
CLIMATE RESILIENT FACILITIES MANAGEMENT PLAN

SAMISH INDIAN NATION

September 2022

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1 INTRODUCTION

The purpose of this report is to describe how Samish Indian Nation facilities are vulnerable to impacts from climate change and outline strategies to mitigate these threats. This report also includes data on 2021 greenhouse gas emissions attributed to these facilities.

This report is meant to inform and supplement the forthcoming Samish Indian Nation's Capital Facilities Plan. This information is not intended as a standalone report, but rather to assist in facilities management planning efforts.

2 KEY FINDINGS: VULNERABILITY ASSESSMENT OF SAMISH FACILITIES

The Samish-owned facilities assessed in this report are all located within a three -mile radius of downtown Anacortes. As such, these facilities have similar vulnerabilities to climate change.

Key climate threats include:

- Sea level rise and more severe coastal flooding
- Severe weather events
- More frequent heatwaves
- Poor air quality due to more frequent and intense wildfires

As Samish Indian Nation plans for the future, it's important to consider building resiliency in the face of climate change. Samish facilities should be adaptable, and able to maintain or regain functionality during extreme weather events as well as long term climate change trends.

2.1 Climate Threats and Mitigation Strategies

Climate change is already beginning to impact Samish facilities and operations. The most urgent impacts are listed below along with general mitigation strategies that could be adopted in various facilities. Further site-specific climate vulnerabilities and mitigation strategies are discussed in following sections. The timeframe each of these impacts will likely become a serious issue are listed below as well. Each of these impacts will continue to worsen as average global temperatures increase.

Flooding: Instances of both coastal and riverine flooding will continue to increase as climate change progresses. The warming atmosphere is increasing the rate and intensity of extreme precipitation events. Sea level rise will double the amount of area within the coastal floodplain by 2050¹. Based on conservative warming scenarios for the Skagit River, streamflow levels in

¹ Climate Central and ICF International. *States at Risk: Washington Coastal Flooding*. https://reportcard.statesatrisk.org/report-card/washington/coastal_flooding_grade

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associated with 100-year floods will become 22-year flood flows by 2040². It's impossible to predict exactly when the next 100-year flood will occur, but these events will become much more frequent by the 2040s and beyond. It's unlikely that flooding events will cause direct damage to Samish properties (other than Fidalgo Bay Resort), but they could restrict or sever access to facilities by causing closures to Highway 20. Flooding would also likely lead to utility and communication limitations or outages.

Impact Timeframe: 2040

Mitigation Strategies:

- Implement a strong emergency response plan that specifically details what employees and visitors should do in the event of flooding.
- Close facilities if severe flooding is forecasted, to avoid any employees becoming stranded.
- Designate one or more facilities as “emergency shelters” and install solar PV and battery microgrid system to provide power during outages.

Wildfire Smoke: Climate change is exacerbating drought conditions and causing drier forests – both of which contribute to more intense wildfires. Wildfire season is becoming longer and more intense in the Pacific Northwest. Projections show that every 1 degree C rise in temperature may increase annual area burned by wildfire by up to 600%³. Exposure to smoke poses a variety of serious health risks and should be avoided or limited if possible.⁴

Impact Timeframe: Immediate

Mitigation Strategy:

- Install filtration systems in all occupied buildings that are rated to remove fine particulate matter (PM_{2.5}) from the air.
- Install indoor air quality monitors.
- Providing N95 masks to all staff and respirators for those that must work outside and
- Implement a strong emergency response plan and organizational policies that details how Samish Indian Nation leadership and staff will respond to wildfire smoke, including closing all windows to limit smoke intrusion and allow indoor

² Climate Impacts Group. *Climate Change Impacts on Puget Sound Floodplains*. https://cig.uw.edu/wp-content/uploads/sites/2/2014/11/TNC_Floodplains_3_25_16_bothlogos.pdf

