



CLIMATE CHANGE
ADVISORY COMMITTEE
REGULAR MEETING
WEDNESDAY, JUNE 19, 2019
6:30 – 8:30 PM
CITY HALL
COUNCIL CONFERENCE ROOM
280 MADISON AVENUE NORTH
BAINBRIDGE ISLAND, WA 98110

AGENDA

Members: Derik Broekhoff Gary Lagerloef Nora Fern Nickum
 Michael Cox (Co-Chair) David McCaughey (Co-Chair) Deborah Rudnick
 Lara Hansen Michelle McClure James Rufo-Hill

Liaison: Councilmember Joe Deets

- 6:30 Call meeting to Order/Roll Call/Accept of Modify Agenda/Conflict of Interest Disclosure
- 6:35 Approve May 15th Minutes
- 6:40 Public Comment
- 6:50 GHG Inventory for Schools (Jessie Sheldon - EcoAdapt Intern)
- 7:00 Shoreline Management Program (Christy Carr/Tiara Adler – COBI)
- 7:25 Transportation Strategies for BI (Debbie Weinmann - CAB Intern)
- 7:45 Report Outs
 • CCAC as a Task Force
 • City Council Study Session
 • Capital Improvement Plan
 • GHG Inventory
 • CCAC/UAC subgroup
 • Green Building
- 8:15 Other Business
 • Reschedule July meeting (League of Women Voters Candidate Forum on July 17th)
- 8:30 Adjourn



MINUTES

Present: Committee members Derik Broekhoff, Gary Lagerloef, David McCaughey, Michelle McClure, Nora Ferm Nickum, Deborah Rudnick, James Rufo-Hill; Council Liaison Joe Deets

Absent: Committee members Michael Cox, Lara Hansen

Others: Ellen Schroer, Deputy City Manager; Britain Richardson and Andrea Martin, Cascadia Consulting Group

Public: Deb Weinmann, Kelsey Hulse (PSE), Jens Boemer, Gloria Saylor

The meeting was called to order at 6:30 pm.

Minutes from the previous meeting (April 17, 2019) were approved.

Public Comment

- Gloria Saylor said that she recently took a trip to England where she observed significant media attention on climate change and serious consideration of climate change in decision-making (e.g., whether or not to expand Heathrow Airport).
- Jens Boemer said that the recent Climate and Energy Forum event was a really interesting, informative, and well-managed event.

Greenhouse Gas Inventory Update

- Project leads from Cascadia Consulting Group presented the preliminary greenhouse gas inventory findings. They are doing a municipal inventory specific to City operations and a community inventory for all of Bainbridge Island (including City operations). For each, they analyzed 2014 as a baseline year and 2018 as an additional year. They used ICLEI's U.S. Community Protocol and Local Government Operations Protocol.
- Community inventory: Preliminary findings indicate an increase in total Bainbridge Island emissions between 2014 and 2018 but a small decrease over that period on a per capita basis. Major sources of emissions include residential and commercial electricity, on-road vehicles, and air travel. It has been difficult to obtain data on propane use.
- Municipal inventory (City operations): Emissions from City operations comprise about 1% of the island's overall emissions. Preliminary findings indicate an increase in municipal emissions between 2014 and 2018; the increase appears to be driven by increases in fleet vehicle use and electricity use. There were also reductions in emissions from streetlights. Major sources of emissions are on-road fleet vehicles and electricity. The top electricity-using City facility is still the wastewater treatment plant, but that facility also showed a reduction in its emissions from 2014 to 2018.
- The final numbers will be in the final report.

Workplan

- We may retool the Workplan to differentiate between planned short, medium, and long-term efforts and work with the City on selectively reaching out to staff with potential tactical measures to be implemented.

Sea Level Rise Analysis

- James presented a draft sea level rise analysis. A standard response framework includes the options of protect, accommodate, and retreat. We should expect about two feet of sea level rise by 2100. It is mostly private property at risk. There are a lot of obvious hotspots.
- James will present at the Climate and Energy Forum at the Good Egg on Tuesday evening.

There will be a study session with Council on June 18 focused on the Committee workplan and the sea level rise analysis.

The meeting was adjourned at 8:10 pm.



DEPARTMENT OF
ECOLOGY
State of Washington

How Local Shoreline Master Programs Currently Address Sea Level Rise

November 2017
Publication 17-06-031

Publication and Contact Information

This report is available on the Department of Ecology's website at <https://fortress.wa.gov/ecy/publications/SummaryPages/1706031.html>

For more information contact:

Bobbak Talebi
Coastal Planner
Shorelands & Environmental Assistance Program
P.O. Box 47600
Olympia, WA 98504-7600
Bobbak.Talebi@ecy.wa.gov

Phone: 360-407-6529

Washington State Department of Ecology - www.ecy.wa.gov

- | | |
|---------------------------------------|--------------|
| o Headquarters, Olympia | 360-407-6000 |
| o Northwest Regional Office, Bellevue | 425-649-7000 |
| o Southwest Regional Office, Olympia | 360-407-6300 |
| o Central Regional Office, Yakima | 509-575-2490 |
| o Eastern Regional Office, Spokane | 509-329-3400 |

Accommodation Requests: To request ADA accommodation including materials in a format for the visually impaired, call Ecology at 360-407-6600. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

How Local Shoreline Master Programs Currently Address Sea Level Rise

*By
Liliana Bastian*

Shorelands & Environmental Assistance Program
Washington State Department of Ecology
Olympia, Washington

Introduction

To improve local governments' ability to avoid and minimize the impacts of existing and future coastal hazards, the Washington State Department of Ecology (Ecology) is continually exploring opportunities to update guidance and resource. This report provides background information that will inform improvements to Ecology's guidance on addressing the impacts of sea level rise by helping answer the following questions:

1. *How are local jurisdictions in Washington currently addressing sea level rise using goals, policies, and regulations in their SMPs?*
2. *Are local jurisdictions applying Ecology's existing guidance?*

To answer these questions, this report records current language addressing sea level rise in goals, policies, and regulations of SMPs from 56 jurisdictions with marine shoreline in Washington State. Inclusion of the term "sea level rise" or similar language in SMPs represents jurisdictions' acknowledgement that conditions along the coasts are changing as a result of rising sea levels and that these changes will continue to impact shoreline use and development. Analysis of this language—the purpose of this document—is a starting point in understanding how local jurisdictions in Washington are using SMPs to address sea level rise.

This report explores the different SMP elements in which language about sea level rise appears and also describes the variety of actions that the existing policies and regulations provide for. These findings create a better understanding of how local jurisdictions are currently using SMPs to address sea level rise and help Ecology best address local jurisdictions' future guidance needs.

Background: Existing State Guidance on Addressing Sea Level Rise in SMPs

Jurisdictions in Washington State are currently not required to address sea level rise in their SMPs. However, *Appendix A* of Ecology's *Shoreline Master Program Handbook*, which assists local government planners in meeting the requirements of the Shoreline Management Act, identifies options for addressing sea level rise in SMPs. These options include:

- determining shoreline jurisdiction as sea level rise may shift the Ordinary High Water Mark (OHWM);
- incorporating sea level rise outreach in public participation activities;
- assessing shoreline vulnerability to sea level rise through shoreline inventory and characterization;
- including provisions for sea level rise adaptation in SMP goals, policies, and regulations;
- establishing setbacks through environment designations;
- limiting shoreline armoring through shoreline modifications policies;
- factoring sea level rise into restoration planning; and
- considering potential changes due to sea level rise when selecting indicators of net loss.

The options described in *Appendix A* of Ecology’s *Shoreline Master Program Handbook* provide a high-level overview of ways that SMPs can address sea level rise, including example language from completed and draft SMPs in Washington. This current guidance has been available to more than 260 towns, cities, and counties across Washington State that have completed or are in the process of completing comprehensive updates to their SMPs, many of which have not been fully updated in more than 30 years. Some jurisdictions have used this update process as an opportunity to support local adaptation to sea level rise through goals, policies, and regulations¹ in their SMPs.

Project Scope

Counties and cities with marine shoreline in Washington State (all jurisdictions along the outer coast, along the Strait of Juan de Fuca, and in Puget Sound) were selected for this analysis because these jurisdictions have the potential to be directly impacted by rising sea levels. This geographic scope led to selection of 56 jurisdictions, 40 of which have completed comprehensive updates of their SMPs. The remaining 16 jurisdictions are in the process of local adoption or state approval of their SMPs. Because language in SMPs that are undergoing approval is subject to change, this report only explores policy and regulatory language from the 40 SMPs whose updates are complete. Appendix A lists the jurisdictions included in this report and the status of their SMP updates. SMPs of jurisdictions in green contain language on sea level rise.²

Sea Level Rise and Shoreline Stabilization

Some SMPs include language about sea level rise in sections on shoreline stabilization and other modifications. This area of SMPs can be used to address sea level rise through both allowing and discouraging hard stabilization of the shoreline. For example, some policies allow hard shoreline stabilization as a way to protect property from the impacts of sea level rise. These protective policies may expressly allow hard stabilization for areas threatened by sea level rise and other hazards such as erosion. Conversely, other policies prioritize soft stabilization approaches or limit future hard stabilization of the shoreline. These policies may include restrictions such as proving that future sea level rise was considered when determining that continued stabilization will not be needed.

Results: How SMPs in Washington Currently Address Sea Level Rise

Many SMPs Already Address Sea Level Rise As shown in Appendix A, almost half of updated SMPs for communities along Washington’s coasts already directly address sea level rise through goals, policies, and regulations— 17 of the 40 updated SMPs include language about sea level

¹ Goals and policies express broader principles meant to guide implementation, while regulations express required action. Thus, the use of these different types of provisions in addressing sea level rise has implications for how sea level rise will be incorporated in decision making.

² “Sea level rise” and related terms (e.g., “rising sea levels,” “increases in sea level”) were considered relevant language.

rise. These 17 SMPs most commonly address sea level rise in elements on: flood damage minimization or flood hazard reduction (seven SMPs); restoration, remediation, and conservation (six SMPs); and general shoreline use (six SMPs). Additionally, SMPs' Critical Areas regulations and sections on shoreline modifications, setbacks and height, recreation, climate change, and urban intensity management also address sea level rise (see Table 1). Appendix B shows considerable variation in the details of this language.

Table 1. Elements of updated SMPs that include language about sea level rise.

Area	# of SMPs
Floods (Damage Minimization/Hazard Mitigation)	7
Restoration, Remediation, and Conservation	6
General Shoreline Use	6
Critical Areas Regulations	3
Shoreline Modification (Stabilization and Fill)	3
Shoreline Setbacks and Height	1
Recreation	1
Climate Change	1
Urban Intensity Management	1

The great variation in areas in which updated SMPs address sea level rise shows that sea level rise is a cross-cutting issue affecting many aspects of shoreline management, and preparations can be made in a variety of ways using the elements of SMPs that are currently required.

SMPs Encourage Consideration of Impacts, Use of Information, and Adjustment of Setbacks and Standards to Address Sea Level Rise

The SMPs contain language encouraging or requiring a variety of actions to address sea level rise within each of the elements mentioned above. General policies providing that jurisdictions simply *consider* or *address* sea level rise for a variety of decisions were most common.

Many of these SMPs have only been in effect for several years, but more information about how these policies are implemented or acted upon is needed. Case studies of jurisdictions striving to use sea level rise information in decision making would provide insight into how provisions to *consider* sea level rise information are being implemented and what information is being used.

SMPs can additionally encourage or require actions that move beyond consideration of impacts. Also common in the updated SMPs are policies directing jurisdictions to *monitor and use information* on sea level rise, and policies directing jurisdictions to *encourage, reevaluate, or adjust setbacks and building standards* accordingly. These actions include:

- Providing information about sea level rise to development permit applicants
- Changing setbacks or encouraging location of new or replacement development outside of areas vulnerable to sea level rise and associated flooding (retreat)
- Enhancing standards for project design, location, and construction so that various uses (transportation, utilities, restoration) can withstand the impacts of sea level rise (accommodation)

These specific actions illustrate the wide variety of ways in which local jurisdictions are addressing sea level rise under existing guidelines for SMPs. They also pose the question how these policies and regulations have been implemented and what kinds of policy guidance jurisdictions still need.

SMPs Use Policies More Frequently than Regulations to Address Sea Level Rise

Most (15) SMPs that include language about sea level rise do so through policies, meaning that in these cases, sea level rise is addressed through broader guiding principles rather than through required actions. As discussed above, most of these policies related to sea level rise encourage a general consideration of sea level rise impacts or information when designing, locating and maintaining various shoreline developments and uses, and adjustment of setbacks and building standards to minimize flooding damage.

Additionally, five SMPs use regulations to address sea level rise, some of which are paraphrased below. Three of these regulations appear within Critical Areas Ordinances providing for enhanced standards in hazardous areas, and some also expressly allow shoreline stabilization or fill when a development or area is in danger due to sea level rise.

- Applicants for development in low lying shoreline or other specified areas shall be provided with information on sea level rise.
- Applicants for development in low lying shoreline or other specified areas shall be encouraged to voluntarily consider increasing setbacks to allow for future sea level rise.
- Particular modification or stabilization measures (fill, construction of protective berms) within the shoreline jurisdiction shall be allowed in response to increases in sea level, subject to all other provisions of the SMP.
- Geotechnical reports for variances proposing development within 65 feet of a bluff must contain erosion projections for 75 years based in part on sea level rise.

Comparing the prevalence of regulations (five SMPs) to that of goals and policies (15 SMPs) used to address sea level rise within these various areas is also important because regulations require action, while goals and policies express broader principles meant to guide implementation. Acknowledging the intent to protect from sea level rise in goals and policies creates an anchor for effective preparation in practice, but jurisdictions can also use regulations to require that specific measures be taken. Finally, standards, which are measures developed at the local level to implement regulations, are not listed in SMPs and are not able to be evaluated through literature review. Case studies with local jurisdictions that have included policies and regulations on sea level rise in their SMPs will provide insight into the standards and interpretations used to guide implementation of regulations.

Conclusions

The policies and regulations described in this report closely follow recommendations of Ecology's state-level guidance on sea level rise adaptation in *SMP Handbook Appendix A: Addressing Sea Level Rise in Shoreline Master Programs*. Almost half of coastal jurisdictions

with updated SMPs include some measures recommended in this guidance in a variety of ways through policies and regulations. Conclusions and questions from this synthesis are listed below.

1. Almost half of jurisdictions address sea level rise through explicit language in goals, policies, and regulations of SMPs.

2. When jurisdictions do address sea level rise through SMPs, they follow Ecology's guidance.

This suggests that Ecology's state-level guidance is a relevant source of information that local jurisdictions use in planning for sea level rise in SMPs. Local jurisdictions are finding ways to use existing tools.

3. There is great variety in how SMPs address sea level rise. However, flood damage minimization, conservation and restoration activities, and general shoreline use are the most common elements in which jurisdictions' SMPs currently include language about sea level rise.

In addition to identifying how sea level rise can best be acknowledged in SMPs, updated state-level guidance could also focus on addressing the individual hazards and impacts resulting from sea level rise, such as increased coastal flooding.

4. Most commonly, SMP policies provide for the consideration of sea level rise information in development decisions.

5. Five jurisdictions' SMPs contain regulations that require a variety of specific actions addressing sea level rise. These include providing information on sea level rise to developers and residents, accounting for sea level rise in stabilization planning, and ensuring that the location and design of development minimizes risk.

Standards for implementation of these regulations will be explored through case studies.

The diversity of adaptation options communities have pursued using language about sea level rise in their SMPs shows the SMP's flexibility as a planning program meant to adapt to local contexts. Understanding this diversity and exploring whether local jurisdictions prefer to use policies or regulations to address sea level rise helps inform improvements to Ecology's guidance on addressing sea level rise in SMPs. Regardless of exact language, the standards and interpretations used to implement policies and regulations that address sea level rise in SMPs ultimately dictate their efficacy. Ultimately, conversations with local government staff have indicated that additional guidance would be helpful and that broad flexibility to adapt SMP policies to local conditions and needs is essential for each community to best prepare for sea level rise.

Finally, it is also important to note that regardless of whether the term "sea level rise" is used in SMPs, many jurisdictions are addressing the hazards associated with sea level rise in a variety of ways. During a workshop held by the Department of Ecology, local government staff expressed that many jurisdictions are addressing sea level rise indirectly, using existing programs to prepare for associated hazards such as coastal flooding. In addition to SMPs, communities can take advantage of other planning tools available; local comprehensive plans, flood ordinances,

storm water management, infrastructure planning, evaluations of utility and service capacity, and other activities are also being used to address sea level rise. A multi-plan approach to addressing sea level rise is encouraged because the extent of areas affected by sea level rise exceeds the jurisdiction of any single plan.

Appendices

Appendix A. Shoreline Master Plans Update Status

Appendix A lists the Shoreline Master Plan update status with each of the 56 corresponding jurisdiction.

	Jurisdiction	SMP Update Status		Jurisdiction	SMP Update Status
1	Anacortes	Completed (2010)	41	Aberdeen	State approval underway
2	Bainbridge Island	Completed (2014)	42	Blaine	State approval underway
3	Bellingham	Completed (2013)	43	Clallam County	Local update underway
4	Bremerton	Completed (2013)	44	Grays Harbor County	Local update underway
5	Burien	Completed (2013)	45	Hoquiam	State approval underway
6	Coupeville	Completed (2009)	46	Ilwaco	Local update underway
7	Des Moines	Completed (2010)	47	Long Beach	State approval underway
8	DuPont	Completed (2013)	48	Mason County	Local update underway
9	Edmonds	Completed (2017)	49	Ocean Shores	Local update underway
10	Everett	Completed (2016)	50	Pacific County	State approval underway
11	Federal Way	Completed (2011)	51	Pierce County	State approval underway
12	Friday Harbor	Completed (2015)	52	San Juan County	State approval underway
13	Gig Harbor	Completed (2013)	53	Skagit County	Local update underway
14	Island County	Completed (2016)	54	South Bend	State approval underway
15	Jefferson County	Completed (2014)	55	Thurston County	Local update underway
16	King County	Completed (2013)	56	Westport	State approval underway
17	Kitsap County	Completed (2014)			
18	LaConner	Completed (2014)			
19	Lacey	Completed (2011)			
20	Langley	Completed (2013)			
21	Lynnwood	Completed (2011)			
22	Mukilteo	Completed (2012)			
23	Normandy Park	Completed (2014)			
24	Oak Harbor	Completed (2014)			
25	Olympia	Completed (2015)			
26	Port Angeles	Completed (2014)			
27	Port Orchard	Completed (2013)			
28	Port Townsend	Completed (2007)			
29	Poulsbo	Completed (2013)			
30	Ruston	Completed (2013)			
31	Seattle	Completed (2015)			
32	Sequim	Completed (2013)			
33	Shelton	Completed (2015)			
34	Shoreline	Completed (2013)			
35	Snohomish County	Completed (2012)			
36	Steilacoom	Completed (2013)			
37	Tacoma	Completed (2013)			
38	University Place	Completed (2015)			
39	Whatcom County	Completed (2008)			
40	Woodway	Completed (2013)			

Appendix B. Sea Level Rise Policies and Regulations Included in Shoreline Master Plans

Appendix B lists policies and regulations that include language about sea level rise in updated SMPs of jurisdictions with marine shoreline in Washington State. The jurisdiction, a summary of each policy and regulation, and the year in which the updated SMP took effect are listed.

Location	Year	Language
Bainbridge Island	2014	SMP>Critical Areas Regulations>Frequently Flooded Areas: Applicants for development in low lying shoreline areas and other areas where flood elevation is controlled by tide level shall be provided with information on sea level rise (Ord. 2005-03 § 2, 2005).
Bellingham	2013	SMP>Shoreline Goals and Policies>Shoreline Goals>Flood Damage Minimization>Objective: B: New scientific studies/information on tsunamis and sea level rise should be used to guide shoreline development as it becomes available and accepted as scientifically valid.
Bremerton	2013	SMP>Goals>General Goals>Conservation and Restoration>Goal: 7: Recognize and monitor the potential effects of sea level rise as additional scientific information becomes available. At the next major update of the Shoreline Master Program consider additional specific policies and regulations based on additional scientific projections.
Burien	2013, revised 2016	SMP>General Goals and Policies>Flood Prevention and Minimization Element>Policy: 4: Monitor sea level rise and accordingly adjust development standards and building setbacks to minimize flooding potential.
Edmonds	2017	SMP>Master Program Elements: Goals and Policies for the Edmonds Shoreline Master Program>Shoreline Use Element>Shoreline Use Policies: 11: The City of Edmonds shall stay abreast of scientific information regarding climate change and sea level rise and reevaluate the Shoreline Master Program development standards as soon as adequate scientific information is available. 12: The Edmonds Marsh study identified in the City of Edmonds Capital Improvement Plan is an important study for determining the potential impacts of climate change and sea level rise on the City of Edmonds and should be considered a high priority for completion.
Gig Harbor	2013	SMP>General Goals, Policies, and Regulations>Restoration and Remediation>Policy: F: Climate Change: Consideration should be made for potential adverse effects of global climate change and sea level rise when designing restoration and remediation projects.

Location	Year	Language
Gig Harbor	2013	SMP>General Goals, Policies, and Regulations>Restoration and Remediation>Policy: F: Climate Change: Consideration should be made for potential adverse effects of global climate change and sea level rise when designing restoration and remediation projects.
Island County	2016	SMP>Shoreline Goals and Policies>Shoreline Use Element>Policy: 6: Sea level rise and increased frequency and magnitude of extreme storm events as a result of climate change should be taken into account when considering and evaluating shoreline uses. SMP>Shoreline Goals and Policies>Conservation Element>Policy: 10: Island County shall establish a program to monitor the effects of ongoing climate change on the marine environment by annually measuring sea level and marine water pH at a minimum of five established sites spread throughout Island County. SMP>Shoreline General Policies>Flood Hazard Reduction>Policy: 6: When reviewing projects that could be affected by sea level rise adjust development standards such as building setbacks or elevation as necessary to minimize potential damage from flooding.
Jefferson County	2014	SMP> Master Program Goals>Shoreline Use>Goal: 10: Encourage all use and development to address potential adverse effects of global climate change and sea level rise. SMP>General Policies and Regulations>Shoreline Setbacks and Height>Policy: 2: Proponents of a development on no-bank or low bank marine shorelines are encouraged to locate the bottom of a structure's foundation higher than the level of expected future sea-level rise.

