LGWM Preferred Programme Option Report
WCC and GWRC councillor questions and answers
5 July 2022

Councillor question	LGWM response
1. **Costs:** Costing table and explanation of differences – especially MRT to the east ($388m v $900m) and Golden Mile has $1 million more for Option 4	The proposed bus priority[1] investments included in Options 1, 3 and 4 provide infrastructure improvements only, to support the operation of the standard Metlink bus network. This includes bus lanes, bus stops and intersection treatments. Option 1 would deliver continuous bus priority between Wellington Railway Station and Miramar. In Options 3 and 4, bus priority measures through the local streets of Mt Victoria and Hataitai would be limited to targeted local treatments, rather than the provision of continuous bus lanes, with continuous bus priority achieved from the Kilbirnie Cres/Wellington Rd intersection to Miramar town centre. The Bus Rapid Transit (BRT) concept presented in Option 2 is a more comprehensive system approach, that includes fleet, depot and the operational replacement of parts of the Metlink bus network. The BRT infrastructure design standard in Option 2 is higher than the continuous bus priority in Option 1. It includes more intensive reconstruction of the road including utilities and footpaths that is not included in the less costly option. In Option 2, the cost of the new depot is fully assigned to the Eastern corridor, even though it will be used by vehicles serving both the east and the south. Option 2 includes the cost of new BRT fleet. Option 1 does not include any new bus fleet. The costing for projects outside of the transformational programme (e.g. Golden Mile) vary slightly even though the underlying projects are the same. This is the result of the allocation of the LGWM Programme team costs. This cost is applied to all projects and has been allocated to projects on a pro rata basis based on the scale of the Programme. This means that in the lower-cost Programme Options slightly less LGWM Programme team costs will be allocated to the transformational programme and slightly more to other projects, for example the Golden Mile. [1] "Bus priority" can be used interchangeably with "enhanced bus"
2. **Urban development:** What are the land use numbers for all options and where is this development?	Please refer to Section 7.1 (page 23) of the Preferred Programme Option Report, Table 2. For transport modelling purposes, all of the land use scenarios assume the same total amount of regional development – 257,500 households in 2046 compared to 209,000 in 2018. The difference is where they are located. The more intensified scenarios have up to 50% of this growth on the MRT corridors, whereas the 'core' scenario has only around 20%. The intensified land use assumes 13,500 new homes in the CBD, 10,500 new homes from the Basin south, and 2500 new homes in the east.

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	Options 3 and 4 are unlikely to enable the amount of growth predicted in the Eastern corridor, but this is minor (up to 2,500 households) compared to the CBD and Southern corridor. However, in the intensified scenario public transport demand through Mt Victoria is around 35% higher than in the core scenario. The Corridor Development Plan work being undertaken throughout 2022 will review and seek to confirm the quantum and distribution of growth (or housing yield) that can be achieved in walkable catchments along the MRT corridor, balancing urban development with urban density, aligning with the WCC Housing Capacity Assessment Model. This will consider different scenarios and options for intervention. This will then inform the work on a Specified Development Project under the UDA. Attachment 5 of the Council papers sets out the 'working objectives' for Urban Development that will be further developed as work on the Corridor Development Plan and an SDP proposal progresses (note, these include working objectives for affordable housing amongst others).
3. **Carbon:** What are the Intensive land use scenario effects on carbon emissions for options 3 and 4?	We haven't built an intensified scenario test for Options 3 and 4, however it would be reasonable to assume that the level of intensification achievable to the south would be very similar to Options 1 and 2. The difference is to the east. Intensification isn't only about residential intensification. We also anticipate commercial intensification, and this generates more travel between the eastern suburbs and the CBD irrespective of the level of residential development to the east. It is also important to consider the impact of mode shift to public transport (PT), which is the other part of our most heavily weighted objective. Improved PT and active travel provisions to the east under Options 1 and 2, but not under Options 3 and 4, result in a marked increase in patronage (resulting in carbon benefits). The economic analysis is also instructive when considering the impact of the intensive land use scenario: agglomeration benefits for Option 4 drop under the intensified scenario because: • The alignment of the MRT for Option 4 is less optimal for supporting urban intensification • MRT alignment on Taranaki St causes more congestion than an alignment on Kent/Cambridge Terrace, so causes travel time disbenefits for road users that are not experienced under the other Options • There are less attractive journey options to jobs in the CBD from the east, which reduces job density, resulting in less productivity improvement (effectively, fewer higher remunerated jobs) If only considering carbon performance, under the core land use scenario, Option 4 is the best option. However, under the core land use scenario, all Programme Options take a long time to pay back their embodied carbon. When all the objectives are considered, Option 1 is the best performer. Under the intensive land use scenario particularly, Option 1 enables significantly improved mode share to public transport to the south and to the east and stimulates more walking and cycling to the south. It puts in place the transport infrastructure needed to support a significant increase in urban density to the south. The Detailed Business Case will undertake sensitivity testing on population scenarios that differ from the standard Statistics NZ forecasts used to date. This will identify the potential performance of the option with faster and slower population growth, and the effects of this on the timing of when benefits are realised.
4. **Tunnel:** What's the definition of public transport for the tunnel?	The IBC assessment has assumed public transport refers to buses only.

