



THE WEST COAST
REGIONAL COUNCIL

FUTURE MANAGEMENT OF THE WAIHO RIVER

Community Presentation

Future Management of the Waiho River

This report has been compiled by the 2023
Waiho Technical Advisory Group upon the
request of the West Coast Regional Council

10 October 2023

R. Beagley, T. Davies, I. Fuller, M. Gardner, M.
Healey, and G. Williams.

Welcome (Haere mai) and Introductions

Te Rūnanga o Makaawhio

Kara Edwards (TBC)

Government Departments

DIA - Caroline Dumas; **DWC** - Heath Milne; **Department of Conservation** - Blair Shrimpton and Wayne Costello

Westland District Council

Mayor - Helen Lash; **Deputy Mayor** - Ashley Cassin; **Councillor** – Brian Manera **Chief Executive** - Simon Bastion

West Coast Regional Council

Chair - Peter Haddock; **Deputy Chair**-Brett Cummings; **Councillor** - Andy Campbell; **Councillor** – Peter Ewen; **Chief Executive** - Darryl Lew; Sam Scott - **Infrastructure Manager**; Fiona Thompson - **Planning & Science Manager**; Claire Brown - **Group Manager, West Coast Emergency Management**; Kent Jacobsen - **Area Engineer**; James Bell - **Engineering Officer**; Lillian Crozier - **Business Support Officer**

TECHNICAL ADVISORY GROUP



Rose Beagley

Geomorphologist / Water Resources Scientist, Land River Sea Consulting
BSc, MSc



Tim Davies

Retired Professor
University of Canterbury
BSc (Hons), MSc and PhD in Civil Engineering



Ian Fuller

Professor in Physical Geography, Massey University
BSc Hons Geography, PhD



Matthew Gardner

Principal Engineer, Land River Sea Consulting
BE(Nat Res), CMEngNZ, CPEng



Mark Healey

Principal Engineer - Rivers
WSP
ME(Nat Res), CMEngNZ, CPEng



Gary Williams

Water and Soil Engineer,
G&E Williams Consulting
BE (Hons), BSc (Physics), MCom (Hons), FEngNZ

Mayor Helen Lash - Comments

Why did Council commission the report?

Ongoing threat of the Waiho River

Previous workshops in 2000 and 2016 held to develop long-term sustainable management options – outcomes did not gain traction

Since 2016, the situation has worsened:

Continued aggradation (build-up of gravel in the riverbed)

A major break out (avulsion) channel into the Tartare Stream to the north in 2023

Fundamental change in the behaviour of the river which will have serious consequences on surrounding infrastructure and ecological values

Government funding had been allocated for the South Side. This has been frozen until an acceptable plan formalised for the Waiho.

Outcomes sought

Tonight, we want you to:

Hear the information first

Understand how the recommendations have been reached

Ask the questions you have of the experts

Find out how to provide feedback

Know what happens next



Waiho River

Historic and Future Management Strategies

10-Oct-23

Client: West Coast Regional Council
Report by: Rose Beagley & Matthew Gardner
Land River Sea Consulting Limited
www.landriversea.com

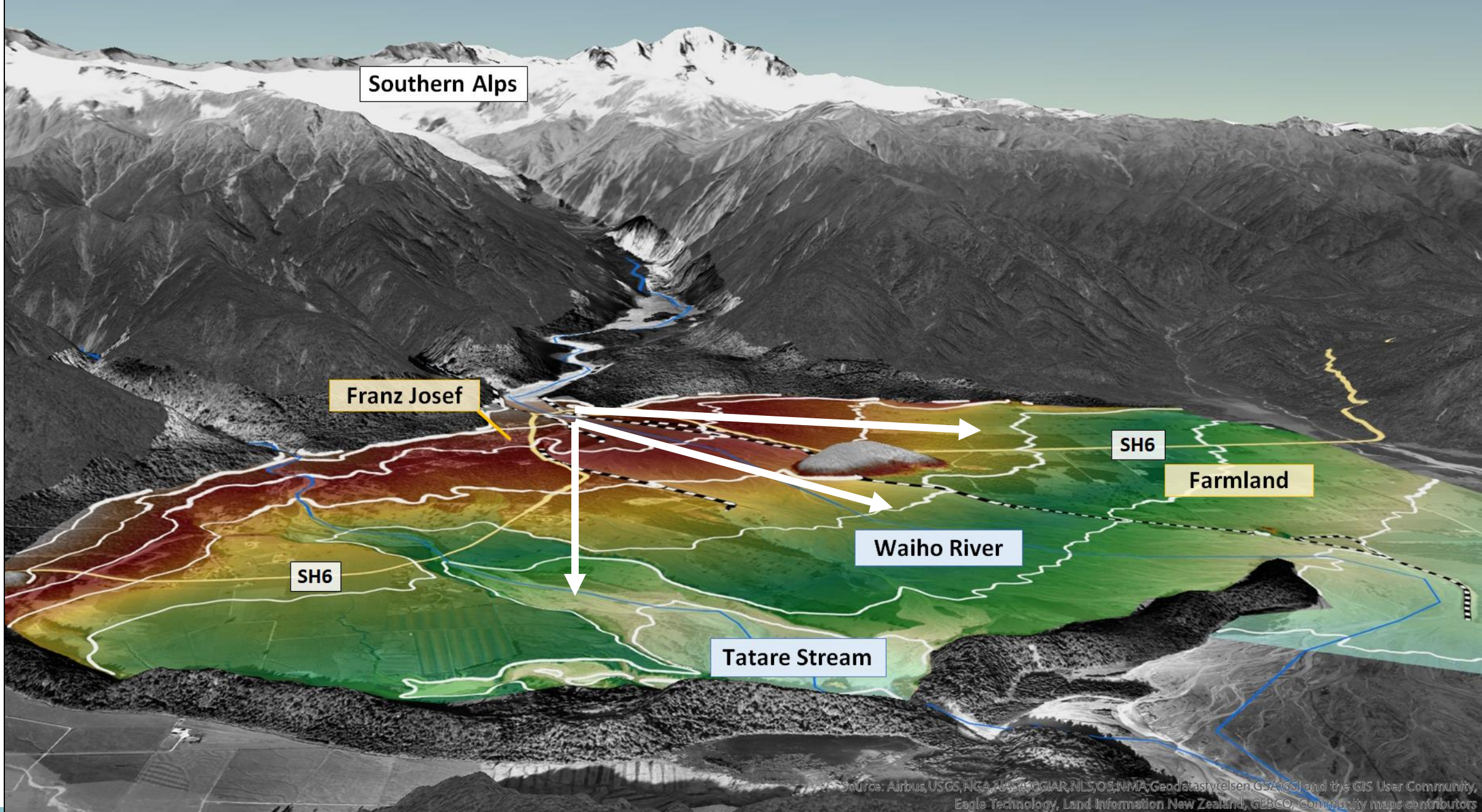


Future Management of the Waiho River

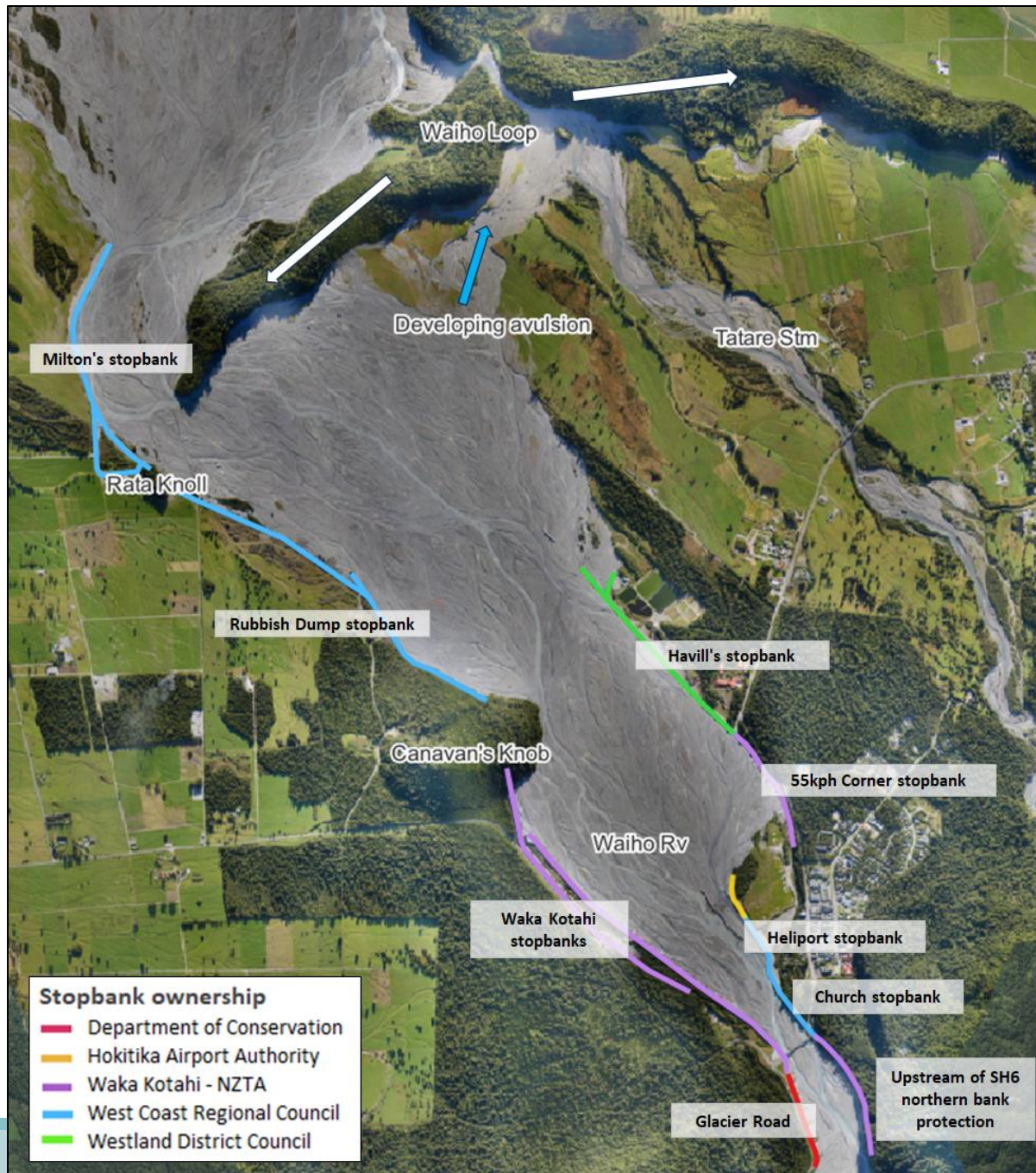
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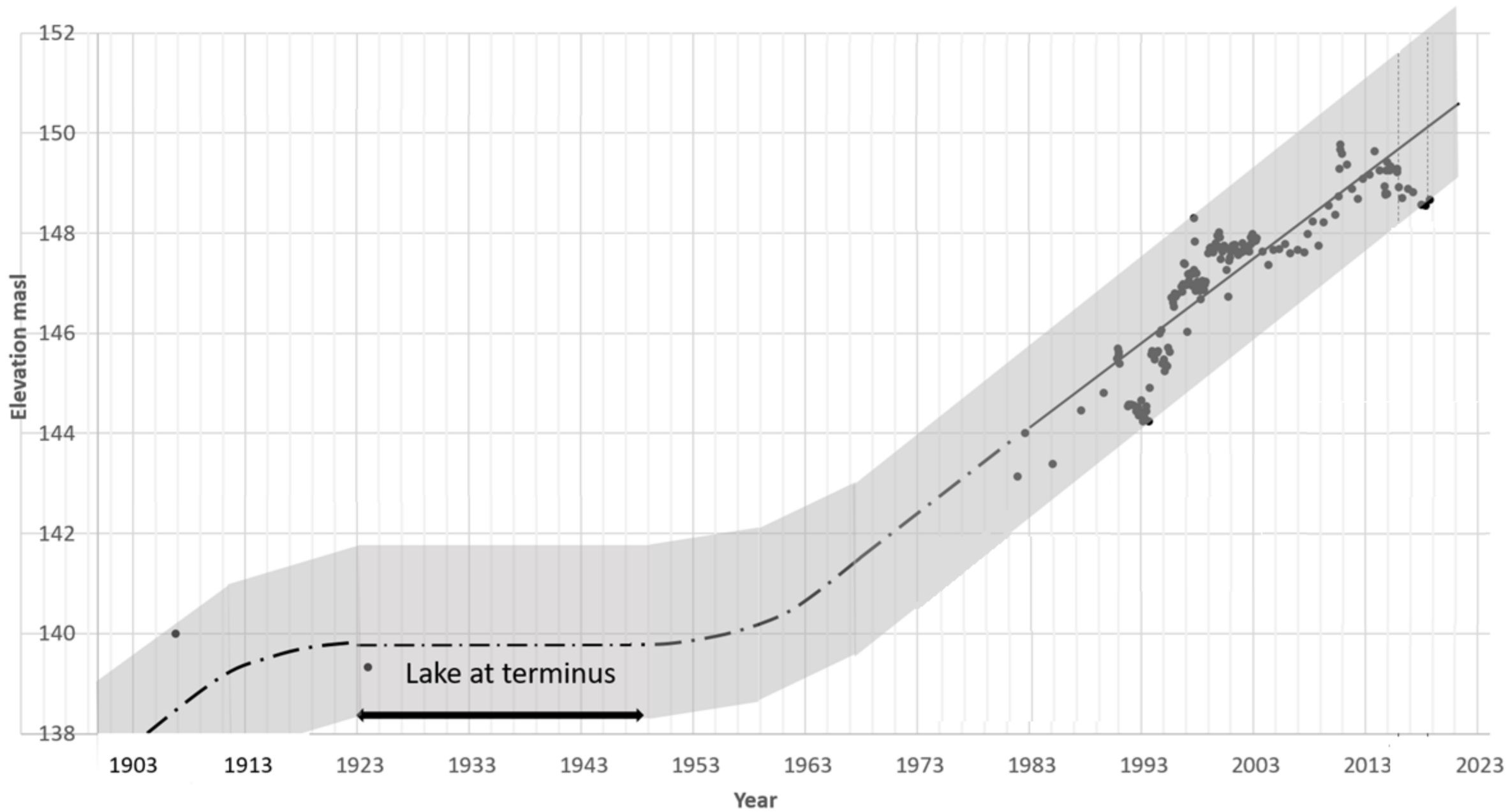
10 October 2023

