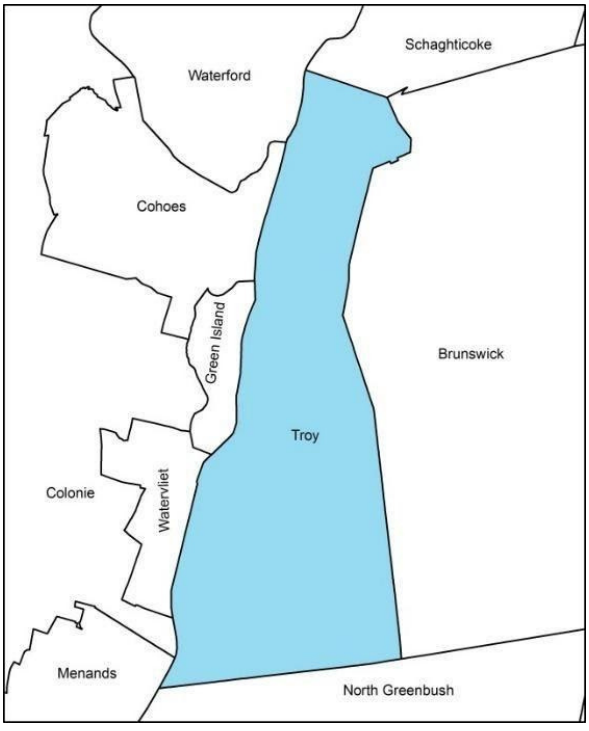
1.1: Size and Geographic Location

The City of Troy is a small municipality located in the Capital Region of Upstate New York State. It is approximately 11 square miles, and is the largest city located within Rensselaer County by size and population. The Hudson River marks the Western boundary of the City. Route 7 (Hoosick Street), which bisects Troy from East to West, is the main route into Vermont and NewHampshire for most of New York State and is the entrance to Vermont for the Southern and Western United States.



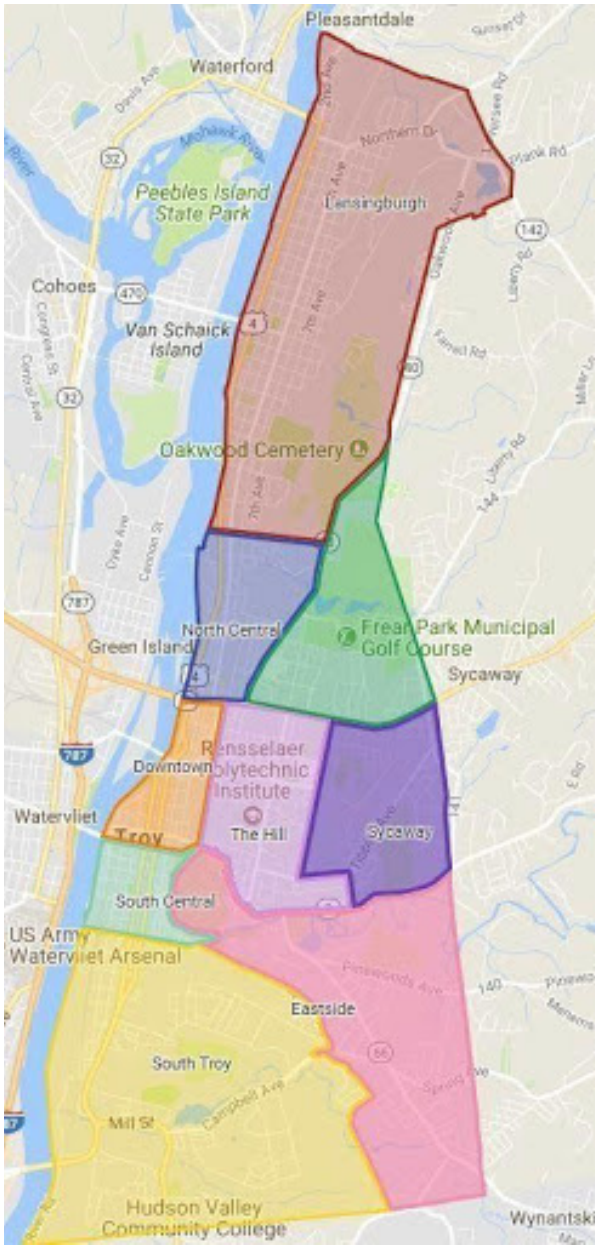
1.2: Population

The US Census Bureau 2010 population for the City of Troy is 50,129. This is an increase of 1.83% from the 2000 census, which put the population at 49,229. The Owner-Occupied Housing Unit rate from 2012-2016 was 37.6%, implying a high number of renters. The City's median income in 2016 dollars from 2012-2016 was $39,847, with a population of individuals under the poverty level at 25.5% (U.S. Census Bureau).



1.3: Neighboring Municipalities

The City of Troy is located near several municipalities including: the City of Albany, Town of Colonie, City of Schenectady, City of Saratoga Springs, and City of Pittsfield, MA. The immediate neighboring municipalities on the Western bank of the Hudson River include: the Village of Waterford, City of Cohoes, Village of Green Island, City of Watervliet and the Village of Menands, listed from North to South. The immediate neighboring municipalities to the East include: the Town of Schaghticoke, Town of Brunswick, Village of Wynantskill, and the Town of North Greenbush, from North to South.



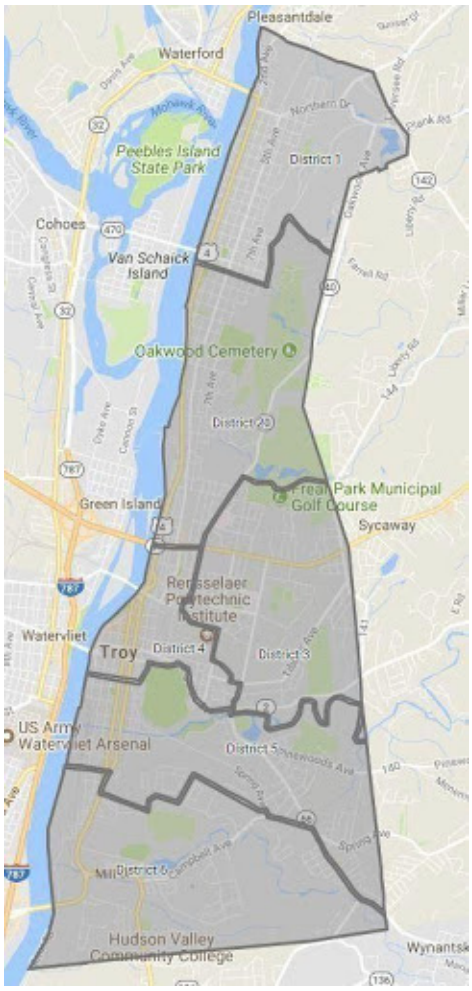
1.4: City Neighborhood

The City of Troy houses nine major neighborhoods, with several, smaller neighborhoods located within these larger neighborhoods. However, the nine provide a clean geographic outline of Troy for solid waste management purposes. These neighborhoods do not follow the political voting districts of the City, of which there are six. The neighborhoods are listed from North to South as follows: Lansingburgh, Frear Park, North Central, Downtown, Hillside, Sycaway, South Central,Eastside and South Troy. Each neighborhood has its own unique identity, coupled with nuanced differences and challenges related to the delivery of solid waste and recycling services. Troy is separated into solid waste collection zones, each having its own day of the week for service. These collection zones do not follow the neighborhood boundaries. The current version of these collection zones will be posted on the City's website in early 2020.The City does not have any data on the breakdown of waste generated by individual neighborhoods or data from private haulers. Only citywide data on material collected by the City's municipal collection is available at this time. Data limitations are discussed at length in Section 2.

1.5: Institutions of Note

The City of Troy hosts prominent organizations, for-profit businesses, non-for-profit businesses, and institutions. The institutions which most contribute to the waste stream are Rensselaer Polytechnic Institute, Russell Sage College,Hudson Valley Community College, Samaritan Hospital, and St. Mary's Hospital. All of these institutions privately manage their own solid waste. The City has no collected data from these institutions related to their solid waste management, or disposal processes. A solution for this problem is given in Section 5.11, Hauler Licensing. As well, the city plans to survey theselarge-scale generators as well as others.

The City has three major parks: two memorial parks, and 18 neighborhood parks. Of the three major parks, one is a municipal golf course operated by the City. The City also boasts a year-round farmer's market—the largest in the region. The farmer's market is run autonomously from the City. It attracts upwards of 14,000 customers to the City each Saturday. The City, in partnership with local organizations such as the Downtown Troy Business Improvement District, hosts many events throughout the year. Each of these draws thousands of people into the City which creates additional waste management challenges.



1.6: Seasonal Variations

The City of Troy features a vibrant, ever-expanding downtown area with a central business district (CBD). It supports a diverse group of businesses, restaurants, bars & breweries, art galleries, retail shops and more. These create a concentrated and unique waste stream in the downtown, complicated by the historic nature of the buildings and ages of streets. As a result, the City provides regular pickups in the CBD Monday through Friday, five days per week. The downtown waste stream fluctuates throughout the year due to seasonal events held downtown such as the Victorian Stroll, the Chowder Festival, and the Troy Pig Out.

The largest impact on the City's seasonal waste stream variation is created by the educational institutions located in Troy. The three higher

education institutions – Rensselaer Polytechnic Institute (RPI), Hudson Valley Community College (HVCC), and Sage College – have a collective student body of over 20,000 people. A little more than half of these students attend HVCC. Although the college is expanding its student residential options, most of their students are commuters. These commuting students do not impact the waste stream as directly as RPI and Sage students, however. All three schools operate on similar annual schedules. Most students arrive before the first week of September, and leave after school ends at the end of May. The semester schedule resulted in a large number of apartments located within Troy to have either June 1 or July 1 start dates, subsequently creating May 31 or June 31 move out dates. Because large numbers of students move out during a similar time frame, a significant volume of accumulated material is deposited into the waste stream. Since 2012, the City's highest disposal volumes of municipal solid waste occur in May and June. The spike is attributed to the departing students and to the semester's effect on yearly lease agreements. In the Spring, the City sees a large influx of brush material from Winter cleanup. In late Fall, a similar influx is seen, but from fallen leaves and yard cleanup. These two seasons contribute the largest amount of yard waste to the City's collection.

1.7: Anticipated Changes

Troy experienced a recent increase in residential and commercial investment. There are a number of residential and mixed use development projects near completion, underway, and in planning phases. These projects are expected to increase the waste streams in their respective neighborhoods. Currently, these developments are concentrated in the downtown central business district. Additional development projects are slated in South Central and North Central. The exact impact of these developments on the waste stream or the population is not known at this time.

SECTION 2: WASTE GENERATION AND MATERIALS RECOVERY DATA

2.1: Description of Current Waste Stream

The City of Troy currently utilizes a private transfer station in South Troy (leased and operated by County Waste) as the primary waste transfer site. The transfer station, its history, and current collection methods are described in Section 3. Since it opened, all waste stream data records are provided to the City in monthly statements issued by the transfer station. The transfer station accepts three streams of material: Single Stream Recycling (SSR), Construction and Demolition debris (C&D), and Municipal Solid Waste (MSW). The transfer station currently provides the City with monthly totals for each type of material. Yard materials, scrap metal, and bulk materials are collected by the City, and consolidated and held at the Alamo facility (a property owned by Troy Local Development Corporation and leased by the City). This facility is located in South Troy, at the intersection of Main Street and Industrial Parkway East. There is currently no truck scale at the Alamo; waste is measured as it is removed from the site. (The Alamo site is expanded upon in section 3.1.3).

Table 2.1 - Waste Stream Breakdown (in tons)

	2017	2016	2015	2014
MSW	15,352.3	15,238.7	15,892.4	16,029.5
SSR	1,170.6	1,163.9	1,243.8	1,342.0
Scrap Metal	40.4	45.3	7.9	6.1
C&D + Bulk	1,791.9	1,766.4	1,243.8	3,326.0
Tires	1.0	N/A	N/A	N/A
Yard materials	700	N/A	N/A	N/A
E-waste	19.0	N/A	N/A	N/A
TOTAL	18,875.10	18,214.30	18,387.80	20,703.50

Table 2.1 provides total tonnage by material from the transfer station from 2014 – 2017. Tires, yard waste and electronic waste data were available from their respective haulers for 2017 only. Scrap metal data was available back to 2014. Troy conservatively estimates a single stream recycling rate between 6-7% for the last 4 years. This rate does not include all diverted material. 2017 is the only year where data is available for other diverted material. In 2017, the recycling rate was 9%. Closer monitoring of materials will yield more data related to solid waste, moving towards achieving the objective of accurate data collection and reporting. The projections chart, featured later in this document, displays data from the transfer station and private collection services. MSW information comes from the monthly tip totals County Waste sends the City.

The monthly weight totals for MSW were added to see the number indicated in the projections chart. The data received from County Waste only accounts for the MSW collected by the City services and does not include MSW tipped at County Waste by individuals, or other collection companies. It also does not account for MSW generated in the City, collected by private collection companies, and brought out of the City. SSR data is compiled in the same manner as MSW, and faces the same data limitations. Construction and demolition debris accounts for any City generated construction and demolition waste (street repair) and all bulk material collected by the City collection services (including furniture).

Bulk material is put into County Waste dumpsters at the Alamo in addition to being brought directly to the transfer station, all data in projections chart reflects both these factors. All construction and demolition debris generated by property owners, which utilize a private dumpster service, is not accounted for in the projections chart. An alternative method to this data collection is discussed in Section 5.11, Hauler Licensing, where it addresses all data limitations indicated above. Scrap metal, tires, and electronic waste are all collected separately from MSW, SSR, and C&D/Bulk. Their direct billing accounts for the weight during each service. This results in accurate accounting of all scrap metal, tires, and electronic waste that the City collects. Scrap metal and tire data is only available for City collection services. The Electronic waste collection event that occurs annually is the one of the two available for City residents (the second event being held by Rensselaer County), and captures nearly all electronic waste generated by the City of Troy.

Bio-solids and industrial solid waste data are unavailable at this time, and are not included in the chart. The data will be accounted for once the alternative methods are implemented that are suggested in Section 5.11, Hauler Licensing.

This document articulates the necessary first step for the City to collect and compile the waste stream data. Analysis of this data is limited, since the data itself is limited. Despite this, some observations can be made. 2016 was the lightest year on record during the time frame 2012 to 2017. The first quarter of 2018 MSW tonnage are approximates per month. The deadline for payment of the first installment of the solid waste management fee was in April, 2018. It is expected that MSW will continue to decrease, as both recycling and reuse options are expanded and education and outreach efforts are increased.

2.2 Data Limitations

Only City collection services data is available, with none available from private collection services. Due to this limitation, the solid waste history of the City is not comprehensive. The City has many large waste generators which are not captured currently. This can be remedied by altering the hauler permit code and making regular data requests. To achieve this goal, City recommendations for hauler code changes are made in Section 5.

The City never requested data from large waste generators located within the City, such as RPI or St. Mary's Hospital, so reporting is incomplete in this area. By streamlining these requests, the data gaps will be filled, beginning with large institutions and expanding to smaller ones. A recycling and solid waste survey will be given to all large-scale generators with a requirement of compliance to be added to city code. Implementing these changes will ensure all necessary data gaps are filled prior to the 2028 plan, completing this document's objective to increase accurate data. The collection of data is a critical first step in lessening the financial burden of waste management on the taxpayers.

The City does not have any data on the breakdown of waste generated by individual neighborhoods or data from private haulers. Only citywide data on material collected by the City's municipal collection is available. The lack of location data creates difficulties in fixing solid waste issues specific to neighborhoods. During the 2019-2028 planning period, waste reporting will be streamlined and available for the next plan in 2029.

Required comprehensive reporting on an annual basis assists in reaching the stated objectives. The mechanisms required within the objectives include: more data provided by large generators, issuance of hauler permits, and holistic educational outreach materials. With these materials the City hopes to provide measurable results.

SECTION 3: EXISTING SOLID WASTE MANAGEMENT SYSTEM

3.1: Facilities and History

The City of Troy lacks a public solid waste management plan since the closure of its landfill. Without regular updates on the solid waste management policy and the City's changes to it, the public does not possess a clear understanding of its municipal collection services. This lack of clarity, over time, contributed to confusion and frustration surrounding Troy's solid waste management practices. This document attempts to lay out the current and historical solid waste practices of the City, and makes recommendations for change which will have positive, clear outcomes.

An objective of this document is to create a clear understanding of solid waste processes so the public can easily participate in the system. The document will also bring the City into compliance with NYS laws pertaining to Comprehensive Recycling Analysis. Troy has not had a CRA, or a solid waste management plan, nor has it been involved with a planning unit. In 1991, a planning unit, the Greater Troy Solid Waste Authority, was created with Troy. This planning unit, however, never became actualized and no records exist of any formal meetings. The unit was formally dissolved by NYS in 2013.

3.1.1: Landfill and Recycling Fee 1968 - 1995

The City of Troy's modern solid waste history begins with the City of Troy Landfill, located off Sherman Avenue in the Eastside Neighborhood on the former Troy airport site. Opened in 1969, the landfill operated without any State oversight or involvement. Concurrently, the City launched a municipal collection service, moving away from utilizing a private collection company.

The landfill site measures at approximately 95 acres. It was assumed the site would provide unlimited waste disposal capacity. For most of the landfill's lifetime, it maintained a tip fee of over $100 per ton. By comparison, the current 2018 average rice per ton in the Capital Region is $65. The revenue from the landfill's tip fees completely funded the municipal waste collection services throughout the landfill's lifetime, and economically benefited the City. However, it was later found it posed an environmental hazard which impacted the surrounding area.

By the late 1980s, the New York State Department of Environmental Conservation and the City consistently disagreed over proper landfill management. Due the City's inability to properly manage the landfill according to then-current state regulations, the pressure applied by NYSDEC and, ultimately, the involvement of the State Attorney General's office, the landfill closed in 1992. As part of the closure, an interim transfer station was constructed and operated from 1993 through November of 1995. Despite attempts to keep the landfill and the transfer station open, NYSDEC became reluctant to support the City in these efforts and forced them to manage the transition without assistance from New York State.

To lessen financial loss of the landfill, Troy reduced the tip fee at the landfill the year before the closure to $55 per ton, down from $110 per ton, to maximize revenue. An article from the Times Union in 1992 outlines this change in tip fee and reactions from the community at that time (Come one, come all: Times Union, 1992). The closure of the landfill greatly affected the City's solid waste programs. The loan, which was required to close and cap the landfill, is still being paid today as part of the MAC debt.

In 1988, the state legislature approved the NYS Solid Waste Management Act which required every municipality in the state have a mandatory source separation ordinance, or local law in place by September 1, 1992. The City of Troy complied with this mandate in August of 1992.

In 1992, the City was inclined to privatize the municipal solid waste system. A stepping stone towards this was to comply with the State and now local recycling mandate and offer a private recycling collection service. Since the landfill tip fee revenue was coming to a close, Troy opted to pay for this new private recycling service through a fee. This was the first time in which the residents received a bill for any solid waste services.

As for municipal solid waste, the closure of the temporary transfer station in 1995 forced the City to seek other disposal options. The City began bringing all waste material to the Town of Colonie landfill. This process continued for over ten years, until the private transfer station opened within the City's limits in 2009. All of the MSW collected by the City's municipal collection now goes to the transfer station in South Troy.

3.1.2 Transfer Station 2009 - 2018

The transfer station in South Troy is located at 83 Water St. on a property owned by the Troy Local Development Corporation (TLDC). The Property is leased to County Waste, a division of Waste Connections Inc., the third largest solid waste services company in the United States. The TLDC's lease allowed County Waste to build out the building to operate

as a transfer station, as long as it remains compliant with NYSDEC. The City's benefit from the site is consistent access to waste disposal at a fixed rate through 12/31/14. The City operates as a "designee" of the TLDC under the lease. According to the lease, the rate per ton varies after December 13, 2014. Since then, the rate ranges from $60 to $62. There will be an addendum to the lease in 2020, capping future increases by a set CPI annually.

There is a zero-dollar tip fee for SSR. The transfer station is open Monday through Friday 7:30am until 4:45pm and Saturday 7:00am until 12:45pm. The general public and City possess access to the transfer station. Due to days where the transfer station closes earlier than the publicized times, the City's sanitation trucks go to County Waste's Albany facility. This requirement increases both labor and transport costs for the city. The City and County Waste seek to level out these costs, and are working together. Through working together, ideas will be generated to lessen unnecessary expenditures.

The transfer station possesses an up-to-date permit with NYSDEC which it maintains. Copies of the permit are sent regularly to the City upon renewal. The facility is permitted to take MSW, SSR, and C&D material. It is not permitted to take electronic waste (e-waste), household hazardous waste, or yard waste. Additionally, the transfer station is permitted to accept a rolling average of 400 tons per day over 30 days, with a maximum daily tonnage of 580 tons on any given day. The City generates an average of 60 tons per weekday, according to a five-year average. This keeps the City at only 15% of the transfer stations rolling capacity. The Alamo site currently handles City yard waste, e-waste, HHW collection events, scrap metal, and bulk collection, at the direction of the City. The organic management portion of Troy's program (currently co-located at the Alamo site) may be relocated to an alternative site in the future.

3.1.3 The Alamo

The City utilizes The Alamo site for almost two decades. Payments to the TLDC are not required to use the site. The City expanded usage options and availability of the Alamo over the years, starting by using the location for yard materials exclusively. Scrap metal, tire storage, HHW collection events, and eventually bulk collection were also added at this site. Due to financial and staffing limitations, the Alamo lacks adequate management for over 3 years, resulting in the buildup of irregular material at the site. This culminated in 2017, when, due to an unfortunate series of events, NYSDEC inspected the site. The inspection resulted in a notice that the site requires the necessary permits and functionality for the general public. The site was henceforth shutdown.

This shutdown prohibited general public access to the Alamo, but did not impact City operations at the site. NYSDEC felt the risk of incorrect disposal was too great without a proper management plan and reliable staffing. The Alamo is operational for internal City uses due to a municipal exemption. The site can be reopened to the public following the filing of a site management plan with the NYSDEC, which outlines 1) the type of material accepted, 2) how it is stored and the pertinent site registrations, 3) and permits or exemptions related to each type of material. Additionally, NYSDEC requires the site be staffed during periods of public access to the site for disposal services.

3.2 Troy Collection Programs

3.2.1 MSW Collection

The City of Troy's municipal solid waste (MSW) collection services have been offered since the landfill opened. The closure of the landfill in 1992 saw an overhaul of municipal collection services due to financial constraints related to loss of landfill tip fee revenue.Since this overhaul, the department slowly grew from 20 employees in 1993, to 29 in 2017. The addition of recycling collection – which the City started performing in 2001 – accounts for the growth.

As of September 2018, the City has six 20-yard rear loader garbage trucks and one automated side loader (ASL) 20-yard truck. When deployed, the rear loaders have one driver and two laborers, while the side loader has only one driver with no laborers. This is relevant because as vehicles are upgraded, it allows reallocation and streamlining of the labor force.

