

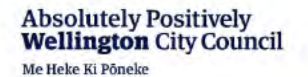


# PROGRAMME OPTIONS UPDATE

## 3 AUGUST 2021

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# Workshop purpose

Today's workshop is preparing for 17<sup>th</sup> August Board Meeting decision by providing:

1. Progress update on option assessments
2. Discussion of Communications and Engagement strategy for October
3. Confirm Affordability Threshold for LGWM
4. Confirmation of information that will, and will not, be available for 17<sup>th</sup> August Board meeting
5. Next steps, challenges, and risks, to achieve October 2021 Engagement

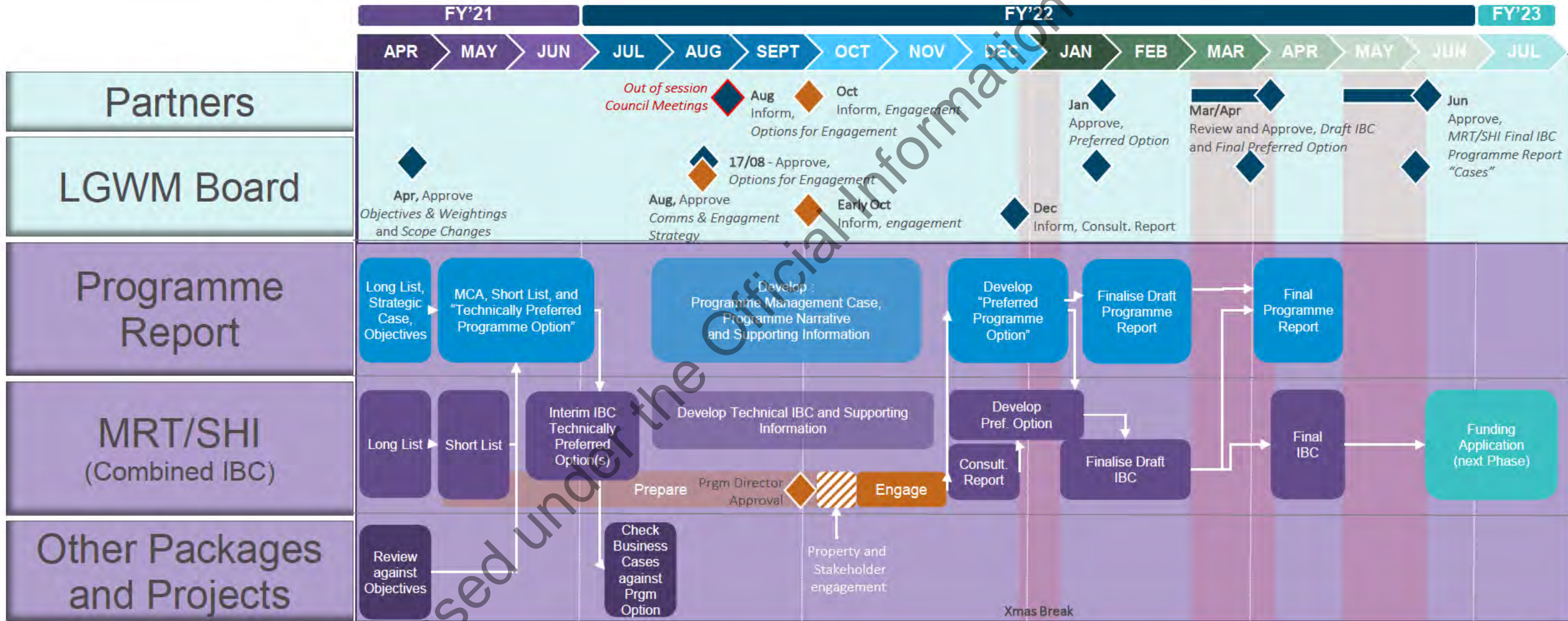
# Challenges and Risks - intro

The objective is to deliver engagement or consultation this side of Christmas, which means it must start between the week of 22-26 October at the latest. Consultation must meet minimum quality standard based on 'good industry practice' and be appropriate to the level required at IBC stage.

To achieve this objective, a Board decision must be made by the 17 August (at the latest) if an October date is to be achieved, noting the following:

1. Significant scheduling and resource risk as the speed in planning and delivering the consultation presents several key logistical challenges and risk.
2. There may be material gaps in the information provided in the pack that means the Board may not have the ideal base from which to make a fully informed decision by 17 August.
3. Multiple reasonable options must be presented as part of consultation or a statutory trigger under the Local Government Act 2002 could be activated.
4. There are several external milestones/events between 17 August and 26 October that are outside of the direct control of the LGWM programme that could impact on the options.
5. The Programme is still in a state of transition following the Health Check, with some key resourcing changes potentially impacting in the next few months
6. There are only a few approval points (e.g. Board meetings) between now and October consultation - the current assumption is that the approval for consultation content and process sits with the Programme Director

# Steps to October



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# Challenges and Risks – Scheduling and Resourcing

## Considerations

### Scheduling & resource

- Resource – capacity & capability, and time-to-market
- Aligning milestones to approval windows
- Transitional programme arrangements

### Delivery

- Feedback from partners prior to a 17/08 decision point and any additional requirements this may drive
- Funding letters from GWRC/WCC to Minister and affordability
- Gaps information and any amendments to baseline assumptions as a result of peer-review

### Externalities

- Series of activity occurring external to the Programme but impactful upon consultation messaging
- Public reaction/disruption to the options
- New government policy initiatives
- COVID-19

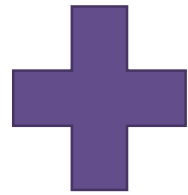
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# Emerging Technical Options

## MCA

- Objectives
- Mana Whenua
- Effects
- Delivery & Operation



## Other Factors

- Affordability
- Stageability
- BCR
- Public Engagement



**Best  
Performing  
Option**

# MCA – 2/7/21 Board meeting position

Program me	PT south	PT east	Basin	Mt Vic	Te Aro & Terrace Tunnel	Long Tunnel
V1A	Island Bay 	Miramar 		 		
V2	Island Bay 	Miramar 				

- V1A is emerging as best performing option through the MCA programme assessment
- Options V1, V3, V3A don't perform as well. Note: V1 has significant Te Aro impacts.
- However, V2 is suggested to be retained for decision makers to consider "Other Factors"
  - Note: Stages of V1A and V2 delivery include various elements of lesser performing options (V3 and V3A)

# Emerging Technical Options

- Progress since 2/7/21 Board meeting
  - MRT/SHI - Package Long to short list workshop – 6 July
  - MRT/SHI - Package Short List assessment Workshop 29<sup>th</sup> July – MRT corridor location (Kent/Cambridge v's Taranaki), Mt Vic tunnel alignment
  - MRT/SHI – Package Emerging Technically Preferred Option Workshop – 4<sup>th</sup> Aug – Tomorrow - Staging
- Other Factors
  - Urban Development – Delivery – the how - progress and Board paper considered earlier
  - Affordability - Programme Threshold progressed with partners
  - BCR information progressing
  - Pricing – High level information completed



# Combined Package Short List

All options to be considered with & without congestion charging.