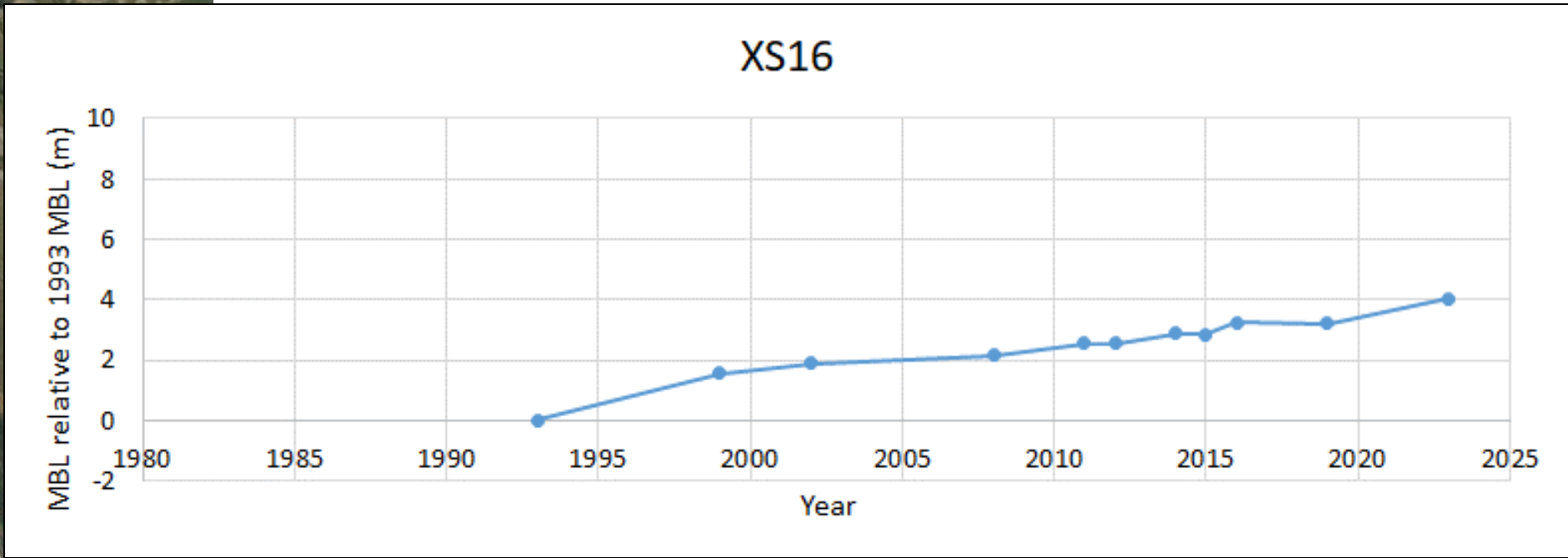
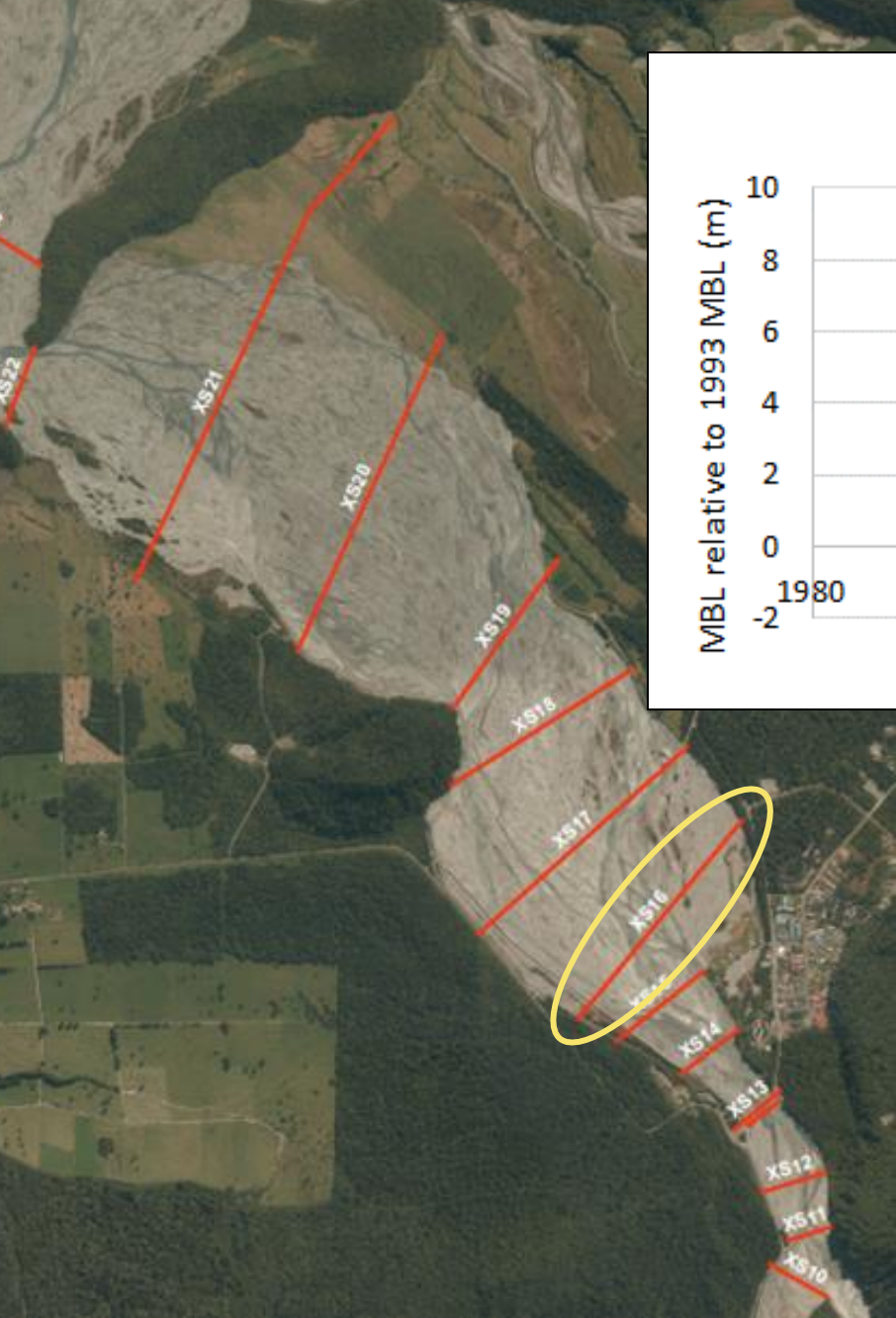
R. Beagley, T. Davies, I. Fuller, M. Gardner, M.
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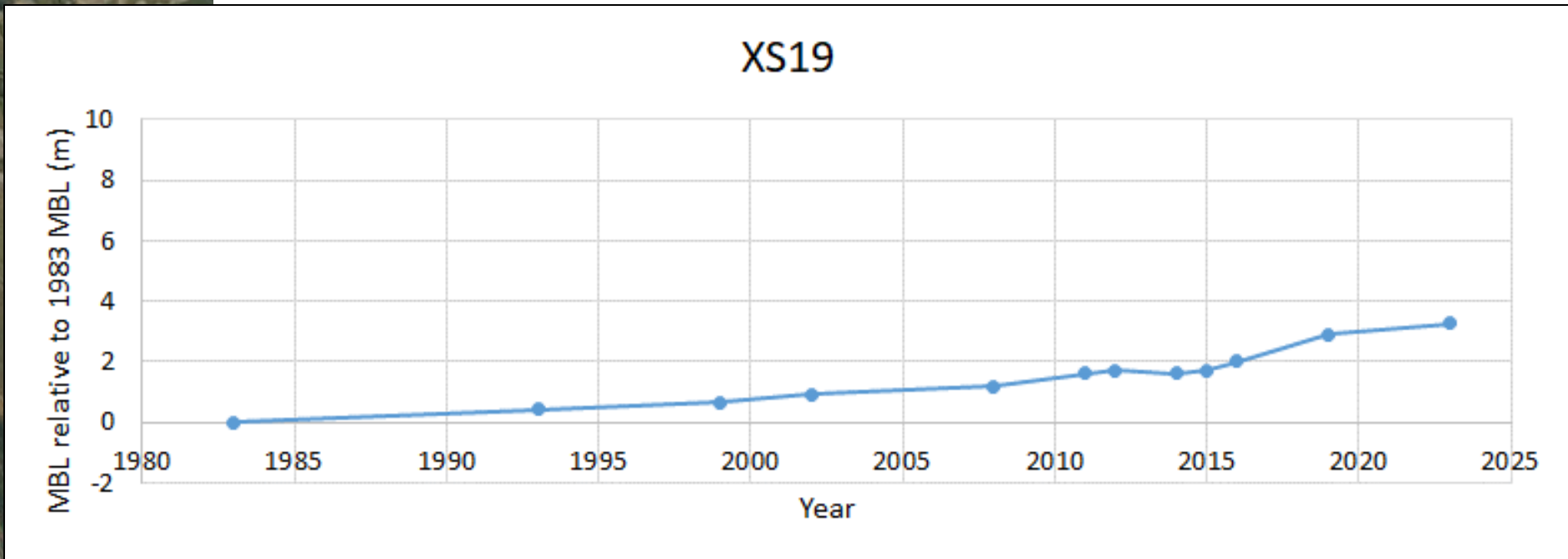
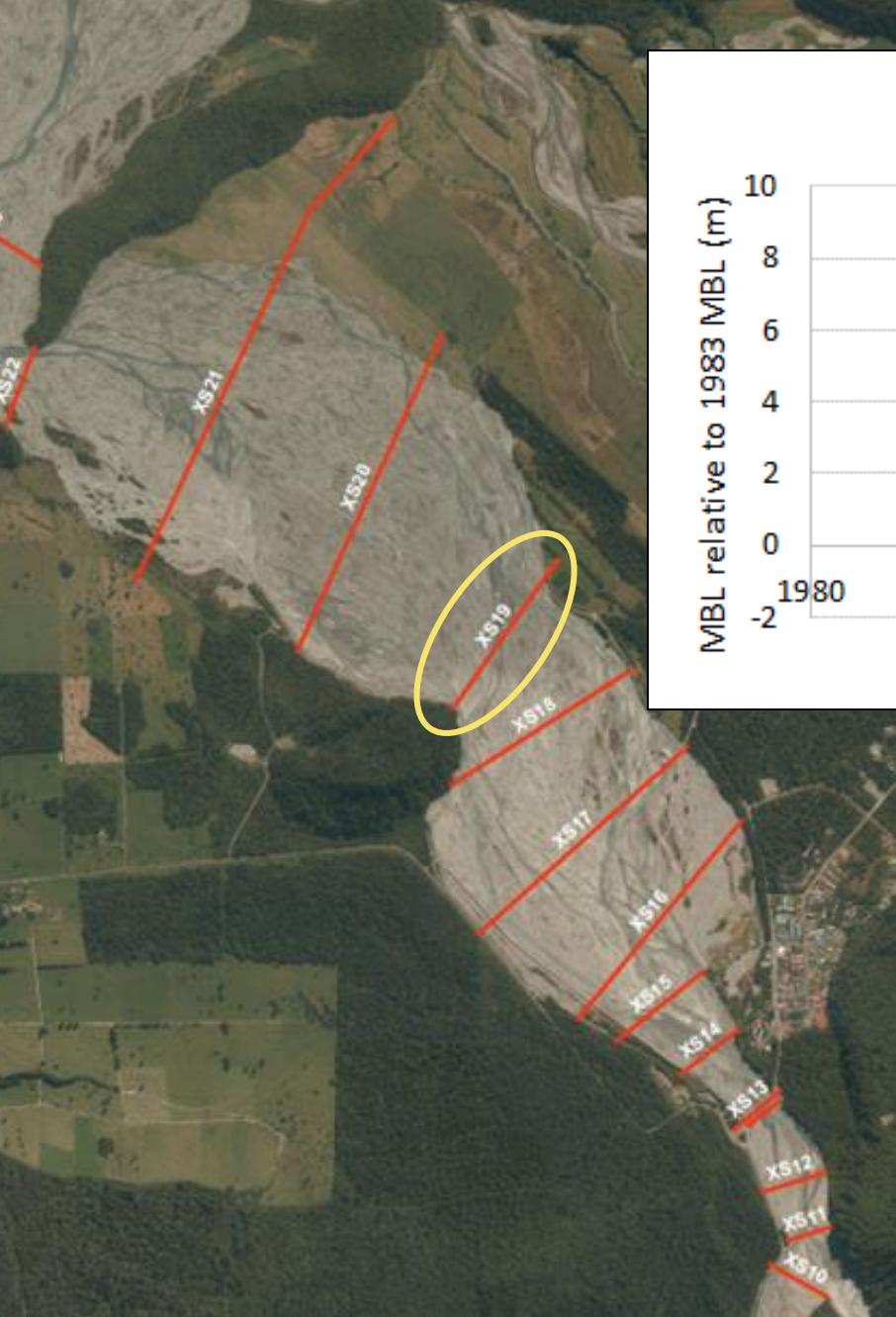
Source: Airbus, USGS, NGA, NASA, CGIAR, NLS, OS, NMA, Geodatastyrelsen, GSA, GSI and the GIS User Community, Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors



