

# BC's Massey Tunnel:

- Current physical condition??
- Remaining use-able life??
- Costs to maintain annually 2019- 2069??



➤ BC Govt & Metro Vancouver transparency needed!!

# Massey Tunnel- Information needed:

- 1) What is remaining use-able tunnel life estimate based upon??
  - Reports from competent, qualified engineering/ construction company(s)?? Or
  - Un-supported govt memorandums/ word of mouth from BC govt staffers??
- 2) If based on written reports, what are the titles and dates of these report(s)??
- 3) Names of company(s) that produced these reports??

- 4) Is current tunnel lifespan estimate based on an assumption or projection that **major refurbishments of the tunnel would be required** during this period?? If Yes,
- 5) What is the nature of the required refurbishments??
- 6) **Estimated costs** of Tunnel refurbishments during 2020 to 2070??
- 7) Schedule?? IE: year(s) refurbishments would have to occur??
- 8) When refurbishments are being conducted, would availability of tunnel and or one or more tunnel's lanes be reduced??
- 9) If Yes- details??...

# Requested Motion:

- Require that a letter is sent from the task force (and or MV GVRD Board) to BC's Minister of Transportation and Infrastructure requesting that:
  - A comprehensive structural assessment of the Massey Tunnel is conducted by a qualified engineering and construction firm with an objective of establishing:
    - 1) The likely remaining use-able life of the tunnel;
    - 2) If major refurbishments are required 2020- 2070- the nature of required refurbishments;
    - 3) **Estimated costs** of such refurbishments;
    - 4) A refurbishments schedule 2020- 2070:
    - 5) The likely remaining use-able lifespan of the tunnel *without* major refurbishments;  
=====
    - 6) Structural assessment report(s) should be made public!!