Short list options will consider both BRT and LRT

Package	PT core	PT south	PT east	Basin	Mt Vic	SH north
V1A - Base	Taranaki (via Basin)	Island Bay	Miramar + via Kilbirnie	Grade separated (MRT both spines)	MRT + SH (diagonal)	No improvements

Taranaki St vs Kent/Cambridge  
 MRT Terminate vs Island Bay vs Newtown  
 MRT route vs Cobham Dr or through Kilbirnie  
 Grade Sep for 1A vs At Grade for long tunnel  
 Mt Vic Tunnel vs Parallel option vs Diagonal option  
 Long tunnel for V2

Not Assessed

- LRT vs BRT mode performance – urban development and PT outcomes on different corridors. E.g. Bus to east
- MRT Cross Section

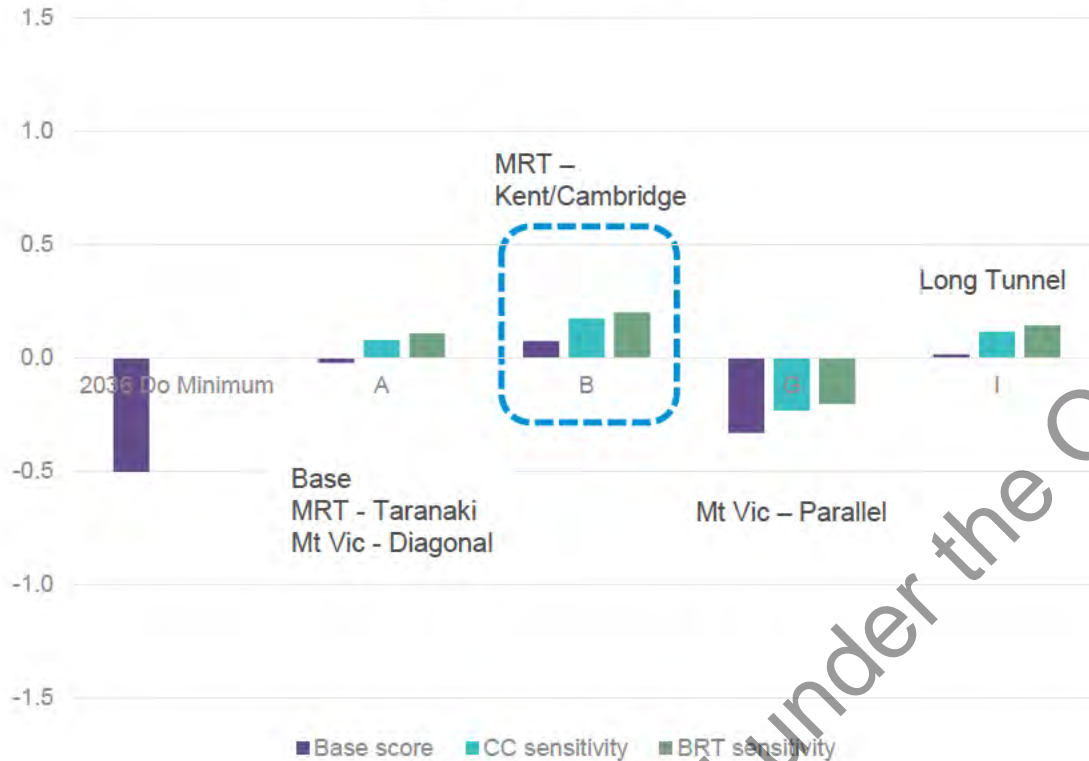
# Combined score summary (weighted)

Project Objectives Only



# Weighting scenarios

Base weighted (adjusted with Mana Whenua and grouped effects)



## Taranaki vs Kent Cambridge

- Taranaki UD slightly higher, if Haining Precinct not delivered there is marginal difference
- Kent/Cambridge better for safety, PT network and mode share, property, RMA, Mana Whenua values, social, economic, environmental

## Mt Vic Tunnel

- Diagonal Tunnel performs significantly better on property, RMA, social, environmental

# Emerging options - What we know - General

1. Programme option 1A, which includes; MRT to the south and east, Basin Grade Separation and an additional Mt Victoria tunnel performs best against the programme objectives
2. Urban Development is a key outcome which plays a major role in justifying the level of investment in MRT
3. In the Wellington context BRT performs better from a PT perspective, as this can be 'open network' and removes unnecessary transfers, particularly to the north
4. Different corridors have different Urban Development potential, which varies dependent on the PT solution options
5. Evidence indicates LRT has a higher Urban Development potential than BRT however, the evidence is not conclusive. The table below shows urban development growth based on a number of examples from around the world.

Wellington	Ave.	Min	Med	Max	Sample
LRT	14%	0%	8%	81%	20
BRT	8%	0%	7%	20%	10

- Outliers have significant impact on the averages
- **Note that a meta-analysis has not been completed**

# Emerging options - What we know – Central – to Basin

1. Package assessment indicates that Kent/Cambridge performs better than Taranaki Street.
2. However, Taranaki St route performs slightly better than Kent/Cambridge regarding Urban Development potential assuming Haining precinct is delivered
3. NB - The 'Haining Precinct' is a key decision point as this requires MRT on Taranaki Street.
4. Kent/Cambridge performs better for PT and Safety perspective, and has a reduced property impact. It scores better against Mana Whenua values
5. If MRT joins the Basin from Kent/Cambridge then this is almost certain to require a grade separated solution at the Basin.

