

District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

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Executive Summary

The District of Peachland (The District, or Peachland) is facing increasing emergency activations from multiple hazards including wildfire, flooding, extreme heat, traffic incidents, and drought conditions. Stantec Consulting Ltd. (Stantec) was retained to complete a Hazard, Risk and Vulnerability Analysis (HRVA) in compliance with BC's Emergency Disaster Management Act (EDMA, *the Act*) requiring local authorities to undertake comprehensive emergency planning. The HRVA provides a structured assessment of current and future risks from climate-related, geological, and human-induced hazards. The results of the HRVA are intended to support the District in the prioritization of actions and initiatives that enhance community resilience, address vulnerabilities, mitigate hazards, and support informed decision-making in emergency preparedness, management, and recovery.

The HRVA establishes a foundation for risk-based planning by identifying how hazards are expected to impact Peachland's infrastructure, services, environment, and populations, and by highlighting where targeted resource allocation towards risk mitigation, preparedness, and resilience are most needed. Informed by engagement with District staff, First Nations, the Regional District of Central Okanagan, and community partners, and with funding support from the Province of BC under the Disaster Resilience and Innovation Funding (DRIF), Community Resilience and Adaptation Fund, the HRVA findings will support Peachland Fire and Rescue Service in developing a Community Emergency Plan.

The analysis followed a multi-step methodology aligned with Emergency Management BC (EMBC) HRVA guidance and international ISO standards for risk management and adaptation to climate change. The analysis was informed by background research and data analysis, local knowledge and expertise, a review of climate, geological, and human-induced and technological hazards, and a scenario-based risk assessment. Engagement activities included interviews with staff and regional partners, an in-person workshop to validate exposure, impacts, and vulnerabilities, and a virtual workshop to review risk results and identify priority risk mitigation actions.

Risk was assessed across three time horizons, including a historical baseline period, near-term future period (2020s), and medium-term future period (2050s), to capture how hazard likelihood may change over time. The analysis considered a range of hazards drawn from EMBC's HRVA list and refined based on relevance to Peachland. Priority hazard scenarios were developed to group hazards and support the evaluation of impacts on critical assets such as infrastructure systems, municipal services, environmental assets, and general and vulnerable populations.

The results identify significant current and future risks to the District driven by multiple hazard scenarios. Risk levels are already high across multiple hazard-system interactions and are projected to increase over time, particularly under climate-driven scenarios. All asset categories face high or extreme risk under at least one hazard scenario, underscoring the widespread risks to Peachland social elements and critical infrastructure requiring holistic resilience and preparedness planning to address vulnerabilities across systems and populations.

Critical infrastructure, including utilities, water, systems, transportation networks, and wastewater infrastructure face high to extreme risks across multiple hazard scenarios. Increasing pressures from



extreme temperatures are expected to drive higher demand on electrical systems, increasing the likelihood of outages and exposing single points of failure within essential services.

These risks are compounded by strong interdependencies across systems. Disruptions to critical infrastructure, including power supply and transportation, can cascade across interconnected services, affecting emergency response, supply chains, and the continuity of essential services. As the severity and frequency of hazards increases across multiple hazard scenarios, these cascading impacts are expected to further strain municipal operations and emergency response capacity.

Vulnerable populations are also disproportionately affected across all time horizons. Seniors, low-income residents, children, and other vulnerable groups face heightened vulnerability to extreme heat, poor air quality, and service disruptions, amplifying the social implications of infrastructure and service disruptions or failures.

The findings of the HRVA demonstrate the need for a risk-based approach to emergency management and long-term planning. A set of risk reduction and resilience-building actions have been developed to reduce priority risks, enhance preparedness, and strengthen coordination and partnerships across agencies and jurisdictions. The HRVA provides the foundation for further emergency management planning in the District of Peachland and should be reviewed and revised periodically as hazards evolve, infrastructure condition and vulnerabilities change, and based on community needs.



Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
CCRA	Climate Change Risk Assessment
CWPP	Community Wildfire Protection Plan
CWRP	Community Wildfire Resilience Plan
DRIF	Disaster Resilience and Innovation Funding
EDMA	Emergency Disaster Management Act
HRVA	Hazard, Risk, and Vulnerability Analysis
RDCO	Regional District of Central Okanagan
SSP	Shared Socioeconomic Pathway

Glossary

Term	Definition
Adaptation	Adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. Actions/measures that reduce the negative impacts of climate change, while taking advantage of potential new opportunities.
Climate	The average, or expected weather and related atmospheric, land, and marine conditions for a particular location. In statistical terms, it is the mean and variability of relevant measures over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization.
Climate Change	A persistent, long-term change in the state of the climate, measured by changes in the mean state and/or its variability. Climate change may be due to natural internal processes, natural external forcings such as volcanic eruptions and modulations of the solar cycle, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.
Climate Change Resilience	The ability of a system (built, natural, social or economic) to anticipate, withstand, recover, adapt to and transform in response to a climate-related hazard.
Climate Hazard	The potential occurrence of a natural or human-induced physical event or trend, or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources. In this report, the term hazard refers to climate-related physical events or trends and their physical impacts.
Climate Impact	The effects on natural and human systems of extreme weather, climate events and climate change. Impacts generally refer to effects on lives, livelihoods, health status, ecosystems, economic, social, and cultural assets, services (including environmental), and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. The impacts of climate change on geophysical systems, including floods, droughts, and sea level rise, are a subset of impacts called physical impacts.
Climate Model	A numerical representation of the climate system based on the physical, chemical, and biological properties of its components, their interactions and feedback processes, and accounting for all or some of its known properties. Climate models are developed and used at climate research institutions around



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Term	Definition
	the world to make projections of future climate, based on future scenarios of greenhouse gas and aerosol forcing.
Climate Projection	An estimate of future climate conditions based on climate model output under a given emissions scenario.
Consequence Score	A rating (1 to 5) used to define the severity of the consequences of a weather event or climate trend impacting a particular infrastructure component.
Interaction	The interface between weather events and/or climate trends and infrastructure components.
Likelihood (in quantifying climate change uncertainty)	The chance of a specific outcome occurring, where this might be estimated probabilistically. The likelihood of a result occurring is based on quantified measures of uncertainty expressed probabilistically (based on statistical analysis of observations or model results, or expert judgment). Likelihood is expressed quantitatively.
Likelihood (in risk analysis)	The chance of an event or an incident happening (e.g., a climate hazard), whether defined, measured or determined by qualitative or quantitative means.
Resiliency	Resiliency is the elasticity, or adaptability of buildings to 'endure' and maintain operations in changed climate conditions or recover from a climate change related disruption or impact. It requires designers to identify hazards and vulnerabilities local to a given site, before projecting impacts and implementing measures that reduce risk and increase flexibility to adapt.
Risk Assessment	The overall process of risk identification, risk analysis and risk evaluation.
Shared Socioeconomic Pathways (SSPs)	Shared Socioeconomic Pathways are scenarios of projected socioeconomic global changes up to 2100. They are used to derive greenhouse gas emissions scenarios under different climate policies and help project and assess the impacts and risks of climate change.
Weather	The state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and barometric pressure.



1 Introduction and Purpose

The District of Peachland (The District, or Peachland) engaged Stantec Consulting Ltd. (Stantec) to complete a Hazard, Risk and Vulnerability Analysis (HRVA). This report summarizes the process and findings of the HRVA performed in accordance with BC's HRVA requirements for local governments under BC's Emergency Disaster Management Act (EDMA, *the Act*). The Act requires local authorities in BC to maintain HRVAs as a foundation for their emergency management programs.

The HRVA is intended to help the community make risk-based choices to address vulnerabilities, mitigate hazards, and prepare for, respond to, and recover from hazard events. The results of the HRVA will be used by Peachland Fire and Rescue Service to create a Community Emergency Plan.

The objectives of the HRVA are to:

- Understand hazard-related impacts to social, environmental, and physical community assets.
- Guide emergency management through identification of gaps and disaster risk reduction.
- Prioritize and target resource allocation towards risks and build resilience.

The assessment was informed by engagement with District staff, First Nations, the Regional District of Central Okanagan, and community partners, including:

- Interviews with staff and regional partners to validate hazard information and gather local input on risks and vulnerabilities.
- An in-person workshop to validate exposure, impacts, and vulnerabilities, implications for service delivery, system interdependencies, and existing responses and resources.
- A follow-up virtual workshop to review risk results and identify relevant risk mitigation actions.

Insights from engagement were incorporated into the HRVA to reflect local context, experience, and operational knowledge, as well as how social, geographic, and economic factors influence vulnerability and outcomes.

This report provides a summary of the context, methodology, findings, and recommendations of the HRVA.

The District received funding from the Province of BC under the Disaster Resilience and Innovation Funding (DRIF), Community Resilience and Adaptation Fund, to undertake an HRVA. This is an important step by the District in meeting new requirements under the Emergency Disaster Management Act (EDMA) and will support future work in emergency management and planning.

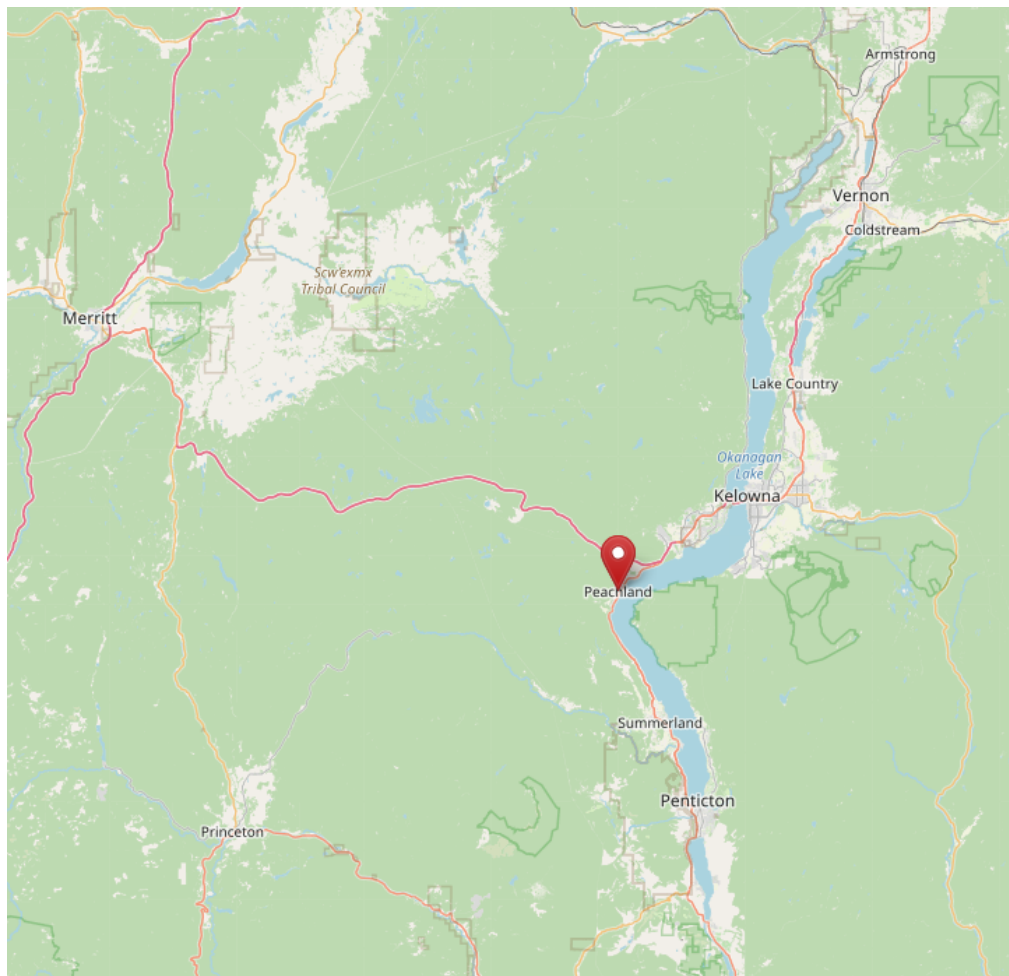
Note: DRIF does not allow for the inclusion of interface wildfire as a hazard due to separate, targeted wildfire funding opportunities. Air quality issues related to wildfire are applicable, relevant, and included in the DRIF scope of the HRVA. The District of Peachland therefore funded the wildfire interface hazard from their corporate budget and have included its analysis within this HRVA process.



