

CITY OF PALO ALTO

Zero Waste Plan

August 2018

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EXECUTIVE SUMMARY

The 2018 Zero Waste Plan updates the first such Plan for Palo Alto which was adopted in 2007. The new Plan contains new and revised provisions designed to meet aggressive goals adopted by the Palo Alto City Council in 2016 as part of its [Sustainability/Climate Action Plan](#) (SCAP). Specifically, the Council adopted a goal of 95% diversion of materials from landfills by 2030, and 80 % reduction of greenhouse gases by the same year. Additionally, other goals were adopted for water use reduction and environment protection. All of these goals require even more effort by the City of Palo Alto staff and the larger community to reduce the use of materials, to reuse them, and to recycle and compost residuals.

The new Plan was also prepared to provide a basis for new and revised contracts the City must have for residuals management. Current contracts with GreenWaste, the Sunnyvale Materials Recovery Station (SMaRT), and Waste Management (Kirby Canyon Landfill) all expire in the Fall of 2021. New and/or revised contracts for hauling, processing, recycling, composting and landfill disposal must all reflect the aggressive goals adopted by the Palo Alto Council. In order to meet the environmental goals by 2030, and have new and revised contractor support contracts in place by 2021, it was necessary to begin a planning process in 2016 and finalize the new Zero Waste Plan in 2018.

It was also necessary to re-examine what Palo Alto currently sends to Landfills in order to target the right materials in the Plan. It was found that two of the largest components were food-related materials, and demolition and construction related materials. Therefore, important new and revised Plan provisions deal with these materials. Enforcement of commercial composting and recycling requirements is strengthened, as is source separation and deconstruction in the construction industry. A third and difficult component of landfilled materials are diapers, other personal care products, and pet waste. These will be further explored under the Plan to find workable solutions.

The Plan is divided into Short Term, Mid Term and Long Term actions. For the most part, this is because of resource constraints. But it is also because good solutions may not be apparent yet, or because the residual is a smaller component of the total.

Asian markets for US recyclables are in flux. At the same time, plastics from around the world are building up in oceans and in wildlife. As part of the Plan, the City will examine better ways to reduce plastics use and manage their residuals. A Foodware Packaging Reduction Plan will be prepared in concert with the City's other environmental protection programs in 2019. Targeted plastics will include food and drink containers and other types of packaging.

The City will continue to use a blend of local action and regional, state and national collaboration to establish new program components. Local initiatives in Palo Alto are being taken when it is efficient, helps pilot new ideas and lights the way for others. Enforcement of recycling and composting in the commercial and construction sectors are key examples where Palo Alto is taking new local action under its 2018 Zero Waste Plan.

ZERO WASTE GUIDING PRINCIPLES

Zero Waste is a holistic approach to managing the flow of resources through society in a closed loop system (circular economy) rather than a linear one. While Zero Waste includes the traditional hierarchy of reducing, reusing and recycling, it is much more. Zero Waste principles provide guidance on how resources are managed, from product design through ultimate disposal. Zero Waste is about designing products and packaging to minimize waste, creating incentives to encourage clean and sustainable products and processes, fostering both producer and consumer responsibility, investing in resource recovery facilities, strengthening local economies, and building community collaboration. This Zero Waste Plan uses the following guiding principles:

- Follow the waste management hierarchy of reduce, reuse, recycle/compost, prioritizing waste prevention first, and then reuse (including salvage and repair) before recycle/compost.
- Manage discards as resources, not waste. Preserve materials for continued use and recognize that all products are made from and with natural resources and manage them accordingly.
- Create and support rules and policies that further the Zero Waste hierarchy of rethink, reduce, reuse, recycle/compost; and redesign systems, processes, or products to reduce the volume and toxicity of waste and materials.
- Support Producer Responsibility to hold manufacturers responsible for the full lifecycle of their products, giving them incentive to create less toxic, more durable, reusable, repairable, and recyclable/compostable products, packaging, and processes.
- Create and support programs in every sector of the community to shift away from waste generation toward waste prevention, reuse, and recycling/composting.
- Create and keep materials and products for use as high on the hierarchy as possible and in the useful loop as long as possible. Keep materials from being “downcycled,” where the number of future uses or options are limited (e.g., composting recyclable paper).
- Minimize all discharges to land, water or air that may be a threat to planetary, human, animal or plant health, including climate changing gases.
- Empower the community to live a Zero Waste lifestyle, build collaborative efforts to further Zero Waste, and to continue to call for Zero Waste progress.
- Utilize existing infrastructure and assets in the development of new programs (e.g., waste collection vehicles, mail services, food storage).
- Foster and pilot programs and systems that are adaptable, flexible, nimble, scalable, and resilient.

ADAPTING TO CHANGING MARKET DEMANDS

The following hierarchy of contingencies has been created to help Palo Alto adapt to future market fluctuations for recyclable and compostable materials. If markets change to such an extent that currently recyclable or compostable items are no longer accepted, the following measures will be taken:

1. Increase allocation of resources and focus on initiatives that further waste reduction and reuse, so that fewer materials will be generated for recycling and composting.
2. Improve processing so recycle and compost streams are cleaner, to improve marketability.
3. Enhance enforcement of customer sorting; and keep non-complying customers waste separate for special processing until compliance is achieved.
4. Embrace the concept that recycling/composting is better than landfilling; even as these expenses increase.
5. Conversion (e.g., gasification, pyrolysis, chemical process) for nonmarketable materials; maintain ability to move in and out as markets change. This is a less preferred option than recycling the materials.



Sorting Station at GreenWaste Material Recovery Facility

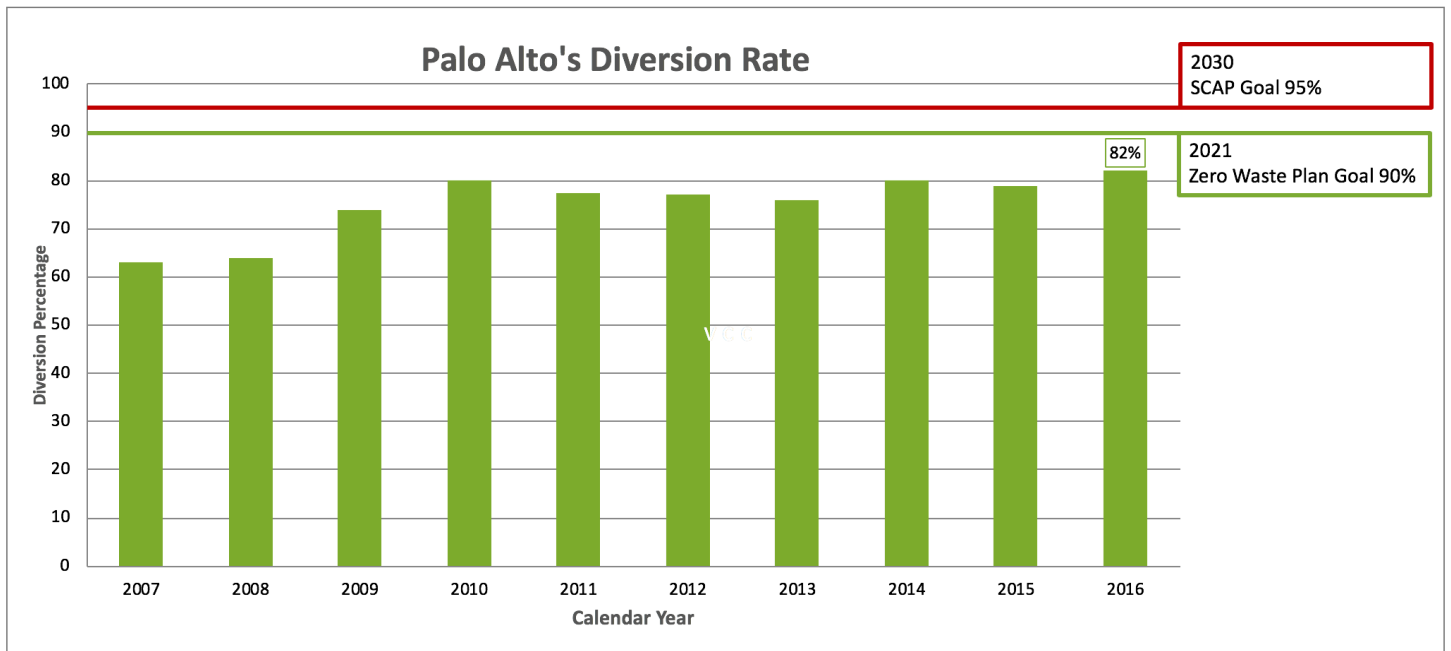
BACKGROUND

The City of Palo Alto is a leader in Zero Waste. In 2005, the City adopted a Zero Waste goal of 90% diversion of waste from landfills by 2021. The City’s Zero Waste Operational Plan, adopted in 2007, identified a number of initiatives that will help Palo Alto reach its Zero Waste goal.

The City has implemented the major initiatives identified in the plan, including:

- A Zero Waste collection contract
- Universal roll-out of recycling and composting to all customers
- Regional organics processing
- Construction debris diversion requirements
- Regional construction debris processing
- Use of emerging technology

The City’s diversion rate has increased from 62% in 2007 to 82% in 2016. “Diversion” includes all waste prevention, reuse, recycling and composting activities that “divert” materials from landfills.



In November 2016, the City Council approved the Sustainability and Climate Action Plan Framework, Principles & Guidelines (SCAP) which identified a new goal of 95% by 2030.

This Zero Waste Plan identifies the new and expanded policies, programs and infrastructure that will be needed to reach this goal.

CURRENT ZERO WASTE PROGRAMS



Color-coded Compost, Landfill and Recycle Bins

The City contracts with GreenWaste of Palo Alto, Inc. (GreenWaste) to provide comprehensive recycling and organics collection to all residential and commercial customers in Palo Alto. The City and GreenWaste provide technical assistance to multifamily complexes, schools, and commercial buildings pursuant to the City’s mandatory recycling and composting ordinance.

Recyclable materials are processed at the GreenWaste Material Recovery Facility where commodities are segregated and sold to domestic and international markets. Organic materials are processed at the Zero Waste Energy Development Corporation anaerobic digestion facility which produces renewable energy to operate the facility. Excess energy produced at the facility is sold to the power grid. The materials leftover from the digestion process are further composted at the Z-Best compost facility.

The City also partners with the cities of Mountain View and Sunnyvale on the Sunnyvale Materials Recovery and Transfer Station (SMaRT Station). The SMaRT Station processes mixed garbage from Palo Alto and recovers recyclable and compostable materials that would have otherwise gone to landfill.

The City has innovative outreach and education programs, including Zero Waste Block Leaders and Champions and Green Teams at most Palo Alto schools. The Zero Waste programs are supported by the City’s Zero Waste policies, which include: a tiered rate system to incentivize creating less garbage, plastic bag and Styrofoam bans, construction debris recycling and deconstruction incentives, Zero Waste requirements at special events, and the City’s Environmentally Preferred Purchasing Policy.

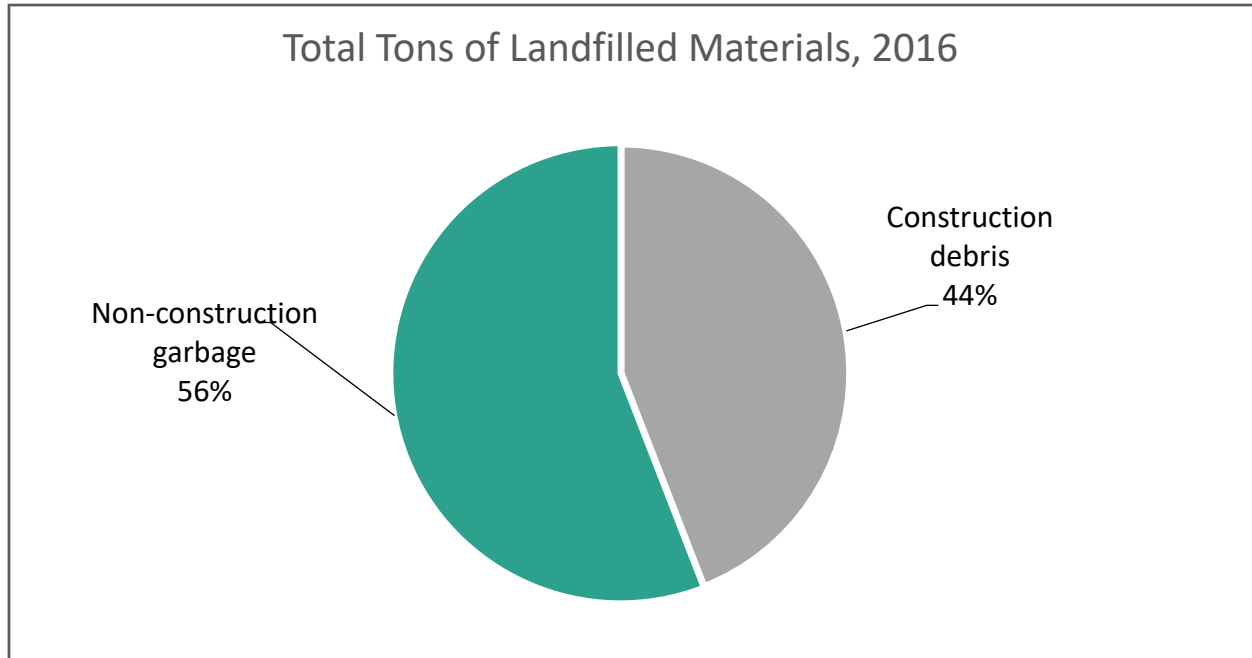


Waste Station Monitors at Barron Park Elementary

Attachment 1 includes a comprehensive list of the City’s current Zero Waste programs.