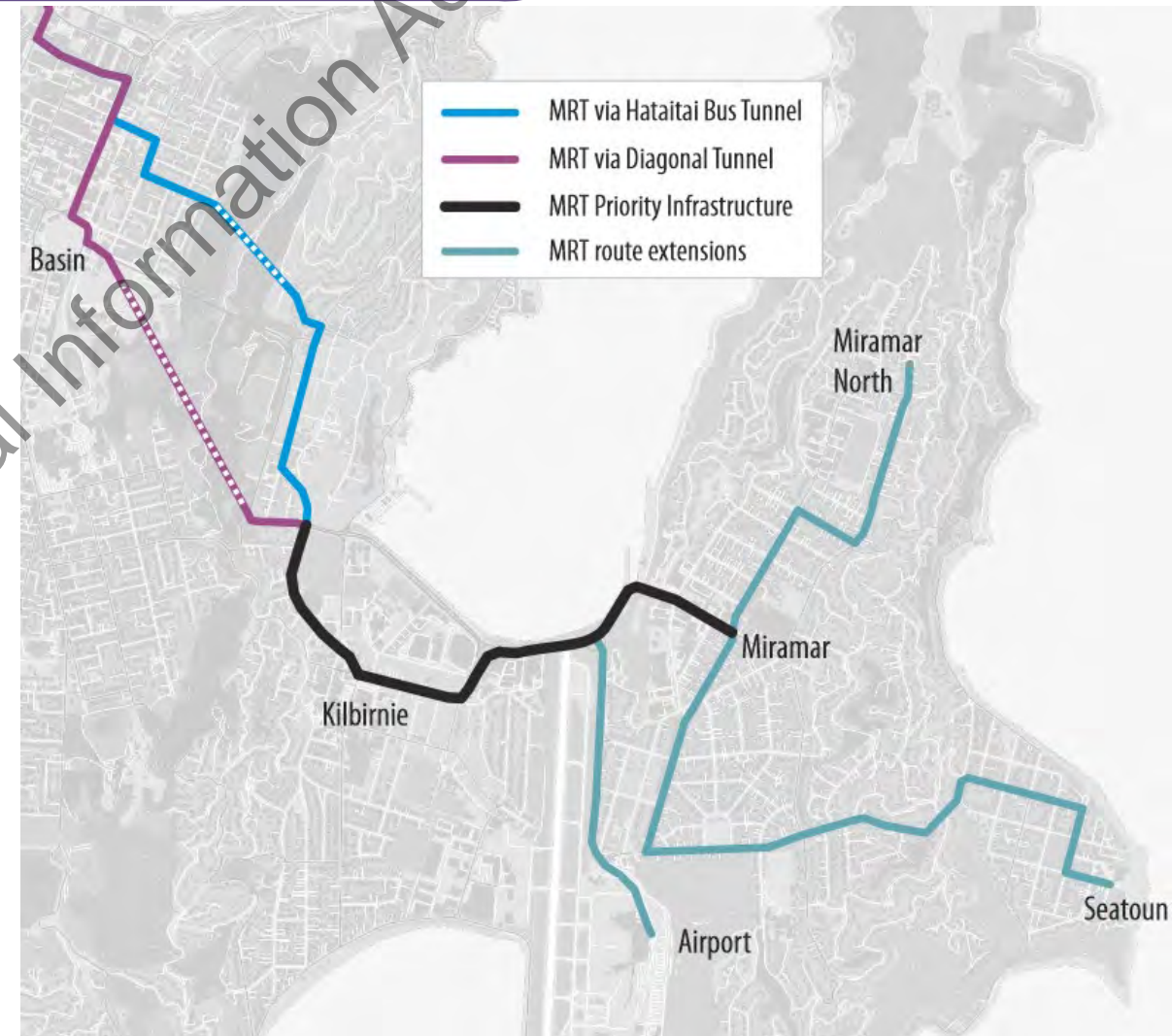


# Emerging options - What we know - South

1. Basin to Newtown is a key growth area - opportunity is much lower south of Newtown, and timeframes are less certain.
2. Terminating an LRT solution at Newtown would require forced PT transfers, it would also be a relatively large investment (vehicles, stabling) for a relatively short LRT network. This could be addressed through delivering an 'open system' such as a BRT solution, which could accommodate lower levels of service further away from the city where corridor widths are narrower.
3. The provision of a high quality and high performing MRT solution south of Newtown would require significant property purchases due narrow corridors.
4. Variable cross sections could be provided, ie with a lesser property impact, lesser Urban Development, and a lower MRT performance south of Newtown
5. Trade off between the requirement for Urban Development with associated benefits and the level of MRT investment required to enable said development.
6. Wider network transport modelling not available to confirm implications of narrower cross sections or sharing of lanes (PT with general traffic)

# Emerging options - What we know - East

1. Urban Development opportunity to the east not expected to be high enough to warrant a MRT level of investment.
2. BRT or significant improvements in current PT provision could deliver the desired transport outcome
3. Mt vic tunnel – reduced UD requirement to east and current extra lanes assumed as PT only which provides (xx MRT/Buses) which reduces benefits, if HOV increases benefits for transport and urban development to east including commercial however less aligned with mode shift objective
4. A new Mount Victoria tunnel would provide a higher level of service for PT to the east. A new tunnel would also provide resilience benefits and flexibility to provide some capacity improvements for commercial vehicles and HOV's.



# Emerging options - What we don't know

1. Affordability Threshold assumed – Board direction needed
2. The magnitude of Urban Development sought, and the mechanism on how this will be delivered
3. Certainty of LRT vs BRT regarding Urban Development outcomes
4. Cross section trade offs, particularly Urban Development outcomes south of Newtown and the implications on transport network performance for all modes as a result of narrower cross sections for MRT solutions


























# Ongoing assessment

	What we know	What we're working on
Performance of LRT vs BRT for different options	<ul style="list-style-type: none"> <li>LRT provides moderately better patronage response than BRT.</li> </ul>	<ul style="list-style-type: none"> <li>Modelling to quantify the performance difference between LRT &amp; BRT – not for 17<sup>th</sup>, but for engagement</li> </ul>
Urban Development and Land Value Uplift outcomes for each mode.	<ul style="list-style-type: none"> <li>LRT traditionally shows greater potential to stimulate development &amp; generate uplift.</li> <li>Very limited research exists on electric BRT.</li> </ul>	<ul style="list-style-type: none"> <li>Research on LVU for different modes, and other factors that drive uplift – initial position for 17<sup>th</sup></li> </ul>
Kent Tce vs Taranaki Street alignments	<ul style="list-style-type: none"> <li>Each alignment achieves similar MRT performance.</li> <li>Taranaki St may have better UD outcomes, but will have higher cost to deliver.</li> <li>Kent Tce will be less expensive, but requires Grade Separation of the Basin.</li> </ul>	<ul style="list-style-type: none"> <li>AIMSUN modelling to further assess performance – for 17<sup>th</sup> Aug</li> </ul>
Performance gains achieved by corridor widening	<ul style="list-style-type: none"> <li>Costs and property impacts associated with different corridor width options.</li> </ul>	<ul style="list-style-type: none"> <li>AIMSUN modelling to assess the performance of each option – not by 17<sup>th</sup> Aug</li> </ul>

# “Other Factors” for Decision making

- Affordability and Staging
- Value for Money – Benefit cost ratio
- Urban Development
  - Importance of UD for programme and scale achievable
  - Ability of UD outcomes to be delivered
  - Variable Development based on options – more modelling required
- Travel Behaviour Change - Charging
- Other considerations
  - Ability for current State Highway to be returned to local streets - V1A locks in SH1 on Karo Drive and Vivian Street
  - City impact and consenting risk

# Package Assessment – Staging – Work in progress

Programme	PT south	PT east	Basin	Mt Vic	Long Tunnel	Notes
1A Stage 3	Island Bay 	Miramar 		 		MRT to East
1A Stage 2	Island Bay 	Miramar 		 		BRT to East
1A Stage 1	Island Bay 	Miramar 				Mt Vic tunnel not included Hataitai Bus tunnel used
V2 Stage 2	Island Bay 	Miramar 				
V2 Stage 1	Island Bay 	Miramar 				

Note: MRT assumed for all options to south, possibility to use BRT or bus if required

# Cost Estimate

Estimates still being reviewed, factors effecting estimate:

1. Cross section and staging sensitivities
2. Property estimate review, including different options – linked to cross section
3. Operational costs for different mode options and corridors

Capex Figures shown in 2020 \$ millions	1A Base	MRT on Kent/Cambridge	Mt Vic Parrallel	Long Tunnel
P95 Undiscounted	\$4,002 M	\$3,850 M	\$3,722 M	\$4,621 M