³ WA Department of Ecology. *Climate Change Increases Wildfire Risk*. <https://ecology.wa.gov/Air-Climate/Climate-change/Climate-change-the-environment/Wildfire-risks>

⁴ United States Environmental Protection Agency. *Wildfire Smoke and Your Patients' Health: The Air Quality Index*. <https://www.epa.gov/wildfire-smoke-course/wildfire-smoke-and-your-patients-health-air-quality-index>

filtration to work and policies to restrict work outdoors should the Air Quality Index (AQI) for PM_{2.5} exceed 150.⁵

Extreme Heat Events: Western Washington has already begun to experience increased incidence of extreme heat days. The summers of 2021 and 2022 both shattered previous heat records. It's important employees, clients, and visitors are protected from extreme heat by providing adequate cooling.

Impact Timeframe: Immediate

Mitigation Strategy:

- Install efficient HVAC equipment in all occupied buildings and provide regular service to all existing HVAC equipment.
- Designate one or more buildings as an “emergency cooling center” that can provide a space for community members to go during extreme heat events if they do not have adequate cooling at home.
- Limit outdoor work for employees during extreme heat events, or provide adequate cooling facilities.

GHG Emissions: While not a direct threat per se, Samish Indian Nation can mitigate the future impacts of climate change by reducing GHG emissions today. Samish Indian Nation should consider Hiring a firm to conduct an energy audit to survey facilities and recommend specific equipment changes. However, the following strategies are useful for planning purposes.

Mitigation Strategy:

- Convert natural gas or propane appliances (kitchen, laundry, HVAC, water heaters) to efficient electric appliances - this is likely the best “bang for the buck” emissions reduction strategy.
- Install rooftop solar panels to offset electricity use.
- Install occupancy sensors in facilities to turn off lights and dial back thermostats when spaces aren't occupied.
- Convert any non-LED lighting fixtures to LED.

3 GREENHOUSE GAS EMISSIONS INVENTORY PRIMER

A greenhouse gas (GHG) inventory is a method of quantifying the amount of greenhouse gases released into the atmosphere by an entity. GHG inventories are generally used by businesses,

⁵ American Society of Heating, Refrigerating and Air-Conditioning Engineers. *Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events*.
<https://www.ashrae.org/File%20Library/Technical%20Resources/COVID-19/Planning-Framework-for-Protecting-Commercial-Building-Occupants-from-Smoke-During-Wildfire-Events.pdf>

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governments, or other organizations to determine how much GHG is released by their operations on an annual basis; these findings can be useful in identifying opportunities to reduce their emissions.

GHG inventories are conducted by collecting data on emissions-causing activities for a calendar year or more and calculating the amount of greenhouse gases (including Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF₆) and Nitrogen trifluoride (NF₃)) released. Because these GHGs each behave differently in the atmosphere and have different potentials to warm our climate (over a 100-year timeframe), total GHG emissions are generally referred to as CO₂ equivalent (CO₂e). For any quantity and type of greenhouse gas, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact.

GHG inventories are comprised of three groups of emissions data – Scope 1, Scope 2, and Scope 3. Scope 1 includes “direct emissions” that are caused by facilities owned or operated by the organization, such as natural gas HVAC equipment or fuel used in official vehicles. Scope 2, or “indirect emissions,” are emissions that are released elsewhere but are directly related to the organization’s operation, i.e. purchased electricity. Scope 3 emissions are caused by activities or entities not owned or controlled by the reporting entity, but that play a role in supporting the reporting entity’s operations and value chain. Scope 3 typically makes up the bulk of an organization’s GHG emissions, and includes emissions from employee commuting, commercial airline travel, leased assets, investments, and supply chain. Scope 3 emissions are generally not required for GHG emissions inventory reporting.

