

DRAFT WASTE AND NATURAL SYSTEMS ACTIONS

BELLEVUE ENVIRONMENTAL STEWARDSHIP PLAN

INTRODUCTION

This document summarizes the current list of proposed actions for the Waste and Natural Systems focus areas of the Environmental Stewardship Plan. These actions have been developed by a team of city staff and consultants and build on the City's work to date to increase recycling and composting rates and improve the health of Bellevue's streams. The Environmental Stewardship plan will include actions to be implemented over a five year period, in the following five focus areas: climate change, waste, natural systems, energy, and mobility and land use.

This document outlines a suite of actions to advance progress toward achieving the following climate, waste, and natural systems goals and targets:

Focus Area	Goal	2030 Target	2050 Target
Climate Change	Reduce Bellevue's greenhouse gas emissions and prepare and adapt to ongoing climate change impacts.	Reduce Bellevue's communitywide greenhouse gas emissions 50% by 2030, compared to a 2011 baseline.	Reduce Bellevue's communitywide greenhouse gas emissions 80% by 2050, compared to a 2011 baseline.
Waste	Reduce the negative impacts from consumption and waste practices and strive towards Zero Waste of Resources.	<ul style="list-style-type: none"> Achieve a 50% recycling rate by 2030. 	<ul style="list-style-type: none"> Achieve Zero Waste of Resources by 2050.
Natural Systems	Improve and preserve the integrity and health of Bellevue's natural systems and ensure all of Bellevue's residents have access to	<ul style="list-style-type: none"> Stream Health Metric (to be developed in Watershed Management Plan. Achieve a 38% citywide tree canopy by 2030. Ensure that 80% of Bellevue's residents live 	<ul style="list-style-type: none"> Stream Health Metric (to be developed in Watershed Management Plan. Achieve a 40% citywide tree canopy by 2050.

Focus Area	Goal	2030 Target	2050 Target
	Bellevue's abundant natural resources.	within 1/3 of a mile to a park, open space, or trail by 2030.	<ul style="list-style-type: none"> Ensure that 100%¹ of Bellevue's residents live within 1/3 of a mile to a park, open space, or trail by 2050.

This report includes a summary of the scope and intent of individual waste and natural systems stream health actions along with the results of the impact analysis performed by the Cascadia Consulting team.

DRAFT ACTIONS

This section provides a brief description of the scope and intent of each of the actions currently proposed for the Environmental Stewardship Plan related to waste and natural systems.

Materials Management and Waste

1. **Recycling Education and Outreach:** Provide waste reduction, recycling and composting education and outreach targeted at multi-family and commercial buildings, to help improve the citywide recycling rate.

Bellevue provides a number of outreach, education, and technical assistance programs on waste prevention, waste reduction, recycling, carbon footprint reduction, toxics reduction, and proper hazardous waste disposal to multi-family and commercial customers. This work will continue to help increase the recycling rates for these customers, who may need different engagement models than single-family customers. Future education and outreach will focus on working with multi-family and commercial customers who do not have organics collection programs in place or businesses who would benefit from waste reduction assistance.

2. **Single-use Plastics Ban:** Explore a prohibition on single-use plastics such as polystyrene and conduct outreach and technical assistance to support implementation, to reduce waste and litter.

Single-use plastics are an environmental problem because they are used in large quantities and cannot be easily recycled. This action would evaluate new strategies and

¹ Staff originally recommended that 90 % of residents live within a 1/3 of a mile of a park, open space, or trail head at the November 12th Council presentation. However, based on direction from Council to consider increasing some targets to "leading edge", staff now recommend a 100 % target.

policy tools to reduce plastic waste in Bellevue. The Washington State Legislature recently passed a ban on single-use plastic bags, which is planned to go into effect in January 2021 (although this timeline could change due to COVID-19 implications). This work will explore strategies for reducing other plastic products, such as polystyrene (more commonly referred to as Styrofoam®) and other food packaging items. This action is impacted by the effects of COVID-19, which has temporarily led to an increase in single-use plastics in the community. Bellevue will develop and evaluate strategies that reduce single-use plastics waste while mitigating economic impacts on residents and the business community.