# George Massey Crossing Project

Phase 2: Crossing Options

Task Force Meeting #2

July 24, 2019

# Purpose: Short-list Potential Options

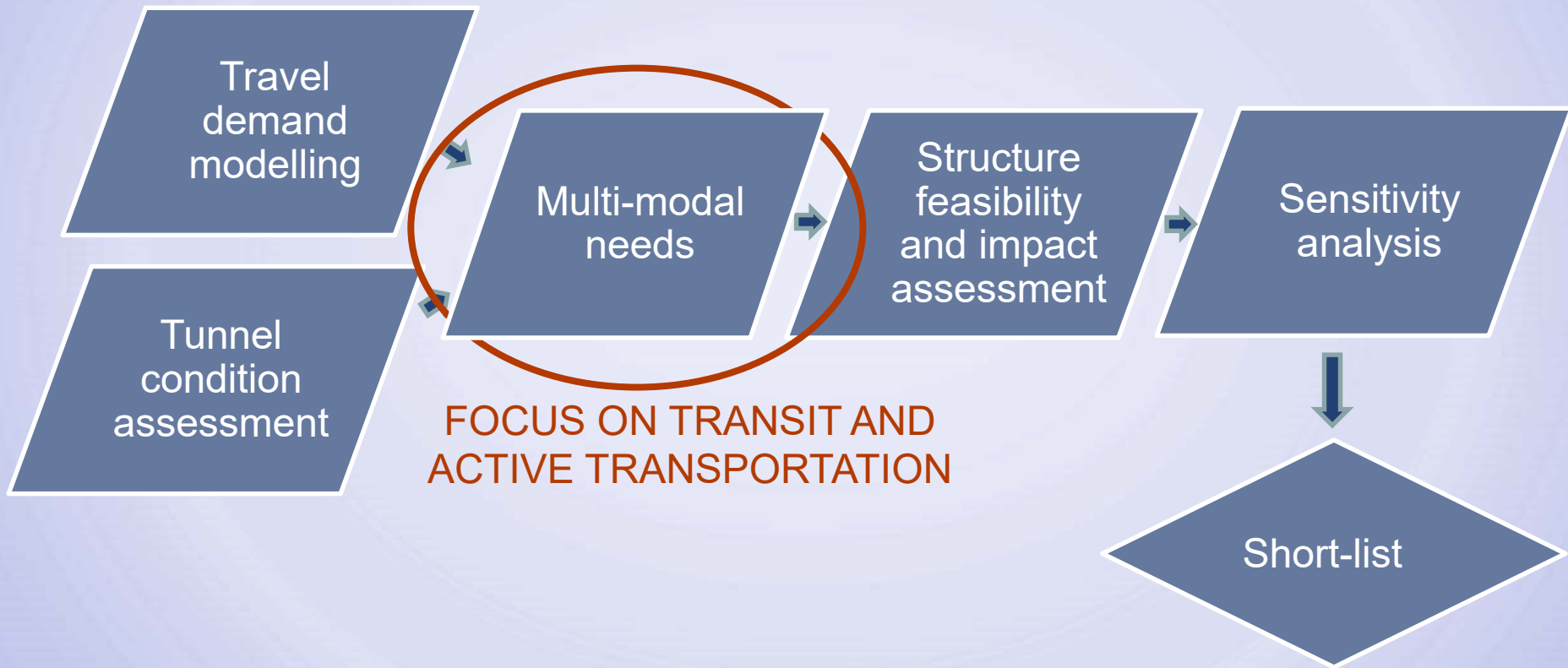




## Discussion Topics

1. Multi-modal needs assessment
2. Existing tunnel condition
3. Structure feasibility and impacts
4. Travel demand modelling
5. Preliminary shortlist discussion

# Evaluation Process Recap: Long-list







# Multi-modal Needs Assessment

- Transit assumptions:
  - Commitment to transit growth; including dedicated lanes
  - Transit service in curb lane
- Multi-use path (MUP) assumptions:
  - 2 single-direction paths
  - 4 m width desired; 3.5 m acceptable



# Existing Tunnel Condition

- Seismic strength est. 1-in-275 event; lifeline std. is 1-in-2475-year.
- Can be seismically retrofitted to 1-in-475 but requires full closure to complete.
- Requires further lighting, electrical, and drainage improvements and improved Fire and Life Safety (FLS).
- Otherwise structurally sound.
- Does not meet minimum lane width standards for 4 vehicle lanes.
- Vertical clearances are substandard.
- Can be used for multi-use path; requires separate ventilation from traffic.

**Conclusion: consider for local traffic, transit and/or MUPs only (with seismic and FLS upgrades) or leave for utilities only (no upgrade).**



## Range of Structural Options

- Bored tunnel
- Immersed tube tunnel (ITT)
- Bridge
- Re-use existing tunnel in combination with above



## Structure Feasibility and Impacts: Specifications

Feature	Specification
Service Life Design	New: 100-150 years Retrofit: assume 50 years or less
Seismic Resilience	New: 1-in-2475 yr (lifeline structure) Retrofit: upgrade to 1-in-475 yr
Maximum Grade	5%
Road Geometry	Highway: BC MOTI standards Bridge: BC MOTI standards Tunnels: Meet FLS standards
Maximum Tunnel Width (interior)	Bore: 16 m inside diameter Immersed Tube (ITT): 40-42 m



## Structure Feasibility and Impacts: Specifications

Feature	Specification
Minimum Separation Between Tunnels	New ITT: 10-25 m Existing: 25 m Bore: 26 m (1.5 diameter)
Ventilation in Tunnels	Uni-directional traffic
Fire and Life Safety	Design for all “Ages and Abilities”
In-stream Construction Season (if required)	July to mid-February (to accommodate fish migration)
Geographic extent	Steveston to Hwy 17A interchanges

