

Hazard Policy Guidance Project Fairmont Hot Springs



Policy Direction – Options & Examples

February 13, 2025

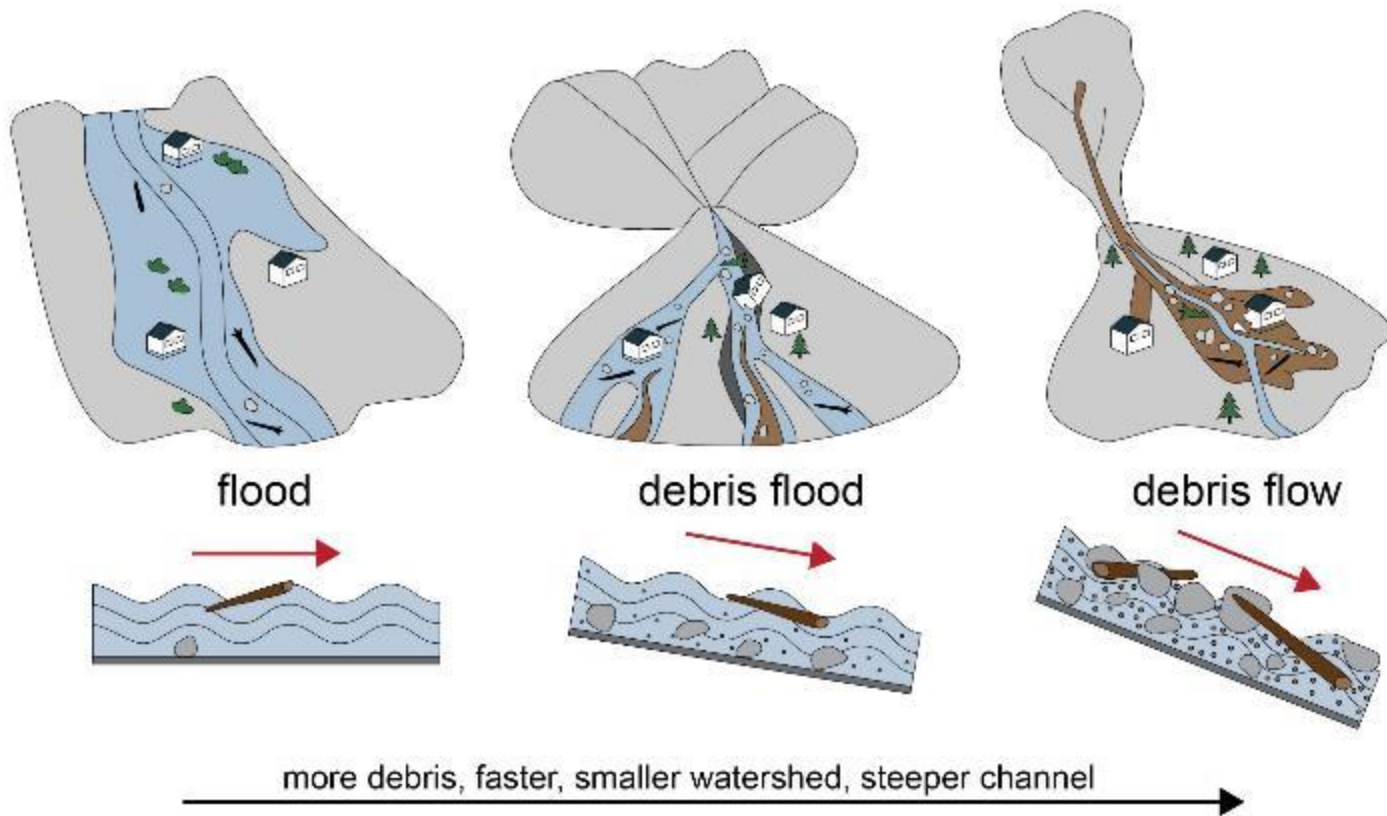
Presented to RDEK Electoral Area Committee