Location	Year	Language
King County	2013	SMP>Environment Protection Policies>Preparing for Climate Change Policy: S-650: King County shall ensure that new projects for and major maintenance or replacement of utilities, roads, and other public infrastructure consider the impacts of sea-level rise in the location, design, and operation of the projects. SMP>Environment Protection Policies>Preparing for Climate Change Policy: S-651: Habitat protection and restoration projects in the shoreline jurisdiction shall consider implications of sea-level rise and other climate change impacts to promote resiliency of habitats and species. SMP>Shoreline Use & Shoreline Modification>Shoreline Modifications>Shoreline Stabilization Policy: S-778: When new development occurs within the shoreline jurisdiction, the following measures apply: King County should notify all prospective developers of new development along Vashon and Maury Islands that their development may be impacted by sea-level rise and should encourage all such new development to be set back a sufficient distance to avoid the need for shoreline protection during the expected life of the development. SMP>Shoreline Use & Shoreline Modification>Shoreline Modifications>Shoreline Stabilization Policy: S-785: King County should encourage replaced structural shoreline stabilization located on Vashon and Maury Islands to be relocated outside of the 100-year floodplain whenever possible. The edge of the 100-year floodplain is consistent with a two-foot sea-level rise. Critical Areas Regulations>Shorelines>Stabilization Regulation: The department shall provide a notice to an applicant for new development or redevelopment located within the shoreline jurisdiction on Vashon and Maury Island that the development may be impacted by sea level rise and recommend that the applicant voluntarily consider setting the development back further than required by this title to allow for future sea level rise (Ord. 16985 § 41, 2010: Ord. 5734 § 5, 1981: Ord. 3688 § 413, 1978. Formerly K.C.C. 25.16.180).
Langley	2013	SMP>General Policies and Regulations>Flood Hazard Management Policy: When reviewing projects that could be affected by sea level rise adjust development standards such as building setbacks or elevation as necessary to minimize potential damage from flooding.

Location	Year	Language
Olympia	2015	SMP>Section 2: Goals and Policies>2.4 Shoreline Use and Development Policies: D. The City should continue to develop information about the impacts of sea level rise on the shoreline and other affected properties; the City should develop plans to address the impacts of sea level rise in collaboration with impacted property owners, the community and the Department of Ecology. These plans should include at minimum flood prevention approaches, shoreline environment impact considerations and financing approaches. The City should amend the Shoreline Master Program and other policy and regulatory tools in the future as necessary to implement these plans. E. The City should consider the impacts of sea level rise as it plans for the rebuild of Percival Landing and other shoreline improvements and it should be designed to provide for a reasonable amount of sea level rise consistent with the best available science and the life cycle of the improvements. SMP>Section 2: Goals and Policies>2.9 Marine Recreation Management Policy: G. The City recognizes that the Marine Recreation shoreline (Reach 5C) and the adjoining Urban Conservancy/Urban Intensity shoreline in Reach 6A provide a variety of benefits to the community including boat moorage, utility transmission, transportation, public access, water enjoyment, recreation, wildlife habitat and opportunities for economic development. These benefits are put at risk by continued shoreline erosion. The City recognizes that there exists a need to develop a detailed plan for shoreline restoration and stabilization for Reaches 5C and 6A and encourages the Port to partner in this effort. 1. This plan may include: a. Measures to enhance shoreline stabilization through the introduction of bioengineered solutions. b. Measures to incorporate habitat restoration water-ward of the OHWM. c. Measures to incorporate public access and use through trails, public art, parks and other pedestrian amenities. d. Measures to incorporate sea level rise protection. e. Setbacks, building heights and building design considerations. 2. Upon completion of a jointly developed shoreline restoration and stabilization plan for Reaches 5C and 6A, the City will initiate a limited amendment to the SMP to implement this plan. SMP>Section 2: Goals and Policies>2.11 Urban Intensity Management Policies: B: Olympia's shoreline is characterized by a wide variety of "urban" uses and activities, including commercial, industrial, marine, residential, and recreational uses. Together, these uses and activities create a vibrant shoreline that is a key component of Olympia's character and quality of life. These types of uses should be allowed within the Urban Intensity environment, with preference given to Water-Dependent and Water-Enjoyment uses. Shorelines in this SED are highly altered and restoration opportunities are limited. The City's own Percival Landing is a good example of how the immediate shoreline in the Urban Intensity SED should be redeveloped with a focus on public access and enjoyment, sea level rise protection and restoration of shoreline environmental function where feasible.

		E: Provide for the restoration, repair and replacement of Percival Landing including consideration of sea level rise protection. SMP>Section 2: Goals and Policies>2.32 Fill Policy: C: Fill should be allowed to accommodate berms or other structures to prevent flooding caused by sea level rise, when consistent with the flood hazard reduction provisions in this Shoreline Program. Any such fill should include mitigation assuring no net loss of ecological functions and system-wide processes. SMP>Section 3: Regulations>3.61 Shoreland Fill Regulation: L: Fill within the shoreline jurisdiction shall be allowed in response to increases in sea level subject to all other provisions of this Master Program and the mitigation sequencing process. SMP>Section 3: Regulations> 3.62 Fill Waterward of OHWM Regulation: A. Fill water-ward of the OHWM shall be permitted for the following purposes only, with due consideration given to specific site conditions and only as part of an approved use or development: 1. Port development for water dependent uses where other upland alternatives or structural solutions, including pile or pier supports is infeasible; 2. Expansion or alteration of transportation facilities where there are no feasible upland alternatives; 3. Ecological restoration or enhancement such as beach nourishment, habitat creation, or mitigation when consistent with an approved restoration or mitigation plan; 4. Disposal of dredge material in accordance with the Dredge Material Management Program (DMMP) of the Department of Natural Resources; 5. Construction of protective berms or other structures to prevent the inundation of water resulting from sea level rise shall be allowed subject to all other provisions of this Master Program and the mitigation sequencing process when there are no other feasible options to protect existing development; 6. Public access; or 7. Cleanup of contaminated sites. B. Fill shall be the minimum necessary for the intended use or activity.
--	--	--

Location	Year	Language
Port Angeles	2014	SMP>General Policies and Regulations>Critical Areas (Geologically Hazardous Areas)>Regulation: Proposals requiring a variance for development within 65 feet of the top of a marine bluff as outlined above shall be required to submit a geotechnical engineering report, prepared in accordance with the requirements of this SMP and Title 15, PAMC. The geotechnical engineering report shall: • be prepared by a Washington State licensed professional civil engineer with a specialty in geotechnical engineering or an engineering geologist with a Washington specialty license in engineering geology as specified in RCW 18.220, • be professionally stamped, • be based upon the best available science, • consider existing and proposed uses, • include risks of slope failure, • include coastal erosion rates over at least 75 years, based in part on anticipated sea level rise and storm frequency, • Document how, and include a certification that the proposed structure will not be in danger from erosion for at least 75 years, • Include vegetation enhancement and low impact development measures that might be used as a means of reducing undesirable erosion. • address the requirements outlined in PAMC 15.20.060 (C), and • outline how the proposal meets all of the variance criteria in chapter 7 of this SMP.
Seattle	2015	SMP/Comprehensive Plan>Land Use Element>Shorelines>Shoreline Protection and Restoration: LUG52: Address and minimize the impacts of sea level rise on the shoreline environment with strategies that also protect shoreline ecological functions, allow water-dependent uses and provide public access.

Location	Year	Language
Shelton	2015	SMP>Shoreline Master Program Goals and Policies>Flood Hazard Reduction Goals and Policies> Policy: SMP6.1c.: Floodplain management planning should consider implications of sea-level rise and other climate change impacts. SMP>Shoreline Master Program Goals and Policies>Restoration Goals and Policies> Goal: SMP10.2.: Restoration projects should be designed in a manner that complements adjacent natural resources, incorporates maintenance-free designs, minimizes in-water work, considers sea-level rise, and includes adaptive management techniques. SMP>Shoreline Master Program Goals and Policies>Restoration Goals and Policies> Policy: SMP10.2d: Habitat protection and restoration projects should consider implications of sea-level rise and other climate change impacts to promote resiliency of habitats and species. SMP>Shoreline Master Program Goals and Policies>Shoreline Use and Development Goals and Policies> Policy: SMP12.1m: Consider implications of sea-level rise and other climate change impacts as part of capital facilities and infrastructure projects.
Shoreline	2013	SMP>Goals and Objectives>Flood Hazard Management Goal: Protect the City of Shoreline and other property owners from losses and damage created by flooding along the coast and sea-level rise.

BAINBRIDGE ISLAND SHORELINE MASTER PROGRAM (2014) OUTLINE

1.0 INTRODUCTION	8
1.1 Shoreline Master Program Introduction	8
1.2 Requirements of the Shoreline Management Act.....	8
1.3 Bainbridge Island’s Shoreline Master Program (SMP).....	14 1.3.1
1.4 Restoration Planning	20
1.5 Master Goal	20
2.0 SHORELINE INVENTORY AND CHARACTERIZATION	21
3.0 SHORELINE DESIGNATION POLICIES AND REGULATIONS	22
3.1 General	22
3.2 Upland Designations	23
3.3 Aquatic Designations.....	30
3.4 Island Conservancy, Shoreline Residential and Shoreline Residential Conservancy	35
4.0 GENERAL (ISLAND-WIDE) POLICIES AND REGULATIONS	37
4.1 Environmental Quality and Conservation	67
4.2 General Use	121
5.0 SPECIFIC SHORELINE USE AND DEVELOPMENT POLICIES AND REGULATIONS	152
5.1 Agriculture	152
5.2 Aquaculture	152
5.3 Boating Facilities.....	157
5.4 Commercial Development.....	166
5.5 Forest Practices.....	169
5.6 Industrial Development	169
5.7 Mining.....	174
5.8 Recreational Development.....	175
5.9 Residential Development	181
6.0 SHORELINE MODIFICATION POLICIES AND REGULATIONS	189
6.1 General Shoreline Modification Provisions.....	189
6.2 Shoreline Stabilization.....	191
6.3 Overwater Structures.....	201
6.4 Dredging and Dredge Material Disposal	213
6.5 Fill	217
7.0 VIOLATIONS, ENFORCEMENT, AND PENALTIES	220
7.1 General	220
7.2 Regulations	220
8.0 DEFINITIONS	224
Appendix A Shoreline Designation Map	263
Appendix B Critical Areas Regulations	264
Appendix C Buffer Recommendation Memorandums	314
Marine Shoreline Buffers and Riparian Areas.....	318
Scientific Importance of Marine Shoreline Buffers and Riparian Areas.....	319
Marine Shoreline Buffer and Riparian Protection Zone Recommendations.....	322
Agreed Principles.....	325
Buffer Assumptions and Recommendations	327
Appendix D Single-Family Residence Mitigation Manual	341
Appendix E Special Area Maps	378



Community Based Strategies to Reduce Greenhouse Gas Emissions

TRANSPORTATION

City of Bainbridge Island

June 2019



Huxley School of the Environment

Authored by: Deborah Weinmann

Contents

Executive Summary 4

Propel Non-motorized Transportation 5

Introduction 6

Greenhouse Gas Inventory Baseline 7

Increase Electric Vehicle Use..... 8

Education and Public Engagement 10

 Direct Outreach to Diverse Audiences 11

 Address Electric Vehicle Environmental Concerns 11

 Organize Electric Vehicle Drive Events 12

Increase Charging Infrastructure..... 13

Partner with Utility to Create EV Infrastructure Pilot Programs 15

Pass EV Ready Ordinances 16

Develop EV Ready Building Codes..... 18

Reduce Traffic Impact Fees for Mobility Enhancing Development..... 20

Mode Shifting..... 21

Increasing Public Transit Ridership 23

 Invest in Basic Bus Stop Amenities 23

 Target Campaigns Based on Human Behavior 24

 Educate Using Mobility Tools 24

Promote Electric Bikes 26

Non-Motorized Transportation Collaboration..... 27

Conclusion 28

Prioritization of Strategies 29

Appendix A - Sample Zoning Language 32

Appendix B - Kitsap Transit Ridership Data 2008-2018..... 35

Appendix C - City of Bellingham Mode Shifting Incentives 36

Executive Summary

In 2008, the Washington State legislature established limits on statewide greenhouse gas (GHG) emissions. The mandate set the following three goals: by 2020, reduce overall emissions of greenhouse gases to 1990 levels, by 2035, reduce overall emissions of greenhouse gases to 25 percent below 1990 levels, and by 2050, reach global climate stabilization levels by reducing overall emissions to 50 percent below 1990 levels, or 70 percent below the state's expected emissions that year.¹ Based on the most recent 2015 GHG inventory, the transportation sector 3-year average from 2012 to 2015 accounted for 42% (Figure 1) of the total statewide greenhouse gas emissions, more than electricity consumption (19%), industrial (19%), and all other sectors (<8% each).² In order to reach the legislated GHG reduction goals, actions to reduce emissions from transportation activities will be necessary.

State and regional governments have a major role in decarbonizing our transportation system. At the same time, the participation of local municipalities is also critical considering the magnitude of the problem and the necessity to act. Learning and improving upon strategies other localities are using will help to move the transition forward.

Bainbridge Island's Comprehensive Plan includes the following Greenhouse Gases

Goal, "Reduce greenhouse gas emissions through compliance with federal, state and regional policies while developing local strategies to reduce emissions further."³ No doubt, the island community is committed to supporting actions that will contribute to the achievement of state goals. The subsequent report highlights strategies Bainbridge Island can use to reduce local greenhouse gas emissions in the transportation sector.

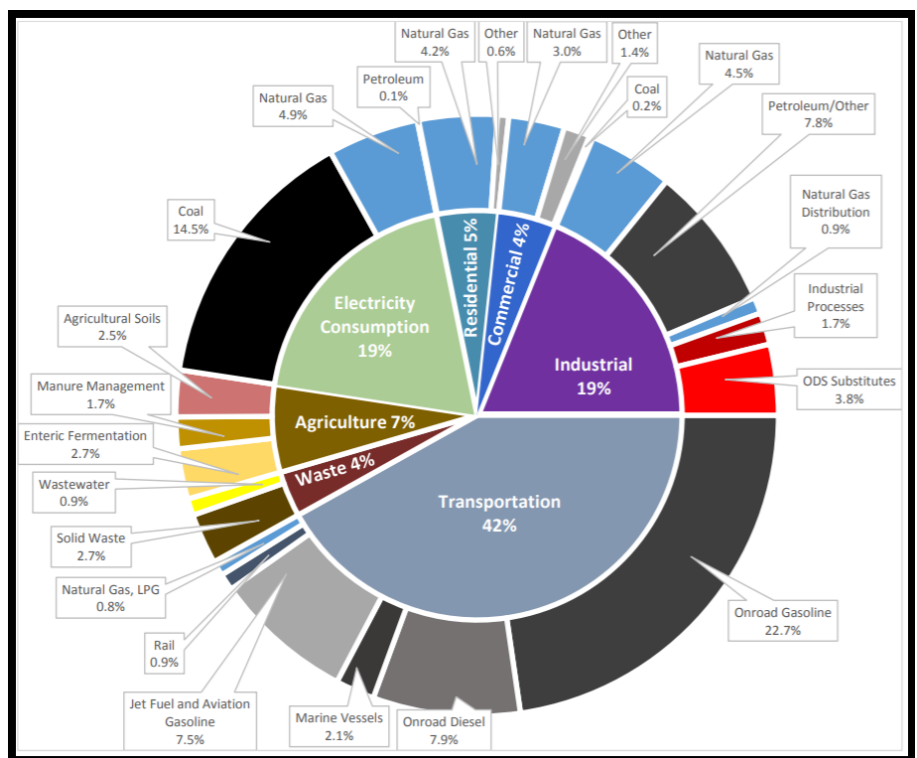


Figure 1. Washington State Greenhouse Gas Emissions, 3-year average (2012-2015). Data from Washington State Greenhouse Gas Emissions Inventory: 1990-2015, page 14. Report to the Legislature. Retrieved from: <https://fortress.wa.gov/ecy/publications/summarypages/1802043.html>.

¹ <https://apps.leg.wa.gov/RCW/default.aspx?cite=70.235.020>

² <https://fortress.wa.gov/ecy/publications/documents/1802043.pdf> , page 14

³ <https://www.bainbridgewa.gov/DocumentCenter/View/7800/5-ENVIRONMENTAL?bidId=>, page 11

Increase Electric Vehicle Use

Provide education and community outreach to promote the benefits of electric vehicle ownership

- Partner with the Farmer's Market, the City of Bainbridge Island, and local car dealers and bike shops to hold an Electric Vehicle Drive Event including E-bikes
- Partner with local organizations such as the BI Climate and Energy Forum to Hold Electric Vehicle Question/Answer Forums to:
 - Share information on federal and state incentive programs
 - Provide tools for comparing electric vehicles with similar conventional cars
 - Remove misconceptions about electric vehicle ownership
 - Address environmental concerns associated with electric vehicle manufacturing, battery disposal, and charging with 'unclean' electricity

Increase Charging Infrastructure

Partner with Puget Sound Energy and the City of Bainbridge Island to pilot electric vehicle charging infrastructure incentive programs

- Provide residential and commercial customers with rebates for electric vehicle supply equipment (EVSE) installations
- Participate in utility program analysis activities to ensure future grid reliability
- Apply for a state grant through the Electric Vehicle Infrastructure Partnerships Program (EVIPP)
- Implement ordinances or building codes requiring *EV Ready* infrastructure

Encourage Mode Shifting

Partner with Kitsap Transit and community leaders to increase ridership

- Develop advertising campaign based on human choice behavior research
- Invest in basic bus stop amenities including shelters and benches
- Provide education and outreach on the use of mobility applications
- Promote e-bikes along with public transit use

Propel Non-motorized Transportation

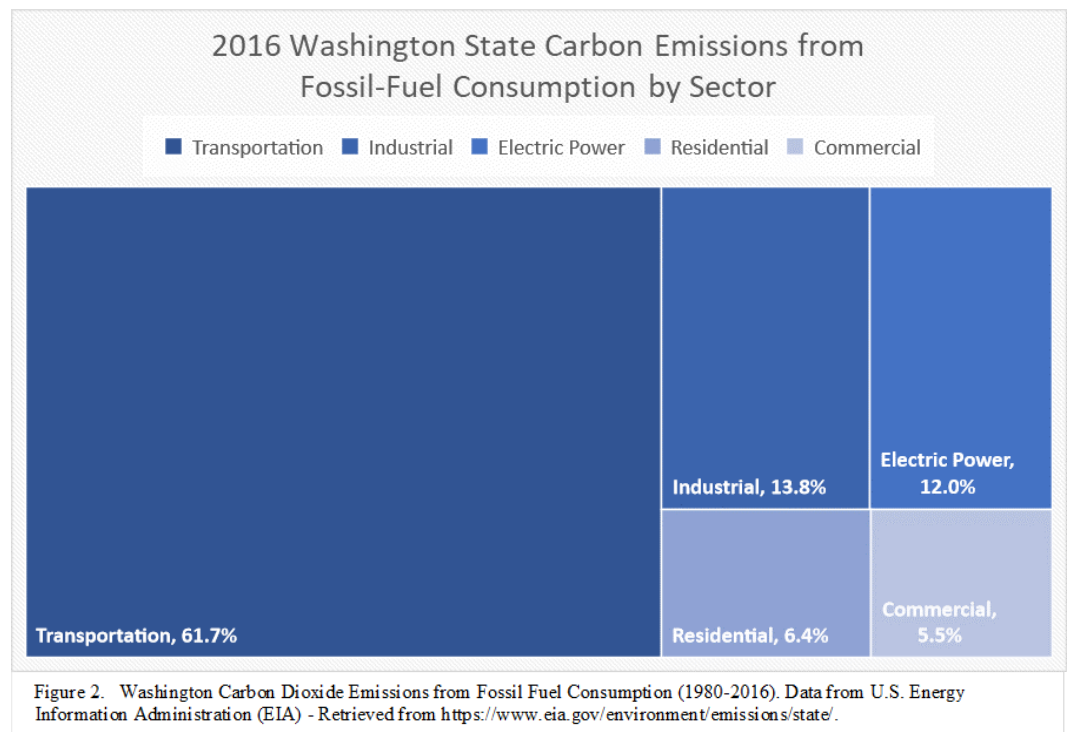
Collaborate with community groups to advance non-motorized travel

- Work with the Multi-Modal Advisory Committee and the BI Mobility Alliance to develop an infrastructure plan
- Support community funding for non-motorized transportation projects
- Partner with schools to encourage safe walking and biking routes

Introduction

The Washington State law established in 2008 to limit greenhouse gas (GHG) emissions requires the Washington State Department of Ecology (DOE) to produce a biennial statewide Greenhouse Gas Emissions Inventory Report for the legislature. The purpose of the report is to update representatives on the state's progress in meeting the mandated goals. The latest report indicates from 2013 to 2015, on average, the transportation sector was responsible for the greatest amount (42.5%) of annual total statewide GHG emissions (DOE 2019). In 2016, when only accounting for emissions generated by the burning of fossil fuels, the transportation sector in our state produced 61.7%, by far more than any other sector, even more than the industrial sector (Figure 2).

Currently, our state transportation system is built around the use of fossil fuels for mobility. And, emissions continue to grow. From 1990 to 2016, the general trend shows Washington's emissions from fossil fuel combustion in the transportation sector rose by almost 20% (EIA 2016).



During the 2019 session, the state congress passed several bills containing policies aimed at propelling the electrification of our transportation system. Without a doubt, political support and openness to new ideas are critical to curtailing emissions. While policies and programs at the state level provide the foundation for change, regional, county, and city planners also play a role in shaping the future development of transportation systems in our state. Local governments along with knowledgeable community leaders, in particular, are best able to build relationships with neighbors willing to invest in their own towns.

Greenhouse Gas Inventory Baseline

Fortunately, numerous measures are being taken by cities and counties to reduce transportation related GHG emissions. While each local government is unique, identifying successful strategies implemented by other communities can accelerate change in places with similar challenges. As a starting point, municipalities have conducted GHG inventories to gather baseline data about local emissions. Likewise, Bainbridge Island is in the process of conducting an inventory. Based on preliminary data, the electric power sector had the most GHG emissions followed by transportation.

Transportation Strategies

- Fund non-motorized infrastructure
- Increase electric vehicle use
- Install charging infrastructure
- Update building codes
- Encourage Mode shifting

The Puget Sound Clean Air Council (PSCAA) recently completed a comprehensive GHG inventory covering a four-county area, which included Kitsap County. According to the PSCAA inventory Kitsap County's transportation sector accounted for 30% of emissions, second behind residential buildings (Figure 3). Within Kitsap's transportation sector, over 85% of emissions are from on-road vehicles fueled by diesel or gasoline (PSCAA 2016). Most people continue to move through communities using conventional vehicles running combustion engines. Until vehicles powered by alternative methods become widely adopted, or people choose different forms of mobility, reigning in transportation pollution poses a significant challenge for Bainbridge Island. Local leaders and concerned community members throughout the state are addressing the problem by focusing on increasing electric vehicle use, installing charging infrastructure, updating building codes, and encouraging mode shifting.

