# District of Summerland Hazard, Risk, and Vulnerability Project Summary CCRA + HRVA

*October 17, 2023*

# HRVA

**Hazard, Risk, and Vulnerability Assessment**

- All hazards risk assessment for social, environmental, and physical community priorities
- Guides emergency management and general hazard mitigation
- Online tool
- Provincial mandate
- Previously completed 2006

# CCRA

**Climate Change Risk Assessment**

- Identifies risks from climate hazards to infrastructure assets
- Guides prioritization of assets and components for climate adaptation

# HRVA Process and Worksheets

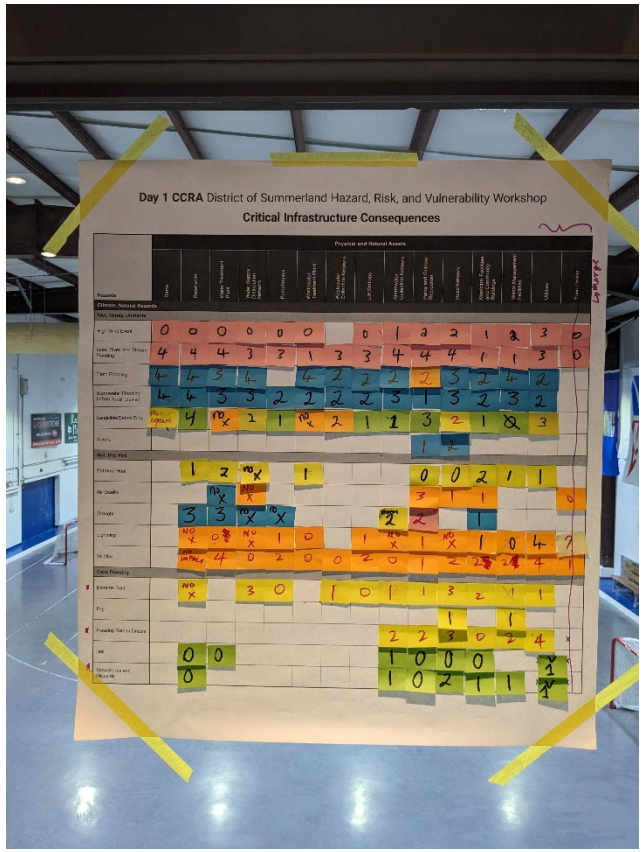
- Step 1 - Getting started
- Step 2 - Hazard identification
- Step 3 - Understand community risk and resilience
- Step 4 - Assess hazard likelihood
- Step 5 - Assess consequences
- Step 6 - Build a risk profile
- Step 7 - Identify Risk Reduction Strategies
- Step 8 - Generate report
- Step 9 - Approval report