2 Local Context

The District of Peachland is a hillside and lakeside community located on the western shores of Okanagan Lake in the Regional District of Central Okanagan (RDCO) of British Columbia (Figure 1). Incorporated in 1909, Peachland occupies approximately 12.63 square kilometres and is situated 25 kilometres south of Kelowna and 40 kilometres north of Penticton. The community is bordered by the City of West Kelowna to the north, the Regional District Electoral Area south of the District, Okanagan Lake to the east, and Crown land in the Trepanier Valley to the west.

Figure 1 Project Location (OpenStreetMap, 2026)



2.1 Population & Social Context

The District's last official recorded population in the 2021 census was 5,789 residents¹. Recent unofficial projected figures suggest a population close to 6,400 people for 2025².

Peachland's demographic profile reflects a significantly aging population. The median age increased from 53.8 years in 2011 to 60 years in 2021, substantially higher than provincial and national averages. The majority of residents fall within the 60 to 69 age category. Approximately 82% of households are owner-occupied, with only 18% renter households. The community is characterized by smaller household sizes, with an average of 2.2 people per household.

The District's growing senior population indicates increasing need for age-friendly housing, healthcare proximity, and emergency management considerations tailored to older adults.

Peachland's social vulnerability profile is shaped by many factors. Notably, with an older population profile there is typically a heightened sensitivity to hazards that disproportionately affect older adults, such as extreme heat, poor air quality (e.g., wildfire smoke), evacuation stress, and healthcare access needs.

Core vulnerable groups identified in the HRVA include low-income residents, children (0–14 years old), and seniors (65 years+). These groups experience differentiated exposure and sensitivity depending on hazard type. For example, extreme heat risks are elevated for infants, individuals without access to cooling, outdoor workers, and those with mental health conditions or social isolation. These examples are not exhaustive, and vulnerable populations are further discussed in Section 3.1.1.

2.2 Territorial Acknowledgement and Indigenous Context

Peachland Council and staff respectfully acknowledge that the District of Peachland is on the traditional territory of the Syilx/Okanagan People. The area is within the traditional territory of both the Westbank First Nation and the Penticton Indian Band. Outreach and invitations to First Nations representatives resulted in participation in context-setting interviews and the in-person workshop. When the RDCO began their parallel HRVA project in February 2026, this created broader opportunities for engagement on a scale better aligned with the extent of respective Nation's territories and populations. This is further detailed in Section 2.7 Foundational & Parallel Projects.

¹ <https://www12.statcan.gc.ca>

² <https://www.peachland.ca/parks-recreation/about-peachland>



2.3 Topography

Peachland's topography is dominated by steep hillside terrain. Over 78% of the District lies on slopes greater than 10%, and nearly half (47%) consists of slopes exceeding 30%. This challenging terrain significantly influences land use, transportation infrastructure, emergency access, and hazard exposure.

2.4 Transportation

Highway 97 is the primary transportation corridor, running longitudinally through the community and serving as the main access route. Highway 97C provides regional connectivity northwest toward Merritt. Major local arterials include Beach Avenue, Princeton Avenue, Ponderosa Drive, and Trepanier Bench Road. The community is served by local transit (Route 22) connecting to West Kelowna and regional bus service (Route 70) linking Kelowna and Penticton. Active transportation infrastructure includes the Westside Trail and highway underpasses at Princeton/Beach Avenue and Trepanier Creek.

2.5 Economic Characteristics

Peachland's economy is anchored by several key sectors. Historically, mining, forestry, and agriculture—particularly tree fruits, cattle farming, and ranching—drove the local economy. In 2016, the most common occupations were in sales and services (26%), trades/transport/equipment operators (16%), and business/finance/administration (15%). The top three employment industries regionally were health care and social assistance (13.1%), retail trade (13%), and construction (10.9%).

Tourism and recreation are significant economic drivers, with increased visitation during summer months. The District maintains approximately \$130 million in public infrastructure supporting economic activity. Peachland functions partly as a bedroom community, with substantial proportions of residents commuting to employment centres in Kelowna, West Kelowna, and Penticton.

The community's retirement appeal—driven by lakefront amenities, climate, and proximity to urban services—shapes housing demand and municipal service needs. The District's 2022–2026 Strategic Plan emphasizes fiscal responsibility, downtown vitalization, and diversification of the municipal tax base beyond low-density residential development. Economic resilience considerations for emergency management include protection of tourism infrastructure, support for commuter access during disruptions, and recognition of the aging workforce and retirement demographic vulnerabilities during extended emergency events.

2.6 Hazard and Emergency Context

In the last ten years, the District has experienced significant emergency activations from hazards including wildfire, flooding, extreme heat, traffic incidents, and drought conditions. Some examples are provided below for initial context, though detailed assessment of hazard-community impacts was captured through the engagement processes including workshops and interviews.



Wildfire

The District is located within a fire-prone region. As recently as September 2025, an Evacuation Order was issued for over 1,111 addresses in Peachland for the Munro Lake Wildfire. In September 2023, the entire community was put on Evacuation Alert due to the outbreak of the Glen Lake Wildfire only days after the McDougall Creek Wildfire to the north of Peachland destroyed 190 homes and structures. Other notable wildfires experienced include the 2017 Finlay Creek Wildfire and the 2018 Mount Eneas Wildfire.

Flooding

The region's hydrology can produce spring freshet floods (from snowmelt and rain) that overwhelm creeks and raise lake levels. The community has experienced two years of catastrophic flooding, in 2017 and 2018, which required significant remediation of the District's foreshore.

Landslide and Rockslide

In the past 10 years, a major landslide impacted Renfrew Road (2017). A significant rockslide on Highway 97 just south of Peachland occurred in August 2023 and is still being repaired.

Extreme Heat & Drought

Extreme heat and drought conditions have been experienced during the past three years, although emergency activations directly related to these hazards are limited. Water restrictions are common and extensive.

Transportation Incidents

The 2019 Highway 97 Transportation Planning Study notes that within the 10-year period from 2004 to 2014, the highest number of collisions occurred at the intersection of Highway 97 with Clements Crescent (18 collisions) and Princeton Avenue (19 collisions). A fatal collision occurred on Highway 97 near Peachland in May 2024, and in August 2025 a motorhome crash ignited a local wildfire that resulted in the evacuation of approximately 60 homes.

2.7 Foundational & Parallel Projects

The HRVA provides essential information required to inform effective and fulsome emergency planning. A Community Emergency Plan does not currently exist, and this is the first comprehensive hazard and risk assessment undertaken for the community.

Foundational work regarding specific hazards has been undertaken in recent years, notably:

- A Community Wildfire Preparedness Plan (CWPP) was developed in 2021 to help address wildfire risk in the community. The District has dedicated resources to preparing the community for this particular hazard.



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

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- A Community Wildfire Resilience Plan (CWRP) was also developed in early 2026 and will replace the CWRP. The CWRP includes fire history analysis, and risk reduction treatments including FireSmarting practices. The CWRP was finalized in May 2026.
- An Integrated Asset Management and Climate Change Planning Report was undertaken in 2025 and identifies risks from climate hazards to infrastructure assets, and guides prioritization of assets and components for climate adaptation.
 - To reduce duplicate efforts and incorporate the findings of this project into the HRVA process, the HRVA work was paused from September to November 2025. This was important to support consistent approaches to analysis of climate data and asset systems between engineering, planning, and emergency management.
- The RDCO began their HRVA project in February 2026 and this work was ultimately completed in parallel with Peachland's HRVA.
 - Due to the regional overlap and jurisdictional collaborations pertinent to emergency management across the region, and with Stantec developing and facilitating both projects in tandem, Peachland paused their HRVA following their initial in-person workshop on 28 January 2026. This pause allowed for broader data-gathering and engagement activities at the regional scale of the RDCO including its member municipalities.
 - Critically, the additional time allowed for a clearer understanding of the actions and commitments of the RDCO, and provided more opportunities for the participation of First Nations on a scale commensurate with their territories.



3 Methodology

Stantec's HRVA methodology follows an approach that is consistent with Emergency Management BC (EMBC) Hazard, Risk and Vulnerability Analysis (HRVA) guidance. The HRVA aligns with the following local guidance and international standards:

- Strategic Climate Risk Assessment Framework for British Columbia
- ISO 31000:2018 – Risk Management — Principles and Guidelines
- ISO 14090:2019 – Adaptation to climate change — Principles, requirements, and guidelines
- ISO 14091:2021 – Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment

The HRVA process supports qualitative, risk-based decision making by identifying which hazard related risks to District of Peachland infrastructure, services, communities, and ecosystems should be managed and, where feasible, reduced through coordinated resilience and mitigation actions. In this context, hazard risk refers to the possibility that an asset or service may be adversely affected through interaction with a climate related, seismic, or human induced or technological hazard. Resilience refers to the capacity of the District's systems, services, and communities to anticipate, absorb, adapt to, and recover from hazard events while maintaining essential functions and service levels under current and future conditions.

The assessment considers three core components of risk: the likelihood of hazards occurring within defined time periods, the exposure and vulnerability of infrastructure, services, and populations to those hazards, and the consequences of impacts on service delivery, structural damage, public safety, and community wellbeing. These components are used together to support risk scoring and prioritization.

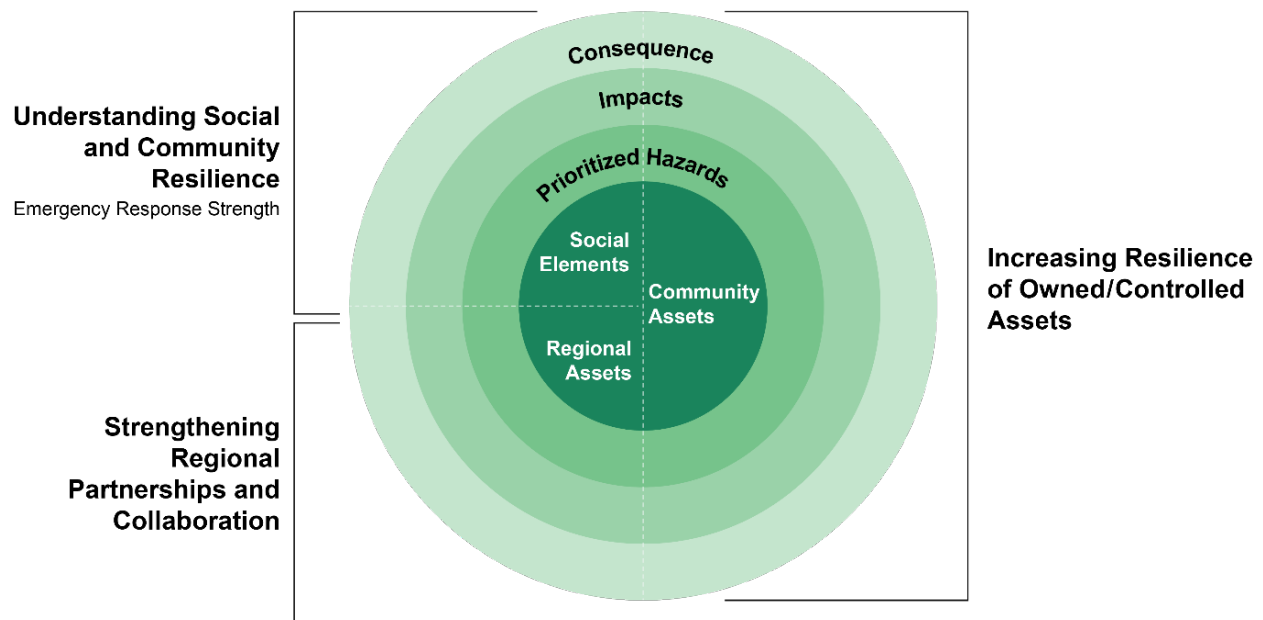
Hazard risk was expressed using the following formula:

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

Another way to envision this approach is captured in **Figure 2** through a broader conceptual lens, with the various components detailed thereafter.



Figure 2 HRVA Framework



Assets & Social Elements

- Defined as the assets and social elements that the community and the region depend on to meet basic needs. These include physical, environmental, cultural elements, and populations.

Prioritized Hazards

- Hazards are reviewed based on exposure, trends, and likelihood of occurrence. Based on this information and contextual input from stakeholder interviews (e.g., the cascading impacts of hazards, determining primary and secondary hazards, etc.), a refined list of prioritized hazards was chosen for the risk evaluation. This shorter list allowed for more effective scenario planning and focused exploration.

Impacts

- A descriptive statement explaining what has happened or can happen when there is an interaction between an asset (or social element) and a hazard. Impact statements were developed using literature review, interviews, and workshop inputs.

Consequence

- A numerical value capturing the severity of each impact statement, evaluated based on three categories: implication, duration, and scale.



3.1 Task 1: Define Assessment Scope & Undertake Background Research

This initial task defined the geographic and temporal scope of the risk assessment. Time was taken to understand and confirm the District's assets, infrastructure systems, and social elements to be captured as part of the risk assessment.

