

2.2 Natural Hazard Areas¹

INTRODUCTION

Natural hazard areas are sources of potentially dangerous chance events. Examples of natural hazards are: flooding, landslide, forest fire, strong winds, and earthquakes. Natural hazard areas are often also areas of high environmental value. Known areas of potential hazard are identified on Map No. 8 Slope Hazard Development Permit Area and Map No. 9 Coastal Flood Hazard Development Permit Area.

Flooding

Within the Plan Area the lands surrounding river mouths and estuaries have the highest flood risk. Other areas with flood potential are isolated lowland areas and shore land adjoining watercourses, lakes, creeks, and wetlands. The Horne Lake area also faces the risk of potential flooding as the rate of water released from the Big Qualicum River Dam can modify the level of the lake significantly.

Low-lying coastal lands bordering the Strait of Georgia are expected to experience increasing flood risk with sea level rise and increasing frequency and severity of storms due to climate change. Flood risk for lands on the marine coast is different from that of freshwater bodies and streams. Flooding at the marine coast is caused by wave run-up at high tides during storm events that is likely to recede relatively quickly and unlike riverine flooding, does not produce substantial flows that would cause bank erosion.

The lower reach of Nash Creek is a particularly notable environment where it parallels the shoreline before exiting into the Strait of Georgia and in doing so passes through several residential lots of relatively small size. Flood events in the past have been relieved by the creation of outflow weirs, but this area continues to be an active environment.

Landslide

The Horne Lake road and Mount Mark slide areas are known areas with potential for mass movement of land. Steep Slopes along the marine coastline are also a major concern within the Plan Area. Some areas along the marine coastline are straddling steep wave cut bluffs (with slopes between 30% and 60%) and are composed of unconsolidated sand. The threat of landslides is particularly concerning in areas where homes have been constructed near the edges or below these unstable slopes. A submarine landslide at the west end of Mapleguard Spit (also known as Deep Bay Spit) was recorded as a result of the 1946 earthquake. Outside of the developed area, the highland and mountain areas are particularly susceptible to mass movements of land, such as rock falls and avalanches.

Wildfire

Between 2006 and 2007, Community Wildfire Protection Plans were developed for Bow Horne Bay Fire Service Area, Deep Bay Improvement District, and the Horne Lake area. There are a number of areas where extreme interface fire risk is identified. It is important that FireSmart recommendations for building and landscaping are encouraged to mitigate any loss of life, property and the environment as a result of forest fires.

OBJECTIVES

1. ***Prevent*** adverse effects of natural hazards by maintaining protective areas and healthy ecological systems.
2. ***Protect*** area residents from loss of property and personal injury.
3. ***Mitigate and adapt*** to the impacts of natural hazards under climate change conditions within the Plan Area.
4. ***Encourage*** use of FireSmart recommendations to reduce the susceptibility of buildings and property to wildfire.

¹ Bylaw 1335.09, adopted October 8, 2024

Strong Winds

Wind storms can have a significant impact on the Plan Area causing power outages, downed trees across roads, and damage to buildings and structures. A particularly damaging wind is known as the “Qualicum”, a strong southerly that moves across Vancouver Island, passes over Horne Lake, and out on to the Strait of Georgia typically between Crome Island and Qualicum Beach.

Earthquake

Seismic activity is a distinct possibility within the Plan Area. Vancouver Island is classified as a high risk for seismic activity by Natural Resources Canada. A major earthquake may result in serious damage to the Plan Area. Potential damage caused by seismic activity may be further exacerbated given that many buildings and structures within the Plan Area that may have been constructed on or adjacent to unstable slopes, and/or below Building Code standards.

The hazard land mapping will continue to be refined as mapping data and other information becomes available. Changes to Map No. 2 may be undertaken to reflect changing on-site conditions or more comprehensive hazard assessments.

NATURAL HAZARD AREAS POLICIES

1. Natural Hazard areas shall be designated as Development Permit Areas to ensure that proposed development is reviewed by the appropriate professionals so that it is protected from hazardous conditions.
2. The Regional District will gather and communicate information about coastal hazards to help develop a better understanding of the long-term impacts and consider implementing measures to mitigate and adapt to these impacts.
3. The Regional District will implement recommendations of Community Wildfire Protection Plans and update the Plans on an ongoing basis.
4. The Regional District will consider adopting a development permit area for protection of development from wildfire hazard.