# Affordability analysis approach

## FUNDING OPTIONS

Funding tools

Affordability threshold



Funding scenarios

## ANALYSIS



Programme timing



Financing



Funding implications

## PROGRAMME OPTIONS

Long list

MCA best performing



Short list

## FINANCIAL OUTPUTS



Construction cost



Operating cost



On street parking impact

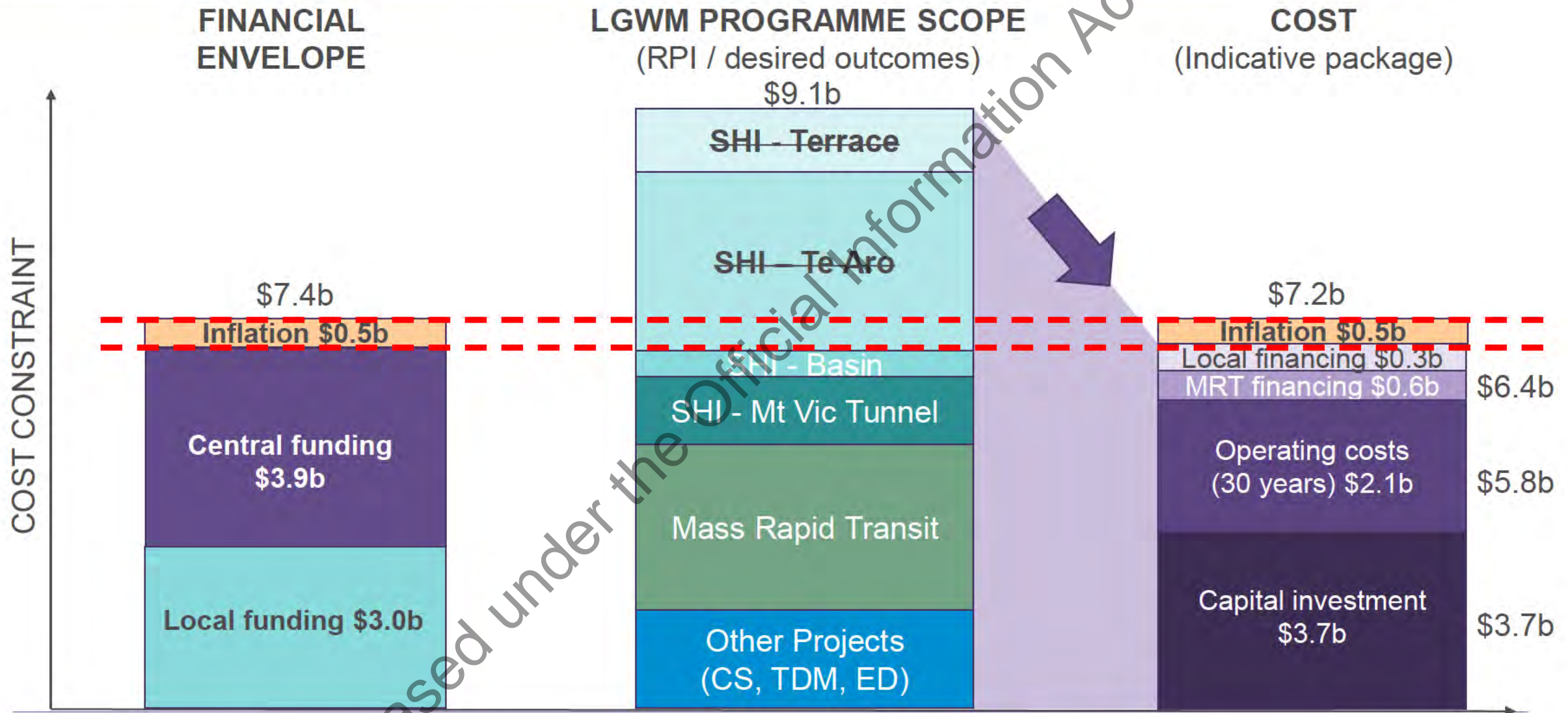
FUNDING

COST

VS



# PBC stage & recommended affordability threshold



Recommended affordability threshold is \$7.4b (PBC funding inflated)

# Affordability threshold – implications

## Notes

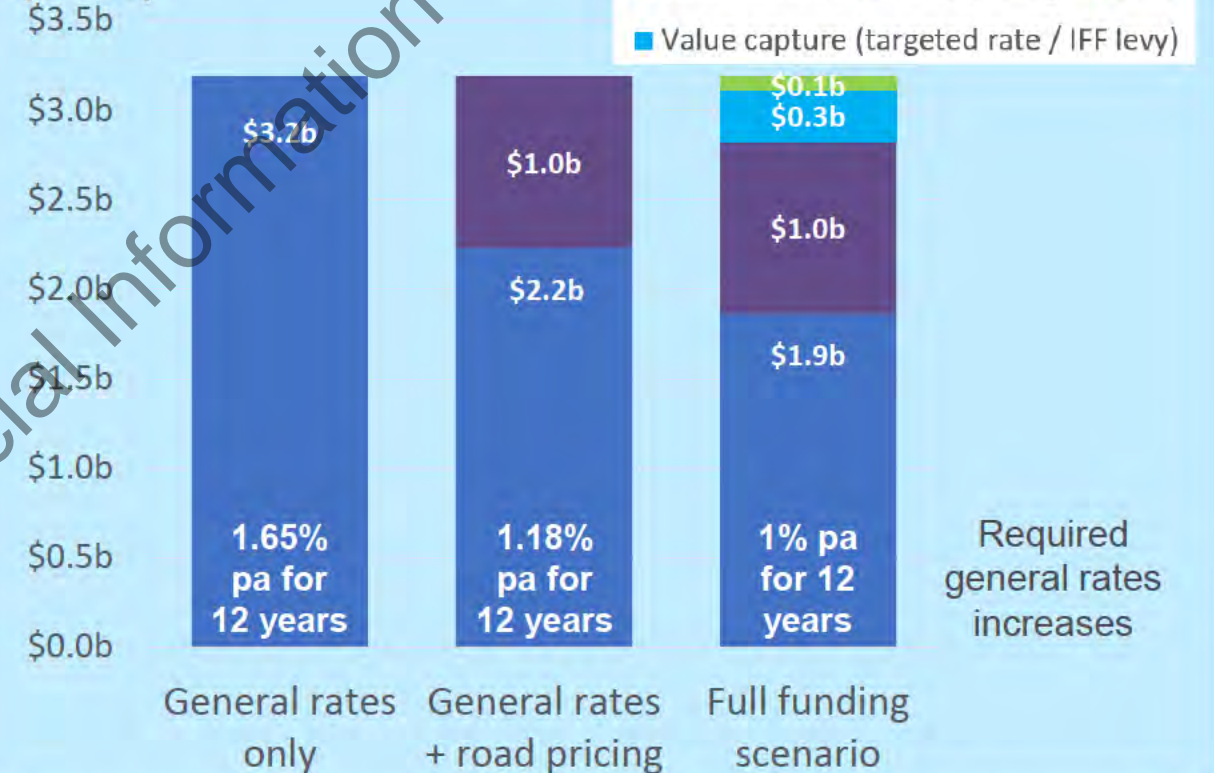
- Recommended threshold is in line with the lower range scenario presented to the minister in June.
- The emerging technically preferred option would *not* be fundable & would need to be staged.
- Emerging information on congestion charging indicates it is likely to generate less net revenue, but better mode shift, than a parking levy.
- Enduring cost shares are yet to be agreed. Final cost shares will need to be balanced to consider funding.
- Only very early work done on implications for specific groups.