TARGETED MATERIALS AND GENERATORS

Materials are generated from many different sources, including households, businesses, institutions (like hospitals and schools), and construction sites. In 2016, 44% of landfilled materials were from construction projects and 56% were from all other sources.



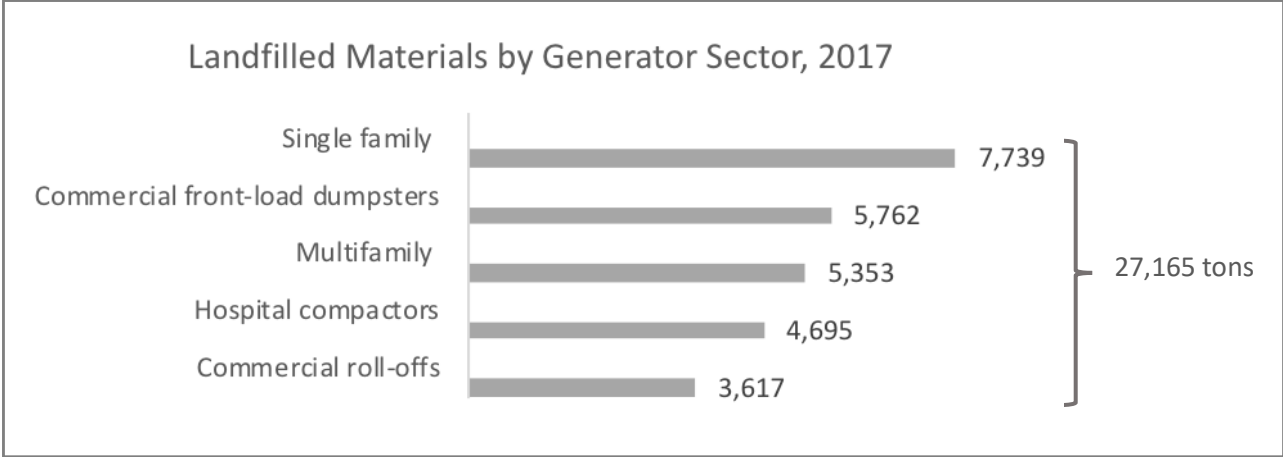
Construction projects have a high recycling rate. In 2016, they achieved 72% diversion. However, there is so much construction activity that the 28% of construction materials that are being landfilled still account for 44% of the total amount of waste landfilled by Palo Alto. These materials include: composite materials (things stuck to other things), mixed residue and fines (materials too small to recover for recycling), and non-recyclable items (including painted or treated wood, rubber, non-recyclable plastics).



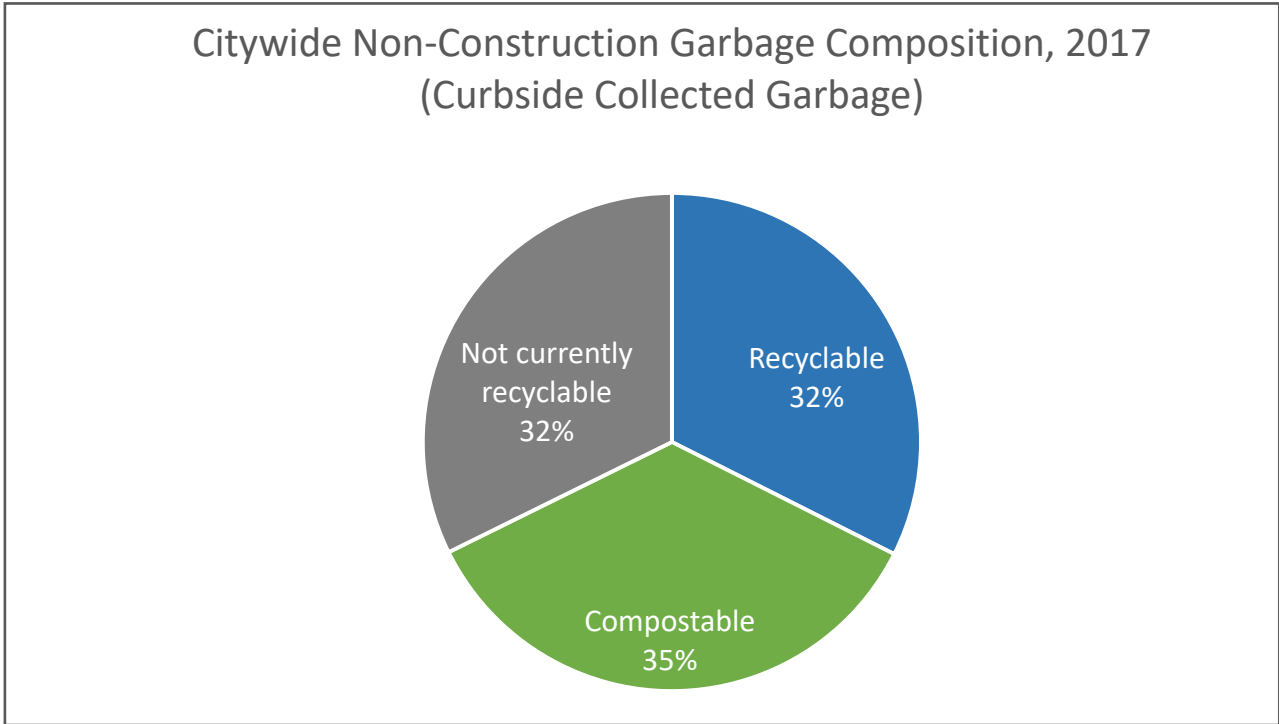
Zanker Materials Processing Facility

Material Composition

To plan for 95% diversion, the City conducted a waste characterization study profiling each of the City’s non-construction garbage generator sectors, including residential, commercial, industrial and institutional generators. In 2017, 27,165 tons of materials were disposed in landfills from these non-construction sources.

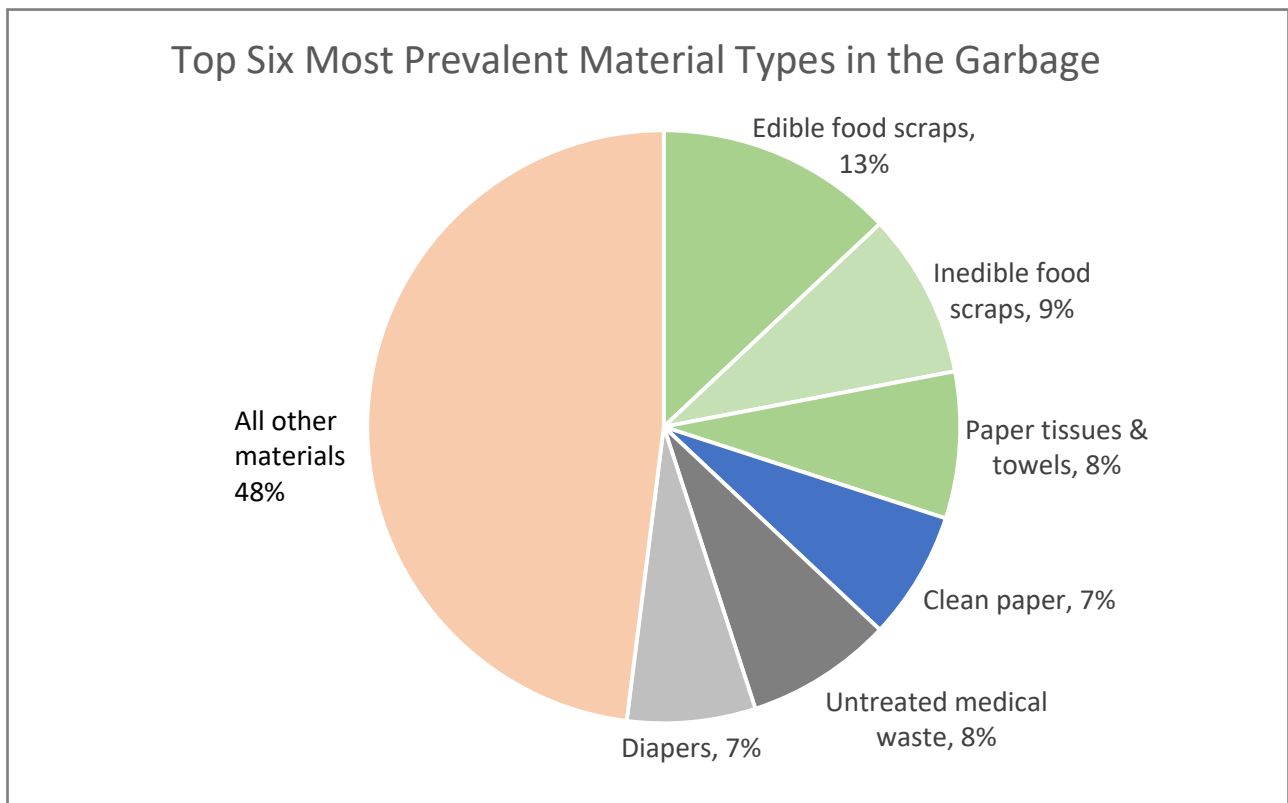


The results of the waste characterization study show that 67% of what is currently thrown away could have been recycled or composted through the City’s current programs.



The waste characterization study also identified the individual material types that were more prevalent in the garbage. The following material types account for 52% of what is thrown away by Palo Alto generators.

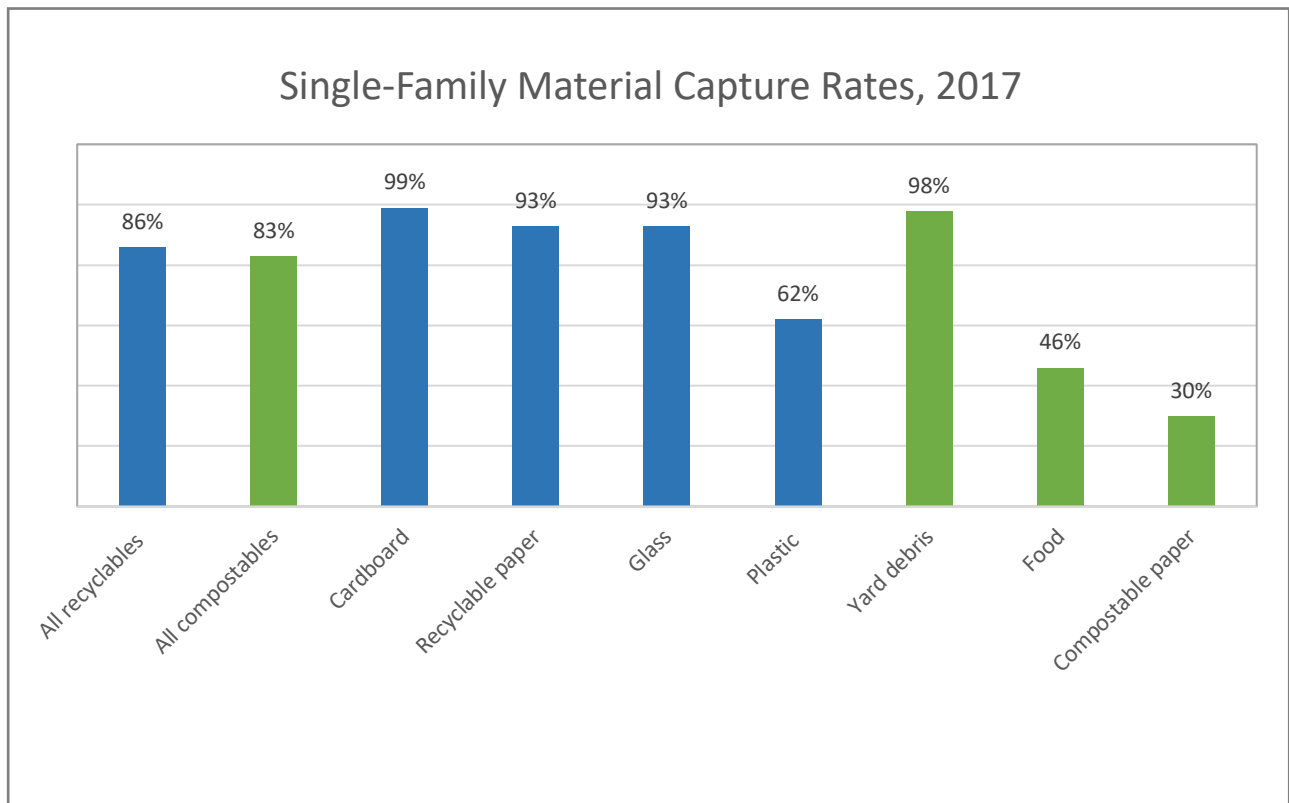
1. Edible food scraps (food that could have been eaten, but was thrown away) – 13%
2. Inedible food scraps (pits, peels, cores, shells, etc.) – 9%
3. Untreated medical waste (we need to work with our hospitals to address) – 8%
4. Paper tissues & towels (we need to put these in the green cart) – 8%
5. Clean paper (we need to put this in the blue cart) – 7%
6. Diapers (we need a disruptive solution) – 7%



Single-Family Residential Material “Capture Rates”

A capture rate indicates what proportion of a material type is being placed in the correct container. Capture rates for the single-family residential sector were able to be included in the waste characterization study because waste samples were taken from the residential garbage, recycle and compost containers. This was only done for the single-family residential sector due to cost considerations.