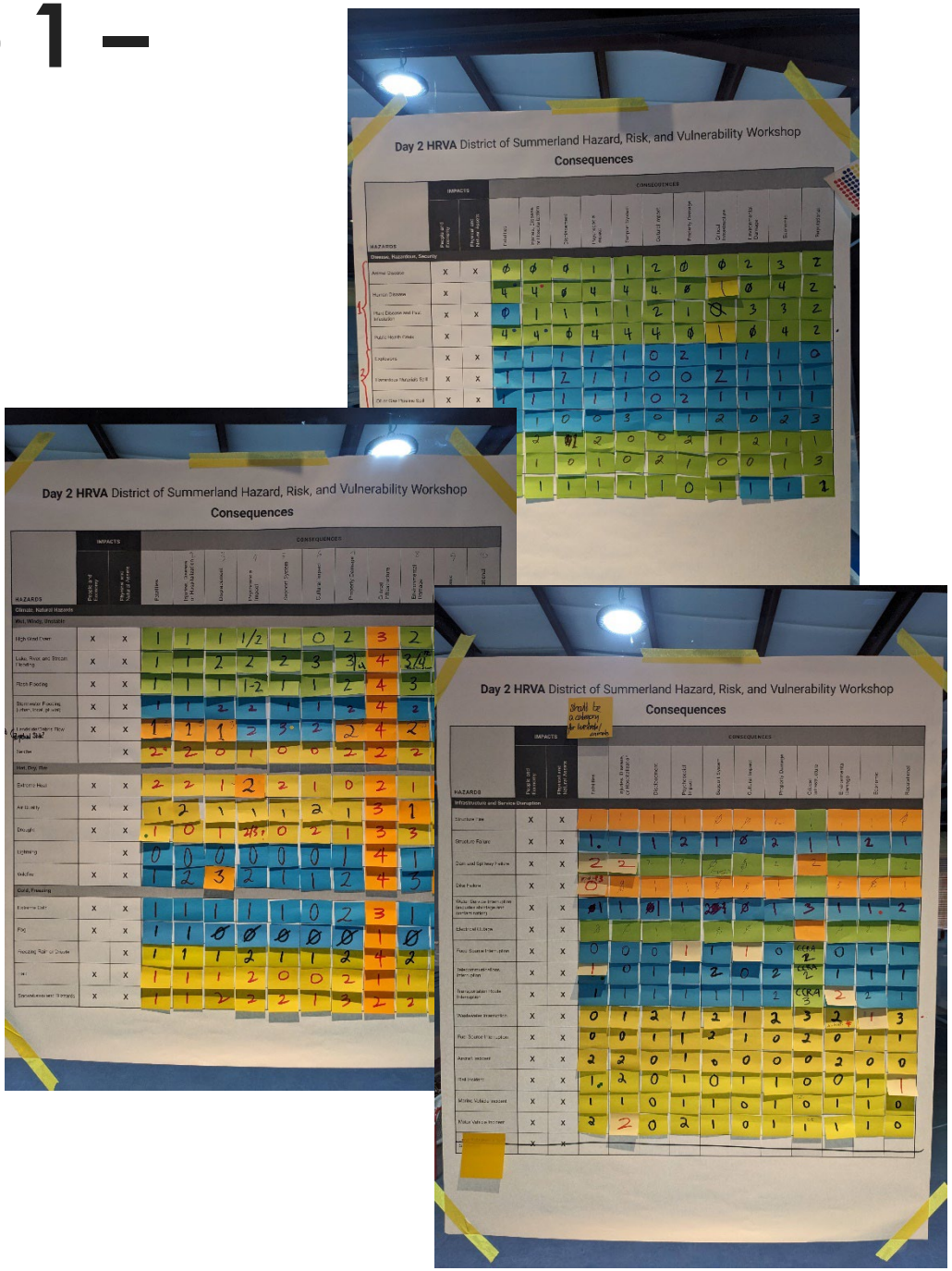
# Risk Assessment Outline

1. **Identify Hazards**
   i. What hazards is Summerland exposed to now and in the future?
      a. *Literature review and stakeholder interviews*
2. **Explore Impacts**
   i. What historic impacts has the District experienced, and what vulnerabilities exist?
      a. *Stakeholder interviews*
3. **Determine Likelihood**
   i. How will the relevant hazards change over into the future (2050s)?
      a. *Climate science – Stantec generated data*
4. **Score Consequence**
   i. Not all impacts are of equal consequence, how severe are these impacts? Financially, socially…etc.
      a. *Stakeholder workshop*
5. **Assess Risk and Plan to Adapt**
   i. How does the District's risk profile change over time? What can the District do to adapt to these risks?
      a. *Stakeholder workshop*