Sanitation vehicles and equipment require an update. While the City's current capital plan calls for new garbage and recycling trucks every other year, this has not historically been the case. This new capital plan must be adhered to in order to ease the financial burden of maintaining older equipment, frequent repairs, and missed services. A description of the MSW vehicles, including age of the vehicles and yardage capacity, is included in Table 3.1 and 3.2

Table 3.1 – MSW Truck Details

Type	Truck #	Yardage	Truck Year	Age
ASL	10	20	2006	13
Rear Load	4	20	2003	16
Rear Load	5	20	2006	13
Rear Load	7	20	2009	10
Rear Load	9	20	2014	5
Rear Load	11	20	2014	5
Rear Load	13	20	2000	19

Table 3.2 – Bulk and Yard Waste Truck Details

Type	Truck #	Yardage	Truck Year	Age
Grapple	150	20	2014	5
Grapple	154	20	2005	14
Grapple	158	20	2002	16
Grapple	159	20	2001	17
1 Ton Dump	63	3	2009	10
Pick up	23	1	2008	11
Pick up	39	1	2009	10
Pick up	59	1	2008	11

MSW is collected in zones throughout the City once per week, outside of the Central Business District in the Downtown Neighborhood, where it occurs more frequently. The Central Business District receives street side service two days per week and alley service three days per week, totaling five days per week of MSW services.

The City requires MSW be placed in “heavy-duty plastic bags tied at the top or specially treated paper bags” and be placed “in water-tight, covered wooden, plastic, or metal containers.” These containers must be marked for identification by the owner, either by name or street number. At this time, the maximum limit of waste generated per household is “75 pounds in weight or 95 gallons in capacity.” Full waste containers must be placed at the curb adjacent to the premises, or in the alley to the rear of the property no more than 12 hours before collection of solid waste in residential areas, and no more than 10 hours before collection of solid waste in business areas of the City.

3.2.2 Bulk Collection

The municipal service of bulk collections involves collection of waste material too large for garbage trucks. Bulk material is collected with a grapple truck and pickup trucks.Sanitation uses four grapple trucks, three pickup trucks and one larger one-ton pickup dump truck for bulk collection. One driver operates the grapple truck, while the pickup trucks are operated by one driver and one laborer.

Prior to revision of City Code 247-8, every owner-occupied property could receive free pickup of bulk service annually, as long as it amounted to less than one (6'x6' sized; or two cubic yards) pickup truck load. In the past, bulk collection was intended to be performed on demand. The property owner called the DPW dispatcher, and their pickup is scheduled for their next MSW service day. Since then, bulk collection continued with no major overhauls, with exception of the 2019 protocol, which charges to collect bulk materials.

Due to staffing capacity, this was not realistic. The City views keeping the streets clean as a priority, and have since the mid 1990s. This allowed the City to maintain cleaner streets, but allowed for illegal dumping, excess bulk dumping by homeowners, and overburdened bulk collection crews. The intention is to revise the pickup schedule to align the collections to coincide with the solid waste management schedule for each zone.

The City faces two large issues concerning bulk waste: illegal dumping and missed services, due to staffing or equipment breakdowns. There was little clarity regarding residential bulk material disposal. In the mid-1990s, Troy attempted to enforce a payment system for bulk material. After low compliance (40%), high illegal dumping rates, and difficulty in differentiating the homes which paid versus those that did not, the program was discontinued.

After its collection, The Alamo receives bulk material where it is placed into private roll-off containers. Grapple trucks go directly to the transfer station instead of bringing material to the Alamo. The Alamo containers are picked up weekly. This is considered C&D material by the disposal company: any bulk material brought directly to the transfer station is also considered C&D material, not MSW.

3.2.3 Recycling Collection

Ever Since the early 2000s, the City has performed recycling collection. When the City took over the recycling collection in the early 2000's, they consolidated all collection days into one. Before this, each household would have three collection days: one for MSW, one for SSR, and one for bulk. By consolidating the collection days down to one per zone, labor and missed services were reduced. Descriptions of SSR vehicles listed in table 3.3.

The City offered a zero-sort, single stream recycling (SSR) method of collection since County Waste started accepting this material at the transfer station in 2009. Although this method of recycling is easier for the general public, it gives rise to a higher risk of contamination due to the lack of handling and inspection usually used in SSR collection.The City is currently assessing opportunities to reduce both single-stream recycling contamination, as well as creating more cost effective sanitation collection protocols.

Table 3.3 – SSR Truck Details

Type	Truck #	Yardage	Truck Year	Age
Curb Hopper	14	20	2001	17
Long Side Loader	16	10	2006	12

Accepted SSR materials are placed "curbside" for municipal collection in blue14-gallon bins provided by the City. Only property owners who qualify for municipal collection services (outlined in the City of Troy Code) receive the bins and service. During the 2020 calendar year, the City plans to upgrade to 18 and 22-gallon bins. These size bins are the largest practical sizes given in the limitations of the City's recycling trucks. Unlike the collection of MSW and bulk services, a driver and laborer perform the SSR collection using two different trucks. Both trucks used are side loaders, a type with high sides for loading, and no tipping mechanisms.

3.2.4 Food Recovery/Composting/ Source Separated Organics (SSO)

There will be efforts made to recover and re-distribute viable and usable foods back into the community via partnerships with local agencies, groups, and non-profits. This will put the food to a better hierarchical purpose compared to other options.

In 2012, the City created a Citizens Working Group to research and make recommendations with regard to municipal composting in Troy. Their draft report was partially adopted by the City Council in 2012. The report made clear recommendations to the City, some of which have been adopted, others have not. The hiring of a recycling coordinator and removal of waste costs from the general taxes were the two most recent recommendations adopted.

In 2015, the City began developing a request for proposal (RFP) for a pilot food waste collection program for the City of Troy. As the date for issuing the RFP approached, the City experienced the tragic and untimely death of its Solid Waste Coordinator, the project lead on the RFP. No further action has been taken.

The City does not currently offer any municipal source separated organics collection.There are, however, community efforts for food waste diversion and collection. There are several community gardens throughout the City which have on-site compost piles. The organization or group that organizes each respective garden commonly allows garden participants to utilize the compost pile on-site. Troy Zero Waste, a local community organization, offers a weekly food waste drop-off site at the Troy Waterfront Farmer's Market every Saturday. This material is hauled by the organization to one of the local community compost piles in Troy. Market vendors and City residents utilize this free service.

Further development of these analyses and their implementation will occur in the intermediate phase of this document.

3.2.5 Yard Materials

The City requests the collection of yard waste and tree debris. This service is available to all property owners in the City. This practice will be revised in the Spring of 2020, as all commodity streams will be picked up on a zone-day basis. City Code currently requires yard waste be placed in brown paper bags before pickup; tree debris must be bundled, and be no more than 5 feet in length, 18 inches in diameter and weigh less than 75 lbs. The DPW dispatcher compiles a weekly list of call-in requests.

Yard waste collection was previously unreliable due to lack of available labor during the Summer months. In the Spring, the City schedules a regular yard waste collection for several weeks. During this time, the City will collect yard waste every week on the regular trash and recycling day. The City will occasionally offer this service in the Fall. This protocol will be expanded to be provided regularly, labor and weather permitting. In the past, all collected

yard waste was brought to the Alamo and stored in a pile, which, after one year, is approximately 4,000 cubic yards. According to NYSDEC, this site is exempt for registration or permitting because the total material onsite never exceeds 10,000 yards of material annually.

Once or twice per year (depending on quantity generated), the yard waste pile has been ground into mulch and hauled away. This practice has been ongoing since at least 2011. Initially, ground mulch was given to residents. However, fewer and fewer residents took mulch, and storing the ground material for years became burdensome. In recent years, the ground mulch was found to have been contaminated at the collection source with plastic and metal materials. As a result, the ground material required screening, so the contaminated material was hauled away by the contractor to be screened off-site.

The City intends to reduce contamination levels in these materials to encourage residents and the City's hauling partners to use the mulch. Using this nutrient-rich mulch may help prevent further erosion of soil and aid the increase of new soil.

3.2.6 Construction and Demolition Debris

The City does not currently possess a large-scale system for construction and demolition collection, or recycling. Homeowners are prohibited from placing C&D debris in the streets for bulk pickup. Instead, they must rent a private dumpster through a permitting process overseen by Troy's Bureau of Code Enforcement. The County Waste transfer station accepts C&D debris. Contract vendors remove City-generated C&D debris. Currently, these bids do not require recycling. The City pays C&D rates for its bulk collection for the residents, including furniture and white goods (large appliances). There is no available data from outside municipal collection for C&D disposal rates.

3.2.7 Hauler Permits

Changes in City hauler permits are recommended in section 5.11. The City does not enforce its laws pertaining to hauler permits at this time, and there is no indication the City has ever enforced these laws. Two laws require hauler permits, each with different language in regards to process: the City Code Chapter 234-4 Permits for Private Haulers and Chapter 247 Article II: Private Collection.

3.2.8 Recycling Laws

The City mandated recycling in 1992, pursuant to NYSDEC regulations. City residents' access to the service began in 1993. The history of Troy's recycling law is found in section 3.1.1. In 2012, the Citizens' Working Group recommended rewriting the City Code to include a food waste mandate. This mandate has not yet been adopted. The State has a food waste landfill ban that would impact large generators was passed in early 2019, for implementation in 2022.

3.2.9 Enforcement Methods

The City utilizes three entities to report on and enforce its current waste and recycling laws. Two are City entities - the Bureau of Code Enforcement, and Department of Public Works (DPW) - with the third being City residents. DPW and Code handle the enforcement process, while DPW staff and the public report code violations. Violations need to be called in for a code enforcement officer to be dispatched, and document the violation. Because DPW staff see and handle the material most frequently, they are the primary reporting body. As of September 2019, there have been two litter patrol officers hired to assist in this enforcement system.

Illegal dumping and bulk violations pose the most significant violation problems.Because of this, the City asks residents to report these violations when they see them, so they can be handled promptly. Public engagement can curtail problems faster than the City can find and fix them, and therefore public participation is encouraged.

Once documented, the City collects the items from the violation. Fines for violations of solid waste management are laid out in City Code: ""Any person violating any provision of this article shall be guilty of an offense and, upon conviction thereof, shall be punishable by a fine not exceeding $250 or imprisonment not exceeding 15 days, or by both such fine and imprisonment, for each offense. Each day that such violation continues shall constitute a separate violation." Fines and penalties for violating littering or bulk laws are outlined in City Code Chapter 188: Littering.

Sanitation laborers can refuse recycling bins if the contents do not comply with the published acceptable items. However, these refusals are not communicated to the generator (owner or occupant), who often assumes a missed service has occurred rather than a rejection. Proper communication to participants in the city collection services is addressed in Section 5.

3.2.10 Data Collection

County Waste provides an annual transfer station report which breaks down MSW, C&D, and SSR the City brings to their facility. Unfortunately, this report does not capture any other generators besides the city collection services. Institutions like Russell Sage College, Rensselaer Polytechnic Institute (RPI), and Samaritan Hospital all utilize private collection services which do not report data to the City. This also does not capture source location data from the material collected. Annual waste reports and hauler permit data requests will give the City more data and allow for more effective analysis over time.Additionally, waste information from large generators within the City will enable calculations of citywide recycling rates to include generators beyond residential customers.

In 2018, monthly data from County Waste for the period of 2012 to 2018 was requested. This data generated all graphs and charts within this document. Further details of data are outlined in Section 2 and 5.10. Utilizing the historic data as outlined in this document will help to help to lessen the financial burden of waste management on taxpayers.

SECTION 4: EXISTING ADMINISTRATIVE AND FINANCIAL STRUCTURE

4.1: Organization

4.1.1: Department of Public Works

The City of Troy Department of Public Works (DPW) is organized into five bureaus: Central Garage, Facilities Maintenance, Streets, Sanitation, and Traffic. Sanitation and Streets handle solid waste, with Sanitation responsible for primary collection. The following chart (4.1) outlines the hierarchy of order within these two divisions. The DPW dispatcher handles all calls for DPW; this work includes requests for solid waste pickup, bulk collection, yard waste collection, and missed services.

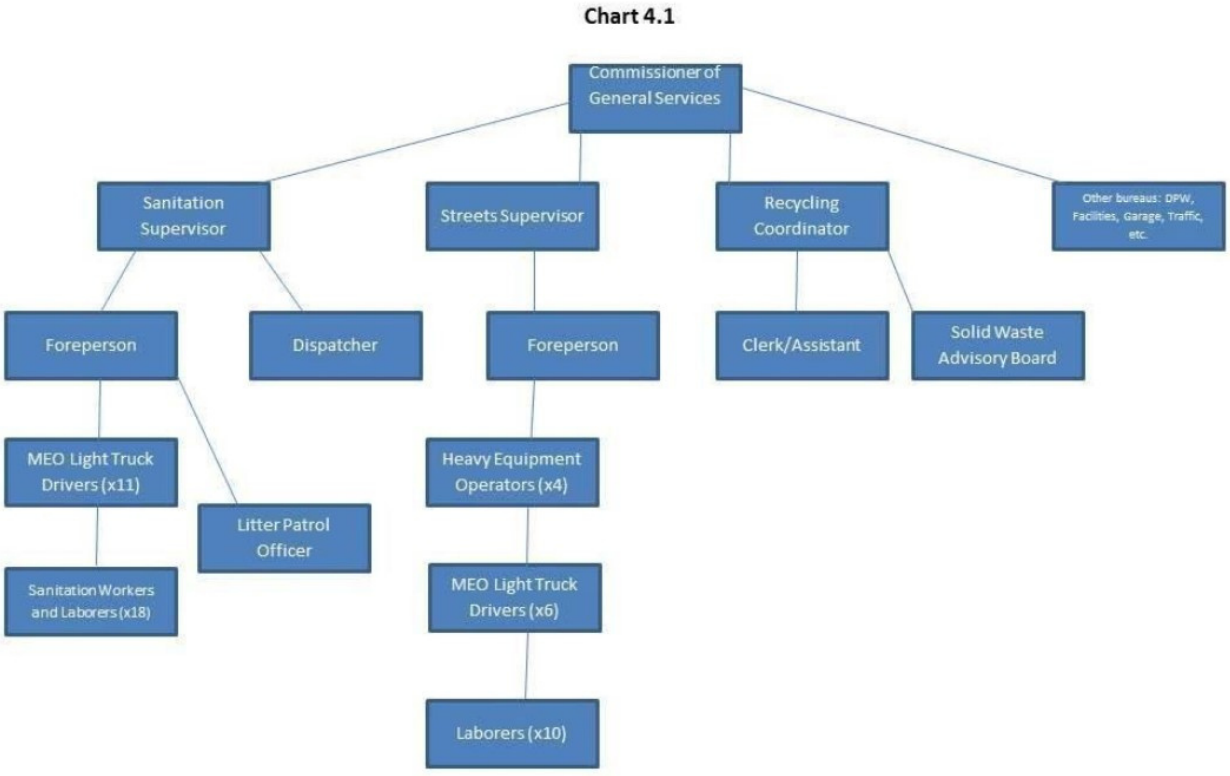
2018 represented a year for restructuring in Sanitation and Streets. Restructuring was triggered by the loss of several employees through retirement, and a new Commissioner of General services. In January of 2020, the two departments (Sanitation and Streets) were partitioned into two separate bureaus and are operating as individual entities due to the Commissioner's determination of overall efficiency.

Once fully staffed, the new management structure will create better accountability and effectiveness in DPW relative to waste services. The Sanitation Department's Litter Patrol Officer position handles solid waste related code enforcement issues. The position was unfilled for nearly a decade, but two litter patrol officers were hired before the end of September 2019.

The Recycling Coordinator Position was created in 2017 and was filled in April of 2018. The Recycling Coordinator Position has been included in Ordinance #103, Ch234 as a permanent position.

Table 4.1 provides an Organizational Chart for the Department of Public Works.

Chart 4.1 - Organizational Chart: Bureau of Sanitation, Streets



4.1.2: Finance

The Sanitation Department operates on an annual budget of over $3 million. This has traditionally been funded through both property taxes and the recycling fee, since the closure of the landfill in 1993 until 2017. In 2017, the City of Troy approved a new law establishing a solid waste management (SWM) fee to fund the sanitation budget. This separated the cost for solid waste management from local property taxes, and eliminated and replaced the recycling fee. The SWM fee was set at $160 per residential unit for 2018, increased to $164 for 2019 and to $180 for 2020.

The City's SWM fee originally had a sunset clause and was directed into the general fund, but for the 2019 fiscal year was moved to the sanitation fund. Over the next several years, the Solid Waste Advisory Board has a goal of reducing the solid waste fee in conjunction with the implementation of a hybrid Pay As You Throw (PAYT) program.

The Solid Waste User Fee remained constant for all generators and was calculated off the total number of units. The SWM fee was billed separately from property taxes and utilities. Additionally, a SWM fee is utilized by many other cities throughout NYS. A table listing their respective fees by unit is below.

Table 4.1 – 2018 Solid Waste Management Fees

Municipality	Single Family	2 Family	3 Family	4 Family	Notes
City of Rochester	$391	$787	$872	n/a*	
City of Plattsburgh	$352	$704	$872	n/a*	
City of Rensselaer	$256	$520	$768	n/a*	SWM fee billed quarterly
City of Schenectady	$224	$448	$672	n/a*	
City of Troy	$160	$318	$477	$636	
City of Albany	$0	$180	$360	$540	
City of Buffalo	$119	$119	$119	n/a*	Hybrid PAYT (annual fee)
City of Utica	$79	$158	$237	n/a*	Hybrid PAYT (annual fee)

**The Cities of Rochester, Plattsburgh, Schenectady, Utica, Buffalo and Rensselaer consider buildings with four or more units as commercial properties and do not provide residential collection services. However, some of these cities offer more expensive options for commercial properties not indicated in the above table.*

From NYSDEC's solid waste management plan 2010 "Beyond Waste…":

"6.3.2 (a) Property Tax Most municipalities in New York State fund their solid waste and recycling programs using general revenues derived from property taxes. This system provides no incentive to the resident/taxpayer to reduce or recycle waste because the actual cost of waste disposal is hidden. Moreover, this approach, while simple and straightforward, leads to difficult budget decisions where investments in waste reduction and recycling compete with other critical public services, such as police, fire protection, libraries and schools. Those who waste less essentially8subsidize their neighbors who waste more."

From U.S. EPA Economics of Waste Management and Land Cleanup webpage:

Municipal solid waste (MSW), otherwise known as "garbage" or "trash," consists largely of waste discarded by households, businesses, and institutions. Economic studies focus on determining appropriate policies for MSW management, as well as measuring the negative external effects of MSW disposal, potential siting difficulties, and so on. The collection of MSW can be priced according to two different policies: traditional regulatory instruments (flat fees and local tax receipt-funded collection programs), and market incentives policies. Flat fees and local tax receipt-funded collection programs provide little incentive to reduce waste as the waste generator faces no extra costs in producing more waste each month. Approaches that include economic incentives increase unit costs and monetary rewards for reducing waste generation, and increasing composting and recycling. Examples of incentive structures include volume-based user charges, subsidies for recycling, and product charges that include the eventual costs of disposal. Economic studies that focus on the negative external effects of solid waste disposal have examined host community payments and hedonic pricing effects. Economic analyses are also conducted to better understand the process and justice issues surrounding placement of recycling, composting, and other municipal solid waste facilities.

From Municipal Composting in Troy:

"It is important for residents to understand their financial stake in the recycling and composting system. Currently, homeowners see no fee for the collection of solid waste, and a $29 yearly fee for recycling collection, while the city spends more than$80 per household per year to dump municipal garbage, and far more to pay for trash pickup and management equipment. These hidden costs result in people not being aware that their actions (failing to separate their waste stream) have real financial implications on themselves and their neighbors. The CWG-C recommends, as part of the implementation of a pay-as-you-throw (PAYT) system (and prior to it), the itemization of these costs in a method that makes them more transparent toresidents. […] The hidden cost for disposal

results in a large percentage of residents believing that garbage collection is free. They are unaware that the cost of trash collection and disposal is included in the property tax. It is difficult for residents to understand the potential economic benefits of recycling without seeing the direct impact on their taxes"

The 2000 titled "Improving Troy's Solid Waste Management Program," issued by the Green City Project report, also recommends moving the cost of waste out of property taxes as discussed here:

"In 1999, Troy homeowners each paid $217 for their trash pickup and disposal because they cannot see this charge as a line item on their property tax bills some residents have the misconception that garbage collection is free. Our survey of Troy residents showed that 35% of respondents were unaware that they paid for solid waste services in their property tax bill. There is no incentive to reduce the amount of landfilled waste if there is no promise of reduced cost from diverting materials from the trash. Residents will not understand the economic benefits of recycling unless they are aware of the cost to citizens for garbage collection and disposal."

4.1.3 Outreach

The City, historically, has not provided effective outreach to residents to communicating the rules, regulations, and procedures of its solid waste services. The City's website contains limited information for bulk requests, yard waste pickup, trash and recycling collection schedules, and what can be recycled. Recent efforts made some progress to allow for improved communication, including the establishment of an online services page, as well as significant updates to instructions and content contained on the City's municipal website, but further work is required.

In April 2018, the City hired a Recycling Coordinator to perform a series of solid waste related tasks including expanded public outreach regarding solid waste and recycling programs. The Recycling Coordinator is also tasked with developing the City's CRA, coordinating future recycling efforts, assisting in recycling education, ensuring the City's compliance with NYSDEC reporting requirements and collecting recycling data for internal and external reporting. The coordinator began increasing outreach in 2018 by disseminating information with Household Hazardous Waste Day coupons and now serves as public contact available by phone for any and all recycling and solid waste management related questions. The coordinator has plans to assist the City in the implementation of the recommendations within the CRA document in Section 5, including expanding outreach.

4.1.4 Enforcement

As outlined in Section 3.2.9, the enforcement of the City's solid waste laws currently occurs. When Sanitation and Streets employees tasked with removing material, or city residents visually observe violations, these violations are communicated to the dispatcher. The violation is photographed as documentation. Then, DPW removes the material and Code Enforcement issues a violation. The litter patrol officers are also tasked with issuing trash violations, and work with Sanitation to ensure that all violations are photographed. The photo is attached to a bill which details the fine and is mailed to the property owner. In the event the fine is not paid, the total is re-levied on the property owner's taxes for the following year. The fines and penalties are outlined in City Code Chapter 188-19 [b-d] shown below:

B. *Any person committing an offense of illegal dumping as set forth in § 188-18 shall be guilty of a violation punishable by a fine, imprisonment, or both, for each offense. The fine shall be a minimum fine of $200 for each occurrence, with the maximum fine not to exceed$500 per offense. A sentence of incarceration shall not exceed 15 days per offense.*

C. Fine; civil penalty. In addition to the collection of costs associated with the removal or cleanup of garbage, refuse or waste materials found in violation of this chapter by the City, any person violating this chapter shall be punished by a fine in City Court pursuant to Subsection A or B of this section or a civil penalty recovered in accordance with § 188-20 of this chapter in the following amounts:

Violation	Penalty
First	*$100*
Second	*$125*
Third	*$225*
Fourth	*$300*
Fifth	*$350*

D. Fine; civil penalty options. In addition to the penalties imposed in § 188-19 of this chapter, the City Court may order a person to perform one or more of the following:

1) Perform public service relating to the removal of litter or to the restoration of an area polluted by litter;
2)Pay the person, or in the case of public property, the City, sustaining damages arising out of a violation of this chapter, plus the injured party's court costs and attorney's fees if action results in a civil proceeding.