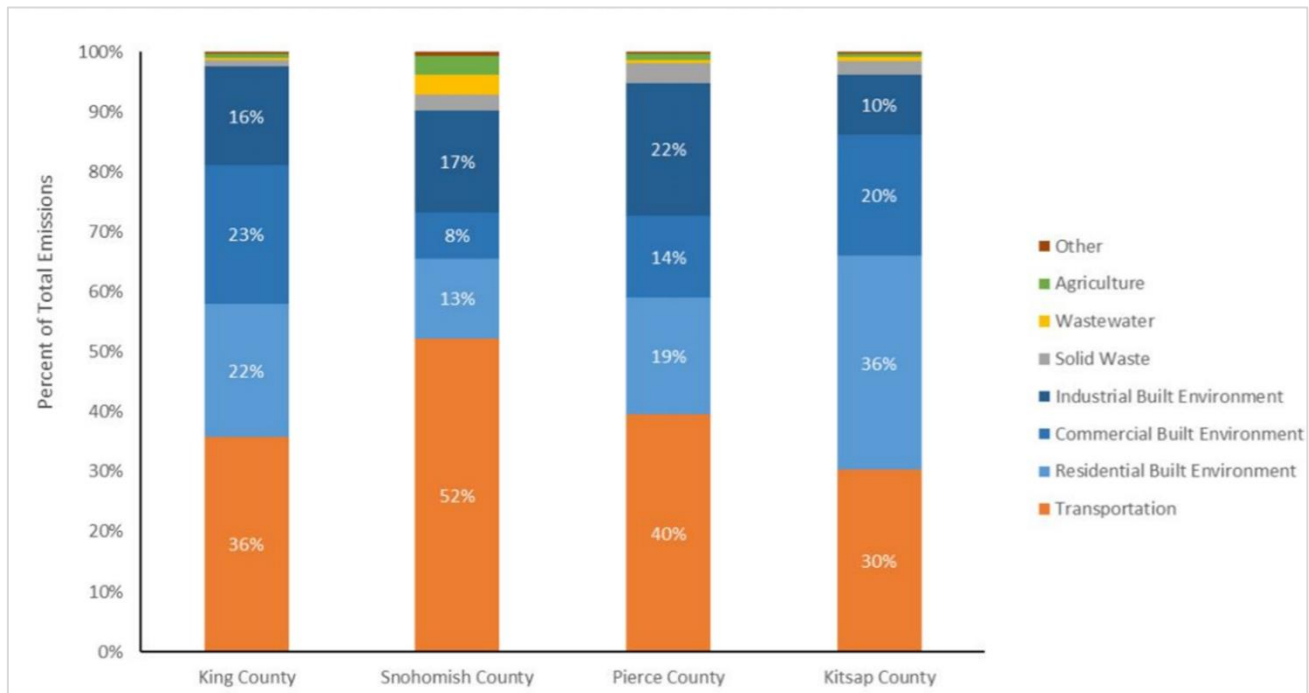


Figure 3. Puget Sound Clean Air Agency GHG Inventory. Retrieved from <https://www.pscleanair.org/DocumentCenter/View/3328/PSCAA-GHG-Emissions-Inventory?bidId=>

Increase Electric Vehicle Use

Background – Electric Vehicles

For years, researchers have been evaluating ways to reduce GHG emissions related to transportation. Among many ideas, increasing vehicle efficiency through the electrification of on-road vehicles ranks high as an effective strategy to decarbonize transport. Compared to other U.S. states, Washington had the third most plug-in vehicle (PEV) registrations per 1,000 people in 2017 at 4.06, behind California and Hawaii at 8.64 and 5.12 respectively.⁴ Though increasing, still only a small amount of the total number of vehicles in our state are powered by electricity.

The state sales and use tax credit for the purchase of an electric vehicle expired at the end of May last year after the total number of qualifying vehicles reached 7,500, the maximum allowed by law.

During the 2019 legislative session, a Green Transportation Bill (HB2042 2019) was passed re-instating the sales and use tax credit for the purchase or lease of electric vehicles including all-electric,

hybrids, hydrogen fuel cell, and now even used EVs.⁵ The new vehicle price must be less than \$45,000 and used vehicle price less than \$30,000. The tax credit phases out, dropping every two years, over the next six years. Beginning in August of this year, \$25,000 of the new vehicle price will be tax free, and for used vehicles \$15,000 remains tax free for the entire six-year period. Already, there is a federal income tax credit, up to \$7,500, in place for certain new electric vehicles. With multiple incentives in place, electric vehicles prices are becoming more affordable and competitive with comparable conventional cars.

Cumulatively, increases in EV adoption reduces emissions from transportation. That said, transitioning to electric vehicles (EVs) is most effective at reducing emissions when clean electricity is used to charge car batteries. Puget Sound Energy (PSE) is the electric utility serving Bainbridge Island. Unfortunately, PSE generates electricity with a fuel mix containing over 65% fossil fuels, mainly coal and natural gas.

To reduce GHG emissions from the electric power sector, the Washington State legislature passed a Clean Energy Bill mandating the generation of 100% clean energy by 2045 (SB5112 2019).⁶ As the grid becomes cleaner, vehicles powered by electricity become cleaner too. Passage of the clean energy bill paves the way for a sensible transition by charging cars with electricity generated from a higher percentage of carbon free sources year by year. Still, to keep moving forward, individuals will need to choose to drive EVs.

Green Transportation Bill

Re-instated tax credit on purchased or leased new and used electric vehicles.

Clean Energy Bill

Mandates the generation of clean electricity by 2045.

A clean grid means cleaner EVs.

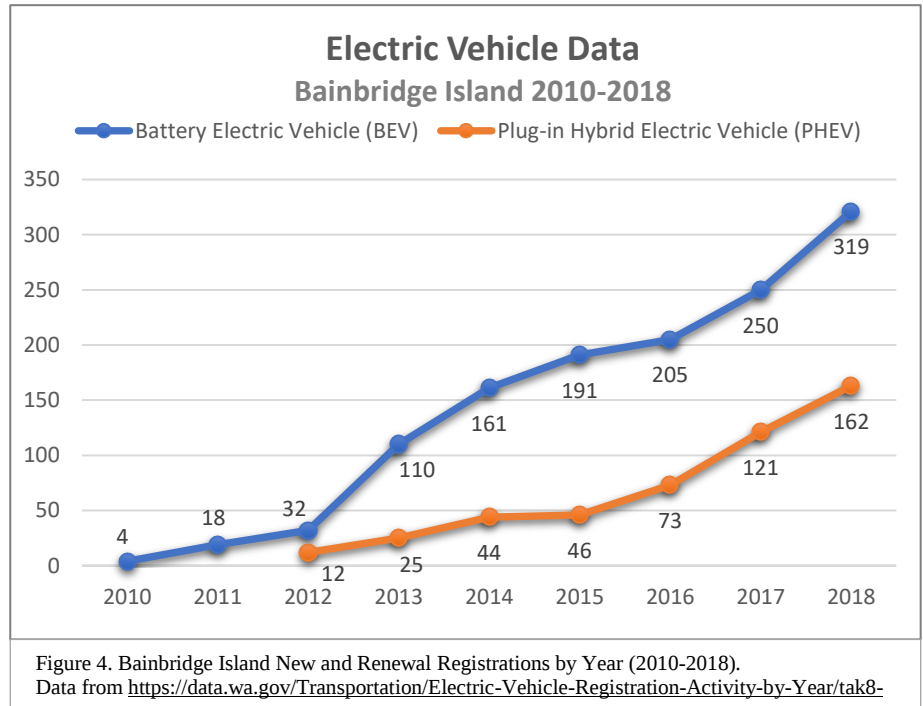
⁴ <https://www.energy.gov/eere/vehicles/articles/fotw-1059-december-10-2018-california-had-most-plug-vehicle-registrations>

⁵ <https://app.leg.wa.gov/billssummary?BillNumber=2042&Year=2019&Initiative=false>

⁶ <https://app.leg.wa.gov/billssummary?BillNumber=5116&Initiative=false&Year=2019>

Washington State officials realize a mass transition from combustion engines to electrically charged batteries is needed to significantly reduce GHG emissions from transport. The state’s goal of 50,000 plug-in electric vehicles by 2020 was nearly achieved at the end of last year when the total number of registered plug-in vehicles reached 42,542.⁷

Many jurisdictions are setting transportation goals aimed at increasing EV use. Goals can be set and measured using annual electric vehicle registration data available through the Washington State Department of Transportation (WSDOT). For example, the City of Bellingham’s Climate Action Plan sets a goal of 40% EV adoption and 30% hybrid adoption by 2030 as a way to reduce GHG emissions.⁸ As another example, Olympia set a goal of 30% of all vehicles are electric by 2030.



On Bainbridge Island, over the past three years ownership of plug-in hybrid and battery electric vehicles has been accelerating, on average, at a rate of 16% annually (Figure 4).⁹ Clearly, BI residents recognize the benefits of electric vehicles evidenced by the upward trend in ownership. Last year, vehicle registrations on Bainbridge Island accounted for one-third (33%) of the county-wide total of EVs, and per capita ownership was four times more than the county as a whole.^{10, 11} Similar to other municipalities, Bainbridge Island’s data can be used to set long and short-term EV goals.

	BEV	PHEV	Total	Per Capita*
Bainbridge Island	319	162	481	0.0151
Kitsap County	894	548	1442	0.0038

Table 1. WSDOT New and Renewal Registrations by Year (2018). *Based on 2017 population data
Data from <https://data.wa.gov/Transportation/Electric-Vehicle-Registration-Activity-by-Year/tak8-xdcp>.

⁷ <http://www.westcoastgreenhighway.com/pdfs/PEVSummaryDec2018.pdf>

⁸ <https://www.cob.org/services/environment/climate/Pages/program.aspx>

⁹ <https://data.wa.gov/Transportation/Electric-Vehicle-Registration-Activity-by-Year/tak8-xdcp>

¹⁰ <https://data.wa.gov/Transportation/Electric-Vehicle-Registration-Activity-by-Year/tak8-xdcp>

¹¹ <http://worldpopulationreview.com/us-cities/bainbridge-island-wa-population/>

Education and Public Engagement

Communities around the state are using educational campaigns as a strategy to remove misconceptions about EVs, to promote the many benefits of EVs, and to address legitimate environmental issues related to EV production. Communicating to the public is especially important considering consumers are purchasing vehicles less frequently than in the past. Compared to a decade ago, people are holding on to their vehicles longer, on average about 6.5 years for new and 5.5 years for used cars.¹² Add to that, many real and perceived barriers still exist amongst consumers in regards to electric vehicle adoption. Concerns about price, range anxiety, and lack of infrastructure are common, but other factors also play a role in car purchase decision-making including social networks, lifestyle, and even skepticism. Local leaders can address information deficits and promote electric vehicle adoption through outreach in the neighborhoods they know best.

Outreach Strategies

- Partner with the Farmer's Market, the City of Bainbridge Island, and local car dealers and bike shops to hold an Electric Vehicle Drive Event including E-bikes
- Partner with BI Climate and Energy Forum to Hold Electric Vehicle Question/Answer Forums
- Place links to electric vehicle information on the city website

For starters, community education is needed to eliminate the misconceptions known to exist in the public realm about the cost of electric vehicles. A lack of knowledge about incentive programs, and limited awareness about maintenance and fuel cost savings are known barriers to EV adoption.

Researchers Jenn, Springel and Gopal (2018) found in states where the cumulative knowledge about EV incentives was high, a significantly greater number of electric vehicles were sold. Because price is often mentioned as a barrier to purchasing an EV, consumer's perception of the final transaction price may be much higher than the true cost of an EV after accounting for incentives. The same study found, of respondents with incomes over \$60,000 who planned to buy a new car in the next three years only 6.2% knew about state or local purchase incentives available to them (Jenn, Springel and Gopal 2018).

Additionally, part of the car shopping process involves comparing the financial costs and benefits among different vehicle types. Again, consumers lack the tools to effectively calculate and compare the maintenance and fuel costs of electric vehicles to similar conventional car models.

Taken altogether, inaccurate perceptions about electric vehicle prices coupled with a lack of information on incentives and savings on maintenance and fuel, translates into individuals being less likely to consider

¹² <https://news.ihsmarkit.com/press-release/automotive/vehicles-getting-older-average-age-light-cars-and-trucks-us-rises-again-201>

purchasing an EV. State and federal EV policies and programs frequently change. As such, consumers need to be kept abreast of these changes in order to make informed decisions when making a vehicle purchase. Regular educational campaigns in local communities can provide people with up-to-date information, tools, and valuable resources.

Direct Outreach to Diverse Audiences

Besides the considerations already mentioned, social networks, lifestyle, and self-identity influence a car purchase, especially an electric vehicle.

In a study of the interpersonal influence on pro-environmental behavior, researchers Axsen and Kurani (2012) found individuals were more likely to develop new, pro-societal views of plug-in vehicles when they had a basic understanding of the technology and pro-societal values were supported in their social network. In essence, once participants were versed in the functionality of EVs they then considered whether friends would support their car buying decision. No doubt, the car a person drives is symbolic and reflects the self-identity of the driver and impacts their feelings of acceptance within their peer group.

Other Factors Influencing Car-Buying Decisions

- Friends and family
- Self-identity
- Social Networks
- Lifestyle

Similarly, researchers Axsen, Tyree-Hageman, and Lentz (2012) found people living a pro-environmental lifestyle, with an openness to change, and friends and family with comparable practices, were the most likely to purchase plug-in vehicles. However, people lacking social connections with people holding pro-societal values were much less likely to engage in pro-environmental actions, such as purchasing an EV (Axsen, Tyree-Hageman, and Lentz 2012).

Evidenced by both of these studies, people need more experiences with electric vehicles and would benefit by making connections with people concerned about environmental issues in their community. Additionally, the research indicates lifestyle and social networks influence car purchases. Looking ahead, community outreach may be the most effective way to promote social connections that can lead to exercising pro-societal values. Equally important will be finding creative ways to connect with diverse audiences in order to reach people *open to change*, but not necessarily pegged as having pro-environmental attitudes. Providing links to EV information on the City of Bainbridge website would be a way to reach all community members.

Address Electric Vehicle Environmental Concerns

A good portion of people, even environmentally minded individuals, are reluctant to pursue alternative autos due to skepticism over the environmental impacts of batteries and electricity powered by dirty fuels for charging.

Environmentally minded individuals have concerns about electric vehicle batteries and charging powered by dirty electricity.

Some of these concerns can be alleviated by sharing knowledge from informative studies. In a recent study, the Union of Concerned Scientists (2015) found, using the average carbon intensity of electricity in the Northwest region, driving a battery electric vehicle (BEV) had the equivalent global lifecycle emissions of a similar type conventional car getting 94 miles per gallon. Stated differently, even considering the higher emissions associated with battery electric vehicle (BEV) manufacturing, global lifecycle emissions from BEVs are offset within 1.5 years of driving. In brief, the public needs a forum to ask questions and learn more about EVs.

Add to that, production processes and battery recycling efforts continue to improve. Again, outreach provides an opportunity to engage people with environmental concerns about EVs. Too, educational campaigns designed for varied audiences have the greatest potential to increase the number of electric vehicle adopters.

Organize Electric Vehicle Drive Events

Not only do people lack accurate knowledge about electric vehicles, they also have little experience with EVs. Electric car drive events give people exposure and hands-on experience with electric vehicles. In addition, community members who own EVs can answer questions and share their first-hand experiences with others.

Several local communities have held different types of events by partnering with other organizations. Obviously, most people have never owned an EV, few people know someone else who owns an EV, and even less people have actually driven an EV. Taken altogether, inexperience poses a significant barrier to electric vehicle adoption.

In a recent study, researchers Taylor and Fujita (2018) found test drives and personal recommendations from friends and relatives were two of the most highly valued information resources when making a car purchasing decision. Simply put, people find it particularly important to ask questions and learn from other EV drivers.

RESEARCH ON ELECTRIC VEHICLES

- Electric vehicles are cleaner, even when considering electric power GHG emissions associated with charging
- People lack experiences with electric vehicles and knowledge about the benefits of ownership.
- Test drives and personal recommendations are important to consumers.

Connect with National EV Events

- Drive Electric Earth Day in April
- National Drive Week in September

Cities in our state are giving people the opportunity to do just that by hosting electric drive events. Bellingham used valuable resources, provided by sponsors of the national Drive Electric Earth Day, to organize a local

event in April.¹³ The city partnered with their local utility and several other businesses and community organizations to orchestrate the event. While attending, people were given the opportunity to test drive EVs, but they also celebrated the opening of a new fast charging station. National Drive Electric Week, which takes place during the third week of September, is another annual event local cities have been promoting.¹⁴ Again, national sponsors provide local towns with a variety of resources for organizing the event. Bainbridge Island could partner with the Farmer's Market, PSE, local bike shops, and nearby car dealers to organize an event.

Other communities have partnered with their utility provider to host electric drive events where people can test drive different vehicles, even electric bikes, and get their questions answered by experts in a casual atmosphere. For example, the City of Olympia partnered with Puget Sound Energy, Western Washington Clean Cities, Washington Department of Enterprise Services, and Forth to host a community electric drive event at the State Capital building.¹⁵ Evidenced by the number of organizations involved in these events, multiple stakeholders are benefitting.

Partner with PSE, bike shops, and car dealerships, to hold EV Drive and E-Bike Event

In the end, to reduce transportation emissions, mass people will need to *choose* to buy electric, instead of a conventional car powered by gasoline, when their next vehicle choice is made. Holding a combined EV Drive and E-bike event on Bainbridge Island would give the public more experiences with alternatively fueled vehicles. The first step in changing people's perceptions is to remove some of the barriers to EV ownership. With that in mind, it is important to realize too, other factors influence individual car choices. Along this line, educational campaigns also need to address personal aspects considered when it comes to purchasing a car.

Increase Charging Infrastructure

Background – Electric Vehicle Charging Infrastructure

The Environmental Element of Bainbridge Island's Comprehensive Plan states, "Facilitate the improvement and convenience of low carbon mass transit and increased carsharing, cycling, walking and the development of *alternative vehicle infrastructure* (e.g., charging stations) to reduce greenhouse gas emissions." No doubt, before purchasing an electric car, people first consider where they would charge their vehicle. To date, Bainbridge Island has only four, Level 2 public charging stations. Two are in the downtown Winslow area, and the other two are near the Highway 305 and High School Road intersection.

¹³ <https://driveelectricearthday.org/>

¹⁴ <https://driveelectricweek.org/>

¹⁵ <https://www.pscleanair.org/505/Olympia-Ride-Drive>

Recognizing EV ownership requires nearby or easy access to charging, the Washington State Joint Transportation Committee commissioned a study back in 2015 to determine the most effective way to increase public EV charging infrastructure.

The final report determined private firms were unlikely to invest in public charging stations because it simply would not be profitable due to high investment costs, uncertain demand in the near-term, and commercial charging competing with home charging (WSDOT 2015). Furthermore,

STUDY - INCREASING EV CHARGING STATIONS

- Private/public partnerships are necessary
- Electric Vehicle Infrastructure Partnerships Program offers state grant money for EV infrastructure along major highways

using a private/public business model, the study found a private sector firm with public interventions such as low interest loans and state grant funding could be sustainable in the private market after 5 years (WSDOT 2015). As a result of the study, the Washington Department of Transportation (WSDOT) developed the Electric Vehicle Infrastructure Partnerships Program (EVIPP).¹⁶

The EVIPP program is designed to expand fast charging along major highway corridors. After running out of money last year, the 2019 legislature approved \$2 million in the transportation budget for continuation of the program.¹⁷ Coincident with the study, a tool was developed to analyze the financial performance of electric vehicle charging projects.¹⁸ The tool is designed to examine diverse project scenarios allowing government agencies to broaden potential funding opportunities between public and private entities.

Recently, the City of Bellingham partnered with a private EV charging firm to secure a grant for two new fast charging stations along the I-5 corridor. Currently, the identified priority corridors are outside of Kitsap County, however, Highway 305 through Bainbridge Island is an important connector route to the Olympic Peninsula and would likely be considered should funding continue.

To help increase the installation of charging equipment, our state continues to offer a sales and use tax exemption on electric vehicle batteries and infrastructure, labor and service on EV batteries and infrastructure, and on personal

State EV Infrastructure Incentives

- Sales tax exemption on EV batteries, infrastructure, labor and service
- Public lands leasehold excise tax exemption

¹⁶ <https://app.leg.wa.gov/RCW/default.aspx?cite=47.04.350>

¹⁷ <https://www.wsdot.wa.gov/Funding/Partners/EVIB.htm>

¹⁸ <https://atlaspolicy.com/rand/ev-charging-financial-analysis-tool/>

property that will become a component of EV infrastructure. In addition, leases to tenants of public lands used for electric vehicle infrastructure are exempt from leasehold excise taxes.

In 2015, a state law was passed to allow investor-owned utilities, such as PSE, an incentive rate of return on Electric Vehicle Supply Equipment (EVSE) deployed for the benefit of utility ratepayers.

As another boost, back in 2015, a law was passed to allow investor-owned utilities an incentive rate of return on electric vehicle supply equipment (EVSE) deployed for the benefit of ratepayers. The purpose of the incentive was to signal to utilities that the legislature is providing a clear policy and financial investment intended to engage private utilities in the build out of EV infrastructure. In response, several utilities have offered pilot programs to promote the installation of residential and commercial EVSE.

Partner with Utility to Create EV Infrastructure Pilot Programs

Utility companies can provide residential and commercial customers with rebates for electric vehicle supply equipment (EVSE) installations. In turn, customers agree to participate in utility program analysis activities. In response to the utility EVSE incentive, Puget Sound Energy (PSE) offered up to 5,000 qualified residential customers a \$500 rebate on the purchase of Level 2 electric-vehicle chargers.¹⁹ Currently, the incentive is no longer available. However, PSE is using the data gathered from program participants to explore potential future incentives.

EV Infrastructure Strategies

- Partner with PSE to develop EV infrastructure rebate programs like other private utilities are doing
- Pass *EV Ready* ordinance
- Update development codes

Avista offers rebates including \$1,000 on single family homes and \$2,000 for a workplace or public installation.

On the eastern side of the state, Avista, an investor-owned electric and gas utility, continues to offer rebates on installation costs including \$1,000 on single family homes and \$2,000 for a workplace or public installation.²⁰ Serving central and southeastern Washington, investor-owned Pacific Power currently offers customers competitive grants covering up to 100% of the

¹⁹

https://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=EVSE%20Report%20to%20the%20Legislature%20-%20Final_a9efaf10-04d7-4c3e-b2df-f0c3da1d06ed.pdf , page 11

²⁰

https://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=EVSE%20Report%20to%20the%20Legislature%20-%20Final_a9efaf10-04d7-4c3e-b2df-f0c3da1d06ed.pdf page 8-9

Pacific Power offers grant money, with preference given to government entities and non-profits.

costs for non-residential capital expenses directly associated with the installation of EV chargers, including hardware, installation and upfront software license costs.²¹ The utility is giving preference to community focused organizations and city, county, and regional governments. In return, grant recipients are required to participate in program analysis activities to help the utility plan for load demands from EV infrastructure.