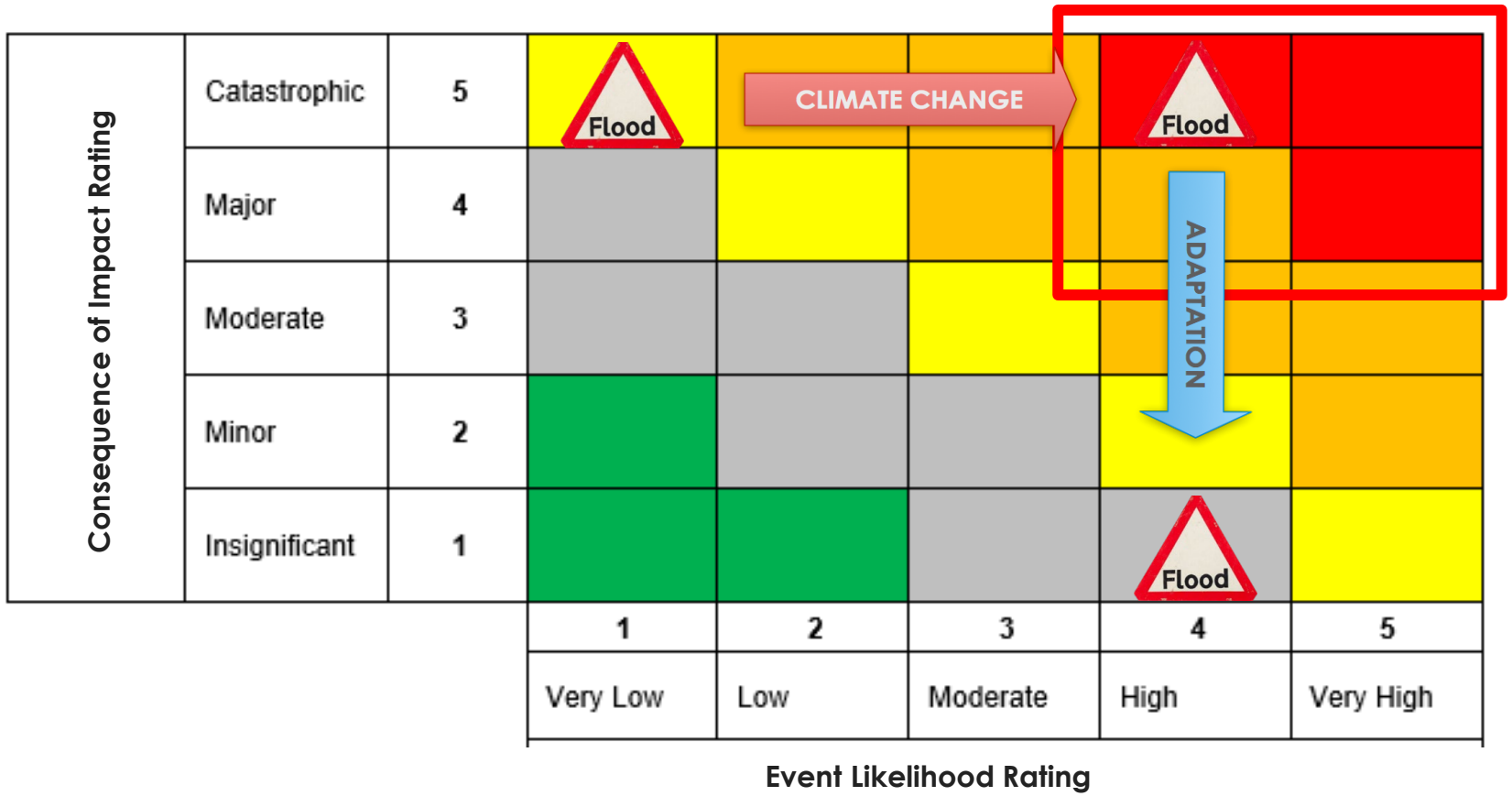
# Risk

# Summary of Workshop 1 – Consequence Scoring



# Risk Assessment - Example



# Key Differences Between CCRA and HRVA

Level of detail on assets

Consequence considerations / severity of impact

Visualisation of risks

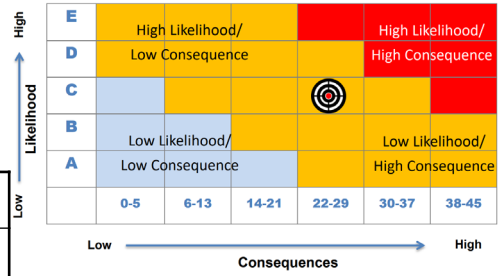
# Summerland Risk Profile - CCRA

| Assets | Air Quality | | | | Extreme Heat | | | | Extreme Cold | | | | SDHI | | | | Fog | | | | Freezing Rain or Drizzle | | | | Hail | | | | High Wind Event | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s |
| Dams | | | | | | | | | | | | | 8 | 12 | 16 | 16 | | | | | | | | | | | | | 0 | 0 | 0 | 0 |
| Reservoirs | | | | | 3 | 5 | 5 | 5 | | | | | 8 | 12 | 16 | 16 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Treatment Plant | | | | | 6 | 10 | 10 | 10 | | | | | 6 | 9 | 12 | 12 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Water Supply Distribution Network | | | | | | | | | 9 | 3 | 3 | 3 | 6 | 9 | 12 | 12 | | | | | | | | | | | | | 0 | 0 | 0 | 0 |
| Pumphouses | | | | | | | | | 0 | 0 | 0 | 0 | 4 | 6 | 8 | 8 | | | | | | | | | | | | | 0 | 0 | 0 | 0 |
| Wastewater Treatment Plant | | | | | 3 | 5 | 5 | 5 | | | | | 4 | 6 | 8 | 8 | | | | | | | | | | | | | 0 | 0 | 0 | 0 |