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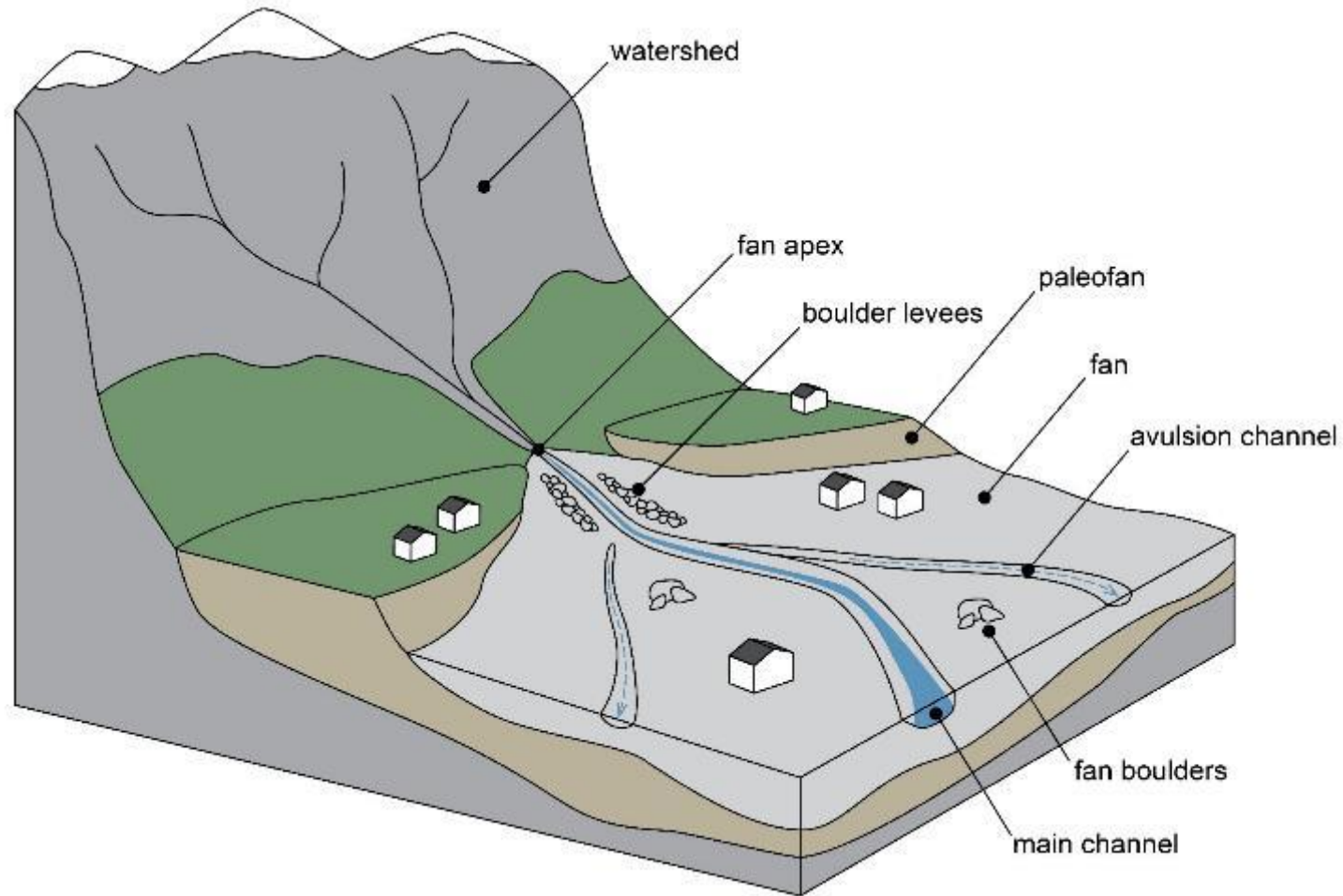
Agenda

- Debris Flow Hazard
- Current RDEK Approach
- Key Concepts
- Examples from Other Jurisdictions