## Central share assumptions (\$4.2b)

- Baseline NLTF forecast
- 2% FED / RUC increases pa. from FY24/25
- Regional spend allowance of \$125m pa.
- Assumes MRT financed using DMO

## Local share assumptions

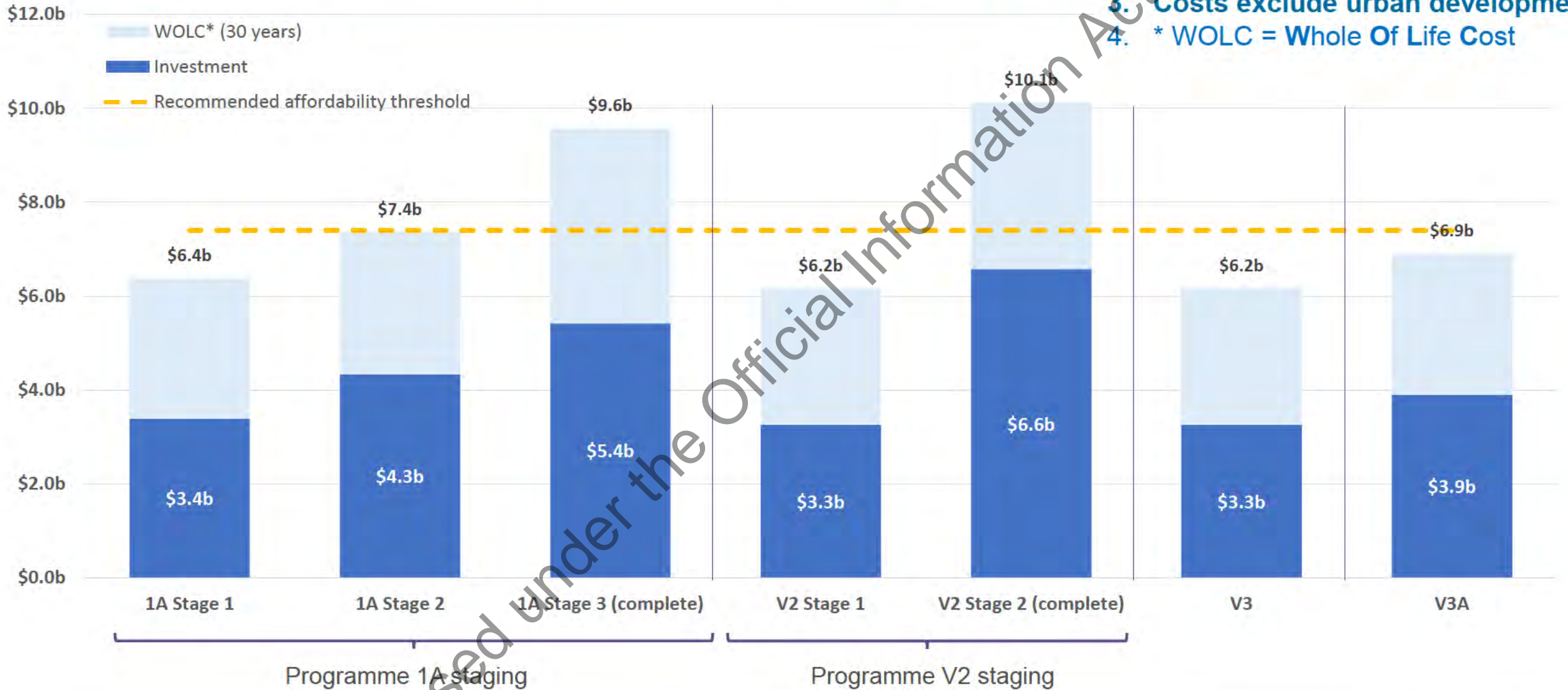
(\$3.2b)



Local share would require rates increases of 1.65% pa. over 12 years. This could be reduced by use of other sources as indicated above.

# Programme staging & affordability

- Notes: 1. Work in progress, subject to change  
 2. Costs based on upper cost estimate (95<sup>th</sup> percentile)  
 3. Costs exclude urban development  
 4. \* WOLC = Whole Of Life Cost





# Affordability implications

Assumed affordability threshold indicates:

1. Option 1A with LRT to south and east corridors cannot be accommodated within threshold
2. BRT for entire network is assumed to be affordable, more work to confirm
3. 1A Stage 2 - Mix and match for mode with LRT south with BRT or bus east may be possibility – this is expected to achieve majority of outcomes and similar performance against objectives as 1A. Cost estimate updates and performance assessments still required.

# Economics

- BCR commenced using transport model outputs 5 weeks ago in parallel with modelling updates
- Transport benefits alone – V1A indicate programme BCR of approx. 0.4 – 0.6.
- Final BCR relies on realistic urban development (land value uplift) benefits – uncertainty of this being realised at present
  - Sensitivity testing required for potential urban development and congestion charging
- PBC BCR range 0.6-1.2. This included land value uplift (\$180-\$550M), congestion charging (\$200-\$400M), and continuous 2-3% PT patronage growth to north (requires additional significant rail investment RS2 – outside LGWM scope).

## Next Steps

1. Update BCR with new model runs – city centre run update for 17<sup>th</sup>, remainder for engagement
2. Complete BCR information for different options and staging – not by 17<sup>th</sup>

# Travel Behaviour Change

- Currently assesses range of demand management tools that could be used
- Parking levy (Feasibility) and Congestion (High level) charging considered as part of tools available
- Doesn't impact Programme options selection, improves performance of network if included resulting in better return on investment for programme solutions
- Congestion charging requires provision of alternative mode to the private car, which is likely to require significant investment in rail to north outside LGWM programme scope

# Property

- Different options have different property impacts – engaging on range of options at detailed level results in significant quantum of owners requiring engagement with uncertainty of impacts and timing of potential impacts
- Property Strategy progressing but is challenging due to uncertainty with range of options and interface with urban development
- Currently limited funding available for acquisition if approached by affected landowners for early purchase. Additional funding expected to be required.
- Acquiring partner confirmation required – MRT?

# Other Factors

Other factors that require consideration for decision on 17<sup>th</sup> Aug

- All options except long tunnel retain SH1 through City on Vivian St and Karo Drive for long term
- Property and Consenting Risks, and construction disruption

# LGWM Board 17<sup>th</sup> Aug Decision

1. Board decisions required on 17<sup>th</sup> to achieve October
  - a) Approve Options and level of detail for engagement

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# Gaps to be filled for 17<sup>th</sup> Decision

Gap Name	Description	Risk/Implication
MRT – UD and impact on land value	Updated assumptions on the value uplift potential of LRT vs BRT	Lack of certainty of value uplift and project benefits
Engagement options – Indicative UD comparison		
Engagement options - Staging Cost estimates	Cost of new 'Indicative Package'	Uncertainty whether the programme options are affordable
Level of detail for Engagement options	Currently 1 week period to engage with affected parties prior to public	Not able to confirm engagement with all affected parties prior to public can be achieved if detail increases
BCR update	Modelling Do min City centre updates only	BCR information for all options and staging not available for decision

# Gaps at 17<sup>th</sup> Decision

Gap Name	Description	Risk/Implication
BRT vs LRT – modelling	Modelling for all network mode options not available	Performance of PT for all options not understood on 17 <sup>th</sup>
MRT corridor width network performance comparisons	Retaining lane use understood, other cross sections will not be understood	MRT cross section performance comparison for options not understood on 17 <sup>th</sup>
Engagement Options and staging network modelling	Full range of mode and staging performance not understood	Performance of options change post 17 <sup>th</sup> decision
Engagement and staging options - BCRs	Only have a general range for BCR for programme	BCR may change following 17 <sup>th</sup> decision. BCR for options reliant on modelling for engagement
Engagement Options – detailed UD quantum's	Only High level quantum's available	UD outcomes achieved may change
Congestion charging	Details on cost, method, performance	Decision with limited detail available
Options construction disruption quantification	Limited information on construction impact and economic disruption	Uncertainty regarding impacts for options decision