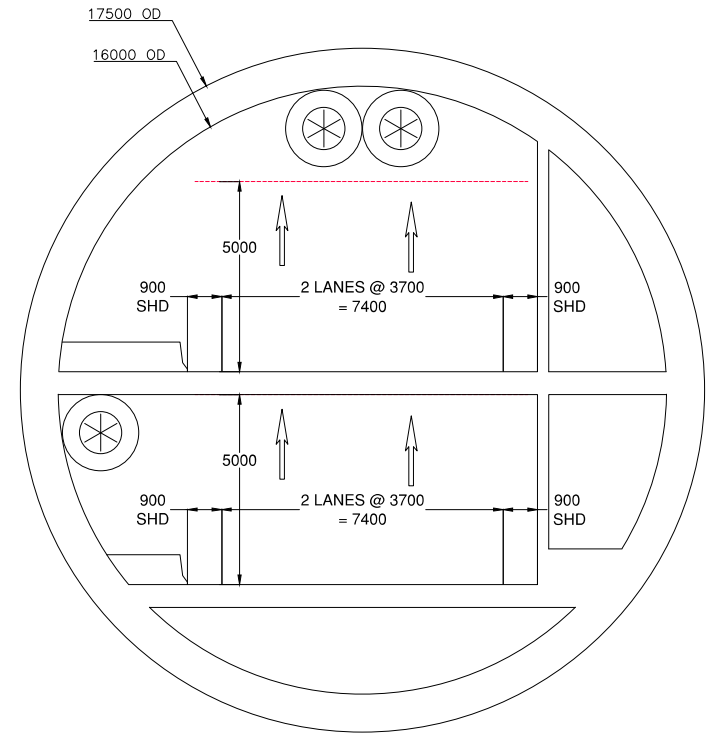
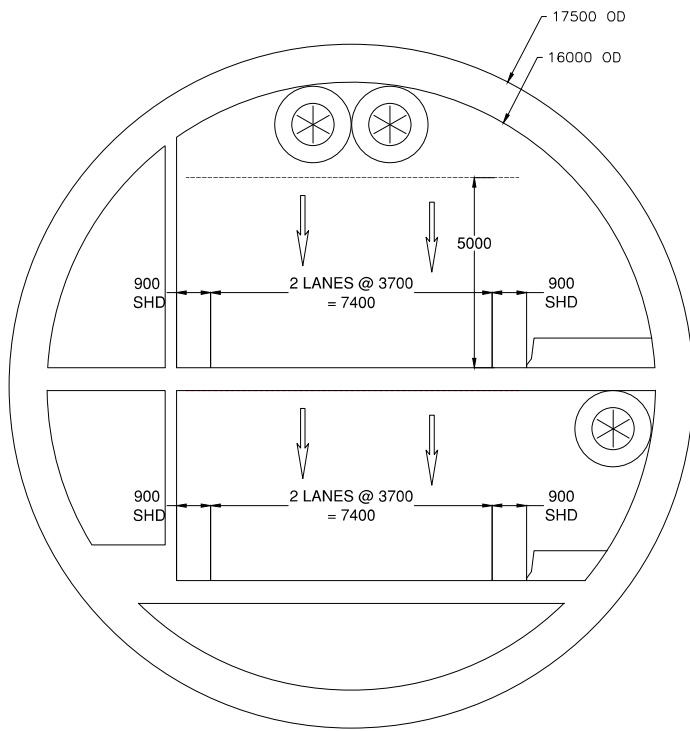