Existing literature was reviewed to inform both an understanding of the community, assets, and ecosystems, as well as to inform the selection of hazards for inclusion in the risk assessment. Interviews were also undertaken with District staff to gain clarity on their assets as well as regional dependencies and support systems.

3.1.1 Identify Assets and Social Elements

The list of assets and social elements considered in the analysis are listed below in Table 1. Further explanations on their selection and context follows this table.

Table 1. Asset Categories, Systems & Social Elements

Asset Group	Asset Category	Asset System
Social Elements	General Population	General population
	Vulnerable Populations	Low-income
		Children 0-14 years old
		Seniors 65 years old +
Physical & Environmental Assets	First Nations Territories & Lands	Okanagan Indian Band
		Okanagan Nation Alliance
		Westbank First Nation
	Parks & Outdoor Recreation	Local and regional greenspace
	Road Network	Local roads
		Highways
	Water System	Water reservoirs
		Water treatment plant
		Water supply distribution network
	Stormwater System	Stormwater system
	Wastewater/Sanitary System	Wastewater treatment plant
		Sanitary mains/service pipes/manholes, life stations



Asset Group	Asset Category	Asset System
	Waste Management Facilities	Landfill & recycling depot
	Utilities	Electrical substation
		Major electrical transmission lines
		Gas pipeline
	Municipal Facilities & Community Buildings	Grouped Municipal Buildings (municipal office, works & utilities office, electrical warehouse, community centre)
		Fire & rescue service
		Heritage buildings/cultural sites
	Economic & Institutional Facilities	Economic, institutional and commercial development
	Dams	Peachland Lake Dam, Glen Lake Dam, Silver Lake Dam

The structure and categorisation of assets and social elements was aligned with existing work undertaken by the District (see Section 2.7 Foundational & Parallel Projects). In some instances, necessary categories did not exist, or further development was needed to meet the intent of the HRVA, these were:

Vulnerable Populations

Though vulnerable populations is a broad term that encompasses a large and complex set of sub-groups, for the purpose of this assessment a simplified roll-up to three key groups was applied (low-income, children 0-14yrs, seniors 65yrs+). Through interviews and workshops more nuanced discussions captured this context. The sub-groups considered and discussed as vulnerable populations included:

- older adults,
- pregnant individuals,
- infants and young children,
- members of racialized groups,
- non-English speaking, or having English as a second language
- Indigenous peoples,
- people living with chronic or complex illnesses,
 - including mental health aspects (not just asthma, diabetes, cardiac conditions),
 - substance use disorders
- persons living alone or socially isolated,
- persons with disabilities, limited mobility,
- people experiencing homelessness,
- people who work or exercise outdoors,
- agricultural community and foreign workers program,



- people without access to air conditioning or for whom using air conditioning is a financial or technological burden

First Nation Territories & Lands

This category was created to provide clear and distinct input opportunities regarding specific First Nations impacts and experiences of hazards. Due to limited availability of First Nation's representatives for workshop participation and considering the concurrent RDCO HRVA process, there was no available representative to provide input for this category during the first workshop. Engagement was sustained and possible through the parallel RDCO scale HRVA (see Section 2.7 Foundational & Parallel Projects).

Dams

Specific dams were named to ensure clarity and expedite the evaluation of hazard-asset interactions. There are many private, public, and orphan (no known owner/operator) dams across the region, including tailings pond dams associated with mining sites. There is the potential for dams beyond the geographic extent of the District (but within its watershed) to cause damage and create emergency situations.

3.1.2 Identify Hazards and Draft Impact Statements

To identify hazards relevant to the District of Peachland, the assessment began with a review of historical hazard events that have affected, or could reasonably affect its assets, services, communities, and ecosystems. Hazards were initially drawn from EMBC's HRVA hazard list and refined through background literature review, review of planning documents, hazard mapping, meetings with staff, and input from interviews and workshops. Hazards with limited relevance, exposure, or credible impact pathways were screened out.

3.1.2.1 Initial Hazard Groups

Following this review, identified hazards were consolidated and grouped into primary hazards based on impact pathways.

Flooding

- Lake, River and Stream Flooding
- Flash Flooding
- Seiche
- Stormwater Flooding

Cold / Winter Hazards

- Extreme Cold
- Fog

Fire

- Wildfire
- Structure Fire
- Lightning

Geological / Terrain Stability

- Earthquake / Liquefaction
- Landslide / Debris Flow
- Land Subsidence



- Freezing Rain / Snowstorms / Blizzards

Human Induced

Hot & Dry

- Extreme Heat
- Drought

Wind & Hail

- High Wind Event
- Hail

- Aging Asset
- Disease
- Security
- Chemical & Explosive
- Vehicle Accident

3.1.2.2 Preliminary Hazard-Asset Interactions and Impacts

For every interaction between a hazard and District asset category, system, or social element, an impact statement was extracted based on available literature, research, and interviews. Impact statements describe the effect of each interaction including potential outcomes and severity. These impact statements are later used in the workshop and risk assessment process, described in Section 3.4 Task 4: Conduct Hazard Risk and Vulnerability Assessment. A register of all impact statements can be found documented on the posters in Appendix A.

3.1.2.3 Develop Priority Hazard Scenarios

To support the exploration of impacts and process of workshop facilitation, primary hazard groups were re-framed using hazard scenarios that described specific extreme weather or emergency response events to help ground workshop participants before their review and scoring began. The hazard scenarios can be found on the respective hazard scenario posters in Appendix A.

3.2 Task 2: Hazard Projections and Climate Science

Hazard projections were developed using a combination of qualitative and quantitative review, including climate science, incident reporting records, best practices and professional judgement.

3.2.1 Temporal Scale

Hazards have been assessed across three timeframes: a baseline (historical) period, the near-term future period, and a medium-term future period. This approach aligns with provincial HRVA guidance and supports evaluation of how hazard likelihood may change over time. The baseline (historical) likelihood is informed by scientific data, observed trends, and local and traditional knowledge of past hazard events. The current likelihood reflects recent trends and short-term projections relative to the historical baseline. The future likelihood considers longer-term projections, including anticipated environmental, social, and economic changes that may influence hazard frequency and severity. Likelihood periods, as defined in provincial guidance and applied in this assessment, are summarized in Table 2.



Table 2. Likelihood Period Definition Table

Period	Confidence in Data	Period Definition & Guidance	HRVA Period
Historic Likelihood	Factual Data – Highly Accurate	The measured frequency of the hazard based on scientific data and local knowledge of past events. Ideal measurement periods should be >50-100 years for most hazards, or the actual practical limits of recorded data.	Baseline (1991-2020)
Near-term Future Likelihood	Estimated Change – Reasonably Accurate	The anticipated frequency of the hazard in the near-term (+/- 10-15yrs) based on short-term analysis including; recent rate of change (i.e. <25yr period), and similar short-term projections by subject matter experts).	2020s (2021-2040)
Medium-term Future Likelihood	Estimated Change – Reasonably Accurate	The medium-term projection based on predictive scientific models and anticipated changes to the Region. (e.g., urban development / demographic shifts / industry changes / etc.)	2050s (2041-2070)

3.2.2 Hazard Projections, Trends and Likelihood Scores

3.2.2.1 Climate Hazard Likelihood Estimation

The climate assessment was conducted for acute and chronic climate hazards relevant to the geographical extent of the District and its immediate periphery, identified through discussions with project staff and Stantec team experience with the regional climate.

Acute climate hazards are those that impact people, infrastructure, services, and ecosystems over a relatively short period (e.g., hours to days), including events such as extreme temperatures, heavy rainfall, and high wind gusts.

Chronic climate hazards are those that generate impacts over a longer period (e.g., years to decades). In most cases, chronic hazards are already occurring, but it is important to consider how they may change in the future, as they can have significant cumulative impacts over time. Chronic hazards relevant to the District include aging assets and drought.

For this assessment, historical climate data was obtained from local Environment and Climate Change Canada (ECCC) weather stations and the PCIC-Blend gridded dataset developed by the Pacific Climate Impacts Consortium (PCIC), which provides daily maximum and minimum temperature and total precipitation data on a ~10 km grid resolution over Canada for the 1950–2012 period.

Following the collection and assessment of historical climate data, the results were used to inform the development of future climate projections. Climate projections are based on a subset of 26 CMIP6 global climate models (GCMs) downscaled by the Pacific Climate Impacts Consortium, known as the Canadian Downscaled Climate Scenarios Multivariate (CanDCS M6). These projections cover the period from 1950 to 2100 and represent the primary climate change dataset used by Environment and Climate Change Canada (ECCC). The assessment uses projections under the SSP5 8.5 emissions scenario, selected because it closely aligns with historical and current greenhouse gas emissions trends and represents a



plausible high emissions future. This approach provides a risk averse, conservative estimate of future climate conditions and associated impacts, reducing the likelihood of underestimating potential risks. For climate variables not fully represented in CanDCS M6 such as freezing rain, hail, lightning, landslides, and wildfire, CMIP5 Representative Concentration Pathway (RCP) projections and relevant scientific literature were used.

With the climate hazards and emissions scenario identified, likelihood ratings were developed for each hazard. For each hazard, a definition or threshold was assigned to describe the conditions under which a notable interaction with regional systems or communities is expected to occur. Likelihood scores were assigned based on either the frequency of occurrence or the projected change from baseline conditions, using a five-point scale where 1 indicates a climate hazard is remote and 5 indicates it is almost certain to occur (see Table 3 and Table 4). In some cases, changes in frequency or magnitude may not result in a change in likelihood score. For example, a hazard may remain at a likelihood score of 3 across all time horizons, even as frequency increases from 1 in 25 years in the baseline period to 1 in 15 years in the 2050s (per Table 3). Similarly, when likelihood is based on changes from baseline conditions (per Table 4), a hazard may remain at a likelihood score of 4 across all future time horizons, despite increasing changes from baseline of 20% in the 2020s and 45% in the 2050s.

Likelihood ratings were developed using both historical data and future projections across defined time periods. Ratings reflect the expected frequency or change in conditions associated with each hazard and are based on a five-point scale, where a score of 1 represents a rare likelihood event and a score of 5 represents an almost certain event.

Table 3. Absolute Scaling for Acute Hazard Likelihood Classifications & Scoring

Score	Qualitative Descriptor	Descriptor	Occurrence
1	Rare	Not likely to occur within period	> 1:50 year
2	Unlikely	Likely to occur at least once between 25-50 years	1:30-50 year
3	Possible	Likely to occur at least once every 10 to 25 years	1:10-30 year
4	Likely	Likely to occur at least once per decade	1:1-10 year
5	Almost Certain	Likely to occur once or more annually	> 1:1 year

Table 4. Relative Scaling for Chronic Hazard Likelihood Classifications & Scoring

Score	Qualitative Descriptor	Descriptor	Percentage Changes
1	50-100% reduction compared to baseline	Likely to occur much less frequently than baseline climate	50%+
2	10-50% reduction compared to baseline	Likely to occur slightly less frequently than baseline climate	10-50%
3	Within +/-10% compared to baseline	Likely to occur about as frequently as in the baseline climate	+/-10%
4	10-50% increase compared to baseline	Likely to occur slightly more frequently than baseline climate	10-50%



Score	Qualitative Descriptor	Descriptor	Percentage Changes
5	50-100% increase compared to baseline	Likely to occur much more frequently than baseline climate	50%+

3.2.2.2 Human-Induced & Technological Hazard Likelihood Estimation

In addition to climate related hazards, the HRVA assesses risks to asset groups from human induced and technological hazards relevant to the District. These hazards were identified through provincial HRVA guidance and refined through literature review and input from staff interview and workshop participants.

As with the climate hazards, the human induced and technological hazards were grouped into representative hazard scenarios based on similarities in how they may impact infrastructure, services, communities, and ecosystems. Likelihood scores were then assigned across time periods as presented in Table 3 and Table 4 to align with the climate hazard methodology. Likelihoods and trends for the assessed human induced and technological hazards are summarized in Table 5 alongside the climate hazards.