| Wastewater Collection Network | | | | | | | | | 3 | 1 | 1 | 1 | 4 | 6 | 8 | 8 | | | | | | | | | | | | | | | | |
| Lift Stations | | | | | | | | | 0 | 0 | 0 | 0 | 4 | 6 | 8 | 8 | | | | | | | | | | | | | 0 | 0 | 0 | 0 |
| Stormwater Collection Network | | | | | | | | | 3 | 1 | 1 | 1 | 6 | 9 | 12 | 12 | | | | | 6 | 6 | 8 | 10 | 3 | 3 | 4 | 4 | 2 | 2 | 3 | 3 |
| Parks and Outdoor Recreation | 9 | 9 | 12 | 12 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 1 | 2 | 3 | 4 | 4 | | | | | 6 | 6 | 8 | 10 | 0 | 0 | 0 | 0 | 4 | 4 | 6 | 6 |
| Road Network | 3 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 9 | 3 | 3 | 3 | 6 | 9 | 12 | 12 | 3 | 3 | 4 | 4 | 9 | 9 | 12 | 15 | 0 | 0 | 0 | 0 | 4 | 4 | 6 | 6 |
| Municipal Facilities and Community Buildings | 3 | 3 | 4 | 4 | 6 | 10 | 10 | 10 | | | | | 4 | 6 | 8 | 8 | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 | 3 |
| Waste Management Facilities | | | | | 3 | 5 | 5 | 5 | 3 | 1 | 1 | 1 | 6 | 9 | 12 | 12 | 3 | 3 | 4 | 4 | 6 | 6 | 8 | 10 | | | | | 4 | 4 | 6 | 6 |
| Utilities | | | | | 3 | 5 | 5 | 5 | 3 | 1 | 1 | 1 | 4 | 6 | 8 | 8 | | | | | 12 | 12 | 16 | 20 | 3 | 3 | 4 | 4 | 6 | 6 | 9 | 9 |