As described, partnering with utility companies can lower the costs associated with the installment of public charging stations and provide utilities with valuable consumption data. Local governments benefit from the expertise offered by utilities such as knowledge on the electrical grid, equipment, and locations for charging stations. In turn, utilities gain a better understanding of changes in load demand associated with the increasing use of electricity for vehicle charging.

Pass EV Ready Ordinances

The majority of electric vehicle owners charge at home. Access to charging infrastructure is a significant barrier for people living in buildings with separate parking areas without electricity. To address the problem, city governments can implement ordinances requiring *EV Ready* infrastructure. Access to a home location charger is the most important piece of infrastructure considered by potential electric vehicle adopters, followed by workplace charging and public charging infrastructure (Berkeley, N. et al 2017).

With this mind, local jurisdictions need to focus efforts on building out charging infrastructure for people living in buildings other than a single-family home. The City of Seattle completed a study in 2014 that explored ways to increase access to EV charging infrastructure (Seattle 2014).

DEVELOPMENT TYPE	TYPE OF PARKING FACILITIES	EV READINESS REQUIREMENTS
Small-scale residential (single-family, townhouses, DADUs, etc.)	Private (individual) garage, carport, or surface parking area	1 outlet per garage, carport or surface parking area
Multifamily (townhouses, apartments, etc.)	Shared surface parking	1-6 spaces: 1 outlet per space 7-25 spaces: 6 outlets total >25 spaces: outlets for 20% of parking spaces
	Shared parking garages	Outlets for 20% of parking spaces
Other residential	Any parking facilities	Outlets for 20% of parking spaces
Non-residential (retail, office, industrial, institutional, etc.)	Any parking facilities	Outlets for 10% of parking spaces

Figure 4. Reprinted from the Seattle Department of Construction and Inspection Director's Report, EV Ready Ordinance, February 2019. Retrieved from <http://www.seattle.gov/Documents/Departments/SDCI/Codes/ChangesToCodes/ElectricVehicleReadiness/EVReadinessOrdinanceFeb2019.pdf>

One of the key recommendations of the study was to facilitate EV readiness in multi-family dwellings via code changes. In April, the Seattle City Council adopted an *EV Ready* ordinance aimed at increasing access to electric vehicle charging infrastructure.²² The ordinance outlines specific requirements for different building types (Figure 4).

STUDY - EV READY ORDINANCE

- Focus on multi-family dwellings and any new or expanded parking facilities
- Outline requirements based on building types

Other cities are implementing similar measures to ensure new buildings are EV ready. For example, Coupsville has an ordinance requiring, “Development of new multifamily housing projects or new or expanded parking facilities, public or private, exceeding twenty (20) parking spaces shall be required to provide electric vehicle infrastructure for ten (10) percent of the parking spaces unless waived by the council upon a request by the applicant.”²³ Coupsville’s ordinance is very simple, however, each city is unique.

²²

<http://www.seattle.gov/Documents/Departments/SDCI/Codes/ChangesToCodes/ElectricVehicleReadiness/EVReadinessOrdinanceFeb2019.pdf>

²³

https://library.municode.com/wa/coupeville/codes/code_of_ordinances?nodeId=TIT16DERE_CH16.12DEST_16.12.075ELVECHST

Develop EV Ready Building Codes

Back in 2011, the U.S. Department of Energy issued grant money to the Clean Cities Coalition in Michigan to create an Electric Vehicle Readiness Plan that could act as a blueprint for others. Michigan's plan is very detailed covering all aspects of building EV infrastructure.

The section on zoning has samples of language for every element pertaining to EV infrastructure a city may want to use in an ordinance or development code (see Appendix A).

Of particular interest, the sample language illustrates three different levels of stringency including accepting, encouraging, and assertive, leaving a city to decide the appropriate wording, as shown in the example (Figure 5).²⁴ Several other cities also received federal grants for implementing an electric vehicle infrastructure plan. Of these cities, many have passed ordinances to govern the use of property by land use and occupancy type. Others have gone through the process of changing building codes. Apparently, there are many ways to employ change. As such, a city will need to grapple with the extent of each requirement, such as deciding over the words *capable*, *ready*, or *installed*.

5. Readiness Recommendations

5.1. Residential. (select the appropriate tier)

Accepting

- 5.1. Residential - All new single-family and multiple-family homes with garages may be constructed to provide a 220-240-volt / 40 amp outlet on a dedicated circuit and in close proximity to designated vehicle parking to accommodate the potential future hardware installation of a AC Level 2 electric vehicle charging station.

Commentary: Industry experts have advised that the majority of electric vehicle charging will occur at the owner's home in the evening. Retrofitting a home for electric vehicle charging is considerably more expensive than the cost of basic infrastructure at the time of construction. To minimize the unnecessary cost to retrofit a home, the (municipal name) allows for electric vehicle readiness in new home construction.

Encouraging

- 5.1. Residential - In order to proactively plan for and accommodate the anticipated future growth in market demand for electric vehicles, it is strongly encouraged, but not required, that all new single-family and multiple-family homes with garages be constructed to provide a 220-240-volt / 40 amp outlet on a dedicated circuit and in close proximity to designated vehicle parking to accommodate the potential future hardware installation of a AC Level 2 electric vehicle charging station.

Commentary: Industry experts have advised that the majority of electric vehicle charging will occur at the owner's home in the evening. Retrofitting a home for electric vehicle charging is considerably more expensive than the cost of including the capacity at the time of construction. To minimize the unnecessary cost to retrofit a home, the (municipal name) considers electric vehicle readiness in new home construction a high priority.

Assertive

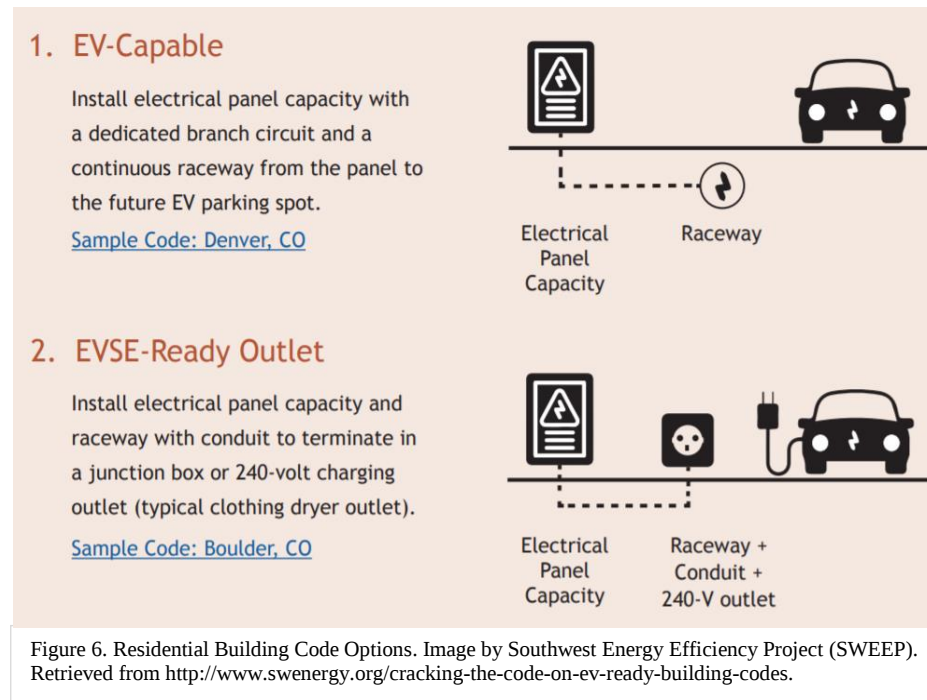
- 5.1. Residential - In order to proactively plan for and accommodate the anticipated future growth in market demand for electric vehicles, it is strongly encouraged, but not required, that all new single-family and multiple-family homes with or without garages be constructed to provide a 220-240-volt / 40 amp outlet on a dedicated circuit and in close proximity to designated vehicle parking to accommodate the potential future hardware installation of a AC Level 2 electric vehicle charging station.

Commentary: Industry experts have advised that the majority of electric vehicle charging will occur at the owner's home in the evening. Retrofitting a home for electric vehicle charging is considerably more expensive than the cost of including the capacity at the time of construction. To minimize the unnecessary cost to retrofit a home, the (municipal name) considers electric vehicle readiness in new home construction necessary.

Figure 5. Electric Vehicle Readiness Plan. Clean Cities Coalition – Michigan. 2011.
Retrieved from <http://cec-mi.org/wp-content/uploads/2011/11/Plug-In-Ready-Michigan.pdf>

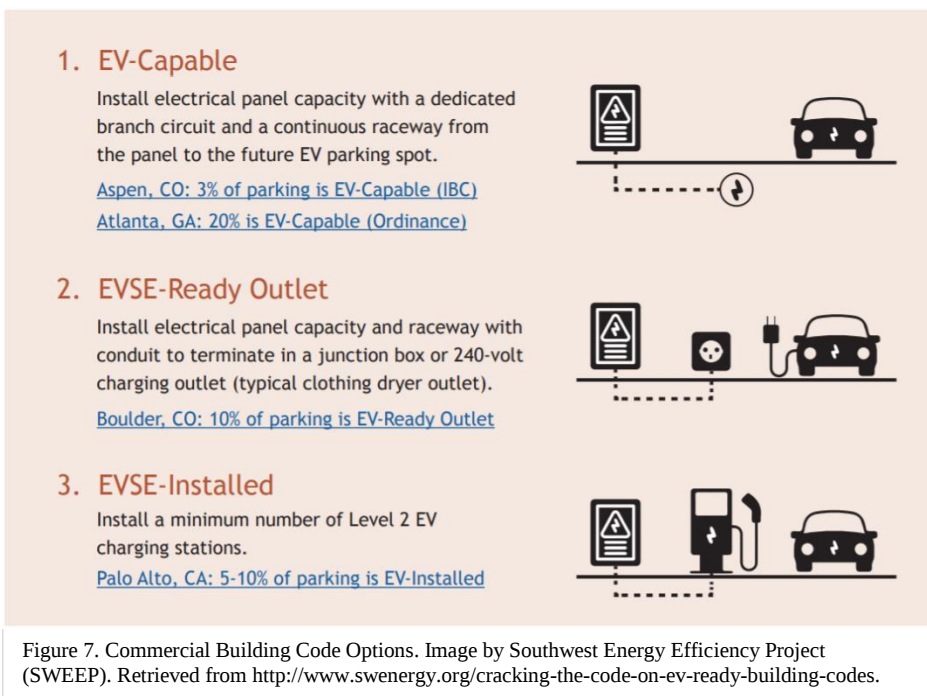
²⁴ <http://cec-mi.org/wp-content/uploads/2011/11/Plug-In-Ready-Michigan.pdf> , page 101-110.

Though of secondary importance, updating commercial building codes to require EV Ready infrastructure would be a way to increase work place charging. Work place charging is especially effective at increasing the number of electric miles driven by plug-in hybrid vehicles (PHEV). The range of PHEVs is generally shorter than full battery electric vehicles (BEV). Work place charging offers PHEVs a convenient option for extending battery powered travel.



The availability of workplace charging could also influence a consumer's decision to purchase a PHEV or BEV by reducing range anxiety.

A city may choose to implement a variety of regulations depending on the building type and the needs of specific environments. The Southwest Energy Efficiency Project has developed visual guidelines for determining residential (Figure 6) and commercial (Figure 7) coding options.



Buildings have a long lifespan. With this in mind, it is more cost effective to place EV infrastructure in a new building rather than try and retrofit or make changes later to accommodate EVs.

Workplace charging increases electric miles driven, especially for plug-in hybrid vehicles.

Our state continues to implement policies to propel electrifying the transportation system because we have a giant problem with emissions in this sector.

To be ready for the future, cities need to plan accordingly. Overcoming the infrastructure barrier is important for a significant number of people living in buildings where parking areas lack infrastructure for charging. It makes sense for the problem to be addressed by updating residential and commercial building codes to address the problem.

Reduce Traffic Impact Fees for Mobility Enhancing Development

Residential and commercial development can have a significant influence on transportation decision-making. The easier it is to access transit, a bike path, or pedestrian walkway, the more likely people are to make sustainable travel choices. Developers must pay, through traffic impact fees (TIF), a proportionate share of the cost of increasing capacity in the transportation system associated with new growth and development.

In 2015, Bainbridge Island conducted a study to determine the level of traffic impact fees the city would require.²⁵ As a result of the study, Bainbridge Island adopted traffic impact fees in-line with other

STUDY – TRAFFIC IMPACT FEES

- Bainbridge recently adopted new traffic impact fees in-line with other cities
- Create developer TIF incentives for actions known to increase mode shifting

municipalities.²⁶ Bainbridge Island could introduce incentives to developers to promote mode shifting in exchange for lower TIFs. For instance, the City of Bellingham has implemented an incentive program to reduce developer traffic impact fees. Developers can take actions *known* to increase mode shifting, in return, they receive reductions in TIFs as outlined by the city's Urban Village Vehicle Trip Reduction Credit guidelines (see Appendix C).²⁷

As an example, proximity to or frontage on a county transit line reduces TIFs from 10%-2% depending on the distance. In most cities, arterial roads were put in place a long time ago. Therefore, placing buildings near public transportation routes close to main corridors makes it convenient for people to mode switch. Not only can cities incentivize access to public transit, but they can also consider mode shifting in land use planning.

²⁵ <http://mrsc.org/getmedia/37b0efaa-9364-4d2e-b720-48152685bfd2/b29transimpct.pdf.aspx>

²⁶ <http://mrsc.org/getmedia/7b937ea4-f666-4b86-b21d-fd21f43115e3/b45impactFeeCompare.pdf.aspx>

²⁷ <https://www.cob.org/documents/planning/applications-forms/misc-department-forms/tif-faq-uv-reduction.pdf>

Mode Shifting

Background – Public Transit Ridership

Bainbridge Island’s Comprehensive Plan states, “Support the development of a public education program which informs all citizens on the methods and progress for meeting the Island’s greenhouse gas emission goals and ways citizens can assist in reaching the reduction goals.”²⁸ However, public transit ridership through Bainbridge Island (BI) has been decreasing along with falling ridership counts system-wide in Kitsap County. At \$2 per trip or less, depending on whether a person is eligible for a reduced fare, the cost to ride the bus has been kept at a minimum. Nonetheless, bus routes carrying riders through the island have been losing customers over the past six years (Figure 9).

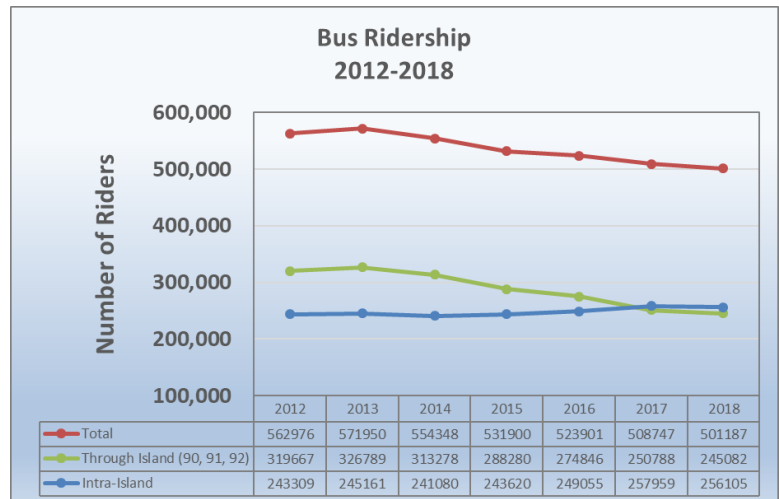


Figure 9. Bainbridge Island Kitsap Transit (2012-2018).
Data provided directly from Kitsap Transit. Appendix A.

The main corridor connecting the Kitsap Peninsula to the BI ferry terminal regularly becomes congested during peak travel times. Multiple factors may be contributing to the problem. Population figures for Bainbridge Island and the greater Kitsap County region are trending upward. No doubt, with more people living in these areas ferry ridership has increased. From 2013 to 2017, the Bainbridge Island/Seattle ferry route experienced an 8.8% increase in foot traffic (267,322 passengers), though a 1.7% decrease in vehicles.²⁹

During the same period, public transit ridership through the island along Highway 305 declined by 23% (76,001 riders), which might indicate people headed for the ferry are using a vehicle to get there (Figure 9). With more people living in Kitsap County and fewer people using public transit, it is not surprising that during peak commuting hours, cars are clogging the roadway.

Unfortunately, with continuous population growth projected for the region, unless some mode shifting occurs, it is likely traffic and the related pollution from tailpipe emissions will continue to have a negative impact on the Bainbridge Island community.

Traffic congestion on the island, particularly along the north-south State Highway 305 corridor presents a barrier to efficient travel. The Washington State Department of Transportation (WSDOT) is currently

²⁸ <https://www.bainbridgewa.gov/DocumentCenter/View/7800/5-ENVIRONMENTAL?bidId=> , page 12

²⁹ https://www.wsdot.wa.gov/ferries/traffic_stats/

engineering several roundabouts and other intersection enhancements to improve the flow of vehicles. Even so, the Washington State Ferries 2040 Long Range Plan indicates the largest increase in the number of walk-on passengers is expected on the Bainbridge Island/Seattle route.

In 2017, walk-on ridership was 3.25 million, however, by 2040, a 41% increase to 4.59 million pedestrians is projected along with more than a million additional vehicles (WSDOT 2019). Already, the Agate Pass bridge creates a substantial bottleneck for northbound drivers. Taken altogether, the decline in public transit riders coupled with a projected annual increase in ferry ridership amounts to a difficult transportation scenario going forward.

In response to county-wide pressures on the transportation system, Kitsap Transit conducted a Comprehensive Route Analysis last year. The purpose of the route analysis was to determine how to better serve community members by utilizing new software to enhance routing efficiencies.

Kitsap Transit Highlights

- Increasing frequency of I-90 route from Poulsbo to every 30 minutes in June
- Adjusted commuter routes on island to provide more efficient service
- Invested in second electric bus through a federal grant
- Using cleaner biodiesel fuel when possible
- switch from diesel to propane fuel for smaller buses
- Partnering with city on *BI Ride* campaign

According to Jeff Clausen, Kitsap Transit's Executive Director, several routes within Bainbridge Island were adjusted to enhance commuter transport to and from the ferry terminal (J. Clausen, interview, May 3, 2019). Adding to those efforts, the Bainbridge Island city council recently approved a \$10 increase in the vehicle tab fee to provide funding for marketing the *BI Ride* service. Director Clausen indicated Kitsap Transit would be partnering with the city to market *BI Ride*, a proposed action strategy outlined in the agency's 2018-2023 Long Range plan (J. Clausen, interview, May 3, 2019).³⁰

Promoting the environmental benefits of public transit may be a way to motivate people to ride the bus. In Canada, scientists conducted a study in 2011 to better understand the perceptions and attitudes of people choosing to use public transit. Researchers found *environmental reason* as the prime motive for utilizing public transit over other modes of travel. The result of the survey indicates sustainable travel is highly valued, specifically by current riders. In light of the study, environmental messaging may resonate with many community members living on the island, specifically people with pro-societal values.

Finally, to help alleviate gridlock during peak commuting times, transit service through the island will be stepped up soon. Director Clausen stated bus service from Poulsbo to the ferry terminal is set to increase in

³⁰ <http://www.kitsaptransit.com/uploads/pdf/2018-2023tdp.pdf> , page 15.

frequency from every 50 to 30 minutes beginning in June (J. Clausen, interview, May 3, 2019). Once in place, advertising the elevated service level inside and outside the island should help to attract new riders.

Increasing Public Transit Ridership

Invest in Basic Bus Stop Amenities

Removing small obstacles makes it easier for community members to give up the speed and flexibility of driving an automobile.

Predictably, reliability and convenience also ranked high in importance to bus riders based on the study conducted by Canadian researchers Nurul, Kattan, and Islam (2011). Not surprisingly, people are impatient and their perceptions of wait times do not always match reality.

A variety of circumstances make wait times feel longer than they actually are including poor weather, when people are in a hurry during peak commuting hours, behind schedule transit vehicles, and a lack of amenities at bus stops (Fan, Guthrie, and Levinson 2016; Ji et al. 2017). Installing benches and providing shelter at bus stops are two simple ways to mitigate negative perceptions concerning wait times.

RESEARCH ON BUS RIDERSHIP

- Environmental reasons primary motivation for current riders
- Reliability and convenience also important
- Invest in basic bus stop amenities, such as benches and shelters, weather protection matters
- Use choice architecture to advance change in social norms, people are influenced by behavior of neighbors and peers
- Mobility apps make bus option easier to navigate and offers positive feedback

Increase Ridership Strategies

- Invest in basic bus stop amenities
- Target *BI Ride* campaign on choice architecture research
- Educate the public on the use of mobility apps

Specific to our region, researchers Stover and McCormack (2012) studied the impact of weather on bus ridership in Pierce County and found adverse weather such as high winds, rain, above or below normal temperatures, and snow had a negative effect on bus ridership across most seasons.

Given the long rainy season in our region, adding basic amenities, such as shelters and benches, improves the experience of riding public transit by making the wait period at the bus stop more tolerable. Certainly, removing small obstacles means community members are more likely to choose to ride.

Target Campaigns Based on Human Behavior

Understanding human behavior may be the most important element in developing strategies to propel mode shifting. Simply stated, people need to know what others are doing to expand their own possibilities. In this regard, educational campaigns about what is happening can be effective in facilitating a sought-after behavior (Thaler and Sunstein 2009).

For example, ferry survey information such as, “25% of weekday ferry riders telecommute at least one day a week”, could be shared as part of educational outreach.³¹ Furthermore, drawing attention to people using public transit could increase the adoption of the desirable behavior by others. Conducting interviews with local commuters and other community members who regularly use public transit would be an excellent way to promote ridership.

Authors Thaler and Sunstein (2009) point out people are influenced by what their neighbors are doing. In other words, experiences shared by community members can have a positive influence on the actions of others by way of providing examples of sustainable practices people are already using to get around. As an example, sharing knowledge about the use of mobility applications can make public transit easier to navigate.

Educate Using Mobility Tools

Technology definitely plays a role in making it more convenient for people to choose environmentally sustainable mobility options. For instance, most people have used Google Maps for directions, but it is also very useful for estimating times for different modes of travel.

Readily available, and up-to-date travel information helps people to at least compare across modes when planning a trip or while in route. Applications specifically designed to persuade sustainable travel are available too, such as *Move It*. Similar to smart-phone apps designed to help people develop better eating or exercise habits, mobility applications inform the user of environmentally-friendly transportation options and track a user’s progress by calculating emissions saved. No doubt, humans are prone to habitually move around town in familiar ways.