3.2.2.3 All Hazards Likelihood and Trend Summaries

Table 5. Baseline and Future Likelihood Scores by Hazard

Hazard	Indicator and Threshold	Likelihood Score			Chronic or Acute
		Historic	Near-term	Medium-term	
Extreme Heat	Days/ year with Tmax $\geq$ 35°C	3	5	5	Chronic
Drought	Occurrence of Standardized Precipitation Index (SPI or SPEI) of less than -1 (12-month scale for at least 3 consecutive months)	1	1	1	Acute
Extreme Cold	Days/ year with Tmin $\leq$ -15°C	3	1	1	Chronic
Fog	Visibility	3	3	4	Acute
Freezing Rain / Snowstorms & Blizzards	Median annual hours of freezing rain, Heavy Snowfall- 10 cm or more snowfall in 24 hrs	3	3	4	Chronic / Acute
High Wind Event	Wind gusts greater than or equal to 90km/hr	3	3	3	Acute
Hail	Number of Severe Hail Days (Ds $\geq$ 2cm) in Summer	3	3	4	Acute
Lake, River and Stream Flooding	Max 5-day precipitation (proxy)	3	3	3	Acute
Flash Flooding	Short duration high intensity rainfall (proxy)	2	2	3	Acute
Seiche	Occurrence of seiche in Lake Okanagan	3	3	3	Chronic
Stormwater Flooding	N/A	2	3	4	
Wildfire	Fire Rating (lightning, landcover, FWI)	2	2	3	Acute
Structure Fire	N/A	4	4	4	Acute
Lightning	Greatest single year C-G lightning density in km2	3	3	3	Acute



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Hazard	Indicator and Threshold	Likelihood Score			Chronic or Acute
		Historic	Near-term	Medium-term	
Earthquake	N/A	-	-	-	Acute
Liquefaction	N/A	-	-	-	Acute
Landslide / Debris Flow	Moderate to high landslide hazard days	3	4	4	Acute
Land Subsidence	N/A	-	-	-	-
Aging Assets	N/A	2	2	3	Chronic
Disease	N/A	4	4	5	
Security	N/A	5	5	5	Acute
Chemical & Explosive	N/A	3	3	4	Acute
Accident ³	N/A	5	5	5	Acute
Pandemic	N/A	3	4	5	Acute

The HRVA assessed risk based on hazard scenarios that incorporate multiple hazards to reflect lived experiences recognizing that many hazards don't happen in isolation as individual events. The likelihood for scenarios is based on the highest likelihood hazard within each scenario, representative of the worst-case situation.

Table 6. Priority Hazards – Grouped into Scenarios

Hazard Scenario	Hazards	Trend from Baseline
Hot & Dry	Extreme Heat	↑ Increasing
	Drought	→ Steady
Cold / Winter Hazards	Extreme Cold	↓ Decreasing
	Fog	↑ Increasing
	Freezing Rain / Snowstorms / Blizzards	↑ Increasing
Wind & Hail	High Wind Event	→ Steady
	Hail	↑ Increasing
Flooding	Lake, River and Stream Flooding	→ Steady
	Flash Flooding	↑ Increasing
	Seiche	→ Steady
	Stormwater Flooding	↑ Increasing

³ Later revised in workshop discussions to *Vehicle Incident*



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Hazard Scenario	Hazards	Trend from Baseline
Fire	Wildfire	↑ Increasing
	Structure Fire	→ Steady
	Lightning	→ Steady
Geological / Terrain Stability	Earthquake	N/A
	Liquefaction	N/A
	Landslide / Debris Flow	↑ Increasing
	Land Subsidence	N/A
Human Induced	Aging Assets	↑ Increasing
	Security	→ Steady
	Chemical & Explosive	↑ Increasing
	Accident	→ Steady
Pandemic	Pandemic	↑ Increasing

Likelihoods for hazard scenarios were based on the highest likelihood hazard within each respective scenario, since this is representative of the worst-case scenario. The likelihood values used in the final risk assessment were based on the values in Table 7.

Table 7. Baseline and Future Likelihood Scores by Hazard Scenario

Hazard Scenario	Representative Hazard			
		Historic	Near-term	Medium-term
Hot & Dry	Extreme Heat	3	5	5
Cold / Winter Hazards	Freezing Rain / Snowstorms / Blizzards	3	3	4
Wind & Hail	Hail	3	3	4
Flooding	Stormwater Flooding	2	3	4
Fire	Structure Fire	4	4	4
Geological / Terrain Stability	Landslide / Debris Flow	3	4	4
Human Induced	Security	5	5	5
Pandemic	Disease	3	4	5



3.3 Task 3: Impacts Validation and Consequence Scoring

3.3.1 Impacts Validation

The validation of the impact statements generated through the literature review, interviews, and research were presented using posters during an in-person workshop on Wednesday 28th January 2026 as depicted in Figure 3. Posters representing each hazard scenario were displayed pre-populated with impact statements for each individual hazard-asset interaction.

Note: Whether an interaction was captured was a function of prior evidence or participant input. Notably, whether there was active presence from a participant with lived experience or working knowledge of an asset category. A missing interaction does not imply that no impact or potential future interaction has, can, or could occur. This is a limitation of any assessment process and is further detailed in Section 3.6 Limitations of the Analysis.

Figure 3 Workshop #1 - Participants Validating Impact Statements and Scoring Consequence



3.3.2 Consequence Scoring

With hazard-asset interactions captured and validated using the impact statements, consequence ratings were assigned to score the severity of impacts.

Consequence scoring was done using colour-coded sticky-notes corresponding to the respective consequence categories described in Table 8.

Table 8. Consequence Scoring Categories and Criteria

Rating	Implication	Duration	Scale
1 None	No directly related illnesses, injuries or psychosocial trauma.	Little to no impact.	Little to no impact.
2 Low	Illness or injury is manageable within the scope of normal operations and through physical and psychological First Aid.	Hours to days-long environmental or economic disruptions or impacts to daily life including reduced access to support systems and services. Community trust and political or reputational impacts are limited.	Low percentage of the population is impacted by service disruptions, evacuation orders or sheltering in place, or minor property damage. Supports are provided within the community.
3 Medium	Localized fatalities or serious injuries are beyond the scope of normal operations and may require overtime and/or additional resources for support and treatment including potential activation of response systems and emergency plans.	Weeks-long environmental or economic disruptions or impacts to daily life including reduced access to support systems and services. Community trust and political or reputational impacts are significant.	Localized service disruptions, evacuation orders or sheltering in place, or severe property damage. External community support is required.
4 High	Severe loss of life triggers the activation of mass fatality procedures, or extensive illness or serious injuries that require specialized care. Health authority response systems and emergency plans activated.	Months to years-long environmental clean-up, economic losses or impacts to daily life including significantly reduced access to support systems and services. Community trust and political or reputational impacts are severe.	High percentage of the population is impacted by one major or multiple service disruptions, evacuations or displacements, or widespread structural damage. Support from external personnel and expertise are required.
5 Extreme	Fatalities exceed the capacity of existing plans and capabilities. Provincial, Federal, and international resources may be required.	Severe or irreparable environmental, economic, cultural, political or reputational losses and damages. Support systems and services may be permanently changed.	High percentage of the population is impacted by long-term or permanent service outages, displacement, or irreparable structural damage. Extensive external support is required.

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Figure 4 Sample Poster Populated with Participant Input on Consequence Scores

Do the impacts need edits? are there missing impacts?

Rate the consequence of the impact and asset system interactions for each category.

		Extreme Cold Days/ year with Tmin 5-15°C	Fog Visibility	Freezing Rain / Snowstorms / Blizzards Median annual hours of freezing rain, Heavy Snowfall: 10 cm or more snowfall in 24 hrs	Consequence Categories		
		Cold			Implication	Duration	Scale
Physical & Environmental Assets	Water System						
	Water reservoir	Extreme cold may cause water reservoir to freeze if improperly insulated.			1	4	5
	Water treatment plant	Extreme cold may cause physical damage to water treatment infrastructure or reduce the efficiency of treatment processes.	poor design policy		1	4	5
	Water supply distribution network	Extreme cold may affect the efficiency of pumps. Extreme cold may cause water mains and pipes in the water supply distribution network to freeze and crack, resulting in failure.		1	4	5	
	Stormwater System						
	Stormwater system	Extreme cold may cause ice formation, leading to stormwater intake blockages.		Heavy snowfall accumulation may block stormwater intakes and outlets, causing localized flooding.	1	4	5
	Wastewater/Sanitary System						
	Wastewater treatment plant	Extreme cold may cause physical damage to treatment infrastructure or reduce the efficiency of treatment processes.	poor design policy		1	4	5
	Sanitary mains/service connections/Lift stations	Extreme cold may cause mains and pipes to crack and break. Extreme cold may compromise lift motor function.		1	4	5	
	Waste Management Facilities						
Landfill		Impact: garbage pickup	Imp: snowing even later	1	3	3	
Utilities							
Medical substation		In need of more info. Care not to cut power to medical equipment		Freezing rain and snow may accumulate on lines or poles, increasing outage risk.	2	4	5
Major electrical transmission lines		Electricity is critical to many services. Major roads (highway 101)		Freezing rain and snow may accumulate on transmission lines, increasing outage risk.	2	4	5
Gas pipeline	Extreme cold may cause crack and break.			2	4	5	

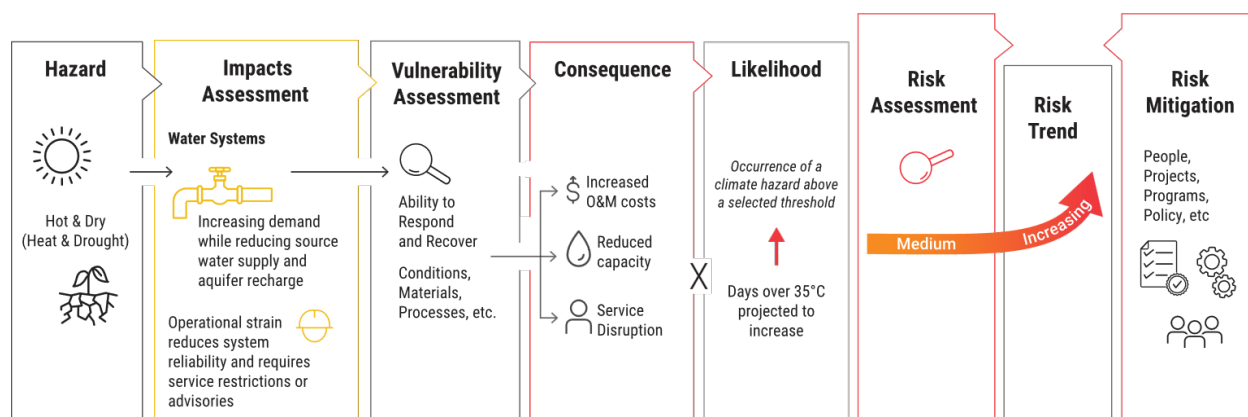
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District of Peachland – Hazard, Risk, and Vulnerability Analysis (HRVA)

3.4 Task 4: Conduct Hazard Risk and Vulnerability Assessment

The HRVA evaluated the potential impacts of current and future hazard conditions on District of Peachland's assets and social elements across defined time horizons by combining hazard likelihood with the exposure, vulnerability, and consequences identified throughout prior tasks. This task brought together the hazard and impact information to generate overall risk ratings for District's asset categories. An example of the process is presented in Figure 5.

Figure 5 Hazard Risk Assessment Process



For human-induced and technological hazards, likelihood was assessed across the same time horizons as climate related hazards, consistent with EMBC provincial guidance. Near-term projections inform understanding of existing and emerging risks. Medium-term or mid-century projections help characterize growing trends and the urgency for resilience actions.

If an interaction was determined to exist this was documented through an impact statement, and then the risks of the interaction were calculated using the following equation:

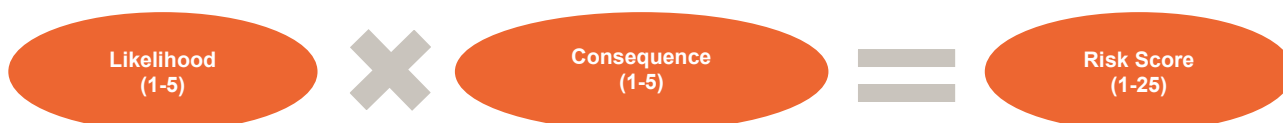
$$\text{Risk (R)} = \text{Likelihood (L)} \times \text{Consequence (C)}$$

$$\text{Likelihood (1–5)} \times \text{Consequence (1–5)} = \text{Risk Score (0–25)}$$

- Likelihood** is the likelihood of occurrence of a hazard above a selected threshold. Likelihood scores range from 1 (very low) to 5 (very high).
 - Generated using data described in Section 3.2.2 Hazard Projections, Trends and Likelihood Scores.
- Consequence** is the severity of the impact on the asset or element should the hazard event occur. Consequence scores range from 1 (very low) to 5 (very high).
 - Evaluated using participant input based on the criteria established in Section 3.3.2 Consequence Scoring.