# Summerland Risk Profile - CCRA

| Assets | Lightning | | | | Snowstorms and Blizzards | | | | Wildfire | | | | Landslide/ Debris Flow | | | | Drought | | | | Seiche | | | | Lake/ River/ Stream Flooding | | | | Flash Flooding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s | Present | 2030s | 2050s | 2080s |
| Dams | | | | | | | | | | | | | | | | | | | | | | | | | 8 | 12 | 12 | 12 | 8 | 12 | 16 | 16 |
| Reservoirs | | | | | 0 | 0 | 0 | 0 | | | | | 16 | 16 | 16 | 16 | 9 | 12 | 12 | 15 | | | | | 8 | 12 | 12 | 12 | 8 | 12 | 16 | 16 |
| Water Treatment Plant | 0 | 0 | 0 | 0 | | | | | 20 | 20 | 20 | 20 | | | | | 9 | 12 | 12 | 15 | | | | | 8 | 12 | 12 | 12 | 6 | 9 | 12 | 12 |
| Water Supply Distribution Network | | | | | | | | | 0 | 0 | 0 | 0 | 8 | 8 | 8 | 8 | | | | | | | | | 6 | 9 | 9 | 9 | 8 | 12 | 16 | 16 |
| Pumphouses | 5 | 5 | 5 | 5 | | | | | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 4 | | | | | | | | | 6 | 9 | 9 | 9 | | | | |
| Wastewater Treatment Plant | 0 | 0 | 0 | 0 | | | | | 0 | 0 | 0 | 0 | | | | | | | | | | | | | 2 | 3 | 3 | 3 | 8 | 12 | 16 | 16 |
| Wastewater Collection Network | | | | | | | | | 0 | 0 | 0 | 0 | 8 | 8 | 8 | 8 | | | | | | | | | 6 | 9 | 9 | 9 | 4 | 6 | 8 | 8 |
| Lift Stations | 5 | 5 | 5 | 5 | | | | | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 4 | | | | | | | | | 6 | 9 | 9 | 9 | 4 | 6 | 8 | 8 |
| Stormwater Collection Network | | | | | 3 | 3 | 4 | 4 | 0 | 0 | 0 | 0 | 4 | 4 | 4 | 4 | 6 | 8 | 8 | 10 | | | | | 8 | 12 | 12 | 12 | 4 | 6 | 8 | 8 |
| Parks and Outdoor Recreation | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 12 | 12 | 12 | 12 | 6 | 8 | 8 | 10 | 3 | 3 | 3 | 3 | 8 | 12 | 12 | 12 | 4 | 6 | 8 | 8 |
| Road Network | | | | | 6 | 6 | 8 | 8 | 10 | 10 | 10 | 10 | 8 | 8 | 8 | 8 | | | | | 6 | 6 | 6 | 6 | 8 | 12 | 12 | 12 | 6 | 9 | 12 | 12 |
| Municipal Facilities and Community Buildings | 5 | 5 | 5 | 5 | 3 | 3 | 4 | 4 | 10 | 10 | 10 | 10 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | | | | | 2 | 3 | 3 | 3 | 4 | 6 | 8 | 8 |
| Waste Management Facilities | 0 | 0 | 0 | 0 | 3 | 3 | 4 | 4 | 10 | 10 | 10 | 10 | 0 | 0 | 0 | 0 | | | | | | | | | 2 | 3 | 3 | 3 | 8 | 12 | 16 | 16 |
| Utilities | 20 | 20 | 20 | 20 | 3 | 3 | 4 | 4 | 20 | 20 | 20 | 20 | 12 | 12 | 12 | 12 | | | | | | | | | 6 | 9 | 9 | 9 | 4 | 6 | 8 | 8 |