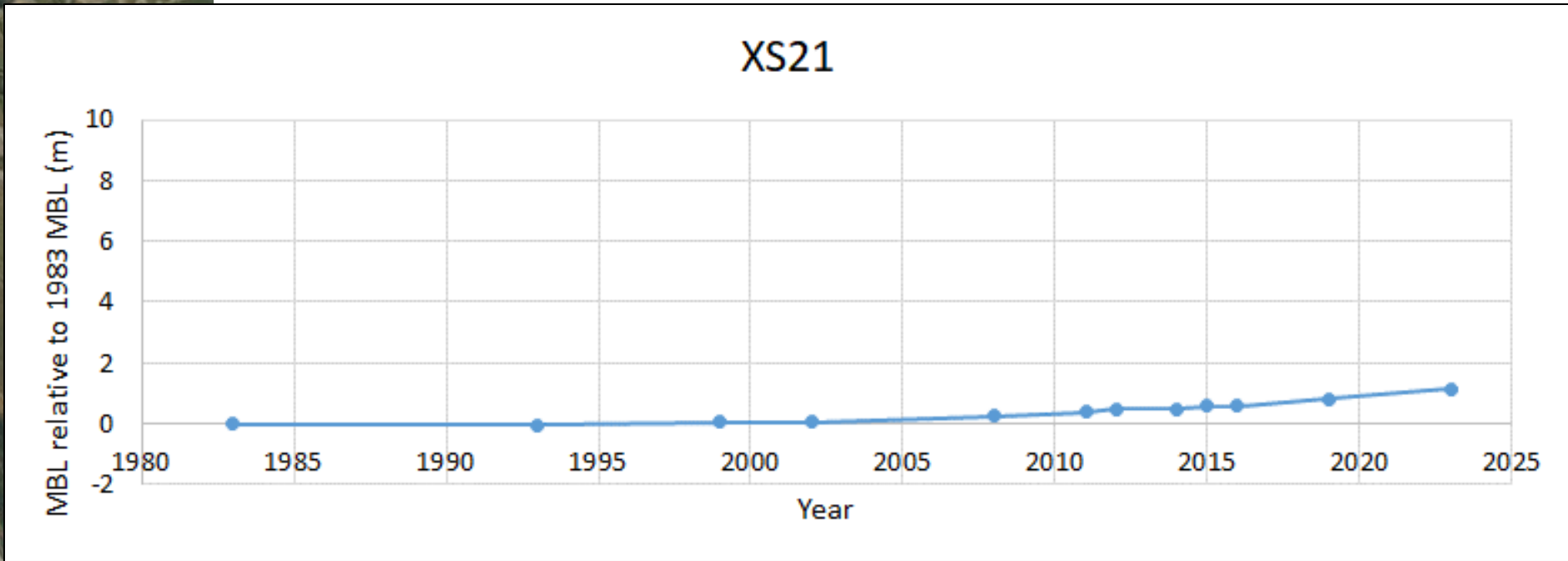
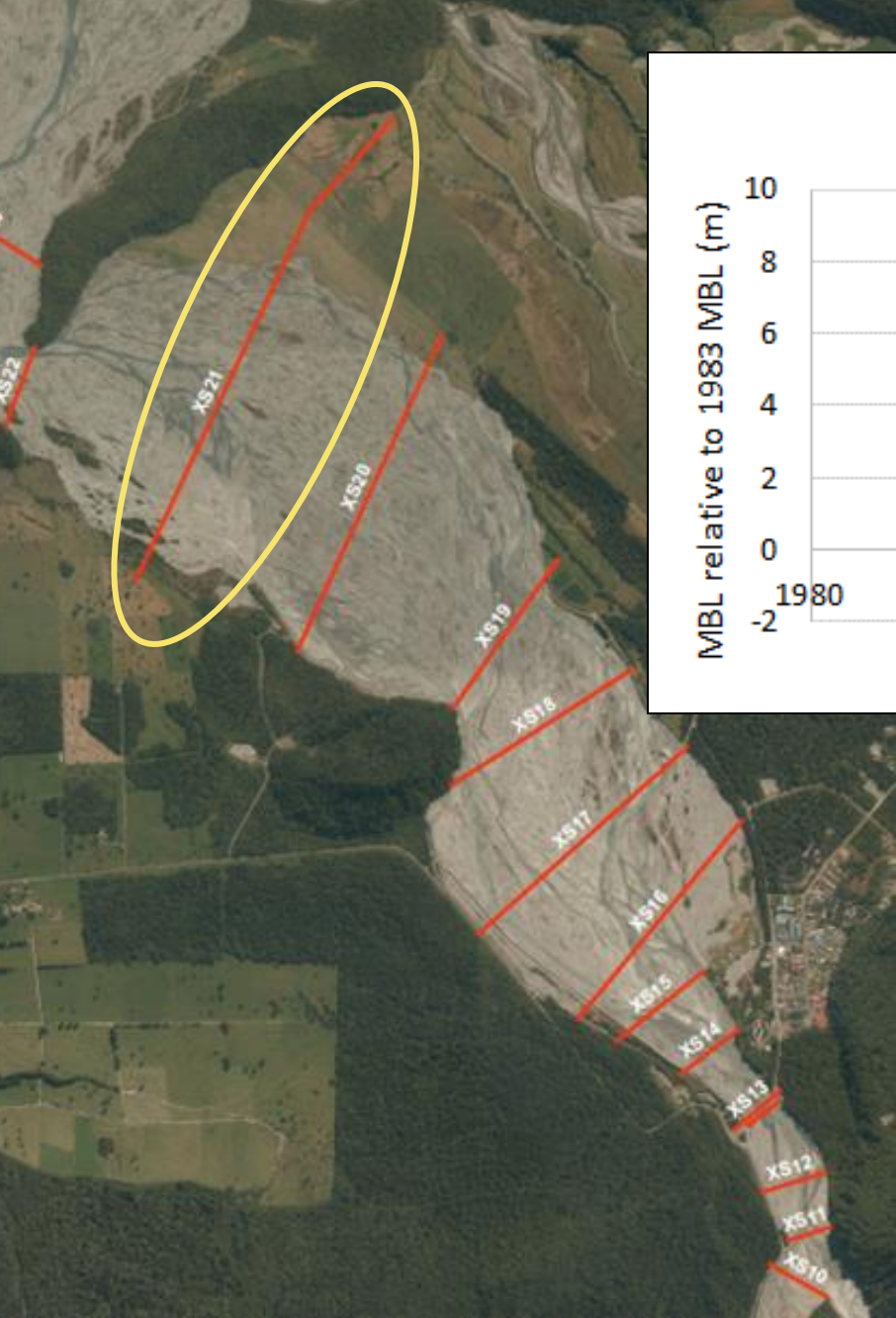




Mean bed level trends



Mean bed level trends



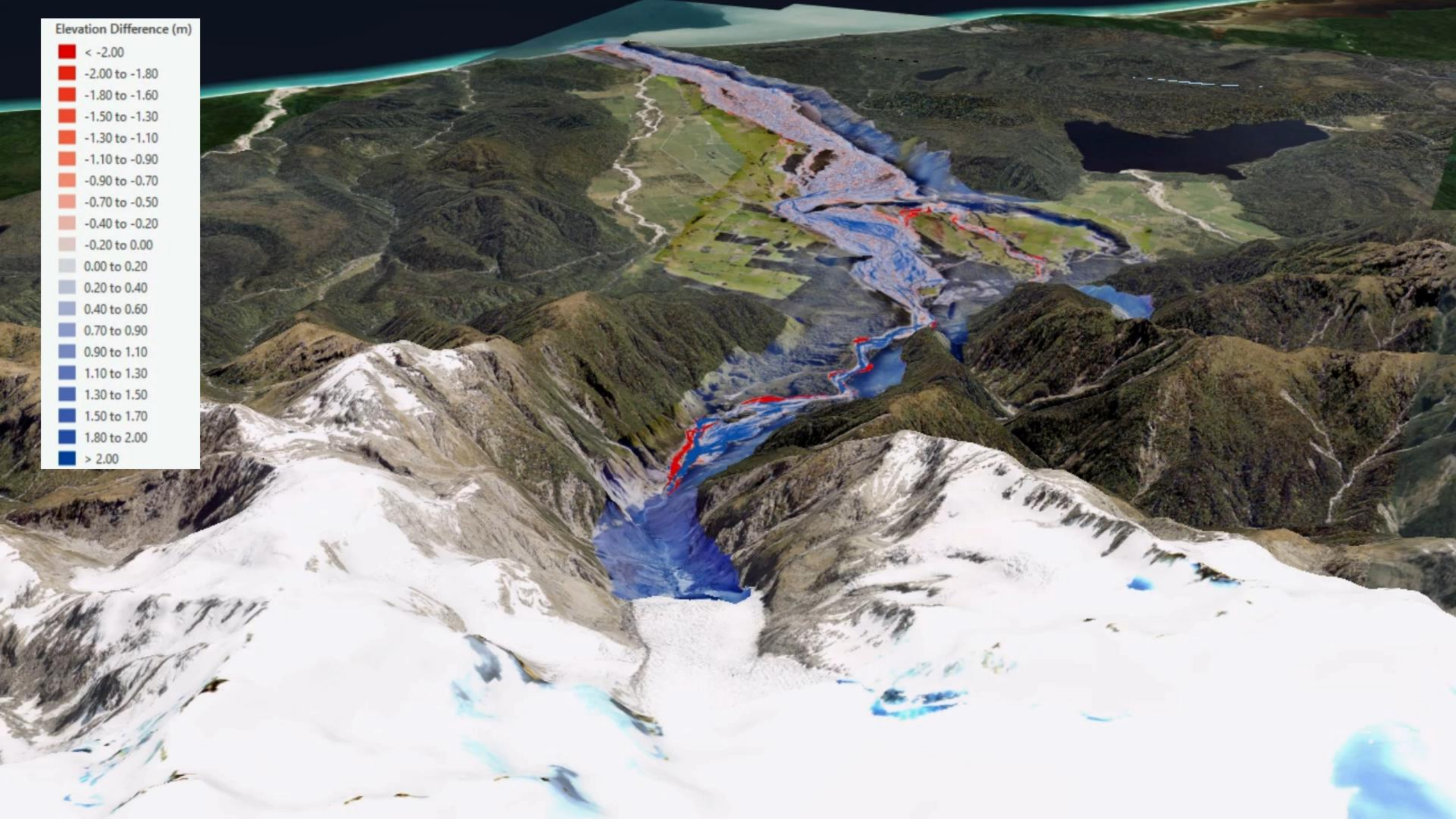
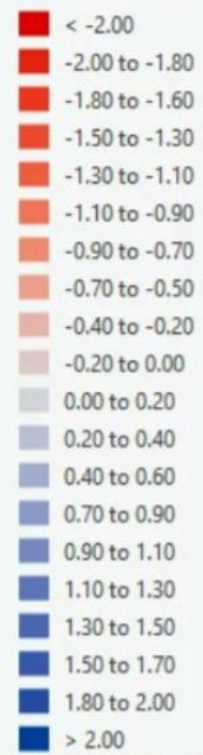
Mean bed level trends