A sustainable travel app, such as *Move It*, assists users by supplying potentially new route choices using different modes and eventually aims to instill a habit of at least considering alternatives. Apps also incorporate positive feedback mechanisms to reinforce environmentally-friendly decisions. Over time, the idea is to persuade users to be more thoughtful and intentional by guiding the user to opt for sustainable transport. The community as a whole would benefit from knowing about these tools.

Outreach to share information about using technology to explore mobility choices is another strategy for educating and informing the public. For example, setting up a collaborative project with local schools would be an opportunity to expose young audiences to sustainable transport.

³¹ http://www.bainbridgewa.gov/DocumentCenter/View/5632/Chapter3_?bidId=, page 3-11

The State of Washington requires Integrated Environmental and Sustainable Standards be taught within the core curriculum. The experience of using smart-phone technology to inform sustainable travel would be a creative way to get students engaged while at the same time meeting the *Standard for Sustainability and Civic Responsibility* which requires, “Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.”³²

Public schools must teach about sustainability and civic responsibility. Partnering with the high school on a mobility app project would engage young people.

Young people in particular are generally receptive to using new tools to simplify tasks. Recently, researchers Sunio and Schmöcker (2017) analyzed several mobility apps and concluded they were similar to health-related applications in that they provide useful decision-making information. The study also suggested applications currently available could be improved by fully utilizing known methodologies for changing behavior. Still, the future potential for using apps to persuade mode shifting appears promising. Minimally, these types of apps would make it easier to access public transit and simplify planning for sustainable travel.

Taken altogether, community outreach to inform the public about the current state of the transportation situation would be an important first step in getting people on board to embrace systematic change. Because the feedback loop is not immediate between travel decision-making and negative environmental impacts, most people do not observe the connection or choose to ignore it when making their everyday choices.

Enough data has been collected through governmental reports and studies to indicate the traffic problem on Bainbridge Island is likely to accelerate. Indeed, population growth is expected in the region as well as a projected rise in ferry ridership, both increasing motorized traffic on the island. With this in mind, community outreach, within and outside the island, to improve attitudes and perceptions about using public transportation are needed. Already, the city council has approved funding to partner with Kitsap Transit to market *BI Ride*. Additionally, experiences using public transit would be improved by providing basic amenities such as benches and shelter at bus stops, especially considering perceived wait times are exaggerated in poor weather.

Environmental reasons may be enough to motivate some people to use ‘cleaner’ transportation options, still others may need more nudging and positive experiences trying out alternative modes of getting around before adopting new habits. Giving people information on how to utilize smart-phone applications as a quick and easy tool to plan sustainable travel may be a good way to encourage mode switching since it is known people value convenience. In time, societal norms are apt to change as sustainable mobility increases.

³² <http://www.k12.wa.us/EnvironmentSustainability/Standards/default.aspx>

Promote Electric Bikes

Electric bicycles hold significant potential for reducing carbon emissions and traffic congestion on roadways. Riding an e-bike appeals to a broader audience of users because many barriers associated with traditional bikes are lessened or even eliminated with electric assist.

In 2017, a survey by the National Institute for Transportation and Communities (NITC), found multiple factors are keeping people off of traditional bikes including steep topography, trip distance, time constraints, and even not wanting to arrive sweaty to a destination. The study found trips made by younger people are replacing motor vehicle trips and commuters, in particular, find less exertion

is needed to propel an e-bike allowing them to arrive at the office less sweaty and ready to (NITC 2017). E-bikes allow older adults and others with physical limitations to enjoy more recreational opportunities. Still, cost is a drawback.

Generally, e-bike prices are higher than similar models of conventional bicycles. However, if cycling miles are reducing motorized miles, eventually fuel savings can make up the difference in cost. As with most transportation alternatives, the challenge is to engage the public and provide experiences using electric bikes.

Even though electric bike ownership has been increasing, most people have not had an opportunity to experience electric assisted travel.

In Switzerland, researchers Moser, Blumer, and Hille (2018) forced a disruption in habit by asking people to give up motorized travel for two weeks, instead, they were asked to use an e-bike. The experiment was successful. One year later participants habitual association with car use had been significantly reduced, even for people who chose not to purchase an e-bike (Moser, Blumer, and Hille (2018).

In light of the study, it appears the extended experience of riding an e-bike led participants to at least change their mindset and broaden their view of alternative modes of travel. With this in mind, cities need to promote and give community members opportunities to experience different modes.

RESEARCH – E-BIKES

- Habitual association with car use reduced after given e-bike only option for two weeks
- E-bikes remove barriers associated with traditional bikes such as topography, trip distance, and electric assist for staying sweat-free on commute
- Older adults or others with physical limitations can use E-bikes
- E-bike riders cycle more often

A simple approach would be to include electric bikes in events aimed at increasing awareness of electric vehicles and outreach for public transit. Considering our region in particular has hilly topography, e-bikes remove this significant barrier while at the same time provide additional benefits to a diverse group of riders. Finally, electric bicycles increase sustainable travel, reduce carbon emissions, and lessen congestion on already crowded roadways.

Non-Motorized Transportation Collaboration

The Bainbridge Island Comprehensive Plan is choke-full of references to the desire for city-wide multi-modal options. From the detailed transportation plan, “Separated non-motorized facilities that provide a non-motorized transportation option for a wide range of people walking, riding bikes, riding horses, or using wheelchairs. This pathway network is envisioned to connect to the City’s sidewalk and bike lane infrastructure and connect to main destinations like the ferry terminal, Agate Pass Bridge, Winslow, designated centers, schools, parks, shoreline road ends, equestrian facilities, and other amenities.”³³ Clearly, the Island community sees the necessity for and expressly values investments in non-motorized facilities.

Committed community members have joined together to take action on improving infrastructure for all ages and all abilities to move around the island. Specifically, the Bainbridge Mobility Alliance is dedicated to improving mobility options for everyone. After a failed bike levy, the group members have listened to community, and are currently developing an infrastructure plan. The city of Bainbridge Island needs alternative forms of transport. Realize too, paved shoulders on busy highways only provide non-motorized facilities for a very small number of people. Unfortunately, multi-modal infrastructure to serve the rest of the community, including all ages and all abilities, has been lacking.

With this in mind, it will take a detailed plan to gain the trust and support of the public. However, the information already outlined in both the Comprehensive and Transportation Plan will provide a thorough framework to design infrastructure in line with the Island’s goals.

Non-Motorized Strategies

- Develop an infrastructure plan with the Multi-Modal Advisory Committee and the BI Mobility Alliance
- Support community funding for non-motorized projects
- Partner with schools to encourage safe walking and biking routes

³³ <https://www.bainbridgewa.gov/708/Island-wide-Transportation-Plan-IWTP-Upd>

The support of city officials for funding and partnerships with community groups is essential to propelling the vision forward.

Conclusion

Federal and State governments are the primary provider of electric vehicle incentive programs aimed at increasing electric vehicle purchases. However, local governments play an important role in educating and engaging the public considering significant information deficits exist about electric vehicle ownership. To propel the adoption of alternative vehicles cities can organize community outreach directed at diverse audiences. Through public engagement and the sharing of information, leaders need to address environmental concerns about electric vehicle production and ‘unclean’ electricity used to charge electric vehicles. Realizing most people have limited or no experiences with electric vehicles, Bainbridge Island can partner with other community organizations to host electric drive events that give the public more direct experiences with EVs.

To accelerate EV adoption cities can take actions to increase EV charging infrastructure. Bainbridge Island would benefit from partnering with PSE to create incentive programs which would benefit both sides. Passing ordinances and developing building codes that require *EV Ready* infrastructure is less costly than making changes in the future. Furthermore, providing developers with incentives in the way of reduced traffic impact fees, makes mode shifting more convenient for people and increases efficiency for transit agencies.

People with pro-environmental values use the bus because it fits their lifestyle. However, other community members may need some nudging and positive experiences with alternative modes of travel before changing their habits. As such, with a modest investment, Bainbridge island could provide basic amenities at bus stops, and educate people about mobility applications that make planning sustainable travel convenient. Sharing the experiences of other community members in the ridership campaign being created by the City of Bainbridge Island and Kitsap Transit, would influence changes in attitudes and behaviors. People need and want more non-motorized infrastructure on the island. Collaborative efforts between city officials and community groups need to be accelerated in order for multi-modal goals to be realized. Over time, societal norms reflect the priorities and values of the community. By making investments now in EV infrastructure and sustainable mobility, the Island community will be doing their fair share to reduce our state’s emissions while at the same time improving the quality of life for everyone.

Prioritization of Strategies

Mitigation	By 2023, reduce GHG emissions by 25% compared to 2014 levels.			
Community Engagement	Inspire action across the community and partner with local and regional organizations to take meaningful climate change mitigation and adaptation actions.			
		FACTORS		
STRATEGIES		Timeliness	Permanence	Priority
Provide education and community outreach to promote the benefits of electric vehicle ownership.		*		1
Partner with the Farmer’s Market to hold an electric vehicle drive event including E-bikes.		*		1
Partner with local organizations such as the BI Climate and Energy Forum to hold EV Question/Answer Forums.		*		1
Partner with PSE and the COBI to pilot electric vehicle charging infrastructure incentive programs.		*		2
Apply for a state grant through the Electric Vehicle Infrastructure Partnerships Program (EVIPP)			*	3
Implement ordinances or building codes requiring <i>EV Ready</i> infrastructure		*	*	1
Develop public transit advertising campaign based on human choice behavior research.		*		2
Invest in basic bus stop amenities including shelters and benches.			*	2
Provide education and outreach on the use of mobility applications.				3
Partner with the Multi-Modal Committee and BI Mobility Alliance to develop non-motorized infrastructure.		*	*	1

References

- Axsen, John, and Kenneth S Kurani. 2012. "Interpersonal Influence within Car Buyers' Social Networks: Applying Five Perspectives to Plug-in Hybrid Vehicle Drivers." *Environment and Planning A: Economy and Space* 44(5): 1047–65.
- Axsen, John, Jennifer TyreeHageman, and Andy Lentz. 2012. "Lifestyle Practices and Pro-Environmental Technology." *Ecological Economics* 82: 64–74.
- Berkeleya, N., Bailey, D., Jones, A., Jarvisa, D. 2017. "Assessing the transition towards Battery Electric Vehicles: A Multi-Level Perspective on drivers of, and barriers to, take up." *Transportation research. Part A, Policy and practice* 12: 320-332.
- "Clean Energy Coalition: Bridging Needs. Advancing Change. Plug-In Ready Michigan." <http://cec-mi.org/mobility/programs/pluginreadymichigan/>.
- "Cracking the Code on EV-Ready Building Codes." *SWEEP*. <http://www.swenergy.org/cracking-the-code-on-ev-ready-building-codes>.
- Department of Ecology (DOE). 2019. "Washington State Greenhouse Gas Emissions Inventory: 1990-2015." <https://fortress.wa.gov/ecy/publications/summarypages/1802043.html>.
- "Environment - U.S. Energy Information Administration (EIA)." 2016. <https://www.eia.gov/environment/emissions/state/>.
- Fan, Yingling, Andrew Guthrie, and David Levinson. 2016. "Waiting Time Perceptions at Transit Stops and Stations: Effects of Basic Amenities, Gender, and Security." *Transportation Research Part A: Policy and Practice* 88: 251–64.
- Habib, Khandker M. Nurul, Lina Kattan, and Md Tazul Islam. 2011. "Model of Personal Attitudes towards Transit Service Quality." *Journal of Advanced Transportation* 45(4): 271–85.
- Jenn, Alan, Katalin Springel, and Anand R. Gopal. 2018. "Effectiveness of Electric Vehicle Incentives in the United States." *Energy Policy* 119: 349–56.
- Kitsap Transit. 2018. "Kitsap Transit Development Plan 2018-2023." <http://www.kitsaptransit.com/uploads/pdf/2018-2023tdp.pdf>
- Moser, Corinne, Yann Blumer, and Stefanie Lena Hille. 2018. "E-Bike Trials' Potential to Promote Sustained Changes in Car Owners Mobility Habits." *Environmental Research Letters* 13(4): 044025.
- "National Electric Bike Owner Survey | National Institute for Transportation and Communities." https://nitc.trec.pdx.edu/research/project/1041/National_Electric_Bike_Owner_Survey_.
- Office of Superintendent of Public Instruction (OSPI). State of Washington. 2014. "K-12 Integrated Environmental and Sustainable Education Learning Standards." <http://www.k12.wa.us/EnvironmentSustainability/pubdocs/ESEStandards.pdf>

- Puget Sound Clean Air Agency (PSCAA). 2018. "Puget Sound Clean Air Agency Greenhouse Gas Emissions Inventory".
<https://www.pscleanair.org/DocumentCenter/View/3328/PSCAA-GHG-EmissionsInventory?bidId=>.
- SB5116. 2019. Washington State Legislature. "An act relating to supporting Washington's clean energy economy and transitioning to a clean, affordable, and reliable energy future."
<http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/Senate%20Bills/5116-S.pdf>.
- HB2042. 2019. Washington State Legislature. "An Act relating to advancing green transportation adoption."
<http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/House/2042-S2.SL.pdf>
- Seattle Office of Sustainability and Environment. 2014. "Removing Barriers to Electric Vehicle Adoption by Increasing Access to Charging Infrastructure".
- Stover, Victor, and Edward McCormack. 2012. "The Impact of Weather on Bus Ridership in Pierce County, Washington." *Journal of Public Transportation* 15(1).
<https://scholarcommons.usf.edu/jpt/vol15/iss1/6>.
- Sunio, Varsolo, and Schmöcker, Jan-Dirk. 2017. "Can we promote sustainable travel behavior through mobile apps? Evaluation and review of evidence." *International Journal of Sustainable Transportation* 11(8): 553-566. <http://dx.doi.org/10.1080/15568318.2017.1300716>
- Taylor, M., and K. Fujita. 2018. "Consumer Behavior and the Plug-In Electric Vehicle Purchase Decision Process: A Research Synthesis," January. <https://escholarship.org/uc/item/4hj203w3>
- Thaler, Richard H., and Sunstein, Cass R. 2009. *Nudge: Improving decisions about health, wealth, and happiness*. New York: Penguin Group.
- Union of Concerned Scientists. 2015. "Cleaner Cars from Cradle to Grave." <https://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions>.
- Washington State Department of Transportation (WSDOT). 2018. Map of Washington EV Registration by County. http://www.westcoastgreenhighway.com/pdfs/Map_WAEVRegistrationByCounty.pdf.
- "Washington State Ferry Traffic Statistics." 2019. http://www.wsdot.wa.gov/ferries/traffic_stats/
- Washington State Department of Transportation (WSDOT). 2019. "Washington State Ferries 2040 Long Range Plan." <https://www.wsdot.wa.gov/ferries/planning/long-range-plan/the-plan>.
- Washington State Department of Transportation (WSDOT). 2015. "Study of Business Models to Sustain Electric Vehicle Charging Station Networks. "
<http://leg.wa.gov/JTC/Pages/CompletedStudies.aspx>
- Photo references <https://creativecommons.org/licenses/by-sa/4.0/>
https://commons.wikimedia.org/wiki/File:Winslow_Way_Bainbridge_Island_panoramio.jpg

Appendix A - Sample Zoning Language

SECTION #####.01 Purpose

Electric vehicles are becoming more commonplace on the roads and are available to consumers across the country. As the home state of the automobile industry, the (municipal name) recognizes the importance of supporting this emerging innovation in the industry.

Automakers have clearly identified that to support the mass production of EVs, municipalities will need to enable and promote the necessary charging infrastructure demanded by potential customers. Thus, it is critical to support the early adoption of EVs and allow for and accommodate private sector investment.

EVs need a much different type of fueling network than gasoline engine vehicles. This new fueling system will be based on a clustering of strategically placed charging stations at homes, workplaces, and retail stores. These charging stations will be in addition to and complement traditional gas stations.

We anticipate that higher gas prices, advancements in battery storage, lower vehicle costs, and significant public/private investment in technology and infrastructure will greatly influence the EV market over time.

The ordinance below will encourage and simplify the establishment of a network of public and private EV charging stations throughout the community.

SECTION #####.02 Intent

2. Intent. The intent of this section is to create standards that will make (municipal name) a leader in expediting and promoting the development of a safe, convenient, and cost-effective electric vehicle infrastructure to support the use of electric vehicles.

SECTION #####.03 Definitions

For the purposes of this section, the following definitions shall apply.

3.1. Accessible electric vehicle charging station means an electric vehicle charging station where the battery charging station is located within accessible reach of a barrier-free access aisle and the electric vehicle.

3.2. Battery charging station means an electrical component assembly or cluster of component assemblies designed specifically to charge batteries within electric vehicles.

3.3. Battery electric vehicle means any vehicle that operates exclusively on electrical energy from an off-board source that is stored in the vehicle's batteries and produces zero tailpipe emissions or pollution when stationary or operating.

3.4. Charging levels means the standardized indicators of electrical force, or voltage, at which an electric vehicle's battery is recharged. The terms AC Level 1, AC Level 2, and DC fast charging are the most common charging levels and include the following specifications:

3.4.1. AC Level 1 is considered slow charging. Voltage including the range from 0 through 120.

3.4.2. AC Level 2 is considered medium charging. Voltage is greater than 120 and includes 240.

3.4.3. DC fast charging. Voltage is greater than 240.

3.5. Electric vehicle means any vehicle that is licensed and registered for operation on public and private highways, roads, and streets; and is powered either partially or exclusively on electrical energy from the grid, or an off-board source, that is stored on-board via a battery for motive purpose. "Electric vehicle" includes: (1) a battery electric vehicle; and (2) a plug-in hybrid electric vehicle.

1. Allow for AC Level 1 and 2 electric vehicle infrastructure as a permitted use in the zoning code, either as an ancillary use or a principal use in all zones.

2. Require that developers install charging stations or electrical conduits with new developments or significant renovations.

3. Require owners of multi-family residential units to provide charging stations as part of their parking facilities requirements.

4. Require a portion of electric vehicle infrastructure installations to meet the needs of people with disabilities.

5. Install electric vehicle charging stations at public institutions, such as the city/township hall, and municipal parking lots.

6. Install public electric vehicle charging stations at major activity centers.

7. Establish an ongoing working group of developers, utility companies, residents, businesses owners, electric car owners, and others key stakeholders to develop and review local policies that relate to electric vehicle infrastructure as electric vehicle technology progresses and needs change.

8. Promote the community as an electric vehicle friendly place.

3.6. Electric vehicle charging station means a public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle. An electric vehicle charging station equipped with AC Level 1 or AC Level 2 charging equipment is permitted outright as an accessory use to any principal use.

3.7. Electric vehicle charging station – private restricted use means an electric vehicle charging station that is (1) privately owned and restricted access (e.g., single-family home, executive parking, designated employee parking) or (2) publicly owned and restricted (e.g., fleet parking with no access to the general public).

3.8. Electric vehicle charging station – public use means an electric vehicle charging station that is (1) publicly owned and publicly available (e.g., carpool parking lot, public library parking lot, on-

street parking) or (2) privately owned and available to visitors of the use (e.g., shopping center parking).

3.9. Electric vehicle infrastructure means conduit/wiring, structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations and fast charging stations.

3.10. Electric vehicle parking space means any marked parking space that identifies the use to be exclusively for the parking of an electric vehicle.

3.11. Non-electric vehicle means any motor vehicle that does not meet the definition of electric vehicle.

3.12. Plug-in hybrid electric vehicle means an electric vehicle that (1) contains an internal combustion engine and also allows power to be delivered to drive wheels by an electric motor; (2) charges its battery primarily by connecting to the grid or other off-board electrical source; (3) may additionally be able to sustain battery charge using an onboard internal-combustion-driven generator; and (4) has the ability to travel powered by electricity.

4.2. DC fast charging electric vehicle charging stations are permitted in the (public/civic), (office), (commercial), and (industrial) districts when accessory to the primary permitted use. Installation shall be subject to permit approval as administered by the (municipal name).

4.3. If the primary use of the parcel is the retail electric charging of vehicles, then the use shall be considered a gasoline service station for zoning purposes. Installation shall be subject to all zoning standards that apply to gasoline service stations.

5.1. Residential - In order to proactively plan for and accommodate the anticipated future growth in market demand for electric vehicles, it is strongly encouraged, but not required, that all new single-family and multiple-family homes with or without garages be constructed to provide a 220-240-volt / 40 amp outlet on a dedicated circuit and in close proximity to designated vehicle parking to accommodate the potential future hardwire installation of a AC Level 2 electric vehicle charging station.

Commentary: Industry experts have advised that the majority of electric vehicle charging will occur at the owner's home in the evening. Retrofitting a home for electric vehicle charging is considerably more expensive than the cost of including the capacity at the time of construction. To minimize the unnecessary cost to retrofit a home, the (municipal name) considers electric vehicle readiness in new home construction necessary.

5.2. Non-Residential - In order to proactively plan for and accommodate the anticipated future growth in market demand for electric vehicles, it is required that all new and expanded non-residential development parking areas provide the electrical capacity necessary to accommodate the future hardwire installation of AC Level 2 electric vehicle charging stations. It is recommended that a typical parking lot (e.g., 1,000 or less parking spaces) have a minimum ratio of 8 percent of the total parking spaces be prepared for such stations. A minimum of one parking space for every development should also include one AC Level 2

charging station. It is noted and understood that large-sized parking areas (e.g., corporate headquarters, shopping malls, sporting venues, universities, etc.) may require less electric vehicle charging stations than recommended above to accommodate the anticipated market demand.

Commentary: If the property owner decides not to install more than one battery charging stations at the time of initial construction, this approach allows for the stations to be installed in the future without costly or cost-prohibitive retrofits. The intent of this subsection is to require sites to be "roughed-in" with the installation of electrical stubs at planned electric vehicle charging station locations and conduit run from the power source to the station location to support future installation.

6.1. Accessible Parking - It is required that a minimum of one accessible electric vehicle charging station be provided. Accessible electric vehicle charging stations should be located in close proximity to the building or facility entrance and connected to a barrier free accessible route of travel. It is not necessary to designate the accessible electric vehicle charging station exclusively for the use of disabled persons.

6.2. Lighting

6.2.1. Site lighting shall be provided where an electric vehicle charging station is installed, unless charging is for daytime purposes only.

6.3. Equipment Standards and Protection

6.3.1. Battery charging station outlets and connector devices shall be no less than 36 inches and no higher than 48 inches from the surface where mounted. Equipment mounted on pedestals, lighting posts, bollards, or other devices shall be designed and located as to not impede pedestrian travel or create trip hazards on sidewalks.

6.3.2. Adequate battery charging station protection, such as concrete-filled steel bollards, shall be used. Curbing may be used in lieu of bollards, if the battery charging station is setback a minimum of 24 inches from the face of the curb.