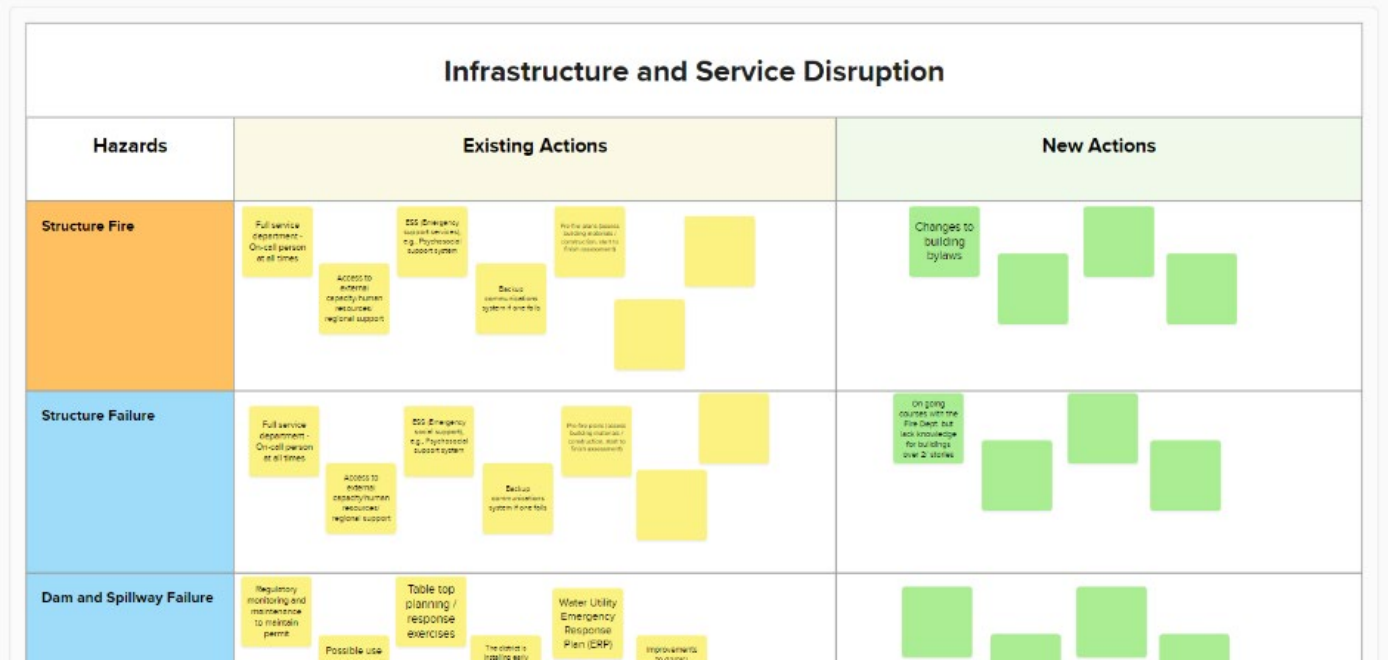
# Summerland Risk Profile - HRVA




| Hazards | | |
|---|---|---|
| **Climate, Natural Hazards** | **Disease, Hazardous, Security** | **Infrastructure and Service Disruption** |
| High Wind Event | Animal Disease | Structure Fire |
| Lake, River, and Stream Flooding | Human Disease | Structure Failure |
| Flash Flooding | Plant Disease and Pest Infestation | Dam and Spillway Failure |
| Storm Water Flooding (urban, local, pluvial) | Public Health Crisis | Dike Failure |
| Landslide/Debris Flow | Explosions | Water Service Interruption (Includes shortage and contamination) |
| Seiche | Hazardous Materials Spill | Electrical Outage |
| Extreme Heat | Oil or Gas Pipeline Spill | Food Source Interruption |
| Air Quality | Cyber Security Threat | Telecommunications Interruption |
| Drought | National Security Threat | Transportation Route Interruption |
| Lightning | Public Disturbance | Wastewater Interruption |
| Wildfire | Major Planned Event | Fuel Source Interruption |
| Extreme Cold | | Aircraft Incident |
| Fog | | Rail Incident |
| Freezing Rain or Drizzle | | Marine Vehicle Incident |
| Hail | | Motor Vehicle Incident |
| Snowstorms and Blizzards | | |

# Summary of Workshop 2 – Risk Reduction





# Next Steps

Results can be used towards development of a climate adaptation plan for the District by:

- Identifying gaps and opportunities internally to support education and awareness in departments for risks and hazards in the District.
- Informing improvements in how the District responds to hazards and risks at a local and regional level.
- Informing future climate change planning by enhancing understanding of climate risk and informing actions and future implementation (adaptation and mitigation based low carbon resilience).

# Next Steps – Recommendations

- Continue to promote a collaborative approach to adaptation planning that involves relevant stakeholders and knowledge holders, such as District government, First Nations, residents, business owners, and regional agencies (e.g., RDOS, IH, OASSIS).
- Continue to implement the District's approved Asset Management Strategy by updating building condition assessments and Level I ASHRAE energy audits when necessary for critical facilities.
- Although "high" and "extreme" risks have been the focus of this analysis, there is value in developing risk reduction measures for medium and lower risk assets as well.