3. **Construction and Demolition Waste Recycling:** Explore strategies to ensure that Bellevue-based job sites recycle certain types of construction and demolition debris prohibited from disposal by county ordinance, such as clean wood, cardboard, metal, gypsum scrap (new), and asphalt paving, bricks, and concrete, to reduce waste and minimize impacts of construction.

In 2016, King County passed an ordinance that requires construction and demolition debris to be recycled and banned from landfill disposal. Construction and demolition debris make up approximately 30% of all waste generated in King County.² While King County is responsible for enforcing this requirement, there are additional steps Bellevue could take to educate job site staff and supervisors about this recycling requirement to help increase compliance with the county ordinance. This action would explore options, such as outreach and education for contractors, to support compliance and increase the amount of recycled construction and demolition waste.

4. **Recycling Space Requirements:** Consider updates to space and access code requirements for recycling services in multi-family, commercial, and mixed-use buildings, to ensure new buildings have adequate space for three waste streams.

As job and population growth continues to increase within Bellevue, access to recycling services in multi-family, commercial, and mixed-use buildings will become increasingly important to increase Bellevue's recycling rate. This action will strengthen existing space requirements and evaluate new space and access code requirements to continue increasing recycling rates.

5. **Waste Study:** Utilize regional waste characterization studies for multi-family and commercial buildings to better focus education and outreach.

² 2019 Comprehensive Solid Waste Management Plan, King County

The recycling rate for multi-family and commercial customers in Bellevue is approximately 22%, lower than single-family residents. This percentage of waste from multi-family and commercial customers will increase because of job and population growth in Bellevue's growth centers. Bellevue will utilize existing regional waste characterization studies to identify and target materials and generators for waste reduction. This will help inform changes to the outreach and technical assistance programs in order to address the low recycling rates among multi-family and commercial customers.

6. **Food Waste Prevention:** Encourage food donation and food waste prevention.

This action will support and promote strategies for food waste prevention and food donation in Bellevue. Food waste and organics makes up a large portion of the total waste collected in Bellevue and these strategies will support the community in ensuring less food waste is generated and excess food can be donated to feed hungry community members. These actions will focus on single-family, multi-family, and commercial customers, as well as working in partnership with other entities like schools and non-profit organizations.

7. **Assess Waste Strategies:** Analyze additional or updated strategies for achieving short-term recycling and long-term Zero Waste goals.

King County passed the Comprehensive Solid Waste Management Plan in 2019, which sets goals and guides strategies for managing solid waste for cities within the county. This action will involve assessing additional strategies for achieving Bellevue's solid waste management goals, by reviewing best practice strategies and analyzing the impact, costs, and benefits of additional strategies.

Natural Systems and Climate Change

8. **Improve Stream Health:** Through the Watershed Management Plan, assess current stream health conditions and develop a plan for improving stream health, including watershed-specific recommendations which could include capital projects, enhanced maintenance/operational changes, and policy recommendations.

The goal of the Watershed Management Plan (WMP) is to direct improvements to the health of Bellevue's streams using a toolbox of holistic storm and surface water management practices. The WMP will involve a comprehensive assessment of the health of Bellevue's streams, along with recommendations for stream health performance monitoring and short and long-term targets. The WMP will prioritize investments in rehabilitation efforts to high-priority watersheds providing measurable environmental benefits to stream health within shorter time frames compared to relying on current and known future

regulations alone. At the same time, the WMP will help prevent further degradation in non-priority watersheds.

9. **Stormwater Retrofit:** Identify stormwater retrofit or enhancement opportunities and develop an implementation plan to support the expansion of green stormwater infrastructure.

Green stormwater infrastructure includes the numerous ways that landscaping, pervious surfaces, rainwater catchment, or soil cell systems store, clean, and reduce the flow of stormwater in sewer systems or as surface runoff. Stormwater runoff is a key cause of water pollution in urban areas, and green stormwater infrastructure helps manage these impacts in a cost-effective and aesthetically appealing way. Identifying additional green stormwater infrastructure opportunities will allow the City to continue working toward the communitywide target of maintaining and improving the health of Bellevue's streams. One water quality retrofit project has been identified in the 2021-2027 CIP by the Utilities department, and more projects may be identified by the 2023-2029 CIP.