4 KEY FINDINGS: GREENHOUSE GAS INVENTORY

The GHG inventory completed for Samish Indian Nation for this report was compiled using methodology from the World Resources Institute⁶ and The Climate Registry⁷. This GHG inventory is a *transitional* report, meaning it is not a complete accounting of Samish Indian Nation’s GHG emissions. The scope of this GHG inventory is limited to 2021 emissions related to on-site natural gas use (Scope 1) and purchased electricity (Scope 2) for Samish Indian Nation-owned facilities. This inventory did not include the recently completed C Store, nor did it include projections for the 34th Street housing project currently under construction.

Below are the results of the emissions inventory. 2021 GHG emissions for these facilities are likely significantly lower than pre-pandemic emissions figures due to Samish Indian Nation’s rules regarding the COVID-19 pandemic that required most employees to work from home in

⁶ World Resources Institute. *The Greenhouse Gas Protocol Corporate Accounting and Reporting Standard*. <https://ghgprotocol.org/corporate-standard>

⁷ The Climate Registry. *General Reporting Protocol*. <https://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/>

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2021. It will be important to monitor emissions in the future as employees return to in-person work to gain a more accurate understanding of energy use patterns and base-case emissions.

Location	Scope 1 Emissions (MT CO ₂ e)	Scope 2 Emissions (MT CO ₂ e)	Combined Emissions (MT CO ₂ e)
Administration Campus	6.87	17.14	24.01
Cannery	24.60	40.57	65.17
Longhouse	2.84	12.53	15.37
Summit Park	9.93	20.62	30.55
Fidalgo Bay Resort	0.00	114.26	114.26
Total Emissions (MT CO₂e)	44.24	205.12	249.35

Table 1 GHG Emissions from Samish Indian Nation facilities, 2021 data.

These emissions can also be described on a per unit basis. The table below highlights the intensity of emissions in each facility.

Location	Staff	ft ²	MT CO ₂ e / employee	kg CO ₂ e / ft ²
Administration Campus	13	11845	1.8	2.0
Cannery	20	30000	3.3	2.2
Longhouse	13	4256	1.2	3.6
Summit Park	25	11434	1.2	2.7

Table 2 GHG Emissions metrics for Samish Indian Nation facilities, 2021 data.

Two data point outliers are misleading without context and warrant further discussion.

First, the Longhouse has a very high rate of emissions per square foot (3.6 kg CO₂e/ft²). It's likely that this comparatively high rate is a result of the building's use for education/childcare resulting in high occupancy per ft². It's also likely that the Longhouse's emissions/ft² appear high relative to other Samish facilities because it remained fully staffed in 2021 while other facilities were largely vacant with many Samish employees working from home due to COVID-19 pandemic restrictions. Additionally, both the Administration and Summit Park campuses have buildings that are unused even without pandemic restrictions and therefore reduce the rate of emissions/ft².

Second, the seemingly high rate of emissions per employee at the Cannery (3.3 metric tons CO₂e) is likely misleading. A significant portion of the Cannery Building's space is leased to other businesses; Samish pays for all utility bills at the building and charges tenants for these costs. This means that all Scope 1 and 2 emissions at the Cannery were attributed to Samish Indian Nation in this inventory, but a significant portion of these emissions should actually be attributed to those other businesses and only attributed to Samish Indian Nation as Scope 3 emissions.

5 FUTURE CONSIDERATIONS

As Samish Indian Nation works towards improving building resiliency and reducing GHG emissions in the future, staff should continue to track GHG emissions to determine how emissions levels change as employees return to in-person work. The emissions inventory scope should also be expanded to include the C Store, 34th Street housing project, fuel consumption by official vehicles, and other GHGs (i.e. refrigerants) not included in this study. Samish Indian Nation could also elect to capture Scope 3 emissions in a future inventory to paint a complete picture of the Nation's emissions profile.

6 ADMINISTRATION CAMPUS

The Administration Campus is located on Commercial Ave in Anacortes and includes offices as well as space for community gatherings. The property does not face any significant direct impacts from future climate change, though it will likely face indirect impacts such as temporary access limitations due to road closure or utility disruptions in the future.