## Preliminary Analysis: Bored Tunnel Configuration

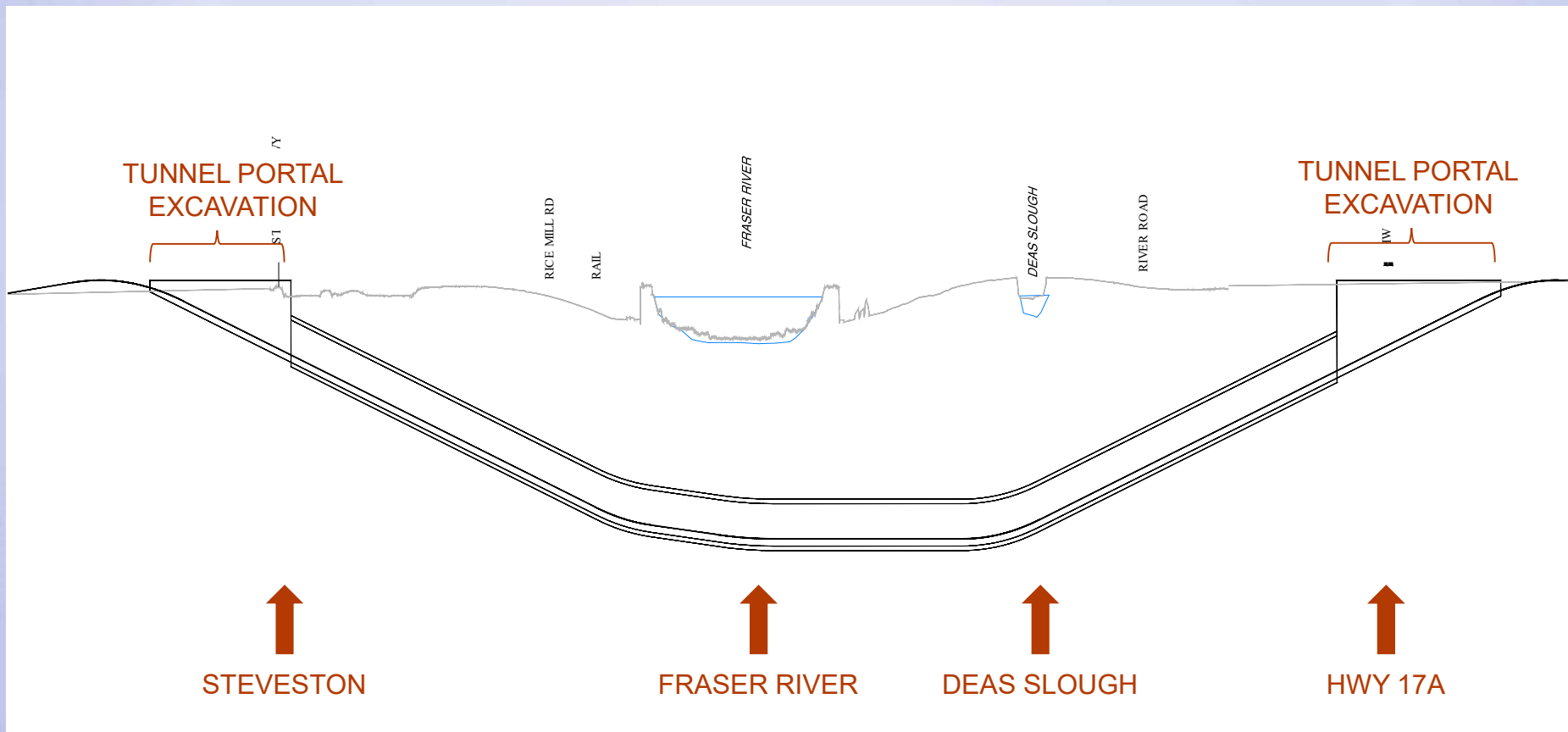
- Depth of tunnel is governed by depth of liquefiable soils (est. 35-50 metres).
- Resulting length is 3-4 km; may extend north of Steveston and south of Hwy 17A; challenging connections required.
- Significant excavation challenge at the interchanges.
- Stacked roadway configuration, max four lanes per bore.
- MUP not feasible with 8-lanes (use existing tunnel or separate new facility).
- Stairs may be required for emergency egress, making FLS for all ages and abilities challenging.