ADVOCACY POLICIES

5. Property owners are encouraged to adopt FireSmart recommendations such as vegetation management and use of fire-resistant building materials.
6. BC Hydro and local landowners are encouraged to cooperate in regular removal of invasive/flammable plant species (i.e. broom) along power lines.
7. In the event of an emergency such as earthquake or power outage, residents and businesses are encouraged to be prepared to care for themselves for a minimum of 72 hours (three days), and up to two weeks.

2.3 Freshwater Resources

INTRODUCTION

The Plan Area contains many streams, watercourses, wetlands, and aquifers. Each of these natural resources is worthy of protection through careful land use planning both for their importance in supporting human settlements in the area, and for their value as significant ecosystems. It is recognized that there may be many significant areas of groundwater that have not yet been identified, and identification of these special features is an ongoing process. The Drinking Water and Watershed Protection program of the Regional District works to continually improve our knowledge and understanding of groundwater and surface water resources.

The Regional District of Nanaimo has seven major water regions, which are basin-scale geographic areas defined by common surface water drainage and groundwater aquifer features. The Big Qualicum River Water Region includes all of the Plan Area and small sections of adjacent electoral areas. The Big Qualicum River and its tributaries, which include Hunts Creek and Horne Lake, comprise the largest watershed in the Plan Area. Other watercourses within the Plan Area include Nile Creek, Thames Creek, Chef Creek, Fletcher Creek, and the Deep Bay Estuary area.

Spider and Illusion Lakes are part of an enclosed drainage system with no surface outflow streams. The enclosed nature of the drainage system makes both of these lakes susceptible to potential negative impacts caused by contaminated runoff and increased erosion. Best practice rainwater management is essential to ensure that runoff does not impact the environmental integrity as well as the recreational appeal of these lakes.

Groundwater resources are particularly important to the Plan Area as residents rely on these resources for both domestic water and agricultural supplies. Three water Improvement Districts supply potable water to approximately 64% of dwellings, representing 1,540 connections, with the balance of parcels utilizing on-site wells.

In certain locations, particularly in the central and eastern portions of the Plan Area, soils are thin and fractured bedrock is common.

As a result, both surface and groundwater sources may be sporadic and unreliable and residents of this area wish to maintain the integrity of these resources through land use management. By contrast, the Deep Bay – Bowser area is characterized by well-draining sand and gravel that has high groundwater yields but is vulnerable to surface contamination. (2016. Waterline Resources Inc. “Hydrogeological Review of Aquifers in Electoral Area ‘H’ in support of the Official Community Plan Update”).

The protection and sustainability of groundwater and surface water supplies are critical to maintaining the rural character of the Plan Area and protecting the natural environment.

OBJECTIVES

1. *Identify and protect* freshwater resources and ecosystems to maintain their natural habitat, environmental quality and quantity, aesthetic appeal, and recreational value.
2. *Conserve, protect and enhance* the quality and quantity of freshwater sources for existing and future agricultural and domestic uses in cooperation with local and provincial water authorities and landowners.
3. *Recognize* that the quality and quantity of domestic water supply is essential and land development must be planned in a manner that minimizes impact on existing aquifers and groundwater sources.
4. *Consider* the potential impact of increased demand or risk of contamination on aquifers as a result of new development when making any land use decisions.
5. *Recognize* the value of natural rainwater retention and encourage rainwater management during development that mimics natural processes.

FRESHWATER RESOURCES POLICIES

1. Streams, lakes, wetlands and aquifer areas are designated as Development Permit Areas to allow for evaluation of development proposals pursuant to the objectives of this section. Both mapped and unmapped streams are included in the development permit area, and where streams move over time or mapping accuracy is improved, mapped streams will be updated on maps in the Plan.
2. Aquifer recharge areas should be protected, particularly those within the well protection areas or well capture zones of community water supply wells. The site of the now closed Bowser Seed Orchard should not have any use that could contaminate the aquifer as it is within the recharge area of the nearby Bowser Waterworks wells.
3. Applications to amend this Plan or the relevant zoning bylaw must consider potential impacts to surface and groundwater, as outlined in Section 5.1 *Development Guideline Criteria*.
4. Due to its unique environment and very sensitive enclosed drainage system, the Regional District will not support any introduction of motors to Spider or Illusion Lakes.