6.1 Climate Change Vulnerability

The Administration Campus sits approximately 24 meters above sea level and is not proximate to any waterways. It is largely protected from any direct climate-related flooding threats. However, the campus could be indirectly impacted by regional extreme weather events. The campus could implement strategies to better protect employees/visitors from climate-related events and ensure operations continue should they occur.⁸

Resiliency Recommendations

- Install indoor filtration to protect employees and visitors from smoke and PM_{2.5} inhalation.
- Install new HVAC units in buildings w/o cooling to protect employees from extreme heat.

6.2 Greenhouse Gas Emissions

Emissions were measured in Metric Tons CO₂e (MT CO₂e) using billing data for the 2021 calendar year. CO₂e, or “carbon dioxide equivalent,” is a measure of combined CO₂, CH₄, and N₂O produced by greenhouse gas emitting activities. Samish Indian Nation should perform a full emissions inventory once in-person work has resumed to establish a true emissions baseline for the facility.

⁸ Samish Indian Nation. *Samish Indian Nation Climate Change Vulnerability Assessment*. 2019. <https://www.samishtribe.nsn.us/departments/environment/climate-change/climate-change-resources>

Administration Campus	Scope 1 Emissions (MT CO ₂ e)	Scope 2 Emissions (MT CO ₂ e)	Combined Emissions (MT CO ₂ e)
1012 30th St		1.59	1.59
1013 29th St	2.78	2.76	5.54
1016 30th St		0.36	0.36
1017 29th St	4.10	1.51	5.60
2916 Commercial Ave		6.43	6.43
2918 Commercial Ave		4.49	4.49
Total Emissions (MT CO₂e)	6.87	17.14	24.01

Table 3 2021 GHG emissions data, Administration Campus.

Staff	ft ²	MT CO ₂ e / employee	kg CO ₂ e / ft ²
13	11845	1.8	2.0

Table 4 2021 GHG emissions metrics, Administration Campus.

Emission Reduction Opportunities

The suggestions below are based on the emissions inventory and building observations. An energy audit should be performed prior to investing in efficiency upgrades to ensure the best “bang-for-buck” upgrades are completed first.

- Replace natural gas HVAC with electric heat pump.
- Replace conventional natural gas water heaters with electric heat-pump water heaters or tankless natural gas water heaters.
- Replace old electric wall heaters in outbuildings with efficient heat pumps.
- Replace energy intensive electric heater in wood-carving building with an efficient heat pump that could both heat and cool the space.
- Install solar PV on Admin building roof to offset purchased electricity consumption.
- Install occupancy sensors in all facilities to reduce unnecessary lighting, heating, and cooling.
- Work with IT to ensure all computer workstations are shut down during non-business hours, according to IT guidelines.

7 CANNERY BUILDING

The Cannery Building is an office building located next to the Cap Sante Marina in Anacortes. Samish Indian Nation's Department of Health and Human Services relocated to office space in the building in 2019, and the Tribe leases the remaining space to other tenants. The building sits about 11 feet above sea level and will not face direct threat from sea level rise this century. It's also largely protected from storm surge impacts thanks to the Marina's capped breakwater over the old Scott Paper Mill pollution site.⁹



7.1 Climate Change Vulnerability

Resiliency Recommendations

- Inspect HVAC system to ensure filtration can maintain indoor air quality and remove PM_{2.5} during wildfire smoke events.
- Perform regular HVAC filtration maintenance.

7.2 Greenhouse Gas Emissions

Emissions were measured in Metric Tons CO₂e (MT CO₂e) using billing data for the 2021 calendar year. CO₂e, or “carbon dioxide equivalent,” is a measure of combined CO₂, CH₄, and N₂O produced by greenhouse gas emitting activities.