Consequence ratings reflect the severity of impacts should the described interaction occur. This HRVA assessed consequences on a scale of 1-5 across three categories (implication, duration, scale). The highest consequence score within any one of the consequence categories was applied for each hazard-asset interaction. The scoring of each impact statement under the respective consequence categories was undertaken during the first workshop, as described in Section 3.3 - Task 3: Impacts Validation and Consequence Scoring.

3.4.1 Risk Scoring



Risk scores were calculated for each interaction between hazards and assets across all time periods and were evaluated using a standardized risk matrix to support comparison and prioritization (Table 9).

Table 9. Risk Assessment Matrix

Risk Scoring Matrix							
Hazard Likelihood Score	Almost Certain	5	5	10	15	20	25
	Likely	4	4	8	12	16	20
	Possible	3	3	6	9	12	15
	Unlikely	2	2	4	6	8	10
	Rare	1	1	2	3	4	5
		1	2	3	4	5	
		None	Low	Medium	High	Extreme	
Consequence Score							

Legend

Negligible	Low	Moderate	High	Extreme
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3.5 Task 5: Risk Results and Risk Mitigation Actions

This step identified and explored risk mitigation and resilience-building actions informed by the findings of the HRVA. Actions were compiled to reflect the issues identified by impact statements, workshop participant feedback, and the risk profiles of hazard scenarios. Actions also built upon existing District plans, policies, programs, and initiatives related to emergency management and infrastructure planning.

Additionally, due to the concurrent HRVA work of RDCO, actions development was also informed by their process and inputs. This was importance in recognising the relevant spheres of influence and collaborative efforts required to holistically address risk across all levels of government.

Through this analysis, a list of emergency management focused risk mitigation and resilience-building actions were compiled. These actions were then reviewed through a workshop with District staff, healthcare authority representatives, and emergency management personnel.

3.6 Limitations of the Analysis

The following limitations should be considered in the evaluation of the results of the HRVA. The HRVA is subject to some uncertainty and limitations, including:

- **Climate Projections:** Uncertainty remains in climate projections and associated indices, particularly for non-temperature variables. Sources of uncertainty include future emissions pathways, inter-model variability, and natural variability, with outcomes strongly influenced by future societal decisions. These uncertainties affect the estimation of future climate hazard likelihoods and should be considered when interpreting results.
- **Hazard Scenarios:** Hazard scenarios were developed based on the selected primary hazard groups to facilitate the vulnerability and risk assessment process. The likelihood score associated with each hazard scenario is based on a representative hazard within the scenario that has the highest likelihood as part of a conservative approach to risk scoring. Consequence scoring was conducted for each component hazard within a hazard scenario. The risk calculation is therefore based on the hazard scenario likelihood score and the hazard-specific consequence score.
- **Human Induced and Technological Hazards:** Likelihood and consequence ratings for human induced and technological hazards are based primarily on historical events, available incident data, and participant input. Unlike climate hazards, these hazards are not modeled using predictive datasets, and future likelihoods are informed by observed trends, expert judgment, and anticipated changes in population, infrastructure, and service demand. As a result, projections for these hazards carry greater uncertainty and should be interpreted as indicative rather than predictive.
- **Perspective & Participation:** The HRVA process is a subjective exercise that relies on interview and workshop participant understanding and perception of exposure, vulnerability, and consequences to District of Peachland infrastructure, assets, services, and populations to diverse hazards. Participation in engagement activities is limited to representatives from the District of Peachland, neighbouring member municipalities, regional partners, and First Nations, who chose to participate and attend events. The HRVA does not capture every perspective and experience.



- **System Interdependencies:** The HRVA considers interactions between hazards, infrastructure, and services; however, it does not fully capture all system interdependencies or cascading failures across the region. Disruptions in one system may influence others in ways not fully represented in this assessment.
- **Consequence Scoring:** Consequence scores were assigned based on workshop and interview participant input, and project team experience assessing similar infrastructure, subject matter expert judgment, historical event data, and background data. While care was taken to ensure consistency and internal validation, the scoring remains qualitative, interpretive, and subjective.
- **Future Risk and Iteration:** This HRVA represents a snapshot in time based on current data, assumptions, and understanding of hazards. Risks are expected to evolve due to changes in climate, development, infrastructure, and governance. The District of Peachland should establish a formal review cycle of three to five years at minimum, with unscheduled reviews triggered by significant hazard events or material changes to infrastructure or population.
- **Recommended Actions:** Suggested mitigation and resiliency actions are based on the findings of this assessment and input from participants; however, they have not been subject to detailed technical, financial, or feasibility analysis. As such, recommendations are intended to support planning and prioritization and should be further evaluated through detailed design, feasibility studies, and implementation planning. Many actions also require inter-agency collaboration, which will require ongoing engagement opportunities, clear communication, and collaboration.

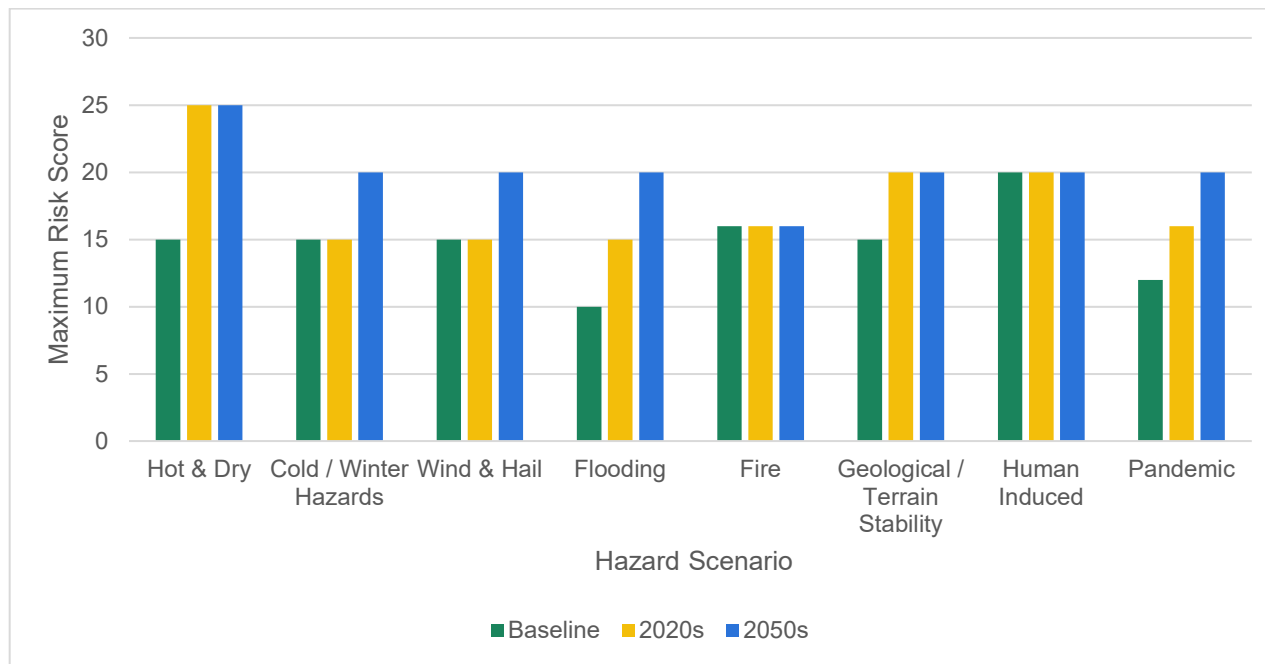


4 HRVA Results

The HRVA has identified a series of climate, human induced, and technological hazard-related risks to the District of Peachland's infrastructure, services, and populations. The results of the HRVA show that the most significant increase in risks between the baseline and future time periods is projected from the increasing severity and frequency of hot & dry, flooding, and pandemic events.

The maximum risk scores by hazard scenario across all assessed time horizons are presented in Figure 7. The highest projected risk is represented by an extreme risk score of 25 in the 2020s and 2050s due to the impacts of hot & dry conditions on utility infrastructure, specifically to electrical substations and major electrical transmission lines. During extended periods of extreme heat, electricity demand for cooling is expected to increase, consequently increasing the risk of power outages. Extreme risk scores of 20 to infrastructure, services, and populations are also projected due to cold / winter hazards, wind & hail, flooding, geological / terrain stability, and human induced hazards.

Figure 6 Maximum Risk Scores by Hazard Scenario Over All Time Horizons



Across the baseline period, the highest risks are projected due to interactions with human induced hazards and fire-related hazards. A summary of all risk scoring interactions is provided in Appendix C.

4.1 Key Risks to Asset Groups and Asset Categories

Social elements, which include general population and vulnerable populations, rank consistently among the highest risk categories. The general population faces high risks across the baseline, 2020s, and 2050s particularly from human induced hazards, geological/terrain stability, and pandemic. Significant cascading impacts raised by workshop participants include prolonged displacement of residents, severing of support network, and implications of school and recreational closures for children and families. Vulnerable populations face extreme risk levels across all assessed timelines. Within vulnerable populations there is nuance between impacts to sub-groups and their exposure / vulnerability to specific climate hazards. For example, the impacts of extreme heat on infants are expected to be of very high consequence, while wildfire may present significant health and safety concerns for people with chronic health conditions, outdoor workers, people who are socially isolated, or residents with low mobility.

Multiple critical infrastructure systems are also projected to experience high or extreme risk, particularly in the 2050s. Water systems are at risk from hot & dry conditions and human induced hazards that may lead to diminished reservoir levels and water shortages, increased strain on water treatment processes, requirements for demand management during prolonged drought, and contamination of water reservoirs or water sources from spills or contamination. Water shortages may also have implications for fire suppression capacity. Utilities are at risk from hot & dry conditions, wind & hail, geological, and human induced hazards where extreme heat conditions may increase electricity demand for cooling, straining power systems, chemicals and explosions may cause blackouts, and earthquakes, landslides, land subsidence, or high winds may damage or destroy transmission infrastructure.

System interdependencies and cascading impacts of one or multiple hazards, beyond the direct impact of a hazard-asset interaction, were also highlighted by workshop participants. Disruptions in critical infrastructure systems may have widespread community impacts. Power failures or destruction of transmission infrastructure may present significant challenges without sufficient backup capacity with one primary electrical transmission line from Merritt. Landslides or earthquakes may damage highways, requiring closures for safety and cleanup such that residents are cut off from emergency services or disconnected from daily amenities for extended periods. Consideration of the highest risk interactions, system interdependencies, and cascading impacts are important for the prioritization of risk mitigation measures.



4.2 Asset and Asset Category Risk Profiles

4.2.1 Population – General Population and Vulnerable Groups

The residents and population of the District face heightened and varied risks across multiple hazard scenarios. Under hot and dry conditions, infants, outdoor workers, people experiencing schizophrenia or other mental health challenges, and residents without adequate cooling are particularly vulnerable, including those receiving community-based supports who may not be unhoused but still face heightened exposure.

Flooding may disproportionately affect people living or working near flood-prone areas such as schools, childcare centres, and mobile home parks. Fire-related hazards can cause housing loss, prolonged displacement, and social disconnection, especially for low-income residents, socially isolated people, those with chronic health conditions, and residents on higher slopes or roads with limited access or egress.

Geological and terrain stability hazards, particularly earthquakes, may lead to prolonged displacement, disrupted schooling, and added hardship for residents with low mobility. During pandemics, vulnerable groups may experience intensified social isolation, while people with multiple chronic conditions, mental health challenges, and complex care needs face greater health and support risks.

The risk scores are presented in Table 10.



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

4 HRVA Results

Table 10. Summary of Population Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
General Population	General population																								
Vulnerable Populations	Low-income																								
	Children 0-14																								
	Seniors 65+																								

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.2 First Nations Territories & Lands

Due to limited availability of First Nation's representatives for workshop participation and considering the concurrent RDCO HRVA process, there was no available representative to provide input for this category during the first workshop. Opportunity for engagement with representatives was sustained and possible through the parallel RDCO scale HRVA and findings were used to inform findings in this assessment where applicable (see Section 2.7 Foundational & Parallel Projects).



4.2.3 Parks & Outdoor Recreation

Parks and outdoor recreation assets show high risk profiles across all time horizons. Local and regional greenspaces are expected to experience high risks due to hot & dry conditions, winter hazards, and fire hazards in the baseline. By the 2020s, extreme risks are projected to impact these assets due to increasing frequency and severity of hot & dry hazard conditions, and human induced hazards especially chemical & explosive incidents.

Extreme heat may lead to heat stress on vegetation throughout the District. Prolonged hot conditions may also contribute to the development of algal blooms in Lake Okanagan (cyanobacteria), causing unsafe conditions for recreation and swimming at a time when relief from the heat is most needed. Drought may cause vegetation stress and mortality, which may be exacerbated by water restrictions. Water restrictions may also limit water cooling spaces, including spray parks, which may be used for relief from extreme heat conditions.