Even though the garbage contains materials that could have been recycled or composted, overall residents in Palo Alto are doing a good job of sorting materials correctly. Single-family generators are “capturing” 86% of recyclable materials and 83% of compostable materials. Some materials types, such as plastics, food and compostable paper have lower capture rates.



RESEARCH AND PUBLIC INPUT

To identify solutions for achieving 95% diversion, the City conducted research and presented the results at two citywide workshops. Over 100 different ideas were researched and vetted using the U.S. EPA Managing and Transforming Waste Streams Tool.

Workshop participants received information about new policies, programs and infrastructure projects that could be undertaken by the City to address materials generated by residential, commercial, construction, and self-haul generators.

Participants then broke up into small groups for longer discussions about each of the alternatives. Additional ideas were recorded and each person identified their high priority items for implementation by the City.

Feedback was also gathered from the community through an online survey that asked for opinions on specific initiatives, but also allowed for participants to add their own ideas.

Results from the workshops and survey are included in Attachment 2.

This input was used to develop the final list of Zero Waste initiatives for implementation in the:

- Short-term (2018-2019)
- Medium-term (2020-2026)
- Long-term (2027-2030)

NEW ZERO WASTE INITIATIVES

Forty-eight Zero Waste initiatives were identified for implementation in the short-term 2018-2019, medium-term 2020-2026, and long-term 2027-2030. Under these time frames, the initiatives are listed in order of landfill diversion potential and include efforts focused on waste prevention, reuse, and recycling/composting using a variety of tactics such as changing local and state policies, new or expanded programs, and infrastructure development.

For each initiative, the following impacts have been identified and estimated:

- Potential landfill diversion tons - annual
- Greenhouse gas (GHG) emissions reduction potential in metric tons of carbon dioxide equivalent (MTCO₂e) - annual
- Staffing based on full-time equivalent (FTE) levels of existing staff – one time or ongoing effort
- Additional metrics for success
- Key performance indicators (KPIs)

Some initiatives require hauler, contractor, or consultant support. Costs have been included for those initiatives. The assumptions and calculations for the diversion and greenhouse gas emissions reductions are included in Attachment 3.

Short-Term Programs (2018-2019)

The following 20 initiatives were chosen for short-term implementation. These initiatives focus on materials that make up a large percentage of our waste stream (e.g., construction and demolition), are natural outgrowths of programs we already have (e.g., mandatory ordinance enforcement), and/or improve our focus higher up the waste hierarchy to waste reduction and reuse (e.g., waste generation metric and goal, residential food waste reduction).

1. Require Deconstruction and Source Separation of Construction Materials – Explore the development of an ordinance to require deconstruction and source separation for the purposes of 1) increasing salvage/reuse to highest extent possible, 2) increasing the amount and quality of recyclable materials for all construction and demolition projects. Demolishing entire buildings and combining the materials in a single box would no longer be allowed. Consider provisions that encourage or require recovery for reuse as much as practical. Consider provisions that require



Adaptive reuse refers to the process of **reusing** an old site or building for a purpose other than which it was built or designed for. The Art Center is a local example.

commercial buildings to make materials available for salvage for a period of time and to publicly advertise salvage opportunities (e.g., dates, times, materials available). Explore incentives to encourage remodeling and adaptive reuse of buildings, including easier permitting and financial incentives. Also consider adding a new metric and KPI for deconstruction.

Diversion Potential	3,330 tons
GHG Emissions Reduction Potential	8,580 MTCO ₂ e
Staff Levels	0.2 FTE one time
Costs: Ongoing annual costs of \$460,000 to add full time driver, half-time administrative support, and additional processing for GreenWaste, as well as \$20,000 consultant support to monitor customers for compliance	
Additional Metrics for Success: Council adoption of municipal code amendment requiring deconstruction and source separation of construction materials	
KPIs: Landfill reduction, GHG reduction	

2. Direct Mixed Construction Materials to High Diversion Construction Materials Recycling Facilities – Explore the development of an ordinance to require that all mixed construction and deconstruction materials be delivered to a certified high diversion recycling facility and investigate the feasibility of developing and implementing an automated data management system.

Diversion Potential	2,320 tons
GHG Emissions Reduction Potential	7,850 MTCO ₂ e
Staff Levels	0.02 FTE one time
Cost: \$30,000 one time for consultant support	
Additional Metrics for Success: Council adoption of municipal code amendment requiring all mixed construction and deconstruction materials be delivered to certified facilities	
KPIs: Landfill reduction, GHG reduction	

3. Mandatory Ordinance Enforcement for Commercial – Expand and improve outreach and enforcement of sorting requirements for commercial customers (including multifamily customers).

Diversion Potential	2,070 tons
GHG Emissions Reduction Potential	4,400 MTCO ₂ e
Staff Levels	0.75 FTE ongoing
Costs: \$60,000 annually for half-time GreenWaste Environmental Outreach Coordinator	
Additional Metrics for Success: <ul style="list-style-type: none"> • Create enforcement procedure • Implement enforcement procedure 	
KPIs: Landfill reduction, GHG reduction	

4. Construction Project Recycling Technical Assistance – Provide technical assistance and outreach to contractors and permittees about the City’s ordinance requirements and provide referrals to local reuse, recycling and deconstruction service providers.

Diversion Potential	1,900 tons
GHG Emissions Reduction Potential	4,890 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: \$300,000 over a 3 year period for consultant support, \$60,000 per year for half-time GreenWaste Environmental Outreach Coordinator	
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Develop outreach and technical assistance program and materials for construction and deconstruction contractors • Implement outreach and technical assistance program 	
KPIs: Landfill reduction, GHG reduction	

5. Statewide Packaging and Product Design – Advocate for statewide packaging and product design policies that encourage items to be repairable, reusable, fully recyclable/compostable, and less-toxic. This includes membership in statewide organizations (California Product Stewardship Council, Californians Against Waste) and submitting testimony to legislative and regulatory proceedings.

Diversion Potential	790 tons
GHG Emissions Reduction Potential	1,500 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Costs: \$10,000 annually for memberships	
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Continue membership in CPSC and support of CAW • Support legislation that furthers Zero Waste • Support and participate in CalRecycle’s packaging requirements policy creation 	
KPIs: Generation reduction, GHG reduction	

6. Collect Additional Items for Landfill Diversion (e.g., diapers, aseptic containers, pet waste) – Identify strategies to divert hard to recycle or compost items.

Diversion Potential	620 tons
GHG Emissions Reduction Potential	570 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: TBD ongoing	
Additional Metrics for Success: Additional items collected for recycling and/or composting	
KPIs: Landfill reduction, GHG reduction	

7. Plastics Conversion - Develop pilots to convert non-recyclable plastics and multi-layered products to useful chemicals or products.

Diversion Potential	590 tons
GHG Emissions Reduction Potential	950 MTCO ₂ e
Staff Levels	0.02 FTE one time
Cost: TBD ongoing	
Additional Metrics for Success: Participate in a plastics and multi-layered products conversion pilot	
KPIs: Landfill reduction, GHG reduction	

8. Textile Collection for Reuse & Recycling – Research and implement a program for residents and businesses to divert textiles for reuse and recycling. Investigate feasibility of adding bagged or boxed textiles to the curbside collection program.

Diversion Potential	460 tons
GHG Emissions Reduction Potential	3,330 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: TBD ongoing	
Additional Metrics for Success: Textile collection program added to curbside collection program	
KPIs: Landfill reduction, GHG reduction	

9. Waste Reduction for Diapers – Explore incentives and requirements for reusable and/or compostable diapers.

Diversion Potential	450 tons
GHG Emissions Reduction Potential	390 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Costs: \$20,000 one time for consultant support	
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Determine the type of diaper(s) to incentivize • Establish an incentive program for reusable and/or diapers 	
KPIs: Generation reduction, Landfill reduction, GHG reduction	



Diapers comprise 16% of all residential discards (7% citywide)

10. Increase Collection of Reusable Items in the Clean Up Day Program – Enhance the reusable items component of the by-appointment Clean Up Days for both resident and businesses. Consider adding an additional clean-up day and collecting on a neighborhood wide basis. Consider partnering with a non-profit(s).

Diversion Potential	390 tons
GHG Emissions Reduction Potential	1,730 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: \$187,000 annually to add one full-time driver and to expand outreach and noticing	
Additional Metrics for Success: Enhance the reuse element of the Clean Up Day program and include a partnership with at least one local reuse non-profit	
KPIs: Landfill reduction, GHG reduction	

11. Outreach and Technical Assistance for Self-Haul – Develop outreach and technical assistance to customers that self-haul materials generated within Palo Alto.

Diversion Potential	380 tons
GHG Emissions Reduction Potential	980 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: \$30,000 per year for 3 years for consultant support	
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Develop outreach and technical assistance program and materials for self-haul customers • Implement outreach and technical assistance program 	
KPIs: Landfill reduction, GHG reduction	

12. Residential Food Waste Reduction – Expand outreach and education programs to reduce wasted food. Learn the barriers and benefits for Palo Alto residents so outreach addresses those that lead to measurable change.

Diversion Potential	310 tons
GHG Emissions Reduction Potential	270 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Costs: \$20,000 one time for consultant support	
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Conduct food waste reduction barriers and benefits research • Create an engagement program based on that research 	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

13. Foodware Packaging Reduction Plan – Develop a Foodware Packaging Reduction Plan to reduce the amount of single-use, disposable foodware packaging generated in Palo Alto, encourage reusable foodware items, and to ensure that the single-use disposable items that are generated are recycled or composted. As a first phase of implementation, explore the development of an ordinance to require some single-use items (e.g., cutlery, straws, stirrers) to be compostable in Palo Alto’s program and provided only upon request.

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.1 FTE one time
KPIs: Generation reduction, landfill reduction, GHG reduction	

14. Add a Waste Generation Metric(s) and Goal(s) to the Current Landfill Diversion Goals – Explore metrics to adopt that focus on reducing the creation of waste. Establish targets for reducing discarded materials (garbage, recycle, and compost). Include metrics that address climate/carbon impacts and footprints.

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: \$10,000 one time for consultant support	
Additional Metrics for Success: Waste reduction metric and targets adopted by Council	
KPIs: Generation reduction, GHG reduction	



GreenWaste’s all-electric collection truck contributes to the City’s greenhouse gas reduction goals.

15. Wood to Biochar – Explore the production and application of biomass power-generation technology from tree trimming operations and the residual biochar application on public lands within the City.

Diversion Potential	240 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.02 FTE one time
Cost: TBD ongoing	
Additional Metrics for Success: Determine the cost effectiveness and feasibility of wood to biochar for Palo Alto	
KPIs: Landfill reduction, GHG reduction	



Biochar is charcoal used as a soil amendment. **Biochar** is a stable solid, rich in carbon, and can endure in soil for thousands of years. Like most charcoal, **biochar** is made from biomass via pyrolysis. **Biochar** application to soil is being evaluated as an approach to carbon sequestration.

16. Color Tinted Clear Bags – Explore the development of an ordinance to require all commercial customers who use bags to use color-tinted clear plastic bags (blue tint for recycle, green tint for compost, clear for garbage) and compostable bags for compost to consolidate materials by material type for better monitoring and enforcement of waste sorting.

Diversion Potential	230 tons
GHG Emissions Reduction Potential	430 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Municipal code amendment requiring color tinted clear bags adopted by Council	
KPIs: Landfill reduction, GHG reduction	

17. Commercial Food Donations – Building on the 2015 Food Rescue Services, Barriers, and Recommendations in Santa Clara County, continue participation in County’s Silicon Valley Food Rescue working group to create a sustainable food rescue system in Santa Clara County, where all surplus edible food goes to food insecure people. Consider policies and programs applicable

in Palo Alto according to the findings from the county working group. Integrate with food waste prevention efforts.

Diversion Potential	160 tons
GHG Emissions Reduction Potential	140 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Continue involvement in Silicon Valley Food Rescue • Pilot A La Carte food truck in Palo Alto 	
KPIs: Landfill reduction, GHG reduction	

18. Encourage Residential Application of Compost – Explore the feasibility of making compost available to residents for no charge to encourage its use.

Diversion Potential	30 tons
GHG Emissions Reduction Potential	30 MTCO ₂ e
Staff Levels	0.02 FTE one time
Cost: \$10,000 on going	
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Increase markets for organic materials • Achieve co-benefits carbon sequestration 	
KPIs: Landfill reduction, GHG reduction	

19. Sustainable Repair Café Function - Work with Repair Café leaders and other repair community stakeholders to explore ways to create a permanent, sustainable Repair Café function.

Diversion Potential	150 tons
GHG Emissions Reduction Potential	770 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Increase number of repaired items per year and increase use of repair and reuse services over buying new items	
KPIs: Generation reduction, Landfill reduction, GHG reduction	



Silicon Valley legend Dan Kottke helped out at the fourth Palo Alto Repair Café. Dan is known as 'Apple employee number one' and was a major contributor to the Apple I, Apple II and the first Macintosh computers.