Further investigation is recommended to determine if any of these Scope 1 or 2 emissions are attributable to other building tenants. Further, Samish Indian Nation should perform a full emissions inventory once in-person work has resumed to establish a true emissions baseline for the facility. It should also be noted that Samish is installing a large rooftop solar PV system on this building that will significantly offset purchased electricity consumption and reduce Scope 2 emissions.

⁹ Samish Indian Nation. *Samish Indian Nation Climate Change Vulnerability Assessment*. 2019. <https://www.samishtribe.nsn.us/departments/environment/climate-change/climate-change-resources>

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Cannery	Scope 1 Emissions (MT CO ₂ e)	Scope 2 Emissions (MT CO ₂ e)	Combined Emissions (MT CO ₂ e)
715 Seafarer's A	24.60	30.36	54.96
715 Seafarer's B		9.41	9.41
715 Seafarer's Car Chgr		0.80	0.80
Total Emissions (MT CO₂e)	24.60	40.57	65.17

Table 5 2021 GHG emissions data, Cannery Building.

Staff	ft ²	MT CO ₂ e / employee	kg CO ₂ e / ft ²
20	30000	3.3	2.2

Table 6 2021 GHG emissions metrics, Cannery Building.

Emission Reduction Opportunities

The suggestions below are based on the emissions inventory and building observations. An energy audit should be performed prior to investing in efficiency upgrades to ensure the best “bang-for-buck” upgrades are completed first.

- Replace natural gas appliances with electric models to eliminate direct, on-site emissions.
- Replace all halogen and fluorescent bulbs with more efficient LEDs. Lighting in the central atrium that is left on for extended periods should be a high priority for replacement.
- Ensure all computer workstations are shut down during non-business hours.

8 LONGHOUSE

The Samish Longhouse is located at 1618 D Ave in Anacortes. It houses the Early Learning Center and Head Start Preschools, serving Tribal and local community members. The property does not face any significant direct impacts from future climate change, though it will likely face indirect impacts such as temporary access limitations due to road closure or utility disruptions in the future.¹⁰



8.1 Climate Change Vulnerability

Among Samish Indian Nation facilities, the Longhouse is one of the most resilient to the impacts of climate change. It's unlikely to suffer direct damage from extreme weather events such as flooding, and like other Samish facilities is mainly vulnerable to regional impacts like smoke, utility service disruption, and road closures due to flooding. The Longhouse is set up well to mitigate the most pressing near-term climate impacts: wildfire smoke and extreme heat events. It is equipped with an HVAC system to provide heating and cooling, and is capable of air filtration. The Longhouse also features a raingarden on the east side of the building that will help mitigate heavy precipitation events.

Resiliency Recommendations

- Survey HVAC equipment to determine if filtration system is capable of filtering PM_{2.5}, upgrade if necessary.
- Install solar PV and battery system to provide backup power and maintain safe childcare conditions in the event of service disruptions.

8.2 Greenhouse Gas Emissions

Emissions were measured in Metric Tons CO₂e (MT CO₂e) using billing data for the 2021 calendar year. CO₂e, or “carbon dioxide equivalent,” is a measure of combined CO₂, CH₄, and N₂O produced by greenhouse gas emitting activities.

¹⁰ Samish Indian Nation. *Samish Indian Nation Climate Change Vulnerability Assessment*. 2019. <https://www.samishtribe.nsn.us/departments/environment/climate-change/climate-change-resources>

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Considering that the Longhouse maintained full operations in 2021 while departments in other facilities were largely working from home, as well as the fact that the Longhouse serves many clients in a childcare/education capacity, the Longhouse performs well in terms of GHG emissions when compared to other Samish facilities.

Longhouse	Scope 1 Emissions (MT CO ₂ e)	Scope 2 Emissions (MT CO ₂ e)	Combined Emissions (MT CO ₂ e)
1502 D Ave		0.26	0.26
1618 D Ave	2.84	12.14	14.98
1618 D Ave Pkg Lght		0.13	0.13
Total Emissions (MT CO₂e)	2.84	12.53	15.37

Table 7 2021 GHG emissions data, Longhouse.