4.1.5 Data Collection

Before 2018, data was not collected beyond an annual statement from the transfer station. The Recycling Coordinator position has begun to implement a system of data collection and reporting for the City. The creation of a body of complete, accurate solid waste data will allow Troy to discover and develop efficiencies in the system, and increase recycling rates. The collection of data is a critical first step in lessening the financial burden of waste management on the taxpayers.

4.1.6 Advisory Board

The Solid Waste Advisory Board ("the Board") was established by the City in May of 2018 to assist in the writing and development of the Solid Waste Management Plan. The board was created utilizing City Code Chapter 234-8 which reads.

At the discretion of the Mayor, an advisory board shall be appointed to review and work with the City administration on current and future recycling issues and programs. Said advisory board members shall be appointed by, and serve at the pleasure of, the Mayor and shall receive no financial compensation for their work. Advisory board members shall be residents of the City and shall not hold public office within the City administration. The advisory board shall consist of a minimum of five and a maximum of nine members. The advisory board shall have a Chair who shall preside at all meetings. Meetings of the advisory board shall be scheduled by the Chair in conjunction with the Mayor or his/her designated representative.

The Board met from May through August, in order to complete the draft version of this document within the allotted time frame. The Board provided regular feedback on each section of this document. The operation and input of the entire Board has been essential in the completion of a document of this magnitude. The completion and implementation of this CRA, and the continued assistance of the Board, is an essential component of the City's ability to achieve all of its objectives and reporting requirements.

As of September of 2019, The Board expanded to include representatives from RPI, Russell Sage and Hudson Valley Community College. Additional expansion is planned to include non-board sub-teams, incorporating college student and non-profit partners.

4.2 Financial Structure

4.2.1 Landfill and The Alamo

The closure of the landfill in 1992 resulted in the loss of significant revenue to the City in the form of tip fees. The landfill site now costs the City approximately $15,000 annually in engineering and monitoring costs. The site houses a city solar array, resulting in a net savings of municipal electricity costs of approximately 20% of the City's power. With the future addition of a second array in early 2020, this number is anticipated to increase to 40% of the City's power.

The Alamo does not cost the City any money in lease expenses. However, the TLDC owns the site and maintains a loan associated with it. The Alamo involves expenses for the City for grinding of yard materials, electronic waste, household hazardous waste collection, recycled tires, bulk waste, and scrap metal. Including all associated expenses, the Alamo costs approximately $100,000 annually. Expenses are related to the disposal material, and this cost comes entirely out of the tip fee budget. The City is investigating alternatives for handling some of the materials, and changing how some materials are unnecessarily handled as HHW and additional cost-saving measures.

The Alamo generates no revenue from tip fees, and sees modest revenue (approximately $5,000) from scrap metal collection. Prior to March of 2019, the heavy machine equipment operator (HMEO) maintained the site. This was based on staff availability, and was non-permanent from early Spring to late Fall. HMEO's most important service is snowplowing, occurring in the Winter months. Without an HMEO and a loader on site for a period of more than a week, the site becomes overburdened and requires a day of cleanup to become reorganized. The City is working to have an HMEO onsite at least once a week. The HMEO will be included in the Sanitation bureau budget.

The transfer station and its equipment, operated by County Waste, are privately owned. The building and land are leased to County Waste by the TLDC. The lease is effective through 2024 with an option for two (2) consecutive five (5) year lease extensions, through 2029 and 2034 respectively. The transfer station guarantees the City can dispose of MSW, SSR and C&D at a negotiated, reduced price and SSR at no charge. The City receives a monthly bill encompassing all material disposed of at the transfer station, which includes a breakdown of material type into MSW, SSR, and C&D.

4.2.2 Funding Methods

The City is responsible for upgrades to waste collection equipment. State grant funding is available for financial assistance related to recycling and waste reduction. The City has applied for, or is currently in the process of submitting, the following NYSDEC grant programs:

Municipal Waste Reduction & Recycling Program – NYSDEC provides assistance for projects which further the primary strategy of the NYS solid waste management hierarchy. Troy has a grant application in development for recycling equipment to expand services and increase efficiencies.
Household Hazardous Waste – A 50% matching reimbursement grant from NYSDEC using the Environmental fund to incentivize municipalities to offer disposal options for waste materials that are potentially hazardous in homes.
Electronic Waste – a 50% matching grant from NYSDEC using the Environmental Fund to incentivize municipalities to increase recycling options for electronic waste, which is illegal to dispose of in MSW streams. The program sunset occurred in 2018, and no further grant awards were provided in 2019 and beyond.
Recycling Coordinator – A 50% matching grant from NYSDEC to incentivize municipalities to create and keep a recycling coordinator position. These positions increase recycling participation and reduce MSW.
Public outreach and education – A 50% matching grant from NYSDEC to increase community awareness and engagement regarding waste reduction, recycling and diversion.

These grants require a 50% local match from the municipality. The programs are annual grants which help offset the cost of HHW collection events, e-Waste Collection, educational outreach and the recycling coordinator position. All grant reimbursements go back into the Sanitation Fund, as this is where initial expenditures occurred.

4.3 Laws, Regulations and Ordinances

4.3.1 City of Troy Code 234: Recycling and 247: Solid Waste Code

City of Troy Code Chapter 234 mandates recycling in the City. It also mandates the municipality service all residential buildings with six units or fewer, and with all buildings with seven or more units, are required to recycle through private collection services unless determined to be allowable by the Commissioner of General Services. Approximately 87% of all units in the City are billed and receive City solid waste collection. The exact population that receives City solid waste collection is unknown.

The City's Solid Waste code only allows commercial units to use City collection methods if the Commissioner determines them to be viable, or as allowed by the "fair share" plan when implemented in 2020. The City does not offer SSR collection for commercial locations that generate more than the 14-gallon bins the City uses.

Beginning in May of 2019, the City also implemented a $5.00 per rolling-tote handling fee for each event held within the city requiring pickup of solid waste. This includes both one-time events and regularly recurring events.

City of Troy Code Chapter 247 Solid Waste was updated in 2017. The changes included the creation of the solid waste management fee (SWM). The remaining changes adjusted the language to be clear with regard to what the City provides as solid waste collection. This included language clarifying what properties receive services from City Code Chapter 247-8 (B):

"Garbage, recycling and yard wastes. The collection and disposal of garbage, recycling and yard waste shall be provided to residential premises of six or fewer residential premises and to such other types of premises as the Commissioner determines to be necessary and/or desirable."

4.3.2 City of Troy Code 188 - Littering

The City of Troy Code 188-18 of the Troy City Code defines illegal dumping and littering, and also governs acceptable bulk collection services and pricing for these services. Illegal dumping is defined in the City of Troy Code as:

"All categories of waste material, including but not limited to garbage, rubbish, bulk refuse, construction and demolition material, scrap metal or any similar type of waste material, shall only be placed for collection, either by private or municipal services, at the location from which the waste material was generated. Waste material deposited at a location within the City other than the location/property address from which the waste material was generated shall be considered illegal dumping and shall be subject to all appropriate fees, fines and penalties provided for in this chapter."

Currently, owner-occupied properties with less than six residential units receive a flat fee of $25 (for 6'x6'; 2 cubic yard) pickup truck loads of bulk material collection. Non owner-occupied residents do not receive this pricing, but instead are charged a per-item rate. The current system does not adequately address the problem of illegal dumping. Further, the terms of the City Code have not been clearly communicated to the public. Residents who might otherwise wish to comply do not know how to properly use the system in place which results in frustration and unknowing violations. This challenge will be addressed more effectively through the education and outreach objective.

4.3.3 Other Laws

The following types of laws relating to solid waste recommended by NYSDEC are not yet established in the City of Troy:

- Green procurement
- Environmental justice
- Local product stewardship
- Comprehensive sustainability initiatives

(These components are also highlighted in Realize Troy (sections: 5.1.3, 5.3.2, 5.3.4 and 5.3.5), and as a duly-cited objective will be addressed within the coming years as well.)

The City created a Joint Task Force on Sustainability in 2014 with City Code Part 53, which was not convened until summer of 2019. The City of Troy is a registered Climate Smart Community accredited by New York State, and has an Environmental Commission who will be reviewing and discussing options for additional actions in accord with this accreditation.

SECTION 5: ALTERNATIVES TO CURRENT SOLID WASTE MANAGEMENT PRACTICES

Section 5 covers recommended adjustments and alternatives to current solid waste management practices. The section is broken into 15 subsections by NYSDEC recommended topics. Several subsections within Section 5 are dense due to their detail. A brief overview of the denser subsections is highlighted above the relevant subsection as an aid.

5.1 Waste Reduction Programs

Sharing Economy

In addition, emphasizing movements and opportunities to create systems which allow people to share items and tools through a sharing economy, rental and resale. When people rent, borrow or purchase used equipment and other goods they only need to use occasionally it reduces wasteful purchasing. There are several examples of models for purchasing used goods, such as Craigslist and Let Go, as well as models for a sharing economy. Currently, there are other municipalities and organizations which have active "tool libraries".

This is an avenue the City of Troy may want to consider, as people who become members are able to borrow and rent tools. The Buy Nothing Project (https://buynothingproject.org) is another example of the sharing economy, users form localized groups on social media and offer unwanted items to their neighbors at no cost. This type of sharing is and could be further facilitated by the City and it ultimately cuts down on individual purchase of infrequently used items. Expanding this type of sharing economy has potential for source reduction.

Repair

The region has long-standing repair options, such as repair services for shoes, bicycles, lawn and garden equipment, appliances and electronics. Repair café's (classes and clinics) are another repair option offered by a collection of local volunteers in many cities around the world. These are often Saturday events that draw in volunteer fixers to share their skills with attendees who bring in items needing repair. Expanding repair options by working with partners to offer clinics would cut down on material sent to landfill while also increasing awareness of reuse and general solid waste issues.

Other recommendations within this section qualify as waste reduction programs in addition to their respective sections. These items include:

- Improve the transparency of municipal solid waste costs
- Expand education and outreach
- Create incentive-based pricing
- Expand enforcement programs
- Establish a recycle center
- Create a deconstruction permit
- Partner with non-profit organizations to divert edible food for human consumption
- Develop a food waste composting pilot program.

Each of these items is expanded upon in this section, and is expected to reduce waste in addition to accomplishing their established goals. Prior to implementation of these actions, the City will visit similar such sites to observe successes and struggles of other programs. This will allow the City of Troy to take a well-researched, deliberate and intentional approach to each objective.

5.2 Reuse Programs

Recommendations for Implementation by City:

- Explore reuse center options within city limits
- Report on reuse center feasibility in City in 2020

The City of Troy does not currently offer a municipal or a public-private option for reusable material donation, or disposal within the City. Reuse centers are different from recycling centers because the material is not broken down and remade into something else, but rather sold “as is.” There are local restore centers and salvage yards run by local nonprofits and private companies.

Troy residents need a more accessible reuse center option in order to prevent reusable materials from entering the waste stream. The amount of bulk waste that residents dispose of annually that could be repurposed or reused is costly, wasteful and abundant. Troy can make a significant reduction to the waste stream through reduced labor for cleaning up large bulk dumping and decreased tip fees. This will reduce the financial and environmental impact on the City. Additionally, this waste stream reduction will give taxpayers access to a secondhand market to provide multiple life cycles to usable goods before they become waste.

A reuse center provides opportunity for public-private partnership. The City does not have the financial resources to launch its own at this time, but the need for such anenterprise is apparent. The development of a reuse center, coupled with the incentive-based pricing changes discussed later in this section, will offer residents a low cost or no cost option for disposal of large usable items.

Development of a Troy reuse center should be prioritized because of the financial, environmental, and public benefit which would be achieved. The research and development of a reuse center will be analyzed and prepared for the City in conjunction with the Solid Waste Advisory Board. It will be presented at the annual reporting update in 2021. In addition, partnering with established restore centers who take donated goods should be encouraged by the City to immediately reduce our waste stream. This could be accomplished through a public-private partnership at the Alamo site.

The following points address the various factors concerning this objective:

Explore Reuse Center Options within City Limits and Provide Feasibility Study in 2021 Update

Administrative/Technical:
Quantitative and qualitative impacts - The bulk waste quantity was 1791 tons in 2017. Much of this material could be diverted from the landfill stream into a second hand market. As a qualitative note, the option should also reduce the incorrect disposal of bulk material on Troy streets.

Facility or program needs based upon the projected quantities and composition of waste – The Solid Waste Advisory Board will need to convene, research, and report on this over a two-year period. This report will expand on necessary requirements.

Summary of the cost data used for evaluation including life cycle analysis – The Solid Waste Advisory Board does not receive financial payments, so the cost of this report will be nothing. The life cycle of the analysis will cover the rest of this planning period(2020-2028).

Impact or effect on natural resource conservation, energy production and employment creating opportunities – This action would result in net-positive impact on conservation efforts, energy production or employment opportunities. It will tie the public into the process through the Solid Waste Advisory Board and the resulting reports recommendations should have positive impacts on employment creation opportunities.

Jurisdictional Impacts: neighboring planning units and municipalities effect on or how it affects them
An assessment of interest in participation by other planning units – Municipalities and planning units have not shown any interest in participating in the report. The resulting report's reuse center should garner interest from neighboring municipalities and planning units.

Alternatives that would be available if planning units participated – In the event of planning unit partnership on the report, it would increase the stakeholders at the table for location discussions.

Comments and recommendations received from any neighbors – None at this time.

Assessment of the environmental justice impacts within the planning unit- None known at this time. An environmental justice component will be an area of emphasis in this report.

Selected Alternatives:

Alternative chosen and reason why – A report on a reuse center was not viable prior to the submission of this plan. With the creation of a Solid Waste Advisory board, as per this document, using the public board to create a report was deemed the best option.

Detailed description of procedures for implementation – During 2020, the board will meet monthly to go over the details of the report. In 2021, January – March, the report will be finalized and in April 2021 it will be generated.

Identification of expected qualitative and quantitative impacts - See above.

Assessment of the impact of the proposed recyclables recovery effort – See above.

Identification of the administrative, financial and contractual requirements for this program's implementation – The Recycling Coordinator will be required to sit on the board and assist in the report creation process. Beyond the labor, this report does not have any financial or contractual requirements.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative - The report does not require any changes to current laws. The Solid Waste Advisory Board does require a law change which is included in appendices.

The inclusion of actions to be taken to maximize of economic markets of recyclables recovered – The report will not require any actions. The report itself will address this question in relation to a reuse center.

Identification of the public education and related programs undertaken for implementation- The report will not require any actions. The report itself will address this question in relation to a reuse center.

There are numerous opportunities within the City to find private businesses and non-profit organizations that have systems to connect used household furniture, appliances and clothing to new users.

Reuse retailers: There are many reuse options located in The Planning Unit and neighboring communities. These include clothing and household goods at thrift stores and consignment shops, used sporting goods stores, refurbished and used bicycles and secondhand bookstores. These facilities all provide options for residents to make their unwanted goods available for reuse, through donation or sale, as well as to contribute to the local economy. Encouraging residents to buy second hand would cut down on material being sent to landfills.

Reuse donations: There are numerous non-profit organizations that collect and distribute gently used clothing and furniture to clients with unmet needs. These organizations offer a tangible way for people to help others, be credited for a gift to a non-profit that is a potential tax deduction and to find a purpose for materials that would otherwise be sent to the landfill.

Reuse Online Options: The internet has increased options for buying, selling and trading used goods. eBay, Craigslist and similar websites facilitate buying and selling transactions locally and nationally. More recently, this has expanded to include social media style sites including the app Letgo and Facebook marketplace. The Internet has also facilitated the growth of the estate sale industry with websites that efficiently connect buyers and sellers with pictures of items available at each sale and notices of upcoming sales. EstateSales.net offer buyers a convenient way to search for sales offered by multiple vendors using a map feature and then view photos of items available at each sale. Of note, the disadvantage of encouraging online retail (as opposed to encouraging brick and mortar stores) is the added packaging associated with online retail and not supporting local businesses.

Article VI Solid Waste Advisory Committee

Sec. 247 — 20. Establishment of Citizens Solid Waste Advisory Committee.
At the direction of the Mayor a Solid Waste Advisory Committee shall be established. Committee will be composed of six residents of the City who are not employees of the City who are appointedby the Mayor and/ or such other City employee having specific knowledge of solid waste issues. The resident members will serve without compensation. The Mayor will appoint a City employee member to sit on the committee to act as a liaison.

Sec. 247 - 21. Chairperson. Terms of Office and Rules.
The Committee members may select a Chairperson by a majority vote. Two members of the Committee shall be appointed to four year terms, two members to three year terms and two members to two year terms. Each member shall be able to serve additional terms if willing to do so and if reappointed by the Mayor. The committee may establish its own rules.

Sec. 247 — 22. Responsibilities and Duties.
ORD#102
The Committee shall be responsible to conduct annual reviews of the design and implementation of the City of Troy's Solid Waste Management Plan and to provide recommendations and advice to the Mayor and City Administration for the improvement of the SWMP and its' implementation as the Committee deems appropriate in connection with the annual updates. The Committee shall also be responsible to assist in the preparation and drafting of the next Solid Waste Management Plan to be issued in 2029 and to conduct the annual review process thereafter with respect to that plan. The Committee shall also provide advice and recommendations to the Mayor and the City Administration regarding various solid waste issues that may arise and that are not covered in the Comprehensive Recycling Analysis.

Sec. 247 — 23. Assistance of City Departments.
The committee through its Chairperson may request and shall be entitled to the assistance of various City Departments and shall be provided with information necessary and relevant in order for the Committee to perform its responsibilities with respect to the long-term Solid Waste Management Plans and other solid waste issues.

Sec. 247 — 24. Reports.
The Committee will provide an annual report at a minimum to the Mayor regarding its review of the implementation of the Solid Waste Management Plan including any unforeseen problems associated with such plan. The Committee will provide an annual report to the Mayor as well as submitting it to the NYSDEC. The Committee may provide additional interim reports as it deems appropriate regarding the Solid Waste Management Plans or other solid waste issues.

5.3 Recyclable Recovery Programs

Recommendations for Implementation by City:

- Monitor international recycling changes – Annual reports to city in each year of plan
- Explore regional solutions to managing recyclable materials
- Research and report on a modernized recycling collection system in 2024
- Monitor and expand as needed textile recycling pilot program
- Consideration of re-opening the Alamo in 2020 with proper state approval

5.3.1 International Recycling Changes

In January 2018, China, the largest global importer of recycled materials, implemented a .5% contamination rate limit across all imported recyclable material. This change in material restrictions immediately and significantly impacted the global market. It caused countless tons of recyclable materials to build up in boats, ports, and recycling centers worldwide. This backlog of material resulted in buyers having their pick of clean material and leaving contaminated material to stockpile.

Single Stream Recycling (SSR) conveniently collects recyclable materials without the demands of source separation. It also eliminates the visual inspection of each bin for contamination at its source. This results in a higher average national contamination rate in SSR compared to other sorted recyclables. SSR is the “dirtiest” type of material and is first to experience backlogs, due to decreased demand in international markets. As a result, municipalities invested in SSR programs have or will begin to experience dramatic changes in the availability of buyers, as well as significant cost increases to provide SSR services.

The waste and recycling industry in the United States seeks new solutions to current market problems. Major industry stakeholders will likely establish recyclable processing centers nationally for recycled materials in the future. However, there will be a period where other markets must fill in the void left by China. This period is the most uncertain. Its duration is unknown, which makes planning difficult. However, the City of Troy is using this period as an opportunity to explore alternatives to the current system with the same interest that was given to SSR. Alternative services like composting, C&D recycling, reuse centers and waste reduction initiatives are given a front seat for consideration and implementation.

Shifts in the global recycling market do not mean recycling will end. Neither speculation, nor abandonment of recycling systems will benefit the situation. The City of Troy is fortunate, and at the present time is sheltered from dramatic pricing impacts of local SSR changes. The City's contract, which establishes it as a designee through the TLDC with County Waste, guarantees a zero-dollar ($0) tip fee for recyclables through the lease term ending in 2024 with two opportunities for five-year renewals. County Waste operates the transfer station. The lease has been modified via a lease amendment, executed in early 2020. It gives the City more latitude in implementing alternatives and changes in SSR outlined in this document as it continues to monitor changes in the SSR markets locally, regionally, and nationally. The MRF commoditizes recyclable materials, eliminating the need for the City to handle the materials post-collection. This arrangement mitigates any requirement for the City to invest additional resources for expanded market analysis. As per the DEC's requirements, the City will provide annual reports. These reports will highlight changes to solid waste and SSR protocols. The City may explore a regional approach to solid waste.

5.3.2 Recovery Programs (Paper, Metal, Glass, Plastic and Textiles) and Recycling Center

Since 2001, The City provided the collection of recyclables. Two recycling trucks serve residents; the vehicles are over 10 and 15 years old, respectively, and both require significant maintenance and upkeep. With uncertainty in the global recycling market expected to continue, any overhaul of Troy's municipal recycling collection system should be undertaken carefully. Research into a modernization of citywide SSR collection was underway in early 2018. The City will ensure the development of a plan that can be modified to navigate the new and rapidly changing markets. A new modernization plan of recycling collection will be researched and reported on in 2020.

A pilot textile recycling program was launched by the City in July 2018. Four containers were placed strategically around the City, in the Eastside, South Troy, Downtown, and

Lansingburgh neighborhoods. The program is still in its infancy, and no data has been generated yet. However, through education and outreach, the expectation is that participation in textile recycling will increase, thus allowing the city to increase the number of available textile containers. By supplementing the other textile donation programs throughout the local area, the City aims to increase awareness and access to the bins for residents. This will have the desired effect of diverting textiles from the waste stream.

To ensure state compliance (as well as for reasons of ethics and environmental stewardship), available recycling options on site must be expanded, because source separated recycled materials are still considered a commodity. It is also an opportunity to create employment opportunities, both in the materials separation sector and the sales of such commodities. Unlike SSR, the City should incur no additional costs. The diversity of these recycling options will be based upon the 2019 recyclable markets. Minimally, the items to be considered for acceptance here will include: sorted paper products, cardboard, glass, plastic, bulk plastic, electronic waste, tires, yard waste, and scrap metal. The City will make the determination of materials collection based on margin and viability. Any materials not processed by the City will continue to be handled by County Waste, or other recycling partners. The benefits of owning this site may be even greater when considering other potential uses outlined in this section.

The City must monitor the SSR markets and maintain the current program with two major updates on a two and four-year timeline. There will be an emphasis on continuing the County Waste lease another five years, beyond 2024. The City is considering whether the location for the recycling programs, including electronic waste, tire recycling, scrap metal recycling, textile recycling, yard waste diversion, should remain at the Alamo (while also considering purchasing the site from the TLDC), or move to an alternative site.

The timeline for reopening the Alamo on a limited basis is currently unknown. Additional cleanup and consideration of other locations for organic materials will be assessed first. If the City follows this recommendation, it will achieve the objectives to establish a recycling drop-site site.