20. Improve Recycling Collection and Processing – Explore the feasibility of adding an additional collection route to improve processing of contaminated recyclables to reduce rejection of the materials in the market. Provide more and better sorting of marginally contaminated recyclables at the processing facility to ensure the marketability of the materials.

Diversion Potential	380 tons
GHG Emissions Reduction Potential	770 MTCO ₂ e
Staff Levels	0.02 FTE one time
Costs: \$371,000 ongoing for an additional driver and enhanced sorting for GreenWaste	
Additional Metrics for Success: Increase quality of recycled feedstocks and reduce rejection of contaminated loads	
KPIs: Landfill reduction, GHG reduction	

Medium-Term Programs (2020-2026)

The following 18 initiatives were chosen for medium-term implementation. These initiatives focus on continuing to increase waste prevention and reuse/repair efforts within the community, but also planning for improved material processing.

21. Improve Municipal Solid Waste (MSW), Recyclable Materials, and Compostable Materials Processing - Use Request for Proposal process to pursue more effective material recovery facilities for MSW when SMaRT agreement ends in 2021. At a minimum, ensure that residues after processing are further composted or digested to minimize landfilling.

Diversion Potential	2,820 tons
GHG Emissions Reduction Potential	5,240 MTCO ₂ e
Staff Levels (RFP development not included)	0.1 FTE one time
Additional Metrics of Success: Council approval of a new contract for more effective MSW processing	
KPIs: Landfill reduction, GHG reduction	

22. Mandatory Ordinance Enforcement for Residential - Expand residential outreach efforts (e.g., pilot providing posters on carts or inside lids). Explore providing periodic auditing of residential collection containers and provide outreach and education to residents to ensure that they are aware of the mandatory recycling program and how to comply with more outreach provided to residents who require more assistance (as indicated by audit results). Explore options for shared containers.

Diversion Potential	1,380 tons
GHG Emissions Reduction Potential	2,320 MTCO ₂ e
Staff Levels	0.2 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Increase participation in residential recycling and composting program • Decrease contamination in the recycle, compost and landfill containers 	
KPIs: Landfill reduction, GHG reduction	

23. Commercial Waste Prevention Technical Assistance - Expand commercial technical assistance program to include waste prevention and reuse. Provide tools to identify and redesign wasteful practices, products and packaging, make business case for Zero Waste, and purchase more environmentally preferred products (e.g., the current ReThink Disposable program).

Diversion Potential	890 tons
GHG Emissions Reduction Potential	1,890 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Additional Metrics for Success: Reduce generation of products and packing at Palo Alto businesses and institutions	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

24. Business Outreach (presentations, door-to-door outreach, Zero Waste Champions) - Expand outreach and technical assistance to industrial, commercial and institutional generators addressing recycling and/or composting logistics and increasing employee participation. Conduct focus group on how to make recycling and composting more intuitive.

Diversion Potential	890 tons
GHG Emissions Reduction Potential	1,890 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Increase participation in recycling and composting programs • Promote Zero Waste culture at Palo Alto businesses and institutions 	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

25. Plastic Recovery Facility - Participate in the development of a regional plastic recovery facility for hard to recycle plastics with recycling service providers, business generators, and other communities throughout the Bay Area.

Diversion Potential	590 tons
GHG Emissions Reduction Potential	950 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Determination of the feasibility of a regional plastic recovery facility	
KPIs: Landfill reduction, GHG reduction	

26. Foodware Packaging Reduction – Continue implementation of the Foodware Packaging Reduction Plan. Explore modification of the foodware ordinance to require: 1) use of reusables (dishes, cups, utensils) for on-site dining; 2) a reusable takeout packaging option; 3) a charge for disposable takeout foodware (e.g., cups, clamshells); and 4) all disposable foodware be free of certain highly toxic chemicals known to migrate into food and beverages and be compostable in the City’s waste management programs.

Diversion Potential	420 tons
GHG Emissions Reduction Potential	780 MTCO ₂ e
Staff Levels	0.1 FTE one time
Additional Metrics for Success: Council adoption of modified foodware ordinance to further reduce foodware packaging	
KPIs: Generation reduction, Landfill reduction, GHG reduction	



10 downtown restaurants are participating in the City’s Go Box pilot.

27. Commercial Food Waste Prevention - Explore expansion of outreach to grocery stores, restaurants, school cafeterias and other food generators on opportunities and practices to prevent food waste. Work with Santa Clara County, local business, and regional industry associations to hold Waste Less Food panels. Incentivize food waste reduction tools such as Lean Path, etc.

Diversion Potential	420 tons
GHG Emissions Reduction Potential	370 MTCO ₂ e
Staff Levels	0.05 FTE ongoing
Additional Metrics for Success: Reduce generation of wasted food	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

28. Improve Green Purchasing - Finalize the update to the City’s Environmentally Preferred Purchasing Policy and operating procedures. Include plans for staff education and policy awareness. Contract staff support contingent on budget approval.

Diversion Potential	380 tons
GHG Emissions Reduction Potential	1,300 MTCO ₂ e
Staff Levels	0.04 FTE one time
Costs: \$120,000 for contract staff support	
Additional Metrics for Success: Updated Environmentally Preferred Purchasing Policy adopted	
KPIs: Generation reduction, Landfill reduction, Toxics reduction, GHG reduction	

29. Issue Waste Reduction Grants - Explore the feasibility of providing grants to non-governmental organizations (NGOs), schools, businesses and/or individuals to assist the community to implement innovative reduction, reuse, recycling and composting programs and to help foster the culture change needed to achieve Zero Waste. NGOs outside of the city that provide services within the city should be eligible for grants (e.g., gleaners).

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Costs: \$10,000 annual grant program	
Additional Metrics of Success: Implementation of grants program supporting local NGOs in waste prevention and recycling	
KPIs: Generation reduction, Landfill reduction, Toxics reduction, GHG reduction	

30. Incentives for Reuse, Rental, Repair Industry - Explore the feasibility of providing incentives for reuse, rental and repair through contract incentives, material exchanges, wood reuse, and direct assistance.

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics of Success: Development of repair and reuse culture in Palo Alto	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

31. Bans or Fees – Identify additional toxic, hard to recover products, or packaging for regulation (through bans, takebacks, fees, incentives or other regulation). Targeted materials could include expanded polystyrene foam products that are not included in the current ban (such as meat trays and egg cartons), delivery service packaging (such as cold packs and non-

recyclable plastics), Mylar packaging (such as chip bags and juice pouches), or other hard to recover products or packaging.

Diversion Potential	260 tons
GHG Emissions Reduction Potential	300 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Council adoption of new ordinances addressing hard-to-recycle products or packaging	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

32. Residential Food Donations - Expand Palo Alto’s current residential food sharing network (gleaning, donations). Integrate with food waste prevention efforts.

Diversion Potential	200 tons
GHG Emissions Reduction Potential	180 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Increase donations and gleaning • Promote sharing economy 	
KPIs: Landfill reduction, GHG reduction	

33. Retailer Take-Backs – Explore the development of an ordinance to require retailers to takeback key products and packaging that they sell to improve convenience for consumers or to collect materials that are not acceptable in the curbside recycling program (e.g., batteries, pharmaceuticals, compact fluorescent bulbs). Research should include: options for extended producer responsibility for manufacturers and distributors with pickup points at retail sites (such as in the Alameda County pharmaceutical takeback ordinance); and “milk run” pickups from retail sites by the City’s contractor or household hazardous waste program (such as the in the San Luis Obispo Integrated Waste Agency takeback program). Coordinate with neighboring cities to adopt ordinances at same time, and/or to take effect once all neighboring cities adopt.

Diversion Potential	190 tons
GHG Emissions Reduction Potential	320 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Council adoption of take-back ordinances addressing hard-to-recycle products or packaging	
KPIs: Landfill reduction, GHG reduction	

34. No Green or Brown Colored Non-Compostable Produce Bags – Explore the development of an ordinance to prohibit the sale or distribution of green or brown-tinted produce bags that are not compostable. Clear bags and produce bagged outside of City (e.g., potatoes packed in brown bags to reduce oxidation) would be permissible.

Diversion Potential	120 tons
GHG Emissions Reduction Potential	110 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Council adoption of new ordinance addressing non-compostable bags	
KPIs: Landfill reduction, GHG reduction	

35. Residential Outreach to Encourage Zero Waste Lifestyle - Expand outreach and education programs to promote adoption of a “Zero Waste lifestyle.” Promote online resources and best practices for reducing waste. Conduct focus group on how to make recycling and composting more intuitive.

Diversion Potential	80 tons
GHG Emissions Reduction Potential	110 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Expand adoption of Zero Waste Lifestyle • Promote Zero Waste culture with Palo Alto residents 	
KPIs: Landfill reduction, GHG reduction	

36. Free Collection of Small Quantities of Construction Debris from Residents - Explore providing a reuse and recycling opportunity for small quantities of building materials that are generated through home improvement projects. Investigate feasibility of collecting small amounts of mixed construction debris in a special container.

Diversion Potential	20 tons
GHG Emissions Reduction Potential	0 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Small quantities of reusable and recyclable building materials added to on-call collection program	
KPIs: Landfill reduction, GHG reduction	

37. Promote Access to Goods Over Ownership - Explore how to promote services that provide short term rentals of reusable goods such as tools, sports equipment, party equipment (tables, chairs, serving utensils), as well as sharing websites. Explore a membership-based program that promotes community resource sharing while leveraging communal purchasing power (e.g., a Tool Library delivers affordable tool-lending services to individuals, businesses, and civic or community organizations).

Diversion Potential	10 tons
GHG Emissions Reduction Potential	80 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics of Success: Further enhancement of a reduce and reuse culture in Palo Alto	
KPIs: Generation reduction, GHG reduction	

38. Reusable Filling Stations at Stores and Zero Waste Supermarkets - Explore the promotion of purchasing items in bulk bins and bulk packages at local stores, the expansion of bulk bin sales at local stores, and Zero Waste supermarkets (everything is sold in bulk).

Diversion Potential	10 tons
GHG Emissions Reduction Potential	10 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics of Success: Increase in locations for bulk purchasing in Palo Alto	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

Long-Term Programs (2027-2030)

The final 10 initiatives were chosen for long-term implementation. These initiatives include more collaborative efforts.

39. Every Other Week Garbage Collection – Explore every other week garbage collection service options for both residential and commercial customers.

Diversion Potential	4,310 tons
GHG Emissions Reduction Potential	6,980 MTCO ₂ e
Staff Levels	0.1 FTE one time
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Achieve greater collection efficiencies • Increase participation in recycling and compost • Decrease contamination of recycling and compost in the trash 	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

40. Building Materials Reuse Center - Investigate the feasibility of creating a Building Materials Reuse Center in the region for the sale of salvaged building materials. The building materials would be available for sale to the public and the Center would provide an outlet for resale from deconstruction.

Diversion Potential	670 tons
GHG Emissions Reduction Potential	2,840 MTCO ₂ e
Staff Levels	0.05 FTE one time
Additional Metrics for Success: Local resource for reused building materials	
KPIs: Landfill reduction, GHG reduction	

41. Require Items to be Reusable, Compostable, or Recyclable - Explore the development of an ordinance to require all products and packaging sold in Palo Alto to be reusable, compostable, or recyclable, in that order of priority.

Diversion Potential	470 tons
GHG Emissions Reduction Potential	880 MTCO ₂ e
Staff Levels	0.05 FTE one time
Additional Metrics for Success: Council adoption of ordinance requiring reusable, compostable or recyclable products	
KPIs: Landfill reduction, GHG reduction	

42. Market Development (local, regional, state, national) - Explore more active promotion of local businesses that repair, refurbish, market, and sell used, recycled content or compost products (through on-line resource guides, outreach and advertising); and local flea market.



Since 2016, 25% of the City’s whole house demolition projects have been deconstructed instead of demolished.

Consider expanding promotion of garage sales for sale of reusable items and swaps for household goods (e.g., clothing, toys).

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.02 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> Promotion and visibility of repair and reuse organizations within the region Increased use of recycled content and compost products. 	
KPIs: Landfill reduction, GHG reduction	

43. Recycling, Reuse & Repair Directory - Explore adding reuse and repair locations to RecycleWhere and/or developing a supplemental web-based directory specific to reuse and repair. This new directory could also include Zero Waste vendors and caterers.

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Comprehensive resource about how to recycle, reuse or repair anything in Palo Alto	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

44. Zero Waste Research Initiative - Work collaboratively with industry, government and educational institutions to find new solutions for items that are hard to reuse, recycle or compost in Palo Alto, connecting with the latest developments, innovation and innovative funding (including venture capital). Work with Stanford University on research, development, and policies to support innovations.

Diversion Potential	290 tons
GHG Emissions Reduction Potential	470 MTCO ₂ e
Staff Levels	0.04 FTE one time
Additional Metrics for Success:	
<ul style="list-style-type: none"> Engagement with regional partners Adoption by local educational institutions 	
KPIs: Generation reduction, Landfill reduction, Toxics reduction, GHG reduction	

45. Reuse Exchange - Explore and develop a program that encourages businesses to institutionalize internal reuse – reuse closets for office supplies or tools, surplus sales to other businesses, remnants, surplus goods and equipment, donating goods to non-profits and, finally, giving items away.