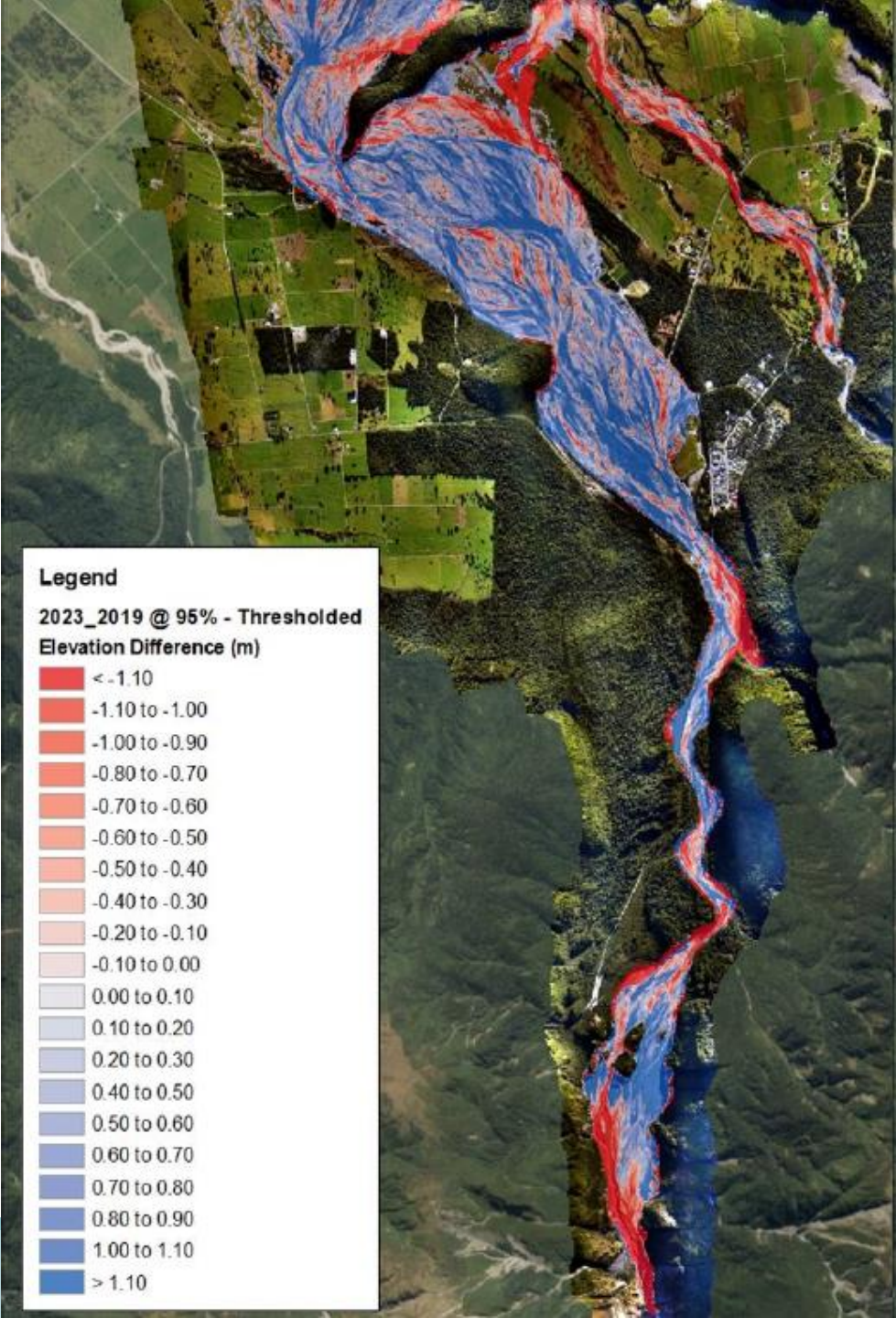


Waiho River Cross Section - 400m Downstream of the SH6 Bridge



Elevation Difference (m)

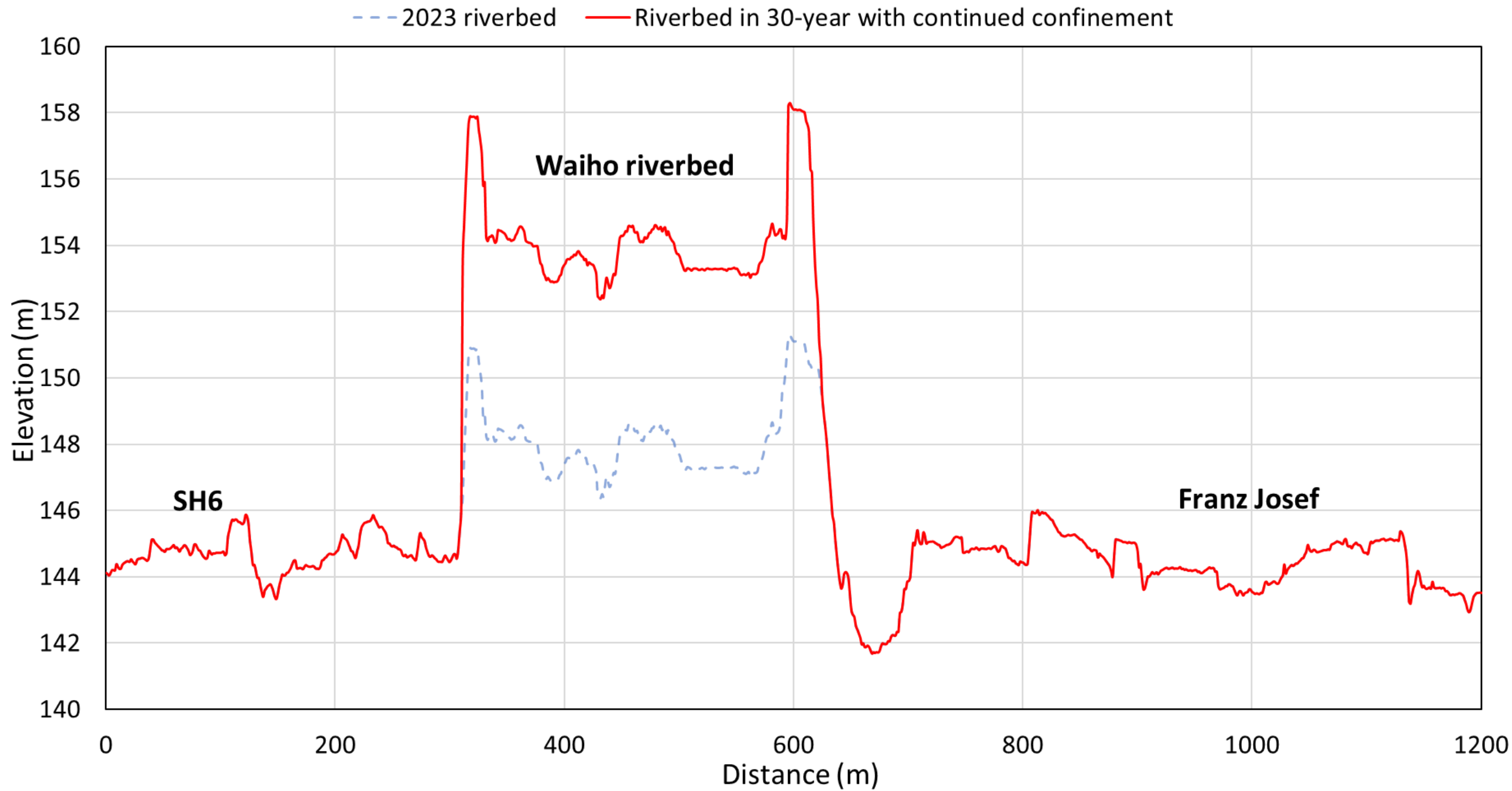




Riverbed continues to rise

- Best case is it will get worse at the same rate
- Likely case is it will get worse at a higher rate
- Worst case is the AF8 event (30% chance in the next 20 years)



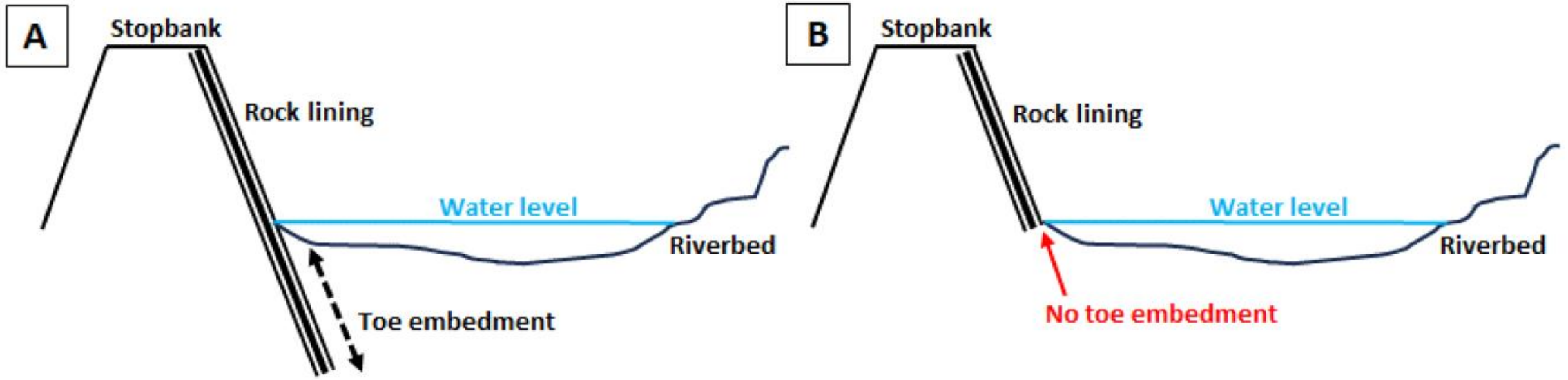


Emerging Issues

Miltons Bank

Toe Failure







Unlined bank under attack



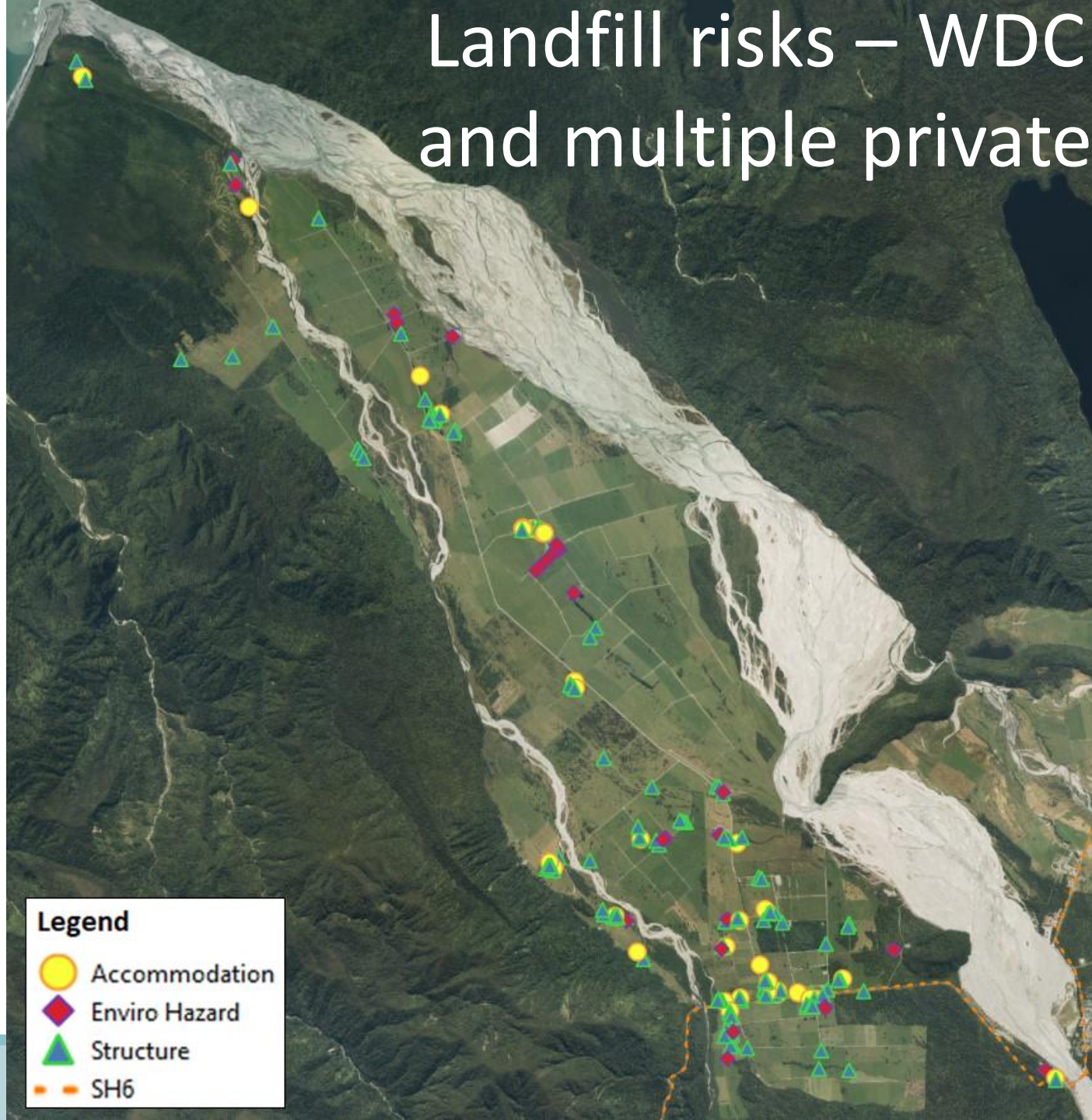
Tatare Avulsion

2023





Landfill risks – WDC and multiple private

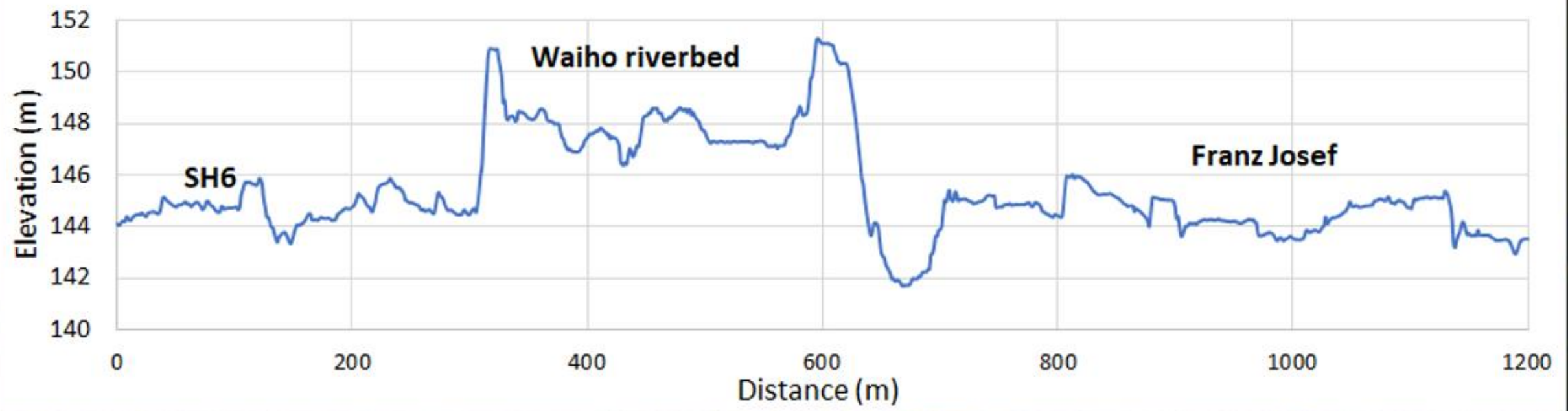


Critical River Bed Levels

Cross section 
Stopbanks 



Waiho River Cross Section - 400m Downstream of the SH6 Bridge



Flood risks are significant

- All areas are High or Critical risk
- Structural work reduces by one risk category at best
- Only **Release to South** reduces risk significantly