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Does it include Taxis, rideshare, Ubers?	This will be explored in the detailed investigation (DBC) phase. Broadening the definition would have implications for the design of the intersection at the eastern portal and the lanes approaching the western portal, influencing how vehicles would enter and exit the lanes. Wellington currently has bus lanes that can be used by taxis (and motorcycles), and bus-only lanes that can be used by buses only. Different variations on this are used in other cities, with a key consideration being enforcement and visual identification of permitted vehicles (which is why taxis are often permitted, but not Ubers).
5. **Mana whenua:** What's the Mana Whenua view on the preferred option?	During 2020/21, the Iwi Partnership Working Group was involved in the MRT/SHI option assessment process. This included assessing the options against Mana Whenua values identified for LGWM – one of a number of assessment factors. This assessment was considered as part of the process to arrive at the four short-listed options that were publicly engaged on during November-December 2021. Mana Whenua input was coordinated by Leslie Brown who was heavily involved in the assessment process and this is summarised as: *"Mana Whenua gave option 2 the highest score on the basis that scores well in respect of Whakapapa (place), Hau-ora (wellbeing) and Manaakitanga (just society). It was considered beneficial to provide a broader spread of urban uplift benefits and the prospect of expansion of BRT to the north and west was considered advantageous. There were significant positives associated with Options 1, 2 and 3 in relation to keeping MRT away from the Te Aro Pā site at the northern end of Taranaki Street."* Following the review of the updated technical information and consideration of more intensive land use scenarios, Mana Whenua input has been expanded as follows to reflect the benefits of a more intensified land use scenario: *"Option 1 under an intensified land use scenario is the best performing option in terms of LGWM objectives. Mana Whenua awarded option 1 an additional point under the intensified scenario as it was deemed to be the option likely to catalyse the most development. This means that under an intensified scenario options 1 and 2 perform equally well from a mana whenua perspective."*
6. **Tunnel:** Can anything else be done to lock in the additional lanes through Mt Victoria for public transport?	Network performance is an important consideration here. In option 1 the capacity of this corridor, CBD and the east, for private vehicles is not dictated by the tunnel itself but by the capacity of the intersections either end of the proposed tunnel: • To the west, the Taranaki St/SH1 and Vivian Street/Kent and Cambridge intersections • To the east, the Kilbirnie Crescent/SH1 and Evans Bay Parade/SH1 intersections. These intersections limit the capacity of the tunnel for private vehicles such that if both lanes each way of the new tunnel were allocated to general traffic there would be no marked improvement in private vehicle travel times or reliability. Any desire to reduce private vehicle travel times between the east and the CBD would likely require grade-separated intersections at either ends of the tunnel. Some design options could be considered:

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	• The public transport approach and exit lanes could be physically separated from the traffic lanes depending on where they are located – this would not be a strange concept; however, the key issue is the additional space it might take up in a very constrained environment (Basin Reserve, Schools, Church, Green Belt). • Physical design options such a as mechanically guided busways (e.g. Adelaide O-Bahn) are theoretically possible, but would add cost, be very restrictive to specific bus types with custom steering equipment, and likely reversible. Emergency vehicles or other desirable vehicles such as long-distance coaches, minibuses, could not use the lanes. Design options would need to be investigated through the DBC phase. Designation options could also be considered: • A designation condition could restrict the use of certain lanes to particular modes. This has been done before – the State Highway designation through Mana had a designation condition that required the outside lanes to be used as T2 lanes (later changed to clearways). A slightly different approach was used in the NCI project north of Auckland – there the busway has its own designation, separate from the State Highway designation. A designation condition could be changed in the future. The change process would likely be publicly notified (the test is based on the degree of effects), so it could be opposed. In theory, a government could use other tools such as legislation to define or change how tunnels are used.
6. **Bus Tunnel:** What is the capacity of the existing bus Tunnel?	The capacity of the existing Hataitai bus tunnel is constrained not just by the tunnel itself, but also the approaches which do not have dedicated bus lanes and have significant "side friction". Initial work estimates that the tunnel will not be able to reliably cater for 60 buses an hour (required at 2046) without delays and level of service impacts. Beyond 2036, PT travel times and reliability using the existing bus tunnel will begin to deteriorate significantly due to forecast demands. This is the case for the Programme's do minimum and Options. Note that each additional inbound bus is also likely to result in an additional outbound bus on the return trip, exacerbating the impact of increased bus numbers on the one-way tunnel.
7. **MRT:** Please explain what bus improvement will be to the east (reference in the paper)	The recommended option includes continuous bus priority (extensive bus priority improvements including long continuous sections of kerbside bus lanes and signal priority), via the new tunnel expected to be used by most eastern suburbs buses. The exact detail of these improvements will be determined through the detailed investigation (Detailed Business Case). Remaining local eastern suburbs buses (e.g. Hataitai services) would continue to use the existing Hataitai bus tunnel.
8. **Network Plan:** Briefing on MMNP and work on reassigning space in the city	The City Streets Programme has started considering the CBD network wide implications for the proposed City Street investments and, by default, also integrates with other programmes of work including the Transformational Programme (MRT, Basin improvements and extra Mt Victoria Tunnel). The development of the Multi Modal Network Plan is ongoing and will reference previous studies into reducing the number of private cars in the CBD. The MRT project will be a cornerstone to delivering the MMNP and this will be presented to Councils for approval during the DBC phase of the Transformational Programme.