Debris Flow Hazard

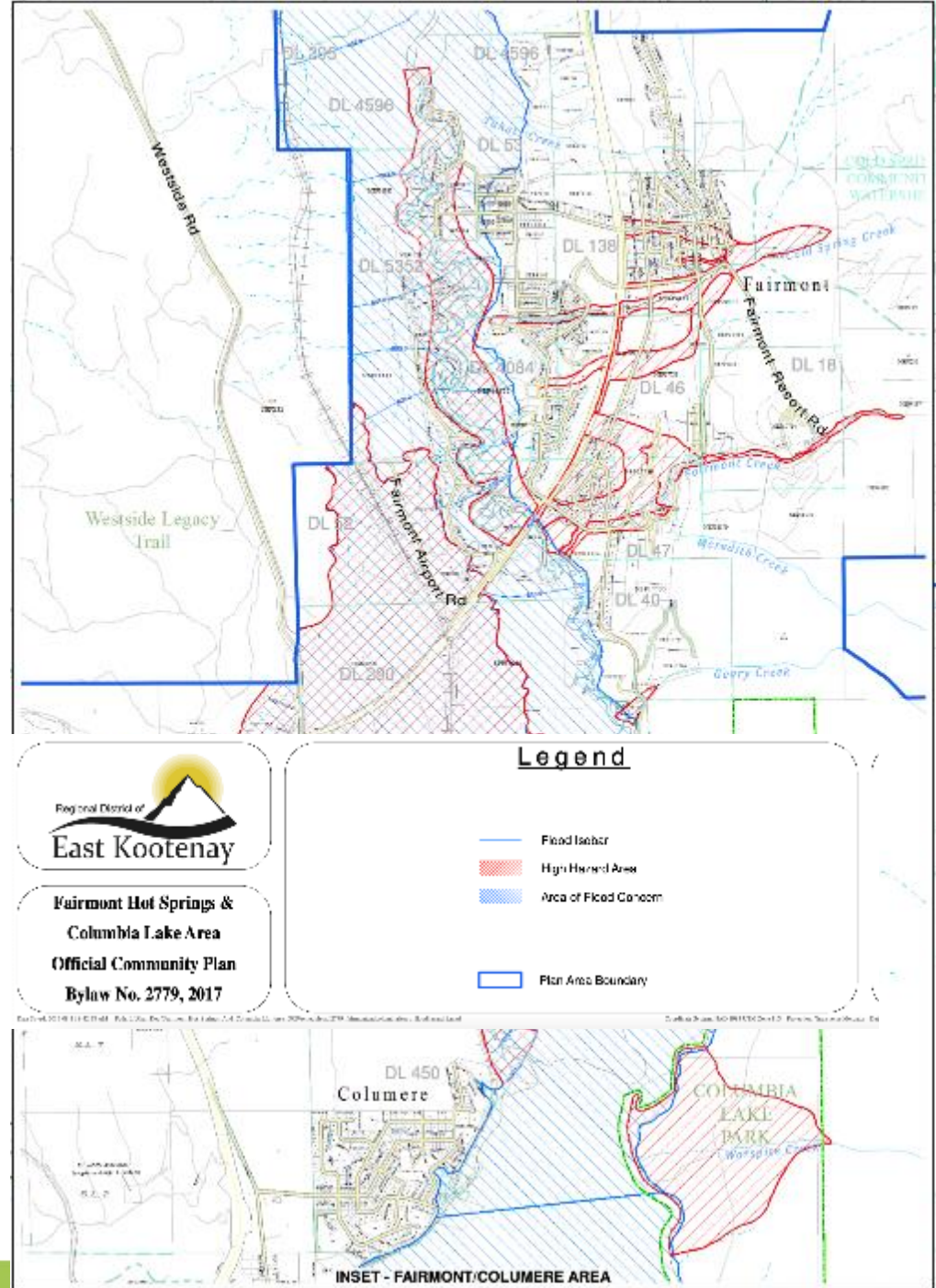


Debris Flow Hazard



Current RDEK Approach

OCP Hazard Areas Schedule I



OCP – Development constraints related to debris flow fans, floodplains, and geotech. hazards

- Objectives:
 - Ensure public safety by **discouraging development in unsuitable areas**, such as floodplains and areas subject to geotechnical hazards such as slope, erosion and landslip.
 - **Prevent or minimize the expenditure of public money in damage compensation** or mitigation resulting from the development of lands subject to hazardous events or situations
 - Encourage engineering and construction of **public infrastructure**, such as roads, bridges, and drainage works to be more resilient to increasingly frequent severe climatic events such as flooding.