Diversion Potential	230 tons
GHG Emissions Reduction Potential	940 MTCO ₂ e
Staff Levels	0.04 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> Adoption of practice by local businesses and institutions Transition to sharing economy 	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

46. Promote Zero Waste Credits in CalGreen Building Code (reuse, recycling, composting, and recycled products) - Participate in Green Building Advisory Group. Provide information on Palo Alto Zero Waste policies and programs for construction and demolition and advocate for statewide requirements that support Zero Waste in CalGreen Building Code.

Diversion Potential	190 tons
GHG Emissions Reduction Potential	490 MTCO ₂ e
Staff Levels	0.02 FTE one time
Additional Metrics for Success: Universal adoption of Zero Waste programs in construction and deconstruction	
KPIs: Landfill reduction, GHG reduction	

47. Businesses Recognition - Assess city and non-city recognition and certification programs active in Palo Alto (e.g., certified Green business, certified Zero Waste facilities, Business Environmental Network). Explore ways to bolster programs. Hold opportunities and challenges meet-ups with representatives. Develop on-going cooperation agreements. Work with Chamber of Commerce and Palo Alto Downtown Business and Professional Association, regarding (re)integrating green priorities and projects into each group’s mission and vision as per the Economic Development Policy. Engage with large janitorial contractors to support “back of house” recognition. Develop draft multi-year Green Business Recognition Strategy. Hold quarterly meet-ups for businesses interested in going green including all interested parties.

Diversion Potential	30 tons
GHG Emissions Reduction Potential	60 MTCO ₂ e
Staff Levels	0.04 FTE ongoing
Additional Metrics for Success:	
<ul style="list-style-type: none"> • Increase exposure of Zero Waste businesses • Promotion of Zero Waste culture 	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

48. Palo Alto Businesses Product & Packaging Redesign - Launch/participate in a regional initiative to encourage businesses to use reusable, recycled content and eco-friendly materials in the design and redesign of new and existing products and packaging; collaborate with local economic development staff to provide assistance and incentives. Support the San Jose Recycled Market Development Zone and encourage Palo Alto businesses to buy recycled content products from them.

Diversion Potential	30 tons
GHG Emissions Reduction Potential	60 MTCO ₂ e
Staff Levels	0.1 FTE one time
Additional Metrics for Success: Local leadership in product and packaging redesign	
KPIs: Generation reduction, Landfill reduction, GHG reduction	

COSTS AND KEY PERFORMANCE INDICATORS

Zero Waste Initiatives	Projected Diversion	Projected GHG Reduction	Estimated Costs		KPIs			
			FTE = Full Time Equivalent \$ = Hauler/Contractor/Consultant Support		GR = Generation Reduction LR = Landfill Reduction TR = Toxics Reduction GHG = GHG Reduction			
	(Tons)	(MTCO _{2e})	FTE	\$	GR	LR	TR	GHG
Short-Term (2018-2019)								
1. Require Deconstruction and Source Separation of Construction Debris	3,330	8,580	0.2 ¹	\$480K		.		.
2. Direct Mixed Construction Debris to High Diversion Construction Debris Recycling Facilities	2,320	7,850	0.2 ¹	\$30K ¹		.		.
3. Mandatory Ordinance Enforcement for Commercial	2,070	4,400	0.75	\$60K		.		.
4. Construction Debris Recycling Technical Assistance	1,900	4,890	0.02 ¹	\$300K ¹ \$60K		.		.
5. Statewide Packaging and Product Design	790	1,500	0.02	\$10K	.			.
6. Collect Additional Items for Landfill Diversion	620	570	0.02 ¹	TBD		.		.
7. Plastics Conversion	590	950	0.02 ¹	—		.		.
8. Textile Collection for Reuse & Recycling	460	3,330	0.2 ¹	TBD		.		.
9. Waste Reduction for Diapers	450	390	0.02 ¹	\$20K ¹	.	.		.
10. Increase Collection of Reusable Items in the Clean Up Day Program	390	1,730	0.02 ¹	\$187K		.		.
11. Outreach and Technical Assistance for Self-Haul	380	980	0.02 ¹	\$90K ¹		.		.
12. Residential Food Waste Reduction	310	270	0.02 ¹	\$20K ¹	.	.		.
13. Foodware Packaging Reduction Plan	290	470	0.1 ¹	—	.	.		.
14. Add a Waste Generation Metric and Goal to the Current Landfill Diversion Goals	290	470	0.02 ¹	\$10K ¹	.			.
15. Wood to Biochar	240	470	0.02 ¹	TBD		.		.
16. Color Tinted Clear Bags	230	430	0.02 ¹	—		.		.
17. Commercial Food Donations	160	140	0.02	—		.		.
18. Encourage Residential Application of Compost	30	30	0.02 ¹	\$10K		.		.
19. Sustainable Repair Café Function	150	770	0.02	—	.	.		.
20. Improve Recycling Collection and Processing	380	770	0.02 ¹	\$371K		.		.
Subtotal	15,380	38,990	1.75	\$1.65M				

¹One time staff support or one time costs

ZERO WASTE PLAN

Zero Waste Initiatives	Projected Diversion	Projected GHG Reduction	Estimated Costs		KPIs			
	(Tons)	(MTCO _{2e})	FTE = Full Time Equivalent \$ = Hauler/Contractor/Consultant Support	\$	GR = Generation Reduction	LR = Landfill Reduction	TR = Toxics Reduction	GHG = GHG Reduction
Medium-Term (2020-2026)								
21. Improve Municipal Solid Waste (MSW), Recyclable Materials, and Compostable Materials Processing	2,820	5,240	0.1 ¹	\$ ²		.		.
22. Mandatory Ordinance Enforcement for Residential	1,380	2,320	0.2			.		.
23. Commercial Waste Prevention Technical Assistance	890	1,890	0.02		.	.		.
24. Business Outreach	890	1,890	0.02		.	.	.	.
25. Plastic Recovery Facility	590	950	0.02 ¹			.		.
26. Foodware Packaging	420	780	0.1 ¹		.	.		.
27. Commercial Food Waste Prevention	420	370	0.05		.	.		.
28. Improve Green Purchasing	380	1,300	0.04 ¹	\$120K	.	.	.	.
29. Issue Waste Reduction Grants	290	470	0.02	\$10K	.	.	.	.
30. Incentives for Reuse, Rental, Repair Industry	290	470	0.02 ¹		.	.		.
31. Bans or Fees	260	300	0.02 ¹		.	.		.
32. Residential Food Donations	200	180	0.02 ¹			.		.
33. Retailer Take-Backs	190	320	0.02 ¹			.		.
34. No Green or Brown Colored Non-Compostable Produce Bags	120	110	0.02 ¹			.		.
35. Residential Outreach to Encourage Zero Waste Lifestyle	80	110	0.02			.	.	.
36. Free Collection of Small Quantities of Construction Debris from Residents	20	0	0.02 ¹			.		.
37. Promote Access to Goods Over Ownership	10	80	0.02 ¹		.			.
38. Reusable Filling Stations at Stores and Zero Waste Supermarkets	10	10	0.02 ¹		.	.		.
Subtotal	9,260	16,790	0.75	\$130K				

¹One time staff support or one time costs

²Most medium- and long-term costs are to be determined

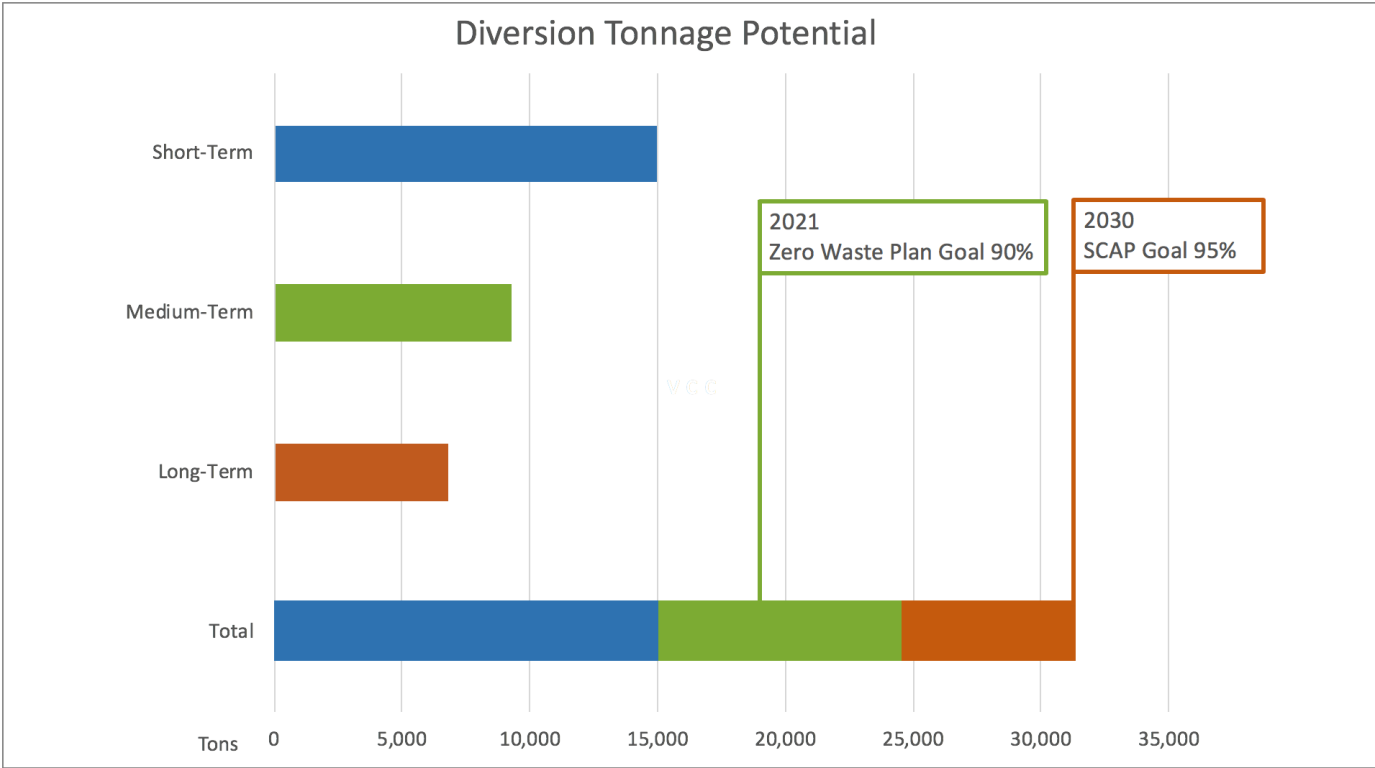
Zero Waste Initiatives	Projected Diversion	Projected GHG Reduction	Estimated Costs		KPIs			
	(Tons)	(MTCO _{2e})	FTE = Full Time Equivalent \$ = Hauler/Contractor/Consultant Support	\$	GR = Generation Reduction	LR = Landfill Reduction	TR = Toxics Reduction	GHG = GHG Reduction
Long-Term (2027-2030)								
39. Every Other Week Garbage Collection	4,310	6,980	0.1 ¹	\$ ²	.	.	.	.
40. Building Materials Reuse Center	670	2,840	0.05 ¹			.		.
41. Require Items to be Reusable, Compostable, or Recyclable	470	880	0.05 ¹			.		.
42. Market Development	290	470	0.02			.		.
43. Recycling, Reuse & Repair Directory	290	470	0.02 ¹		.	.		.
44. Zero Waste Research Initiative	290	470	0.04 ¹		.	.	.	.
45. Reuse Exchange	230	940	0.04		.	.		.
46. Promote Zero Waste Credits in CalGreen Building Code	190	490	0.02 ¹			.		.
47. Businesses Recognition	30	60	0.04		.	.		.
48. Palo Alto Businesses Product & Packaging Redesign	30	60	0.1 ¹		.	.		.
Subtotal	6,800	13,660	0.48					
Total	31,440	69,440	2.98	\$1.78M				