Industrial spills or pollution could cause significant damage to environmentally sensitive areas. Cascading impacts from environmental damage include disruptions in tourism which serves as an economic pillar for the district and the region more broadly.

The risk scores are presented in Table 11.

Table 11. Summary of Parks & Outdoor Recreation Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Parks & Outdoor Recreation	Local and regional greenspace																								

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.4 Road Network

Local roads and highways that serve Peachland show high risks across all assessed time horizons. High risks are projected across multiple hazards including hot & dry conditions, cold and winter hazards, flooding, geological and terrain stability, and human induced hazards such as motor vehicle incidents, and hazardous material release. Extreme risks are projected to impact highways by the 2020s due to increasing frequency and severity of hot & dry conditions, deteriorating road conditions and contributing to the urban heat island effect.

Disruptions to local and regional road networks may have significant cascading downstream effects on supply chains, business continuity, emergency services, and daily amenities.

The risk scores are presented in Table 12.

Table 12. Summary of Road Network Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Road Network	Local roads	Yellow	Orange	Orange	Orange	Orange	Orange	Green	Green	Yellow	Green	Yellow	Orange	Green	Green	Green	Orange	Orange	Orange	Orange	Orange	Orange	Grey	Grey	Grey
	Highways	Orange	Red	Red	Orange	Orange	Orange	Green	Green	Yellow	Green	Yellow	Orange	Yellow	Yellow	Yellow	Orange	Orange	Orange	Orange	Orange	Orange	Grey	Grey	Grey

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.5 Water System

Water systems show high risks across all assessed time horizons and across multiple hazard scenarios. The highest risks, reaching extreme risk levels, are driven primarily by hazard scenarios including hot & dry conditions, cold and winter hazards, and human-induced hazards.

Periods of extreme heat and drought are expected to contribute to diminished reservoir levels, water shortages and restrictions, degraded source water quality (including due to the increased growth of algal blooms in standing water), and increased strain on water treatment systems. Extreme cold conditions may damage reservoirs, cause physical damage to water treatment infrastructure or reduce the efficiency of water treatment processes and pumps in the distribution network. Poor water quality, and failure in the water supply distribution network may cause service disruptions across the community.

Disruptions to water systems may have cascading effects. Disruptions in water treatment facilities or the presence of waterborne disease increasing water treatment plant needs may present public health challenges. Water shortages may affect emergency response, particularly related to fire suppression. Overall community wellbeing may also be affected if water availability and water quality is compromised.

The risk scores are presented in Table 13.

Table 13. Summary of Water System Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Water System	Water reservoir																								
	Water treatment plant																								



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4 HRVA Results

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
	Water supply distribution network																								

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.6 Stormwater System

Stormwater systems show high and extreme risks across multiple time horizons, under cold and winter conditions, flooding, geological/terrain stability, and human-induced scenarios. Within these hazard scenarios, extreme risks are driven by ice and heavy snowfall accumulation blocking stormwater intakes and outlets, causing localized flooding, and aging infrastructure vulnerable to system overwhelm, surcharge, and failure.

Additional high risks are associated with heavy rainfall events exceeding the capacity of the stormwater capacity, leading to local overland flooding and earthquakes, landslides/debris flows, and land subsidence that may lead to stormwater system failure, or debris blockages in stormwater intakes or outfalls.

Disruptions in stormwater systems may contribute to localized flooding, and standing water pooling in low-lying areas may also create additional hazards, including bacteria or algae growth that may contribute to health hazards to animals and to people.

The risk scores are presented in Table 14.

Table 14. Summary of Stormwater System Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Stormwater System	Stormwater system	Green	Yellow	Yellow	Orange	Orange	Red	Green	Green	Yellow	Green	Yellow	Orange	Grey	Grey	Grey	Yellow	Orange	Orange	Red	Red	Red	Grey	Grey	Grey

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.7 Wastewater/Sanitary System

Wastewater and sanitary systems show high and extreme risks across multiple assets, hazard scenarios and time horizons. Freezing temperatures may cause physical damage to treatment infrastructure, including degradation or failure of sanitary mains, pumps, and cracking of pipes. The efficiency of treatment processes and lift stations may also be reduced. Reductions in system performance may contribute to localized or widespread service disruptions depending on the extent of the damage, failure, or reduced efficiency of the wastewater and sanitary system.

Additional risks are projected from other hazard scenarios. Extreme heat may disrupt biological treatment process, leading to water quality issues. Geological hazards, including earthquakes, landslides, and land subsidence present significant risks to wastewater systems. Earthquakes may damage or destroy to wastewater treatment plant infrastructure, sanitary mains, service pipes, and life stations, resulting in system-wide failures. System failures may lead to the release of untreated sewage in Okanagan Lake, creeks, and on land, presenting environmental and public health risks. The risk scores are presented in Table 15.

Table 15. Summary of Wastewater / Sanitary System Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Wastewater / Sanitary System	Treatment plant																								
	Sanitary mains / service pipes / lift stations																								

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.8 Waste Management Facilities

Waste management facilities show high risks across two hazard scenarios. Temperature-driven risks include temperature fluctuations increasing methane output at landfill sites. Extreme temperatures may also disrupt garbage collection services and operations, reducing service reliability. Geological and terrain stability hazards, notably earthquakes, may inundate waste management facilities with debris from earthquake damage to infrastructure and vegetation. Curbside garbage collection may also be disrupted if road networks are compromised or blocked due to earthquake impacts. Disruptions to waste collection and management services may contribute to the accumulation of waste in the community and public health and environmental concerns if waste is handled improperly.

The risk scores are presented in Table 16.

Table 16. Summary of Waste Management Facilities Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Waste Management Facilities	Landfill, Recycling depot																								

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.9 Utilities

Utilities show high and extreme risks across multiple hazard scenarios and time horizons. The highest risks are associated with extreme temperatures, wind and hail events, geological hazards, and human-induced incidents.

Extreme risks to electrical substations and major electrical transmission lines are driven by increasing strain on systems from demand for cooling and heating during extreme heat and extreme cold periods respectively. With sustained high demand, the risk of power outages and equipment failure may also increase. Freezing rain and snow accumulation may also damage transmission lines or poles, further increasing outage risks under winter conditions. High wind and hail events may damage substation infrastructure or transmission infrastructure, requiring repair, replacement, or causing widespread outages.

Earthquakes, landslides, and land subsidence may also damage substation or transmission infrastructure, which may result in widespread and long-term power outages, with cascading impacts to critical communications infrastructure and services coordination. Human-induced hazards, including hazardous materials releases and explosions may present extreme risks to utility infrastructure, with the potential to trigger fires, system failures, and/or blackouts.

Gas pipeline infrastructure is at extreme risk from geological events leading to pipeline rupture, and explosion hazards with the potential for significant environmental and public safety impacts. The risk scores are presented in Table 17.

Table 17. Summary of Utilities Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Utilities	Electrical substation																								
	Major electrical transmission lines																								



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

4 HRVA Results

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
	Gas pipeline																								

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.10 Municipal Facilities & Community Buildings

Hazard scenarios including hot & dry conditions, cold and winter hazards, wind and hail events, flooding, fire, geological and terrain stability, human-induced hazards, and pandemic are projected to affect municipal facilities and community buildings.

Municipal facilities and community buildings face multi-hazard and compounding risks that are projected to affect physical infrastructure and service provision. Cooling and heating demands during extreme heat and extreme cold conditions may increase energy consumption, strain the capacity of the systems in an effort to maintain comfortable indoor temperatures, and increase the risk of malfunction. Under extreme temperature conditions, there may also be an increased need for the use of public centres for cooling or heating, requiring coordination and communication, and increased call volumes to fire & rescue, and health services, straining local resources. Extreme heat risks may also lead to increased risk of fire.

High wind events and hailstorms may cause structural damage to building exteriors due to wind-blown debris or collision damage from hailstones, while service provision may be disrupted if communications or power infrastructure are damaged.

Flooding hazards, including lake, river, and stream flooding, flash flooding, seiche, and stormwater flooding, also drive high risk scores as floodwaters may damage building structures, forcing closures or changes in service delivery. Flooding impacts may have cascading effects on community access to essential services, and lead to strains on emergency response capacity. Prolonged disruptions due to significant structural damage or loss of facilities due to wildfire, structure fire, and geological and terrain stability hazards are also expected with cascading implications for emergency service response capacity.

Human-induced hazards are also projected to contribute to high risks for municipal facilities. Aging infrastructure, security threats (e.g. ransom attacks), hazardous material spills or explosions, and severe disease outbreak present significant operational and financial risk to the District and to taxpayers, with potential for disruptions in municipal service provision and impacts to public safety.

The risk scores are presented in Table 18.



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

4 HRVA Results

Table 18. Summary of Municipal Facilities & Community Buildings Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Municipal Facilities & Community Buildings	Grouped Municipal Buildings*																								
	Fire & rescue service																								
	Heritage buildings / cultural sites																								

*Municipal office, Works & Utilities office, Electrical warehouse, Community centre

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.11 Economic & Institutional Facilities

Economic and institutional facilities show high risks across multiple hazards and time horizons, including hot & dry conditions, cold and winter conditions, flooding, fire, geological and terrain stability, and human-induced events.

Extreme temperatures and geological hazards drive local crop or livestock loss, increasing threats to food security. Flooding may damage the entire community business district in Peachland with impacts to service provision and economic losses. Long-term economic harm may result from structural damage due to wildfire. Wildfire losses may contribute to changing economic patterns including future development, and adverse impacts to tourism. Pest outbreaks may impact agriculture and food businesses, which are an economic pillar of the District. Disruptions to economic and institutional facilities, particularly in the business district and the agricultural sector, may have cascading downstream effects on employment, food security, business continuity, and the economy in the District and the region.

There is no interaction noted in relation to pandemic as there was no private sector input at the first workshop. This, however, does not indicate that pandemic-related impacts are absent. Broader economic and operational impacts are likely to occur, but many mitigation approaches fall within the jurisdiction of health authorities and other governmental bodies. Risk scores are presented in Table 19.

Table 19. Summary of Economic & Institutional Facilities Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Economic & Institutional Facilities	Institutional development, commercial development	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Grey	Grey	Grey

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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4.2.12 Dams

Dams show extreme risks across flooding and geological and terrain stability. Failure of the Peachland Lake, Glen Lake, or Silver Lake dams could occur due to overtopping from flooding or structural damage, leading to inundation of downstream areas, risks to community safety, and impacts to water systems and community infrastructure.

Additional hazards with high risks include hot & dry conditions, cold and winter conditions, and wind. Extreme temperature conditions may impair mechanical systems, requiring increased maintenance, while windblown debris may damage the dam structure or lead to blockages.

The risk scores are presented in Table 20.

Table 20. Summary of Dam Risk Scores

Asset Category	Asset	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Dams	Peachland Lake Dam, Glen Lake Dam, Silver Lake Dam	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Red	Red	Grey	Grey	Grey	Grey	Grey	Grey

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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5 Risk Reduction Strategies

The actions presented are recommended for the District of Peachland's consideration. Actions were developed based on a review of existing District plans and policies, regional practices, information from the concurrent RDCO HRVA process, and input from participants in interviews and workshops.

Proposed actions and responsible authorities are included in Table 21. Full details of each action mapped to its corresponding hazard scenarios and asset categories is included in Appendix D. This additional information is intended as a guide to support future decision-making.