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9. **Tunnel:** Please summarise performance of parallel vs diagonal tunnel	The decision to confirm whether the new tunnel would be a parallel or diagonal tunnel will be made during the detailed investigation (DBC). The IBC identifies that the diagonal tunnel alignment has the following attributes, when compared to a parallel tunnel alignment: • Results in travel distances that are approximately 400 metres shorter, directly creating an approximately 30 second travel time reduction. • Results in bus travel times approx. 4 minutes faster when compared to the existing route via Hataitai and Mt Victoria, achieved by bypassing local streets and the existing one-way bus tunnel. • Does not require the widening of Ruahine Street which would be required for the parallel tunnel. That widening would impact the town belt and/or the properties along Ruahine Street. • Allows portal locations further away from the slopes of Mt Victoria, improving resilience outcomes and avoiding impacts on the town belt. • Has a higher cost. Further work on the performance of tunnel options will be undertaken early during the DBC.
10. **MRT** Is the backup BRT Option 1 modified with BRT or is it Option 2?	Option 1 is preferred with LRT to the south and continuous bus priority to the east (as detailed in the response to Question 1). Option 2 or BRT in general is to be investigated further as a reserve option may be appropriate given technological developments etc.
11. **Sequencing:** System plan, acceleration and sequencing	The current indicative schedule indicates the detailed investigation will start in late 2022 and be completed in late 2024, pre implementation late 2024 to late 2027, construction late 2027 to late 2032. There is potential for staging delivery and bringing forward portions of the project that are within current road reserve and do not require consent or property acquisition. A number of items require further investigation to confirm the MRT, Arras Tunnel Extension, and Mt Victoria Tunnel project schedules and if acceleration is possible including: 1. Confirming MRT mode early in DBC to allow DBC to progress quickly to confirm the project boundaries and allow the next phases to proceed 2. Integrating with other Wellington City construction projects (vertical builds, utilities, WCC) including coordinated disruption considerations 3. Aligning and confirming partner decision making requirements for any acceleration opportunities 4. Confirming funding requirements for any acceleration opportunities and obtaining partner approvals if to proceed.
12. **Economics:** Level of agglomeration benefits – there seems to be too little difference between Options 1 and 2	Calculation of Wider Economic Benefits (WEBs) including agglomeration benefits has followed the standard procedure specified in Waka Kotahi's Monetised Benefits and Costs Manual. We have a high degree of confidence in the calculation of WEBs for the core land use scenario. As noted, the intensified land use scenario was developed specifically for Option 1. Option 2 and Option 4 are both less extensive infrastructure solutions compared to Option 1: • Option 2 performance is currently assessed as being poorer than Option 1 because of lower PT capacity and because land values are unlikely to increase as much in response to Bus Rapid Transit as Light Rail infrastructure. • Option 4 cannot perform as well as Option 1 because it provides no infrastructure to the east.

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	Consequently, the current intensified land use performance for Option 2 and Option 4 is over-assessing its likely performance – it is too positive. Undertaking further work to assess Option 2 and Option 4 in greater detail will likely reveal a worsening of the assessment of Option 2 and Option 4 under the intensified land use scenario. Furthermore, incremental analysis of Option 1 compared to Option 4 is positive: with an incremental BCR over 1. The additional cost of Option 1 over Option 4 is met with transport benefits that are valued at more than the cost, which suggests that from an economic perspective, the additional cost represents good value. Further work is unlikely to change the preferred option analysis.
13. **Modelling:** Impact of options on private motor vehicles on journeys from the north	One of the key objectives for the Programme is to enable a system that moves more people with fewer vehicles. This is achieved through significant investment in public transport, walking and cycling. All options therefore reallocate road space away from general traffic towards non-car modes This creates significant improvements for public transport, walking and cycling, and it results in reduced performance for general traffic. This is reflected in an increase in some travel times for private vehicles above what is forecast in the Do Minimum scenario. For example, there is some increase in travel times for vehicle traffic travelling from the north, particularly during peak hours. Reductions in capacity for general traffic, to accommodate MRT, are required to move more people with fewer vehicles. Therefore it is forecast that although vehicle numbers will reduce from the Do Minimum, performance will remain largely unchanged. Modelling shows that on some routes journey times by private vehicles would increase. Option 4 travel times would be generally slightly slower than Option 1 travel times. Southbound private vehicle trips would be slower in the four options compared to the Do Minimum, however northbound trips would be slightly faster in the case of Option 1. Other factors to consider include the success of travel demand management. Current assumptions do not include any form of priccing sushc as a congestion charge or parking levy. This would, if implemented, improve the performance of all options against the programme objectives and improve travel times and journey reliability for private vehicles. There are also interdependencies with other projects. For example, investment in regional rail to ensure there is sufficient capacity to meet the forecast increased demand in public transport and achieve equilibrium between the different modes. The access objective for LGWM includes a series of sub-objectives – namely, people living within close proximity of key destinations, travel time reliability, comparative travel time between modes, equitable access for/to transport, pedestrian level of service, public transport delay, and the quality of cycling facilities. As a result, the preferred option is a balanced and multi-modal approach which prioritises: • Encouraging access by alternative modes other than the private vehicle and • Stimulating urban development to ensure more people live and work near public transport.
14. **Infracom:** Can we see the infrastructure commission report? What were there top key recommendations?	This is available online https://lgwm.nz/all-projects/mass-rapid-transit/related-documents/