		Risk Rating				
		Low	Medium	High	Critical	Critical
Likelihood	Almost Certain	Low	Medium	High	Critical	Critical
	Likely	Low	Medium	High	Critical	Critical
	Possible	Low	Medium	Medium	High	Critical
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Low	High
		Insignificant	Minor	Moderate	Severe	Extreme
CONSEQUENCE						

Risk Assessment

Asset / Area	Status Quo/Residual Risk			Improved/Residual Risk					
	Likelihood	Consequences	Risk	Scenario	Rough Order Costs (rounded to \$0.5 M)	Likelihood	Consequences	Risk	
North	Tatare <i>avulsion</i>	Almost certain	Severe	Critical	Build	\$15 M+	Possible	Severe	High
	Havill's <i>stopbank</i> (without <i>avulsion</i>)	Likely	Moderate	High	Upgrade	\$5 M	Unlikely	Moderate	Medium
	55 kph Corner <i>stopbank</i>	Possible	Severe	High	Build	\$3 M	Unlikely	Severe	Medium
	Heliport <i>stopbank</i>	Possible	Extreme	Critical	Upgrade	\$0.5 M	Possible	Extreme	Critical
	Church <i>stopbank</i>	Possible	Extreme	Critical	Upgrade	\$0.5 M	Possible	Extreme	Critical
	SH6 Bridge upstream	Rare	Extreme	High	Upgrade	\$0.5 M	Rare	Extreme	High
State Highway 6 Bridge	Possible	Extreme	Critical	Upgrade	\$5 M	Rare	Extreme	High	
South	Glacier Road	Unlikely	Extreme	High	Upgrade	\$2 M	Rare	Extreme	High
	Waka Kotahi <i>stopbanks</i> (SH6 to Canavan's Knob)	Likely	Extreme	Critical	Upgrade	\$3 M	Unlikely	Extreme	High
					Build	\$3 M	Unlikely	Extreme	High
					Relax	\$100 M+	Certain	Insignificant	Low
	Rubbish Dump <i>stopbank</i> (Canavan's Knob to Rata Knoll)	Almost certain	Severe	Critical	Upgrade	\$5 - 15 M	Possible	Severe	High
					Relax	\$50 - 70 M	Certain	Insignificant	Low
	Milton's <i>stopbank</i>	Almost certain	Severe	Critical	Upgrade	\$2 M	Likely	Severe	Critical
Build					\$5 M+	Possible	Severe	High	
				Relax	\$30 - 50 M	Certain	Insignificant	Low	
Lower valley (downstream of Milton's)	Likely	Moderate	High	Upgrade	\$2 - 5 M	Possible	Moderate	Medium	

Upgrading and/or building would have **significant** initial and on-going costs while **not** significantly reducing the *risk* of failure over a ten-year period.

However, removing all of the stopbanks on the south side of the river will:

- Reduce the *risk of stopbank* failure.
- Reduce the number of assets exposed to the *flood hazard*.
- Provide the Waiho River with more surface area to deposit sediment (and hence decrease the rate of bed level rise).
- Increase the lifespan of the north stopbanks and reduce their *risk* of failure during *flood* events.
- Reduce the pressure on the overflow path on the north bank upstream of the SH6 Bridge.
- Reduce the pressure of the developing *avulsion* into the Tatare Stream.
- Reduce the impact of the *aggradation* and flooding that will follow an Alpine fault or other earthquake.

Release to south the only sustainable solution

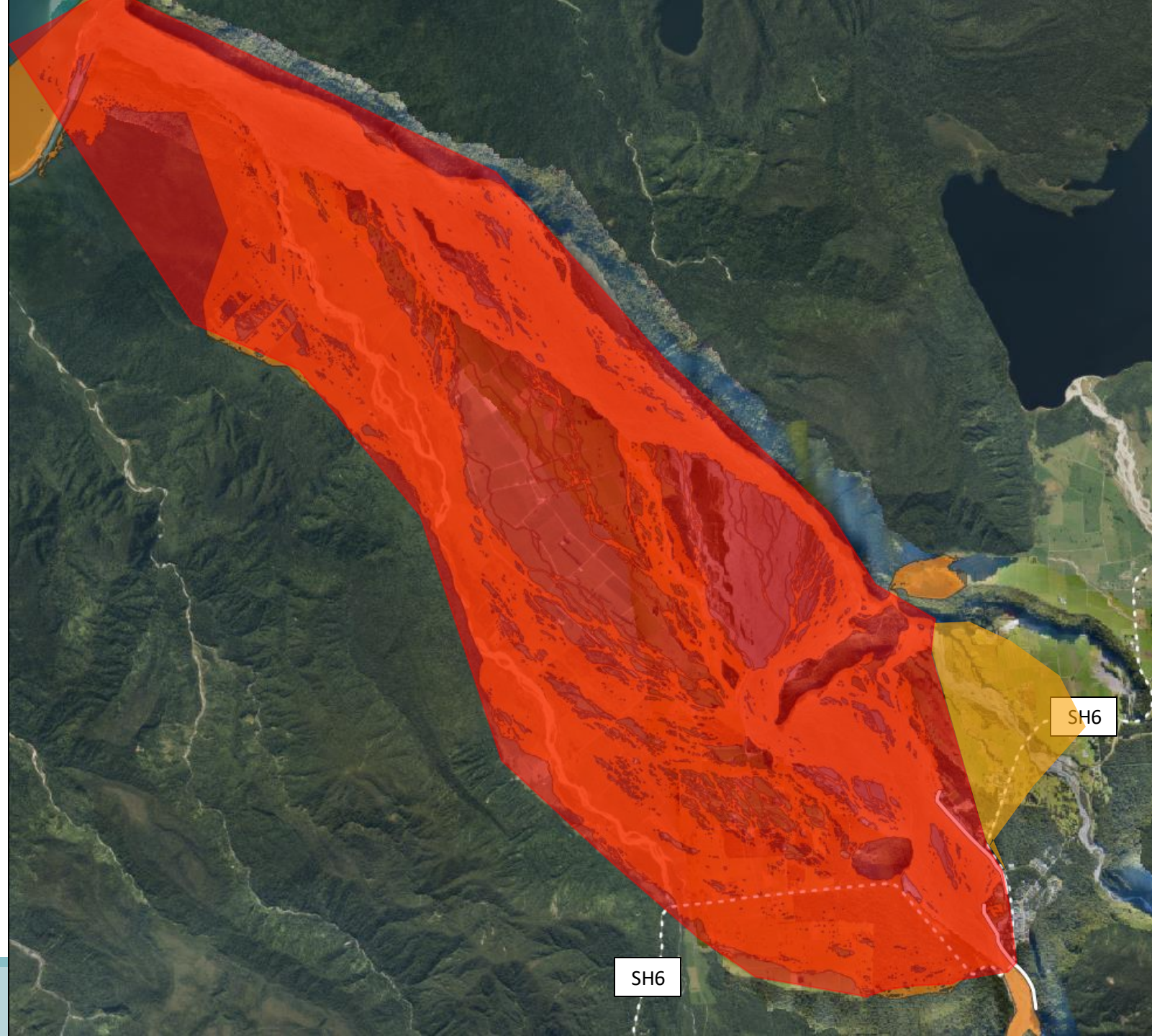
- Unanimous agreement by TAG
- Drops risks significantly
- 10-year implementation programme (likely staged)
- Must start now to minimise implementation risk (+2m)