# Gaps at Public Engagement

Gap Name	Description	Risk/Implication
Congestion Charging	Details on cost, method, performance	Limited ability to answer detailed questions
Options construction disruption quantification	Limited information on construction impact and economic disruption	Limited certainty able to be shared during engagement for particular affected parties

# Key milestones/Hold points post 17 August decision

Milestone/hold point	Who	Date	Risk/Implication if not achieved	Note
Confirm Options to engage on	LGWM Board	17 Aug	Engagement Delayed to 2022	
Engagement material drafting/production	LGWM C&E and COIMS	17 Aug – 30 Sept	Engagement Delayed to 2022	32 working days to complete
Minister update on engagement options	Chair	30 Sept	Engagement Delayed to 2022	Enables Key stakeholder and limited property owner engagement (Basin only)
Public Engagement material approved	PD	30 Sept - 5 Oct	Engagement Delayed to 2022	COIMs consulted GRG & Councillors consulted
Consult on engagement options	LGWM Board	6-11 Oct	Engagement Delayed to 2022	
Consult on engagement options	WCC & GWRC councillors, WK Board	12-18 Oct	Engagement Delayed to 2022	
Key stakeholder and property engagement	LGWM	19 – 22 Oct	Public informed prior to affected party	Limited time to engage with affected parties post councillor consultation

# External factors post 17 August decision

Factor	Who	Date	Risk/Implication if not aligned	Note
Alignment of WCC Fossil Fuel Free	WCC	September	Misalignment of technical solutions and/or messaging	
Alignment of WCC Cycle way rapid Role out	WCC	September	Misalignment of technical solutions and/or messaging	
District Plan engagement	WCC	October		
Multi User Ferry Precinct	GWRC	This year	Public messaging could be misaligned depending on timing	

# To assist 17<sup>th</sup> Board decision

Based on information available for 17<sup>th</sup> Aug and Public engagement

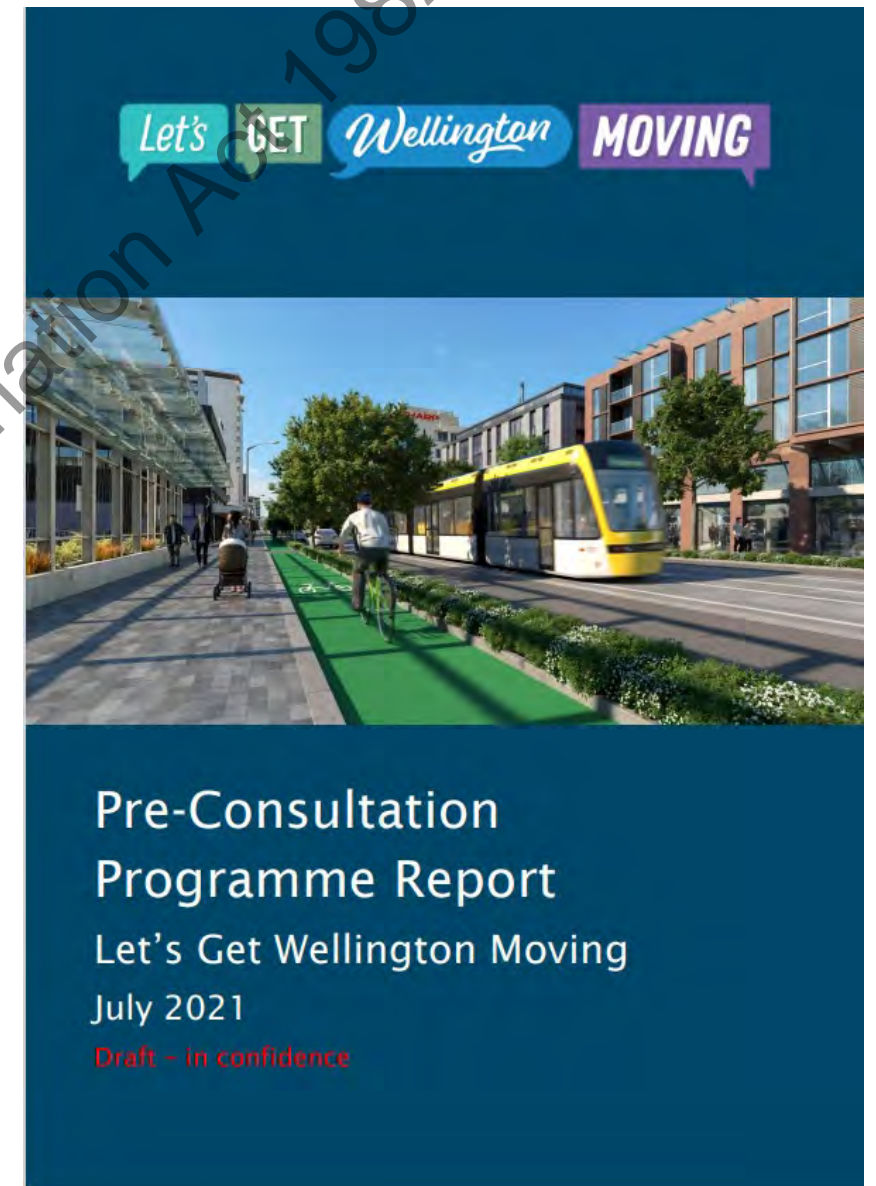
1. Are any of the gaps critical for decision?
2. Is there any other information required for decision?

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# Programme Report

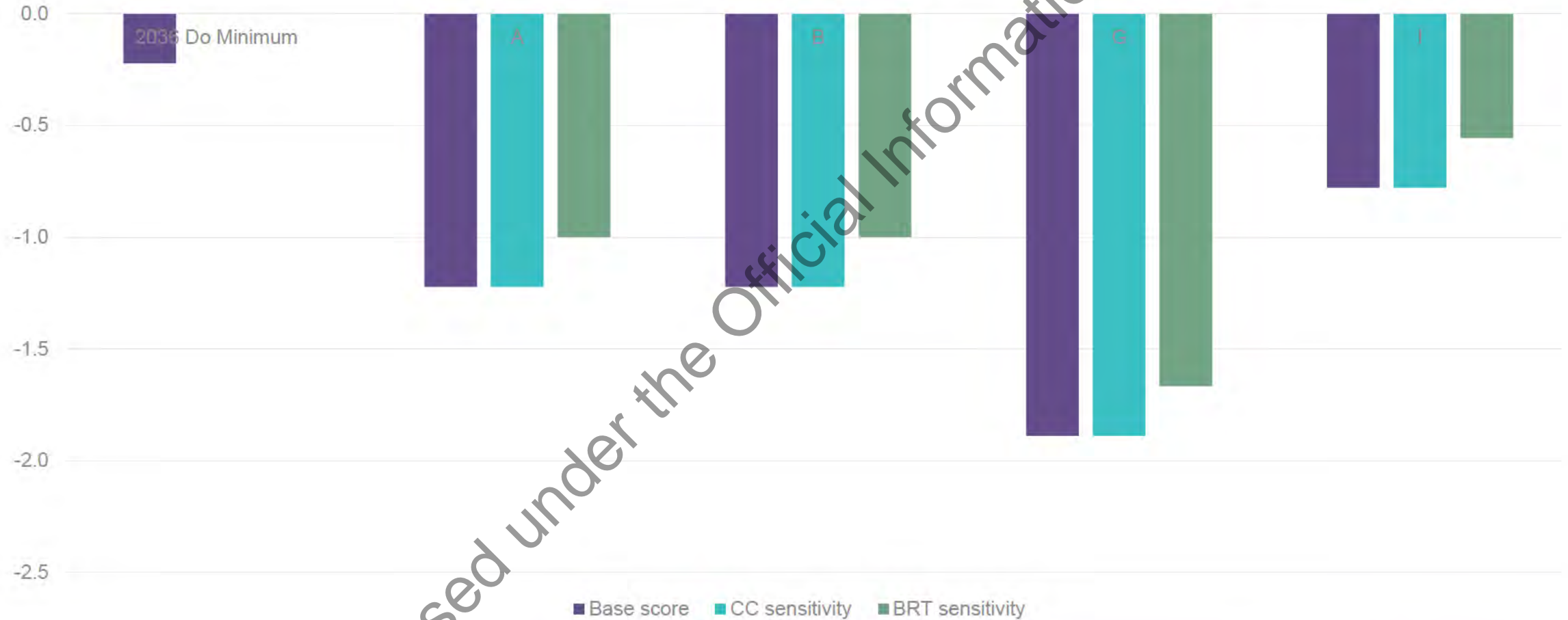
Programme report brings the entire programme together and tells the story of the programme. This includes:

- Regional story regarding transport and development
- Wellington City Story of transport and development
- Where LGWM fits into regional and city landscape for both Urban Development and Transport
- Outlining the programme problems, assumptions (RS2 etc), objectives, options considered, emerging options
- Outlining the Urban Development and City Transformation
- Providing Counterfactual if Programme didn't occur
- Economics (BCR) of programme
- Carbon Assessment
- Congestion charging



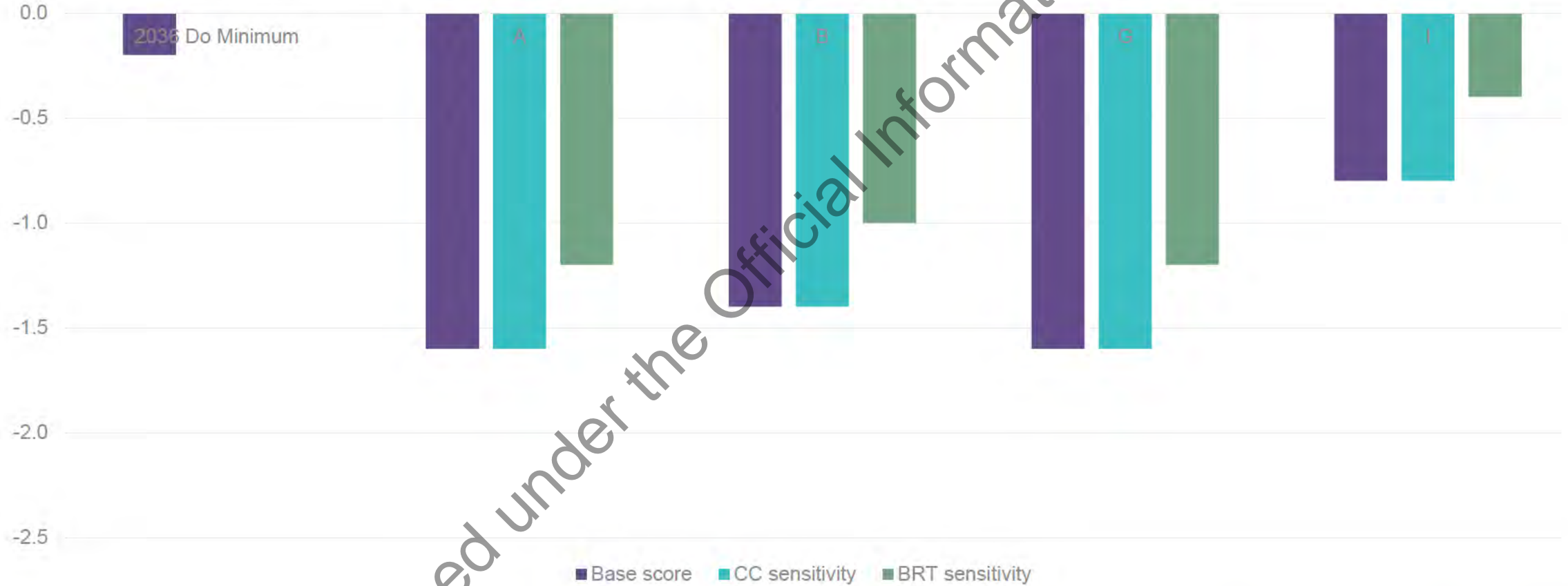
# Combined score summary

## Mana Whenua and Environmental & Social Impacts Only



# Combined score summary

## Design, Delivery and Operations Only



# Weighting scenarios

Mode Share



RMA Part 2





# Weighting scenarios

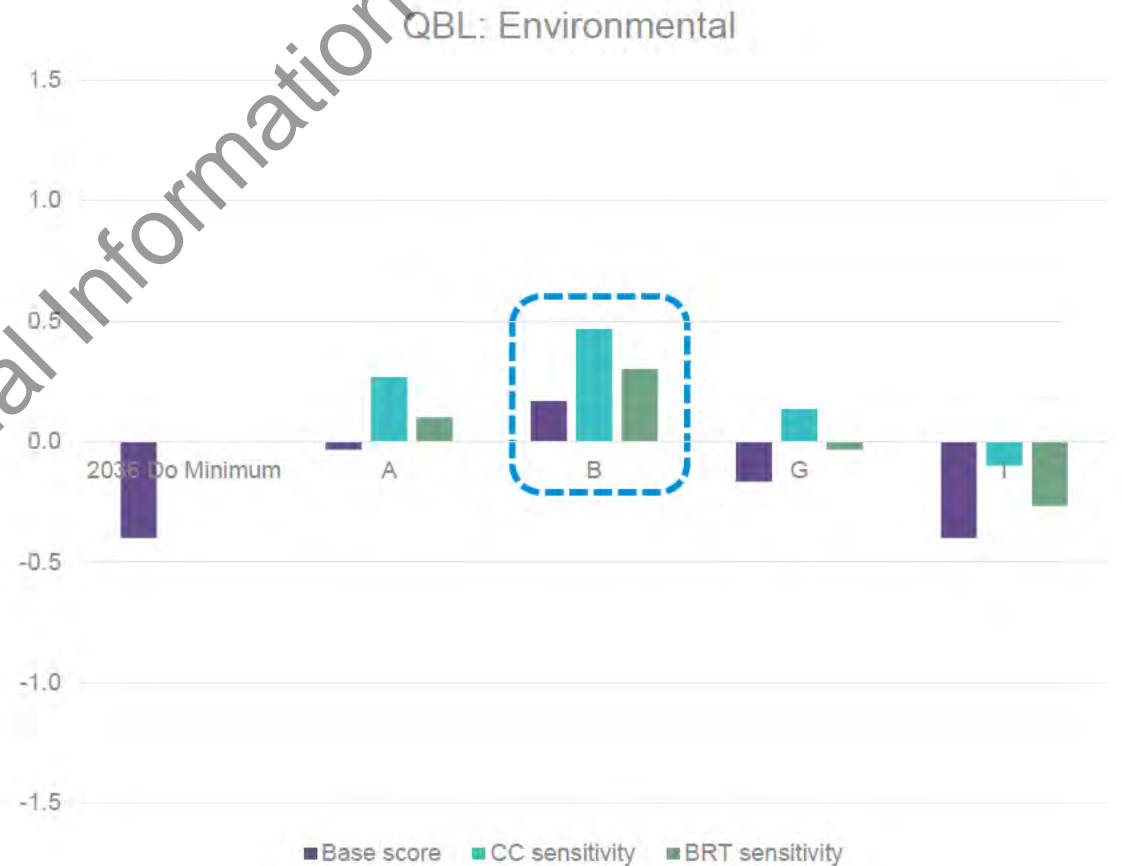
QBL: Social



QBL: Economic



# Weighting scenarios



# Cross sections for MRT

- Dedicated MRT lanes are required to achieve target travel speeds and reliability.
- Creating dedicated MRT lanes reallocates space from other modes. Our options are to:
  - Remove existing traffic lanes, and accept reduced performance of the local traffic system;
  - Widen the corridor to retain (or improve) traffic lanes, bike lanes and/or parking lanes; or
  - Share lanes between MRT and general traffic.
- Different approaches may be appropriate depending on the location.
- If we choose to widen the corridor, we have the opportunity to create better outcomes for cyclists and pedestrians.

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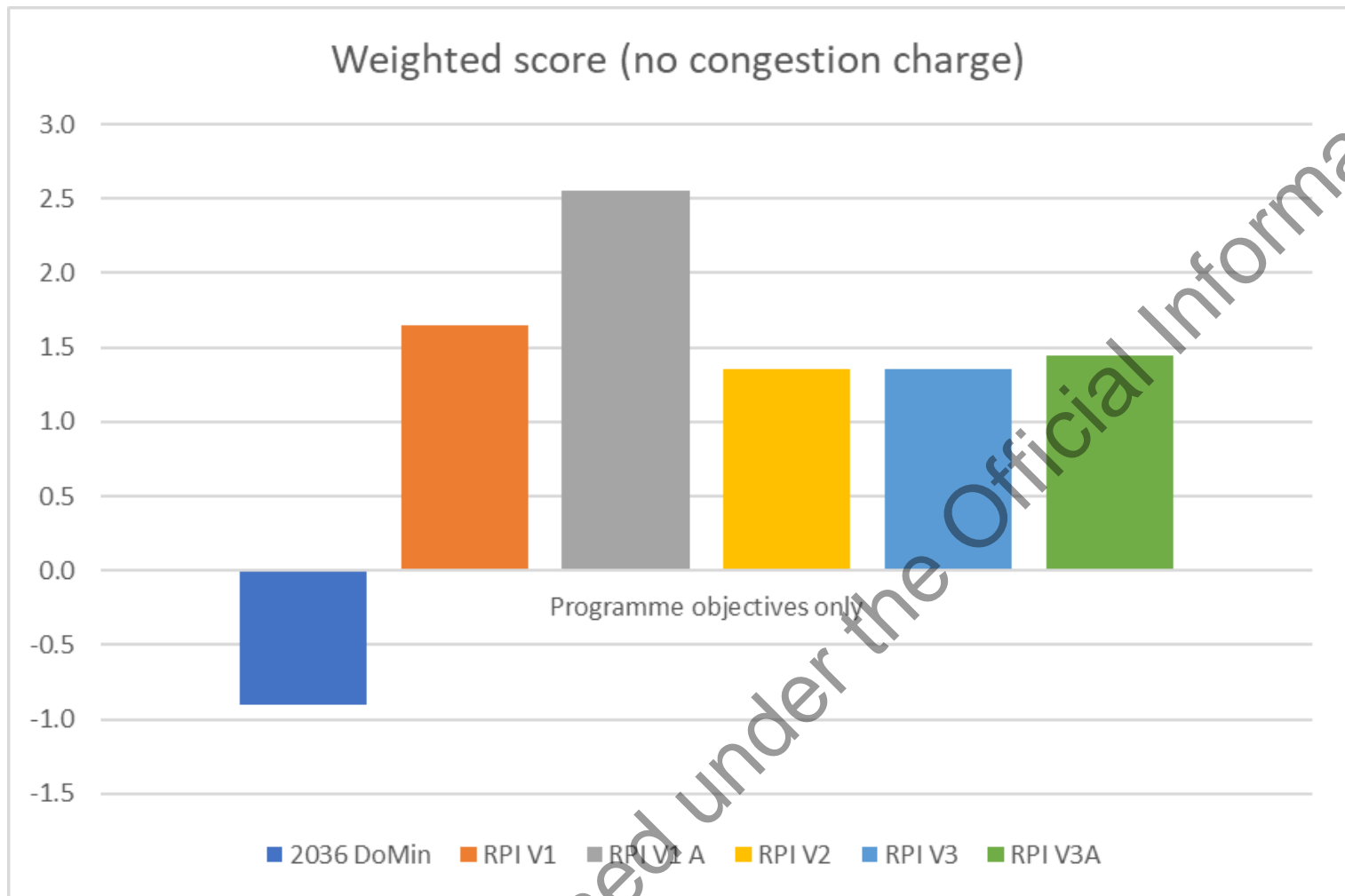
# LRT vs BRT - research

Net Results:

Wellington	Ave.	Min	Med	Max	Sample
LRT	14%	0%	8%	81%	20
BRT	8%	0%	7%	20%	10

- Outliers have significant impact on the averages
- **Note that a meta-analysis has not been completed**