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15. **MRT:** Bus route changes graphic with MRT – can councillors have this separately?	Yes. PDF file is here: https://nztransportagency.sharepoint.com/:b:/s/LGWM-grp365/EZHr4_9C7FFPgSIFvRuXyxQBebaZ_omlSUR9R_MrjtuO_Q?e=VFOdVk
16. **Next Steps**: what are the next steps?	1. Partners approve the preferred option, to allow IBC to be completed 2. LGWM then complete IBC documentation based on partners preferred option approval, this includes: a. Next phase – Detailed Business Case – scope and budget requirement confirmation b. Management case, Commercial case – to confirm there are feasible procurement, financial and delivery (consenting, property, construction market) method options available to deliver the preferred option for the DBC to investigate further and bring back for partners to approve and confirm the way forward c. Note: no further technical assessment is undertaken on the MRT options for completion of the IBC 3. LGWM Urban Development workstream progresses Corridor Development Plan and Specified Development Project (SDP) proposal with Kāinga Ora and support from the Ministry of Housing and Urban Development. 4. Partners approve IBC and approve DBC phase to commence (including funding if required) 5. DBC commences and is completed. The DBC phase will include: a. Confirming MRT i. Mode ii. Station locations iii. Route and cross section b. Confirming Mt Victoria tunnel Alignment option (diagonal or parallel) – if included in preferred option c. Confirming Arras Tunnel Extension option and design – if included in preferred option d. Public engagement e. Confirming project boundary for Property acquisition and statutory approval requirements f. Cost estimate g. Confirming how to proceed regarding design, statutory approvals, procurement for design and construction h. Further development of delivery staging and sequencing schedule 6. Further work on Urban Development, potentially SDP steps as appropriate, and initial precinct planning. 7. Partners approve DBC and to proceed to next phase a. LTP/SCP requirements will need to be addressed Suggest inserting the pie/wheel type diagram that Jenny Condie liked previously indicating level of detail at each stage of the project.
17. **Tunnel:** How will commuters from Hataitai get to town by road? I expect many will prefer to drive through Roseneath or round the Bays. What sort of interchange will there be at the end of Ruahine so travellers from Hataitai can access the new tunnel.	• Hataitai commuters will benefit from a range of improvements under the Transformational Programme • If a diagonal tunnel is chosen as the preferred option for the new tunnel, the existing Mt Victoria Tunnel could be repurposed for pedestrians and cyclists – encouraging greater uptake • The Hataitai bus tunnel would continue to be used by local services to and from the Hataitai catchment. Local commuters would benefit from greater available bus seated capacity (as Miramar, Kilbirnie and airport passengers will use the dedicated lanes through the Mt Victoria Tunnel) • For those who need to drive, improved access to the State Highway could be provided at Hamilton Road, removing the queuing at Taurima Street. Detailed investigation will be part of the DBC. Those in the northern part of the Hataitai catchment may choose to travel via Oriental Parade, as they do currently.