Table 21. Proposed Risk Mitigation Actions & Responsible Authority

Proposed Action	Responsible Authority
Hot & Dry	
Conduct a feasibility study for a home resilience retrofit program that focuses on improving insulation, ventilation, and access to cooling and air filtration in existing homes.	Peachland
Explore opportunities for distributed models for cooling support in the community. This could be a rental program to distribute portable air conditioning / air purification units to community members during periods of extreme heat and poor air quality (wildfire smoke). A District run program may be supplemented by funding programs through other organizations such as Fortis BC and BC Hydro who offer funding programs for vulnerable families with a medical letter).	Peachland, Fortis BC, BC Hydro
Implement a drought management plan and water conservation program to reduce strain on water supply during severe drought conditions. This may include enhanced water-use restrictions or irrigation efficiency requirements. The plan and program should align with RDCO water conservation strategies.	Peachland, RDCO
Coordinate a vulnerable populations check-in system during and after extreme heat events in partnership with health authorities, and other community partners and mental health associations.	Peachland, health authority, RDCO, community partners
Develop a public awareness program to improve and increase engagement and amplify the reach of check-in systems. This may include a resident role in checking in on neighbours, direct engagement with people at pharmacies and other places of healthcare access to inform residents.	Peachland, community members, community organizations
Use geo-mapping of health data to identify regions where door-knocking and direct resident support (i.e. collecting residents by vehicle) and taking them to support centres may be required.	Peachland, health authority, EMCR, Ministry of Health



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

5 Risk Reduction Strategies

Proposed Action	Responsible Authority
Plant native and drought resistant species adapted to withstand periods of extended extreme heat or drought, that have low irrigation needs and reduce maintenance demands. Additionally, consider restricting the sale of invasive species at nurseries and garden centres through bylaw amendments.	Peachland
Develop a policy that encourages shade through built environment structures and increases tree canopies to support natural shade.	Peachland
Explore opportunities for water re-use and its utilization during periods of extended and severe drought.	Peachland, health authority
Expand access (e.g., extended opening hours) to cooled spaces within community facilities during periods of extreme heat.	Peachland
Cold	
Enhance winter road maintenance protocols and coordination through mutual aid agreements. Upgrade snow clearing equipment, such as plows, or re-purpose existing machinery and fleet, and establish agreements with neighbouring communities to maintain network connectivity and emergency access during severe winter events.	Peachland, RDCO, neighbouring municipalities/districts
Install pipe freeze protection on critical infrastructure systems.	Peachland
Disseminate emergency support services communications through local channels to increase local engagement with public safety campaigns, including BC Services.	Peachland, ESS organizations
Wind & Hail	
Expand vegetation management for windstorms. Increase tree trimming and maintenance schedules to reduce wind-blown debris, health and safety risks, and damage to power lines, telecommunications infrastructure, and property.	Peachland
Establish alternative sources of energy and/or telecommunication options to maintain critical operations, service delivery, and population health and safety.	Peachland
Establish backup systems, redundancy, or power outage protocols for large and small drinking water systems to maintain levels of service across systems.	Peachland
Develop policy that promotes stronger-limbed trees that may be more suitable to withstand high wind events to reduce risk of falling branches.	Peachland
Flooding	



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

5 Risk Reduction Strategies

Proposed Action	Responsible Authority
Strengthen floodplain land-use and development regulations by updating bylaws to enforce setback distances, enhance riparian area protection, and discourage new development in high-risk flood zones near to Okanagan Lake or creeks, rivers, and streams.	Peachland
Upgrade stormwater infrastructure with climate-adjusted drainage system capacity and implement bio-swales, retention ponds, and other natural flood attenuation strategies to accommodate future projected rainfall.	Peachland
Upsize culverts on critical roads (e.g., one-way in, one-way out) that are prone to flood-related washouts. Undertake detour route planning in parallel to maintain connectivity during closures.	Peachland
Identify critical municipal infrastructure in flood-prone areas (e.g. lift stations, water intakes) and implement flood protection measures and backup protocols to maintain service.	Peachland
Collaborate regionally on flood response and lake level management with RDCO, provincial agencies, and dam operators on integrated early-warning and response plans for lake, riverine, and dam flooding.	Peachland, RDCO, Province, dam operators
Upgrade sanitary systems lift station pumping capacities as needed to serve a growing community, reducing potential overflow and damage to the lift stations themselves. Coordinate with the treatment plant operator to ensure available future capacity exists at the treatment plant.	Peachland
Complete an assessment to identify at risk development/ population and then take proactive measures to reduce the hazard of catastrophic flash flood risk	Peachland
Fire	
Implement actions outlined in the Community Wildfire Resiliency Plan.	Peachland
Enhance wildfire emergency preparedness and evacuation planning. Formalize mutual aid agreements with neighbouring fire departments and coordinate joint wildfire interface training with the BC Wildfire Service.	Peachland, BC Wildfire Services, neighbouring fire departments
Protect critical infrastructure against wildfire, including fire-resistant materials, vegetation management and buffers, and backup power at key facilities.	Peachland
Support provincial and regional initiatives to mitigate wildfire fuel loads and post-fire runoff and debris flow responses.	Peachland (with regional and provincial alignment)
Protect outdoor workers. Follow WorkSafe BC guidance on smoke-related workplace safety, including the option of well-fitted respirators (e.g., N95 filters) to reduce exposure to wildfire smoke.	Peachland
Review the need for local monitors per the air quality map and where possible procure and implement local PM 2.5 monitors through the BC Lung Carter's Project.	Peachland



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

5 Risk Reduction Strategies

Proposed Action	Responsible Authority
Utilize information from Air Quality Warnings, provincial Air Quality Health Index (AQHI), or modified AQHI from local monitors to guide decisions around: outdoor activities for the general and at-risk population; cancelling outdoor events in the event of severely reduced air quality; implementing cleaner air shelters.	Peachland
Distribute proactive messaging in advance of fire season to address residents pre-emptively using roof sprinkler systems.	Peachland
Support public spaces in improving air filtration. Support operators with upgrading HVAC systems for the summer. MERV 13 or higher and HEPA filters provide protection from wildfire smoke.	Peachland
Geological / Terrain Stability	
Conduct detailed mapping of steep slopes and past slide areas and integrate slope stability criteria into land-use decisions. Implement stabilization or drainage measures in key risk areas.	Peachland
Evaluate seismic vulnerability of critical municipal facilities and undertake seismic retrofits or upgrades.	Peachland
Incorporate earthquake preparedness and recovery into emergency plans.	Peachland
Work with the province to identify and prepare emergency bypass routes in emergency plans in case Highway 97 or key local roads are disrupted by landslides.	Peachland, Province
Develop District plan to address maintenance and management of water mains susceptible to seismic shocks or liquefaction.	Peachland
Human Induced	
Enhance physical and cyber security by conducting regular security assessments of water, power, and communications systems. Implement upgrades as needed.	Peachland
Work with critical infrastructure partners (including telecommunications providers, emergency management partners, electricity providers, and the RDCO) to confirm or establish continuity of service plans during power disruptions or other interruptions.	Peachland, RDCO, telecommunications providers, BC Hydro, Fortis BC
Develop standardized spill and hazardous material response protocols for highways. Implement interagency notification systems with provincial emergency management and first responders to support clear and effective communication, evacuation, and remediation procedures due to hazardous material spills.	Peachland, health authority
Coordinate regular interagency emergency preparedness exercises, simulating extended power outages or communications disruptions to test backup systems and coordination capacity.	Peachland, neighbouring municipalities, regional partners, etc.



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)

5 Risk Reduction Strategies

Proposed Action	Responsible Authority
Share and promote health authority messaging on public education surrounding vector borne disease and other environmental hazards under changing climate conditions (e.g. ticks, mosquitoes, rats), animal contact process, virus transmission, and vaccination.	Peachland, health authority
Collaborate with dam owners to establish early warning systems on dams in case of dam breach or failure and develop safety and failure plans to mitigate impacts to downstream communities.	Peachland, dam owners
Pandemic and Community Disease Outbreaks	
Maintain a robust community disease response plan by conducting regular updates to the business continuity plan, including critical staffing plans, remote work arrangements, essential service backup, and support for essential service worker families (e.g. daycare).	Peachland, health authority
Amplify health authority messaging, including opportunities to increase immunization rates.	Peachland, health authority
Develop an inventory of community assets (e.g. buildings, facilities) that could be used or activated during a community disease outbreak or pandemic. Verify that selected community assets have appropriate HVAC systems and air filtration, particularly for pandemics which would likely be as a result of an airborne pathogen.	Peachland, health authority
Increase local understanding and skills for risk communication to adequately balance trust and emotions in the delivery of pandemic and community disease outbreak responses and restrictions.	Peachland, health authority
Cross-Cutting and Consolidated Actions	
Establish public early warning and outreach systems to help community members stay safe during extreme events. Utilize regional applications such as <i>Alertable</i> and <i>Voyent Alert!</i> through the emergency program to push proactive messaging including water restrictions, nearby events, ESS registration on BC services, etc. Messaging may be tailored to the specific event and requires balanced coordination across multiple levels/scales.	Peachland (increase reach with regional coordination)
Expand psychological first aid and long-term community recovery support following extreme events.	Peachland, health authority
Support, establish, and promote community resilience hubs that make use of existing accessible public buildings, facilities, and spaces (e.g. libraries, community centres) with expanded hours to provide warming/cooling/clean air centres and emergency shelter.	Peachland, health authority, community organizations, social service partners
Expand community-scale backup power beyond essential facilities and establish alternative communication channels (satellite, radio) for emergencies or during extended power outages.	Peachland
Develop an extreme weather response plan with sections tailored to specific events (e.g. cooling centres, misting stations, and water refill stations for extreme heat, warming centres for extreme cold, etc.). Provisions for vulnerable populations to reach support facilities, including coordinating public transportation (e.g. buses, taxis) for vulnerable populations or people with limited mobility should also be considered.	Peachland, Extreme Weather Social Task Force





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Appendix A Workshop #1 Posters including Impact Statements

Provided under separate cover.



Appendix B Hazard Exposure Maps

Provided under separate cover.

B.1 Hazards

- Figure 1. Hazards: Water Level/Flooding
Figure 2. Hazards: Forest Fires
Figure 3. Hazards: Slopes

B.2 District Scale Assets

- Figure 1. Physical and Environmental Assets
Figure 2. Social Assets

B.3 Regional Scale Assets

- Figure 1. Physical and Environmental Assets
Figure 2. Social Assets



Appendix C Risk Results

		Hazard Scenario	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Representative Hazard	Extreme Heat			Freezing Rain / Snowstorms / Blizzards			Hail			Stormwater Flooding			Structure Fire			Landslide / Debris Flow			Security			Disease		
		Time Horizon	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Asset Group	Asset Category	Asset	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row
Social Elements	General Population	General population	9	15	15	6	6	8	12	12	16	6	9	12	16	16	16	15	20	20	20	20	20	12	16	20
	Vulnerable Populations	Low-income	9	15	15	9	9	12	12	12	16	8	12	16	16	16	16	15	20	20	20	20	20	12	16	20
		Children 0-14	9	15	15	6	6	8	12	12	16	8	12	16	16	16	16	15	20	20	20	20	20	12	16	20
		Seniors 65+	9	15	15	6	6	8	12	12	16	6	9	12	16	16	16	15	20	20	20	20	20	12	16	20
Physical & Environmental Assets	Parks & Outdoor Recreation	Local and regional greenspace	12	20	20	12	12	16	6	6	8	4	6	8	12	12	12	6	8	8	20	20	20			
	Road Network	Local roads	9	15	15	12	12	16	6	6	8	6	9	12	4	4	4	12	16	16	15	15	15			
		Highways	12	20	20	12	12	16	6	6	8	6	9	12	8	8	8	12	16	16	15	15	15			
	Water System	Water reservoir	12	20	20	15	15	20	3	3	4	2	3	4	16	16	16	9	12	12	20	20	20			
		Water treatment plant	12	20	20	15	15	20	12	12	16	6	9	12	16	16	16	12	16	16	20	20	20	9	12	15
		Water supply distribution network	12	20	20	15	15	20	12	12	16	6	9	12	16	16	16	12	16	16	20	20	20			
	Stormwater System	Stormwater system	3	5	5	15	15	20	6	6	8	6	9	12				9	12	12	20	20	20			
	Wastewater/Sanitary System	Wastewater treatment plant	9	15	15	15	15	20				2	3	4	4	4	4	12	16	16						



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)
Appendix C Risk Results

		Hazard Scenario	Hot & Dry			Cold / Winter Hazards			Wind & Hail			Flooding			Fire			Geological / Terrain Stability			Human Induced			Pandemic		
		Representative Hazard	Extreme Heat			Freezing Rain / Snowstorms / Blizzards			Hail			Stormwater Flooding			Structure Fire			Landslide / Debris Flow			Security			Disease		
		Time Horizon	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s	Baseline	2020s	2050s
Asset Group	Asset Category	Asset	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row	Risk per Row
		Sanitary mains/service pipes/manholes Lift stations				15	15	20										12	16	16						
	Waste Management Facilities	Landfill Recycling Depot				9	9	12				2	3	4				12	16	16						
	Utilities	Electrical substation	15	25	25	15	15	20	9	9	12	6	9	12	16	16	16	15	20	20	20	20	20			
		Major electrical transmission lines	15	25	25	15	15	20	15	15	20				16	16	16	15	20	20	20	20	20			
		Gas pipeline				12	12	16				6	9	12				15	20	20	20	20	20			
	Municipal Facilities & Community Buildings	Grouped Municipal Buildings: Municipal office Works & Utilities office Electrical warehouse Community centre	6	10	10	12	12	16	9	9	12	6	9	12	16	16	16	9	12	12	15	15	15	6	8	10
		Fire & Rescue Service	6	10	10	12	12	16	9	9	12	8	12	16	16	16	16	12	16	16	15	15	15	9	12	15
		Heritage buildings/cultural sites	6	10	10	12	12	16	9	9	12	6	9	12	8	8	8	12	16	16	15	15	15			
	Economic & Institutional Facilities	Institutional & Commercial development	6	10	10	12	12	16	6	6	8	8	12	16	12	12	12	9	12	12	15	15	15			
	Dams	Peachland Lake Dam Glen Lake Dam Silver Lake Dam	6	10	10	12	12	16	12	12	16	10	15	20	8	8	8	15	20	20						