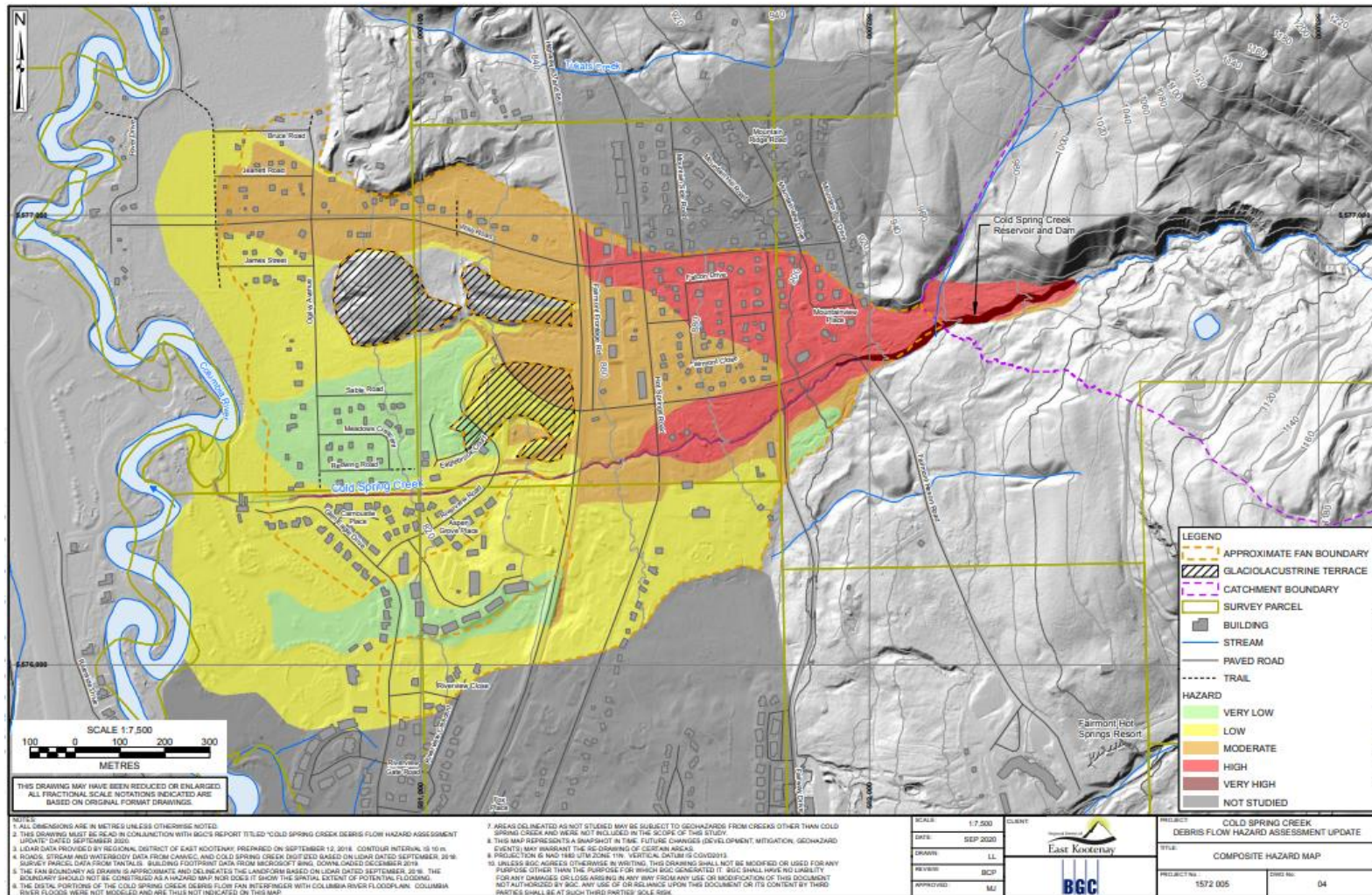
OCP – Related Policies

- Development of new infrastructure and land development within an alluvial fan (Schedule I) should include a **terrain hazard assessment** – including an assessment of the transfer of risk to downstream properties.
- Rezoning applications in areas identified as high hazard (Schedule I) must incorporate **strategies to mitigate the impact of hazard** (report by Qualified Professional (QP) and covenant).
- Development of land **susceptible to flooding** is discouraged.