The City explores the viability of reopening the Alamo to the public on a regular schedule with: a site plan, NYSDEC approval, and proper management. The major cost to the City would be the purchase of the site from the TLDC. The most recently appraised value was $115,000. It has not yet been determined if the City will choose to make this purchase. There will be no new equipment needed for the site and, at present, no major facility updates are required to reopen the site. If the Alamo is opened to the public, NYSDEC requires the site be staffed during public hours. Currently, there is an HMEO onsite on occasion, but not on a regular schedule.

The following points address the various factors concerning this objective:

Administrative/Technical:
Quantitative and qualitative impacts - The reports will provide the public regular data and updates on the status of solid waste and recycling in the City. This type of regular information will be new to the City and should increase interest in waste, waste rduction and recycling. The Recycling drop-site will allow the public to drop off bulk waste, recyclables (metal, plastic, paper and e-waste), and yard materials. By adding this facility, the City can rescue a large portion of the bulk material (some of which is usable furniture) and increase the recycling rate by incrementally decreasing the MSW amounts.

Facility or program needs based upon the projected quantities and composition of waste - The Solid Waste Advisory Board (SWAB) will need to continue and develop reports in collaboration with the City. The recycling center will utilize a pre-existing waste facility, the Alamo, and work with the State to have any necessary permits to open it to the public on a limited basis in the first two years.

Summary of the cost data used for evaluation including life cycle analysis - There are no costs associated with the reports as the SWAB does not get paid. Before opening the facility, upgrades will be made by an external vendor will be completed during 2020. These upgrades will not exceed funding allocated in the approved budget. The recycling center will not cost extra to run, as the City employee's staffing the facility is already present to manage City waste on site. As the recycling center grows and brings in more material, more investment can be made into the facility at the discretion of the City.

Impact or effect on natural resource conservation, energy production and employment creating opportunities - The reports will not have any effect on natural resource conservation or energy production. They will not have a direct impact on employment creation; however, the experience of such a committee may increase desirable traits for a person seeking employment. The recycling center will not create any energy or immediate employment opportunities. It might increase employment opportunities if the City decides to expand hours of operation and increase labor on site.

Jurisdictional Impacts – *neighboring planning units and municipalities effect on or how it affects them.*

An assessment of interest in participation by other planning units – No assessment was conducted of interest by other municipalities – it will be explored in the reports.

Alternatives that would be available if planning units participated – More materials flowing through the recycling center could increase the revenue available to the City to increase the services the center offers.

Comments and recommendations received from any neighbors – None.

Assessment of the environmental justice impacts within the planning unit – There are not any negative environmental justice impacts created by either of these two alternatives. In fact, the goal of this action will be to improve the balance of environmental justice issues.

Selected Alternatives:

Alternative chosen and reason why - Monitoring recycling markets and developing annual reports were chosen due to the need for greater information in regard to changes in the recycling "climate" and to fulfill the requirements from the NYSDEC. Opening up a recycling center within the City for no immediate costs seems a simple, straightforward option without placing financial burden on the City.

Detailed description of procedures for implementation- The Solid Waste Advisory Board was re-convened in early 2019, and the research and reporting commenced. The reports will be issued in 2020, and annually, beyond. Any permits, registrations, and exemptions will be identified dependent on what materials will be handled at the site.

Identification of expected qualitative and quantitative impacts – See above.

Assessment of the impact of the proposed recyclables recovery effort – The recycling center will give the public a secondary option for recycling beside curbside pickup for greater separation choices.

Identification of the administrative, financial and contractual requirements for this program's implementation- The Solid Waste Advisory Board will conduct the research and reports. The Sanitation Bureau, within the Department of Public Works, will handle the recycling center, with one of the heavy operators acting as the on-site contact and the Recycling Coordinator acting as the on-call contact and fill in.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative – None.

The inclusion of actions to be taken to maximize of economic markets of recyclables recovered Identification of the public education and relations programs undertaken for implementation – The reports will increase public education and relationship with solid waste as they will give the recycling coordinator the opportunity to continue to provide information to the public on a regular basis. The recycling center will act as a public relations program simply by being open and available, showing the City is committed to recycling and waste reduction.

5.4 Organics Recovery Programs

It will be necessary to divert a great deal of materials from the waste stream. Organic matter is heavy and takes up space in MSW and landfills. Diverting this organic waste into alternative beneficial uses will make a large impact in reducing waste and requires a variety of program strategies. Over the ten-year planning period, activities that the City may undertake are as follows:

Recommendations for Implementation by City:

- Maintain clean mulch for use by residents and small urban farms
- Seek funding for a Sustainability Coordinator position to work with local businesses on education and outreach to ensure smooth enactment of the Food Donation and Food Scrap Recycling Act. More information on this is detailed below.
- Partner with local non-profit organizations, before the end of 2021, to establish food gleaning programs which recover usable food for redistribution and human consumption
- Divert viable organics for consumption by farm animals
- Expand food-scrap drop off program at locations to be determined partner with an established composting vendor to test viability of them managing a compost facility in 2021/2022
- Build on lessons learned from compost projects in the region
- Seek additional opportunities for pilot projects in drop-off or curbside food scrap recycling
- As viable, provide support to commercial organizations as they adapt to new regulatory requirements
- Explore regional solutions for food diversion during planning period

The City does not currently have a municipal organics recovery program. To supplement community and privately offered programs, the following recommendations are proposed:

The City will develop viable partnerships with local non-profit organizations and

agencies to assist in the development of food gleaning programs. This will divert food for its highest hierarchical level: human consumption and secondary level of consumption by farm animals. The 2019 Food Donation and Food Scrap Recycling Act will jump start efforts for businesses to adopt means and measures which reduce excess food production and improve the donation streams to local organizations to feed hungry people. The City of Troy will work to provide education and outreach to ensure that grocery stores, restaurants, and other food outlets understand the legislation which protects them and encourages donation of unsold food to Food Banks and non-profits. The legislation should also create a favorable climate for businesses to invest in building or expanding residential and commercial composting to meet the needs of the community.

The City has been collecting yard waste and brush from the residents for decades. This material accumulates annually and is mulched and hauled away. Locations for a proposed mulch facility are currently in exploratory phases. Once enough information has been collected, the most prudent location will be determined. This site is not expected to accommodate much material in the pilot and early phases of the testing; however, it is important to test operation and management before expansion. This test will be conducted over the course of 2020 and 2021. If the pilot is successful, a clean mulch product can be distributed.

Readers will notice an extended timeline for the implementation of a pilot food-scrap program in Troy. This is due to the SSO collection programs' requirement for processors to accept the collected material. The lack of food waste processing locations, such as compost facilities or anaerobic digesters, limits the ability to process the materials. This factor is being strongly considered when determining both feasibility and timeline.

If the compost pilot is successful between 2021 and 2022, the location can become a registered facility which would allow for the acceptance of the maximum quantity of material. This determination will be the responsibility of the composting partner or regional entity. The expansion of local food waste processors would not only benefit the City of Troy, but also the region. A regional approach to food waste management, in conjunction with other solid waste practices, would diversify the options for local municipalities when it comes to best practices in "reduce, reuse, and recycle."

Rather than all local municipalities relying on a single large processor of a single type of material, a network of regional food waste processing facilities could potentially manage the total amount of organic waste produced in the City of Troy and the Capital Region. The single regional processor approach has led to problems, such as the Albany landfill price escalations at County Waste's material recovery facility. A diverse regional approach will ensure Troy's access to food waste processors in the future.

The following points address the various factors concerning this objective:

Administrative/Technical:
Quantitative and qualitative impacts - These will directly impact the waste stream once implemented:

- The creation of a yard material to mulch processing area.
- Partner to create a diversion opportunity for edible food.
- Develop avenues for food scraps to be used as feedstock with composting partners.

Facility or program needs based upon the projected quantities and composition of waste -The anticipated needs of this program will be determined after extensive comparisons of benefits and challenges have been assessed. Other equipment needed for the program to be implemented are already on site or owned by the City, including a loader. Since the food-scrap management would be handled by a partner at a separate location, further permitting or registration by the DEC would be the sole responsibility of the partner.

Summary of the cost data used for evaluation including life cycle analysis - The mulch plans will not incur any additional costs, since the City already processes the yard materials in unground form with a partner. The eventual expansion of services to food scrap collection require analysis by the Solid Waste Advisory Board (SWAB) to provide exact cost data. Food scrap drop-off by the public to a designated location for composting will not cost anything for residents. This will result in cost incurred to the partner selected to fulfill this objective.

Impact or effect on natural resource conservation, energy production and employment creating opportunities - This recommendation will not immediately impact energy production or employment opportunities. It does create opportunities for natural resource conservation related to yard waste and food waste streams, as well as the introduction of local compost and mulch into the City. In the future, the food waste diversion and collection alternative will create employment opportunities. Exactly how many will be discussed in the report by the SWAB.

Jurisdictional Impacts – *neighboring planning units and municipalities effect on or how it affects them.*

An assessment of interest in participation by other planning unit: No assessment was conducted.

Alternatives that would be available if planning units participated - If other planning units participate in the alternative, a larger facility would be needed, but would also be justified.

Comments and recommendations received from any neighbors – None

Assessment of the environmental justice impacts within the planning unit – Increased access to edible food for community members facing food insecurity. Clean mulch and compost from the community will aid in building cleaner and more fertile soil.

Selected Alternatives:
Alternative chosen and reason why – See above

Detailed description of procedures for implementation – A site management plan will be worked on in collaboration with NYDEC by Spring of 2022

Identification of expected qualitative and quantitative impacts – See above.

Assessment of the impact of the proposed recyclables recovery effort - The expansion of yard waste operations through a mulch program will increase the future likelihood of this collection program continuing. It also may allow the opportunity for future collection processes by the City's composting partner organizations for food-scrap collection. Combined, these account for over a quarter of the waste stream if implemented citywide.

Identification of the administrative, financial, and contractual requirements for this program's implementation - The Sanitation Bureau within DPW, specifically the Recycling Coordinator in partnership with the Sanitation Bureau Supervisor, will oversee the implementation of this project. As the program progresses, additional investments into labor costs will be necessary to expand the program.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative - None.

The inclusion of actions to be taken to maximize of economic markets of recyclables recovered – None.

Identification of the public education and relation programs undertaken for implementation - Having a mulch facility and composting partner opens the opportunities for the City:

- Public/school tours
- Demonstration days to educate residents/students/etc on the processes of composting, mulching and food scrap/yard material management.

5.5 C&D Reduction Including Deconstruction, Reuse and Recovery Programs

Recommendation for Implementation by City:

- Create deconstruction permit
- Establish first-time homebuyer C&D education program
- Create database of all recycling, reuse, salvage and deconstruction services

The City of Troy does not currently have any construction and demolition (C&D) recycling. Many successful municipal guides exist for C&D recovery and recycling. Because the City of Troy has no preexisting C&D recycling infrastructure, establishing protocols for this method is crucial. Construction and demolition debris is a constant element in a legacy city like Troy. Whenever the City's unique architectural history and building materials can be salvaged or recycled, they should be. This can be facilitated through a C&D recycling facility and expanded deconstruction education. The EPA has found that "[if] residential housing designed from 2000 to 2050 allows for the recovery of just 25% of construction debris, the resulting material would be enough for nearly two-thirds of the housing units built over the following 50 years."

Deconstruction permits give contractors the opportunity to sell, recycle, or landfill building parts in individual pieces instead of landfilling the entire building through demolition. It is recommended the City create a deconstruction permit cheaper than the current. Adding this permit will educate contractors and property owners who are unaware of the deconstruction option. The end goal is to achieve a construction and demolition recycling rate, separate from SSR. Due to low utilization rates, the City has no C&D recycling-related data.

Once hauler permits are updated and enforced, the City can begin capturing C&D data which will allow for analysis to establish baseline recycling rates. Syracuse, NY has a deconstruction permit and RFP which should be considered when the City develops its own C&D program. The timeline for creating the deconstruction permit should be the end of 2020. A

deconstruction request for proposal, in addition to a demolition request for proposal, will take more time to research, and should be done before the 2021 annual update fulfilling the related objective of this document. The goals of these RFP's are to create an option other than demolition that results in materials being recycled and reused.

The numbers of first-time homeowners is growing in the City of Troy. C&D deconstruction and salvage opportunities are not effectively taught to residents, or future residents, who attend first-time home buyers' workshops. Working with first time homebuyer programs on a C&D education program will give the City the opportunity to educate potential buyers to proper recycling techniques for construction debris.

Related to this, an online resource of all available C&D recycling, salvage, and deconstruction services will be published by the City or run as a "wiki-site" in partnership with other organizations. This clearinghouse will include all known recycling, reuse, and reduction services available within the region. It is the hope this clearinghouse would be finished before the end of 2020, with annual updates to add or remove information as needed.

Establishing a recycling and C&D recycling clearinghouse and creating first time homebuyer education surrounding deconstruction fulfill the objective of this document related to increased public outreach and education. Achievement of this objective will be explored with local non-profit partners, such as Troy Rehabilitation and Improvement Program, Commission on Economic Opportunity, Troy Area United Ministries, and others.

The following points address the various factors concerning this objective: Creation of a deconstruction permit, C&D education program and an online database for C&D recycling services

Administrative/Technical:
Quantitative and qualitative impacts - The three alternatives will not have immediate quantitative impacts. They will, however, increase awareness of what construction and demolition recycling and reuse options are available in the City. In doing so, this should eventually have a quantitative impact, which will be measurable after these steps are taken.

Facility or program needs based upon the projected quantities and composition of waste - The deconstruction permit may be modeled after the Syracuse permit and will require a verification program to ensure the permit is being used for deconstruction. The education and database will be created by the Recycling Coordinator and SWAB and will not need anything except regular offerings and updates.

Summary of the cost data used for evaluation including life cycle analysis - None as there is no financial investment required. The cost impact or savings from these programs will be collected over the planning period.

Impact or effect on natural resource conservation, energy production, and employment creating opportunities - There is no expected energy production, however, there would be employment opportunities created by implementation of this objective. The diversion of construction and demolition debris from the landfill is expected to have a positive impact on the local reuse market for resource conservation.

Jurisdictional Impacts - neighboring planning units and municipalities effect on or how it affects them.

An assessment of interest in participation by other planning units – No assessment was done.

Alternatives that would be available if planning units participated - The alternatives chosen do not require planning unit participation. The database will feature all available vendors from across many planning units.

Comments and recommendations received from any neighbors- None.

Assessment of the environmental justice impacts within the planning unit- The impact of this type of permitting would establish a baseline of safe and required handling of materials in locations with no previous similar protections.

Selected Alternatives:

Alternative chosen and reason why - The three alternatives listed above were chosen in order to increase awareness of construction and demolition reuse and recycling. Taking this initial small step of creating a permit, homeowner education courses, and an online database of services seems simple, costs nothing, and would increase awareness.

Detailed description of procedures for implementation - In 2020 and 2021, the database and the C&D education will begin. Both will become available before the end of 2021. The form of education will either be in online information or courses, community meetings, webinars, or other outreach options facilitated and promoted by the Recycling Coordinator, the Solid Waste Advisory Board and affiliated partners. The deconstruction permit will be created and enacted in 2021, potentially using the Syracuse permit as a model.

Identification of expected qualitative and quantitative impacts - See above.

Assessment of the impact of the proposed recyclables recovery effort - By increasing awareness of the alternatives to land-filling construction and demolition debris, the debris will not become waste and will enter into the reuse market. The effects of these alternatives on the construction and demolition stream will not be known until the end of this planning period, as there was no accurate means of data collection prior to this CRA.

Identification of the administrative, financial, and contractual requirements for this programs implementation - The Sanitation Bureau and the Recycling Coordinator will oversee the education and the database. The deconstruction permit will be issued through the City Clerk's office in collaboration with the recycling coordinator.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative - Regulation changes will be made to current demolition permits in 2021, so they will be more expensive than the new deconstruction permits.

The inclusion of actions to be taken to maximize of economic markets of recyclables recovered - The reuse alternatives in 5.1 will assist in the maximization of the economic markets related to the alternatives suggested.

Identification of the public education and relation programs undertaken for implementation - The online database and the C&D education will both act as education and public relation programs. The Recycling Coordinator will oversee the implementation of these programs as part of accomplishing this objective before the end of 2022.

5.6 Incentive-based Pricing

Recommendations for Implementation by City:

- consolidate all solid waste collection procedures under City Code Ch. 247
- update annual tip sheet outlining acceptable bulk collection items and disposal costs
- create base hauling fee for bulk collection based upon yardage and items
- create sanitation fund to separate waste costs and revenues from general fund
- investigate hybrid PAYT system: 2021 report
- 2021 and 2022 implementation
- eliminate "sunset clause" of solid waste user fee
- reduction of solid waste user fee upon implementation of PAYT

5.6.1 City Code 188 and 247 – Bulk Pricing Adjustments

Chapter 247 of the City Code addresses solid waste and municipal collection. In Part 188: Littering, the code covers collection of bulk materials. This section does not clearly outline the system for bulk material collection. As such, it should not only be moved to 247, but also be rewritten to provide a clear outline of how the City collects bulk material, an explanation of the services it offers, and related costs.

NYSDEC recommends exploring the concept of incentive based pricing for solid waste management. This is based upon the S.M.A.R.T. method of waste reduction (Save Money and Reduce Trash) outlined in NYSDEC's 2009 "Beyond Waste" State Solid WasteManagement Plan. Based on the shared goals of the plans, it is recommended the City adjust its bulk collection as follows to incentivize waste reduction and reduce solid waste costs:

The City will issue an annual tip fee sheet, outlining the cost of disposal for all waste items, with pricing adjusted based on market conditions. Each item will have a tip fee attached to it. The goal of itemizing this list annually is to increase awareness of the actual costs of disposal related to each item. The intention of tip fees is that all of the above material will be accepted at the listed price, whether handled at a city-run site, or hauled to an alternate site. This is the least expensive option of disposal for tax payers.

Establishment of a clear hauling and tip fee procedure for waste collection fulfills objective 4, related to enforcement of illegal dumping and trash violations outlined in City Code Chapter 188. If a bulk collection is not scheduled with the City, it will be considered a first offense violation. A violation fee will be attached to the tip fee and the hauling fee.

All of these procedures will provide property owners with a clear and consistent system to allow for the collection of bulk material by the City. The City will continue to offer free collection days of certain materials such as household hazardous waste, electronic waste, scrap metal and more. The City may choose to offer a free bulk collection service, resident drop-off at the Alamo or a combination thereof, scheduled occasionally or on a particular schedule of days. These recommendations should assist in the fulfillment of the objective of this document to create clear solid waste processes.

5.6.2 Sanitation Management Fee and Sanitation Fund

In 2000 and 2012, two separate reports were issued concerning the City of Troy's solid waste situation – one regarding municipal composting, the other outlining the benefits of PAYT. Both reports recommended the removal of solid waste costs from the general taxes to delineate the exact costs of solid waste disposal to the taxpayer. The City of Troy complied with these recommendations in late 2017. A Sanitation management fee was established in 2018. The law had a sunset clause of one year.

It is recommended the solid waste management fee remain in place as a permanent funding source for sanitation and a stepping stone to PAYT, in accordance with NYSDEC and other previous recommendations. This sanitation management fee will continue to increase public awareness of the cost of municipal solid waste collection and serve as a foundation for the establishment of a PAYT system. The City desires to reduce the fee on an annual basis (until it reaches a desired level) once the PAYT program is successfully in place.

In addition to keeping the sanitation management fee in place, the City created a separate fund for sanitation. This sanitation fund accounts for all related solid waste expenses and revenues. Establishment of this fund allows the sanitation operations to become more financially stable and ensure the bureau operates outside of the General Fund. The department urgently requires large equipment upgrades. The establishment of a separate fund will ensure these large capital investments will occur as necessary, rather than relying on consistently deteriorating collection vehicles, over a decade old, for critical collection services. Additionally, potential future tip fee revenues and recycling savings can be made more transparent in the Sanitation fund.

The Sanitation Bureau and property owners' best interests are considered in these recommendations. These recommendations ensure the City continues to reduce MSW and increase recycling rates, while properly managing its waste collection department. The creation of a separate sanitation budget fund, continuation of the SWM fee, and streamlined billing procedures will assist in the fulfillment of the objective of this document; creating clear processes for the City and property owners, and to increase appropriate participation in the collection process.

5.6.3 Pay as you Throw (PAYT)

The PAYT model of solid waste collection has been recommended to the City in conjunction with the sanitation management fee. The State and Country showcase the success of PAYT systems. The systems reflect an equal and fair method of waste disposal that bases costs on actual volumes or weight.There are two primary methods of PAYT systems. One refers to a bag system, through which a municipality only collects solid waste put out in a specific type of bag (designated by the municipality). These waste bags are sold in various locations within the municipality. The sale of bags covers the cost of waste collection for the entire municipality. The City of Utica, NY currently utilizes a hybrid PAYT bag system, where they are billed an annual solid waste management fee and pay per bag.

The other primary PAYT system refers to a volume-based method which utilizes carts. In this system, every property owner is given the opportunity to utilize a select size of cart for their specific needs. The carts vary by size – as small as 13 gallons and as large as 96 gallons. The size of the cart, which is serviced weekly, indicates the waste costs. The property owner can change their cart size based on trash volumes. Buffalo, NY, and San Francisco, CA currently utilize a hybrid of this cart-based PAYT method, where they are billed an annual solid waste management fee and pay a different annual fee per cart used (depending on the size of the cart.)

From a collection and management standpoint, the differences between these two types are drastic and involve very different forms of investment. There are many examples of municipalities which have found success with PAYT systems that should be compared during this process. The separation of the SWM fee positioned the City for the future implementation of a hybrid PAYT program.

The development and implementation of a PAYT system for its residents will create fair and equal costs for property owners related to solid waste services. This process will involve a full cost-benefit analysis of all types of PAYT systems, including: how each would operate within the City, and potential costs of implementation. The breakdown and analysis, together with delivery of a subsequent report and decision, will occur in 2019 and possibly and 2020, with implementation of the selected PAYT system during 2021.

Regardless of which system is ultimately chosen, a hybrid PAYT system creates incentive-based pricing while passing along potential savings through reduction in the volume of solid waste disposal. This methodology separates out costs into an annual sanitation management

fee and PAYT costs. The sanitation management fee covers capital expenses, the cost of hauling material, debt services, and other fixed expenses.

The PAYT fees are intended to cover variable costs, the tip fees, and fluctuating costs in the recycling marketplace. In this way, the PAYT fees can fluctuate annually based upon usage, changes in waste costs, and savings based upon recycling. The hybrid PAYT system will ensure that sanitation is properly funded while allowing for the fair and equitable cost allocation and potential savings to be shared by property owners.

The following points address the various factors concerning this objective: Bulk collection tip fee schedule, sanitation fund, and Pay as You Throw research/report with implementation.

Administrative/Technical:
Quantitative and qualitative impacts: These alternatives will have a quantitative impact of reducing the City's solid waste stream. Incentivizing waste reduction through financial means reduces waste. The exact numbers are not known, but will be discussed in the Pay as You Throw report. The quality of the City's solid waste to improve as the City will be properly funding its sanitation department and "extra" services will be priced accordingly.