Staff	ft ²	MT CO ₂ e / employee	kg CO ₂ e / ft ²
13	4256	1.2	3.6

Table 8 2021 GHG emissions metrics, Longhouse.

Emission Reduction Opportunities

The suggestions below are based on the emissions inventory and building observations. An energy audit should be performed prior to investing in efficiency upgrades to ensure the best “bang-for-buck” upgrades are completed first.

- Replace conventional natural gas water heaters with electric heat-pump water heaters or tankless natural gas water heaters.
- Replace natural gas kitchen appliances with electric alternatives.
- Install occupancy sensors in all facilities to reduce unnecessary lighting, heating, and cooling.
- Install rooftop solar PV to reduce purchased electricity consumption.

9 SUMMIT PARK

The Summit Park campus is located at 8327 Summit Park Road, Anacortes WA. The campus houses several departments.

The campus sits approximately 15 meters above sea level on relatively flat and open terrain. It faces little direct threat from changing climate conditions (sea level rise, flooding, etc.), but could be affected by secondary impacts such as road closures or utility disruptions.



9.1 Climate Change Vulnerability

Summit Park is located on high ground relative to its surroundings and as such is largely protected from any direct climate-related flooding threats. However, the campus could be indirectly impacted by nearby extreme weather events. Summit Park could implement strategies to better protect employees/visitors from climate related events and ensure operations may continue should these occur. For example, better indoor filtration to protect employees from smoke.¹¹

Resiliency Recommendations

- Install indoor filtration equipment in all buildings to protect employees and visitors from smoke and PM_{2.5} inhalation.

9.2 Greenhouse Gas Emissions

Emissions were measured in Metric Tons CO₂e (MT CO₂e) using billing data for the 2021 calendar year. CO₂e, or “carbon dioxide equivalent,” is a measure of combined CO₂, CH₄, and N₂O produced by greenhouse gas emitting activities.

Notes:

- Summit Park Building 2 (Chelangen) is served by four PSE meters (#A, B, C, and E) and one CNG meter (#2).
- Buildings 3, 4 and 5 (Planning, Language, Accounting) share one PSE meter (#L), total 2021 Scope 2 emissions from this PSE meter was divided equally among these three buildings. Because Building 4 was largely unoccupied in 2021, it’s likely that Buildings 3 and 5 account for the majority of these Scope 2 emissions from purchased electricity consumption.

¹¹ Samish Indian Nation. *Samish Indian Nation Climate Change Vulnerability Assessment*. 2019. <https://www.samishtribe.nsn.us/departments/environment/climate-change/climate-change-resources>

Summit Park	Scope 1 Emissions (MT CO ₂ e)	Scope 2 Emissions (MT CO ₂ e)	Combined Emissions (MT CO ₂ e)
Building 1 (PSE #D, CNG #1)	0.00	1.42	1.42
Building 2 (PSE #A, B, C, E, CNG #2)	6.93	6.16	13.09
Building 3 (PSE #L)		1.97	1.97
Building 4 (PSE #L)		1.97	1.97
Building 5 (PSE #L, CNG #5)	2.99	1.97	4.97
Building 6 (PSE #SHOP, CNG #SHOP)	0.01	7.12	7.13
Total Emissions (MT CO₂e)	9.93	20.62	30.55

Table 9 2021 GHG emissions data, Summit Park. PSE and CNG #s refer to utility meters associated with each building. Buildings 3, 4, and 5 share the same PSE meter. Building 2 is served by four PSE meters.

Staff	ft ²	MT CO ₂ e / employee	kg CO ₂ e / ft ²
25	11434	1.2	2.7

Table 10 2021 GHG emissions metrics, Summit Park.

Emission Reduction Opportunities

The suggestions below are based on the emissions inventory and building observations. An energy audit should be performed prior to investing in efficiency upgrades to ensure the best “bang-for-buck” upgrades are completed first.