Current Approach

- Cold Spring Creek:
 - Currently using the BGC pre-mitigation hazard map (2020)
 - Anything that is yellow, orange, or red → requiring a QP report.
 - Covenants on title. The Building Inspector monitors that recommendations are implemented.
- Fairmont Creek:
 - Setbacks and Flood Construction Level (FCL) from the Upper Columbia Valley Flood Management Bylaw (1034, 1993)
- Standard exemptions as per flood management bylaw

Map – Pre-mitigation Construction Debris Flow Hazard – Cold Spring Creek



Draft Guidance for Policy

- **Public Safety:** do not create new risks (individual and group) or transfer risk to neighbours.
- **Consistent framework** to make informed development decisions.
- **Ease of use** for RDEK staff - within expertise.
- **Support QPs** in the area to make suitable recommendations.

Key Concepts

Key Concepts

- **Hazard Probability:** The likelihood of an event of a certain magnitude occurring.
 - Often described using “return period” – the average time between occurrences of such an event (e.g. 1:100 year flood).
- **Risk to Life:** The probability of the death of an individual living or working within a hazard area.
 - Depends on whether debris flow reaches inhabited structures, how deep and fast it is when contact is made and the likelihood of structural failure causing a fatality.
 - Can be compared to everyday risks (e.g. 1:1,000 risk of drowning).
 - Group Risk: the probability of multiple fatalities.

Precedents

- Judgement on 1972 subdivision application – “sufficient likelihood” of a catastrophic landslide was described as a return period of 1:10,000 years. Analogous with risk to life in the affected area.
- BC Ministry of Transportation and Transit – natural hazard assessments for subdivision preliminary layout review – where a life-threatening hazard event is possible, QP must consider events with 1:10,000-year probability

Policy Approaches in BC and AB

Hazard-Focused Approaches

- Land use decisions are related to the probability of the hazard occurring and reaching the area of interest.
- Imply risk to a degree by applying different criteria depending on the hazard and the development type

Debris Flow/Debris Torrent

Debris flows and torrents are rapid, saturated flows of coarse debris and mud, damaged trees, stumps, and smaller organic material. These flows may be contained in steep creek channels or they may spread out on debris fan surfaces. Debris flows and torrents can be life-threatening and damage or destroy property.



Table 4

	1:50	1:50-1:200	1:200-1:500	1:500-1:10,000	<1:10,000
Minor Repair (<25%)	5	2	2	1	1
Major Repair (>25%)	5	4	2	1	1
Reconstruction	5	5	4	3	1
Extension	5	5	4	2	1
New Building	5	5	4	3	1
Subdivision (infill/extend)	5	5	5	4	1
Rezoning (for new community)	5	5	5	5	1

FVRD Example

1	Approval without conditions relating to hazards.
2	Approval, without siting conditions or protective works conditions but with a covenant including "save harmless" conditions.
3	Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard.
4	Approval as #3 above, but with a covenant including "save harmless" conditions as well as siting conditions, protective works or both.
5	Not approvable.