6.4. Usage Fees

6.4.1. The property owner is not restricted from collecting a service fee for the use of an electric vehicle charging station made available to visitors of the property.

6.5. Signage

6.5.1. Information shall be posted identifying voltage and amperage levels and any time of use, fees, or safety information related to the electric vehicle charging station.

6.5.2. Each electric vehicle charging station space shall be posted with signage indicating the space is only for electric vehicle charging purposes. For purposes of this subsection, "charging" means that an electric vehicle is parked at an electric vehicle charging station and is connected to the battery charging station equipment. Restrictions shall be included on the signage, if removal provisions are to be enforced by the property owner

pursuant to Chapter ##. (Insert name of chapter and city code here).

6.6. Maintenance

6.6.1. Electric vehicle charging stations shall be maintained in all respects, including the functioning of the equipment. A phone number or other contact information shall be provided on the equipment for reporting when it is not functioning or other problems are encountered.

6.7. Enforcement

See SECTION ##### Vehicle removed by police

(Clean Energy Coalition 2011)

<http://cec-mi.org/wp-content/uploads/2011/11/Plug-In-Ready-Michigan.pdf>

(Insert date and ordinance number)

1. When a sign provides notice that a parking space is a publicly designated electric vehicle charging station, no person shall park or stand any non-electric vehicle in a designated electric vehicle charging station space. Further, no person shall park or stand an electric vehicle in a publicly designated electric vehicle charging station space when not electrically charging or parked beyond the days and hours designated on the regulatory signs posted. For purposes of this subsection, "charging," means an electric vehicle is parked at an electric vehicle charging station and is connected to the charging station equipment.

Appendix B - Kitsap Transit Ridership Data 2008-2018

ROUTE NO.	ROUTE	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Dec-07	* DIFF. DEC-08 & DEC-07	CURRENT MONTHLY %DIFF	** YTD 12/2008 TOTAL	YTD 12/2007 TOTAL	YTD % DIFF.
BAINBRIDGE ISLAND																			
90	POLLSBO/BAINBRIDGE	24,364	22,965	23,048	25,203	24,327	24,669	26,598	24,973	24,657	27,191	22,057	22,175	19,585	2,590	13.2%	292,227	270,216	8%
91	KINGSTON/BAINBRIDGE	9,223	8,840	8,787	9,229	8,938	9,482	9,456	8,651	8,947	9,721	7,592	7,005	7,259	-254	-3.7%	105,671	102,585	3%
92	POKING/SUO	1,812	1,813	1,814	2,073	2,203	2,320	2,442	2,270	2,355	2,625	2,098	1,994	1,451	543	37.4%	25,819	17,511	47%
93	MANZANITA COMMUTER	3,414	3,090	2,966	3,236	3,044	3,285	3,133	2,648	3,208	3,796	2,963	2,566	2,379	189	7.9%	37,349	35,625	5%
94	AGATE POINT COMMUTER	3,263	2,675	2,902	3,106	2,796	2,704	2,824	2,699	2,756	3,118	2,342	2,200	2,261	-61	-2.7%	33,387	33,360	0%
95	BATTLE POINT COMMUTER	3,200	2,825	2,853	2,875	2,794	2,865	2,806	2,647	2,863	3,251	2,525	2,284	2,670	-386	-14.5%	33,808	37,246	-9%
96	SUNRISE COMMUTER	2,579	2,360	2,470	2,712	2,496	2,415	2,640	2,337	2,534	2,856	2,212	2,173	2,096	107	5.2%	29,807	31,621	-6%
97	CRYSTAL SPRINGS COMMUTER	3,644	3,514	3,521	3,786	3,134	3,535	3,383	3,356	3,521	3,909	3,130	3,052	2,980	92	3.1%	41,485	40,902	1%
98	FORT WARD COMMUTER	3,477	3,275	3,143	3,264	2,879	2,981	2,939	2,571	2,963	3,802	2,915	2,810	2,567	243	9.5%	36,839	33,773	9%
99	BILL POINT COMMUTER	3,113	2,959	2,701	2,566	2,470	2,755	2,892	2,556	2,637	2,853	2,412	2,154	2,041	113	5.5%	32,070	29,801	8%
100	WINSLOW SHUTTLE	5,556	5,352	5,270	5,253	4,660	5,249	5,378	5,295	4,968	4,842	5,938	5,552	4,187	635	15.2%	56,911	50,953	16%
106	FLETCHER BAY COMMUTER	2,070	1,961	1,124	2,540	1,947	1,715	1,829	1,730	2,367	2,709	2,258	2,112	1,574	538	34.2%	25,282	23,643	7%
TOTAL BAINBRIDGE ISLAND		65,715	61,349	61,599	65,843	61,593	63,375	66,320	61,735	63,432	70,473	56,442	54,075	51,800	3,673	6.0%	752,655	707,236	6%
ROUTE NO.	ROUTE	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Dec-08	* DIFF. DEC-09 & DEC-08	CURRENT MONTHLY %DIFF	** YTD 12/2009 TOTAL	YTD 12/2008 TOTAL	YTD % DIFF.
BAINBRIDGE ISLAND																			
90	POLLSBO/BAINBRIDGE	23,418	21,438	22,840	21,710	19,112	20,185	20,854	19,620	19,527	20,467	17,201	18,271	22,175	-3,904	-17.6%	244,821	292,227	-18%
91	KINGSTON/BAINBRIDGE	8,185	7,897	9,036	8,845	7,970	8,332	7,846	7,953	7,904	8,194	6,766	7,419	7,005	414	5.9%	96,367	105,671	-9%
92	POKING/SUO	2,318	2,285	2,341	2,394	2,134	2,020	1,870	1,913	2,111	2,367	1,863	1,780	1,994	-214	-10.7%	25,416	25,819	-2%
93	MANZANITA COMMUTER	3,035	2,886	3,263	3,090	2,925	3,015	2,806	2,752	2,713	2,943	2,395	2,526	2,566	-40	-1.6%	34,051	37,349	-9%
94	AGATE POINT COMMUTER	2,707	2,251	2,334	2,105	1,992	2,090	2,217	2,216	1,939	2,321	1,889	1,864	2,200	-316	-14.4%	26,545	33,387	-20%
95	BATTLE POINT COMMUTER	2,783	2,561	2,963	2,963	2,454	2,740	2,327	2,337	2,715	3,077	2,294	3,274	2,284	990	43.3%	32,408	33,808	-4%
96	SUNRISE COMMUTER	2,474	2,113	2,594	2,468	2,237	2,450	2,232	2,142	2,629	2,790	2,415	2,494	2,173	321	14.8%	29,038	29,807	-3%
97	CRYSTAL SPRINGS COMMUTER	3,555	3,415	3,762	3,470	2,944	3,271	3,294	2,747	3,120	3,409	2,864	3,300	3,052	248	8.1%	39,151	41,485	-6%
98	FORT WARD COMMUTER	3,364	2,852	2,542	2,630	2,159	2,215	2,073	2,041	2,197	2,617	2,055	2,247	2,810	-563	-20.0%	28,792	36,839	-22%
99	BILL POINT COMMUTER	2,826	2,646	2,666	2,568	2,318	2,426	2,101	1,948	2,279	2,563	2,096	2,291	2,154	137	6.4%	28,768	32,070	-10%
100	WINSLOW SHUTTLE	4,445	3,921	4,223	3,880	3,655	3,778	3,759	3,354	3,164	3,492	2,807	1,656	3,552	-1,896	-53.4%	42,134	59,911	-28%
106	FLETCHER BAY COMMUTER	2,429	2,192	2,175	2,071	1,896	1,715	1,576	1,600	1,813	1,890	1,652	1,698	2,112	-414	-19.6%	22,509	25,282	-11%
TOTAL BAINBRIDGE ISLAND		61,539	56,035	60,779	58,114	51,598	54,217	53,555	50,823	52,111	56,050	46,337	48,842	54,075	-5,237	-9.7%	650,000	752,655	-14%
ROUTE NO.	ROUTE	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Dec-09	* DIFF. DEC-10 & DEC-09	CURRENT MONTHLY %DIFF	** YTD 12/2010 TOTAL	YTD 12/2009 TOTAL	YTD % DIFF.
BAINBRIDGE ISLAND																			
90	POLLSBO/BAINBRIDGE	17,871	17,388	19,658	18,666	17,458	17,954	17,030	17,999	17,469	18,053	15,844	16,406	18,271	-1,865	-10.2%	211,596	244,821	-14%
91	KINGSTON/BAINBRIDGE	7,180	7,062	8,305	8,188	7,556	8,083	7,355	7,646	7,638	7,263	6,150	6,380	7,419	-1,059	-14.3%	89,025	96,367	-8%
92	POKING/SUO	1,603	1,532	1,692	1,757	1,636	1,639	1,590	1,633	1,648	1,636	1,379	1,589	1,780	-211	-11.9%	19,514	25,416	-23%
93	MANZANITA COMMUTER	2,783	2,525	2,681	2,947	2,780	2,812	2,566	2,661	2,946	2,844	2,311	2,466	2,526	-62	-2.5%	32,484	34,051	-5%
94	AGATE POINT COMMUTER	1,905	1,828	2,137	1,911	1,832	1,936	1,816	1,835	1,943	1,933	1,647	1,755	1,864	-109	-6.6%	22,480	26,545	-15%
95	BATTLE POINT COMMUTER	3,905	3,854	4,314	3,925	3,615	3,649	3,580	3,548	3,360	3,587	3,144	3,355	3,274	81	2.5%	43,836	32,408	35%
96	SUNRISE COMMUTER	2,107	2,135	2,690	1,967	1,893	2,079	1,961	2,140	2,156	2,266	1,961	2,273	2,494	-221	-9.9%	25,668	29,038	-12%
97	CRYSTAL SPRINGS COMMUTER	3,151	2,969	2,725	2,610	2,282	3,077	2,685	2,918	2,951	2,975	2,589	2,562	3,300	-738	-22.4%	33,094	39,151	-15%
98	FORT WARD COMMUTER	2,322	2,103	2,293	2,100	1,946	2,262	2,067	2,118	2,255	2,265	1,811	2,077	2,247	-170	-7.6%	25,819	28,792	-11%
99	BILL POINT COMMUTER	2,467	2,324	2,476	2,355	2,112	2,014	2,125	2,175	2,162	2,274	1,977	2,079	2,291	-212	-9.3%	26,540	28,768	-8%
106	FLETCHER BAY COMMUTER	1,684	1,604	1,885	1,624	1,551	1,670	1,414	1,391	1,504	1,365	1,143	1,197	1,698	-501	-29.5%	18,012	22,509	-20%
TOTAL BAINBRIDGE ISLAND		46,938	44,924	51,455	48,070	44,600	47,177	44,211	45,864	46,032	45,461	39,555	42,099	47,186	-5,087	-10.8%	547,868	650,000	-10%
ROUTE NO.	ROUTE	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Dec-10	* DIFF. DEC-11 & DEC-10	CURRENT MONTHLY %DIFF	** YTD 12/2011 TOTAL	YTD 12/2010 TOTAL	YTD % DIFF.
BAINBRIDGE ISLAND																			
90	POLLSBO/BAINBRIDGE	17,679	16,973	19,752	18,961	18,811	18,048	16,057	18,009	17,893	18,298	17,309	16,357	16,406	-49	-0.3%	214,147	211,596	1%
91	KINGSTON/BAINBRIDGE	7,391	6,710	7,936	7,379	7,272	7,256	6,140	8,072	7,248	7,030	6,926	6,475	6,380	115	1.8%	85,835	89,025	-4%
92	POKING/SUO	1,524	1,505	1,696	1,631	1,653	1,891	1,687	1,863	1,968	1,696	1,516	1,529	1,589	-40	-2.5%	20,159	19,514	3%
93	MANZANITA COMMUTER	2,912	2,658	3,044	2,908	2,843	2,931	2,312	2,718	2,714	2,748	2,569	2,384	2,486	-82	-3.3%	32,741	32,484	1%
94	AGATE POINT COMMUTER	1,954	1,806	2,240	2,064	2,024	2,016	1,641	1,915	1,936	2,016	1,835	1,635	1,755	-120	-6.8%	23,082	22,480	3%
95	BATTLE POINT COMMUTER	3,813	3,668	4,251	3,713	3,643	3,585	2,891	3,429	3,549	3,786	3,700	3,395	3,355	40	1.2%	43,423	43,836	-1%
96	SUNRISE COMMUTER	2,378	2,111	2,516	2,363	2,257	2,221	1,995	2,315	2,241	2,336	2,250	2,045	2,273	-228	-10.0%	27,026	25,668	5%
97	CRYSTAL SPRINGS COMMUTER	3,172	3,085	3,401	3,237	3,166	3,153	2,866	3,105	2,935	3,030	2,836	2,614	2,562	52	2.0%	36,602	33,094	11%
98	FORT WARD COMMUTER	2,321	2,251	2,495	2,360	2,216	2,228	1,973	2,256	2,155	2,399	2,060	2,146	2,077	71	3.4%	26,864	25,819	5%
99	BILL POINT COMMUTER	2,297	2,061	2,354	2,176	2,137	2,074	1,995	2,142	2,095	2,079	1,945	1,777	2,079	-302	-14.5%	25,122	26,540	-5%
106	FLETCHER BAY COMMUTER	1,315	1,353	1,521	1,495	1,442	1,536	1,254	1,419	1,508	1,600	1,497	1,431	1,197	234	19.5%	17,373	18,012	-4%
TOTAL BAINBRIDGE ISLAND		46,756	44,181	51,205	48,287	47,464	46,341	40,803	47,245	46,242	47,018	44,443	41,790	42,099	-309	-0.7%	552,376	547,868	1%
ROUTE NO.																			

Appendix C - City of Bellingham Mode Shifting Incentives

Urban Village Vehicle Trip Reduction Credits

TABLE 2 – URBAN VILLAGE VEHICLE TRIP REDUCTION CREDITS	CREDIT
Menu of Location Factors and Performance Measures to Reduce Vehicle Trips	
<i>Note: Reductions below are additive and may not exceed a total of 50%</i>	
1.) MIXED USE URBAN VILLAGE LOCATION	15%
<i>(Based on ITE Internal Trip Capture - Mixed Use Urban Environment)</i>	
2.) WTA TRANSIT PROXIMITY (Only one transit proximity reduction below may be used)	
Development fronts on a high-frequency WTA GO Line	10%
Development within 1/4-mile of WTA GO Line	7%
Development fronts on standard WTA Route (30 - 60 min)	5%
Development within 1/4-mile of standard WTA Route (30 - 60 min)	2%
3.) EMPLOYER MANDATORY COMMITMENT TO COMMUTE TRIP REDUCTION (CTR)	
CTR/TDM commitment combining economic incentives with transportation services	10%
4.) VOLUNTARY ANNUAL WTA TRANSIT PASS PROVISION (Non-CTR)	
2-year transit pass provided for residential units = 1% per unit pass	1%
2-year transit pass provided for employees = 1% per employee pass	1%
5.) VOLUNTARY CAR SHARE PARTICIPATION OR PROVISION (Non-CTR)	
Car Share Vehicle(s) Parked On Residential or Employment Site = 2% per vehicle	2%
Car Share membership fee provided for residential units = 2% per unit	2%
Car Share membership fee provided for employees = 2% per employee	2%

Appendix A

Addressing Sea Level Rise in Shoreline Master Programs

Introduction

One widely accepted consequence of a changing climate is an increase in the rate of sea level rise (IPCC, 2007). Although there is scientific uncertainty about the precise amount of sea level rise by the end of this century, projections for Puget Sound range from 14 to 54 inches relative to year 2000 (Mauger et al, 2015). Rates could be higher or lower, depending on the rate of vertical land motion locally.

Sea level rise will have significant effects on both human and natural systems (Shipman, 2009), increasing the risk from coastal hazards and the pressure on shoreline resources. These effects present a serious challenge to shoreline planning and coastal management.



Figure A – 1: An unusually high tide in January 2010 caused water to spill over the seawall at Alki Beach in Seattle. Even modestly higher sea levels will cause the frequency of events such as this to increase, along with the potential for associated damage. (Photo by Hugh Shipman.)

The Shoreline Management Act (SMA) and the Shoreline Master Program (SMP) Guidelines contain no requirements for SMPs to address climate change or sea level rise. However, they require local jurisdictions to take into account scientific and technical information pertinent to shoreline management issues. The Guidelines require local governments use “the most current, accurate and complete scientific and technical information available” [WAC 173-26-201(2)(a)]. The Guidelines also encourage local governments to consult Ecology’s guidance for applicable new information on emerging topics such as sea level rise [WAC 173-26-090(1)].

Some local governments have already incorporated sea level rise considerations into their Comprehensive SMP updates. Ecology recommends local governments include SMPs into their broader planning framework for addressing rising seas. This SMP Handbook appendix presents background information on projected sea level rise in Washington State, potential impacts of sea level rise, and suggestions for local governments to address sea level rise in their SMP updates.

This appendix addresses only sea level rise, but climate change may also result in other environmental impacts that will affect shorelines and the ecosystems they support. Some anticipated effects of climate change include:

- Altered hydrological cycles that may affect flooding and water resources.
- Increased sediment in glacier-fed rivers that may result in increased aggradation, flooding and channel movement.
- Increased landslides, which may result in more sediment and wood inputs to streams, potentially increasing flooding, channel movement, and transport of wood to hazardous positions (Beason and Kennard, 2006).
- Changes in ocean chemistry driven by higher levels of atmospheric carbon dioxide that will impact marine ecosystems.
- The potential for invasive species to increase their ranges as the ocean warms.

More information about the anticipated effects of climate change on Washington’s coasts, as well as a number of other sectors such as water resources, endangered species, and human health, can be found at the University of Washington’s [Climate Impacts Group](#) website and Ecology’s [Climate Change](#) web pages.

Projected sea level rise in Washington State

When planning for sea level rise, it is helpful to understand the potential extent of sea level rise and the effects this will likely have on coastal areas in Washington State. Distinct regions of the Washington coast will experience different levels of sea level rise due to vertical land movement in those regions. This movement is driven primarily by tectonic forces such as those responsible for the formation of the Olympic Mountains. Western Washington is located on the edge of the North American continental plate, and as the Juan de Fuca oceanic plate moves underneath it a gradual uplift in the northwestern part of the state is produced.

[Sea Level Rise in the Coastal Waters of Washington State](#), co-authored by the University of Washington’s Climate Impacts Group and Ecology, explains these variations and provides high,

Table A-1: Sea level rise projections

	Puget Sound	NW Olympic Peninsula	Central & Southern Outer Coast
2050	Low 3" Medium 6" High 22"	Low -5" Medium 0" High 14"	Low 1" Medium 5" High 18"
2100	Low 6" Medium 13" High 50"	Low -9" Medium 2" High 35"	Low 2" Medium 11" High 43"

Table A-1: Sea level change projections for 2050 and 2100 in Washington's coastal regions. Note that the low projections for the NW Olympic Peninsula are negative values due to vertical land movement. Adapted From: *Sea Level Rise in the Coastal Waters of Washington State*.

medium, and low sea level change projection scenarios for three broad regions of Washington's coasts. Table A- summarizes the report's projections.

Environmental impacts of sea level rise

Sea level rise will have a variety of impacts on Washington state coastal areas. Increased sea level will allow high tides to reach farther into low-lying areas and higher against flood control structures such as dikes and tide gates. Coastal flooding will persist longer and will be more difficult to drain due to higher sea level. Higher water levels will result in faster rates of erosion on beaches and coastal bluffs (Shipman, 2009).

An important consequence of higher sea level will be increased frequency of high-tide flooding and the potential for storm damage. A rise in sea level of one foot might lead to as much as a ten-fold increase in the frequency of any particular flood event. This means that events that currently occur only once every decade may become annual events, increasing the severity and frequency of flood and storm-related damages to coastal development (Shipman, 2009). These events could pose an increasing threat to coastal development and infrastructure.

The prospect of more flooding, erosion, and storm damage may lead communities and property owners to seek to build seawalls, dikes, and tidal barriers. The construction and placement of these structures will have a direct and immediate impact on natural shoreline environments. These structures will also lead to the progressive loss of beach and marsh habitat as those areas are squeezed between the rising sea and a more intensively engineered shoreline. Predicted

decreases in size or transitions in tidal marshes, salt marshes, and tidal flats will affect the species these habitats support. It is predicted that while some species may be able to locate alternate habitats or food sources, others will not (Glick, 2007).

Shellfish, forage fish, shorebirds, and salmon are among those identified as examples of species at risk (Glick, 2007). Sea level rise will also lead to other changes in coastal ecosystems, such as shifting of stream mouths and tidal inlets, reconfigured estuaries and wetlands, and more frequently disturbed riparian zones.

Coastal landforms and impacts

The impacts of rising sea level will differ substantially between locations, based on landform (bluff, estuary, spit), the character of development (urban, agricultural, rural), and the capacity of the shoreline to adjust to changing conditions. Below is a list of areas particularly vulnerable or resilient to the impacts of sea level rise and anticipated impacts to these areas.

- Low-lying areas – river deltas, historically filled lands, spits and barrier beaches. These areas will experience more frequent and more persistent flooding and damage to infrastructure. In developed low lying areas, there will be an increased need for more robust dikes and drainage systems if the existing uses are to continue.
- Coastal bluffs. In general, sea level rise will result in higher erosion rates and greater instability of landslide prone areas. Demand for seawalls is expected to increase, as will the adverse effects of such structures on shoreline habitat and on erosion patterns on nearby beaches.
- Spits and other barrier beaches. These low-lying features will be subject to increased flooding during storms and high tides and in many situations will experience more rapid erosion.
- Tidal environments – beaches and tide flats. These areas are expected to experience additional inundation and either be lost or undergo conversion to another habitat type.
- Marshy shorelines found in small estuaries and river deltas. These areas will be subject to increased flooding and increased erosion. Loss of salt marsh and related habitats may be significant in systems constrained by surrounding development.
- Developed shorelines – ports, marinas, roads and railroads, urban and residential shorelines. Typically, these are heavily armored with seawalls and riprap. Their level of vulnerability may be largely a function of their elevation. Developed shorelines of all types in low-lying areas will be vulnerable to losses from erosion, storms, or flooding.
- Rocky shorelines. Fairly resilient to modest increases in sea level.

Addressing sea level rise in SMPs

In the absence of advance planning, human reaction to sea level rise will likely be driven by our incremental responses to damaging storms and floods, not by our desire to reduce the long-term impacts of a gradually rising sea. SMPs are among many planning measures that local governments may need to deploy to assure the wise development of coastal areas and the protection of public resources as sea level increases. Many potential problems associated with

sea level rise will intensify existing management challenges such as development in flood prone areas, construction of shoreline armoring, protection of beaches and salt marshes, and siting a variety of shoreline uses.