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	• A new road arrangement would remove the non-local traffic that currently rat-runs along Moxham Avenue to Taurima Street trying to avoid Ruahine Street. The intersection at the eastern end of the extra Mt Victoria Tunnel will be investigated in the DBC phase.
18. **Tunnel:** Why wouldn't you make the bus tunnel dedicated to cycling/walking and use the current Mt Vic tunnel for local bus and cars?	The location of the existing Mt Vic road tunnel isn't on any local bus routes. It would be less direct for buses serving Hataitai to travel through it. The Hataitai bus tunnel is at a higher elevation, with steep vertical grades on each side to approach it. This is an impediment to both cycling and walking. The gradient of Pirie Street is steeper than the permitted maximum grade of a wheelchair ramp and would not meet accessibility requirements. The bus tunnel is less than 4 metres wide, which would limit the quality of facility provided that needs to accommodate both pedestrians and cyclists traveling in both directions.
19. **Tunnel:** How many buses are expected to use the dedicated lane at peak and off peak and how many buses will service Hataitai?	The figures below relate to the 2046 year. The current indicative service assumptions show that 35-40 scheduled Metlink service buses per hour would use the Mt Victoria Tunnel in the peak direction during peak periods. 25-30 buses would be travelling in the contra-peak direction. The tunnel would also be used by school buses, long-distance coaches, private charter buses and minibuses who would be permitted to use the bus lanes. Up to 15 buses per hour would use the Hataitai bus tunnel in the peak direction during peak periods, along with some school buses. Off peak services would consist of 15-20 buses per hour per direction in the Mt Victoria Tunnel and approx. 6 buses per hour per direction in the Hataitai bus tunnel. Further investigation into frequency would determine changes increase over time to respond to changes in demand.
20. **Urban development:** Can you confirm the amount of urban development uplift planned for in the east?	Under the core scenario, up to 1500 new homes could be anticipated within the MRT/PT catchment area (with a minor level of intervention). Under an intensified scenario, the total number of new homes could be up to 2500 new homes (but assuming more intervention from LGWM partners/central government above BAU growth).
21. **Urban development:** How guaranteed is this (the urban development above) if Option 1 is confirmed?	It is not possible to guarantee the level of urban development that will occur. However, in the east, we assume that approximately 1,500 new homes would be developed (under BAU over the next 30 years) within the MRT/PT catchment area. Under Option 1, it is more likely that most additional development would be prioritised and facilitated along the southern corridor from the Railway Station to Island Bay, although there would likely still need to be some public/social housing delivered in the east.
22. **Sequencing:** Can you confirm that sequencing will take the same weighting into account when making that decision? Ie Carbon and mode shift at 40%.	The sequencing assessment will use several inputs including how the different options deliver against the Programme Objectives. Other considerations will include construction staging requirements and cost implications, disruption, speed of delivery, integration with other programmes of work (ie utilities), statutory approval requirements, and market capacity.
23. **Mana whenua:** Can you confirm that daylighting the Waitangi stream up Kent and Cambridge terrace was taken into account with Iwi and What was their	Mana Whenua representatives have confirmed their understanding that daylighting of Waitangi stream may not be feasible along Kent/Cambridge Terraces, particularly where provision is also needed for the State Highway corridor. However, Mana Whenua also noted that they would welcome further work to examine what is possible in terms of partial daylighting, and/or water sensitive

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response to this? If daylighting would not be possible, would other water sensitive design and landscaping treatments be possible to recognise the location and mauri of the stream?	design and landscaping treatments to recognise the location and mauri of the stream and support Mana Whenua values and aspirations.
24. **MRT:** What are the next engagement steps with the community particularly for the southern community as this decision will be a huge change for them? And how will the change implications be communicated?	The Communications and Engagement Plan for the Detailed Business Case phase will be prepared shortly, and will outline the approach for the 2023-2024 period. From the end of 2022, we will start engagement with property owners within the MRT catchment whose properties may be directly or indirectly affected by the project, and those who are considered to be 'neighbours' within the investigation area. Scoping for this engagement is underway.
25. **Sequencing:** Para 145- what process do we need to go through to confirm the potential Featherston street delay.	The programme is working with WCC to confirm the staging and sequencing of all projects (including vertical builds, and utilities) scheduled to be undertaken in the city. This work will help us understand how transport corridors would operate during different phases of the programme and other works. Project solutions/design, staging and network assessments are required to complete the Featherston Street and MRT business cases.
26. **Urban development:** Future development Strategy and integration, how will all councils sign up on this? Or will it be led by WCC?	A Future Development Strategy (FDS) forms the basis for integrated, strategic and long-term planning regionally – to help prioritse growth and infrastructure regionally. It helps set the high-level vision for accommodating urban growth over the long term and identifies strategic priorities to inform other development-related decisions. An FDS is a requirement for some councils in the region, including Wellington, under the National Policy Statement on Urban Development (NPS-UD). The Wellington Regional Leadership Committee (WRLC) has agreed to develop a regional level FDS which will replace the current Wellington Regional Growth Framework (WRGF). This will need to be developed in time to inform 2024 Long Term Plans for local government (ie, by June 2023) and meet all legislative requirements. A further objective agreed by the WRLC is that it be developed in a collaborative manner with all partners to the WRLC. For more detailed information see FDS-Fact-sheet-updated.pdf (environment.govt.nz).
27. **Next steps:** Social Impacts have not scored highly, how will LGWM deal with mitigations, timing and communications to support communities through this transition.	Further investigation of social impacts will be undertaken through the DBC and RMA processes. This will include preparation of a plan for mitigation.
28. **Carbon:** If we need to change the programme because of outcomes that do not demonstrate we will get the carbon benefits, how will we be able to review the decisions on options if necessary?	The decision being sought at this point is on the Preferred Option. This is not a final decision on the option to be built. Substantial work will occur in the detailed investigation (DBC) which will identify in much greater detail the carbon impacts, along with potential mitigations to the level of embodied carbon. Once this work is complete, Programme Partners will be asked to decide on what infrastructure is advanced to construction.