There may be additional opportunities identified through upcoming land use code and policy initiatives in specific geographic areas, such as in the Wilburton area, the BelRed area, and the Grand Connection. This action is directly supported by the completion of the Watershed Management Plan.

IMPACT ANALYSIS

This document estimates variables and outcomes associated with identified actions in the Environmental Stewardship Plan (ESP). Essentially, the analysis assessed the potential of ESI Strategic Plan implementation to meet established targets. This estimation is visualized in a “wedge analysis” that depicts a high-level estimate of how much the actions will collectively contribute towards meeting the city’s communitywide goals and targets.

This section includes a wedge analysis for the following targets:

Climate Change

- Total greenhouse gas emissions (MTCO₂e)

Waste

- Waste diversion (%)

METHODOLOGY

This analysis assessed the following four primary scenarios:

1. **Business-As-Usual (BAU):** An estimate of how the metric would change over time without the influence of external or internal policies or programs. Population and job growth are the key drivers of business-as-usual projections.
2. **External Factors:** The influence of policies external to Bellevue—such as state renewable portfolio standards and federal / state fuel efficiency standards—on Bellevue’s projected GHG emissions. These are denoted in **solid** in the wedge graphics.
3. **ESP Actions:** The estimated impact of priority actions slated for inclusion in the Environmental Stewardship Plan. These are denoted in **patterned** in the wedge graphics.
4. **Additional Needed Actions:** The estimated impact of additional actions that would be needed to meet the ESP’s long-term targets. These are denoted in **grey** in the wedge graphics.

The analysis was conducted to 2050—the long-term target year for communitywide sustainability goals, including the greenhouse gas emission reduction target.

CONSIDERATIONS

Considerations when outlining assumptions for a carbon wedge analysis include:

- **Data availability:** You may have heard the phrase, “garbage in, garbage out.” This phrase is true for wedge analyses. The outputs of the model are only as precise and accurate as its inputs. This means that, where possible, the use of locally precise and accurate data is preferred. However, in many cases, local data are not available. In that case, data from the national level or from other regions are considered in combination with input from local experts.
- **Uncertainty:** Modeling strategy and action potential can be challenged by uncertainty in the cause-effect relationship of actions. For example, what is the emission reduction outcome of an action that calls for the introduction of a rebate for home energy audits? This value is contingent on many factors:
 - Outreach: How many households will know about the program?
 - Buy-in: Of those households that know about the program, how many will sign up?
 - Behavior Change: Of those that sign up, how many will install efficiency measures?
 - Measure Efficacy: Of those that install measures, what measures will they install? How effective will those measures be?

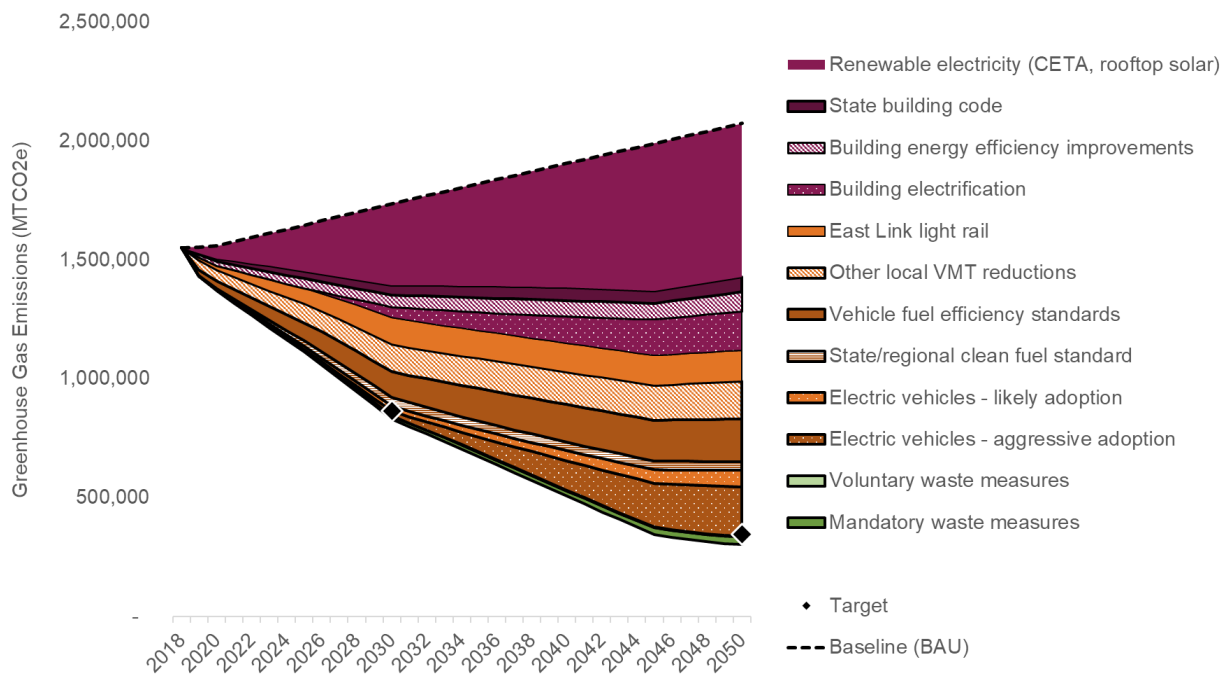
This wedge analysis does not attempt to assign answers to each of these questions. Instead, this analysis is meant to provide a high-level estimate of potential outcomes from ESP implementation. It is assumed that more detailed action evaluation would be performed upon implementation of the action.