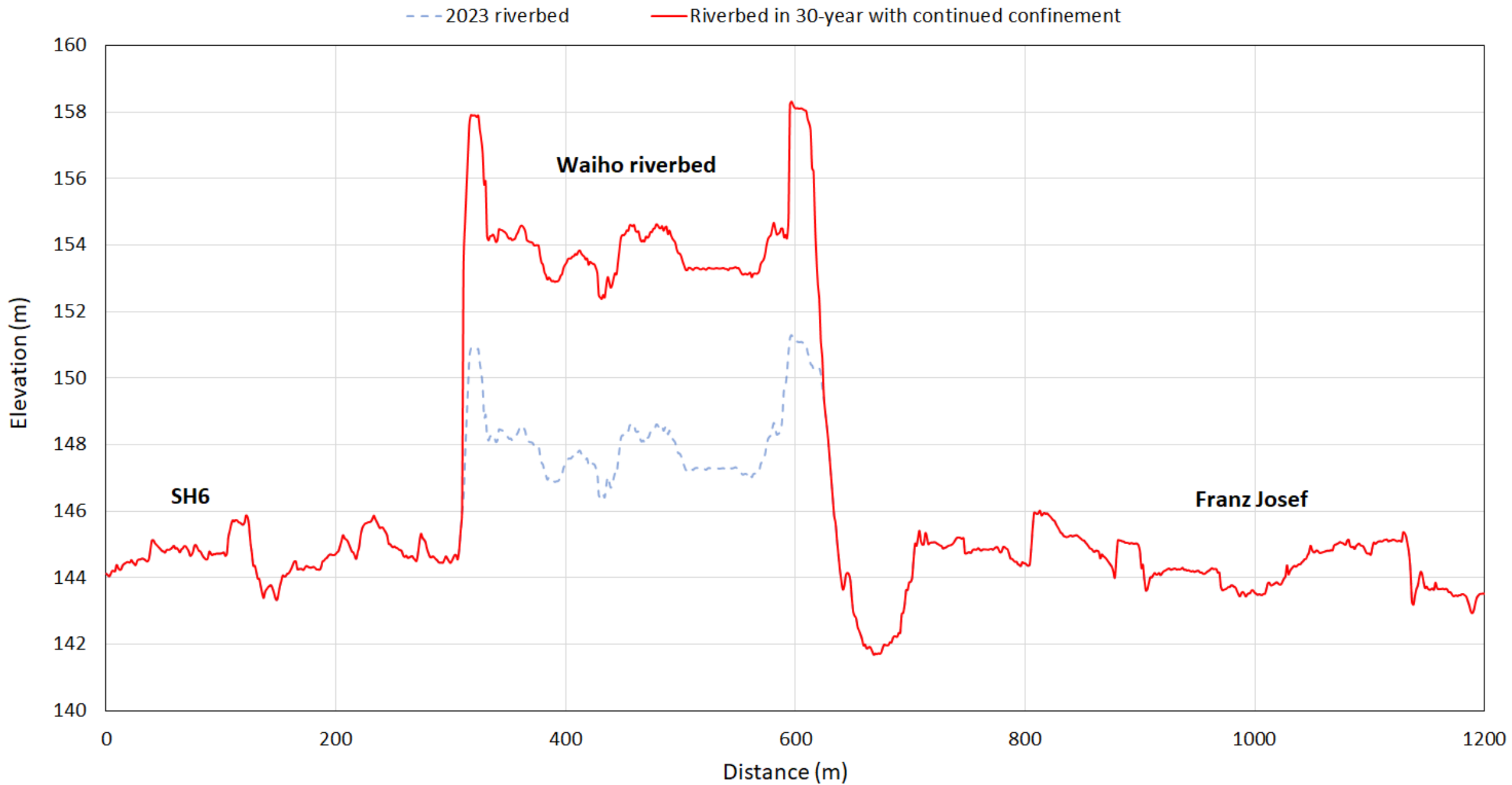
Release to the south

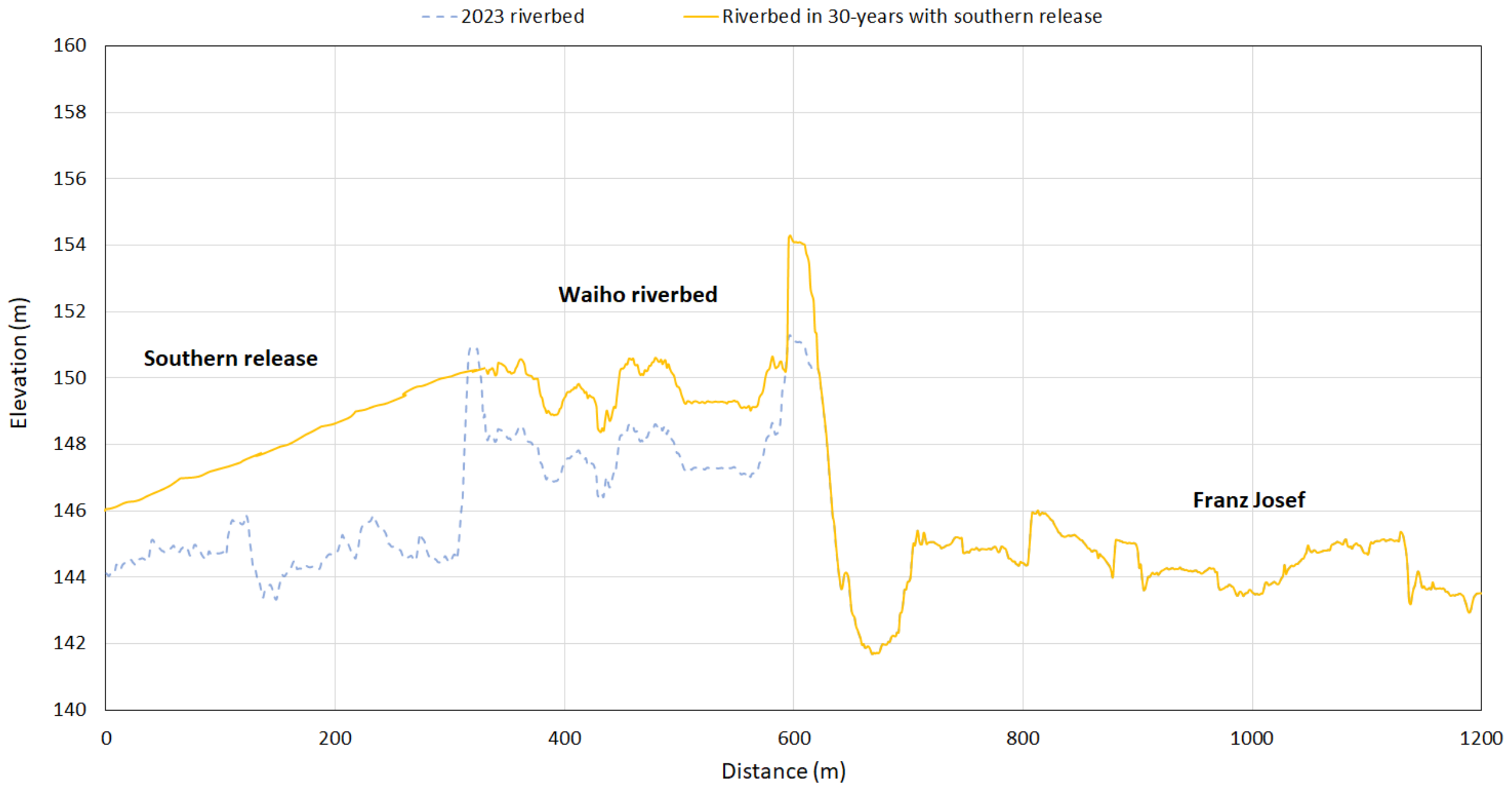
Land River Sea Consulting – model results

All true left (southern) stopbanks removed

- 2023 DEM
- True right stopbanks shown by white lines
- SH6 shown by white dashed line
- Tatare and Docherty flows not included



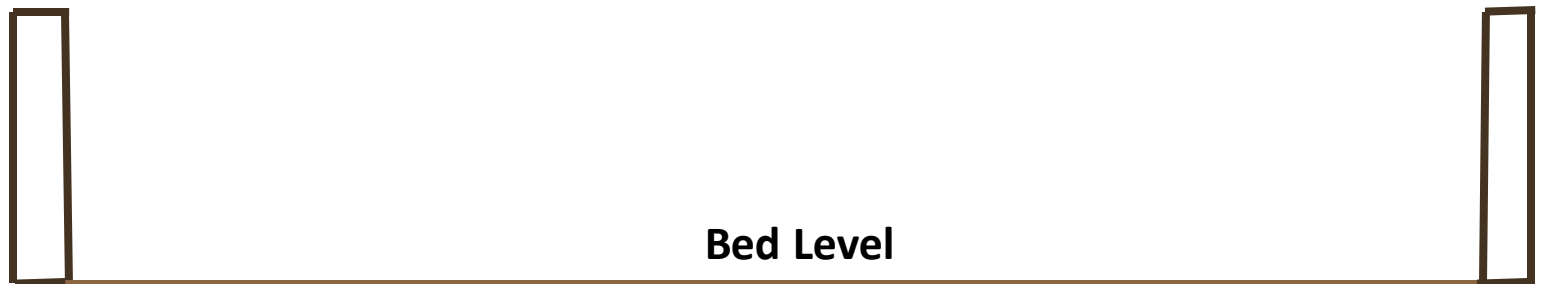




Existing Stopbanks

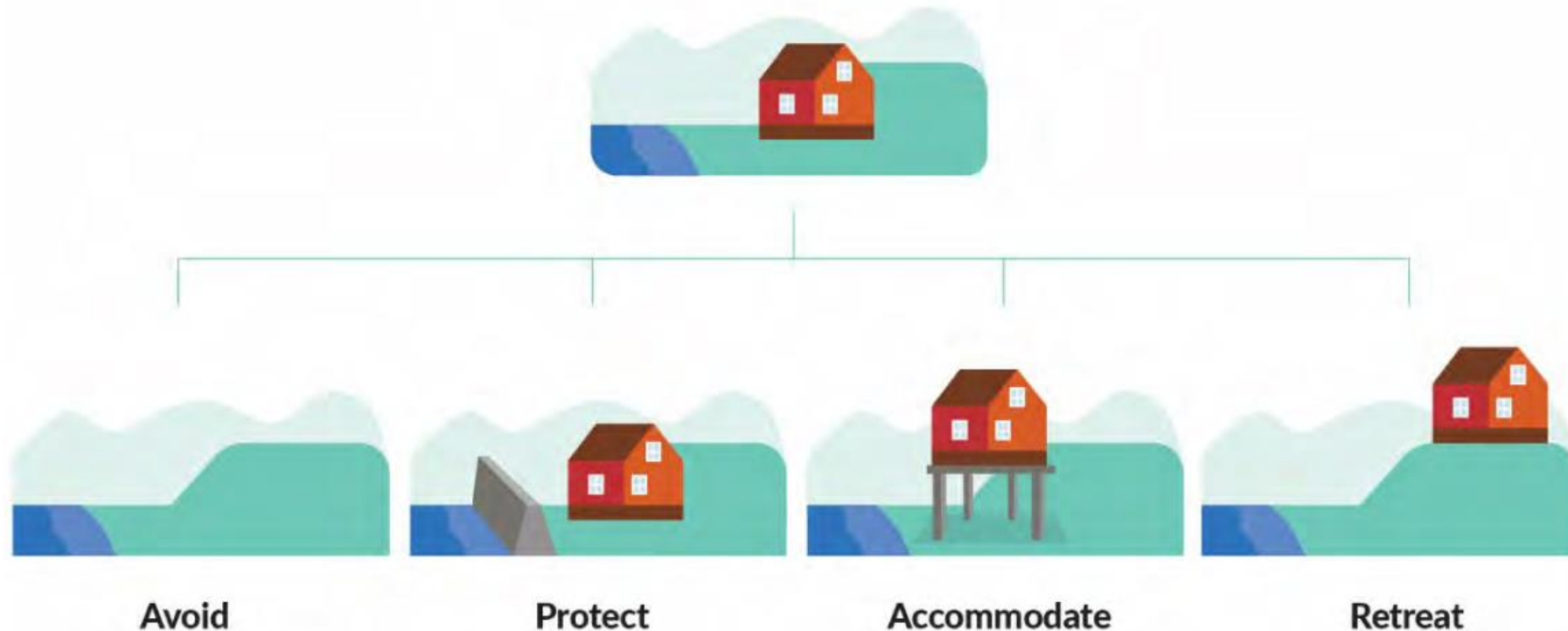


Stopbanks Relaxed
(more room for river)



PARA FRAMEWORK

- **Protect** – Reduce the extent and/or frequency of the *hazard*.
- **Avoid** – Ensure new development and property and vulnerable assets are not exposed to the *hazard*.
- **Retreat** – Relocate existing people, property and assets from locations exposed to the *hazard*.
- **Accommodate** – Reduce the consequences of the *hazard*.

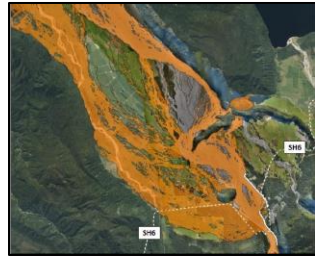


Five Critical Action Areas



1. Emergency Management

and contingency planning



2. Release to South

Commit to and initiate investigation and design



3. Interim Structural Measures

Current works and other key risk areas
“10-year holding work”



4. Risk Management Data & Equip.

Monitoring and modelling

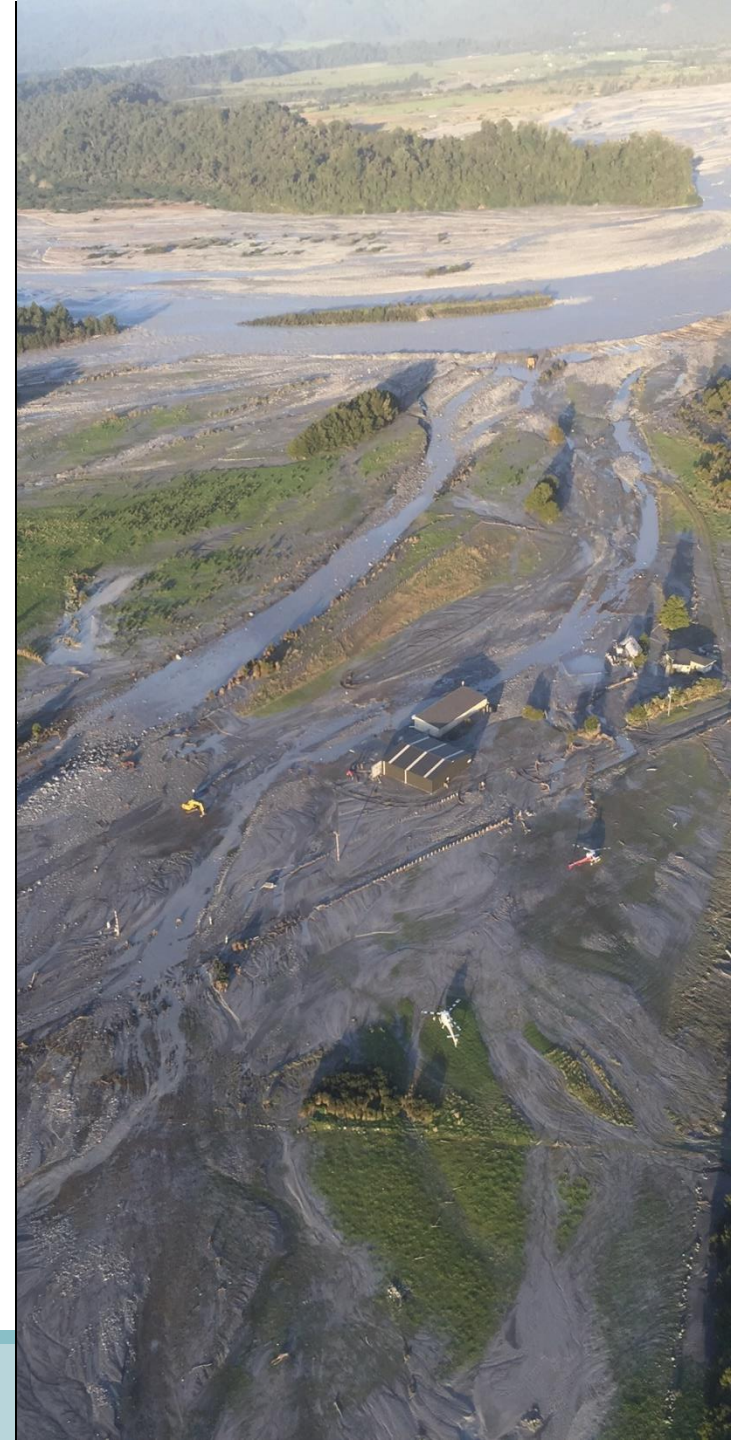


5. Governance & Stakeholder Engagement

Structure and resourcing

1. Emergency Management & Contingency Planning

- Most likely outcome is failure and damage
- Flooding will not be like it was previously
- Enhanced flood risk comms and planning needed
- Contingency plans are needed for key assets (WDC ponds, roads, stopbanks, etc)