# Bored Tunnel: Typical Configuration



# Bored Tunnel: Anticipated Profile

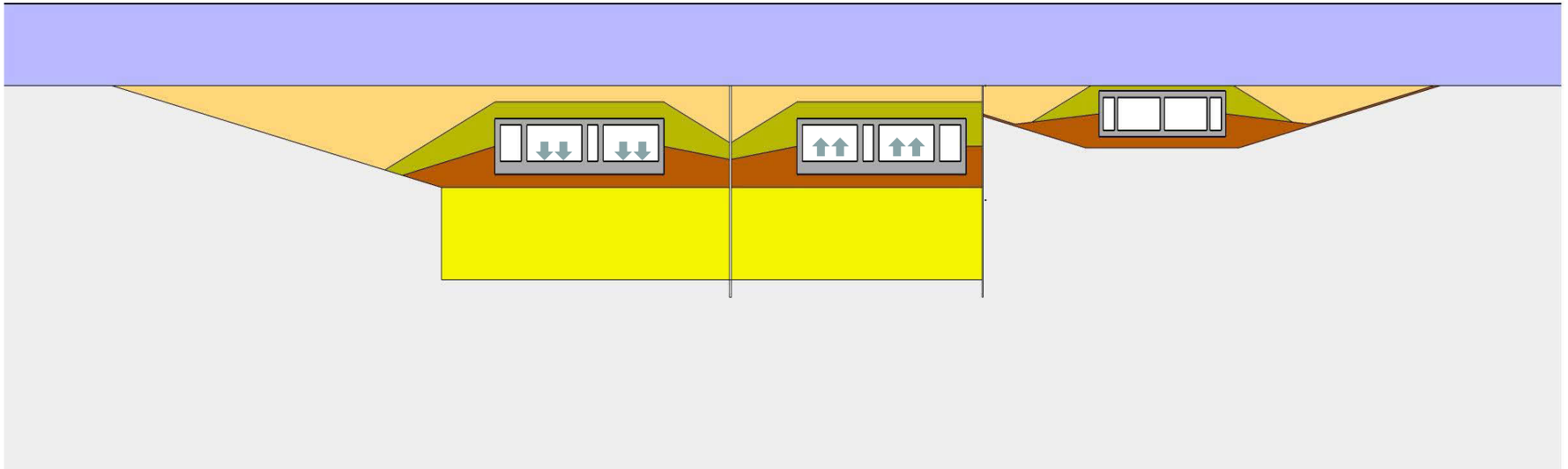




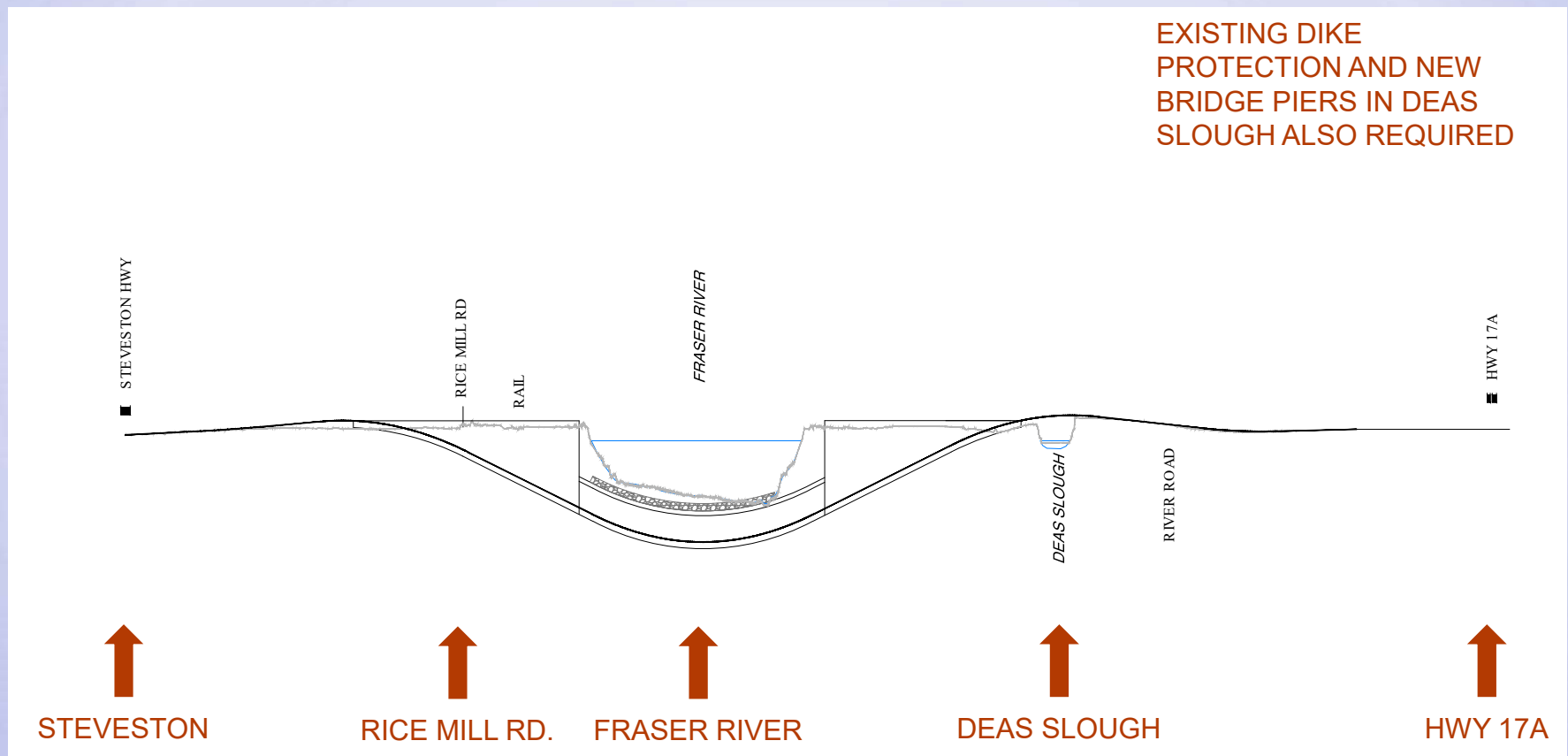
## Preliminary Analysis: ITT Configuration

- Depth of tunnel governed by *Navigation Protection Act*.
- Resulting length is approx. 1.8 kilometres (similar to existing).
- Connections to interchanges similar to today, with possible impacts to Deas Island Park and at the north approach.
- Requires extensive dredging for construction and large graving dock.
- MUP feasible in 8 lane tunnel only if two tunnels; large footprint.
- New bridge over Deas Slough; navigation clearance TBD.