Facility or program needs based upon the projected quantities and composition of waste - There are no facilities needed to implement these alternatives. The program needs are related to public education and internal management of the new system. The Solid Waste Advisory Board will convene regularly in order to finish the report on Pay as You Throw in a timely manner by or before 2021.

Summary of the cost data used for evaluation including life cycle analysis - There will be costs incurred in changing labor and handling practices. The unknown costs associated with this analysis are dependent on the type of PAYT system selected and materials and equipment needed.

Impact or effect on natural resource conservation, energy production and employment creating opportunities - There are no effects on natural resource conservation, energy production, or employment opportunities related to these alternatives.

Jurisdictional Impacts: neighboring planning units and municipalities effect on, or how it affects them.

An assessment of interest in participation by other planning units - Neighboring planning units were not consulted regarding these alternatives.

Alternatives that would be available if planning units participated - These alternatives do not lend themselves to partnering with planning units, until an expansion of recycling collection systems is made.

Comments and recommendations received from any neighbors - None

Assessment of the environmental justice impacts within the planning unit -The PAYT program will address its own environmental justice impacts.

Selected Alternatives:
Alternative chosen and reason why - They were chosen because they assist in the financial stabilization of the solid waste system in Troy, while allowing transparency for residents and reducing the amount of waste being thrown out as well as the costs of solid waste services.

- issue an annual tip fee schedule that outlines the costs associated with non-regular waste collection and disposal (bulk collection),
- the creation of a sanitation fund,
- to research, report on PAYT
- implement a hybrid pay as you throw system within the City.

Detailed description of procedures for implementation - The tip fee schedule and sanitation fund will both be implemented in 2019. The policies related to sanitation funding within the City and the method of billing for bulk collection, and how much it costs will all be adjusted. The pay as you throw alternative will be researched and reported on in 2020. Before the end of 2021, a decision will be made on which pay as you throw method is best for Troy. This method will then begin implementation in 2021.

The SWAB will perform the research and give their findings to the City for the report.Identification of expected qualitative and quantitative impacts - See above.

Assessment of the impact of the proposed recyclables recovery effort -The bulk collection program is anticipated to increase the awareness of waste sufficiently to encourage the use of recycling centers and reuse programs. The PAYT program, when implemented, will also reduce the overall amount of material destined for the landfill. The report will predict the expected reduction based upon participation.

Identification of the administrative, financial, and contractual requirements for this program implementation - The sanitation fund will be the responsibility of the Comptroller's office, as it is purely financial management. The tip fee schedule will be issued and managed by the Sanitation Bureau. The department will collect more data related to bulk collection. There are no contractual requirements with either of these alternatives. The pay as you throw program will require a large administrative and financial change when it is implemented. The extent of this will be researched and reported on by the SWAB in late 2020 or early 2021.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative: In order to implement the tip fee schedule, the sanitation fund and the pay as you throw program, and the Troy City Code require updates. The pay as you throw report will make recommendations as to the way the new law will be worded in 2020. For the sanitation fund and the tip fee schedule, the laws will have to be changed to allow for the methods to be used. This will have to be done in 2019 for implementation in 2020 and 2021.

The inclusion of actions to be taken to maximize economic markets of recyclables recovered - The tip fee schedule will include certain recyclable materials at a cost or for free, depending on the state of recycling markets, this will adjust annually. The pay as you throw program will also account for the cost of recycling and compost collection in the report.

Identification of the public education and relation programs undertaken for implementation - In order to properly implement the bulk collection changes, a public education program will be featured in 2020 & 2021. The Recycling Coordinator will meet with the active neighborhood groups before that time.

5.7 Waste Disposal Options

Waste disposal options, such as landfilling within the city limits and combustion, are not selected alternatives to the current system. The recommendation is to maintain current plans related to waste disposal options through the planning period (2019-2028).

The following points address the various factors concerning this objective:

Administrative/Technical:
Quantitative and qualitative impacts - These alternatives would not have a quantitative impact on reducing the city's solid waste stream

Facility or program needs - None, this option is not being utilized

Summary of the cost data used for evaluation including life cycle analysis - There is no cost data related to not using these alternatives at this time.

Impact or effect on natural resource conservation, energy production and employment creating opportunities - The likely effects to non-utilization of these options would be improved solid waste handling and a greater diversion percentage.

Jurisdictional Impact: Neighboring planning units and municipalities effect on or how it affects them.

An assessment of interest in participation by other planning units - Neighboring planning units were not consulted relating to these alternatives.

Alternatives that would be available if planning units participated - These alternatives do not lend themselves to partnering with planning units at this time.

Comments and recommendations received from any neighbors - None.

Assessment of the environmental justice impacts within the planning unit - None.

5.7.1 Municipal Solid Waste (MSW)

Significant investment and upgrades are necessary to ensure the City can continue to provide reliable solid waste services to the public. The following recommendations are made for MSW services:

- The City should continue to replace old equipment with new equipment at the optimum frequency relative to maintenance, operating, and capital costs. Data to support the replacement frequency should be documented. Examples from other municipalities should be available as a reference.
- The City should make clear information available to residents, property and business owners regarding all existing, proposed, and enacted waste and recycling processes. Information should be provided regularly and frequently and in various formats, including traditional media and City-managed communication platforms. Given the large rental population, public outreach must go beyond property owners alone to reach the transient population in order to be effective.
- The City should create maximum weight and volume limitation rules for MSW collection from properties using municipal collection. These rules will help establish a maximum amount of waste a property owner can put out for collection by municipal services.

5.7.2 Bulk

Recommended changes to bulk collection have been addressed previously in this document. The City should continue to make the necessary equipment upgrades in accordance with the current capital plan in order to handle the changes in bulk collection which will be critical in the future.

5.8 Enforcement Programs

Recommendations for Implementation by City:

- **F**ill litter patrol officer (LPO) positions
- Advocate public's role in reporting violations
- Explore technology to ease reporting and create transparency and accountability
- Require property addresses be visible at solid waste collection areas
- Explore housing court creation to expedite solid waste violation processes

In conjunction with the articulation of clear cost and collection processes, the City of Troy must implement new rules governing the enforcement of MSW violations. The litter patrol officer position has been vacant for over a decade. In order to ensure the efficacy of the new procedures, two positions were recreated for this role and filled before third quarter of 2019. The litter patrol officer must have the same regulatory authority as a code officer, but will work within the Sanitation Bureau. Staff tasked with enforcing trash violations must work with Sanitation employees in order to maintain constant communication. Drivers and laborers generally witness most violations first, and are able to discern patterns of violations in areas across Troy, e.g. alleys routinely utilized for illegal dumping or improper waste disposal practices.

The public will also serve an important role by participating in the process of reporting violations in their neighborhoods. For this to work successfully, the public must understand the reporting process. They must contact DPW to have certain materials collected to avoid a violation. The timeline for update on control of violations will occur during the 2020 update.

A variety of additional tools are available to municipalities which empower the public to take a greater role in reporting issues in their community. These technologies help cities identify and resolve a variety of reported issues more quickly while providing internal ownership of each problem. Platforms such as See ClickFix, CitySourced, City View, Citizen Connect, and Dude Solutions allow the

public to engage with the City on neighborhood issues, while expanding accountability for City staff to resolve reported violations, and generate valuable data for use by the municipality to analyze for future improvements to services.

Recommendations to encourage positive changes in the City's solid waste enforcement policies:

- The City should require visible home addresses wherever solid waste is collected. This ensures solid waste can be correctly identified with the property when a violation is issued.
- The City should invest in a streamlined and transparent form of reporting and enforcement. There are existing technologies, mobile apps, and programs which allow residents to report solid waste violations and other problems to the City publicly.
- Although not specific to solid waste, it is recommended that the City explore the possibility of establishing a dedicated housing court to expedite adjudication and payment of solid waste-related violations.
- Fill and maintain the litter patrol officer positions and utilize technology to ease reporting and increase the public's role in reporting violations.

The following points address the various factors concerning this objective:

Administrative/Technical:
Quantitative and qualitative impacts - The litter patrol officer (LPO) will be the first major enforcement measure the City has taken toward its waste stream in the last 20 years. There is no data available related to current enforcement. This alternative will create data through the use of reporting technology to allow for insights to quantitative and qualitative impacts on the waste stream. Expectation is that recycling numbers will increase and violations/fines will increase until rates of compliance improve.

Facility or program needs based upon the projected quantities and composition of waste -The alternative needs no new facility. The new technology will require staff training and the LPO will go through regular code training. Neither of these requires facilities or new programs.

Summary of the cost data used for evaluation including life cycle analysis -The funding for the LPO employees was taken from a foreman who retired in 2018 and was not going to be replaced. The increased annual cost of the technology services is expected to be covered by the increase in issued violations and fines. Both are expected to be paid out throughout the planning period without changes in expenses.

Impact or effect on natural resource conservation, energy production and employment creating opportunities - The LPO's are new jobs. Other than these jobs, no other

natural resource conservation, energy production, or employment opportunities will be created with these alternatives.

Jurisdictional Impacts: *neighboring planning units and municipalities effect on or how it affects them:* Other planning units were not consulted regarding these two alternatives, there are no local planning units that are expected to either benefit from or provide alternatives to these two recommendations.

Selected Alternatives:
Alternative chosen and reason why - Litter Patrol Officers and public reporting technology were chosen as the alternative because there are currently no formal solid waste enforcement programs; creating formal positions to handle all enforcement is key. Additionally, tapping into reporting technologies to manage all issues increases both the public's and City's accountability and responsiveness.

Detailed description of procedures for implementation - The City anticipates the litter patrol officer positions were filled by the end of September 2019, with the technology also chosen, and in startup phase before the end of 2020.

Identification of expected qualitative and quantitative impacts - See above.

Assessment of the impact of the proposed recyclables recovery effort - Enforcement is expected to reduce waste and increase recycling as materials that are commonly disposed improperly can be disposed of through recycling streams.

Identification of the administrative, financial, and contractual requirements for this program's implementation - The litter patrol officer will report to the Sanitation Bureau. This will cost the City, in total, salary and benefits of $60,000 to $70,000 per year per position. However, a foreperson position retired in 2018 (paid similarly) will not being filled going forward. The position is also expected to increase revenue from fines and violations. The technology is budgeted for at $19,000 annually and is expected to also increase revenue from fines and violations to cover this added expenditure. The annual expenditure for the technology is expected to be shared between the Public Utility Department, the Central Garage, the Street Bureau and the Sanitation Bureau; each responsible for the modules associated with their department.

Identification of any new or modified laws, ordinances or regulations that may be required to fully implement the alternative. - None needed.

5.9 Education and Outreach

Recommendations for Implementation by City:

- Maintain Recycling Coordinator position throughout planning period
- Increase number of HHW events offered annually
- Expand education and outreach opportunities outside of annual events
- Aublish map of solid waste collection zones on website
- Add re-use and recycling collection/drop-off events

In 2018, the City hired a Recycling Coordinator to assist with public education and outreach associated with MSW and SSR services. Maintaining this position will be critical moving forward to increase participation in alternative waste streams like SSO, create a recycling center drop-off facility, and expands recycling events, programs, and other educational opportunities. The City plans to offer the following expanded opportunities for public outreach and education.

First, the City should expand the number of annual events it offers. As of 2019, the City offered two large Household Hazardous Waste event annually. Historically, this was one event, offered in the Fall, which allowed 300 people to come and pre-register, beginning two months ahead of the event. The event was advertised online and with a press release to all media outlets. The second HHW day was added because the one event's pre-registration filled quickly.

Expanding recycling events which offer free, or less expensive options for disposal of material allows for easier handling by the City, as well as reduced costs and more consistent availability for residents. Some of the programs currently offered, like Household Hazardous Waste Day, can be offered twice per year with the assistance of available NYSDEC funding grants. This will enable costs to be split over several events, allowing for increased usage without increasing costs for the City.

Offering a regular electronic collection day, as well as the intended addition of a re-use and recycling day, provides residents free options to dispose of e-waste and other materials without incurring the tip fees associated with City pickup. The number of household hazardous waste events has increased to two annually as of 2019. A future determination will be made if there is a necessity to expand to additional dates. Additionally, there may be community recycling events added to the services offered by the City.

The City should expand their public outreach and education opportunities. Outreach should be conducted regularly and annually, and should be separate from recycling events. The development and implementation of frequent public education opportunities by the Recycling Coordinator is a positive step. Additionally, participating in scheduled neighborhood meetings gives residents direct access to ask questions and voice concerns.

This education already regularly occurs within schools, who provide consistent high value education concerning this topic. Additionally, school-aged children are often leaders in reduce, reuse and recycle efforts, both within their households and in their community. To that end, the City will partner with educational entities to research and recommend:

- educational resources for students and teachers.
- participation in opportunities to attend science fairs and environmental days.
- create displays and outreach for public events and festivals
- speak at Earth Day events
- sponsor/host contests with recognition for student led solutions.

There are opportunities to educate people about individual purchasing habits, and the impact of planned obsolescence, packaging and disposable single use items on the environment. Examples of strategies available to residents and businesses to reduce waste include:

- Packaging - Seek to purchase products that have less packaging. This could be accomplished through bulk purchasing and careful product selection.
- Avoiding Disposable Items - Wherever possible, avoid the purchase and use of disposable items in favor of reusable items. Simple strategies can include the avoidance of single-use plastic bottles, and disposable plates, cups, and eating utensils, in favor of reusable products.
- Electronic vs. Paper - Promote on-line newspapers over paper, the use e-billing, and double-sided printing.
- Catalogues and Other Junk Mail - Contact companies to cease unsolicited mailings to your address.

The City published a map of collection zones on the City website in early 2020. Making this information available online provides the public direct access to this information without the need to call the DPW dispatch. The addition of online resources will also fulfill the objective related to establishing clear solid waste collection processes.

The following points address the various factors concerning this objective:

Maintain Recycling Coordinator position throughout the planning period and increase the number of events offered annually.

Administrative/Technical:
Quantitative and qualitative impacts: The Recycling Coordinator position integrally connects the City government to the community in implementing this plan. Without this position, the implementation of the plan falls on the Waste Advisory Board and onto anyone who would take on the work within the City. The quantitative impacts will be seen in the data collected and the annual solid waste reports the coordinator will produce. Qualitatively, having access to a specific person for all solid waste and recycling questions decreases this burden on other employees in the City. The number of recycling events offered annually will increase the amount of non-regular recyclable materials that are properly disposed of annually. Over time, the data from this will provide a clear picture of optimal event timing and numbers.

Facility or program needs based upon the projected quantities and composition of waste: The recycling events traditionally have been held at the Alamo and the City will continue to do so as it becomes a drop-site for residents' recyclable commodities. The Recycling Coordinator does not have any additional facility needs for this at the time of this report.

Summary of the cost data used for evaluation including life cycle analysis: The cost of an HHW event is currently budgeted. The estimated cost per person for this event is approximately $110 based on attendance, attrition, and the cost for both HHW and electronics management. The Recycling Coordinator positions does not have any life cycle analysis to date.

Impact or effect on natural resource conservation, energy production, and employment creating opportunities: The Recycling Coordinator position creates opportunity for employment. The HHW events hold community volunteer opportunity and an overtime opportunity for current employees. There are no natural resource conservation or energy production impacts of these alternatives.

Jurisdictional Impacts – *neighboring planning units and municipalities effect on or how it affects them:*

An assessment of interest in participation by other planning units: No assessment available.

Alternatives that would be available if planning units participated: If other planning units participate in the recycling events, the events will be larger and more expensive, but also would accommodate a greater number of people as well as provide a larger grant offset by NYSDEC.

Comments and recommendations received from any neighbors: None.Assessment of the environmental justice impacts within the planning unit: There are several potential environmental justice impacts of the education and outreach objectives. Of greatest significance, education and outreach will empower and engage residents and businesses in areas of the City which have previously not had the framework in place to be part of these environmentally sustainable processes and practices.

Selected Alternatives:

Alternative chosen and reason why: Maintaining the Recycling Coordinator position and increasing the number of recycling events are the selected alternatives. Maintaining a position related to the implementation of this plan is critical to the implementation of this plan. Increasing the number of recycling events offered annually should be simple and straightforward, while not costly at first.

Detailed description of procedures for implementation: The Recycling Coordinator position is currently filled and needs no implementation. The Household Hazardous Waste Day needs to be doubled, and a citywide recycling/reuse event may be added. Initially, this will be done by halving the number of attendees and going to two events per year. After costs are determined, the number of events or attendees can be increased from two.

Identification of expected qualitative and quantitative impacts: See above.

Assessment of the impact of the proposed recyclables recovery effort: The recycling events are expected to bring in a greater variety of materials, especially after the recycling center is open to the public. This decreases the demand for the basic services the event offers and will open them up to more people.

Identification of the administrative, financial and contractual requirements for this program's implementation: The Commissioner of General Services oversees the

Recycling Coordinator, while the events are overseen by the latter. The financial requirements for these are the salary of the coordinator, which is partially paid for by the DEC, and the cost of the events. The cost of the events per attendee and by type of material are unknown at this time.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative: None.

The inclusion of actions to be taken to maximize of economic markets of recyclables recovered: The Recycling Coordinator will maximize economic advantages of each recycling event each year.

Identification of the public education and relations programs undertaken for implementation: The Recycling Coordinator position is solely responsible for all public education related to recycling, and will continue to expand the public relations surrounding recycling and waste reduction in the city. The recycling events offer an opportunity to connect with the attendees about recycling in the City.

5.10 Data Collection and Evaluation Programs

Recommendations for implementation by City:

- Create annual solid waste report
- Solid waste advisory board becomes permanent
- Develop local and regional partnerships for data collection and evaluation

The City hired a Recycling Coordinator in 2018 to, among other things, assist in data collection, evaluation, management, and monitoring of all solid waste processes. This position will continue to fill in data gaps outlined in Section 2. The compilation of accurate waste information is critical to the future of solid waste planning in the City, and for properly completing a Comprehensive Recycling Analysis as required by New York State. It is also recommended an annual solid waste report be generated, with the assistance of the Solid Waste Advisory Board, encompassing an overview of the prior year of the City's solid waste services. This enhances the transparency sought throughout the process. It also provides the opportunity for the Administration, the Recycling Coordinator, and the Solid Waste Advisory Board to discuss and share information regarding the year's accomplishments and challenges, improvements and setbacks.

The Solid Waste Advisory Board was established as a permanent board under City

Code, the purpose of which was to advise the City on solid waste issues and to provide a resource throughout the analysis of new data. The Solid Waste Advisory Board's structure, roles and responsibilities should be outlined within the City Code. This provides valuable insight and feedback which will improve the reporting and evaluation process of many future solid waste plans, and allow for the implementation of recommendations within this document.

Troy needs to research the development of improved regional and local partnerships for wider data analysis. In collaboration with local educational institutions, the City could provide relevant solid waste data for analysis through relevant educational programs. The City is only a part of the larger Capital Region waste stream. Monitoring annual trends over a larger scale will be not only important, but ultimately provide a framework for future collaborations and be more cost effective and critical to the City's ability to do the best job possible for the taxpayers.

The following points address the various factors concerning this objective:

Create a schedule for annual solid waste reports published by the City, as per amendment to ordinance, maintain a permanent solid waste advisory board. Additionally, it is recommended to develop regional partnerships for data collection and evaluation.

Administrative/Technical:
Quantitative and qualitative impacts: The quantitative impacts of these alternatives are not known. The indirect impact of the SWAB will be evaluated in the next plan, though it is known their input directly impacted the development of this report. The qualitative impacts of these will be through public interactions and access to solid waste information. In the past, the City has not provided much information to the public in relation to solid waste. This change will positively alter the public's perception of waste.

Facility or program needs based upon the projected quantities and composition of waste: No facility or program is needed for the alternatives. The Recycling Coordinator will handle the reports in collaboration with the committee, on which the Recycling Coordinator will sit.

Summary of the cost data used for evaluation including life cycle analysis: There are no costs to these alternatives.

Impact or effect on natural resource conservation, energy production and employment creating opportunities: There are no impacts on the natural resource conservation, energy production, or employment creating opportunities from these alternatives.

Jurisdictional Impacts – *neighboring planning units and municipalities effect on or how it affects them:*

An assessment of interest in participation by other planning units: No assessment was conducted.

Alternatives that would be available if planning units participated: If the planning units neighboring Troy participate, these alternatives will need to be revisited as they will require greater authority.

Comments and recommendations received from any neighbors: None.

Assessment of the environmental justice impacts within the planning unit: Determination of locations for the various initiatives throughout the City over the ten-year cycle of this plan will be done in a just and equitable manner, giving equal consideration to all districts within the City. As the plan is implemented and these initiatives are rolled out, there will be continued attention given to this work being done in an appropriate and diligent manner.

Selected Alternatives:
Alternative chosen and reason why: Assessment of the impact of the proposed recyclables recovery effort – There are no direct impacts from these alternatives; the indirect impacts are discussed in other alternatives. The regional data collaboration should evolve into a planning unit in which Troy can participate.

Identification of the administrative, financial, and contractual requirements for this program implementation – The Department of Public Works will oversee the reports, the Solid Waste Advisory Board and the data partnerships.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative – The Solid Waste Advisory Board will be put into law in the new 247 code part of the 2019 budget.The inclusion of actions to be taken to maximize the economic markets of recyclables recovered – None related to these alternatives.

5.11 Hauler Licensing

The City currently mandates waste haulers apply for permits annually with the City. The City Code has two separate sections pertaining to hauler permits: 234-4 and 247-5. These two sections contradict, and neither permit has been created, implemented, or enforced. The City must rewrite these contradictory pieces and begin enforcing hauler permits in 2020. With the code changes, certain data requirements must also be met in order to increase the accountability of these haulers and provide the City with more information on internal waste generation.

Specifically, these new permits must require annual information and quarterly data updates. Additionally, to acquire a permit from the City, a hauler must provide proof of NYS Hauling Permit (in compliance with NYS code 364-4-1).

The recommended changes to required annual information are as follows:

- descriptions of vehicles that will be operating within the City limits and an annual permit fee
- Creation of tiered permitting fees (dependent on the number of vehicles in a fleet).

The proposed quarterly data reporting requirements are as follows:

- amount of material hauled over the course of the quarter, by material type
- Name, address, other materials accepted, and operator information of the destination sites for materials hauled.

In the event the quarterly data requirements are not met, a permit shall not be issued for the following year, until and unless the Commissioner determines them to be in complete compliance and advises re-issuance of permit. Most municipalities require a hauler permit in some capacity to operate within the respective municipality. Data reporting is also required from private waste collection entities in order for municipalities to comply with data requirements to the State.

Hauler licensing is a consolidation of the code as it is currently written to allow for easier enforcement. Appendix includes proposed permit, approved by City Council in October 2019.

The following points address the various factors concerning this objective:

Selected Alternatives:

Alternative chosen and reason why- Hauler licensing has not historically been enforced, in order to facilitate enforcement procedures, the code was re-written in 2019.

Detailed description of procedures for implementation – Re-written code was presented and adopted by the City Council in the fall of 2019. All haulers known in the city will be notified in early 2020 and enforcement will begin in 2020 as well.

Identification of expected qualitative and quantitative impacts – The expected outcomes are increased data collection submission from the haulers. This will give the City a better grasp of the overall waste picture and allow for better quantitative and qualitative analysis.