Local governments that are evaluating potential ways to adapt to or prepare for rising sea levels should consider how these plans may be reflected in their SMPs. The guidance below identifies different areas of SMP planning where sea level rise can be considered.

Shoreline jurisdiction

As sea level rises, the ordinary high water mark (OHWM) will move inland as well, altering the line from which shoreline jurisdiction is measured. Although the SMA does not specifically mention shifts in shoreline jurisdiction due to sea level rise, it does identify that the OHWM is located “as it may naturally change” [RCW 90.58.030 (2)(c)]. The location of the OHWM often changes, even without sea level rise, due to erosion, accretion, or shoreline modification.

Local governments may respond to new sea level rise projections or local data by updating shoreline jurisdiction maps. In some cases, this may call for adjustments to environment designations, policies, or regulations.

Public participation

Sea level rise has the potential to generate considerable interest among shoreline property owners and other interested citizens and organizations and can be incorporated into public participation activities. Local information could be presented to the public along with options for addressing sea level rise in the SMP update. Sea level rise adaptation should be part of most if not all public participation activities.

For example, the City of Olympia presented technical information to the public about the anticipated impacts of climate change to hydrologic regimes and area sea levels. The meeting closed with a presentation by city staff about the SMP update process and their plans to incorporate climate change adaptation into the update process. Providing this information during the early stages of the SMP allows local governments to alert interested parties about potential ways the draft SMP can address sea level rise or other climate change adaptation elements.

Shoreline inventory and characterization

The inventory and characterization provides an opportunity to identify shoreline areas that will be particularly vulnerable or resilient to rising sea level. One fairly straightforward way to characterize vulnerability is to classify the shoreline according to coastal landform. Landform types include coastal bluffs, marshes, rocky shorelines, and armored shorelines. Each type of landform will experience different long-term effects of rising sea level.

Once coastal landforms have been mapped, local governments can determine the level of vulnerability to sea level rise for the extent of the shoreline. This type of characterization does not require a precise estimate of the rate of sea level rise.

Some urban jurisdictions have used high resolution coastal topographic data to develop maps of low-lying areas subject to inundation by higher water levels. Such maps can be used to illustrate the consequences of different sea level scenarios and storm and tide combinations. This type of approach can be useful for identifying coastal areas subject to increased flooding and to help direct appropriate future land use or development types to appropriate locations. These maps and projections may be particularly helpful for guiding engineering questions, such as structural elevations, drainage requirements, construction techniques, and hazard mitigation measures.

Some local governments have already prepared a detailed analysis of sea level rise predictions and potential effects. These local products have been produced by academic researchers, independent consultants, and local government public works departments or other agencies responsible for stormwater or wastewater infrastructure. For an example of a detailed local analysis, view the City of Olympia's "[Sea Level Rise](#)" web page. Olympia's vulnerability assessment illustrates why a comprehensive assessment is needed – the areas subject to flooding at all projected sea level rates extend far beyond shoreline jurisdiction.

Public access

As part of the shoreline inventory and characterization, local governments identify existing physical and visual public access sites and opportunities. During this process, sites where sea level rise may pose a threat to public access can be identified. For example:

- Parks in low lying areas may be subject to increased flooding.
- Public tidelands may become inaccessible if shoreline armoring prevents the tidelands from migrating inland.
- Publicly accessible spits may be lost to erosion.
- Visual access sites along coastal bluffs may become hazardous due to landslides.

Local governments also may be able to identify opportunities to preserve or replace those sites. For example, consider expanding the upland reach of coastal parks to accommodate shifting shorelines in low lying areas, or planning for new public access sites in areas less vulnerable to flooding or erosion. Additional potential techniques for ensuring that public access is provided in the future include:

- Building public docks and piers that are more resilient to sea level rise.
- Removing shoreline armoring or moving it inland to allow the public to walk on the beach even as the sea level rises.
- Locating boardwalks or trails above the elevation of projected sea level rise.

Shoreline use analysis

In conducting the shoreline use analysis, take into account the effects of rising sea levels on existing and projected development. The use analysis estimates the future demand for shoreline space and identifies projected development trends and potential use conflicts. The objective is to ensure that shorelines are available for uses that are unique to or dependent on the shoreline. The

use analysis can be helpful in identifying developed and undeveloped areas that may be vulnerable to sea level rise.

Where possible, use analyses should build upon the inventory and characterization to project areas where future infrastructure will be necessary to address sea level rise impacts. This may include corridors along developed shorelines for new or expanded flood control structures, elevation of structures, or locations for pump stations and larger storm drainage facilities. These types of efforts will require detailed planning beyond the SMP and large public and private investments.

Goals, policies, and regulations

SMP goals, policies, and regulations can address sea level rise adaptation. These sea level rise provisions can help to create awareness of the impacts of sea level rise and other climate change effects among shoreline property owners and development proponents. Enhanced awareness of impacts may in turn result in project designs that incorporate measures to decrease the risk of flooding and storm damage to these developments as sea level rises.

Sea level rise adaptation can be incorporated into several different sections of the goals, policies, and regulations. Examples of goals and policies addressing sea level rise are provided below.

General policies

The King County SMP contains the following explanation and policies related to climate change.

F. Preparing for Climate Change

As discussed in Chapter 4 of the King County Comprehensive Plan, climate change has the potential for significant impacts on shorelines and shoreline habitats. Sea-level rise and storm surges may place at risk infrastructure, habitat restoration projects, and other development, including residential development. New development and maintenance or replacement of existing development should take into account the potential for harm that may result from sea-level rise (VII, Environment Protection Policies).

S-650 King County shall ensure that new projects for and major maintenance or replacement of utilities, roads, and other public infrastructure consider the impacts of sea-level rise in the location, design, and operation of the projects.

S-651 Habitat protection and restoration projects in the shoreline jurisdiction shall consider implications of sea-level rise and other climate change impacts to promote resiliency of habitats and species.

Shoreline use policies

Consideration of sea level rise can be incorporated into shoreline use goals and policies. Jefferson County's SMP contains the following shoreline use goal:

10. Encourage all use and development to address potential adverse effects of global climate change and sea level rise (Article 3, 7. Shoreline Use, B. Goals).

The City of Seattle's SMP call for strategies to balance shoreline uses with protection of ecological functions.

LUG52 Address and minimize the impacts of sea level rise on the shoreline environment with strategies that also protect shoreline ecological functions, allow water-dependent uses and provide public access (Shoreline protection and restoration).

Island County's SMP incorporates sea level rise in the shoreline use element.

II.D. 6. Sea level rise and increased frequency and magnitude of extreme storm events as a result of climate change should be taken into account when considering and evaluating shoreline uses.

Flood hazard policies

SMPs must address flood hazards and seek to reduce the damage caused by floods. Goals and policies addressing flood hazards are another opportunity to address sea level rise and the increased threat from flooding that will accompany it. The Jefferson County SMP provides an example of a policy designed to reduce future flooding from sea level rise:

2. Proponents of a development on no-bank or low bank marine shorelines are encouraged to locate the bottom of a structure's foundation higher than the level of expected future sea-level rise (Article 6, 4. Shoreline Setbacks and Height, A. Policies).

The City of Burien's SMP includes a sea level rise policy in the Flood Prevention element. This policy articulates the intention to incorporate updated sea level rise predictions in their future SMP updates and alter policies as needed:

Pol. FLD 4 - Monitor sea level rise and accordingly adjust development standards and building setbacks to minimize flooding potential (Chapter II, 20.20.045, Flood Prevention and Minimization Element).

Island County's flood hazard policies call for future sea level projections to be incorporated into site-specific development review to minimize flood damage.

V.C.6. When reviewing projects that could be affected by sea level rise, adjust development standards such as building setbacks or elevation as necessary to minimize potential damage from flooding.

Shoreline modifications policies

As sea level rises, some property owners may wish to install shoreline armoring. If there are particular sections of the shoreline where armoring is not appropriate and is prohibited, state this clearly in the shoreline modifications policies and regulations. Incorporate planning for sea level rise into permit conditions for shoreline modifications. Policies and regulations should recognize the role that shoreline erosion and accretion play in preserving ecological functions, and to encourage softer armoring techniques where appropriate.

King County's SMP encourages developers to consider sea level rise in projects along marine shorelines. This policy will help to prevent future unnecessary shoreline armoring.

S-778 King County should notify all prospective developers of new development along Vashon and Maury Islands that their development may be impacted by sea-level rise and should encourage all such new development to be set back a sufficient distance to avoid the need for shoreline protection during the expected life of the development (VIII, Shoreline Use and Shoreline Modification).

Development regulations

Shoreline buffers and setbacks are one way to ensure that future development is not threatened by sea level rise. Buffers and setbacks along with restrictive building standards near low lying or erosion prone shorelines will help reduce flooding and the need for shoreline armoring.

In intensely developed urbanized settings, the likely policy response to sea level rise will be to defend the existing developed area. In these locations, it might be appropriate to establish a setback to accommodate a future dike or elevated sea wall. The level of investment and intended life of the improvement are important considerations in addressing long-term sea level rise issues.

Environment designations

Environment designations should reflect the results of the inventory and characterization and take into account existing shoreline development. Undeveloped areas that are designated as "natural" will remain less developed and therefore less likely to contain infrastructure that may be damaged by storms or flooding exacerbated by sea level rise. These shorelines may also prove better able to shift and change in response to sea level rise than those in more highly developed areas. Environment designation regulations can also state where and what types of armoring are or are not acceptable.

Restoration plan

Developing a restoration plan provides an excellent opportunity to implement sea level rise adaptation measures. Restoration plans may identify restoration actions that improve resilience to sea level rise. Projects that protect and restore natural geomorphic processes such as erosion, sediment transport, tidal flooding, and marsh accretion are likely to be more successful than



Figure A -2: A high tide event at a restored beach in the City of Seattle. Restoration projects such as this pocket beach should be selected and designed in ways that accommodate rising sea levels. Photo by Hugh Shipman.

those that target the creation of historic habitat configurations that may be inundated or sustain increased flood damage due to sea level rise.

In addition, sea level rise predictions should be factored into restoration planning, perhaps including larger inland areas in restoration or habitat protection efforts to accommodate increasing inundation and to allow the shoreline to shift farther inland.

Jefferson County recognized the potential need to alter the restoration plan as the effects of sea level rise become more evident. The “Obstacles and Challenges” section of County’s Restoration Plan includes the following text:

Climate change: Rising temperatures and sea levels have the potential to dramatically alter Jefferson County’s shoreline jurisdiction, processes, and functions over time. Depending on the scale of change and time period over which changes occur, restoration priorities could shift substantially within a relatively short period of time.

Language such as this would allow local governments to alter their restoration plan over time to address emerging impacts from climate change.

References and resources

- Beason, S. R. and P.M. Kennard, 2006, *Environmental and Ecological Implications of Aggradation in Braided Rivers at Mount Rainier National Park*, Pages 52–53 in J. Selleck, editor. Natural Resource Year in Review—2006. Publication D-1859. National Park Service, Denver, Colorado.
- Climate Impacts Group, 2009, *The Washington Climate Change Impacts Assessment*, M. McGuire Elsner, J. Littell, and L. Whitely Binder (eds). Center for Science in the Earth System, Joint Institute for the Study of the Atmosphere and Oceans, University of Washington, Seattle, WA.
- Glick, P., J. Clough, J., and B. Nunley (2007) *Sea-level Rise and Coastal Habitats in the Pacific Northwest: An Analysis for Puget Sound, Southwestern Washington, and Northwestern Oregon*. National Wildlife Federation, Reston, VA.
- Mauger, G.S., J.H. Casola, H.A. Morgan, R.L. Strauch, B. Jones, B. Curry, T.M. Busch Isaksen, L. Whitely Binder, M.B. Krosby, and A.K. Snover. 2015. *State of Knowledge: Climate Change in Puget Sound*. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. doi:10.7915/CIG93777D
- IPCC, 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.)], Cambridge University Press, Cambridge, UK and New York, NY, USA, 996 pp.
- Mote, P., A. Petersen, S. Reeder, H. Shipman, and L. Whitely Binder, 2008, *Sea Level Rise in the Coastal Waters of Washington State*, University of Washington Climate Impacts Group and the Washington Department of Ecology, University of Washington, Seattle, WA, 11 pp.
- Shipman, H., 2009 (in press), *The Response of the Salish Sea to Rising Sea Level: A Geomorphic Perspective*, Puget Sound Georgia Basin Ecosystem Conference, February 8-11, 2009, Seattle, WA, 8pp.

Bainbridge Island Climate Change Advisory Committee: Draft 2019/2020 Workplan (June 11th, 2019)

Section 1: Background

The Bainbridge Island City Council established the Climate Change Advisory Committee (CCAC) in the fall of 2017¹. The CCAC was established to serve as a technical and planning advisory committee to the city council, city manager, and department of planning and community development staff on issues related to climate change as directed by the City Council.

More specifically, the CCAC was tasked with assisting the city in implementing the climate related goals and policies of the comprehensive plan² by undertaking several tasks as expeditiously as committee and city resources allow as outlined in Ordinance 2017-13³.

The plan that follows is for calendar year 2019 and 2020. We believe it is more efficient to provide a workplan for two years as many of the actions will occur over two years or more.

¹ Bainbridge Island City Council. Ordinance 2017-13. May 17, 2017. <https://www.bainbridgewa.gov/DocumentCenter/View/8510/Ordinance-No-2017-13-Climate-Action-Advisory-Committee-Approved-050917?bidId=>

² **Guiding Principle #7 Reduce greenhouse gas emissions and increase the Island's climate resilience.**

Guiding Policy 7.1 Mitigation: Participate with state, regional and local partners to reduce greenhouse gas emissions consistent with the 1990 benchmark and future year targets set forth in state law, educate the public about climate change and incentivize Island activities including land use patterns and building practices that reduce greenhouse gas emissions.

Guiding Policy 7.2 Adaptation: Minimize or ameliorate the impacts of climate change on our community and our Island's ecosystems through climate-informed policies, programs and development regulations.

Guiding Policy 7.3 Evaluate the climate vulnerabilities and implications of City actions and identify policies that alleviate those vulnerabilities. Consider the effects of shifting conditions (sea level rise, changing rainfall patterns, increasing temperatures and more extreme weather events) and the effects they cause (altered vegetation, changing water demands, economic shifts).

³ **Tasks for CCAC**

1. Provide advice and/or recommendations to the city council or city staff, as appropriate, on methods of completing a baseline island-wide greenhouse gas (GHG) inventory for the city.
2. To the degree directed by the city council, assist with or manage the completion of a baseline island-wide GHG inventory.
3. Provide advice and/or recommendations to the city council or city staff, as appropriate, related to city GHG emission reduction targets.
4. Work with city staff, as appropriate, to complete and recommend to the city council a city climate action plan and implementation strategy.
5. Provide advice and /or recommendations to the city council or city staff, as appropriate, on how to measure progress toward meeting the city's GHG emission reduction targets and adaptation actions.
6. As directed by the city council, assist the city with participation in regional climate change efforts.
7. Provide education and outreach to the public regarding climate change and the work of the committee and the city relating to climate change.

Section 2: Proposed Goals

The CCAC believes that in order to achieve the comprehensive plans guiding principles for climate change and complete the specific tasks requested by the City Council, the CCAC needs to establish goals that can be measured and tracked over time. At this time, the CCAC is proposing one goal in each of the three areas: mitigation, adaptation, and community engagement. The mitigation goal has a specific timeframe while the adaptation and community engagement goals are more qualitative in nature. As we progress in the implementation our workplan we may develop more quantitative goals for the adaptation and community engagement areas. The CCAC believes these three areas are consistent with the guiding principles in the Comprehensive Plan. The goal and the basis for the goal are included in Table 1.

Table 1: Proposed Goals for Mitigation, Adaptation, and Community Engagement

Area	Goal	Basis
Mitigation	By 2040 Bainbridge Island will reduce its greenhouse gas emissions by 90% compared to 2013 levels with interim goals of reducing greenhouse gases by 25% by 2023 and 60% by 2033 compared to 2013 levels. ⁴	The urgency to dramatically reduce our greenhouse gas emissions is highlighted in a 2018 report from the Intergovernmental Panel on Climate Change⁵ that indicated in order to keep global temperatures below 1.5 degrees Celsius compared to post-industrial levels will require net zero global carbon emissions by 2050. Net zero global carbon emissions mean some of those emissions can be offset with carbon credits. The WA State legislator passed a bill that will make the States electrical supply completely free of coal by 2025, carbon neutral by 2030 and 100% carbon-free by 2045. We selected a 90% greenhouse gas emissions goal, because we did not want to utilize carbon offsets in our goal as carbon offsets can be difficult to evaluate and verify. We selected the year 2040 because we wanted to achieve our goal earlier than 2050. We selected 2013 because this is the baseline year that Cascadia will use in the GHG inventory. We will evaluate after we receive the GHG inventory if it is possible to hindcast to 2005. This is the year used by the USA in the Paris agreement.

⁴ The Island GHG inventory should be completed this summer and may influence the goal.

⁵ IPCC, 2018: Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. <https://www.ipcc.ch/sr15/Thw>

Area	Goal	Basis
		We selected interim targets of 2023 and 2033 because this provides a 10 year progress report for the Island.
Adaptation	Bainbridge Island is climate savvy, and can withstand the impacts of climate change (e.g., sea level rise, warming temperatures, and changing precipitation patterns, changing vegetation).	As an Island community Bainbridge Island is vulnerable to climate change. In fact, we are already experiencing the effects of climate change and are committed to much more change in the coming years. To this end, it is prudent governance to both understand the potential implications of climate change (vulnerabilities) and reduce those vulnerabilities to our community (risk reduction or adaptation). Failing to plan for the impacts of climate change and act to avoid them would result in long-term harm to our Island's people, culture, economy and environment. By 2020, Bainbridge Island will have identified a formal process to evaluate all permits and expenditures for their climate vulnerability and a standardized approach to reduce that vulnerability. By 2019, Bainbridge Island will have tools to educate the community about climate vulnerability and the need to implement adaptation.
Community Engagement	The City of Bainbridge Island inspires action across the community and partners with local and regional organizations to take meaningful climate change mitigation and adaptation actions.	Community engagement is essential to effectively implement actions throughout this workplan and to achieve the overarching mitigation and adaptation goals; as such, community engagement is interwoven in the mitigation and adaptation sections. Given its importance and its cross-cutting nature, we are also calling it out with its own goal. We need to increase public understanding and awareness of the magnitude and consequences of climate change in order to create engagement in and support for mitigation actions. We need to work with extant community groups to disseminate information and achieve adaptation and mitigation goals and improve coordination/collaboration with other City advisory committees and Bainbridge Island taxing entities. We need to foster regional collaboration to support and advise the City in engaging in regional climate change efforts, with benefits such as sharing best practices and lessons learned.

Over time the CCAC plans to propose additional goals for the different areas. For example, the CCAC envisions proposing goals for moving the Island to 100% clean, renewable energy or dramatically reducing greenhouse gas emissions from transportation or establish green building standards for all Island projects.

Table 2 provides a road map for the different areas the CCAC will be concentrating its efforts over the next two years.

Table 2: Road Map for CCAC 2019/2020 Workplan

Area	Sub-Work Areas
Mitigation	Greenhouse Gas Emissions Inventory
	Energy Use - Energy provider - Energy conservation and energy efficiency - Local renewable energy sources
	Transportation - Public Transportation - Electric Vehicles - Non-motorized transportation infrastructure
	Buildings
	Land-Use/Forestry/Agriculture
	Waste Management
	Consumption
Adaptation	Vulnerability Assessments
	Risk Reduction
Community Engagement	Community Awareness
	Island Collaboration
	Regional Collaboration

Section 3: Mitigation

As highlighted above, the urgency to dramatically reduce our greenhouse gas emissions is highlighted in a 2018 report from the Intergovernmental Panel on Climate Change⁶ that indicated in order to keep global temperatures below 1.5 degrees Celsius compared to post-industrial levels will require net zero global carbon emissions by 2050. This is also supported by the 4th National Climate Assessment⁷ and many other scientific publications that indicated the impacts of climate change on our communities.

Goal: By 2040 Bainbridge Island will reduce its greenhouse gas emissions by 90% compared to 2013 levels with interim goals of reducing greenhouse gases by 25% by 2023 and 60% by 2033 compared to 2013 levels^{8,9}

We are proposing actions in seven areas for mitigation that will help us achieve the outcomes identified below for each area. The actions in the 2019/2020 workplan will help us to start to accomplish these outcomes.

- 1. Greenhouse gas emissions** - Complete GHG emissions inventory to establish baseline for measuring progress;
- 2. Energy Use** – Move towards 100% clean, renewable electrical energy source for Island, increase energy conservation and energy efficiency in our buildings, and encourage use of renewable energy on the Island.
- 3. Transportation** – Increase use of public transportation; encourage electrification of ferry fleet; increase use of electric vehicles; and support development of infrastructure to increase biking and walking on Island.
- 4. Buildings** – Develop green building standards for public, residential, and commercial buildings on Island.
- 5. Land Use/Forestry/Agriculture** – Develop guidelines and strategies to reduce GHG emissions in development and work with local entities to develop strategies to preserve the existing stock of forest and to promote sustainable agriculture on the Island;
- 6. Waste Management** – Develop food waste diversion programs and evaluate our wastewater facility to reduce GHG emissions.
- 7. Consumption** – Provide education how individuals and businesses can reduce their carbon footprint by their individual choices.

⁶ IPCC, 2018: Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. <https://www.ipcc.ch/sr15/>

⁷ Fourth National Climate Assessment. Volume 11: Impacts, Risks, and Adaptation in the United States. 2018. <https://nca2018.globalchange.gov/>

⁸ The Island GHG inventory should be completed this summer and may influence the goal.

⁹ Many Cities in Washington and around the country have established a goal of reducing greenhouse gas emissions by 80% by 2050 with different baseline years. ICLEI completed a report in 2016 that summarized goals for other cities. http://icleiusa.org/wp-content/uploads/2015/08/Measuring_Up_2015.pdf

For each of the actions areas we include: 1) description of the action; 2) whether the action is a high, medium, or low priority; a timeline to complete; 4) resources needed to accomplish; 5) CCAC Lead; and 6) status for each action. These tables will be updated every 6 months and presented to the City Council.

Section 3.1: Greenhouse Gas Emissions

In order to measure progress in reducing greenhouse gas emissions it is necessary to have a baseline from which to measure progress. Currently, Bainbridge Island does not have a baseline for greenhouse gas emissions. The GHG emissions inventory will provide that baseline. In addition, it will be important to update the GHG emissions inventory periodically to evaluate what programs are successful and which programs need to be modified. Table 3 provides the actions for 2019/2020 for greenhouse gas emissions.