ADVOCACY POLICIES

5. The Regional District shall request that the Approving Officer require subdivisions to be designed to maintain the hydraulic regime of streams while providing sufficient drainage in a manner which does not interfere with groundwater recharge or allow the intrusion of erosion material into natural watercourses, streams, lakes, and wetlands.
6. The Regional District shall encourage the Approving Officer to require protective covenants or the designation of Return to Crown along the bed of, and buffering riparian corridor of watercourses, streams, creeks, lakes and wetlands wherever subdivision on adjacent land is proposed. The Regional District shall encourage the Ministry of Forests, Lands and Natural Resources Operations to ensure a future use of the Bowser Seed Orchard lands that contribute to the protection of aquifer and community water supply wells.
7. The Regional District shall support and encourage the restoration and enhancement of streams and their riparian corridors wherever possible by community groups, corporate bodies or land owners.
8. The Regional District shall coordinate with the Province in sharing data about aquifers and groundwater, to ensure the most current information is used in decisions that affect the Plan Area.

2.4 Marine Environment

INTRODUCTION

The marine coastline is a focal point of the Plan Area, representing diverse ecosystems, which are sensitive to human activity and jurisdictionally complex. Historically, the marine coastline has been the focus of residential and tourist commercial development.

The majority of the marine coastline in the Plan Area is composed of sand and gravel. Except for the protected harbour of Deep Bay, the coastline is exposed to significant wave energy from prevailing winter storms from the southeast. This combination of sand and gravel beaches, high wave energy and longshore drift means the shoreline is constantly changing; some areas are eroding while others are accreting, and backshore bluffs in some areas are susceptible to erosion and landslides. Estuaries are areas of high biodiversity as well as high energy, resulting in actively changing shorelines and flood risk.

The marine environment of the Plan Area, both intertidal and subtidal, comprises habitats that ensure the existence of rich species diversity. Included are fish, birds, mammals, invertebrates such as shellfish, and many plant species such as eelgrass. This region is an important area for herring spawning, for other forage fish, is home to salmon enroute to their spawning sites in the Area's streams, is a salmon nursery area, and part of an Important Bird Area.

The marine environment supports a shellfish aquaculture industry focused in the Deep Bay estuary and one area east of Chrome Island where there is a scallop farm. Commercial fishing fleets visit the area primarily in the spring for the herring fishery and prawning, and later in the year for salmon. Recreational fishing is a popular activity for residents and tourists, including sport fishing, fly fishing and shellfish harvesting.

MARINE ENVIRONMENT POLICIES

1. The marine shores and nearshore waters of the Plan Area is designated a Development Permit Area to allow for the evaluation of development proposals with the objective of protecting the natural environment and natural coastal processes.
2. The waters 1000 m from the foreshore beginning at Deep Bay spit and extending to the eastern boundary of the Plan Area are designated as a "Marine" land use designation in this Plan and are subject to the objectives and policies in this section of this Plan.
3. The Plan recognizes the existing shellfish aquaculture leases. All water lots leased for shellfish aquaculture purposes shall be zoned accordingly.
4. The use of shoreline stabilization measures on Crown foreshore, in a manner that obstructs public access to and along public beaches or foreshore areas, shall not be supported. All works below the high

OBJECTIVES

1. **Recognize** the foreshore, waterfront and marine areas as an integral part of the community, and as a major destination for leisure, commercial and recreational pursuits.
2. **Recognize** the marine environment as a finite resource.
3. **Support** the development of shellfish aquaculture.
4. **Protect** the integrity of marine ecosystems and natural coastal processes.
5. **Maintain and enhance** public pedestrian access to and along the shoreline.
6. **Advocate** cooperation and coordination among agencies responsible for the use and management of marine foreshore and upland resources.
7. **Advance** public ownership and stewardship of the waterfront.

water mark require Fisheries and Oceans Canada approval and Crown foreshore lease or license from the Province. Where approval for Crown foreshore use is obtained, the Regional District may support proposals for shoreline stabilization measures below the high water mark, provided they are designed so that public access along the coastline is not inhibited, and do not have negative environmental impacts.