- Replace natural gas heaters with electric heat pumps.
- Install rooftop solar PV to reduce purchased electricity consumption.
- Install occupancy sensors in all facilities to reduce unnecessary lighting, heating, and cooling.
- Ensure all computer workstations are shut down during non-business hours.

10 FIDALGO BAY RESORT

Fidalgo Bay Resort is a camping, cabin rental, and event venue owned by the Samish Indian Nation. The resort is located on Weaverling Spit on Fidalgo Bay, just east of the SR-20 Spur W, and is accessed via the low-lying Weaverling Rd. It is one of the Samish Indian Nation’s economic development assets.



10.1 Climate Change Vulnerability

Of Samish Indian Nation’s facilities, Fidalgo Bay Resort is the most vulnerable to direct climate change impacts, especially sea level rise. The access road and parts of the property already suffer flooding during king tide events on a near-annual basis.

Sea level in this area may rise by 1.4 feet around 2050 and 5 feet by 2100. At these levels, the resort should expect to experience annual coastal flooding in the lower half of the property by mid-century, especially during winter storm events. By the end of the century, the property will likely experience extensive daily flooding during MHHW tide, as well as more extreme coastal flood events during winter storms.¹²

Samish DNR previously completed a beach restoration project. Further modifications to the shoreline (i.e. sea walls or other armoring) are unlikely to receive permitting. Planned retreat may be the best course of action for the lower portion of this property.



¹² Samish Indian Nation. *Samish Indian Nation Climate Change Vulnerability Assessment*. 2019. <https://www.samishtribe.nsn.us/departments/environment/climate-change/climate-change-resources>

Resiliency Recommendations

- Hire an engineering firm to investigate options for protecting facilities and guests as threats of sea level rise and coastal flooding increase in the coming decades, with particular focus on road improvements to ensure evacuation routes remain open.
- Investigate feasibility of planned retreat from the lower portions of the property, and alternative uses for that area that could better withstand frequent flooding.
- Create emergency management plan for facility to plan evacuation of guests in event of severe flooding event.
- Inspect Convention Center HVAC system to ensure filtration can maintain indoor air quality and filter out PM_{2.5} during wildfire smoke events.
- Install indoor filtration equipment in Office to protect employees and visitors from smoke and PM_{2.5} inhalation.
- Perform regular HVAC filtration maintenance.

10.2 Greenhouse Gas Emissions

Emissions were measured in Metric Tons CO₂e (MT CO₂e) using billing data for the 2021 calendar year. CO₂e, or “carbon dioxide equivalent,” is a measure of combined CO₂, CH₄, and N₂O produced by greenhouse gas emitting activities.

Scope 1 emissions were not recorded for Fidalgo Bay Resort. However, the facility does have natural gas appliances that should be included in a future emissions inventory.

Fidalgo Bay Resort	Scope 1 Emissions (MT CO ₂ e)	Scope 2 Emissions (MT CO ₂ e)	Combined Emissions (MT CO ₂ e)
1111 FBR-Club		15.17	15.17
4701 FBR-Laundry		28.31	28.31
4701 FBR-Lift Pump		1.90	1.90
4701 FBR-Office		14.86	14.86
4701 FBR-Lower		54.03	54.03
Total Emissions (MT CO₂e)	0.00	114.26	114.26

Table 11 2021 GHG Emissions data, Fidalgo Bay Resort.

Emission Reduction Opportunities

The suggestions below are based on the emissions inventory and building observations. An energy audit should be performed prior to investing in efficiency upgrades to ensure the best “bang-for-buck” upgrades are completed first.

- Replace conventional natural gas water heaters with electric heat-pump water heaters.
- Install heat pump HVAC system in office to replace other, less efficient cooling appliances.

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- Install occupancy sensors in Office, Laundry, and Convention Center to reduce unnecessary lighting.
- Install occupancy sensors in Office, Laundry, and Convention Center to reduce unnecessary heating and cooling.