¹One time staff support or one time costs

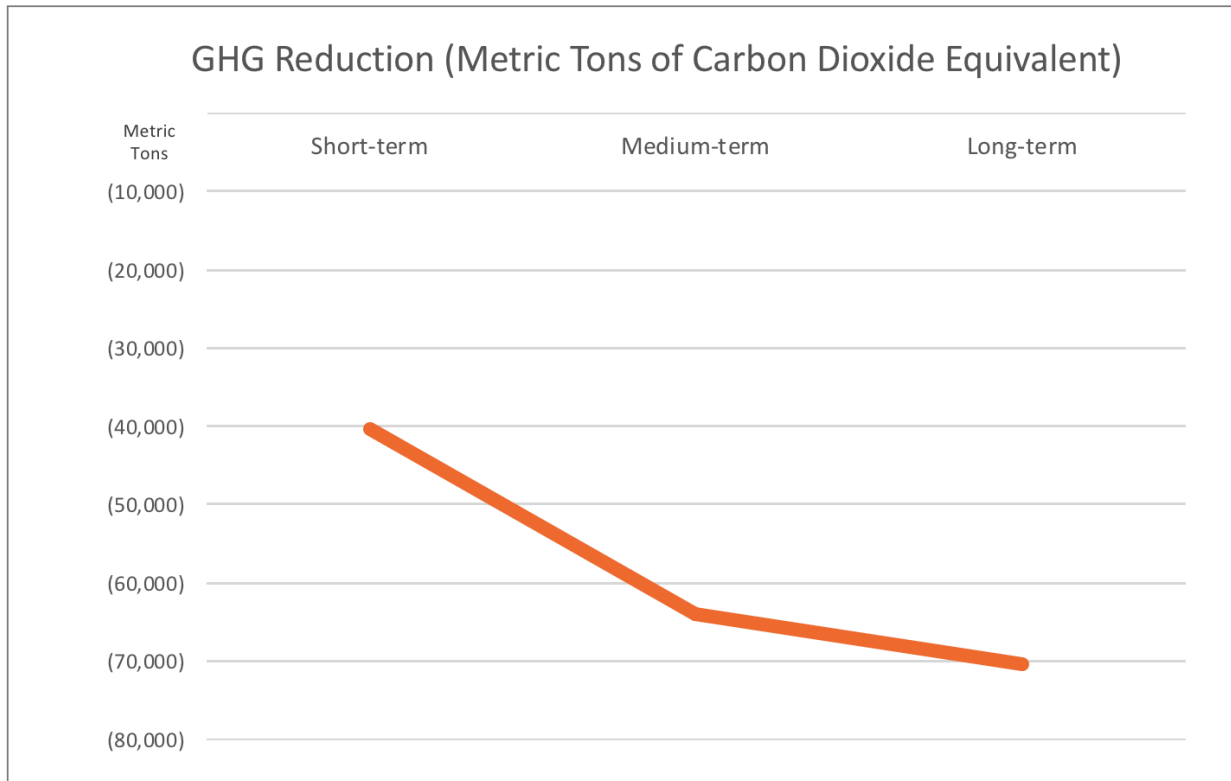
²Most medium- and long-term costs are to be determined

DIVERSION ESTIMATES AND GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

Implementing the Zero Waste initiatives identified in this plan update will help the City achieve its 95% goal. Using conservative estimates for capture rates by material type, the short-, medium-, and long-term Zero Waste initiatives would result in an additional 31,000 tons per year diverted from landfill. The assumptions and calculations are included in Attachment 3.



Waste prevention, recycling and composting activities also reduce greenhouse gas emissions. Using the U.S. EPA Waste Reduction Model (WARM), the Zero Waste initiatives to be undertaken in the short-, medium- and long-term are estimated to reduce greenhouse gas emissions by approximately 69,000 metric tons of carbon dioxide equivalent. The calculations and projections using WARM are included in Attachment 3. This will contribute to the City’s greenhouse gas emissions reduction goal of 80% below 1990 levels by 2030.



ATTACHMENT 1

CURRENT POLICIES AND PROGRAMS

Policies

- Rate Structure Incentive (pay as you throw)
- Service Provider Incentives and Requirements
- Environmentally Preferred Purchasing Policy
- Product policies (e.g., polystyrene and plastic bag bans)
- Construction and Demolition Recycling Requirements
- Zero Waste Requirements for Special Events
- Recycling and Composting Ordinance (recycling and composting are required)
- Zero Waste goal
- Zero Waste included in Climate Action Plan

Programs

- Universal Recycle and Compost Collection
- Anaerobic Digestion of Compostable Material
- Municipal Solid Waste Processing after source separation
- Mixed Construction and Demolition Processing
- Commercial Technical Assistance
- Zero Waste Block Leaders and Champions
- Support for Repair Café and Share Faires
- Home Composting workshops and free compost bins as incentive
- Outreach and Education
 - What Goes Where annual outreach
 - New resident/customer welcome information
 - General program outreach – workshops, shred events, Repair Café dates, etc.
 - Food waste reduction annual outreach
 - Give an experience annual outreach – holiday waste reduction
 - Monthly Zero Waste tip
 - Zero Waste eNewsletter
 - Community Based Social Marketing efforts



Most of the Zero Waste Block Leaders host “party packs” (reusable plates, cups, napkins, and cutlery) that neighbors can borrow to reduce waste from parties and picnics.

ATTACHMENT 2

WORKSHOP AND SURVEY RESULTS

Poster versions of the following matrix were presented at the workshops on January 25th and 27th. Participants in the workshops used “dot voting” to indicate their preferred policies and programs. The votes are indicated on the matrix using orange dots for the January 25th workshop and blue dots for the January 27th workshop.

Comments from the workshop participants were added to the matrix and are highlighted in different colors: January 25th workshop in orange, January 27th in blue.

The City also conducted an online survey using Survey Monkey. General comments from the survey were documented and matched up with the initiatives and included in the matrix. Comments from the survey respondents are highlighted in green.

Notes in the matrix indicate whether each comment was incorporated into the initiative descriptions or otherwise addressed. The initiatives were updated and renumbered for presentation in the plan based on whether they were recommended for implementation in the short-, medium-, or long-term. Some of the initiatives presented at the workshop were combined or renamed and the descriptions were updated for inclusion in the plan.

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
Community-Wide Policies					
Any way to incorporate diversity into Zero Waste?		Comment noted and is listed as a possible future project as part of this initiative.			
Integrate sustainability priorities into all City projects		Comment noted and is listed as a possible future project as part of this initiative.			
Lead by example		Comment noted and included 3.CW8. Improve green purchasing.			
19.CW1. Bans or Fees	Ban or limit sales of toxic or hard to recover products and product packaging by ordinance. Ban additional uses of expanded polystyrene foam (EPS). Adopt point-of-sale fees for products that are toxic, hard to reuse, recycle or compost and/or certain disposable items to incentivize customer reuse. Explore with express delivery services how to reduce packaging, takeback packaging and use reusables more.	Flexible plastic pouches, Mylar packaging, cold packs, composite film plastic, hard-to-recycle products (e.g. disposable diapers) and packaging (e.g. EPS blocks).	Staff time	<ul style="list-style-type: none"> ● ● 	<p>Short – research which products and packaging to target</p> <p>Medium – adopt Ordinances after develop Plan for each ban.</p>
Work with Amazon and other mail delivery vendors to reduce packaging waste (try reusables)					Comment noted and is listed as a possible future project as part of this initiative.
How to address Mylar packaging?		Comment noted and product is on our list of items to possibly address.			
Ban additional Styrofoam products		Short term– research additional Styrofoam products			
Need additional motivation to further reduce and reuse		Included in #19			
Support fees on disposable hot and cold beverage cups at local shops, on straws and disposable utensils, and on disposable takeout containers		Included in #19			
Support reusable, compostable or recyclable packaging alternatives including through consumer pressure		Included #19			
Support bans to reduce wasting		Included in #19			
Increase disposal fees		Included in #19			
36.CW2. Require items to be reusable, recyclable or compostable	Require all products and packaging sold in Palo Alto be reusable, recyclable or compostable by ordinance.	Non-reusable, non-recyclable, non-compostable products and packaging	Staff time	●●	Long

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
20.CW3. Reusables for takeout beverages and packaging; not single-use packaging	Require reusables for takeout beverages and packaging in foodware ordinance. Only allow single-use items (e.g. cutlery, straws, sauce packets) to be provided “on request.” Enforce “front of house” sorting at restaurants and businesses.	Foodware packaging, including paper and plastic	Staff time		Medium
All disposables (cutlery, straws, sauce packets) provided “on request” (still need to allow compostables)		Comment noted and will be considered for incorporate into #20 as part of the broader requirement			
Require “front of house” sorting at restaurants and businesses and provide customized posters		Already required in Palo Alto			
Require reusable coffee cups – like in London		Included in #20			
Support incentive policies and programs encouraging reusables over disposables		Included in #20			
1.CW4. Color tinted clear bags	Require all residents and businesses who use bags to use color-tinted clear plastic bags (blue tint for recycle, green tint for compost, clear for garbage) to consolidate materials by ordinance for better monitoring of materials.	Recyclable and compostable materials	Staff time	•	Short
Require customers to bag garbage and compostables		Not recommended to include in plan			
21.CW5. No green or brown colored non-compostable produce bags	Ban the sale or distribution of green or brown-tinted empty produce bags that are not compostable by ordinance. Clear bags and produce bagged outside of City (e.g., potatoes packed in brown bags to reduce oxidation) would be permissible.	Film plastic, plus organics	Staff time		Medium
Give free compostable bags to community		Not recommended			
Require compostable produce bags		Not recommended			
Should not apply to produce bagged outside of city (e.g., potatoes packed in brown bags to reduce oxidation)		Included in #21			
2.CW6. Statewide packaging and product design	Advocate for statewide packaging policies including membership in statewide organizations (California Product Stewardship Council, Californians Against Waste) and submitting testimony to legislative and regulatory proceedings.	Hard-to-recycle products and packaging	Staff time + memberships \$10k max	●●●●●●●● ●●●●	Short

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
Reduce packaging		Included in #2			
22.CW7. Retailer take-backs (voluntary, mandatory)	Ask retailers to takeback products and packaging that they sell to improve convenience for consumers or to collect materials that are not acceptable in the curbside recycling program (e.g., batteries, pharmaceuticals, compact fluorescent bulbs). Research which items retailers should be required to takeback by ordinance. Coordinate with neighboring cities to adopt ordinances at same time, and/or to take effect once all neighboring cities adopt.	Universal waste, non-recyclable products and packaging	Staff time	●● ●	Short – Ask retailers to takeback targeted products and/or packaging that they sell. Medium – Require retailers to takeback targeted products and/or packaging that they sell.
Don't hurt local businesses. People will go to other cities to buy.		Comment noted			
3.CW8. Improve green purchasing	Finalize Environmentally Preferred Purchasing Policy update and train all City staff regarding that Policy. Develop standard operating procedures and education campaign and include in employee performance review targets.	Reusable materials, recycled-content, recyclable and compostable products, and compost products	Staff time	●● ●	Short
9. Product & packaging fees	Adopt point-of-sale fees for products that are toxic, hard to reuse, recycle or compost and/or certain disposable items to incentivize customer reuse.	Hard-to-recycle and recyclable and compostable products and packaging examples? Packaging such as Styrofoam blocks	Staff time		Include in 1
4.CW9. Change from a diversion goal to a generation goal	Research additional metrics that focus first on eliminating and reducing consumption and wasteful practices, then reusing products and packaging, and then recycle or compost remaining discarded materials. Include metrics that address climate/carbon impacts and footprints.	All	Staff time + consultant assistance \$10k max	●●●●●●●● ● ●●●●	Short
Climate/carbon metric/footprint Metric valuing reduce, reuse over disposal		Include in #4			
Time urgency: due to climate change, we need to do more/faster		Made #4 a short-term item			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
Community-Wide Programs					
23.CW10. Issue waste reduction grants	Research the feasibility of providing grants to non-governmental organizations (NGOs), schools, businesses and/or individuals to assist the community to implement innovative reduction, reuse, recycling and composting programs and to help foster the culture change needed to achieve Zero Waste. NGOs outside of the city that provide services within the city should be eligible for grants (e.g., gleaners).	All	Staff time	● ●●	Medium
NGOs outside of the city that provide services within the city should be eligible for grants (e.g., gleaners)		Will include in #23			
24.CW11. Incentives for reuse, rental, repair industry	Work with Chamber of Commerce to develop and promote repair businesses. Offer more repair cafes. Research the feasibility of providing incentives for reuse and repair through contract incentives, material exchanges, wood reuse, and direct assistance.	Reusable materials	Staff time	● ●●	Medium
Develop and promote repair businesses (work with chamber)		Include in #24			
More repair cafes (we are swamped)		Include in #24			
37.CW12. Market Development (local, regional, state, national)	Research and promote network of local businesses that repair, refurbish, market, and sell used, recycled content or compost products (through on-line resource guides, outreach and advertising). Promote local flea markets and garage sales for sale of reusable items and swaps for household goods (e.g., clothing, toys).	Used, recycled-content and compost products		●	Long
38.CW13. Recycling, reuse & repair directory	Research adding reuse and repair locations to RecycleWhere and/or to develop a supplemental web-based directory specific to reuse and repair. This new directory could also include Zero Waste vendors and caterers.	Reusable and repairable materials	Staff time	● ●	Long
Provide on-line resource library for Zero Waste vendors, caterers		Linked to #38. Will research at the same time.			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
39.CW14. Zero Waste Research Initiative	Work collaboratively with industry, government and educational institutions to find new solutions for items that are hard to reuse, recycle or compost in Palo Alto, connecting with the latest developments, innovation and innovative funding (including venture capital). Work with Stanford University on research, development, and policies to support innovations. This is not necessarily a facility, business or organization.	Particularly focus on hard to recycle materials (such as diapers, dirty film plastics, Mylar and composites), toxic items, medical wastes, value-added products, building products, transportation products and products that could be used by Parks & Recreation			Long
Work with Stanford on 1) research and 2) development and then 3) develop policies		Included in #39			
Want way to recycle or donate non-recyclable and non-compostable packaging, (including Single-service, Styrofoam, Mylar and Aseptics), textiles, shoes wood, pet waste, diapers, repairables, composites, and pressure treated wood		Included in #39			
25.CW15. Apply compost to public lands/parks	Identify areas on public lands and parks where compost could be applied to sequester carbon to assist in combating climate change.	Compostable materials, including food scraps and plant debris		● ●	Medium
26.CW16. Promote access to goods over ownership	Research how to promote services that provide short-term rentals of reusable goods such as tools, sports equipment, party equipment (tables, chairs, serving utensils), as well as sharing websites. Explore a membership-based program that promotes community resource sharing while leveraging communal purchasing power (e.g., a Tool Library delivers affordable tool-lending services to individuals, businesses, and civic or community organizations).	Reusable materials		●● ●●●●	Medium
Cultural Problem – Problem of affluence		Comment noted			
This is an interdisciplinary problem – may need to talk to psychologists to figure out how to get people to reduce waste. Or business development to figure out incentives.		Comment noted			
Need help to do culture change		Comment noted			
Require Zero Waste events for any event requiring a permit (corporate picnics, etc.)		Currently require			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
Palo Alto permitted events require compliance with a sustainability checklist (see Stanford event policy)		Comment noted, will check Stanford's list			
Want lending libraries for Tools, Appliances, and Toys		Included in #26			
Improve education materials, website and RecycleWhere tool		Included in #26			
27.CW17. Reusable filling stations (bulk bins) at stores and ZW supermarkets	Research the promotion of purchasing items in bulk bins and bulk packages at local stores. Promote the expansion of bulk bin sales at local stores. Promote local and online resources for Zero Waste lifestyles and Zero packaging. Promote Zero Waste supermarkets.	Packaging, including film, containers and bottles	Staff time	•	Medium
Zero Waste supermarket – everything sold in bulk		Include in #27			
Need more bulk filling stations at stores (bring your own container and fill with the item you want to purchase – grains, flour, nuts, herbs, shampoo, soap, etc.)		Included in #27			
5.CW18. Textile collection for reuse & recycling	Research ways for residents and businesses to divert textiles for reuse and recycling. Investigate feasibility of adding bagged or boxed textiles to the collection program. Map regional opportunities.	Textiles and leather	Staff time + Service Provider Proposal		Short
Support textiles collection (71% of respondents)		Included in #5			
Oppose textiles collection (33% of respondents) – don't want another bin, don't want increased costs, only have them infrequently.		Comments noted and will be considered in future program design.			
Want adult and children's clothing and shoe exchange		Comment noted and will be considered in future program design			
6.CW19. Collect additional items (e.g., aseptic, pet waste)	Research and identify strategies to divert hard to recycle or compost items.	Aseptic Packaging, Sanitary Products, Diapers and Animal Feces and Litter	Staff time + Service Provider Proposal		Short
Support pet waste and/or diapers, and aseptics collection program (71%)		Included in #6			
Oppose pet waste and/or diapers collection program (33% of respondents) – don't want another bin, don't want increased costs, don't have these items.		Comments noted and will be considered in future program design.			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
Community-Wide Facilities					
7.CW20. Plastics Conversion	Develop pilots to convert non-recyclable plastics to useful chemicals or products.	Non-recyclable plastics, including film, composites and Mylar	Staff time		Short
8.CW21. Wood to biochar	Research feasibility to produce biochar to apply on public lands within the City using local tree trimmings.	Wood, including engineered wood	Staff time		Short
28.CW22. Plastic Recovery Facility (PRF)	Participate in the development of a regional PRF with recycling service providers, business generators, and other communities throughout the Bay Area.	Hard-to-recycle plastics, including film packaging and rigid plastic products	Staff time	● ●●	Medium
Explore new facilities regionally		Comment noted			
Collect all plastic and let the professionals sort		Comment noted			
29.CW23. Improve MSW processing after source separation to increase diversion	Use RFP process to pursue more effective material recovery facilities when SMaRT agreement ends in 2021. At a minimum, ensure that residues after processing are further composted or digested to minimize landfilling.	Recyclable and compostable materials remaining in the trash	Staff time	●●●●●●●●	Medium
Reinstate Recycle Center		Not recommended			
Regional Repair Café Building		Not recommended			
Space for Lucille Packard Children's Hospital Sale - a great community service		Not recommended			
Offer SMaRT-type drop off programs locally (could be located at Cubberley High School site)		Not recommended			
Provide local shredding events		Not recommended			
Add shredding event to 1 st Saturday HHW events		Not recommended			
Residential Policies					