5. The Regional District will only consider permitting structural modification of the shoreline, such as those composed of lock blocks, poured concrete or rip rap, where it can be demonstrated that such a modification is necessary to protect an existing use or structure and that a Green Shores (softer) approach to shoreline protection is not a practical alternative. In addition, the construction of shoreline stabilization measures including marine retaining walls must be in compliance with the Regional District's Marine Retaining Wall Policy B1-09, as amended or replaced from time to time.
6. The integrity of marine ecosystems and natural coastal processes should be maintained by:
 - a. discouraging uses that disrupt natural features and processes, and encouraging owners of shoreline properties to retain, wherever possible, native vegetation and natural features on areas sloping towards the foreshore;
 - b. land use regulations that provide for waterfront developments to be setback sufficiently to allow for natural erosion and accretion processes, without endangering structures; and
 - c. promoting conservation of the marine environment below the high water mark without precluding aquaculture within areas leased for that purpose.
7. The Regional District supports the use of Crown foreshore for shoreline protection works following *Green Shores* approaches of the Stewardship Centre of BC, when designed by qualified professionals and where it does not impede public access along the shoreline.
8. In order to maintain public beach road rights-of-way whether or not they are currently improved, encroachment onto them by adjacent private property owners and approval of permits from Ministry of Transportation and Infrastructure to formalize the encroachment are generally not supported.
9. Private, residential docks are not supported by this Plan. Limited development of boat ramps is supported and subject to development permit area guidelines in the zoning bylaw².
10. Marinas are supported within the Deep Bay Harbour, subject to development permit area guidelines in the zoning bylaw³.
11. Rezoning proposals for waterfront lots must demonstrate a high level of wastewater treatment to protect the marine environment from contamination.

ADVOCACY POLICIES

12. The Regional District will work with the Ministry of Transportation and Infrastructure to improve public beach accesses within road rights-of-way where appropriate.
13. The Regional District shall encourage those who live and recreate on the foreshore and in the waters of the Plan Area to adopt environmentally responsible practices to protect these sensitive ecosystems.
14. Development activities as well as commercial operations such as fishing and aquaculture are encouraged to follow best management practices to minimize environmental impact.

² Bylaw 1335.07, adopted December 4, 2018

³ Bylaw 1335.07, adopted December 4, 2018

15. The Ministry of Agriculture and Fisheries and Oceans Canada are encouraged to consult with local residents and the Regional District prior to issuing any new or amended licenses for seaweed harvesting on the foreshore of the Plan Area, and are encouraged to communicate with local residents and the Regional District about the terms of the licenses and ongoing scientific study of the sustainability of the fishery.
16. The Regional District will coordinate shoreline management with the Ministry of Transportation and Infrastructure as owner of foreshore areas of beach access road rights-of-way.
17. Island Health or other appropriate government ministry is encouraged to study the impact on marine water quality from onsite wastewater treatment near the foreshore.

2.5 Climate Change and Energy

INTRODUCTION

The climate worldwide is changing, and observations in this region over the past 100 years show that average annual temperature, average annual precipitation, and the surface temperature of the Strait of Georgia have all increased. There are many impacts of these changes that will affect the sensitive ecosystems, species at risk, natural hazards, groundwater, and the people and businesses that rely on them. Some of the most significant impacts to be expected include ocean acidification; hotter, drier summers causing drought and increased risk of wildfire; and increasing frequency and severity of storms coupled with sea level rise causing more significant and frequent flooding events. Decisions and plans made today should look to anticipate the future effects of climate change and adapt to, or mitigate them.

Climate change mitigation refers to the ongoing attempts to prevent significant climate change through the reduction of greenhouse gasses (GHG) in the atmosphere. Mitigation locally can also provide direct community benefits including reduced energy costs, reduced vulnerability to energy markets, economic development, and more resilient communities. The greatest contributors to greenhouse gasses in the Regional District are transportation and buildings.

Adaptation refers to actions taken to respond to the impacts of climate change by reducing the associated risks. Examples of adaptation actions include modifications of coastal development to account for sea level rise, changes to agricultural crops better suited to hotter and drier summers, or reduction of water use.