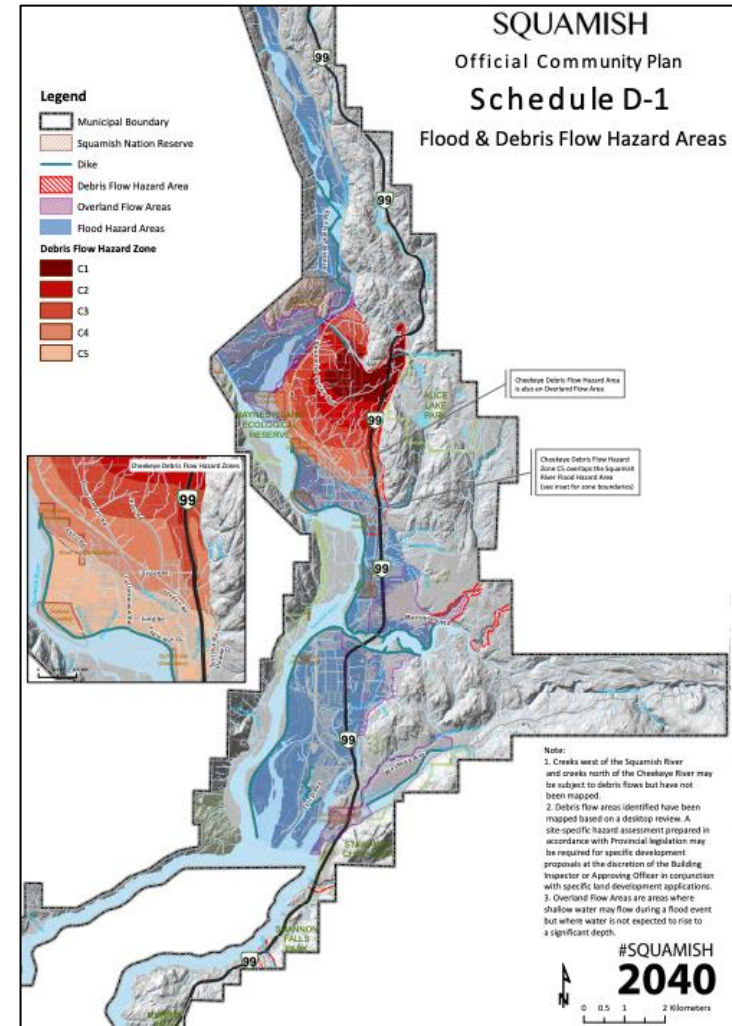
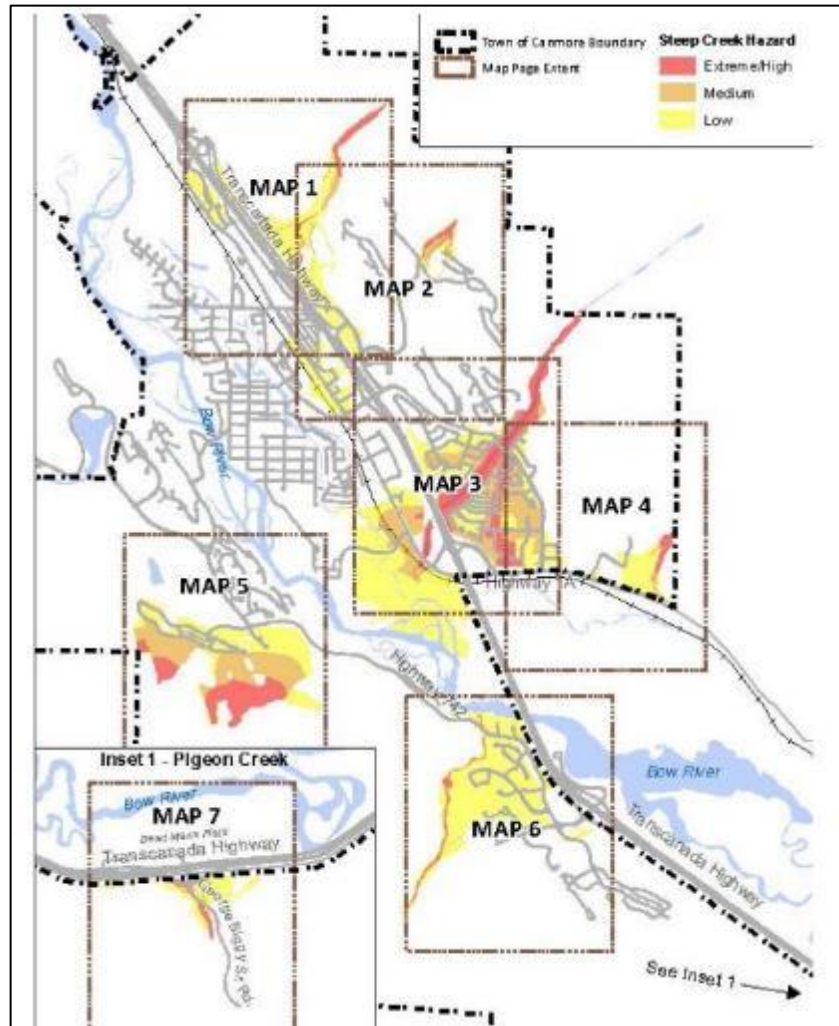
Hazard-Focused Approaches

- (-) Places full responsibility for what constitutes “safe for the intended use” on the QP. Local planners must then rely entirely on the QP’s interpretation with limited ability to assess it.
- (+) Hazard probability is a familiar concept
- (+) Process transparency for applicants
- (-) The approach focuses on new risks and does not directly promote reducing existing risk
- (-) May hamper creative, site-specific approaches that explicitly consider vulnerability.