Assessment of the impact of the proposed recyclables recovery effort – None apart from increasing awareness of potentially unknown recycling haulers.

Identification of the administrative, financial, and contractual requirements for this program's implementation- The administrative aspects of this adjustment are minimal, consisting of managing the filings on an annual basis and contacting haulers. Financially, the implementation is expected to bring in revenue from the hauler permits on an annual basis.

Identification of any new or modified laws ordinances or regulations that may be required to fully implement the alternative – The modified law is attached below.

Actions will be taken to maximize the economic opportunities of recyclables recovered.

5.12 Private Sector Management and Coordination Opportunities

Private sector management and coordination opportunities are not selected specific alternatives at this time. However, they are acknowledged as part of other alternatives. The City should periodically explore a public-private partnership when it comes to solid waste management. All factors should be considered when analyzing direct service costs associated with privatization of existing City services. SSO pickup, SSR, bulk, and MSW should all be considered separately. It is recommended to do this twice over a planning period, or as new services are slated to come online.

5.13 Management of Waste Through Thermal Treatment Technologies

Management of waste through thermal treatment technologies is not a selected alternative at this time. The City should not invest in thermal treatment technologies for itself during this planning period. However, if they are brought from a private or public entity to the City, the proposal may be considered. Thermal treatment technologies can have benefits to a municipality, as long as the environmental impacts are insignificant. Partnership with other municipalities exploring this option of waste management may also be considered as they arise.

5.14 Flow Control

Flow control is not a selected alternative at this time. The City should maintain all State mandated recycling laws as they are written. Although flow control can be useful, the City does not have the infrastructure to handle more than it already mandates when it comes to recyclables.

5.15 Green Procurement and Potential Future Programming

Green Procurement is not a selected alternative, but, it is recommended to ensure the current procurement policies are in line with the State's recommended guidelines. The City must become current with New York's Green Procurement guidelines. In 2008, Executive Order 4 created a NYS Green Procurement and Agency Sustainability Program. It will be beneficial for the City to incorporate these recommendations into its contracts and procurement guidelines in the long-term. Additionally, staying up to date on new specifications as they are issued by New York State will incorporate an environmentally friendly approach to the City's purchasing policies. By incorporating green procurement specifications, the City would purchase known reusable, recyclable, or compostable materials, rather than buying material that needs to be landfilled or disposed as hazardous waste. Green procurement procedures are easily measurable once established and have measurable impacts on the waste stream. If viable, the suggested timeline for implementing this policy is 2022, before Solid Waste Advisory Board's annual update that year. This alternative is not expected to have a direct impact on the waste stream.

5.16 Stewardship

According to the Product Stewardship Institute: “Product stewardship is the act of minimizing the health, safety, environmental, and social impacts of a product and its packaging throughout all life cycle stages, while also maximizing economic benefits. The manufacturer, or producer, of the product has the greatest ability to minimize adverse impacts, but other stakeholders, such as suppliers, retailers, and consumers, also play a role. Stewardship can be either voluntary or required by law.” New York State has adopted product stewardship programs for the following waste streams:

- Electronic Waste (eWaste)
- Rechargeable Batteries
- Mercury Thermostats
- Paint

Elements of product stewardship have been adopted for other waste streams as well. While it is not practical for the City to implement product stewardship at the scale of its operations, cooperation with State and National programs can contribute to the success of the City’s mission to reduce the volume and impact of its wastes upon the environment. It is also understood that the City wishes to implement the practice of using recycled products, and products with high recyclable content in its day-to- day operations.

5.17 Response Readiness - Disaster Debris Management

In the coming decade, the City will strive to create a community action plan for managing disaster debris using the NYSDEC Disaster Debris Management toolkit as a guideline. Planning activities may include:

- Stand-by emergency debris removal contracts for disposal services, pre-approved temporary staging areas
- Educational materials for safe residential removal of building materials and yard debris.
- Development of a community action plan for managing large amounts of waste after an emergency situation.
- Create a focus on recycling disaster debris.Incorporate recycling and waste management into new versions of City emergency plans.
- Work with researchers to explore data gaps and under-researched topics related to disaster debris management.

5.18 Professional and Legislative Support

The City will continue to participate in statewide initiatives and support legislative solutions, including:

- Supporting state level product stewardship efforts
- Supporting expansion of the NYS Returnable Container Act and actions on plastic reduction
- Continued involvement with NYSARContinued involvement with SWANA
- Working with colleagues at various municipalities and agencies on collaborative projects

Additional Departmental Considerations:

- Recycling specialist (support of coordinator's efforts)
- Sustainability coordinator (greenspace, energy-related initiatives)

SECTION 6: IMPLEMENTATION SCHEDULE

The City should implement the recommendations in section 5 within this document's planning period of 2019 through 2028. Each subsection refers to a timeline within the discussion; if relevant, each subsection has a timeline on the Section 6 chart. It should be noted some of the recommendations have ambitious timelines. It is important that the City follow through despite this in order to achieve the objectives outlined in the Executive Summary before the end of the planning period.

It was previously noted the publication of this document is the first step toward achieving compliance with New York State law regarding municipal solid waste management planning. This is the City of Troy's first CRA, produced in accordance with NYS guidelines. The City should adhere to all existing NYS laws pertaining to solid waste management.

The City believes through education and outreach, as outlined in objective 5, there will be opportunities for commoditization of more marketable materials with lower contamination rates as well as creation of potential pathways for cottage industries and public-private partnerships. Taking these actions will result in a more environmentally engaged community with a more robust economy and a culture of planet-centric stewardship.

The preliminary timeline found in the appendix does not yet delineate responsible parties' portions of the task-specific implementation. The Administration, Recycling Coordinator, Sanitation Bureau Supervisor and Solid Waste Advisory Board will spend a portion of the

document's first year making these determinations and assigning schedules to such, creating a detailed and robust timeline.

This deliberate and strategic approach will allow for the City's first annual report in late 2020 to be generated in a collaborative and comprehensive manner by the Solid Waste Advisory Board and the City's Recycling Coordinator. By allowing time for this process to develop more organically, the team believes that the timeline will be most likely to be adhered to and the tasks most effectively assigned.

The attached timeline will also be utilized as a "live document," and will be updated regularly by the Recycling Coordinator and the Solid Waste Advisory Board.

APPENDIX

Appendix #1-PROJECTION JUSTIFICATION:In real estate, there are both residential and commercial designations for property identification. These are used to determine many factors, from taxes to boundaries, from property valuation to population data.

The following codes are being considered residential for the purposes of calculations utilized in the projection charts: 210, 215, 220, 230, 270, 271, 280, 281, 283, 410, 411, 416, and 481 for a total of 10,570 residential properties. There are a total of 25,263 residential units included in this count. All other property codes used in calculations are commercial, with the exception of vacant land of any sort, which has been excluded. For purposes of these calculations, 755 businesses are included in this data, based on their property codes.

Utilizing the 2010 census data, Rensselaer County had 159,431 residents. Of that population, Troy was 50,150 (31%) of the county's residents.

In the calculations for the weight of waste disposed, totals include weight of waste hauled by the City of Troy as well as private haulers. The private hauler weights were obtained from County Waste, these totals are excluding construction materials or other materials not considered as solid waste.

County Waste tonnage (excluding city's own hauling): 110,60631% of this total (assigned to Troy, NY based on population): 34,288 tons

Additional adjustments (reductions) were made to the data in this manner:
Sage: 259 tons (actual)
RPI: 5175 tons (estimate: 7,442 students in 2018 for 9 months of the year, multiplied by 5.15 pounds daily, plus 25 tons for approximately 1,500+ employees annually)
Other large-scale generators/institutions: 2400 tons (7% of city's total weight)
This reduces city's tonnage with County Waste by a total of 7,834 tons
Remained of County Waste tonnage assigned to City of Troy: 26,454 tons

City's own haul-weight (actual; provided by County Waste): 14,514.5 tons

Combined total of tonnage: 40,968.5 tonsThis equates to: 1634 per resident annually, 4.48 pounds daily

APPENDIX

Appendix # 2 (citations)-
Population density characterization (calculated with DEC reviewer):
Based on 2010 census data it can be estimated that 70% of the city is suburban, with a population density of 4,600 residents per square mile. 30% of the city is urban, with a population density of 5,200 residents per square mile. This equates to an average of 4,800 residents per square mile.

Page 9: Beyond Waste: A Sustainable Materials Management Strategy for New York State New York Department of Environmental Conservation, December, 2010, https://www.dec.ny.gov/docs/materials_minerals_pdf/frptbeyondwaste.pdf

Page 13: U.S. Census Bureau, Quick Facts Troy New York, 2017, Retrieved from https://www.census.gov/quickfacts/fact/table/troycitynewyork/PST045217

Map of Troy Neighborhoods and Troy City Council Districts was created using Google My Maps by reddit.com/r/troy

Page 19: 6 NYSCRR Part 360.11

Page 27: 6 NYCRR Part 361-4.2

Page 31: Beyond Waste: A Sustainable Materials Management Strategy for New York State, p.102 6.3.2(a) New York Department of Environmental Conservation, December, 2010, https://www.dec.ny.gov/docs/materials_minerals_pdf/frptbeyondwaste.pdf

Page 34: 6 NYCRR Part 366

Page 59: Beyond Waste: A Sustainable Materials Management Strategy for New York State New York Department of Environmental Conservation, December, 2010, https://www.dec.ny.gov/docs/materials_minerals_pdf/frptbeyondwaste.pdf

WM. Patrick Madden
Mayor

Monica Kurzejeski
Deputy Mayor

Charles Z. Wojton, Jr.
Commissioner of General Services

Renee K. Panetta
Recycling Coordinator

Office of General Services
City Hall
433 River Street
Troy, New York 12180

Name
Street
City, state, zip

Mm/dd/yyyy

Dear _____,

The City of Troy would appreciate your help. Each year, Troy's Solid Waste Advisory Board (SWAB) is required to submit to the New York State Department of Environmental Conservation (NYSDEC) a report detailing total solid waste and recycling tonnages for the previous year. Recycling programs, in addition to positive environmental effects, reduce the amount of waste destined for our landfills, thus saving tax dollars by decreasing the cost of waste disposal.

As recycling is mandatory for all waste generators (including commercial establishments and institutions) in New York State, and many institutions within Troy city limits cannot use City solid waste and recycling services, this creates a discrepancy in what we can report to NYSDEC for the City's actual material totals. In effect, our data is incomplete without your input. By completing the attached survey and returning it to City Hall, the information you provide can be used to inform current and future recycling programs and solid waste initiatives in Troy

Please complete the attached survey form for 2019 to the best of your knowledge and return by July 30th to the address indicated on the attachment. For questions or concerns regarding the survey, please email: adrian.cattell@troyny.gov.

Thank you for your time; your response is greatly appreciated. For additional information regarding the survey, an electronic version of the survey, or local recycling information and tips, please contact us by calling 518-279-7141 or online at www.troyny.gov/contact-us/.

Sincerely,

Charles Z. Wojton
Commissioner of General Services

Charles Z. Wojton, Jr.
Commissioner of General Services

City of Troy
Office of General Services
SOLID WASTE/RECYCLING SURVEY FOR CALENDAR YEAR 2019

Please fill out the applicable survey information below regarding solid waste and recycled materials to the best of your ability and mail, fax or email by July 31st to:

Bureau of Sanitation
City Hall
433 River Street
Suite 5001
Troy, NY 12180

phone: 518-279-7141
fax: 518-270-4546
email: adrian.cattell@troyny.gov

Facility or Company Name:_____
Street Address: _____
Mailing Address: _____
Contact Name:_____
Telephone:_____
E-mail address: _____

Number of Employees: Full Time:_____ **Part Time:**_____

Please check the appropriate box for your facility and provide the requested information:		
	Industrial / manufacturing	# of sq ft:
	Retail sales	# of sq ft:
	Office building	# of sq ft:
	School institution	# of students:
	Medical facilities	# of beds:
	Hotel / motel	# of rooms:
	Restaurant	# of sq ft:
	Other (specify):	# of sq ft:

Survey Instructions:
Please rpovide the following information for calendar year 2019 for any applicable categories. Only fill out data for the materials which apply to your facility. Your hauler may be able to assist you in obtaining this information. You may choose to report either weight or volume of materials. Please include the destination for your recyclables if kown (i.e. purchaser, processor, or hauler).

Material	Annual weight	Annual volume	End destination (purchaser, processor, or hauler)
SINGLE STREAM COLLECTION: (mixed paper, glass, metal and plastic containers)			
DUAL STREAM COLLECTION: (mixed glass, metal and plastic containers)			
GLASS:			
PLASTIC: (soda, water, milk, or laundry bottles included)			
METAL: (mixed metal)			
White goods (enameled appliances)			
ORGANICS:			
Yard waste			
Food scraps			
Bio solids			
CONSTRUCTION & DEMOLITION DEBRIS:			
MICELLANEOUS: (please specify)			
TOTAL RECYCLED TONNAGE:			
SOLID WASTE:			

A. Would you like information on improving your waste reduction and recycling program? YES NO

B. Are you willing to share information about your recycling program with other who could learn from your experience? YES NO

C. Additional input regarding waste and recycling practices:

_____
_____

Thank you for your time. Your response is greatly appreciated! For more local recycling information, please visit www.troyny.gov.

Commissioner of General Services
City Of Troy, NY
433 River Street
5th floor, Suite # 5001
Troy, NY 12180

Application is hereby made to the Commissioner of General Services for the issuance of a commercial hauler's permit, pursuant to (code and chapter) of the Troy City Code. This code requires any person, firm or corporation be permitted in order to engage in the business of collecting and transporting solid waste, bulk waste, post-consumer organic materials, post-consumer recyclable materials for disposal (including but not limited to: single-stream recyclables, construction and demolition debris, scrap commodities and textiles) within the City of Troy, NY.

A separate permit shall be required for persons, firms or individuals performing deconstruction work. The deconstruction permit shall require comprehensive reporting of quantities of materials re-purposed, recycled and disposed.

This application must be submitted annually fifteen days before the last business day of the month of January. Each application made is good for a period of one year. Permit may be obtained in the City Clerk's office. Failure to comply with this requirement will result in loss of permit and violation fees to be incurred.

All permit holders will be required to fill out quarterly collection reports and file them with the Commissioner of General Services. These reports must include types of materials collected, weight/ volume of material collected and location where the material is disposed of each quarter. If the reports are not filed within 30 days of the end of the prior quarter, the permit will be revoked. The permit can be reinstated if the agency provides the required data. A new permit will not be issued the following year until the agency becomes compliant with data reports.

The applicant shall file with his/her application a certificate or affidavit of insurance, also naming the City of Troy as an additional insured on a non-contributing basis, executed by representatives of a duly qualified insurance company, evidencing that said insurance company has issued liability and property damage insurance policies covering the following:All operations of the applicant or any other person, firm or corporation employed by him/her in solid waste collection within the corporate limits of the City.The disposal of such solid waste to and within the designated and approved treatment and/or disposal facility.

Protecting the public and any person from injuries or damages sustained by reason of carrying on work of solid waste collection and disposal.The certificate or affidavit shall specifically evidence the following amounts of insurance coverage, which shall remain in effect for the term of the permit, and

shall provide that written notice shall be given to the City Clerk thirty days prior to any change in the conditions of the certificate or affidavit or any expiration or cancellation thereof:

- Commercial general liability and contractual liability on an occurrence basis with the following limits of coverage: bodily injury, property damage and personal injury, One Million Dollars ($1,000,000) each occurrence/Two Million Dollars ($2,000,000) general aggregate.
- Professional Liability/Errors & Omissions of at least One Million Dollars ($1,000,000) each occurrence/Two Million Dollars ($2,000,000) aggregate (If applicable).
- Workers compensation insurance as required by law and including employer's liability insurance. Statutory disability benefits insurance as may be required by law.
- Comprehensive Automobile Liability coverage on owned, hired, leased, or non-owned autos with limits not less than One Million Dollars ($1,000,000) combined for each accident because of bodily injury sickness, or disease, sustained by any person, caused by accident, and arising out of the ownership, maintenance or use of any automobile for damage because of injury to or destruction of property, including the loss of use thereof, caused by accident and arising out of the ownership, maintenance or use of any automobile.
- Commercial umbrella coverage of Five Million Dollars ($5,000,000).

Each policy of insurance required shall be in form and content satisfactory to the City Corporation Counsel, and shall provide that:

- The insurance policies shall not be changed or cancelled until the expiration of thirty (30) days after written notice to the City of Troy Corporation Counsel’s Office.
- The insurance policies shall be automatically renewed upon expiration and continued in force unless the City of Troy Corporation Counsel's Office is given sixty (60) days written notice to the contrary.

No work shall be commenced under the contract until the selected proposer has delivered to the City or his/her designee proof of issuance of all policies of insurance required by the Contract to be procured by the selected proposer. If at any time, any of said policies shall be or become unsatisfactory to the City, the selected proposer shall promptly obtain a new policy and submit proof of insurance of the same to the City for approval. Upon failure of the selected proposer to furnish, deliver and maintain such insurance as above provided, this Contract may, at the election of the City, be forthwith declared suspended, discontinued or terminated. Failure of the selected proposer to procure and maintain any required insurance shall not relieve the selected proposer from any liability under the Contract, nor shall the insurance requirements be constructed to conflict with the obligations of the selected proposer concerning indemnification.

A permit may be refused or revoked if the applicant shall have been convicted of a misdemeanor or felony which in the judgment of the Commissioner renders the applicant an unfit or undesirable person or if the applicant shall fail to meet and/or demonstrate the ability to meet the requirements of this article to the satisfaction of the Commissioner, and from such a determination such permit

may be refused or revoked by the City Clerk.

Conditions of obtaining a permit are as follows:

- all commercial collectors must file a plan setting forth the procedure, means and methods by which they will handle the materials
- make, model, VIN and license plate number of any vehicle being used for collection and transport
- document listing standard operating procedures used for transport, as well as method of disposal/removal
- permit number must be listed on the establishment's website, as well as visibly posted in any physical structure
- adherence to materials pick-up and roll-off/dumpster placement and removal requirements for allowed timing in the Downtown Business District: between the hours of 6:00am through 9:00pm
- as per ordinance 247.4 (addressing penalties for offenses) failure to follow this requirement shall result in the following punitive and increasing fines (for multiple failures) and eventual loss of permit:

(1)Any person violating any provision of this article shall be guilty of an offense and, upon conviction thereof, shall be punishable by the following fines:

Offense	**Fine**
1st	$250
2nd	$350
3rd	$500
4th	$750
5th	$1000

(2) A person or entity violating any provisions may also be punished by imprisonment of no more than 15 days.
(3) Each day that a violation continues after the fifth offense shall constitute a separate offense punishable by the maximum fine set forth above and/or imprisonment of 15 days.
(4) Payment for violation shall be remitted within 30 days.(5) A monthly interest charge of 3% shall be added to any delinquent violation charge.

This permit usage plan must be approved by the Commissioner of General Services prior to issuance of said permit.

Applicant/company name:

_____

Additional stakeholders associated with same:

_____

SS# or EIN: _____

Address: _____

Phone #: _____ Email;_____

Type of service: (check all if applicable):

Residential: _____
Commercial:_____
Materials/commodities collected:
_____

In so making this application, the applicant agrees that if granted this permit, their respective company will conduct their business pursuant to the regulations set forth in (chapter/code) duly adopted by the City Of Troy, NY (date) as well as any amendments thereto. Should applicant fail to conduct their business thusly; violation fees shall be assessed, the fine amount dependent upon the significance of failure. Should further violations occur, said permit may be revoked forthwith.

The applicant also acknowledges the requirement that any hauler doing business in or through the city limits shall also submit quarterly reports stating the quantity of materials/commodities being hauled and the location of their disposal. As a (mandatory) verification of this requirement of this permit, current and past disposal destination reporting may be requested directly from the processing or disposal facility as deemed necessary by the City Of Troy, NY. A hauler not remitting this information may not be reissued a new permit.

In signing this application, applicant also agrees that any and all disposal facility reports, scale-tickets or other information pertaining to their materials processing may also be requested by the City of Troy, NY.

Further, the applicant agrees to pay all regular fees assessed for the use of any facilities in the City of Troy, NY, as well as any fees the City of Troy, NY may incur in handling or management of materials transported by said hauler. In the event that the applicant fails to make payment of these fees, the applicant agrees that any costs incurred by the City of Troy, NY in enforcing its rights, including but not limited to interest, penalties, court costs and attorney fees, shall be assessed to and collected from the applicant.

If applicant discontinues service in the City of Troy, NY, the requirements of said permit shall be revoked. Proof of discontinuation of service may be requested by the City of Troy, NY from applicant.

Date:
Applicant(s) signature: _____
Printed name(s): _____
Sworn before me this day of , 20
Notary public: _____

Submit this form an appropriate tiered payment for your annual hauler permit fee
$200 if you are a small business with only one hauling vehicle
$250 per truck if your business has between 2-10 trucks
$225 per truck if your business has between 11-25 trucks
$200 per truck if your business has over 26 trucks

To:
City of Troy, NY City Clerk
433 River Street, 5th Floor, City Hall, Troy, NY 12180

Upon receipt and processing of this application, a magnetic tag with a permit number will be mailed to you and will need to be visibly displayed on your vehicle any time it is within the city limits of Troy.

For official use only:
Application receipt date: Fee attached: YES: NO:
Disposal plan attached: YES NO Permit #:
Date issued:

PROJECTIONS CHART

Population and Municipal Solid Waste Composition Calculator

Purpose and Background

Developing a Local Solid Waste Management Plan (LSWMP) consist of several steps:

- Assessment of current planning unit conditions,
- Forecasting the future,
- Establishing objectives with clear statements of what is need to be achieved and when,
- Identifying and evaluating various alternatives and courses of action,
- Making decisions and selecting the best alternative for accomplishing objectives,
- Formulating tasks, subtasks, milestones, responsible parties, and certainly ensuring its effective implementation, as well as
- Evaluating achievements and taking corrective actions when necessary.

The purpose of the *Population and Municipal Solid Waste Composition Calculator* is to support planning units during the planning process, through a graphic and numerical representation of the current and future characteristics of the waste stream. The calculator has been designed to aid the development of a LSWMP from its early stage of assessment to its implementation and even evaluation of the plan over time.

The calculator intends to approximate the solid waste stream composition of the planning unit based on specific demographics and the goals set up for a specific planning period.

This projection tool is not intended to substitute for the valuable information gained by performing a municipal specific waste composition analysis. There is no substitute for accurately gathered and analyzed municipal specific waste composition data. This tool is merely intended to help refine the waste composition differences between planning units as a result of the wide array of demographics in New York State.

For this tool, DEC developed estimates of material's composition present in the MSW stream using data inputs that include field-based waste composition studies, performed within New York State and in other major US cities and States that have similar demographic characteristics to some of New York's regions.

After a careful review of dozens of composition analyses, the data from the following sources were used:

- Municipalities within New York State: New York City and Onondaga County Resource Recovery Authority (OCRRA).
- Municipalities in other states: Seattle, WA and San Francisco, CA.
- Other States: Vermont, Wisconsin, Missouri, Georgia, Oregon, Ohio, Delaware, Pennsylvania, and California.