# ITT: Anticipated Configuration



# ITT: Anticipated Profile

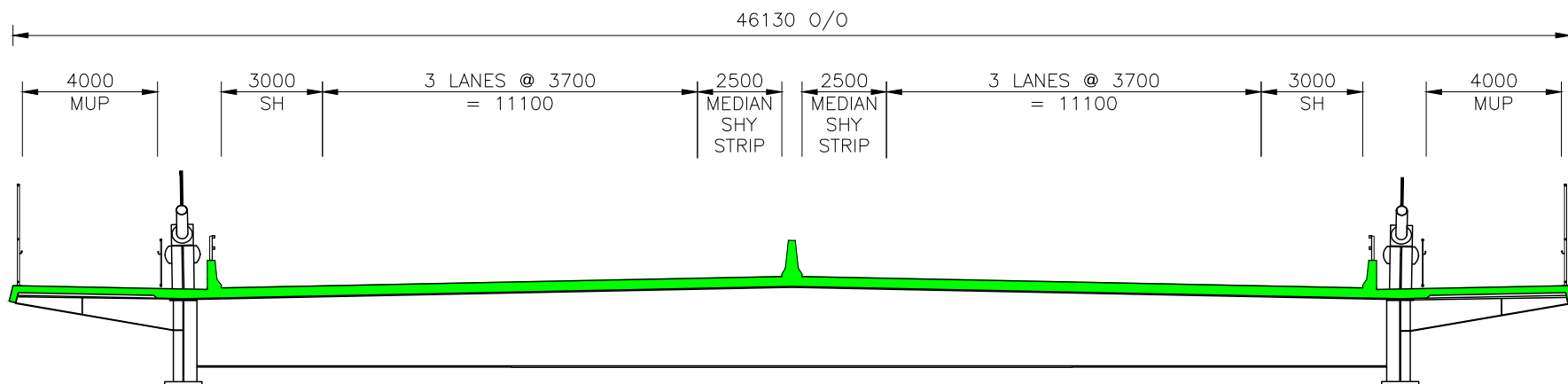


## Preliminary Analysis: Bridge Configuration

- Height governed by *Navigational Protection Act*; similar to Alex Fraser.
- Length estimated at 3 km.
- Large structures required for ramp connections at Steveston interchange.
- 8 lanes with MUP achievable; weather and elevation challenges for cyclists.
- Noise and visual impacts in Deas Park, Richmond and Delta.
- Light impacts required in Deas Park.