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29. **Sequencing:** When would improved walking and cycling access through Mt Victoria be delivered under each option?	The Mt Victoria Tunnel design and alignment will be confirmed during the DBC. In general, any improvements are likely to be completed in the later period of the Mt Victoria construction window of late 2027 to late 2032.
30. **Option ranking:** Can we please see the results of the MCA sensitivity analysis that looked at the effects of different weightings of the criteria.	The MCA sensitivity testing looked across all MCA criteria, not just objectives. Further sensitivity testing of just the Programme Objective weightings could occur. However, it is very unlikely to change the option preference. Option 1 scores the best against all the objectives, except Resilience, and even then, it scores only 1 point lower than the preferred option for resilience.
31. **MRT:** Can we please see the graph from the powerpoint slides showing the capacity and service frequencies on the southern corridor?	Yes. This is appended.
32. **MRT:** Can we please have an explanation about the challenges of retrofitting a BRT corridor that is at capacity into an LRT corridor?	The primary challenge is needing to effectively shut down and reconstruct the street for the construction of the LRT, while still operating public transport services. If this were to occur at a time when a BRT system was operating near capacity, this would be an extremely difficult task, particularly considering the lack of parallel routes south of Berhampore.
33. **MRT:** What are the risks to the benefit stream of the project from descoping BRT in order to deliver cost savings? How will the programme protect against these risks?	Descoping BRT could result in reduced public transport priority and capacity, reduced commitment to delivering a high-standard system, lower investment in enhancing the urban realm, or failure to renew and upgrade utilities. Each of these would result in reduced performance and demand for public transport and/or a lower urban development response. The programme can protect against this by setting appropriate design standards and performance requirements necessary to ensure that the intent of the investment is clearly documented and assessed against.
34. **MRT:** 11.4.8.4 specifies that MRT vehicles must be “high capacity” – can you explain what is meant by high capacity in this context and can we be more specific in defining this?	Although there is no specific definition of “high capacity”, it normally refers to vehicles with a greater capacity than a standard bus. In this context, articulated buses and double decker buses are at the lower end of this range with capacities of 100-120 capacity. All LRT vehicles have a higher capacity than this. If necessary, we could define high capacity as vehicles of 100 passenger capacity or larger.
35. **Urban Development:** What justification is used to support the viability of a high land use scenario in the east given that no SDP is proposed for the east?	The intensified scenario assumes an extra 1,000 new homes in addition to the 1,500 new homes under the core scenario. This assumes some facilitation and investment from central government and/or LGWM partners to meet demand for social/affordable housing. This is of so small a scale not to require an SDP but equally could be considered within the scope of an SDP if appropriate.
36. **Modelling:** What analysis has been done on the travel demand to the airport? The types and number of trips to the airport are	Analysis of catchment areas has been undertaken for a number of regionally significant destinations, including the airport, hospital and CBD. Some of the reporting has focused on the airport as this shows the most differentiation between the options (reflecting the change in accessibility to the eastern suburbs).