Legend

No interaction	Negligible	Low	Moderate	High	Extreme
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Appendix D Risk Reduction Strategies

Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Hot & Dry																						
Conduct a feasibility study for a home resilience retrofit program that focuses on improving insulation, ventilation, and access to cooling and air filtration in existing homes.	Peachland	✓				✓				✓	✓											



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Explore opportunities for distributed models for cooling support in the community. This could be a rental program to distribute portable air conditioning / air purification units to community members during periods of extreme heat and poor air quality (wildfire smoke). A District run program may be supplemented by funding programs through other organizations such as Fortis BC and BC Hydro who offer funding programs for vulnerable families with a medical letter).	Peachland, Fortis BC, BC Hydro	✓				✓				✓	✓	✓										



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)
Appendix D Risk Reduction Strategies

Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Implement a drought management plan and water conservation program to reduce strain on water supply during severe drought conditions. This may include enhanced water-use restrictions or irrigation efficiency requirements. The plan and program should align with RDCO water conservation strategies.	Peachland, RDCO	✓								✓	✓		✓									
Coordinate a vulnerable populations check-in system during and after extreme heat events in partnership with health authorities, and other community partners and mental health associations.	Peachland, health authority, RDCO, community partners	✓									✓											



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Develop a public awareness program to improve and increase engagement and amplify the reach of check-in systems. This may include a resident role in checking in on neighbours, direct engagement with people at pharmacies and other places of healthcare access to inform residents.	Peachland, community members, community organizations	✓	✓						✓	✓	✓											
Use geo-mapping of health data to identify regions where door-knocking and direct resident support (i.e. collecting residents by vehicle) and taking them to support centres may be required.	Peachland, health authority, EMCR, Ministry of Health																					



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Plant native and drought resistant species adapted to withstand periods of extended extreme heat or drought, that have low irrigation needs and reduce maintenance demands. Additionally, consider restricting the sale of invasive species at nurseries and garden centres through bylaw amendments.	Peachland	✓	✓																			
Develop a policy that encourages shade through built environment structures and increases tree canopies to support natural shade.	Peachland	✓								✓	✓		✓							✓		
Explore opportunities for water re-use and its utilization during periods of extended and severe drought.	Peachland, health authority	✓											✓		✓							



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Expand access (e.g., extended opening hours) to cooled spaces within community facilities during periods of extreme heat.	Peachland	✓								✓	✓									✓		
Cold																						
Enhance winter road maintenance protocols and coordination through mutual aid agreements. Upgrade snow clearing equipment, such as plows, or re-purpose existing machinery and fleet, and establish agreements with neighbouring communities to maintain network connectivity and emergency access during severe winter events.	Peachland, RDCO, neighbouring municipalities / districts		✓							✓	✓			✓								
Install pipe freeze protection on critical infrastructure systems.	Peachland		✓											✓	✓	✓	✓	✓	✓	✓		



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Disseminate emergency support services communications through local channels to increase local engagement with public safety campaigns, including BC Services.	Peachland, ESS organizations		✓							✓	✓											
Wind & Hail																						
Expand vegetation management for windstorms. Increase tree trimming and maintenance schedules to reduce wind-blown debris, health and safety risks, and damage to power lines, telecommunications infrastructure, and property.	Peachland			✓						✓	✓		✓						✓	✓		



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Establish alternative sources of energy and/or telecommunication options to maintain critical operations, service delivery, and population health and safety.	Peachland	✓	✓	✓	✓	✓	✓	✓		✓	✓								✓			
Establish backup systems, redundancy, or power outage protocols for large and small drinking water systems to maintain levels of service across systems.	Peachland	✓	✓	✓	✓	✓	✓	✓							✓							
Develop policy that promotes stronger-limbed trees that may be more suitable to withstand high wind events to reduce risk of falling branches.	Peachland			✓									✓						✓			
Flooding																						



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Strengthen floodplain land-use and development regulations by updating bylaws to enforce setback distances, enhance riparian area protection, and discourage new development in high-risk flood zones near to Okanagan Lake or creeks, rivers, and streams.	Peachland				✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Upgrade stormwater infrastructure with climate-adjusted drainage system capacity and implement bio-swales, retention ponds, and other natural flood attenuation strategies to accommodate future projected rainfall.	Peachland				✓										✓							



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Upsize culverts on critical roads (e.g., one-way in, one-way out) that are prone to flood-related washouts. Undertake detour route planning in parallel to maintain connectivity during closures.	Peachland				✓									✓		✓						
Identify critical municipal infrastructure in flood-prone areas (e.g. lift stations, water intakes) and implement flood protection measures and backup protocols to maintain service.	Peachland				✓									✓	✓	✓	✓					
Collaborate regionally on flood response and lake level management with RDCO, provincial agencies, and dam operators on integrated early-warning and response plans for lake, riverine, and dam flooding.	Peachland, RDCO, Province, dam operators				✓								✓	✓	✓							✓



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Upgrade sanitary systems lift station pumping capacities as needed to serve a growing community, reducing potential overflow and damage to the lift stations themselves. Coordinate with the treatment plant operator to ensure available future capacity exists at the treatment plant.	Peachland				✓												✓					
Complete an assessment to identify at risk development/ population and then take proactive measures to reduce the hazard of catastrophic flash flood risk	Peachland				✓					✓	✓											
Fire																						
Implement actions outlined in the Community Wildfire Resiliency Plan.	Peachland					✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Enhance wildfire emergency preparedness and evacuation planning. Formalize mutual aid agreements with neighbouring fire departments and coordinate joint wildfire interface training with the BC Wildfire Service.	Peachland, BC Wildfire Services, neighbouring fire departments					✓								✓								
Protect critical infrastructure against wildfire, including fire-resistant materials, vegetation management and buffers, and backup power at key facilities.	Peachland					✓							✓		✓	✓	✓	✓	✓	✓		
Support provincial and regional initiatives to mitigate wildfire fuel loads and post-fire runoff and debris flow responses.	Peachland (with regional and provincial alignment)					✓	✓							✓	✓							



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Protect outdoor workers. Follow WorkSafe BC guidance on smoke-related workplace safety, including the option of well-fitted respirators (e.g., N95 filters) to reduce exposure to wildfire smoke.	Peachland					✓				✓	✓											
Review the need for local monitors per the air quality map and where possible procure and implement local PM 2.5 monitors through the BC Lung Carter's Project.	Peachland					✓				✓	✓											



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Utilize information from Air Quality Warnings, provincial Air Quality Health Index (AQHI), or modified AQHI from local monitors to guide decisions around: outdoor activities for the general and at-risk population; cancelling outdoor events in the event of severely reduced air quality; implementing cleaner air shelters.	Peachland					✓				✓	✓											
Distribute proactive messaging in advance of fire season to address residents pre-emptively using roof sprinkler systems.	Peachland					✓				✓	✓			✓								



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Support public spaces in improving air filtration. Support operators with upgrading HVAC systems for the summer. MERV 13 or higher and HEPA filters provide protection from wildfire smoke.	Peachland					✓				✓	✓											
Geological / Terrain Stability																						
Conduct detailed mapping of steep slopes and past slide areas and integrate slope stability criteria into land-use decisions. Implement stabilization or drainage measures in key risk areas.	Peachland						✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Evaluate seismic vulnerability of critical municipal facilities and undertake seismic retrofits or upgrades.	Peachland						✓					✓	✓	✓	✓	✓	✓	✓	✓	✓		



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Incorporate earthquake preparedness and recovery into emergency plans.	Peachland						✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Work with the province to identify and prepare emergency bypass routes in emergency plans in case Highway 97 or key local roads are disrupted by landslides.	Peachland, Province						✓							✓								
Develop District plan to address maintenance and management of water mains susceptible to seismic shocks or liquefaction.	Peachland						✓								✓							
Human Induced																						



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)
Appendix D Risk Reduction Strategies

Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Enhance physical and cyber security by conducting regular security assessments of water, power, and communications systems. Implement upgrades as needed.	Peachland							✓						✓		✓	✓	✓	✓	✓	✓	
Work with critical infrastructure partners (including telecommunications providers, emergency management partners, electricity providers, and the RDCO) to confirm or establish continuity of service plans during power disruptions or other interruptions.	Peachland, RDCO, telecommunications providers, BC Hydro, Fortis BC		✓	✓	✓	✓		✓		✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Develop standardized spill and hazardous material response protocols for highways. Implement interagency notification systems with provincial emergency management and first responders to support clear and effective communication, evacuation, and remediation procedures due to hazardous material spills.	Peachland, health authority							✓		✓	✓			✓	✓		✓					
Coordinate regular interagency emergency preparedness exercises, simulating extended power outages or communications disruptions to test backup systems and coordination capacity.	Peachland, neighbouring municipalities, regional partners, etc.							✓							✓		✓	✓	✓	✓		✓



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Share and promote health authority messaging on public education surrounding vector borne disease and other environmental hazards under changing climate conditions (e.g. ticks, mosquitoes, rats), animal contact process, virus transmission, and vaccination.	Peachland, health authority	✓								✓	✓											
Collaborate with dam owners to establish early warning systems on dams in case of dam breach or failure and develop safety and failure plans to mitigate impacts to downstream communities.	Peachland, dam owners							✓														✓
Pandemic and Community Disease Outbreaks																						



District of Peachland Hazard, Risk and Vulnerability Analysis (HRVA)
Appendix D Risk Reduction Strategies

Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Maintain a robust community disease response plan by conducting regular updates to the business continuity plan, including critical staffing plans, remote work arrangements, essential service backup, and support for essential service worker families (e.g. daycare).	Peachland, health authority								✓	✓	✓											
Amplify health authority messaging, including opportunities to increase immunization rates.	Peachland, health authority								✓	✓	✓											



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Develop an inventory of community assets (e.g. buildings, facilities) that could be used or activated during a community disease outbreak or pandemic. Verify that selected community assets have appropriate HVAC systems and air filtration, particularly for pandemics which would likely be as a result of an airborne pathogen.	Peachland, health authority								✓	✓	✓											
Increase local understanding and skills for risk communication to adequately balance trust and emotions in the delivery of pandemic and community disease outbreak responses and restrictions.	Peachland, health authority								✓	✓	✓											
Cross-Cutting and Consolidated Actions																						



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Establish public early warning and outreach systems to help community members stay safe during extreme events. Utilize regional applications such as <i>Alertable</i> and <i>Voyent Alert!</i> through the emergency program to push proactive messaging including water restrictions, nearby events, ESS registration on BC services, etc. Messaging may be tailored to the specific event and requires balanced coordination across multiple levels/scales.	Peachland (increase reach with regional coordination)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓											
Expand psychological first aid and long-term community recovery support following extreme events.	Peachland, health authority	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓											



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Support, establish, and promote community resilience hubs that make use of existing accessible public buildings, facilities, and spaces (e.g. libraries, community centres) with expanded hours to provide warming/cooling/clean air centres and emergency shelter.	Peachland, health authority, community organizations, social service partners	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									✓		
Expand community-scale backup power beyond essential facilities and establish alternative communication channels (satellite, radio) for emergencies or during extended power outages.	Peachland	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓



Proposed Action	Responsible Authority	Hazard Scenarios								Asset Categories + Social Elements												
		Hot & Dry	Cold	Wind & Hail	Flooding	Fire	Geological / Terrain Stability	Human Induced	Pandemic	General Population	Vulnerable Populations	First Nations & Territories	Parks & Outdoor Recreation	Road Network	Water System	Stormwater System	Wastewater / Sanitary System	Waste Management Facilities	Utilities	Municipal Facilities & Community Buildings	Economic & Institutional Facilities	Dams
Develop an extreme weather response plan with sections tailored to specific events (e.g. cooling centres, misting stations, and water refill stations for extreme heat, warming centres for extreme cold, etc.). Provisions for vulnerable populations to reach support facilities, including coordinating public transportation (e.g. buses, taxis) for vulnerable populations or people with limited mobility should also be considered.	Peachland, Extreme Weather Social Task Force	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									✓		





Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