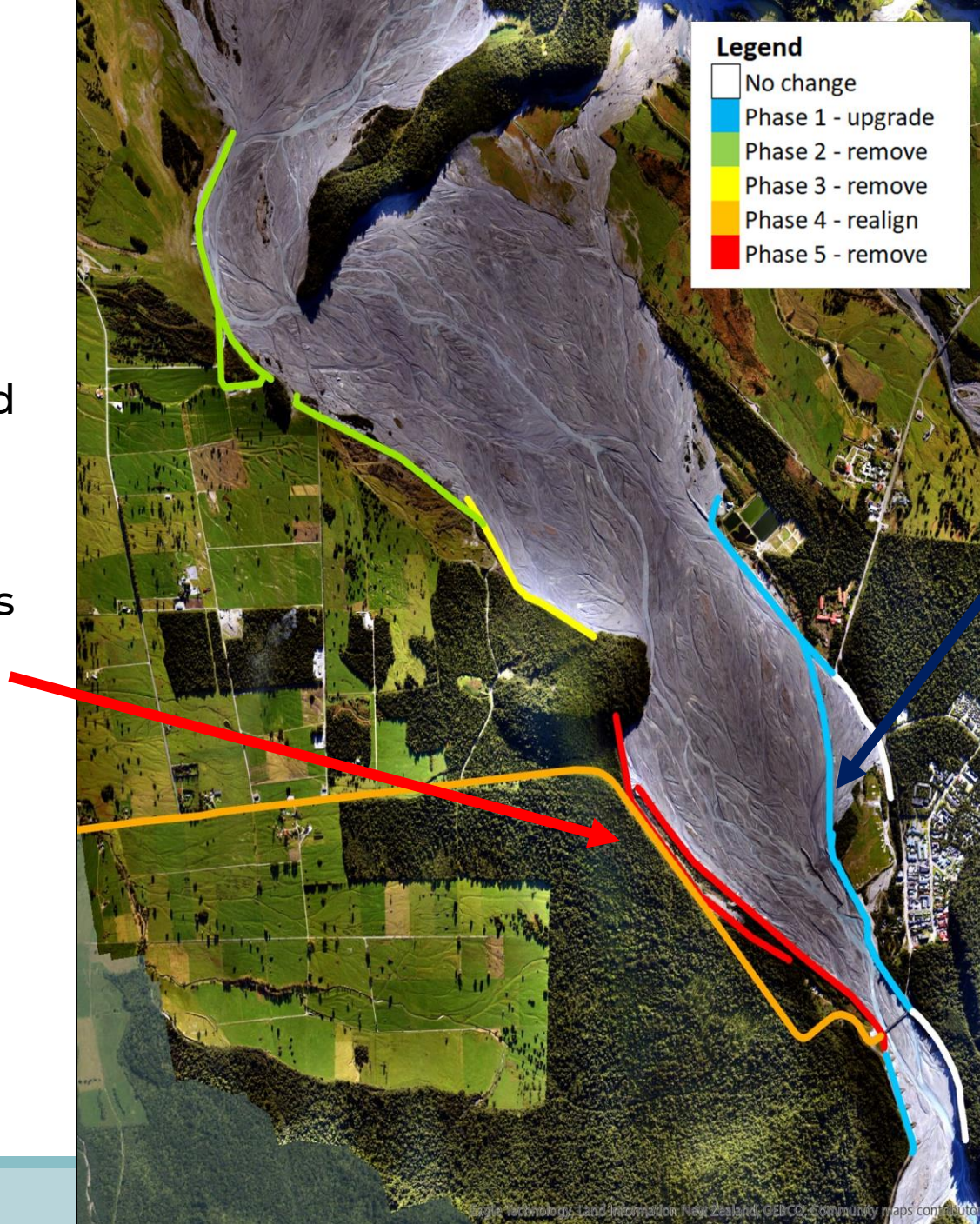


2. Release to South

- Secure commitment and funding, and action release to the south and all that entails
- 10-year programme - start now (staged)
- 30 dwellings, landfills, chemical storage, fuel, wastewater, dairy effluent, power, telecom, structures, roads, ...
- A lot of consultation
- Develop a staging plan

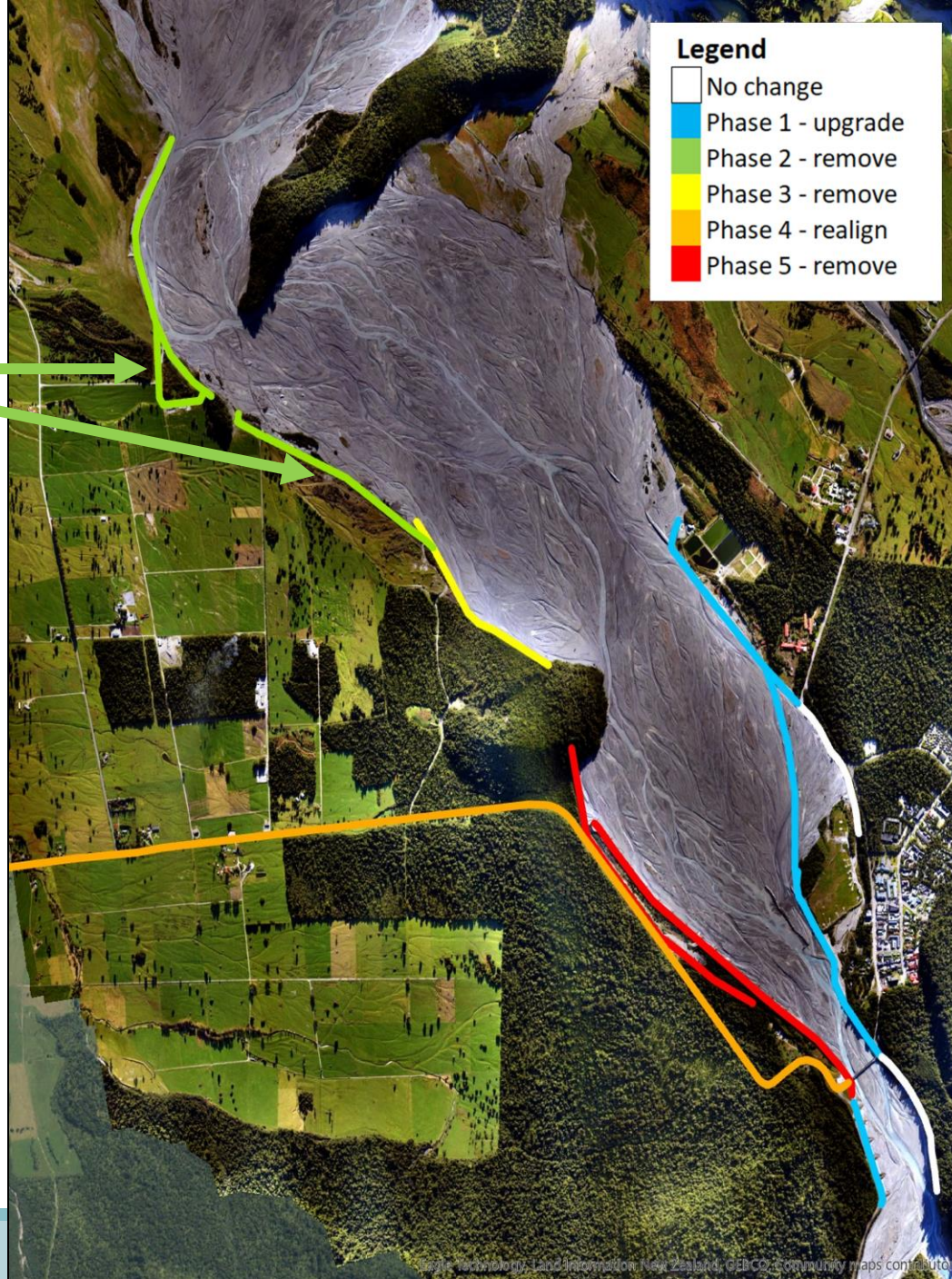


Undertake holding works along the southern stopbanks and Glacier Road to provide protection for the southern *floodplain* while preparatory works for the release are undertaken.



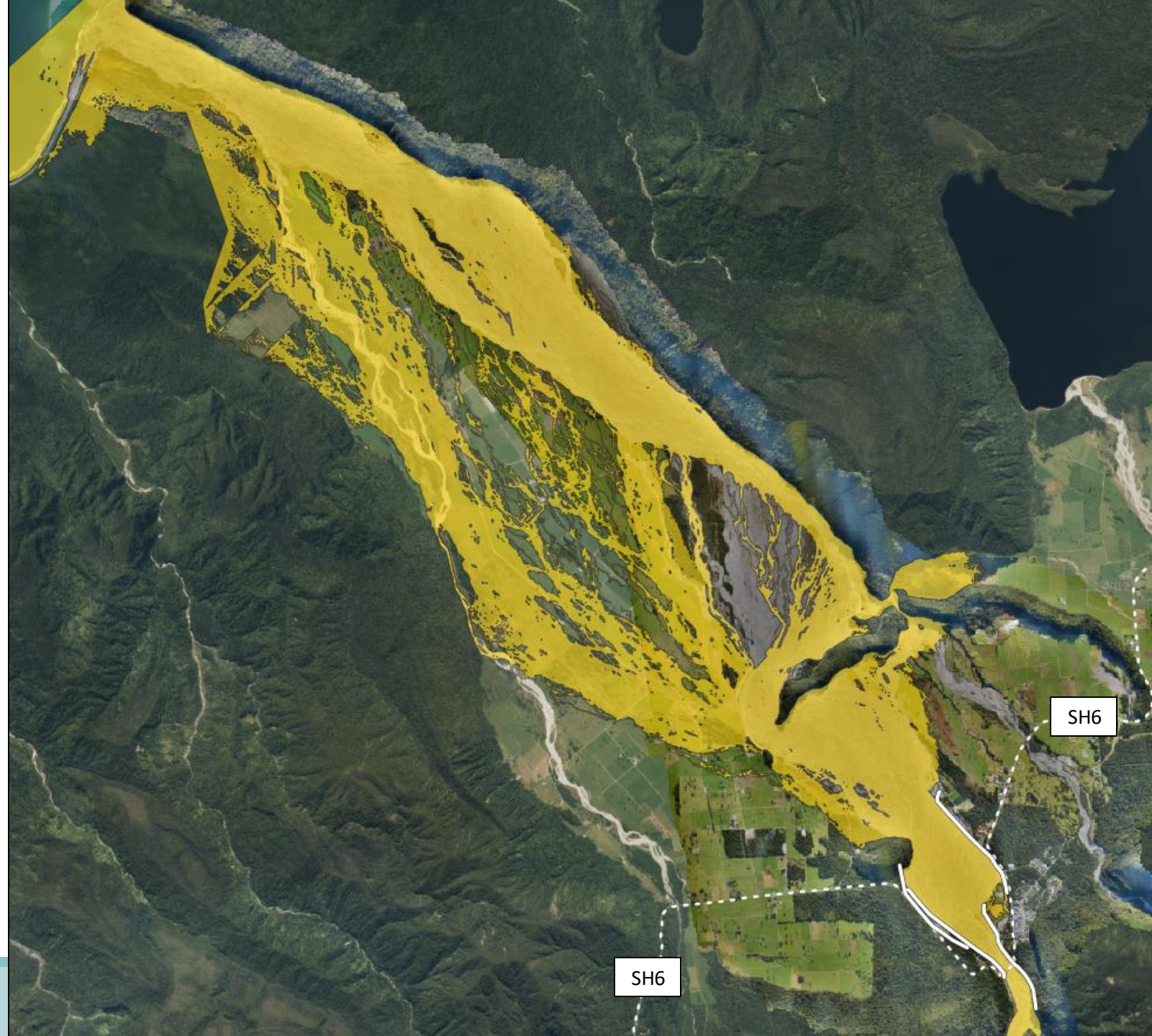
Upgrade stopbanks on the north side

Phase 2: remove Milton's *stopbank* and the unlined Rubbish Dump *stopbank* on the south side.