# MCA results – Objectives only



# Carbon performance

- Assessment of enabled carbon (user emissions) used Waka Kotahi's Carbon Assessment Tool for investment (CATi), which is a sifting tool that identifies the extent to which the different components of each Programme option contribute to emissions increases or reductions. Results were moderated by influencing factors (modelled fleet emissions; assessment of active transport enabled)
- There are some limitations to our analysis
  - Fleet emissions rely on assumptions about electrification of the fleet and modelled output being focused on VKT, not dynamic urban form
  - Land use scenarios do not vary between the Programme options, but could significantly affect transport choices

# Carbon performance: MCA results

	Primary Score	Influencing Factor Scores		Final Scores	
Programme SL Options	Carbon Investment (CATi tool)	Fleet Emissions	Active Transport Enabling	Final Score	Congestion Charging Adjusted (+1)
<i>Score Weighting</i>	<b>60%</b>	<i>20%</i>	<i>20%</i>		
Do Min 2036	<b>-3</b>	<b>-1</b>	<b>-3</b>	<b>-3</b>	<b>-2</b>
V1	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
V1A	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>4</b>
V2	<b>-2</b>	<b>1</b>	<b>1</b>	<b>-1</b>	<b>0</b>
V3	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>4</b>
V3A	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>

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# Carbon performance

Further analysis ahead of engagement:

- Embedded carbon analysis
- Comparative cities benchmarking
- Scenarios around the Pricing of carbon – some different approaches to consider
  - Market price – based on carbon trading and financial valuations (used by Climate Change Commission)
  - Damage price – based on an understanding of the impact of carbon emissions (used in Waka Kotahi's Monetised Benefits and Costs Manual)
  - Shadow price – taking into account the cost of abating a given amount of damage (used by Treasury for Budget 21)
  - Social cost – attempts to encapsulate all the challenges introduced by an amount of carbon emitted into the economy (Supported in academic literature)