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
30.R1. Mandatory ordinance enforcement	Don't mandate, educate first. Pilot providing posters on carts or inside lids. Research providing periodic auditing of residential collection containers and provide outreach and education to residents to ensure that they are aware of the mandatory recycling program and how to comply. Ensure that all customers are audited once per year with more outreach provided to residents who require more assistance. Direct residents to nice looking compost pails. Research options for shared containers.	Recyclable and compostable materials	Staff time	•	Short – Posters Medium – Shared containers
Don't Mandate – educate				•	Included in #30
Direct residents to nice looking compost pails		Comment noted			
Poster on carts or inside lids – (add language: pilot this in the short term)		Included in #30			
Research options for shared containers – (add language)		Included in #30			
Residential Programs					
9.R2. Food waste prevention	Research expanding outreach and outreach programs to reduce wasting food at home and choose less wasteful packaging. Learn the barriers and benefits for Palo Alto residents so outreach addresses those and leads to measurable change.	Food	Staff time + contractor \$20k	••• ••••	Short
Encourage people to choose less wasteful packaging (don't buy onions cut in half and wrapped in plastic – cut your own onion)		Comment noted			
31.R3. Food donations (food bank soup kitchen, gleaning)	Expand Palo Alto's current residential food sharing network (gleaning, donations). Prepare outreach plan and outreach materials. Integrate with Food Waste prevention efforts.	Food	Staff time	•••• ••••	Medium
Donate end-rolls from toilet paper (custodians replace before fully empty)		Comment noted			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
40.R4. Every other week trash collection [Move to citywide]	Offer with reduced fee if not picked up each week (or higher fee if picked up weekly). Follow Strategy SW-2.2 of the 2016 Sustainability and Climate Action Plan: "As the City moves closer to Zero Waste, more of the waste materials collected should be recoverable (recyclable or compostable), evaluate eliminating separate collection of garbage, and moving to a two- cart collection scheme. Moving toward every other week trash collection is an appropriate next step."	All recyclable and compostable materials	TBD based on Service Provider Proposal	●● ●●●●	Medium
Every other week collection with reduced fee if not picked up each week (or higher fee if picked up weekly)		Linked to #40			
Fees are going up. How do we reduce waste and costs?		Comment noted			
10R5. Collect reusables ahead of cleanup trucks [Move to citywide]	Research the addition of reusables to the by-appointment Clean Up Days for both resident and businesses and allow non-profits to take turns collecting those goods the day before the GreenWaste collection trucks arrive. Update website and promotional materials and promote via media releases and across social media channels.	Reusable materials	Staff time + TBD based on Service Provider Proposal	●●●●●●●● ● ●●	Short
11.R6. Incentives for reusable and/or compostable diapers Waste reduction for diapers [Move to citywide]	Research incentives and requirements for reusable and/or compostable diapers.	Diapers	Staff time + consultant time \$20,000 per year	●●●●● ●●●●●	Short
Social norming – just try it!		Comment notes			
The green bin gets pretty nasty when you share with other residents – how about periodic cleaning by collector?		Cart and bin cleaning is offered as a service by GreenWaste. Free service not recommended due to costs.			
Mandate only small garbage cart (e.g., 16 or 20 gallons)		Not recommended			
Special programs to assist multifamily				●	Comment noted
Enforcement and outreach for multifamily		Included in #11			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
Require drivers to get out of the collection truck to pick up batteries		Doing this now			
Support reusable diaper service program subsidy		Included in #11			
Commercial Programs					
12.C1. Mandatory ordinance enforcement	Expand and improve outreach and enforcement of sorting requirements for commercial customers (including multifamily customers).	Recyclable and compostable materials	Staff time + ½ GW EOC - \$59,500	● ●	Short
32.C2. Food waste prevention	Research and expand outreach to grocery stores, restaurants, school cafeterias and other food generators on opportunities and practices to prevent food waste. Work with local business and regional industry associations to hold Waste Less Food panels. Incentivize food waste reduction tools such as Lean Path, etc.	Food	Staff time	● ●●	Medium
18.C3. Food donations (food bank soup kitchen, gleaning)	Building on the 2015 Food Rescue Services, Barriers, and Recommendations in Santa Clara County , continue participation in County’s Silicon Valley Food Rescue working group to create a sustainable food rescue system in Santa Clara County, where all surplus edible food goes to food insecure people. Consider policies and programs applicable in Palo Alto according to the findings from the county working group. Integrate with food waste prevention efforts.	Food	Staff time	●●●●●● ●●●	Short
34. Less than every week trash/residual collection [Moved to citywide]	Strategy SW-2.2 of the 2016 Sustainability and Climate Action Plan states: As the City moves closer to Zero Waste, more of the waste materials collected should be recoverable (recyclable or compostable), evaluate eliminating separate collection of garbage, and moving to a two- cart collection scheme. Moving toward every other week trash collection is an appropriate step in that direction.	All	TBD – Service Provider Proposal	●● ●●●	Medium Combine this with the residential one.

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
33.C4. Waste Prevention Technical Assistance	Expand commercial technical assistance program (including ReThink Disposable) to include waste prevention and reuse. Provide tools to identify and redesign wasteful practices, products and packaging, incentive policies and programs encouraging reusables over disposables , how to recycle and compost, how to right-size collection, reusable shipping containers and packaging requirements/program , digital delivery of all official communications , identify where materials go, make business case for Zero Waste, and purchase more environmentally preferred products. Conduct focus group on how to make recycling more intuitive.	All	Staff time	●●● ●	Medium
Focus group on how to make recycling more intuitive					Comment noted
Technical assistance to document diversion & cost savings					Included in #33
Technical assistance to make the business case for Zero Waste					Included in #33
Easy to find list of what goes where – app or better website					Comment noted
Support Reusable shipping packaging requirements/program					Included in #33
Promote reusable shipping containers.					Included in #33
Digital delivery					Included in #33
34.C5. Business outreach (presentations, door-to-door outreach, Zero Waste Champions)	Expand outreach and technical assistance to industrial, commercial and institutional generators addressing recycling and/or composting logistics and increasing employee participation.	All	Staff time	●●	Medium
41.C6. Reuse exchange	Research and develop a clever and convenient program that encourages and rewards businesses for institutionalizing internal reuse – reuse closets for office supplies or tools, surplus sales to other businesses, remnants, surplus goods and equipment, donating goods to non-profits, and, finally, giving items away.	Reusable materials	Staff time	●● ●	Long
Want business reuse exchange					Included in #41

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
38. Reuse collection [Moved to citywide]	Add reusables to the by-appointment Clean Up Days and allow non-profits to take turns collecting those goods the day before the GreenWaste collection trucks arrive. Update website and promotional materials and promote via media releases and across social media channels.	Reusable materials	TBD – Service Provider Proposal	●●●●●●	Short Combine with the residential initiative
42.C7. Help Businesses apply for recognition (certified Green business, certified Zero Waste facilities, Business Environmental Network) Business recognition	Assess city and non-city recognition and certification programs active in Palo Alto. Hold opportunities and challenges meet-ups with representatives. Develop on-going cooperation agreements. Work with Chamber of Commerce and Palo Alto Downtown (PAD), regarding (re)integrating green priorities and projects into each group’s mission and vision as per the Economic Development Policy. Engage with large janitorial contractors to support “back of house” recognition. Develop draft multi-year Green Business Recognition Strategy. Hold quarterly meet-ups for businesses interested in going green including all interested parties.	All	Staff time	●●● ●	Long
Janitorial or “back of house” recognition		Included in #42			
Engagement with large janitorial contractors (JLL, ISS)		Included in #42			
43.C8. Palo Alto businesses products and packaging redesign	Launch/participate in a regional initiative to encourage businesses to use reusable, recycled content and eco-friendly materials in the design and redesign of new and existing products and packaging; collaborate with local economic development staff to provide assistance and incentives. Support the San Jose Recycled Market Development Zone (RMDZ) and encourage Palo Alto businesses to buy recycled content products from them.	Products and packaging	Staff time	●●●	Long

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
41. Incentives/subsidies for reusable diapers [Moved to citywide]	Provide incentives/subsidies to day care centers, hospitals and nursing homes for transitioning to reusable diapers. Phil asked to incorporate all diaper items into one initiative	Diapers	Scalable \$10,000 per year	●●●●● ●●●●	Short Combine with the residential initiative
Self-Haul Programs					
13.SH1. Outreach and technical assistance	Research outreach and technical assistance to self-haulers, including householders and business owners with service exemptions and service providers that self-haul materials generated within Palo Alto. Address requirements, how-to guides (e.g. how to sort recycle, compost and garbage properly).	Municipal solid waste, construction debris, reusable and recyclable materials from periodic cleanouts and construction	Staff time, outreach materials \$5,000 per year	●●●●●	Short
C&D Policies					
14.CD1. Require deconstruction and source separation of selected materials	Require deconstruction and source separation for all construction and demolition projects by ordinance. Demolishing entire buildings would no longer be allowed. Require source-separation at construction and demolition sites for easily recyclable materials. Research incentives to encourage remodeling and adaptive reuse of buildings, including easier permitting and financial incentives.	Reusable building materials, including lumber, fixtures, furniture and appliances, sheetrock, carpet, asphalt composition shingles, ceiling tile, wood, metal, concrete, asphalt, brick, and stucco.	Staff time	●●●●●●●● ●●●●●●●	Short
Support ordinance (87% of respondents)		Included in #14			
Oppose ordinance (19% of respondents) – too costly, can hurt small businesses, create an incentive instead of a fine, already too many regulations for building in Palo Alto		Comments noted			
Adaptive Reuse of Buildings				●●●●	Included in # 14
Expand requirements for demo permits				●	Not recommended
Create incentives for contractors and property owners having to spend extra time and costs		Comment noted			
Require deconstruction and source separation for all projects		Included in #14			