In 2007, the Province of BC set province-wide greenhouse gas emission reduction targets of 33% below 2007 levels by 2020 and 80% by 2080. In addition, the Province amended the *Local Government Act* to require that an official community plan include targets for the reduction of greenhouse gas emissions in the area covered by the plan, and policies and actions of the local government with respect to achieving those targets.

Throughout this Plan, there are objectives and policies in relevant sections to address climate change adaptation and mitigation. The Implementation section of this Plan includes specific actions the Regional District can take to effect changes.

CLIMATE CHANGE POLICIES

1. This Plan encourages increased density and a mix of uses in Rural Village Centres to reduce the reliance of residents on the private automobile and to increase viability of public transit. Rezoning proposals within Rural Village Centres should contribute to neighbourhood form that facilitates energy efficient modes of transportation such as walking, cycling, or public transit and contributes to implementation of the Active Transportation Plan, 2017 where applicable.

OBJECTIVES

1. **Reduce** greenhouse gas emissions to 33% below 2007 levels by 2020 and 80% by 2050, as identified in the RDN Community Energy and Emission Plan.
2. **Support** energy conservation and greenhouse gas emission reduction at the community and at the site-specific scale.
3. **Identify** anticipated local climate changes, associated impacts, and potential adaptation actions.
4. **Encourage** energy efficiency in buildings and site design.
5. **Recognize** the importance of natural areas for carbon sequestration.
6. **Support** efforts to maintain sustainable, locally produced sources of food.
7. **Promote** private and public infrastructure that uses energy more efficiently.

2. Outside Rural Village Centres, alternative forms of rural development that contribute to a reduction in greenhouse gas emissions through design and in some cases also through conservation of natural areas that sequester carbon, are encouraged through policies in Section 5.10 of this Plan.
3. The Regional District should develop tools and incentives to facilitate the encouragement of development in Village Centres.
4. In all parts of the Plan Area, rezoning proposals should contribute to implementation of the Active Transportation Plan, 2017 where the location of the property to be rezoned allows.
5. Greater energy efficiency, water conservation and greenhouse gas emission reductions in the development and redevelopment of sites and buildings shall be encouraged through designation of development permit areas⁴, community amenity contribution policies, and the continued use of a sustainability checklist in conjunction with the BC Energy Step Code of the BC Building Code during rezoning and development permit application processes.
6. The Regional District will provide education and resources to the building industry, owner-builders, and consumers about energy efficiency in renovations and new construction, and pursue partnerships with the private sector for green building demonstration projects such as net zero homes.
7. This Plan supports recovery of energy and materials from both public and private sector waste streams that may be used to service communities or facilities.
8. This Plan supports proposals for renewable energy generation as an economic opportunity for residents and businesses that show compatibility with surrounding land uses and the environment by mitigating noise, vibration, visual impacts by distance separations, screening and buffering. The Regional District should develop criteria in order to enable evaluation of these and any other relevant community impacts of such proposals.
9. Agricultural land and aquaculture areas are recognized as necessary for current and future local food production. Proposals to increase production and availability of local food are encouraged, and proposals that would reduce the future potential for local food production are discouraged.
10. The Regional District should work with First Nations, the public and stakeholders to develop a climate change adaptation plan including an assessment of vulnerability and risk of climate change impacts such as sea level rise, hotter and drier summers, changes to agriculture, and increased frequency and severity of storms.
11. The marine coast is designated a development permit area to allow for the protection of the natural environment, its ecosystems and biological diversity, which includes evaluation of the resiliency of coastal development to climate change, and the impacts on natural coastal processes..
12. The Regional District recognizes the role of forests in carbon sequestration, which is an important component of climate change mitigation.

ADVOCACY POLICIES

13. The Provincial government is encouraged to undertake new floodplain mapping for use by local governments in planning for sea level rise and other impacts of climate change.

⁴ Bylaw 1335.07, adopted December 4, 2018

14. Residents are encouraged to install wiring for an electric vehicle charging station in all new home and garage construction for ease and cost-effectiveness of installing the charging station itself in the future.
15. The Regional District encourages installation of electric vehicle charging stations in commercial and community areas.
16. The Regional District will work with relevant agencies to address air quality concerns.