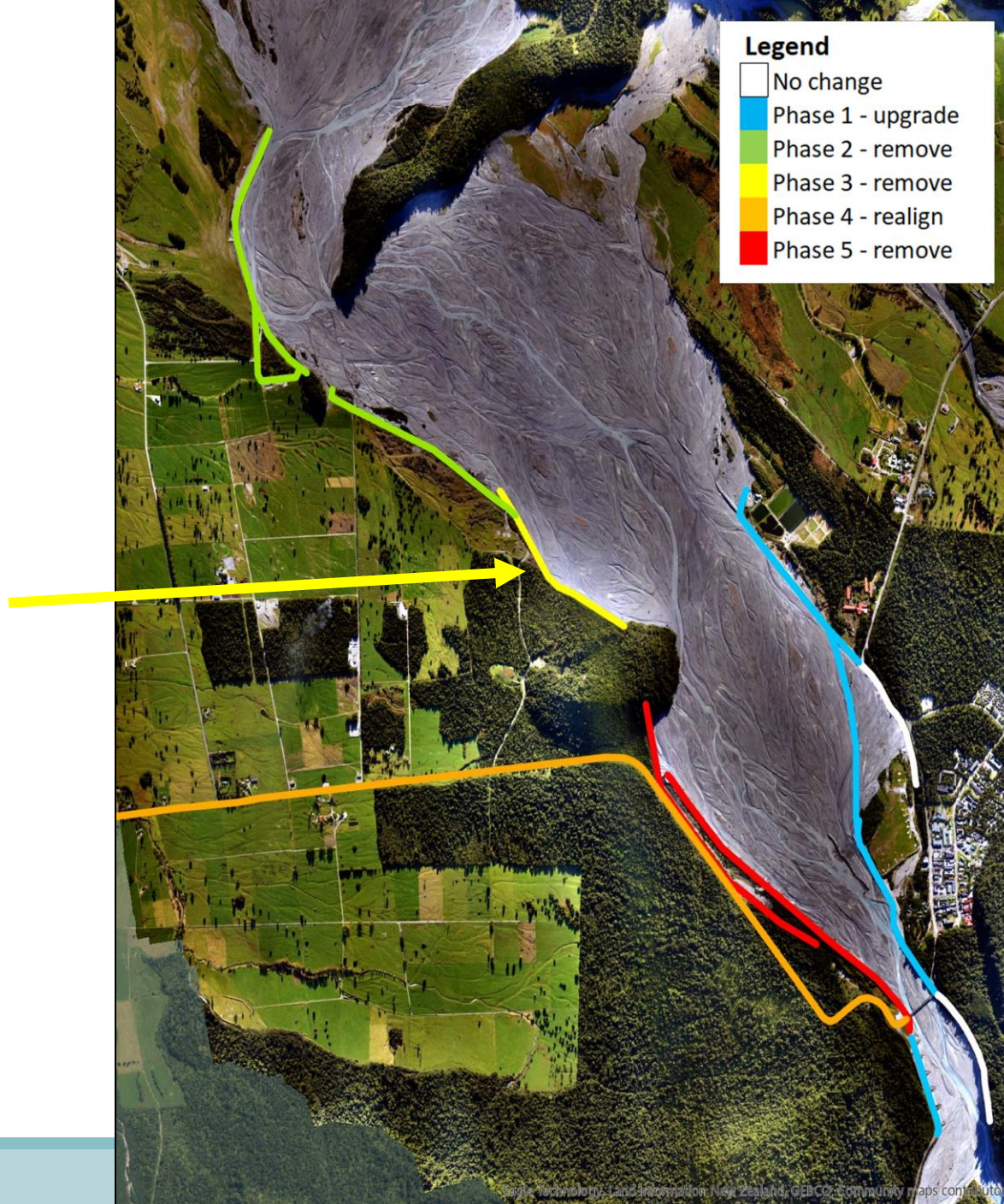


**Only true left (southern) stopbanks
downstream of Canavan's Knob removed**

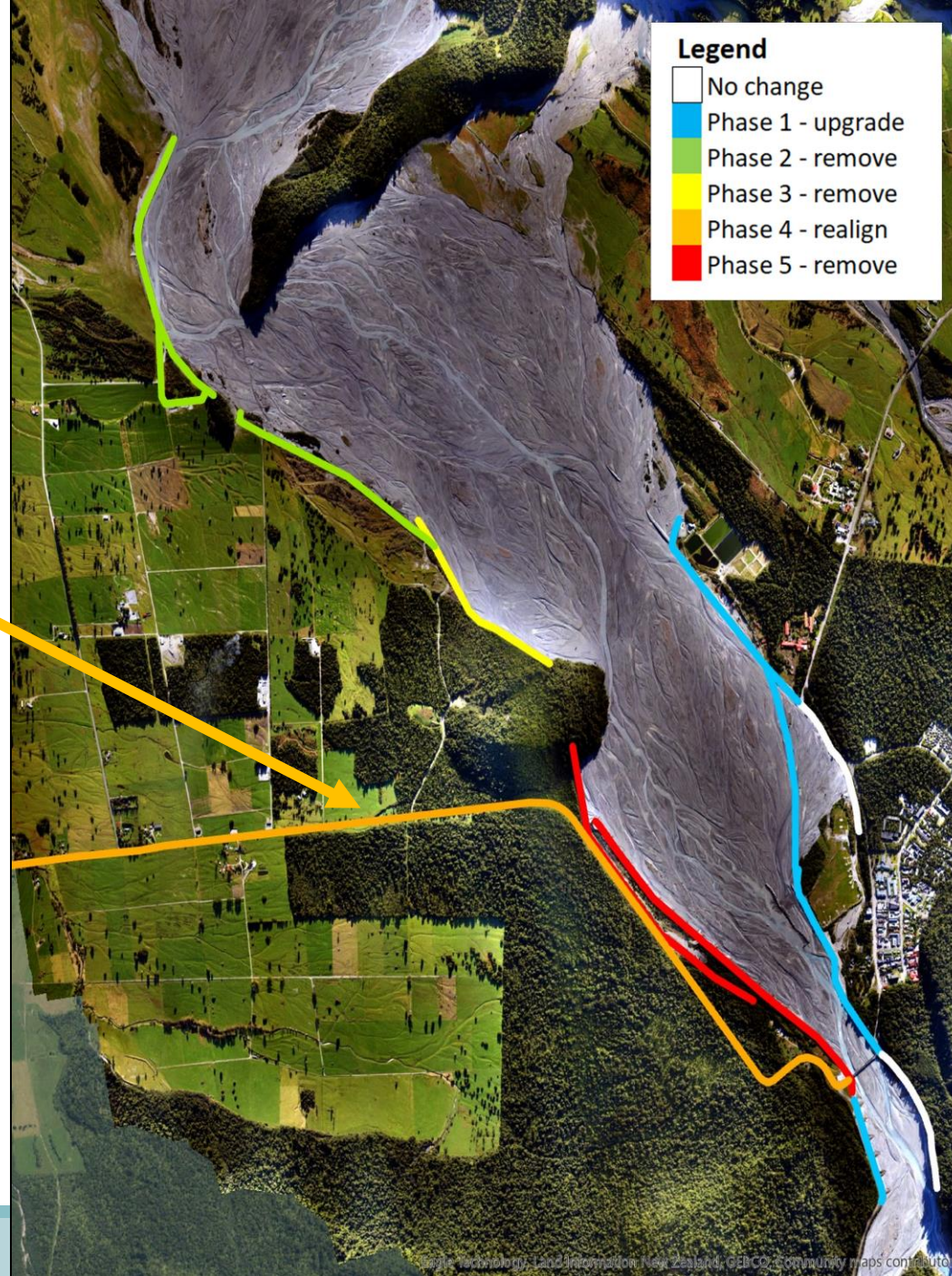
- 2023 DEM
- True right and upstream of Canavan's Knob true left stopbanks shown by white lines
- SH6 shown by white dashed line
- Tatare and Docherty flows not included



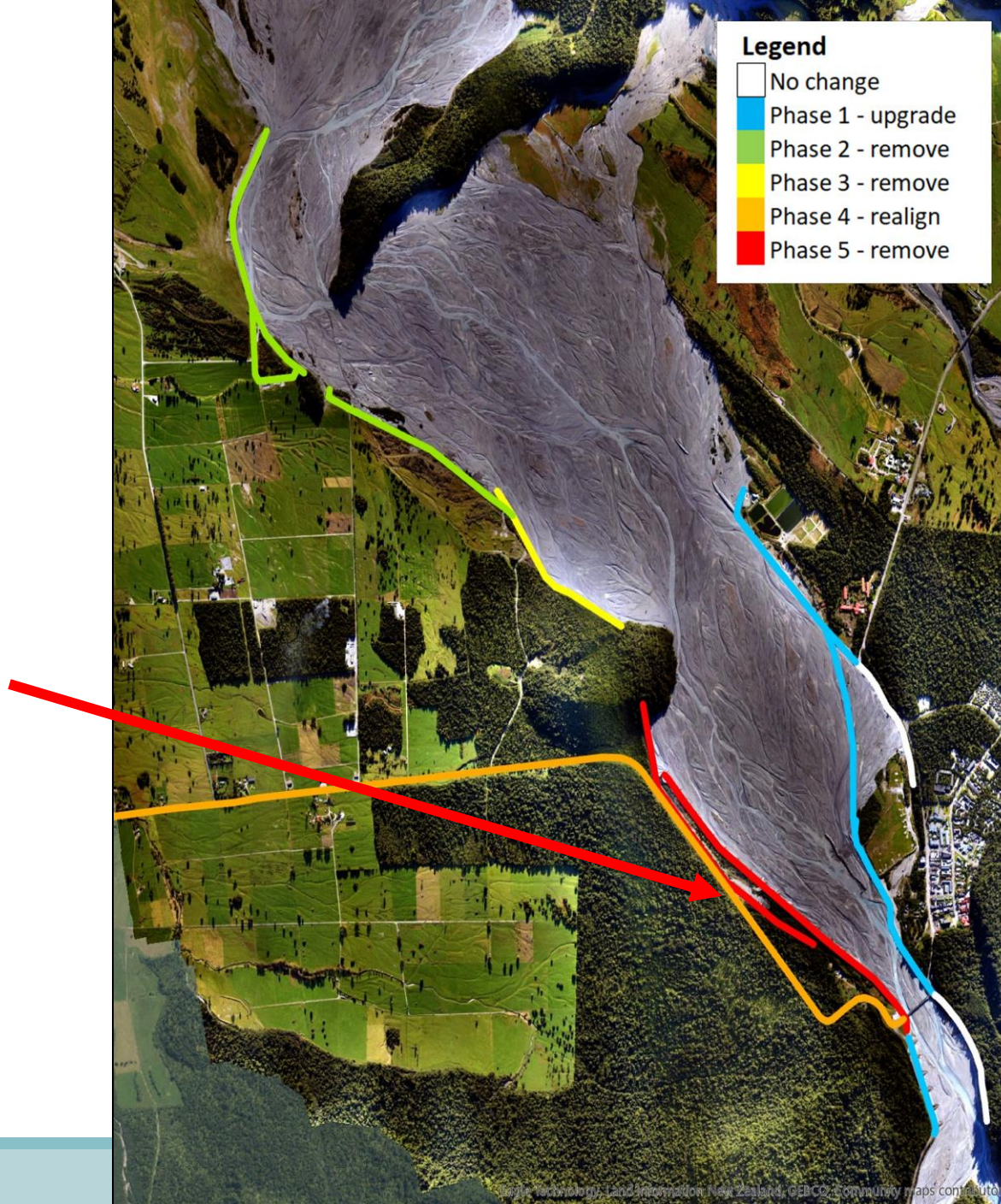
Phase 3: remove lined Rubbish Dump *stopbank* on the south side.



Phase 4: ` Realignment and construction of SH6 to the south of the Waiho River.

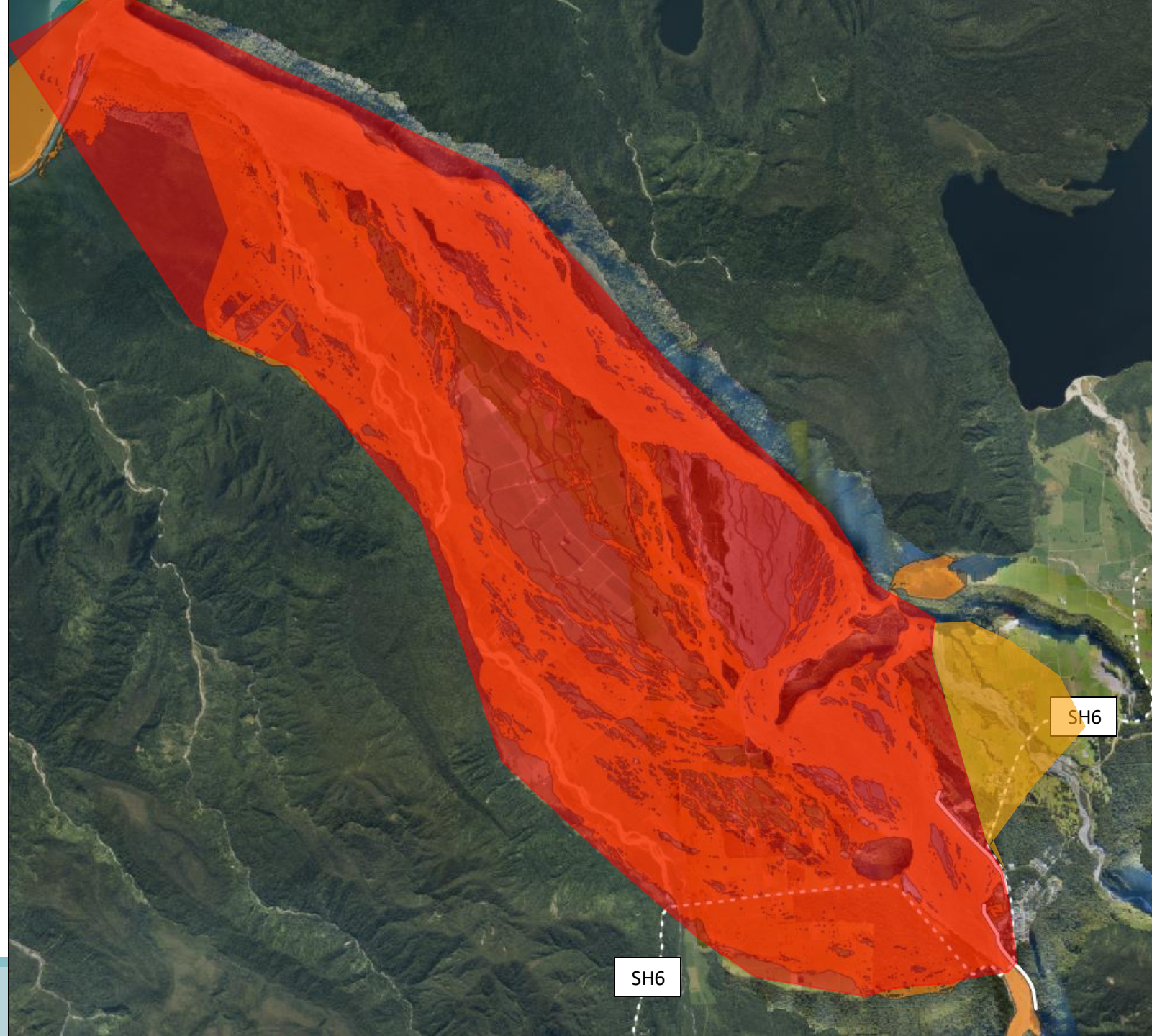


Phase 5: remove the remaining southern stopbanks between the SH6 bridge and Canavan's Knob.



All true left (southern) stopbanks removed

- 2023 DEM
- True right stopbanks shown by white lines
- SH6 shown by white dashed line
- Tatare and Docherty flows not included



3. Interim Structural Measures

- Need to try to hold the line while release to south is progressed
- Work programme still being assessed – risk priority – includes:
 - Existing contract works
 - Milton's Bank
- Further assess avulsion to Tatara Stream



4. Risk Management Data and Equipment

- Update 2016 monitoring strategy
 - Flood warning, imagery, survey
- Hydraulic and geomorphic modelling of risks and options



5. Governance & Stakeholder Engagement

- Develop Business Plan
- Consultation / Engagement



THE WEST COAST
REGIONAL COUNCIL

Question time



We want to hear from you

We want your feedback about what you hear tonight

Feedback forms will be available at the end of the evening

Important for us to understand

- Do you agree or disagree with the 10-year Strategy?
- Do you agree or disagree with the recommended progression proposed over the 10-years?
- If it was implemented as proposed tonight, what would the impact be on you?
- What other options can you think of that the Strategy hasn't considered?

Next steps

Collation of feedback

Consideration of feedback and finalisation of 10-year strategy

Strategy will form part of a briefing package to the incoming Government.

Whatever we do in the future, it has to be done in partnership – Community – Iwi – Local Government – Central Government

Once we have finalized the strategy for the river will come the plan for property and infrastructure over the next 10 years.

Ngā mihi