FINDINGS OVERVIEW

Climate Change

	Communitywide GHG Emissions (MTCO _{2e})	
	2030	2050
Target (diamonds)	865,425 (50% reduction)	346,170 (80% reduction)
Planned	956,758 (45% reduction)	501,357 (71% reduction)

The following graph illustrates the impact of primarily buildings and transportation / land use related strategies for reducing greenhouse gas emissions.



The actions outlined for this Environmental Stewardship Plan will help to lay the foundation, but these strategies will need to be expanded or built upon in order to achieve the short and long-term reduction goals. It is important to note that while voluntary and mandatory waste measures do not have a large impact on this emissions reduction analysis, this can be accounted for by the methodology of the GHG inventory used to estimate greenhouse gas emissions. This wedge analysis uses a geographic inventory, which estimates emissions produced by activities directly within Bellevue. If a consumption-based inventory is used, which estimates emissions associated with the consumption of food and goods within the community, voluntary and mandatory waste measures will have a greater impact on emission reductions in Bellevue.³ King County has performed both a geographic and consumption-based greenhouse gas emissions inventory, and the consumption-based inventory shows that emissions associated from food, goods, and construction account for 45%⁴ of countywide greenhouse gas emissions.

This analysis is built on research and assumptions from regional emissions studies and when no regional information is available, using other national reports and studies, as noted in the following sections. The intent is to model the potential impact of various strategies to understand the cumulative impact of the proposed actions.