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
15.CD2. Direct mixed C&D materials to high diversion C&D recycling facilities	Require that all mixed C&D materials be delivered to a certified high diversion facility by ordinance	Building materials and C&D debris, including wood, gypsum, paper, plastic, glass, carpet, and roofing materials	Staff time	●● ●●	Short
16.CD3. Publicly notice pending demolition to facilitate deconstruction and salvage in commercial buildings	Require that any business demolishing a structure within the City publicly advertise the hours and dates that materials will be available for salvage, provide a survey of potentially salvageable materials, and make such materials available for at least 10 days.	Reusable building materials, including lumber, fixtures, furniture, and appliances	Staff time	●●●●	Short
46. Required source-separation [Combined with 14]	Require source-separation at construction and demolition sites for easily recyclable materials by ordinance.	Sheetrock, carpet, asphalt composition shingles, ceiling tile, wood, metal, concrete, asphalt, brick, stucco	Staff time	●● ●	Short
Decrease permit time as an incentive		Comment noted			
Create incentives for property owners		Comment noted			
C&D Programs					
44.CD4. Promote Zero Waste credits in CalGreen Building Code (reuse, recycling, composting, and recycled products)	Participate in Green Building Advisory Group. Provide information on Palo Alto Zero Waste policies and programs for construction and demolition and advocate for statewide requirements that support Zero Waste in CalGreen Building Code.	Recyclable building materials, including sheetrock, carpet, asphalt composition shingles, ceiling tile, wood, metal, concrete, asphalt, brick, stucco and reusable building materials, including lumber, fixtures, and appliances	Staff time	●	Long
35.CD5. Free collection of small quantities of C&D from residents.	Research providing a reuse and recycling opportunity for small quantities of building materials that are generated through home improvement projects. Investigate feasibility to collect small amounts of mixed C&D in a special container.	Recyclable building materials, including sheetrock, carpet, asphalt composition shingles, ceiling tile, wood, metal, concrete, asphalt, brick, stucco and reusable building materials, including lumber, fixtures, and appliances		●●●● ●	Medium

Initiative	Description	Targeted Materials	Cost	Dot Voting	Term
17.CD6. Technical assistance	Provide technical assistance to contractors and permittees by publishing information about the City's ordinance requirements and providing referrals to local reuse, recycling and deconstruction service providers	Building materials and C&D debris, including wood, gypsum, paper, plastic, glass, carpet, and roofing materials	Staff time + \$5-10K + ½ GW EOC - \$59,500	●	Short
C&D Infrastructure					
45.CD7. Building Materials Reuse Center	Investigate the feasibility of creating a Building Materials Reuse Center in the region for sale of salvaged building materials. The building materials would be available for sale to the public and the Center would provide an outlet for resale from deconstruction.	Reusable building materials, including lumber, fixtures, and appliances	Staff time	●●●●●●●● ●	Long
Work with East Palo Alto on Building Reuse Center and create jobs		Comment noted			
Cubberley C&D collection center		Not recommended			
Need a building materials reuse center		Included in #45			
General Survey Comments					
Reasons for not reducing, reusing, recycling or composting more: <ul style="list-style-type: none"> • Confusion on what is recyclable • No incentive to sort properly • Inconvenience (there is no recycling container near where material is generated) • Lack of space • Concern about recycling personal documents • Too busy to separate waste • Zero Waste is not a priority. 		Comments noted			

ATTACHMENT 3

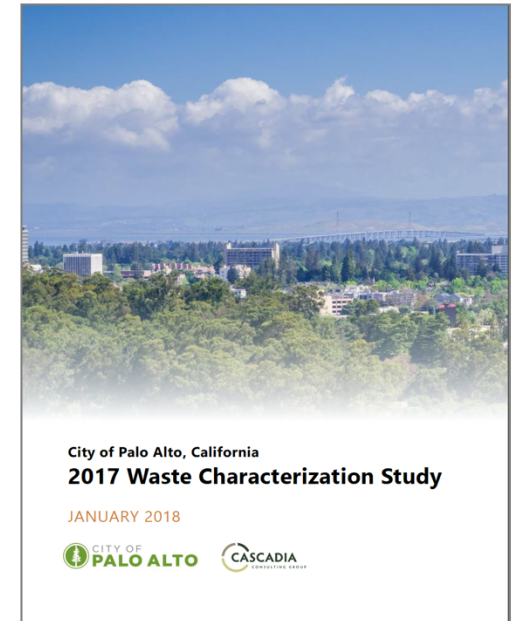
ASSUMPTIONS AND CALCULATIONS

Results from the Palo Alto 2017 Waste Characterization Study were used to estimate the diversion potential for each initiative. This study evaluated samples from each generator sector: residential, multifamily, and commercial (including commercial front-load, commercial roll-off, and hospitals). The samples were characterized by material type. The percentages of each material type and the total tons by material type were estimated for each generator sector.

To estimate the diversion potential of each initiative in this plan, a “capture rate” by material type was determined. For example, enforcement of the mandatory ordinance for commercial front-load generators was estimated to divert 25% of the clean flattened cardboard from commercial garbage to commercial recycling. This would result in an additional 20 tons of material diverted from disposal annually. The capture rate estimates were based on results from similar programs or best estimates. It is possible that implementation of this program will result in much higher capture rates. However, conservative assumptions were used for these calculations. The City will be able to refine this analysis once it has fully implemented each program.

The U.S. EPA Waste Assessment Model (WARM) was used to estimate the potential reduction in greenhouse gas emissions anticipated to be achieved through implementation of each initiative. WARM identifies the metric tons of carbon dioxide equivalent (MTCO₂e) reduced by material type for each ton diverted from disposal. For example, the 20 tons of flattened cardboard from commercial front-load customers that is diverted from disposal annually through enforcement of the mandatory commercial recycling ordinance is estimated to reduce greenhouse gas emissions by 3.4498 MTCO₂e per ton or 69 MTCO₂e per year.

A sample calculation for commercial front-load generators is included in this attachment.



GHG Emissions Factors	Commercial Front-Load				12.C1. Mandatory ordinance enforcement for commercial		
	Material	Est. Percent	+ / -	Est. Tons	Capture Rate	Tons Captured	MTC2e Reduced
MTCO2e							
	Paper	32.4%		1,865			
3.4498	Clean, Flattened, Uncoated OCC	1.4%	0.4%	80	25%	20	69
3.4498	Clean, Unflattened, Uncoated OCC	0.7%	0.3%	38	25%	10	33
1.9084	Newspaper	1.0%	0.5%	60	25%	15	29
4.6242	Other Clean Paper	10.2%	1.8%	587	25%	147	678
1.9084	Paper Tissue & Towels	11.9%	1.7%	684	25%	171	326
1.9084	Other Soiled Uncoated Fiber	0.8%	0.3%	47	25%	12	23
3.4498	Coated OCC	0.1%	0.1%	8	25%	2	7
1.9084	Other Coated Paper	1.1%	0.3%	66	25%	16	31
1.9084	Gable Top Cartons	0.2%	0.1%	11		0	0
1.9084	Aseptics	0.2%	0.1%	11		0	0
1.9084	Paper Takeout Containers	0.9%	0.4%	52	25%	13	25
1.9084	Coated Paper Cups	1.9%	0.5%	111		0	0
3.4498	Pizza Boxes	0.2%	0.2%	14	25%	3	12
1.9084	Other Composite Paper	1.7%	0.4%	98		0	0
	Plastic	17.0%		977			
1.5781	#1 PETE Plastic Packaging	1.2%	0.2%	67	25%	17	27
1.4313	#2 HDPE Plastic Packaging	0.6%	0.2%	32	25%	8	12
1.5781	Expanded #6 Products & Packaging	1.3%	0.5%	72		0	0
1.5781	Other #3-7 Plastic Packaging	1.4%	0.3%	83	25%	21	33
1.5781	Durable Plastic Products	1.2%	0.3%	70	25%	18	28
1.5781	Plastic Takeout Containers	0.4%	0.1%	26		0	0
1.7616	Compostable Plastic Bags	0.1%	0.1%	6	25%	2	3
1.7616	Other Compostable Plastic	0.2%	0.1%	14	25%	4	6
1.7616	Recyclable Film Plastic	2.1%	0.5%	121		0	0
1.7616	Flexible Plastic Pouches	0.1%	0.1%	7		0	0
1.7616	Other Composite Film Plastics	0.2%	0.1%	12		0	0
1.5781	Other Plastic	8.1%	1.3%	465		0	0
	Glass	2.6%		152			
0.3303	Glass Bottles & Jars	1.6%	0.4%	91	25%	23	8

GHG Emissions Factors	Commercial Front-Load				12.C1. Mandatory ordinance enforcement for commercial		
	Material	Est.		Est.			
MTCO2e		Percent	+ / -	Tons	Capture Rate	Tons Captured	MTC2e Reduced
0.3303	Blue or Red Glass Bottles & Jars	0.0%	0.0%	0	25%	0	0
0.3303	Other Non-Composite Glass	0.9%	1.2%	53		0	0
0.3303	Other Composite Glass	0.1%	0.2%	8		0	0
	Metal	2.4%		138			
13.7258	Aluminum Cans & Foil	0.5%	0.2%	30	25%	7	102
5.2848	Other Non-Ferrous Metal	0.0%	0.0%	2	25%	1	3
1.835	Steel Cans & Lids	0.5%	0.2%	29	25%	7	13
1.835	Appliances	0.2%	0.3%	9		0	0
1.835	Other Ferrous Metal	0.7%	0.3%	41	25%	10	19
5.2848	Other Composite Metal	0.5%	0.3%	27		0	0
	Organics	22.4%		1,293			
-0.1468	Plant Trimmings	3.5%	2.4%	200	25%	50	-7
0.8808	Edible Food Scraps	8.0%	1.3%	458	25%	115	101
0.8808	Inedible Food Scraps	8.2%	1.5%	474	25%	118	104
0.8808	Other Compostable Organics	0.5%	0.7%	29	25%	7	6
0.8808	Diapers	1.4%	0.9%	80		0	0
0.8808	Animal Feces & Litter	0.9%	1.1%	52		0	0
0.8808	Other Organics	0.0%	0.0%	0		0	0
	C&D Debris	10.4%		600			
1.9451	Clean Wood	1.6%	1.3%	95		0	0
1.9451	Clean Engineered Wood	0.5%	0.5%	27		0	0
1.9451	Painted Wood	0.6%	0.3%	36		0	0
1.9451	Treated Wood	0.2%	0.2%	9		0	0
0.0367	Inerts	2.9%	2.8%	167		0	0
0.0367	Clean Gypsum	0.0%	0.0%	0		0	0
0.0367	Painted Gypsum	0.0%	0.0%	0		0	0
0.0367	Roofing	1.0%	1.2%	59		0	0
0.3303	C&D Glass	0.0%	0.0%	0		0	0
7.2666	Carpet	1.4%	1.9%	80		0	0
0.3303	Fiberglass Insulation	0.0%	0.0%	1		0	0
0.0367	Other C&D	2.2%	1.9%	126		0	0
	Hazardous	4.4%		255			

GHG Emissions Factors	Commercial Front-Load				12.C1. Mandatory ordinance enforcement for commercial		
	Material	Est.		Est.			
		MTCO2e	Percent	+ / -	Tons	Capture Rate	Tons Captured	MTC2e Reduced
2.3121	Electronics	0.0%	0.0%	1		0	0
	Paint	0.0%	0.0%	2		0	0
	Batteries	0.0%	0.0%	2		0	0
	Non-Empty Aerosol Cans	0.0%	0.0%	0		0	0
	Mercury Lamps	0.0%	0.0%	0		0	0
	Pesticides	0.0%	0.0%	0		0	0
	Cleaning Products	0.0%	0.0%	0		0	0
	Motor Oil	0.0%	0.0%	0		0	0
	Oil & Fuel Filters	0.0%	0.0%	0		0	0
	Untreated Medical Waste	3.1%	1.4%	177		0	0
	Treated Medical Waste	0.0%	0.0%	0		0	0
1.7616	Blue Wrap	0.1%	0.2%	6		0	0
	Medicine	0.1%	0.1%	6		0	0
1.7616	Cold Packs	1.0%	0.8%	58		0	0
	Other Hazardous	0.0%	0.0%	2		0	0
	Other Materials	8.4%		482		0	0
7.2666	Mattresses	0.8%	1.0%	45		0	0
1.9451	Furniture	2.2%	1.9%	124		0	0
1.8717	Tires & Rubber	1.3%	0.8%	78		0	0
7.2666	Textiles & Leather	3.1%	1.3%	177		0	0
1.5781	Non-Metal Appliances	0.0%	0.0%	0		0	0
	Fines	0.7%	0.2%	40		0	0
	Other Materials	0.3%	0.2%	19		0	0
	Total			5,762	14%	816	1689

Note that this initiative also addresses multifamily, commercial roll-off and hospital generators, so the total diversion potential of this initiative is approximately 2,070 tons diverted from landfill and 4,400 MTCO2e of greenhouse gas emissions reduced per year.