Step 1. Planning Unit and Plan Period Selection

Please, select from the drop-down list the name of your **planning unit** and the **planning period** of your **LSWMP**. Be aware that a LSWMP must be developed for a **10-year period**, and that your selection will be replicated on each one of the following tabs.

Planning Unit	City of Troy
Planning Period	2019-2028

Step 2. Waste Generation Rate

In order to project how the amount of waste generated in the planning unit will change over time, data regarding the current amount of waste generated by the planning unit is needed. This can be the total tons of waste generated by the planning unit in the current year **(Tons/yr)**, or this can be the estimated daily quantity of waste generated per person in the planning unit **(lb/person/day).** If both the total annual generation and the estimated generation rate per person are unknown, the state average for MSW generation rate can be used along with the planning unit's population to estimate the total amount of waste generated in the planning unit.

For this step, select **one** of the options that describes the known information about the planning unit. Enter the waste generated in Tons (MSW disposed & Recycled Materials) or the waste generation rate in lb/person/day) in the purple cell. If no data on the waste generated in the planning unit is available, choose the corresponding option from the list. The calculator will estimate the total amount of waste generated based on the state's average generation rate and the planning unit's population.

City of Troy

The amount of waste generated (by all residents, institutions, etc.) in the planning unit will be based on what is known. If the MSW generation amount and the generation rate are unknown, the state average for MSW generation rate will be used.

	Enter average generation rate here:	4.48
	Leave this cell blank:	

Step 3. Planning Unit Population - Projections & Municipal Solid Waste (MSW) - Projections

This tab will provide you with population projections and MSW generation projections for the planning period you had previously selected. It is recognized that Municipal Solid Waste (MSW) generation is reliant on population changes, hence, it is necessary to project both and identify their correlation.

In the first purple cell enter the total tons of MSW that was disposed in the year immediately before your plan period starts. For example: If the plan period is 2016-2026, the MSW disposed data should be from 2015.

Population Projection:

Calculations are determined by a linear regression based on the latest **census population data** and an **annual growth rate percentage** specific to the planning unit. If it is anticipated that the population is going to decrease overtime, the minus sign (-) will be used.

MSW Generation Projection:

The MSW generation rate (Lb/person/day) calculated on the previous tab from the **Waste Generation Rate** will serve as a start point for the planning period. On the calculator, three options are considered to anticipate the MSW generation over time, and one must be selected according to the goals of the planning unit:

First Option:

MSW generation **rate** does not change. Consequently, MSW generation fluctuates with the population of the planning unit. If the population increases, waste generation will rise as well, and vice versa.
By selecting this option, the planning unit is in "**status quo**", meaning that is not making any improvements, and consequently is getting far from reaching the State's goal by 2030.

Second Option:

MSW generation **amount** remains the same, regardless of whether or not the planning unit's population changes.

Third Option:

As a result of successfully implementing the Local Solid Waste Management Plan, MSW generation will be reduced by an annual factor of ...

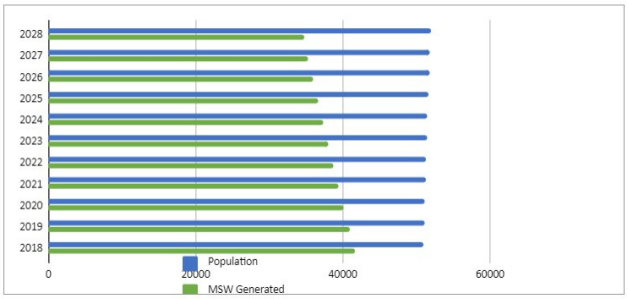
An **Annual Factor of Reduction (%)** should be calculated, defined, and selected by the planning unit. This factor will be the numerical representation of one of the planning unit's **goals** for the planning period. Once calculated, the Annual Factor of Reduction can be chosen from the drop down list provided.

Note:

• The graphic will display the Population and MSW Generation projections over the selected planning period. It has been designed to visualize the contrast of the final outcomes, based on the selections of each planning unit

City of Troy 2019-2028

Current Data	
2010 Population Census	50,129
2018 Population	50,937
2018 MSW Generated (Tons/yr)	41,646
2018 MSW generation rate (Lb/person/day)	4.48
2018 MSW Disposed (Tons/yr)	40,969
2018 MSW Diverted (Tons/yr)	1,244



Annual rate of population growth (%)	0.20%

Population Projection

2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
50,937	51,039	51,141	51,243	51,346	51,448	51,551	51,654	51,758	51,861	51,965

Forecasting future conditions... What do you expect to happen to the MSW generation rate over the next 10 year period plan?

Reduction Factor (per year) 2.0%

SW generation rate (Lb/person/da	4.48

MSW Generation Projection

2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
4.48	4.39	4.30	4.22	4.13	4.05	3.97	3.89	3.81	3.74	3.66	(Lb/person/day)
41,646	40,895	40,157	39,433	38,721	38,023	37,337	36,663	36,002	35,352	34,715	Tons/yr

Step 4. Municipal Solid Waste (MSW) Detailed Composition Analysis

The next step is to *Identify the Materials Composition of the Waste Stream* based on population density, and demographic characteristics of the Planning Unit.
This tab will provide the PU with a more detailed estimate of the materials present in the waste stream, which could be crucial when prioritizing the initiatives and programs of the LSWMP.

The population density distribution has been calculated based on the 2010 Census data and will be auto populated when a planning unit is selected. The following parameters were used:

- Rural: <325 persons/mi2
- Suburban: >325 and <5,000 persons/mi2
- Urban: >5,000 persons/mi2

Under **Density Population Distribution**, the user has the option to modify the percentage values for the **Sector** *(Residential and Commercial/Institutional)* based on land use and specific characteristics of each planning unit. For example: A rural population in Westchester County could be 64% Residential and 36% Commercial / Institutional, while in Wyoming County might be 50% Residential and 50% Commercial / Institutional.

The results are presented on the last right column under **MSW Materials Composition.** Be aware of color changes on the cells, whenever a category represents over 15% of the total waste generation, the cell will turn red to easily identify key categories of the waste stream. It will also facilitate the selection of initiatives, programs, and infrastructure for the solid waste management system.

Note: If no data exists, use the pre-populated information in the worksheet.

City of Troy — **2019-2028**

Material			Density Population Distribution	Rural			Suburban			Urban			MSW Materials Composition (%)
				0.00%			70.00%			30.00%			
				Residential	Comm/Inst.	Combined	Residential	Comm/Inst.	Combined	Residential	Comm/Inst.	Combined	
				0.00%	0.00%	0.00%	97.00%	3.00%	100.00%	85.00%	15.00%	100.00%	100.00%
	Newspaper			5.20%	1.90%	0.00%	5.00%	1.90%	4.91%	6.60%	2.00%	5.91%	5.21%
	Corrugated Cardboard			6.60%	13.90%	0.00%	6.60%	13.90%	6.82%	6.90%	13.70%	7.92%	7.15%
	Other Recyclable Paper	Paperboard		3.20%	1.10%	0.00%	3.30%	1.00%	3.23%	3.60%	0.90%	3.20%	3.22%
		Office Paper		0.80%	3.80%	0.00%	0.90%	4.20%	1.00%	1.10%	5.80%	1.81%	1.24%
		Junk Mail		3.00%	0.70%	0.00%	3.20%	0.70%	3.13%	3.50%	0.70%	3.08%	3.11%
		Other Commercial Printing		1.70%	2.30%	0.00%	1.70%	2.40%	1.72%	2.30%	2.60%	2.35%	1.91%
		Magazines		1.10%	0.90%	0.00%	1.00%	0.80%	0.99%	1.10%	1.00%	1.09%	1.02%
		Books		0.50%	0.30%	0.00%	0.50%	0.30%	0.49%	0.60%	0.40%	0.57%	0.52%
		Paper Bags		0.50%	0.20%	0.00%	0.50%	0.20%	0.49%	0.60%	0.20%	0.54%	0.51%
		Phone Books		0.30%	0.30%	0.00%	0.30%	0.30%	0.30%	0.30%	0.20%	0.29%	0.30%
		Poly-Coated		0.20%	0.30%	0.00%	0.20%	0.20%	0.20%	0.30%	0.20%	0.29%	0.23%
	Other Recyclable Paper (Total)			11.30%	9.90%	0.00%	11.60%	10.10%	11.56%	13.40%	12.00%	13.19%	12.05%
	Other Compostable Paper			6.80%	6.80%	0.00%	6.40%	6.40%	6.40%	6.80%	6.80%	6.80%	6.52%
	Total Paper			*29.90%*	*32.50%*	*0.00%*	*29.60%*	*32.30%*	*29.68%*	*33.70%*	*34.50%*	*33.82%*	*30.92%*
	Ferrous/Aluminum Containers	Ferrous Containers		1.90%	1.00%	0.00%	1.20%	0.70%	1.19%	1.40%	0.70%	1.30%	1.22%
		Aluminum Containers		0.70%	0.40%	0.00%	0.60%	0.30%	0.59%	0.50%	0.40%	0.49%	0.56%
	Ferrous/Aluminum Containers (Total)			2.60%	1.40%	0.00%	1.80%	1.00%	1.78%	1.90%	1.10%	1.78%	1.78%
	Other Ferrous Metals			5.20%	5.40%	0.00%	5.00%	5.80%	5.02%	3.30%	3.70%	3.38%	4.52%
	Other Non-Ferrous Metals	Other aluminum		0.20%	0.30%	0.00%	0.20%	0.30%	0.20%	0.20%	0.30%	0.22%	0.21%
		Automotive batteries		0.80%	0.50%	0.00%	0.70%	0.40%	0.69%	0.20%	0.20%	0.20%	0.54%
		Other non-aluminum		0.50%	0.30%	0.00%	0.30%	0.40%	0.30%	0.40%	0.20%	0.37%	0.32%
	Other Non-Ferrous Metals (Total)			1.50%	1.10%	0.00%	1.20%	1.10%	1.20%	0.80%	0.70%	0.79%	1.07%
	Total Metals			*9.30%*	*7.90%*	*0.00%*	*8.00%*	*7.90%*	*8.00%*	*6.00%*	*5.50%*	*5.93%*	*7.38%*
	PET Containers			1.10%	0.80%	0.00%	0.90%	0.80%	0.90%	1.20%	1.00%	1.17%	0.98%
	HDPE Containers			1.10%	0.60%	0.00%	0.90%	0.70%	0.89%	1.00%	0.70%	0.96%	0.91%
	Other Plastic (3-7) Containers			0.20%	0.10%	0.00%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%
	Film Plastic			5.70%	5.90%	0.00%	5.50%	5.80%	5.51%	5.80%	5.80%	5.80%	5.60%
	Other Plastic	Durables		3.10%	3.20%	0.00%	3.00%	3.20%	3.01%	3.20%	3.30%	3.22%	3.07%
		Non-Durables		1.60%	1.80%	0.00%	1.60%	1.80%	1.61%	1.80%	1.90%	1.82%	1.67%
		Packaging		1.40%	1.10%	0.00%	1.40%	1.10%	1.39%	1.50%	1.10%	1.44%	1.41%
	Other Plastic (Total)			6.10%	6.10%	0.00%	6.00%	6.10%	6.00%	6.50%	6.30%	6.47%	6.14%
	Total Plastics			*14.20%*	*13.50%*	*0.00%*	*13.50%*	*13.60%*	*13.50%*	*14.70%*	*14.00%*	*14.60%*	*13.83%*
	Glass Bottles, Jars and Containers			4.10%	3.80%	0.00%	3.90%	3.80%	3.90%	4.30%	3.80%	4.23%	4.00%
	Other Glass (Flat glass, dishware, light bulbs, etc.)			0.50%	0.40%	0.00%	0.30%	0.40%	0.30%	0.40%	0.40%	0.40%	0.33%
	Total Glass			*4.60%*	*4.20%*	*0.00%*	*4.20%*	*4.20%*	*4.20%*	*4.70%*	*4.20%*	*4.63%*	*4.33%*
	Food Scraps			12.70%	13.30%	0.00%	12.90%	15.50%	12.98%	17.20%	25.20%	18.40%	14.60%
	Leaves and Grass / Pruning and Trimmings			3.10%	1.10%	0.00%	11.30%	9.10%	11.23%	4.20%	1.50%	3.80%	9.00%
	Total Organics			*15.80%*	*14.40%*	*0.00%*	*24.20%*	*24.60%*	*24.21%*	*21.40%*	*26.70%*	*22.20%*	*23.61%*
	Clothing Footwear, Towels, Sheets			4.80%	3.00%	0.00%	4.40%	3.20%	4.38%	4.80%	2.50%	4.46%	4.39%
	Carpet			1.40%	1.30%	0.00%	1.70%	1.40%	1.69%	1.70%	0.90%	1.58%	1.66%
	Total Textiles			*6.00%*	*4.30%*	*0.00%*	*6.10%*	*4.60%*	*6.06%*	*6.50%*	*3.40%*	*6.04%*	*6.05%*
	Total Wood (Pallets, crates, adulterated and non-adulterated wood)			*4.10%*	*9.00%*	*0.00%*	*2.90%*	*4.10%*	*2.94%*	*2.00%*	*3.50%*	*2.23%*	*2.72%*
	DIY - Construction & Renovation Materials			8.00%	7.60%	0.00%	3.80%	2.70%	3.77%	4.40%	3.80%	4.31%	3.93%
	Diapers			1.90%	1.10%	0.00%	2.10%	1.20%	2.07%	2.30%	1.10%	2.12%	2.09%
	Electronics			1.30%	1.40%	0.00%	1.60%	1.70%	1.60%	1.30%	1.30%	1.30%	1.51%
	Tires			1.80%	1.80%	0.00%	1.70%	1.40%	1.69%	0.50%	0.40%	0.49%	1.33%
	HHW			0.60%	0.00%	0.00%	0.60%	0.00%	0.58%	0.50%	0.00%	0.43%	0.53%
	Soils and Fines			0.60%	0.60%	0.00%	0.10%	0.20%	0.10%	0.10%	0.10%	0.10%	0.10%
	Other Composite Materials - Durable and/or Inert			1.90%	1.70%	0.00%	1.60%	1.50%	1.60%	1.90%	1.50%	1.84%	1.67%
	Total Miscellaneous			*16.10%*	*14.20%*	*0.00%*	*11.50%*	*8.70%*	*11.42%*	*11.00%*	*8.20%*	*10.58%*	*11.17%*
	Total			*100.00%*	*100.00%*	*0.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*

Step 5. Municipal Solid Waste (MSW) Detailed Composition Analysis

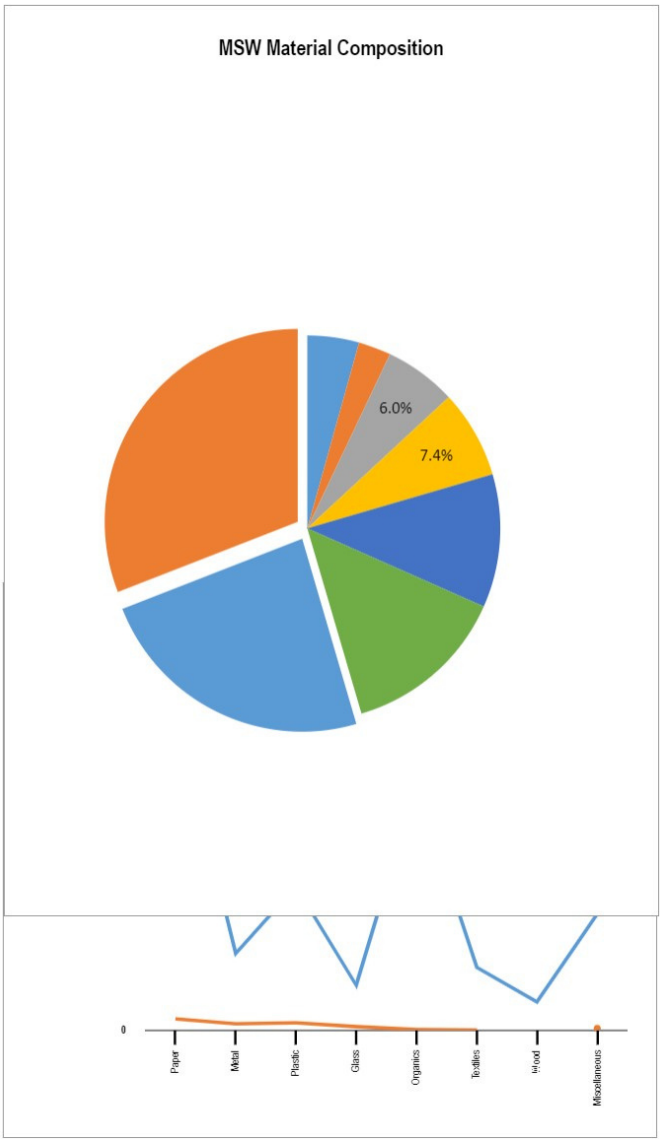
On this tab, the composition of the municipal waste stream will be estimated based on the amount of material generated in the planning unit and the state average of the different waste materials. A pie chart will be generated to clearly show the composition of the waste stream and to identify key categories of the waste stream for the planning unit.

The total tons of MSW diverted per year will be auto populated based on previous data inputs, while the amount tons diverted for each material by category should be populated by the user. Purple should be used for amounts of diverted waste by type of material, and a totaled number by category (e.g. paper, metal) should be put in the green cells. After inputting the data, a graphic will be generated to show the MSW generation and diversion streams in Tons.

Make sure that the total amounts at the bottom of the page are consistent with the data you already put into the calculator. If the cell is highlighted in red, you should revise the amounts of diverted waste by category.

City of Troy **2019-2028**

		2018		
		MSW Materials Composition (%)	MSW Generated (Tons)	MSW Diverted (Tons)
	Material	100.0%	41,646	1,243.83
Paper	Newspaper	5.2%	2,169	78.00
	Corrugated Cardboard	7.1%	2,977	220.00
	Other Recyclable Paper (Total)	12.0%	5,016	155.00
	Other Compostable Paper	6.5%	2,715	0.00
	Total Paper	30.9%	12,878	453.00
Metal	Ferrous/Aluminum Containers (Total)	1.8%	740	70.00
	Other Ferrous Metals	4.5%	1,884	149.00
	Other Non-Ferrous Metals (Total)	1.1%	447	38.00
	Total Metals	7.4%	3,072	257.00
Plastic	PET Containers	1.0%	408	65.00
	HDPE Containers	0.9%	380	43.00
	Other Plastic (3-7) Containers	0.2%	83	10.00
	Film Plastic	5.6%	2,331	0.00
	Other Plastic (Total)	6.1%	2,558	177.83
	Total Plastics	13.8%	5,760	295.83
Glass	Glass Bottles, Jars and Containers	4.0%	1,664	140.00
	Other Glass (Flat glass, dishware, light bulbs, etc.)	0.3%	138	0.00
	Total Glass	4.3%	1,802	140.00
Organics	Food Scraps	14.6%	6,082	22.00
	Leaves and Grass / Pruning and Trimmings	9.0%	3,749	0.00
	Total Organics	23.6%	9,831	22.00
Textiles	Clothing Footwear, Towels, Sheets	4.4%	1,829	5.00
	Carpet	1.7%	690	0.00
	Total Textiles	6.0%	2,519	5.00
Wood	*Total Wood* (Pallets, crates, adulterated and non-adulterated wood)	2.7%	1,134	
Miscellaneous	DIY Construction & Renovation Materials	3.9%	1,637	0.00
	Diapers	2.1%	869	0.00
	Electronics	1.5%	630	8.00
	Tires	1.3%	554	30.00
	HHW	0.5%	223	33.00
	Soils and Fines	0.1%	43	0.00
	Other Composite Materials - Durable and/or inert	1.7%	695	0.00
	Total Miscellaneous	11.2%	4,650	71.00
	Total	100.0%	41,646	1,243.83



Glass	4.33%
Wood	2.72%
Textiles	6.05%
Metal	7.38%
Miscellaneous	11.17%
Plastics	13.83%
Organics	23.61%
Paper	30.92%

	Generated	Diverted
Paper	12,878.10	453.00
Metal	3,071.57	257.00
Plastic	5,759.90	295.83
Glass	1,802.23	140.00
Organics	9,831.35	22.00
Textiles	2,519.17	5.00
Wood	1,133.90	
Miscellaneous	4,649.87	71.00

Step 6. Municipal Solid Waste (MSW) Diversion Projections

This tab will be used to create goals for the amount of material the planning unit will divert for each year of the planning period. These goals will be entered as percentages, based on how much of the material generated will be diverted for recycling or beneficial use.

The diversion goal percentages will be entered in the purple cells for each material and each year of the planning period.