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likely to be significantly different to those to the hospital, how has this been considered?	A significant amount of analysis has been undertaken to understand the impact of changing travel patterns to and from the airport. A bespoke airport module has been developed to forecast airport-related activity, and this has been informed by aviation forecasts from WIAL. It is acknowledged that the pandemic has had a large impact on air travel, however the assumption is that growth will eventually return to the aviation sector.
37. **Costs:** Why is the cost for PT to the east significantly higher for Options 3 and 4 than Option 1 when they are all proposing similar continuous bus priority solutions for the east?	Options 1, 3 and 4 include the delivery of continuous bus priority from the intersection of Wellington Road / Hamilton Rd through to Miramar town centre. Options 3 and 4 also include bus priority treatments through the local streets of Mt Victoria and Hataitai. Depending on the exact location, this ranges from rebuilding kerbs and footpaths, through to minor road widenings and the creation of sections of bus lane. The cost of the bus lanes within the proposed new Mt Victoria tunnel are incorporated into the costings for that project.
38. **Sequencing:** The peer reviewer suggests that a possible preferred way forward would be to deliver Option 3 immediately and then deliver the additional Mt Vic tunnel if growth in the east eventuates. Will the DBC process allow for consideration of this given that the resolutions identify that no further work will be done on option 3 through the DBC?	Staging and sequencing of the Preferred Option will be undertaken during the detailed investigation (DBC phase). This will include consideration of incremental benefits and if there are any triggers for delivering elements of the preferred option. Option 1 essentially includes Option 3 with the addition of an extra Mt Victoria Tunnel. Sequencing the components common to Option 1 and 3 first could be a consideration. However, IBC analysis indicates that the benefits of the Mt Victoria tunnel duplication in Option 1 provide significant mode shift gains for existing eastern suburb residents, and the earlier this is delivered, the earlier and greater the benefits are realised. The impacts of any staged or delayed delivery of increased PT to the east capacity would also need to be considered alongside the delivery timing of a dedicated walking and cycling facility through Mt Victoria. The IBC assessment will be reviewed in more detail during the DBC to confirm the preferred sequencing.
39. **Taranaki V Kent/Cambridge:** Can you please provide a quick summary of the benefits of the Kent and Cambridge corridor compared to Taranaki St. Different factors were mentioned at different points in the report but never brought together in one place.	The route via Cambridge/Kent Terrace was assessed as having the following advantages: • It is nearly twice the width of Taranaki Street (47m vs 25m). This provides substantially more space to fit the dedicated lanes needed for MRT, and still retains necessary functionality for walking, cycling and other traffic. • It provides a like-for-like replacement for the Route 1 bus,and doesn't affect the Route 3. Under the Option 4 alignment which switches from Adelaide Road to Taranaki Street, there would be overlap with, but not a clean replacement for both of those important routes. Extra bus services would be needed to cover the gaps created. • It avoids interfaces with Te Aro Pa towards the northern end of Taranaki Street. • The extra road width is seen as a risk mitigation during an earthquake, due to the risk of buildings falling into the roadway (this is a consideration on all roads). • There is more land with the potential for development, particularly when comparing the current land uses along each road.
40. **Economics:** EY report identifies the limits of BCR analysis in transformational projects such as LGWM, going so far as to describe BCR and NPV as "potentially misleading for decision makers." Can you	The Economics Technical Report identifies that at the IBC phase, just relying on a BCR and net benefit values (not NPV as suggested in this question) has the potential to mislead decision-makers. This commentary is made within the context of the methodology for the entire IBC. The authors are referring to the value and wider understanding / context provided by the MCA in addition to those benefits and costs that are able to be monetised in cost benefit analysis.

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explain this comment further and explain why, given this limitation, significant weighting has been given to the BCR analysis in identifying a preferred option? (p261 of WCC agenda)	As the Economics Technical Report notes, at the IBC stage, programme options are still dependent on matters of considerable uncertainty requiring judgement about a wide range of benefits and costs which are difficult to measure accurately, and which are dependent on forecasting of behaviour by people over the next 40 years. The authors are cautioning against a sole reliance on the cost benefit analysis, noting that a more fulsome assessment adds value to our understanding at this comparatively early stage of analysis of a very complex programme. The preferred option analysis follows this advice. It has relied on both the cost benefit analysis AND the full MCA when making a recommendation on the preferred programme option.
41. **Economics:** EY report also discusses the risks of underestimating population growth for transformational projects such as LGWM and identifies the historical underestimation of population growth as a factor contributing to historical underinvestment in transformation infrastructure in NZ. Can you please explain how these risks apply more specifically to LGWM MRT/SHI?	Historically, Statistics NZ population projections have conservatively underestimated population growth. This is not a criticism of Statistics NZ's work, but a comment on the difficulty of forecasting population trends and the impacts of immigration policy. For transformational programmes like LGWM, the impact of under-forecasting population growth can be that high-cost, high-impact projects tend to rate poorly on value of money attributes / cost benefit analysis (costs appear certain and early, benefits appear less certain and late, reducing the BCR). In the DBC, we propose to undertake detailed sensitivity testing on population growth assumptions – both faster growth and slower growth – to identify the impact that these assumptions have on the realisation of quantified benefits. This includes work to identify how population growth may change once an announcement about MRT is made. International transport / urban economics literature identifies the potential for residents to change their home location following a commitment to investment in transformative transport infrastructure, like MRT. The DBC will seek to identify the effect this could have on the quantification of benefits in the BCR.
42. **MRT extendibility:** Why is extendibility to the north and east included as a necessary characteristic of an MRT system? Is this a goal within the scope of the project? This is mentioned as a key question for the DBC in 13.3 of PPOR and in 11.4.8 Desired MRT Characteristics	Future extendibility is not necessary, but does potentially offer an additional benefit. If all other considerations were equal, prudent planning would suggest that an option than can be extended should rate higher than one that is more difficult to do so. For this reason, DBC planning for the terminus at Wellington Railway Station will consider the physical design aspects needed to allow future extension.
43. **MRT extendability:** What is the viability of extending MRT to the west given that the report identifies significant challenges to delivering continuous bus priority to the west due to corridor constraints?	This has not been investigated because it is not within the scope of the MRT project. The LGWM City Streets team is investigating bus priority improvements in the western corridor.