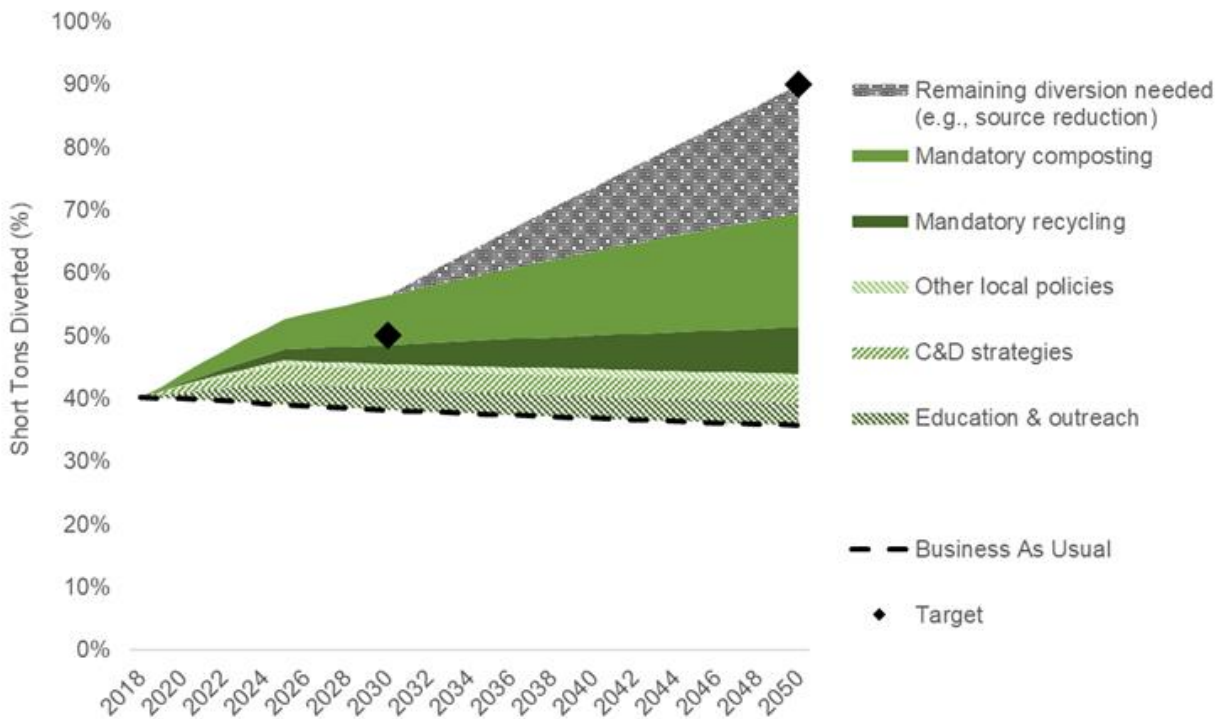
³ <https://your.kingcounty.gov/dnrp/climate/documents/201907-KingCounty-GHG-Emissions-Analysis.pdf>

⁴ <https://www.kingcounty.gov/services/environment/climate/actions-strategies/climate-strategies/strategic-climate-action-plan/emissions-inventories.aspx>

Waste

The following table and graph illustrate the impact of key solid waste strategies to support the achievement of the community tons diverted goal.

	Community Tons Diverted (short tons)	
	2030	2050
Target (diamonds)	67,780 (50% diversion rate)	141,252 (90% diversion rate)
Planned	95,146 (70% diversion rate)	109,245 (70% diversion rate)



This graph illustrates that waste measures such as increased education and outreach, single-use plastics ban, and construction and demolition waste reduction will have some impact on the tons of waste diverted. Additional strategies will need to be considered to reach the 2030 and 2050 waste diversion rate goals.

APPENDIX: ASSUMPTIONS OVERVIEW

Business As Usual Forecast/External Assumptions:

#	Scope	Element	Assumptions
2.1.1	Community	Historical solid waste disposal, recycling, and composting	<ul style="list-style-type: none"> Wet tons of waste by type obtained from Bellevue community GHG inventory.
2.1.2	Community	Forecasted solid waste disposal, recycling, and composting	<ul style="list-style-type: none"> Community waste forecasts are based on anticipated changes in population. Assume 95% of new households will be multi-family (and thus follow a similar diversion pattern as current Bellevue multi-family residents).
2.1.3	Community	King County 2019 Comprehensive Solid Waste Management Plan	<ul style="list-style-type: none"> Has goal of 70% recycling rate by 2030.⁵ Do not assume this applies to Bellevue because more of a goal than a policy.
2.1.4	Community	Food waste	<ul style="list-style-type: none"> 50% reduction in food waste by 2050 (goal adopted by WA Ecology). Does not assume this applies to Bellevue because more of a goal than a policy.

⁵ <https://your.kingcounty.gov/dnrp/library/solid-waste/about/planning/2019-comp-plan.pdf>

Strategy Assumptions:

Action	Description	Assumptions
Priority Actions		
Construction and demolition strategies	Explore strategies to ensure that Bellevue-based job sites recycle certain types of construction and demolition debris prohibited from disposal by county ordinance, such as clean wood, cardboard, metal, gypsum scrap (new), and asphalt paving, bricks, and concrete, to reduce waste and minimize impacts of construction.	Training contractors how to increase recycling of construction and demolition materials at all job sites has a 4-year ramp up period, leading to a 54% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action). ⁶
Improve building codes for waste	Consider updates to space and access requirements for recycling services in multi-family, commercial, and mixed-use building to ensure new buildings have adequate space for three waste streams.	<p>Commercial:</p> <ul style="list-style-type: none"> Requiring new commercial buildings to have adequate recycling and composting space/enclosures to receive building permit has a 4-year ramp up period, leading to a 4.25% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action).⁷ <p>Multi-family:</p> <ul style="list-style-type: none"> Requiring new MF buildings to have adequate space and facilities for recycling and organics storage and collection has a 4-year ramp up period, leading to a 8.5% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action).⁸