Table 3: Greenhouse Gas Emissions

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
3.1: Complete Island-wide GHG Inventory: City will hire consultant to complete and Island-wide GHG emissions inventory	High	2019		Derik and Gary	Cascadia will provide a draft of the report soon and the CCAC will review and provide comments.
3.2: Present findings from greenhouse gas consumption inventory: CCAC will work with City staff to present findings from the greenhouse gas consumption inventory to the public.	Medium	2019		Derik and Gary	We will schedule presentations for City staff and then the public once the Inventory is completed.
3.3: Work with High School on Annual update to GHG Inventory: CCAC will collaborate with BISD/BHS/Eagle Harbor High to add curriculum module that will include an annual GHG inventory by students	High	2020		Lara	EcoAdapt has a summer intern working with three teachers at BHS. Product by end of summer.
3.4: Develop COBI internal carbon pricing program: COBI would incorporate a shadow price for carbon in evaluating all new capital and procurement decisions, and/or implement a carbon fee for operations, revenues from which could be invested in energy efficiency and clean energy projects at city	Medium	2020		Derik and Lara	Derik had a meeting with City Council members to discuss carbon pricing and carbon bank. Need to identify next steps.

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
facilities. Each department is given a carbon budget (as well as a financial budget) for the year.					

Section 3.3: Energy Use

Currently the City of Bainbridge Island receives about 5%¹⁰ of its electricity from clean, renewable energy sources. In Washington State electricity generation contributes about 20% of the States greenhouse gases¹¹. Bainbridge Island is currently conducting a greenhouse gas inventory for the Island, but it is anticipated that the contribution from electrical generation maybe higher than the State average since a large percentage of electrical generation in the State is from hydroelectricity. Bainbridge gets its electricity from Puget Sound Energy that has a fuel mix of over 60% fossil fuels. It is anticipated that Bainbridge Islands percent of greenhouse gases from electricity generation will be greater than the State average. The values from the inventory will be used as a baseline for evaluating potential reductions in emissions.

The Washington State legislator passed a bill that will make the States electrical supply completely free of coal by 2025, carbon neutral by 2030 and 100% carbon-free by 2045. Across the U.S. over 90 cities, more than ten counties and two states, have already adopted ambitious 100% clean energy goals. Six cities in the U.S.--Aspen, Burlington, Georgetown, Greensburg, Rock port, and Kodiak Island--have already hit their targets¹².

We believe Bainbridge Island should strive to achieve 100% clean, renewable energy in order to do our part to keep global temperatures below 1.5 degrees Celsius compared to post-industrial levels. The CCAC will be working over the next year to determine the correct timeframe and interim goals to achieve 100% clean, renewable energy.

Table 4 provides specific actions for 2019 and 2020 in three areas:

- Energy provider:
- Energy conservation and energy efficiency; and
- Local renewable energy sources

¹⁰ Greenhouse Gas Emissions Inventory, Prepared for the Puget Sound Clean Air Agency by Cascadia Consulting Group. June 2018. Assume fuel mix for PSE on Page 17 was the same for Bainbridge Island.

¹¹ Washington State Greenhouse Gas Emissions Inventory: 1990-2015. Report to the Legislature. December 2018. Publication No. 18-02-043. <https://fortress.wa.gov/ecy/publications/documents/1802043.pdf>

¹² 100% Commitments in Cities, Counties, and States. Sierra Club Home Page. Accessed February 5th 2019. <https://www.sierraclub.org/ready-for-100/commitments>.

Table 4: Energy Use

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
Energy Provider					
4.1: Ensure energy delivered to Bainbridge Island is from renewable, lowest GHG emissions sources: Work with the City and UAC to develop an RFP and criteria for the renewal of our island electric utility provider franchise agreement that requires delivery of 100% lowest carbon, renewable energy to all consumers on Bainbridge Island that is additive to the fuel mix of the energy provider (unless they are already 100% renewable carriers with excess product to sell).	High	2020		James, David, Gary, Derik, and Lara	UAC and CCAC have formed a subgroup to develop recommendations for City Council consideration.
Energy Conservation and Efficiency					
4.2: Incentivize reduction in propane use: Work with the City and propane providers to develop strategies to reduce GHG emissions and improve air quality from generation, transportation and combustion of propane.	Medium	2020		David	Cascadia is considering how to evaluate the contribution from propane use in the GHG inventory. We will use that information to help evaluate next steps.
4.3: Limit GHG emissions from buildings: Work with the City and others to develop regulations that would require that all new, retrofit, and re-development minimizes GHG emissions by 1) maximizing energy efficiency and 2) increasing renewable generation either on site or at a community renewable energy investment site. This will decrease our total grid demand decreasing the need to expand our energy delivery infrastructure (which is costly) and decrease greenhouse gas emissions from a mixed grid.	High	2019/2020		Mike and Lara	Will meet with the City lead on Green Building standards and others to identify how the CCAC can provide support to effort.
Island Renewable Energy					
4.4: Create community renewable energy project sites: Work	High	2019/2020		David,	Western Washington

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
with the City and others to develop renewable energy projects on the Island. Not all sites on Bainbridge Island are suitable for renewable energy generation, but local renewable generation is part of building our resilience while decreasing our GHG emissions. Giving community members the opportunity to invest in and benefit from local generation (including financially through benefit from selling electrons into the grid) can increase local generation for those sited where it is not a functional option, and protect local tree canopy in those locations.				Gary, and Mike	Intern is completing a report on possible solar installations at three sites on BI (FD Station #21, Grace Church, and Vincent Road transfer station).
4.5: Develop Local Micro-grids: Work with the City to evaluate harnessing local renewable energy production into local micro-grids to increase our resilience including increasing reliability.	Medium	2020		David and Mike	Will follow work of Intern and reach out to PSE to discuss.

Section 3.4: Transportation

In Washington State, transportation is estimated to produce almost 43%¹³ of greenhouse gases. Bainbridge Island is currently conducting a greenhouse gas inventory for the Island, but it is anticipated that the contribution from transportation will be similar to the State wide percent of emissions. The values from the Inventory will be used as a baseline for evaluating potential reductions in emissions from transportation.

The City will be launching a Sustainable Transportation initiative over the next several months. Information collected by CCAC can be used in the initiative.

Table 5 provides specific actions for 2019 and 2020 in three areas:

- Public transportation;
- Electric vehicles; and
- Non-motorized transportation infrastructure

¹³ Washington State Greenhouse Gas Emissions Inventory: 1990-2015. Report to the Legislature. December 2018. Publication No. 18-02-043. <https://fortress.wa.gov/ecy/publications/documents/1802043.pdf>

Table 5: Transportation

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
5.1: BI Sustainable Transportation Initiative: Participate in all aspects of Cities Sustainable Transportation initiative (scoping, planning, and implementation)	High	2019/2020		Mike and Deb	CCAC members will engage with City to define role.
Public Transportation					
5.2: Develop better understanding of park and rides: CCAC and City staff would meet with Kitsap Transit to improve the park and ride system on the Island to potential reduce GHG emissions. We would need to better understand the current locations, how are they planned and is there a plan for future park and rides.	High	2019		Nora and David	3 sites on BI: American Legion (5 spaces, 100% use); Bethany Church (80 spaces about 68% use); Island Church (37 spaces about 57% use). Day Road to expand by WSDOT lot.
Electric Vehicles					
5.3: Support and incentivize electrification of transportation on island: CCAC would work with the City to create incentives to move our Island transportation fleet toward electrification in order to reduce GHG emissions and improve local air quality (e.g., reduce local car tabs for electric vehicles and develop electrical charging stations around Island).	High	2020		Deb	Western Washington Intern is evaluating actions from other cities and will develop a report providing recommendations for BI by mid-June.
5.4: Encourage School District/COBI/Parks to move towards electric fleets: CCAC would work with the school district, parks, and COBI to move towards electrification of their fleet and battery storage. Some examples can be found at https://driveevfleets.org/ of ideas from other cities.	High	2019		James and Deb	The BISD has provided Ellen with information requested. Parks indicated they will not be providing information at this time. Next step is to discuss possibility of electrifying their fleets.
5.5: Support Washington State Ferries Efforts towards electrification: City would continue to work with Washington State Ferries on the electrification of the ferries and continue to supports efforts to use VW funds to make	High	2019		David and Deb	Reached out to WSF and they indicated they will electrify their fleet and all terminals except Shaw and Lopez Islands. They

this conversion. Also ask the WSF to consider lower rates for electric cars as it would also provide health benefits for their deck hands.					plan to install solar installation at the BI terminal. Their goal is to reduce their GHG emissions by 60% below 2005 levels by 2050.
5.6: Explore Options with Kitsap Transit to move towards electrification of their fleet: City, CCAC, and Multi-Modal committee would meet with Kitsap Transit to learn of their plans for fleet electrification and how they could increase the use of electric buses.	High	2019		James and Nora	Reached out to Kitsap Transit and they indicated they are testing one electric bus and planning on buying a second bus. Cost savings of about \$3000 for the bus compared to using diesel. They will be doing an electrification infrastructure analysis for their system and working with PSE.
5.7: Develop strategies to encourage use of electric vehicles: City would develop strategies for increasing electric vehicle infrastructure and access for high density housing. CCAC would evaluate how many electric cars on the Island and explore innovate ways to use cars during low production time.	Medium	2020		David, Deb, Derik, and James	Western Washington intern is completing case studies of several cities looking at how they are moving towards more sustainable transportation policies. She has obtained information on number of electric cars in State and on BI.
5.8: Explore the use of electric vehicles with UPS/Fedex/USPS: CCAC would meet with the deliver companies to determine if they have pilot programs with electrification or if we could work with them to develop a pilot program. Also, we could prompt anti-idling programs with them.	Medium	2020		Derik	TBD.
Non-Motorized Transportation Infrastructure					
5.9: Work with the Council, Multi-modal Committee (MMC), and City on possible second levy for non-motorized transportation: CCAC would work with all the groups to provide support on efforts to advance non-motorized transportation on the Island and increase island non-autocentric transit paths.	High	2019		Mike	Had meeting with members from MMC and will meet with City Council. City asks for RFQ for study on increasing walking and biking on Island. Will follow developments.
5.10: Introduce hierarchy of transit concept for	Medium	2020		Deb and	TBD

adoption by council: CCAC would work with the MMC and BMA to develop strategies that that promote transit equity and community safety by considering the most vulnerable, then design and implement transit to support pedestrians, bicycles, mass transit and individual cars, in that order.				Mike	
5.11: Anti-idling ordinance: CCAC would work with MMC and BMA to develop an anti-idling ordinance for the Island especially for the ferries.	Medium	2020		James	School representative attended movie “Idle Threat” and is pursuing possibilities with information from movie.

Section 3.5: Buildings

In Washington State, residential, commercial, and industrial buildings are estimate to provide almost 21% of greenhouse gases¹⁴. Bainbridge Island is currently conducting a greenhouse gas inventory for the Island, but it is anticipated that the contribution from buildings will be similar to the State wide percent of emissions. The values from the greenhouse inventory will be used as a baseline for evaluating potential reductions in emissions. COBI is also starting to scope out developing a Green Building Initiative. The CCAC is planning on being involved in the development of the Green Building standards.

Table 6 provides specific actions for 2019/2020 for buildings.

Table 6: Buildings

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
6.1: Support development of mandatory Green Building standards for all City-owned buildings over 5000 square feet: Work with Design Review board, city staff, and others to	High	2020		Mike, Lara, Michelle, and Deb	Will meet with City staff to discuss Green Building program and role of CCAC.

¹⁴ Washington State Greenhouse Gas Emissions Inventory: 1990-2015. Report to the Legislature. December 2018. Publication No. 18-02-043. <https://fortress.wa.gov/ecy/publications/documents/1802043.pdf>

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
develop a mandatory green building program.					
6.2: Support development of mandatory and/or incentive programs for residential and commercial development: Work with the design review board and City to develop incentive programs that could include reducing plan check and building permit fees and expedited permit review for those projects that pursue some minimum green building standards.	High	2019		Mike, Lara, Michelle, and Deb	Will follow progress with and City and offer up the services of the CCAC members.

Section 3.6: Land Use/Forestry/Agriculture

Decisions about land use and land cover can affect, positively and negatively, how much our climate will change and what kind of vulnerabilities humans and natural systems will face as a result. Because humans control land use, and to a large extent, land cover, individuals, businesses, non-profit organizations, and governments can make land decisions to adapt to and/or reduce the effects of climate change. Adaptation options include varying the local mix of vegetation or elevating homes to reduce exposure to sea level rise or flooding. Land use options for mitigating climate change include expanding forests to accelerate removal of carbon from the atmosphere and altering agricultural management practices to increase carbon storage in soil¹⁵.

Table 7 provides specific actions that we propose to assist to meet the building and land use targets.

Table 7: Land Use/Forestry/Agriculture

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
7.1: Create Island-wide land use plan that reflects mitigation and adaptation goals: City	High	2020		Michelle, Deb, and Lara	Meet with City Staff to discuss.

¹⁵ Fourth National Climate Assessment. Volume 11: Impacts, Risks, and Adaptation in the United States. 2018. Land Use and Land Change Chapter. <https://nca2014.globalchange.gov/report/sectors/land-use-and-land-cover-change>.

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
would develop guidelines to encourage siting of projects to reduce greenhouse gas emissions: This could include where to develop to decrease GHG emissions (e.g., decrease miles driven), maintain open space services (e.g., water recharge, water filtration, air filtration, temperature amelioration), increase permeable surfaces (built and natural), manage for change, etc.					
7.2: Work with Parks and Bainbridge Island Land Trust to develop climate plans: CCAC members will work with these two entities to help them develop climate plans for their holdings.	Medium	2019/2020		Mike, Lara, and Deb	Attended session with BILT to help them develop climate plan. Attended Parks meetings to discuss incorporating climate change in their comprehensive plan.

Section 3.7: Waste Management

In Washington State, solid waste and wastewater management contribute about 4% of total greenhouse gases¹⁶. Bainbridge Island is currently conducting a greenhouse gas inventory for the Island, but it is anticipated that the contribution from solid waste and wastewater management will be similar to the State-wide percent of emissions. The values from the greenhouse inventory will be used as a baseline for evaluating potential reductions in emissions. Table 8 provides specific actions to reduce GHG emissions for waste management.

Table 8: Waste Management

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
8.1: Increase use of greenwaste bins for household and commercial food waste: City	Medium	2019		David and Nora	We are working with BI zero waste on a restaurant survey and other initiatives.

¹⁶ Washington State Greenhouse Gas Emissions Inventory: 1990-2015. Report to the Legislature. December 2018. Publication No. 18-02-043. <https://fortress.wa.gov/ecy/publications/documents/1802043.pdf>

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
would develop food waste diversion program for households and commercial businesses to greenwaste bins for compost or energy production to eliminate landfilling of food waste which causes methane emissions					
8.2: Explore local ordinance for plastic waste reduction: Work with zero waste and others to develop an ordinance to reduce plastic waste on the Island.	High	2020		Nora	Work with BI zero waste.

Section 3.8: Consumption

The consumption of goods and services by humans contributes significantly to greenhouse gases. The choices we make on the food we eat, the type of vehicle we drive, how often we travel by airplane, the amount of goods we purchase, and the type of housing we select all have a large impact on global greenhouse gas emissions. When developing the actions outlined in this workplan we will strive to include discussion of what we can do as a City, Community, and individually to make different choices on how we use goods and services. Table 9 includes actions for 2019 and 2020.

Table 9: Consumption

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
9.1: Work with City Green Team: CCAC would work with the City Green Team on sustainable purchasing and other activities to reduce the City's greenhouse gas footprint.	Medium	2019		Mike	Reach out to City Green team to discuss what they are doing and how we can work with them.
9.2: Develop a per-capita community consumption: Determine what our community consumes on a per-capita basis and translate that into a GHG contribution.	Medium	2020		Lara	TBD

Section 4: Adaptation

As an Island community Bainbridge Island is vulnerable to climate change. In fact, we are already experiencing the effects of climate change and are committed to much more change in the coming years. To this end, it is prudent governance to both understand the potential implications of climate change (vulnerabilities) and reduce those vulnerabilities to our community (risk reduction or adaptation). Failing to plan for the impacts of climate change and act to avoid them would result in long-term harm to our Island's people, culture, economy and environment.

Goal: Bainbridge Island is climate savvy, and can withstand the impacts of climate change (e.g., sea level rise, warming temperatures, changing precipitation patterns, and changing vegetation).

We propose actions in two areas.

1. Vulnerability Assessments – We would work with the City to conduct vulnerability assessments around the Island and provide that information in community forums.

2. Risk Reduction – We would work with the City to develop a process for using the information from the vulnerability assessments for evaluating projects on the Island and communicating that process to citizens.

Table 10 provides specific actions for 2019/2020 for adaptation.

Table 10: Adaptation

Action	Priority	Timeline	Staff Lead	CCAC Lead	Status
Vulnerability Assessments					
10.1: Map Climate Impacts to COBI assets: CCAC in collaboration with City staff would start with a sea level rise evaluation to evaluate the vulnerability of COBI assets including roads (motorized & non-motorized), other infrastructure (sewage treatment, water, buildings), and marine access. This first assessment will also provide a template for subsequent assessments. As needed, City staff will map additional climate impacts (e.g., fire, drought, vegetation change, precipitation changes).	High	2019 – Sea level rise 2020 – Other Analysis		James	Will present findings to City Council on June 18 th . Other analysis will take place as resources allow.

Action	Priority	Timeline	Staff Lead	CCAC Lead	Status
10.2: Hold community discussions around vulnerable of COBI and non-COBI sites: City would host community conversations from the sea-level analysis and other analyses regarding findings and how to adapt to those changes.	High	2019		James and David	Will organize sessions with City after analysis completed and presentations to Parks, BILT and the public.
10.3: Create tool for use in the evaluation of vulnerability of COBI and non-COBI assets and activities on Bainbridge Island: CCAC would work with City to identify, and eventually require, the use of a tool (e.g., Climate Change Adaptation Certification) for use in evaluation of climate vulnerability of any activity or investment on Bainbridge Island. This would also include training for City staff, Council, and Committees in the use of the tool. Aforementioned climate impact maps may be used to inform these vulnerability assessments.	High	2019		Lara	Tool completed. Applied for funding from BCF. Would train City staff on use of tool.
Risk Reduction					
10.4: Incorporate vulnerability evaluation tool into all COBI (departments, committees and council) workflow in order to identify vulnerability and risk reduction opportunities: City, Council and committees will develop processes by which all decisions, including permits, planning, and budgetary decisions, are evaluated for their vulnerability to climate change, and determinations can be made based on this assessment in order to ensure better long-term outcomes in the face of factors such as sea level rise, altered precipitation patterns, increasing temperatures and other climate related hazards. CCAC can advise in this process.	High	2020		Lara, Deb, Michelle, and Mike	Will engage with City Staff and others.
10.5: Incorporate vulnerability evaluation tool into all non-COBI projects to identify vulnerability and risk reduction opportunities: Similar to 10.4 but apply to non-COBI projects.	High	2020		Lara, Deb, Michelle, and Mike	Will engage with City Staff and others.

Action	Priority	Timeline	Staff Lead	CCAC Lead	Status
10.6: Community training on adopted risk reduction process: City would host community conversations with vulnerable sites and how to adapt to those changes.	High	2020		Lara, Deb, and Mike	TBD

Section 5: Community Engagement

Community engagement is essential to effectively implement actions throughout this workplan and to achieve the overarching mitigation and adaptation goals; as such, community engagement is interwoven in the mitigation and adaptation sections. Given its importance and its cross-cutting nature, we are also calling it out with its own goal. Areas of the workplan where community engagement is essential for success include:

- Work with community groups is an integral component of the actions in Tables 4, 5, 6, and 8;
- Work with the Council, Multi-modal Committee, and Mobility Alliance on possible second levy for non-motorized transportation is included in Table 5;
- Increase awareness and helping with community preparation is embedded the actions on vulnerability assessments and integration in City Operations in Table 8 and 9; and
- Hold community discussions around vulnerable sites, in Table 10, is also an example of community engagement.

Goal: The City of Bainbridge Island inspires action across the community and partners with local and regional organizations to take meaningful climate change mitigation and adaptation actions.

We propose actions in three areas for 2019/2020.

- 1. Increase Community Awareness** –Increase public understanding and awareness of the magnitude and consequences of climate change in order to create engagement in and support for mitigation actions.
- 2. Encourage and Support Island Collaboration** – Work with extant community groups to disseminate information and achieve adaptation and mitigation goals and improve coordination/collaboration with other City advisory committees and Bainbridge Island taxing entities.
- 3. Foster Regional Collaboration** – Support and advice the City in engaging in regional climate change efforts, with benefits such as sharing best practices and lessons learned.

Table 11 provides specific actions that we propose for community engagement in 2019-2020.

Table 11: Community Engagement

Action	Priority	Timeline	Staff Time	CCAC Lead	Status
Increase Community Awareness					
11.1: Hold Neighborhood Presentations: Have presentations on climate change in the North, Central, and South Wards. Work with Association of Bainbridge Communities (ABC)	High	2019/2020		All	Need to identify dates and work with ABC and others.
11.2: Create Climate Change Week: Council proclamation to designate a week each year (in conjunction with Earth Month) for City and community evaluation of the progress made on meeting our community commitments and goals relating to reducing our contribution and vulnerability to climate change.	Medium	2020		Mike and Lara	Work with Sustainable Bainbridge to coordinate with Earth Month. Work towards hosting events associated with Climate Adaptation Week in 2020.
11.3: Convene semi-annual City events: Collaborate with the City to convene at least semi-annual programs on issues relating to climate change and how the City is addressing this in their daily operations as well as future planning.	High	2020		Mike	Share work of BI committees on Climate Change during farmers market
Encourage and Support Island Collaboration					
11.4: Support community events on climate change: Participate in ongoing information forums such as the Climate and Energy Forum and the Movies that Matter.	High	Ongoing		All	CCAC members are active in organizing and participating in ongoing events
11.5: Increase cooperation with other City advisory committees: Attend other relevant City Advisory Committees (e.g., Multi-modal, UAC, and ETAC) at least twice a year.	High	Ongoing		Liaisons TBD at meeting	Possible Committees: - Multi-Modal - Utilities - ETAC - Design Board
11.6: Attend Intergovernmental Working Group (IWG) – COBI, BIFD, BIPD, and	High	2019 – Initial		Mike	Need to work with other taxing entities as other parts of workplan

BISD: Work with IWG in a collaborative approach to identify and implement mitigation and adaptation actions with buy-in, engagement, and leadership from all of these relevant entities.		Contact 2020 – Identify actions			indicate need to work with BISD, BIFD, and Parks.
Foster Regional Collaboration					
11.7: Foster regional collaboration: Make a recommendation to the City on regional collaborations that Bainbridge Island should participate in and the form that involvement should take. (For example, Puget Sound Climate Preparedness Collaborative; Kitsap Public Transportation, and WSF)	Medium	2020		Nora	Identify groups and evaluate possible role of CCAC.