City of Troy 2019-2028

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Projected MSW Generation (Tons/yr)	41,646	40,895	40,157	39,433	38,721	38,023	37,337	36,663	36,002	35,352
MSW Diverted (Tons/yr)	2,062	2,875	3,597	4,322	5,020	5,700	6,354	6,961	7,543	8,138

			2018			2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
		MSW Materials Composition (%)	MSW Generated (Tons)	MSW Diverted (Tons)	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted	% MSW Diverted
	Material	100.0%	41,646	1,244	3.0%	5.0%	7.0%	9.0%	11.0%	13.0%	15.0%	17.0%	19.0%	21.0%	23.0%
Paper	Newspaper	5.2%	2,169	78	3.6%	6.0%	8.5%	10.5%	12.5%	14.0%	14.5%	15.0%	16.0%	17.0%	19.0%
Paper	Corrugated Cardboard	7.1%	2,977	220	7.4%	10.0%	12.5%	14.5%	17.0%	19.0%	21.0%	22.0%	24.0%	26.0%	28.0%
Paper	Other Recyclable Paper (Total)	12.0%	5,016	155	3.1%	6.0%	8.5%	10.5%	13.0%	15.5%	18.0%	19.0%	21.0%	23.0%	25.0%
Paper	Other Compostable Paper	6.5%	2,715	0	0.0%	0.0%	1.0%	3.0%	5.0%	6.0%	7.0%	8.0%	9.0%	10.0%	11.0%
Paper	*Total Paper*	30.9%	12,878	453	3.5%	5.7%	7.8%	9.8%	12.2%	14.1%	15.8%	16.7%	18.3%	19.9%	21.7%
Metal	Ferrous/Aluminum Containers (Total)	1.8%	740	70	9.5%	12.0%	15.0%	17.0%	18.0%	20.0%	21.0%	22.0%	23.0%	24.0%	25.0%
Metal	Other Ferrous Metals	4.5%	1,884	149	7.9%	10.0%	13.0%	15.0%	16.0%	18.0%	18.0%	19.0%	20.0%	21.0%	22.0%
Metal	Other Non-Ferrous Metals (Total)	1.1%	447	38	8.5%	11.0%	12.0%	14.0%	16.0%	18.0%	18.0%	19.0%	20.0%	21.0%	22.0%
Metal	*Total Metals*	7.4%	3,072	257	8.4%	10.6%	13.3%	15.3%	16.5%	18.5%	18.7%	19.7%	20.7%	21.7%	22.7%
Plastic	PET Containers	1.0%	408	65	15.9%	16.0%	17.0%	18.0%	20.0%	21.0%	21.0%	22.0%	22.0%	23.0%	23.0%
Plastic	HDPE Containers	0.9%	380	43	11.3%	12.0%	13.0%	14.0%	16.0%	18.0%	19.0%	20.0%	21.0%	23.0%	25.0%
Plastic	Other Plastic (3-7) Containers	0.2%	83	10	12.0%	12.0%	13.0%	14.0%	16.0%	17.0%	18.0%	19.0%	20.0%	21.0%	22.0%
Plastic	Film Plastic	5.6%	2,331	0	0.0%	0.0%	3.0%	5.0%	7.0%	8.5%	9.0%	11.5%	13.0%	15.0%	17.0%
Plastic	Other Plastic (Total)	6.1%	2,558	178	7.0%	9.0%	9.0%	10.5%	12.5%	14.5%	17.0%	20.0%	22.0%	24.0%	28.0%
Plastic	*Total Plastics*	13.8%	5,760	296	5.1%	6.1%	7.5%	9.1%	11.1%	12.8%	14.2%	16.7%	18.3%	20.2%	22.9%
Glass	Glass Bottles, Jars and Containers	4.0%	1,664	140	8.4%	10.5%	13.0%	15.0%	16.0%	18.0%	20.0%	22.0%	24.0%	26.0%	30.0%
Glass	Other Glass (Flat glass, dishware, light bulbs, etc.)	0.3%	138	0	0.0%	0.0%	1.0%	3.0%	5.5%	7.0%	8.0%	9.0%	10.0%	11.0%	12.0%
Glass	*Total Glass*	4.3%	1,802	140	7.8%	9.7%	12.1%	14.1%	15.2%	17.2%	19.1%	21.0%	22.9%	24.8%	28.6%
Organics	Food Scraps	14.6%	6,082	22	0.4%	1.7%	5.0%	8.0%	10.5%	13.0%	15.5%	18.5%	22.0%	25.0%	27.5%
Organics	Leaves and Grass / Pruning and Trimmings	9.0%	3,749	0	0.0%	7.0%	9.0%	11.0%	13.5%	17.0%	22.0%	26.0%	29.0%	32.0%	34.0%
Organics	*Total Organics*	23.6%	9,831	22	0.2%	3.7%	6.5%	9.1%	11.6%	14.5%	18.0%	21.4%	24.7%	27.7%	30.0%
Textiles	Clothing Footwear, Towels, Sheets	4.4%	1,829	5	0.3%	2.0%	4.0%	6.0%	8.0%	10.0%	13.5%	17.0%	19.0%	21.5%	24.0%
Textiles	Carpet	1.7%	690	0	0.0%	0.0%	0.0%	0.0%	2.0%	3.0%	3.0%	4.0%	4.0%	5.0%	5.0%
Textiles	*Total Textiles*	6.0%	2,519	5	0.2%	1.5%	2.9%	4.4%	6.4%	8.1%	10.6%	13.4%	14.9%	17.0%	18.8%
Wood	*Total Wood* (Pallets, crates, adulterated and non-adulterated wood)	2.7%	1,134		0.0%										
Miscellaneous	DIY Construction & Renovation Materials	3.9%	1,637	0	0.0%	0.0%	2.0%	4.0%	6.0%	8.0%	10.5%	14.0%	16.0%	18.0%	21.0%
Miscellaneous	Diapers	2.1%	869	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Miscellaneous	Electronics	1.5%	630	8	1.3%	2.0%	4.0%	6.0%	8.5%	11.0%	13.5%	16.0%	19.0%	22.0%	24.0%
Miscellaneous	Tires	1.3%	554	30	5.4%	5.0%	8.0%	10.0%	12.5%	15.0%	17.0%	20.0%	25.0%	28.0%	31.0%
Miscellaneous	HHW	0.5%	223	33	14.8%	17.0%	19.0%	20.0%	23.0%	24.5%	26.5%	27.5%	29.0%	31.0%	35.0%
Miscellaneous	Soils and Fines	0.1%	43	0	0.0%	2.0%	4.0%	6.0%	8.5%	13.0%	18.0%	22.5%	28.0%	30.0%	32.0%
Miscellaneous	Other Composite Materials - Durable and/or inert	1.7%	695	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	6.0%	7.0%	9.0%	11.0%
Miscellaneous	*Total Miscellaneous*	11.2%	4,650	71	1.5%	1.7%	3.1%	4.4%	5.9%	7.4%	9.4%	11.9%	13.9%	15.8%	17.9%

Step 7. Municipal Solid Waste (MSW) Generation and Diversion - Detailed Projections

The final result of the Population and Municipal Composition Calculator is presented on the last tab. This tab contains data for the current year regarding waste generated and waste diverted from disposal. This tab also shows the projected waste diversion percentages, and the amount of waste in tons these percentages will divert for recycling. Total amounts of waste diverted will be calculated for each material and each year of the planning period.

City of Troy 2019-2028

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Population	50,937	50,937	51,039	51,141	51,243	51,345	51,448	51,551	51,654	51,758	51,861
MSW Generated (tons)	41,646.09	41,646	40,895	40,157	39,433	38,721	38,023	37,337	36,663	36,002	35,352
Per Capita MSW Generated (lbs/person/year)	1,635	1,635	1,602	1,570	1,539	1,508	1,478	1,449	1,420	1,391	1,363
MSW Diverted (tons)	1,243.83	2,062	2,875	3,597	4,322	5,187	5,700	6,354	6,961	7,543	8,138
Per Capita MSW Diverted (lbs/person/year)	49	81	113	141	169	202	222	247	270	291	314
MSW Disposed (tons)	40,402.26	39,584	38,020	36,560	35,111	33,535	32,323	30,982	29,703	28,458	27,214
Per Capita MSW Disposed (lbs/person/year)	1,586	1,554	1,490	1,430	1,370	1,306	1,257	1,202	1,150	1,100	1,049
Per Capita MSW Disposed (lbs/person/day)	4.35	4.26	4.08	3.92	3.75	3.58	3.44	3.29	3.15	3.01	2.88

				2018			2019			2020			2021			2022			2023			2024			2025			2026			2027			2028		
			MSW Materials Composition (%)	MSW Generated (Tons)	MSW Diverted (Tons)	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted	MSW generated (Tons)	MSW Diverted	% MSW Diverted
	Material		100.00%	41,648	1,244	3.0%	41,648	2,082	5.0%	40,895	2,875	7%	40,157	3,597	9.0%	39,433	4,322	11.0%	38,721	5,187	13.4%	38,023	5,700	15.0%	37,337	6,354	17.0%	36,663	6,961	19.0%	36,002	7,543	21.0%	35,352	8,138	23.0%
Paper	Newspaper		5.21%	2,169	78	3.6%	2,169	130	6.0%	2,130	181	9%	2,091	220	10.5%	2,054	257	12.5%	2,017	282	14.0%	1,980	287	14.5%	1,944	292	15.0%	1,909	306	16.0%	1,875	319	17.0%	1,841	350	19.0%
	Corrugated Cardboard		7.15%	2,977	220	7.4%	2,977	298	10.0%	2,924	365	13%	2,871	416	14.5%	2,819	479	17.0%	2,768	526	19.0%	2,718	571	21.0%	2,669	587	22.0%	2,621	629	24.0%	2,574	669	26.0%	2,527	708	28.0%
	Other Recyclable Paper	Paperboard	3.22%	1,341		0.0%	1,341	0		1,317	0		1,293	0		1,270	0		1,247	0		1,224	0		1,202	0		1,181	0		1,159	0		1,138	0	
		Office Paper	1.24%	517		0.0%	517	0		507	0		498	0		489	0		480	0		472	0		463	0		455	0		447	0		439	0	
		Junk Mail	3.11%	1,296		0.0%	1,296	0		1,272	0		1,249	0		1,227	0		1,205	0		1,183	0		1,162	0		1,141	0		1,120	0		1,100	0	
		Other Commercial Printing	1.91%	795		0.0%	795	0		780	0		766	0		752	0		739	0		726	0		712	0		700	0		687	0		675	0	
		Magazines	1.02%	425		0.0%	425	0		418	0		410	0		403	0		395	0		388	0		381	0		374	0		368	0		361	0	
		Books	0.52%	215		0.0%	215	0		211	0		208	0		204	0		200	0		197	0		193	0		189	0		186	0		183	0	
		Paper Bags	0.51%	211		0.0%	211	0		207	0		203	0		199	0		196	0		192	0		189	0		185	0		182	0		179	0	
		Phone Books	0.30%	123		0.0%	123	0		121	0		119	0		117	0		114	0		112	0		110	0		108	0		106	0		104	0	
		Poly-Coated	0.23%	94		0.0%	94	0		92	0		91	0		89	0		87	0		86	0		84	0		83	0		81	0		80	0	
	Other Recyclable Paper (Total)		12.05%	5,016	155	3.1%	5,016	301	6.0%	4,926	419	9%	4,837	508	10.5%	4,750	617	13.0%	4,664	723	15.5%	4,580	824	18.0%	4,497	855	19.0%	4,416	927	21.0%	4,337	997	23.0%	4,258	1,065	25.0%
	Other Compostable Paper		6.52%	2,715	0	0.0%	2,715	0	0.0%	2,666	27	1%	2,618	79	3.0%	2,571	129	5.0%	2,525	151	6.0%	2,479	174	7.0%	2,434	195	8.0%	2,390	215	9.0%	2,347	235	10.0%	2,305	254	11.0%
	Total Paper		30.92%	12,878	453	3.5%	12,878	729	5.7%	12,046	992	8%	12,418	1,222	9.8%	12,194	1,482	12.2%	11,974	1,683	14.1%	11,758	1,856	15.8%	11,546	1,928	16.7%	11,337	2,077	18.3%	11,133	2,220	19.9%	10,932	2,376	21.7%
Metal	Ferrous/Aluminum Containers	Ferrous Containers	1.22%	507	48	9.5%	507	42	8.2%	498	51	10%	489	57	11.7%	480	59	12.3%	472	65	13.7%	463	67	14.4%	455	69	15.1%	447	70	15.8%	439	72	16.4%	431	74	17.1%
		Aluminum Containers	0.56%	233	22	9.5%	233	9	3.8%	229	11	5%	225	12	5.3%	221	12	5.7%	217	14	6.3%	213	14	6.6%	209	14	6.9%	205	15	7.2%	201	15	7.6%	198	16	7.9%
	Ferrous/Aluminum Containers (Total)		1.78%	740	70	9.5%	740	89	12.0%	727	109	15%	714	121	17.0%	701	126	18.0%	688	138	20.0%	676	142	21.0%	664	146	22.0%	652	150	23.0%	640	154	24.0%	628	157	25.0%
	Other Ferrous Metals		4.52%	1,884	149	7.9%	1,884	188	10.0%	1,850	241	13%	1,817	273	15.0%	1,784	285	16.0%	1,752	315	18.0%	1,720	310	18.0%	1,689	321	19.0%	1,659	332	20.0%	1,629	342	21.0%	1,600	352	22.0%
	Other Non-Ferrous Metals	Other aluminum	0.21%	86		0.0%	86	0		84	0		83	0		81	0		80	0		79	0		77	0		76	0		74	0		73	0	
		Automotive batteries	0.54%	226		0.0%	226	0		222	0		218	0		214	0		211	0		207	0		203	0		199	0		196	0		192	0	
		Other non-aluminum	0.32%	135		0.0%	135	0		132	0		130	0		127	0		125	0		123	0		121	0		118	0		116	0		114	0	
	Other Non-Ferrous Metals (Total)		1.07%	447	38	8.5%	447	49	11.0%	439	53	12%	431	60	14.0%	423	68	16.0%	416	75	18.0%	408	73	18.0%	401	76	19.0%	394	79	20.0%	386	81	21.0%	379	83	22.0%
	Total Metals		7.38%	3,072	257	8.4%	3,072	326	10.6%	3,016	402	13%	2,962	454	15.3%	2,908	479	16.5%	2,856	528	18.5%	2,804	525	18.7%	2,754	543	19.7%	2,704	560	20.7%	2,655	577	21.7%	2,607	592	22.7%
Plastic	PET Containers		0.98%	408	65	15.9%	408	65	16.0%	400	68	17%	393	71	18.0%	386	77	20.0%	379	80	21.0%	372	78	21.0%	365	80	22.0%	359	79	22.0%	352	81	23.0%	346	80	23.0%
	HDPE Containers		0.91%	380	43	11.3%	380	46	12.0%	373	49	13%	366	51	14.0%	360	58	16.0%	353	22	6.3%	347	66	19.0%	341	68	20.0%	334	70	21.0%	328	76	23.0%	323	81	25.0%
	Other Plastic (3-7) Containers		0.20%	83	10	12.0%	83	10	12.0%	82	11	13%	80	11	14.0%	79	13	16.0%	77	15	20.0%	76	14	18.0%	75	14	19.0%	73	15	20.0%	72	15	21.0%	71	16	22.0%
	Film Plastic		5.60%	2,331	0	0.0%	2,331	0	0.0%	2,289	69	3%	2,247	112	5.0%	2,207	154	7.0%	2,167	390	18.0%	2,128	192	9.0%	2,089	240	11.5%	2,052	267	13.0%	2,015	302	15.0%	1,978	336	17.0%
	Other Plastic	Durables	3.07%	1,278		0.0%	1,278	0		1,255	0		1,232	0		1,210	0		1,188	0		1,167	0		1,146	0		1,125	0		1,105	0		1,085	0	
		Non-Durables	1.67%	695		0.0%	695	0		682	0		670	0		658	0		646	0		634	0		623	0		612	0		601	0		590	0	
		Packaging	1.41%	585		0.0%	585	0		575	0		564	0		554	0		544	0		534	0		525	0		515	0		506	0		497	0	
	Other Plastic (Total)		8.14%	2,558	178	7.0%	2,558	230	9.0%	2,512	226	9%	2,467	259	10.5%	2,422	303	12.5%	2,379	345	14.5%	2,336	397	17.0%	2,294	459	20.0%	2,252	495	22.0%	2,212	531	24.0%	2,172	608	28.0%
	Total Plastics		13.83%	5,760	296	5.1%	5,760	351	6.1%	5,656	422	7%	5,554	505	9.1%	5,454	605	11.1%	5,355	852	15.9%	5,259	746	14.2%	5,164	862	16.7%	5,071	926	18.3%	4,979	1,005	20.2%	4,889	1,120	22.9%
Glass	Glass Bottles, Jars and Containers		4.00%	1,664	140	8.4%	1,664	175	10.5%	1,634	212	13%	1,604	241	15.0%	1,575	252	16.0%	1,547	278	18.0%	1,519	304	20.0%	1,492	328	22.0%	1,465	352	24.0%	1,438	374	26.0%	1,412	424	30.0%
	Other Glass (Flat glass, dishware, light bulbs, etc.)		0.33%	138	0	0.0%	138	0	0.0%	136	1	1%	133	4	3.0%	131	7	5.5%	129	9	7.0%	126	10	8.0%	124	11	9.0%	122	12	10.0%	120	13	11.0%	117	14	12.0%
	Total Glass		4.33%	1,802	140	7.8%	1,802	175	9.7%	1,770	214	12%	1,738	245	14.1%	1,706	259	15.2%	1,676	287	17.2%	1,645	314	19.1%	1,616	339	21.0%	1,587	364	22.9%	1,558	387	24.8%	1,530	438	28.6%
Organics	Food Scraps		14.60%	6,082	22	0.4%	6,082	103	1.7%	5,973	299	5%	5,865	469	8.0%	5,759	605	10.5%	5,655	735	13.0%	5,553	861	15.5%	5,453	1,009	18.5%	5,355	1,178	22.0%	5,258	1,314	25.0%	5,163	1,420	27.5%
	Leaves and Grass / Pruning and Trimmings		9.00%	3,749	0	0.0%	3,749	262	7.0%	3,681	331	9%	3,615	398	11.0%	3,550	479	13.5%	3,486	593	17.0%	3,423	753	22.0%	3,361	874	26.0%	3,301	957	29.0%	3,241	1,037	32.0%	3,183	1,082	34.0%
	Total Organics		23.61%	9,831	22	0.2%	9,831	366	3.7%	9,654	630	7%	9,480	867	9.1%	9,309	1,084	11.6%	9,141	1,328	14.5%	8,976	1,614	18.0%	8,814	1,883	21.4%	8,655	2,135	24.7%	8,499	2,352	27.7%	8,346	2,502	30.0%
Textiles	Clothing Footwear, Towels, Sheets		4.39%	1,829	5	0.3%	1,829	37	2.0%	1,796	72	4%	1,763	106	6.0%	1,732	139	8.0%	1,700	170	10.0%	1,670	225	13.5%	1,640	279	17.0%	1,610	306	19.0%	1,581	340	21.5%	1,552	373	24.0%
	Carpet		1.66%	690	0	0.0%	690	0	0.0%	678	0	0%	666	0	0.0%	654	13	2.0%	642	19	3.0%	630	19	3.0%	619	25	4.0%	608	24	4.0%	597	30	5.0%	586	29	5.0%
	Total Textiles		6.05%	2,519	5	0.2%	2,519	37	1.5%	2,474	72	3%	2,429	106	4.4%	2,385	152	6.4%	2,342	189	8.1%	2,300	244	10.6%	2,259	303	13.4%	2,218	330	14.9%	2,178	370	17.0%	2,138	402	18.8%
Wood	*Total Wood* (Pallets, crates, adulterated and non-adulterated)		2.72%	1,134		0.0%	1,134	0		1,113	0		1,093	0		1,074	0		1,054	0		1,035	0		1,017	0		998	0		980	0		963	0	
Miscellaneous	DIY Construction & Renovation Materials		3.93%	1,637	0	0.0%	1,637	0	0.0%	1,607	32	2%	1,578	63	4.0%	1,550	93	6.0%	1,522	122	8.0%	1,494	157	10.5%	1,467	205	14.0%	1,441	231	16.0%	1,415	255	18.0%	1,389	292	21.0%
	Diapers		2.09%	869	0	0.0%	869	0	0.0%	854	0	0%	838	0	0.0%	823	0	0.0%	808	0	0.0%	794	0	0.0%	779	0	0.0%	765	0	0.0%	751	0	0.0%	738	0	0.0%
	Electronics		1.51%	630	8	1.3%	630	13	2.0%	618	25	4%	607	36	6.0%	596	51	8.5%	586	64	11.0%	575	78	13.5%	565	90	16.0%	554	105	19.0%	544	120	22.0%	535	128	24.0%
	Tires		1.33%	554	30	5.4%	554	28	5.0%	544	43	8%	534	53	10.0%	524	66	12.5%	515	77	15.0%	505	86	17.0%	496	99	20.0%	487	122	25.0%	479	134	28.0%	470	146	31.0%
	HHW		0.53%	223	33	14.8%	223	38	17.0%	219	42	19%	215	43	20.0%	211	49	23.0%	207	51	24.5%	203	54	26.5%	200	55	27.5%	196	57	29.0%	193	60	31.0%	189	66	35.0%
	Soils and Fines		0.10%	43	0	0.0%	43	1	2.0%	42	2	4%	41	2	5.0%	40	3	8.5%	40	5	13.0%	39	7	18.0%	38	9	22.5%	37	10	28.0%	37	11	30.0%	36	12	32.0%
	Other Composite Materials - Durable and/or inert		1.67%	695	0	0.0%	695	0	0.0%	683	0	0%	671	0	0.0%	658	0	0.0%	647	0	0.0%	635	19	3.0%	623	37	6.0%	612	43	7.0%	601	54	9.0%	590	65	11.0%
	Total Miscellaneous		11.17%	4,650	71	1.5%	4,650	79	1.7%	4,566	144	3%	4,484	198	4.4%	4,403	261	5.9%	4,323	319	7.4%	4,245	400	9.4%	4,169	496	11.9%	4,094	568	13.9%	4,020	633	15.8%	3,947	708	17.9%

City of Troy Solid Waste Management Plan (2019-2028) - 10 Year Implementation Schedule

Start Date	End Date	Duration	Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
			ReUse Programs										
			ReUse Center										
			Household Donation Options	On Going									
			Research Center/Partnership Plan										
			Plan Update			Report							
			Recycling Programs										
			Monitor National Recycling Situation	On Going									
			Recycling Contract						Lease Up				
			Bi- Annual Recycling Update		Update		Update		Update		Update		New Plan
			Textile Recycling										
			Household Hazardous Waste										
			Increase Annual Events							Evaluation			
			2 events per year	2 events per year									
			4 events per year			4 events per year							
			Recycling Center										
			PILOT - Open Alamo April - Oct.										
			Update on Recycling Center			Report							
			Alamo Site Buy or Lease										
			Open Recycling Center (Year Round)										
			Education & Outreach										
			Recycling Coordinator										
			Incresed Event Offerings										
			Hauler Licensing										
			Hauler Permit Law										
			Notification to Haulers										
			Permit Solicitation										
			Annual Notice/Data Requests		On Going								
			Organics Recovery										
			Food Waste / Source Separated Organics										
			Pilot Compost Piles										
			SSO Drop off for Residents - Alamo - April -Oct										
			Feasability Study		Report								
			SSO Pick up Pilot- 2 years			Pilot City Collection							
			SSO/Food Waste report				Report						
			Yard Waste										
			Create Separate Mulch and Compost piles										
			Screen Material	On Going									
			Open Alamo for Private Yard Waste			Pilot		Open					
			Registered Compost/Mulch Facility										
			Regional Approach										
			Develop Regional Food Waste Group	Research		Regional Group							
			Incentive Based Pricing										
			Solid Waste Management Fee	On Going									
			Hybrid PAYT										
			Research types and applicability										
			Implement Hybrid PAYT		Implementation								
			Evaluation				Report						
			Bulk Pricing										
			Implement Clear Bulk Wate Pricing										
			Alamo Furniture Donation	On Going									
			Report		Report								
			Waste Disposal										
			Trash Disposal										
			New Equipment Investment	On Going									
			Bulk Disposal										
			New Equipment Investment	On Going									
			Address Visibility										
			Research Cost of Implementation										
			Implement across City										
			Solid Waste Advisory Board										
			bi-annual updates										
			Assist in New Plan (2029 Publication)										
			Data Collection & Evaluation										
			Recycling Coordinator										
			Annual Solid Waste Report	On Going									
			Collect Missing Data										
			Update Plan with New Data	On Going									
			Regional Approach										
			Research Possible Regional Options										
			Join or Create a Planning Unit										
			Flow Control										
			Maintain Recycling Mandates	On Going									
			Private Sector Opportunities										
			RFP for Services										
			RFP for Solid Waste Services for Comparison	Twice over the planning period									
			Explore ReUse Partnership Opportunities		Report								
			C&D Demolition, Reuse & Recovery										
			Deconstruction Permit										
			Generate a Deconstruction Permit										
			City Deconstruction RFP										
			Create an RFP for deconstruction										
			Issue RFP for Demolition Jobs										
			Homeowner Education	On Going									
			Salvage Yard										
			public-private opportunity research										
			Salvage yard Opportunity Update										
			Recycling Clearinghouse										
			Online Database of Recycling and Reuse services	On Going									
			Thermal Treatment Technologies										
			No Major Plans										
			Waste Reduction Programs										
			Green Procurement										
			NYC DEC Green Procurement Law-current	On Going									