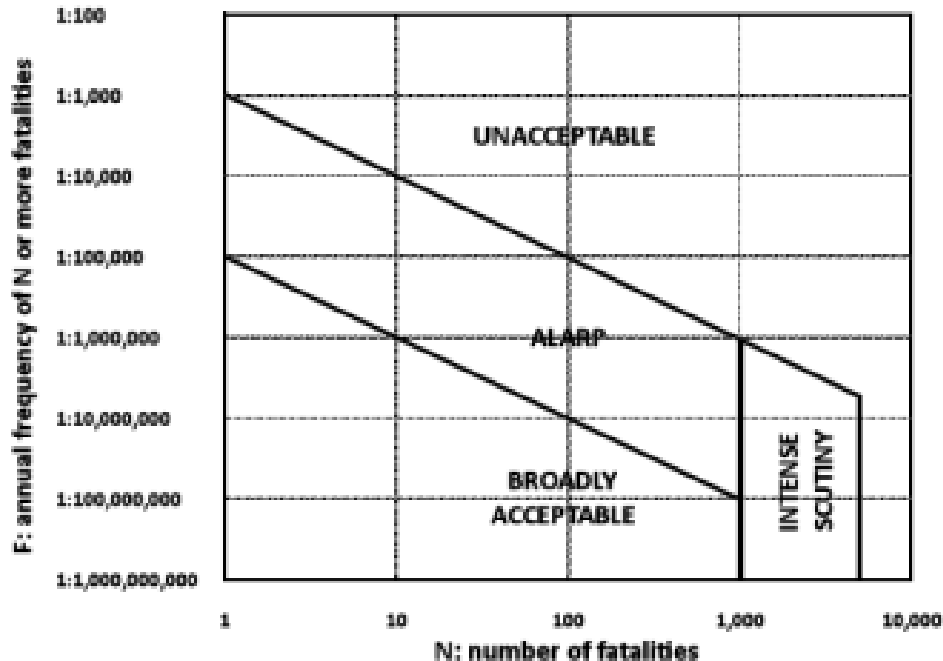
Combined Hazard and Risk Approaches

- Community-established risk tolerance criteria effectively define what is considered “safe for the intended use,” and QPs evaluate whether these standards can be met through the design of mitigation measures for development.
- Hazard maps define zones (e.g. extreme, high, moderate, low, etc.) based on intensities.
- Official Community Plans include risk tolerance criteria and policies relative to the hazard zones. Generally:
 - Higher hazard zones: no development
 - Moderate hazard zones: development if a risk assessment demonstrates that risk tolerance criteria can be met
 - Low hazard zones: development is likely permitted but risk assessment may be required.

Example Hazard Zones – Canmore/DoS



Risk Tolerance Criteria Example: DoS



- Existing development: individual risk < 1:10,000
- New development: individual risk < 1:100,000
- Group risk shall be broadly acceptable or ALARP.
- Where group risk falls in ALARP must have a risk assessment that states why the cost of reducing the risk further is disproportional to the benefit.

Combined Hazard and Risk Approaches

- (+) Relieves the burden on planners to interpret QPs assessments of “safe for the intended use”.
- (+) Hazard zones provide important information on the changing characteristics of the hazard across the fan.
- (-) Can result in costly duplication of effort where independent applicants require a watershed scale analysis.
 - Can be addressed through RDEK watershed scale assessments with sufficient detail for QPs to focus work at the property level.
- (-) Challenging to find QPs with appropriate risk assessment expertise.
- (-) RDEK will need to incorporate assessment deliverables into a maintained body of knowledge about the hazard.

Thank you