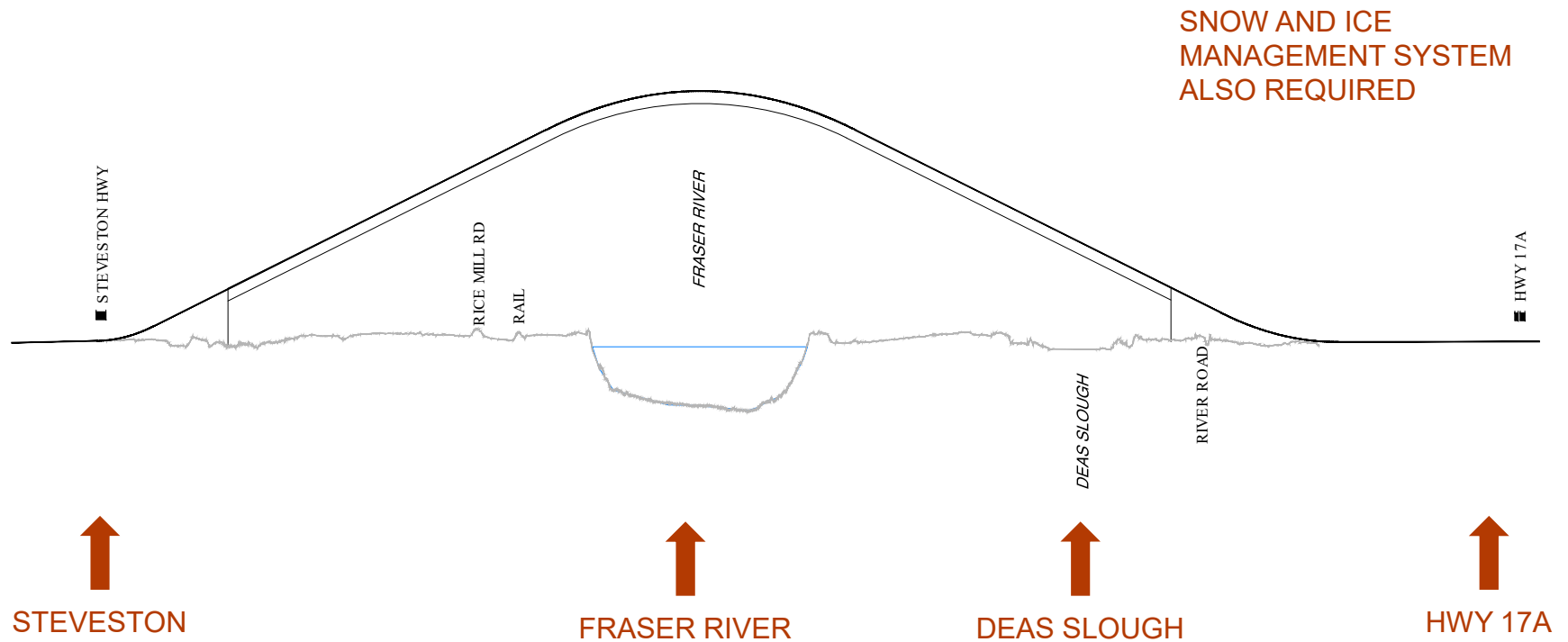


## Bridge: Typical Configuration





# Bridge: Anticipated Profile

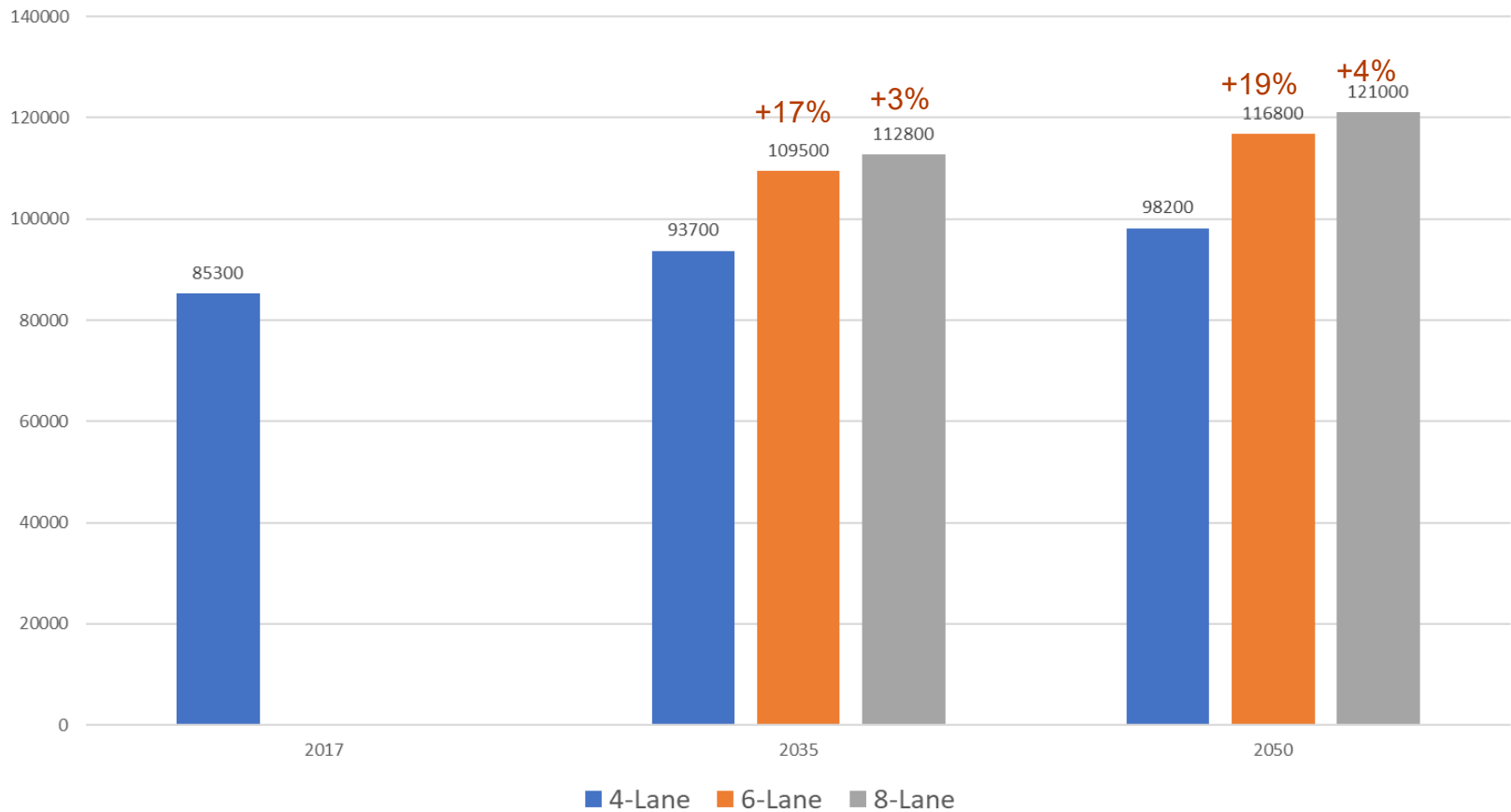




# Travel Demand Modelling

- Modelled runs:
  - 4 lane (base case)
  - 6- and 8-lane (TransLink Regional Transportation Model)
- Model assumptions as per TransLink 10-yr plan

### George Massey Crossing RTM AADT Forecast





# Lane Alternatives Analysis Summary

- 6-lane generates significant benefits in the off-peak direction on Hwy 99; some peak direction benefits.
- 8-lane **with** transit dedication incentivizes transit use and provides upside future Hwy 99 resilience benefits.
- 8-lane **without** transit dedication generates overall network benefits but limits transit network benefits.
- **Staff Working Group general consensus: maintain 3 GP lanes in peak direction and incorporate transit dedication in both directions.**



## Preliminary Short-list: Working Group Recommendation

### *With Existing Tunnel:*

- New 4-lane bridge; keep existing 4-lane tunnel (drop – below standards)
- New 4-lane deep bored tunnel; keep existing 4-lane tunnel (drop – below standards)
- New 4-lane immersed tube tunnel; keep existing 4-lane tunnel (drop – below standards)
  
- New 6-lane bridge; keep existing tunnel for transit or local traffic (2 lanes only)
- New 6-lane deep bored tunnel; keep existing tunnel for transit or local traffic (2 lanes only)
- New 6-lane immersed tube tunnel; keep existing tunnel for transit or local traffic (2 lanes only)