Councillor question	LGWM response
44. **Modelling:** Which modelling scenario from the three set out in the modelling report was used for the PPOR?	The modelling report has been informed by two forecast land use scenarios – the "core" and "intensified" scenarios documented in the PPOR. Analysis has prioritised Options 1 and 4 (being the bookend scenarios), however targeted assessment has also been undertaken for Options 2 and 3 to understand the range of outcomes.
45. **Carbon:** Please explain the difference between the two graphs on carbon reductions found on pages 188 and 189 of WCC agenda. I'm struggling to see how they represent the same data set.	The graph on page 188 ("Carbon Emission Rates (CO2e) shows projections of total carbon produced in the Wellington region from transport sources out to 2075. For simplicity, the graph shows only the effects of light vehicles (i.e. no trucks over 3.5 tons) because LGWM programme options are not expected to affect heavy vehicle movements. The effect of the programme options can be seen by the increase in carbon produced by the programme options (orange and blue lines) caused by carbon used in materials (typically concrete and steel) and construction (fuel), and the significant difference in carbon subsequently produced by transport system users (i.e. the yellow dotted line shows the effect of less carbon intensive transport being used under the intensified land use scenario). The graph on page 189 (Cumulative Carbon Emissions (CO2e) – relative kilotons to DM – Wellington Region) uses the same data, but shows the difference between the Do Minimum (what we project will happen in the transport system without LGWM investment) and the LGWM Programme Options. This graph shows the information cumulatively across time. This graph makes the impact from the programme options easier to see.
46. **MCA:** Why does option 4 have lower benefits for walking and cycling compared to Option 1?	All options scored similarly for walking and cycling in the MCA due to the programme-wide benefits of Golden Mile and City Streets. However, there is a difference in the economic outcomes for walking and cycling because the modelling predicts less transfer of trips to walking and cycling under Option 4.
47. **MCA:** In the MCA Option 4 is scored as having a resilience of -1. How does this option make resilience worse than the status quo?	The existing situation by definition scores 0. If we do nothing over the next 20 years, resilience deteriorates, and the score drops to -2. All options improve resilience compared to doing nothing. Options 3 and 4 provide little improvement compared to the present day because the small improvements do not adequately offset the effects of increased population, climate change and deterioration of assets. Option 3 is slightly better because of grade separation at the Basin Reserve.
48. **PPOR:** 52) Heritage	Apologies, there was a typo in the table. The heritage score for the core land use scenario should be -4. This was correct in the PASLO report. However, the table is correct for the intensified land use scenario with a score of -5 as under this scenario the combination of intensification and the project will likely result in additional impacts on heritage areas. No other errors were found in the table.
49. **Funding**: How does this business case connect with Greater Wellington Regional Council's regional rail plan agreed to last week for $7B over 30 years? How is the affordability for the regions' residents being factored in?	The ultimate decision around affordability will be made by the funding partners on behalf of their stakeholders. There are a range of important decisions that will materially affect the cost impact of LGWM on regional ratepayers which makes any meaningful analysis difficult at this time. Material decisions yet to be made include: the Preferred Programme Option, cost sharing between GWRC and WCC, the funding policy of GWRC, and decisions about any non-rates funding tools to be used. LGWM will not be able to analyse overall affordability constraints for funding partners given LGWM is only one, albeit large, programme in each of the partners' many prioritise . LGWM will work closely with partner finance teams to ensure quality information about LGWM costs is available for wider affordability considerations at a city and regional level.

Councillor question	LGWM response
50. **Costs:** What budget years do the costs fall into? Clauses 197 and 198 seem to reference but they state the costs not the actual budget.	Paragraph 198 of the Council paper shows the expected cost for the Transformational Programme by financial year. This is in line with budget provided by LGWM for the 2022/23 Annual Plan. There is slight reduction in forecast cost in 2022/23 overall which is a timing change only.
51. **Urban Development:** can we estimate the number of dwellings required for the programme to achieve a BCR of 1?	Figure 9 in the PPOR attempts to provide an indication of where this would be, which is between 21,000 and 26,000. More detailed work will be undertaken in the detailed investigation (DBC phase) to better understand where this is likely to be.
52. **Tunnel:** What's the implication if we don't have dedicated public transport lanes? Will the project succeed?	The programme would be unlikely to move more people with fewer vehicles and would be unlikely to meet its objectives – particularly in relation to mode shift and carbon emissions.
53. **Sequencing**: What's the timeframe for deciding whether the tunnel is parallel or diagonal?	The form of the new tunnel will be considered and confirmed in the detailed investigation phase (DBC) – from late 2022 to late 2024.
54. **Tunnel:** who will own the new tunnel?	That will be considered in the detailed investigation phase (DBC).
55. **MRT:** Is BRT able to deliver the capacity we need (for intensive land use)?	It is unlikely that BRT would be able to handle the customer demand generated by the intensified land use scenario. However, BRT would have adequate capacity for lower levels of development.
56. **Urban development**: Has there been work done on areas of the stream that could potentially be daylighted?	Daylighting the stream has been considered only at a high level. There are a number of engineering difficulties that we will consider in more detail during the detailed investigation phase (DBC).

Chart as per question 31.