⁶ Derived from a study conducted for the City of Tacoma (see separate spreadsheet "Tacoma SMMP Programs Final.xlsx" -- TACID 61.

⁷ TACID 41; Tacoma SMMP Programs Final.xlsx

⁸ TACID 25; Tacoma SMMP Programs Final.xlsx

Action	Description	Assumptions
Multi-family outreach	Provide waste reduction, recycling and composting education and outreach targeted at multi-family and commercial buildings, to help improve the citywide recycling rate.	Commercial: <ul style="list-style-type: none"> 3-year ramp up period; 5% marginal recycling rate.⁹ Multi-family (MF): <ul style="list-style-type: none"> 5-year ramp up period; 10% marginal recycling rate.¹⁰ Commercial/MF (combined): <ul style="list-style-type: none"> 5-year ramp up period; 7.5% marginal recycling rate¹¹
Waste characterization study	Utilize existing regional waste characterization studies for multi-family and commercial buildings, to better focus education and outreach.	
Single-use plastics ban	Explore a prohibition on single-use plastics such as polystyrene and conduct outreach and technical assistance to support implementation to reduce waste and litter.	<p>Banning disposable plastic bags and establishing a fee for paper bags has a 3-year ramp up period and 76.5% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action).¹²</p> <p>Per Washington State's 2015-2016 waste characterization report https://fortress.wa.gov/ecy/publications/documents/1607032.pdf (page 16):</p> <ul style="list-style-type: none"> plastic merchandise bags make up about 0.3% of the overall waste stream (by tonnage) expanded polystyrene packaging (aka Styrofoam takeout containers) makes up about 0.4% of the overall waste stream (by tonnage)
Other Actions to Consider		
Transition to recyclable or reusable foodware	Ban of single-use plastic straws or cutlery.	This action has a 4-year ramp up period, leading to a 17.1% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action). ¹³

⁹ TACID 32; Tacoma SMMP Programs Final.xlsx

¹⁰ TACID 19; Tacoma SMMP Programs Final.xlsx

¹¹ Commercial and MF were combined for the analysis because waste data is only available as a combined "MF/Commercial" category.

¹² TACID 101; Tacoma SMMP Programs Final.xlsx

¹³ TACID 44; Tacoma SMMP Programs Final.xlsx

Action	Description	Assumptions
Reusable / compostable dishware at restaurants	Requirements for reusable or compostable dishware at take-out restaurants and establishments.	<p>WA State 2015-2016 characterization includes:</p> <ul style="list-style-type: none"> plastic straws in #5 PP (Polypropylene) Plastic Packaging (~0.3% of overall stream) “disposable plastic products (food utensils)” in #7 Other/Unknown Plastic Products (~0.6% of overall stream)
Multi-family and commercial recycling mandate	Require recycling of specific single-stream materials, such as cardboard, paper, cans, bottles, glass, and food scraps to increase recycling rates. Mandate recycling and composting in multi-family and commercial buildings and ban recyclable and compostable materials from the garbage.	<p>Increase in overall tonnage diverted from landfill by 2030¹⁴:</p> <p>Mandatory separation recycling:</p> <ul style="list-style-type: none"> Non-residential = 2.2% Multi-family = 1.4% Single-family = 0.5% <p>Mandatory food separation results in increase in overall tonnage diverted from landfill by 2030:</p> <ul style="list-style-type: none"> Non-residential = 4.5% Single-family = 3.2% Multi-family = 1.8% <p>An analysis done for the Tacoma SMMP estimates much higher than King County’s Comp Plan (originally cited). Per Tacoma document:</p> <ul style="list-style-type: none"> Requiring recycling for Traditional Recyclables has a 4-year ramp up period, leading to a 64% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action). TACID = 120 Requiring composting of organic materials has a 4-year ramp up period, leading to a 48% marginal recycling rate (the percentage of the targeted waste stream (remaining in the waste stream) that is recycled as a result of the action). TACID = 105 According to King County 2015 waste characterization study, 56.8% of the residential substream is readily recyclable.