## Preliminary Short-list: Working Group Recommendation

### *Without Existing Tunnel:*

- New 6-lane bridge (all GP lanes); with counterflow  
(drop – transit service limitations)
- New 6-lane deep bored tunnel (all GP lanes); with counterflow  
(drop – transit service limitations)
- New 6-lane immersed tube tunnel (all GP lanes); with counterflow  
(drop – transit service limitations)
- New 6-lane bridge (all GP lanes); without counterflow  
(drop – no opportunity for dedicated transit)
- New 6-lane deep bored tunnel (all GP lanes); without counterflow  
(drop – no opportunity for dedicated transit)
- New 6-lane immersed tube tunnel (all GP lanes); without counterflow  
(drop – no opportunity for dedicated transit)



## Preliminary Short-list: Working Group Recommendation

### *Without Existing Tunnel:*

- New 7-lane bridge; with counterflow (drop for now, potentially revisit)
- New 7-lane deep bored tunnel; with counterflow (drop – ventilation challenges)
- New 7-lane immersed tube tunnel; with counterflow (drop – ventilation challenges)
- New 8-lane bridge; ~~consider potential~~ with dedicated transit lanes (keep)
- New 8-lane deep bored tunnel; ~~consider potential~~ with dedicated transit lanes (keep; locate MUP elsewhere)
- New 8-lane immersed tube tunnel; ~~consider potential~~ with dedicated transit lanes (keep; locate MUP elsewhere)



## Next Steps

- Mayors Council Meeting (25 July)
- Complete meetings with First Nations (in progress)
- Re-confirm Transport Canada navigational requirements
- Conduct shortlist evaluation



Thank You