¹⁴ <https://your.kingcounty.gov/dnrp/library/solid-waste/about/planning/2019-comp-plan.pdf>

Action	Description	Assumptions
C&D waste recycling requirement	Mandate a communitywide construction and demolition waste recycling requirement, aligned with the Countywide C&D waste policies.	Mandatory separation policies (wood, metal, cardboard, paper, yard waste, carpet, tires, mattresses, asphalt, shingles, gypsum) result in 3.5% increase in overall tonnage diverted from landfill by 2030. ¹⁵

Greenhouse Gas Emissions Forecast Variables

Other Business-As-Usual Assumptions:

#	Forecast Variable	Assumptions
0.1.1	Bellevue population between 2011-2050	<ul style="list-style-type: none"> Assumes linear growth between predicted years; growth after 2035 reflects 2030-2035 annual growth. Assumes population grows at a rate anticipated by the City of Bellevue, equivalent to about a 1% increase per year (BGHGForecast-01-01 DaytimePopulation_2017_0306).
0.1.2	Number of households in Bellevue between 2011-2050	<ul style="list-style-type: none"> Assumes the number of households grow proportionally to population (that is, household size remains constant). Historical values from Washington State OFM (BGHGForecast-01-02 ofm_april1_postcensal_estimates).
0.1.3	Number of jobs in Bellevue between 2011-2050	<ul style="list-style-type: none"> Assumes population grows at a rate anticipated by the City of Bellevue, equivalent to about a 1.7% increase per year (BGHGForecast-01-01 DaytimePopulation_2017_0306). Assumes linear growth between predicted years; growth after 2035 reflects 2030-2035 annual growth (BGHGForecast-01-01 DaytimePopulation_2017_0306).
0.1.4	Commercial square footage in Bellevue between 2011-2050	<ul style="list-style-type: none"> Assumes the growth in commercial square footage mirrors anticipated job growth as predicted by the City of Bellevue, equivalent to a 1.7% increase per year.
0.1.5	Transportation trips by mode	<ul style="list-style-type: none"> Assumes changes in regional VMT and trips by mode are as projected by the Puget Sound Regional Council (PSRC) (BGHGForecast-03-01 PSRC RTP Appendix K; BGHGForecast-03-02 VMT Projections for Bellevue).
0.1.6	Electric vehicle penetration to 2050	<ul style="list-style-type: none"> Assumes changes in regional EV penetration are as projected by the Puget Sound Regional Council's (PSRC) likely scenario (BGHGForecast-03-03), which predicts 20% penetration by 2040.

¹⁵ <https://your.kingcounty.gov/dnrp/library/solid-waste/about/planning/2019-comp-plan.pdf>

#	Forecast Variable	Assumptions
		<ul style="list-style-type: none"> Assumes linear growth between predicted years; growth after 2040 reflects 2018-2040 annual growth.
0.1.7	Puget Sound Energy (PSE) emissions factors for 2011-2050	<ul style="list-style-type: none"> Actual emissions factors for 2011-2017 obtained from PSE GHG inventories. Projected emissions factors for 2018-2050 based on PSE Integrated Resource Plan CO₂ emissions for Base portfolio. Projections provided out to 2037, linear trend assumed after 2037 (BESI-40-04).
0.1.8	Vehicle emissions factors, by VMT, for 2011-2050.	<ul style="list-style-type: none"> Actual emissions factors for 2011-2016 obtained from PSRC and downscaled to Bellevue (BGHG-40-01). Projected emissions factors for 2017-2050 based on PSRC likely scenario (BGHGForecast-03-03), which predicts an average MPG of passenger vehicles to be 40, a 5% reduction in heavy-duty vehicle GHG, and a 10% reduction in the carbon intensity of fuels by 2040. Assumes linear growth between predicted years; growth after 2040 reflects 2018-2040 annual growth.